SUNGROW
Clean power for all

User Manual

Energy Management Controller

EMS300CP(Europe)



EMS300CP-UEN-Ver31-202610

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About This Manual

This manual introduces the system in overview, diagram, operation step and examples for you to understand and use this system flexibly and effectively.

The system is referred to as "EMS300CP" hereinafter unless otherwise specified.

Target Group

This manual is intended for:

- Operators
- Managers
- Engineers

How to Use This Manual

This manual is briefly described by using the standard interface as an example. For specific activated functions, refer to the content of the technical agreement or the contract.

Contents may be periodically updated or revised due to the product development. The manual content of subsequent versions of the product may be subject to change. The latest manual can be found at **support.sungrowpower.com** .

Symbols

Important instructions contained in this manual should be followed during installation, operation and maintenance of the product. They will be highlighted by the following symbols.

The symbols listed below may be used in this manual. Please read carefully to make better use of this manual.

⚠ DANGER

Indicates that there is a serious potential danger, which can lead to death or serious injury if not avoided.

⚠ WARNING

Indicates that there is a moderate potential danger, which may lead to death or serious injury if not avoided.

⚠ CAUTION

Indicates that there is a mild potential danger, which may lead to moderate or mild personal injury if not avoided.

NOTICE

Indicates that there is a potential risk, which may cause the equipment to fail to operate normally or cause property damage if not avoided.

Indicates additional information, emphasized contents or tips that may be helpful, e.g. to help you solve problems or save time.

Note

In order to provide customers with the best usage experience, the products and product manuals are always in the process of improvement and upgrade. If the manual received is slightly inconsistent with the product, it may be a result of product version upgrade, and the actual product shall prevail.

The diagrams in this manual are for reference only. The actual product received may differ.

How to Use This Manual

Read this manual carefully before performing operation on the device. Keep the manual in a convenient place for future reference.

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The content of the manual will be periodically updated or revised as per the product development. It is probably that there are changes in manuals for the subsequent module edition. If there any mismatch between the product and its manual, the actual product shall govern.

Contents

All Rights Reserved.....I
About This Manual.....II
How to Use This Manual.....IV
1 System Description.....1
1.1 Overview.....1
1.2 Requirements.....1
1.3 Port Introduction.....1
2 Initial Configuration.....4
2.1 Login.....4
2.1.1 Controller Login Steps.....4
2.1.2 ESS O&M Login.....5
2.2 Cybersecurity Mode Configuration.....5
2.3 Account Password Reset.....6
2.4 Setup Wizard.....6
2.5 System Time Synchronization.....7
2.6 Configure Controller IP Settings.....9
2.7 Configure RS485 Settings.....10
2.8 Add a Device.....11
2.8.1 Add Energy Storage Device.....11
2.8.1.1 Add a Single Energy Storage Device.....11
2.8.1.2 Batch Add Energy Storage Devices.....12
2.8.2 Add PV Device.....13
2.8.2.1 Add Data Logger.....13
2.8.2.2 Add Inverter.....19
2.8.3 Add Meter.....21
2.8.3.1 Add Meter of System-Defined Model.....21
2.8.3.2 Add Meter of Custom Model.....27
2.8.3.3 Check Meter.....31
2.8.4 Add Communication Device.....32
2.8.5 Add Charger.....33
2.8.6 Add LOGGER_UPPER Device.....35
2.8.7 Add Diesel Generator.....36
2.8.7.1 Add Diesel Generator of System-Defined Model.....37
2.8.7.2 Add Diesel Generator of Custom Model.....40

2.8.8 Add ATS....44
2.8.9 Check Device Status....46
2.9 Remote Maintenance....47
2.10 Maintenance Mode....48
3 Web Main Interface....50
4 Overview....51
4.1 General Information....51
4.2 Current Alarms....53
5 Device Monitoring and Maintenance....55
5.1 Device Monitoring....55
5.1.1 Energy Storage Unit View....55
5.1.2 Charger Unit View....56
5.1.3 PV Unit View....56
5.1.4 Diesel Generator Unit View....56
5.1.5 Other Device View....57
5.2 Device List....57
5.2.1 Edit Device....57
5.2.2 Delete Device....58
6 Parameter Maintenance....59
6.1 Configure Time-of-Use Periods for Meter....59
6.1.1 Configure Time-of-Use Period Templates for Meter....59
6.1.2 Configure Time-of-Use Period Strategies for Meter....62
6.2 Meter Time Synchronization....64
6.3 Configure Charger Parameters....64
6.4 Configure ATS Parameters....64
7 Device Start/Stop....66
7.1 Grid-Connected/Off-Grid Startup....66
8 Energy Management....69
8.1 Grid-connected active power....69
8.1.1 Self-Consumption....69
8.1.2 Time Plan....72
8.1.3 Time-of-Use Strategy....74
8.1.4 Forced Mode....75
8.1.5 VPP Dispatch....76
8.1.6 Remote Fixed Value....76
8.2 Grid-connected Reactive Power....78
8.2.1 Power Factor Control....78
8.2.2 Remote Fixed Value....80
8.2.3 Voltage Control....82

8.3 AI Mode 83
8.4 Off-Grid Operation 85
9 Power Control 93
9.1 Grid-Connected Power Control 93
9.2 DI Power Regulation 95
9.3 Overload Protection 96
9.4 Power Backup 100
9.5 SOC Protection 101
9.6 Anomaly Handling 106
10 History Data 109
10.1 Operation Log 109
10.2 History Curve 109
10.3 Fault Records 110
10.4 Dispatch Record 111
10.5 Syslog 111
11 System 113
11.1 Plant Parameters 113
11.2 Run Information 116
11.3 System Maintenance 117
11.3.1 System Update 117
11.3.2 Log Export 118
11.3.3 Reboot 118
11.3.4 One-Click Migration 118
11.3.5 Reset All Settings 119
11.3.6 Recording Export 119
11.3.7 Setup Wizard 119
11.3.8 Function Mode 121
11.3.9 Cybersecurity Mode Configuration 122
11.3.10 Certificate Management 122
11.3.11 Public Key Import 122
11.3.12 ATS250 Update 123
11.4 Remote Maintenance 123
11.5 Message Export 125
11.6 System Time 125
11.7 Forwarding Configuration 128
11.7.1 IEC104 Forwarding Service Configuration 128
11.7.2 Modbus Configuration 130
11.7.2.1 Server 130
11.7.2.2 RTU 131

11.7.3 Cloud Transmission Configuration..... 131
11.7.4 Dispatch Permission Management.....132
11.8 Port Parameter.....133
11.8.1 RS485..... 133
11.8.2 Ethernet.....134
11.8.2.1 Configure Controller IP Settings..... 134
11.8.2.2 Configure Energy Storage Device IP Settings.....135
11.8.3 DI.....136
11.8.4 DO.....137
11.9 Communication Settings.....138
12 Firmware Version..... 139
13 User Management..... 140
13.1 User Roles and Permissions..... 140
13.2 Default Accounts and Passwords.....141
13.3 Create O&M User Accounts..... 141
13.4 Deleting O&M User.....142
13.5 Account Password Reset.....142
13.5.1 Account Password Reset by Administrator..... 142
13.5.2 Reset Administrator Account Password.....143
13.5.3 Account Password Reset by Pressing RST Button.....143
13.5.4 iSolarCloud Account Password Reset..... 144
13.6 Account Protection and Session Security Settings.....144
13.7 O&M Mode.....145
13.8 Configure LDAP Server..... 145
13.9 Password Length Setting.....147
13.10 Set Forced Password Change in Non-Security Mode..... 147
14 Port Matrix.....148
15 Appendix.....151
15.1 Quality Assurance.....151
15.2 Contact Information..... 152

1 System Description

1.1 Overview

EMS300CP is a Web-based local energy management system (EMS) controller. With a dedicated monitoring software system, it helps to address problems arising from the waste of surplus solar and wind power, unstable loads, and fluctuations in energy prices during peak and off-peak hours. Through optimized energy storage control, distributed power output, and load on/off control, the system enables efficient and cost-effective energy control across diverse application scenarios and operation modes, thus balancing energy supply and demand efficiently.

> When the system operates stably as per a preset strategy, it is recommended to exercise prudence when adjusting the controller parameters to avoid impacts on the strategy execution.

1.2 Requirements

Item	Requirements
Browser	Chrome 65 or above; 100% zoom
Display	Resolution 1920 x 1080; 100% scale

1.3 Port Introduction

The layout and identifiers of EMS300CP terminals are shown below:



Identifier	Name	Recommended Cable	Description
ETH1–ETH2	Ethernet port	-	Can be connected to the backend through devices such as switches and routers for data exchange

Identifier	Name	Recommended Cable	Description
ETH3–ETH4	Fast dispatch port	-	Reserved, currently unavailable
ETH5	Ethernet port	-	Reserved for the master-standby feature
DI1–DI16	Digital input	0.75 mm^2 outdoor anti-ultraviolet wire	An interface for receiving binary signals (0 or 1), used to obtain the status of external dry contact switches
USB	USB port	-	Reserved, currently unavailable
Micro SD	SD port	-	Used for software flashing (this port is only available for Sungrow technicians)
Debug	Serial port for debugging	-	Used for debugging of EMS300CP
RST	Reset port	-	Press and hold (> 30s) to restart EMS300CP and restore factory settings Short press (< 3 s) to reset the O&M and administrator account passwords
DO1–DO4	Digital output	0.75 mm^2 outdoor anti-ultraviolet wire	Passive dry contact (used for only signal output, without providing power) Port status: 1 = Normally open (NO), 2 = Normally closed (NC), and 3 = Common (COM). The dry contact switch is controlled by an internal relay, with external specifications of 250 Vac / 3 A and 30 Vdc / 3 A
PT1 and PT2 AI1–AI4	Analog input	0.75 mm^2 outdoor anti-ultraviolet wire	• PT100/PT1000 detection range: -30°C to 120°C • Two-wire or three-wire connection method

Identifier	Name	Recommended Cable	Description
			• AI1: 0–10 Vdc • AI2–AI4: 4–20 mA
A1B1–A7B7	RS485 communication port	2 × (0.75 to 1.5) mm^2 outdoor anti-ultraviolet twisted pair with a shielding layer	Provide 7 positions for RS485 wiring Can be connected to slave devices and background
IRIG-B	Inter-Range Instrumentation Group Time Code Format B port	-	Reserved, currently unavailable
CAN	CAN communication port	-	Reserved, currently unavailable
DC IN 24 V, 1.25 A	DC 24 V power supply port	1-1.5 mm^2 outdoor anti-ultraviolet wire	Current ≤ 1.25 A. The switch-mode power supply (SMPS) used for this port requires reinforced insulation.
AC IN 100–277 V, 0.48 A	AC power supply port	1-1.5 mm^2 outdoor anti-ultraviolet wire	Used for connecting 100-277 Vac (50/60 Hz), current ≤ 0.48 A
⏚	Grounding point	1-1.5 mm^2 outdoor anti-ultraviolet wire	Used for connecting protective grounding cable

AC Power Supply Port

High voltages may be present on the AC power supply port (**AC IN 100-277 V, 0.48 A**) of the EMS. Therefore, before cable connection, ensure that the ports are free of voltage and the grounding cable is reliably connected.

DI/DO Ports

The DI ports (DI1–DI16) and DO ports (DO1–DO4) are used to collect contact data and control contact communication.

RS485 Communication Port

The RS485 communication ports (A1B1–A7B7) support a maximum communication distance of 1000 m.

2 Initial Configuration

2.1 Login

2.1.1 Controller Login Steps

Prerequisite

A PC is connected to the EMS300CP via an Ethernet cable, and the EMS300CP is powered on.

Step 1 The IP address configured on the PC must be on the same subnet as the EMS300CP. For example, the default IP address of the controller's ETH5 port is 13.13.13.13. Configure the PC IP address as 13.13.13.X (X cannot be 13) with a subnet mask of 255.0.0.0.

> When EMS300CP is used as the controller for ST200CS (switch box version), refer to 2.1.2 ESS O&M Login for login.

Step 2 Open a browser on the PC and visit the IP address 13.13.13.13 to access the EMS300CP Web interface.

Step 3 Click  and select the desired language in the upper right corner of the page.

Step 4 Click **Login** and choose either of the following methods: **Regular login** or **LDAP login**. After entering the username and password, click **Confirm** to enter the Web interface.

- For **Regular login**, the O&M user's username is "maintain", and the password is "pw1111". Upon first login, the system requires a password change. The password must be longer than the minimum digit length in length and contain at least three of the following four character types: uppercase letters, lowercase letters, numbers, and special characters.
- For **LDAP login**, you need to configure LDAP settings in advance, and then log in using the username and password saved in the LDAP server. For LDAP configuration instructions, please see 13.8 Configure LDAP Server.

> - This manual describes Web operations using the O&M user account as an example.
> - O&M users can view the basic system information, real-time faults, and device monitoring data, as well as configure and modify the control strategy and parameter settings.

--End

2.1.2 ESS O&M Login

When EMS300CP is used as the controller for ST200CS (switch box version), refer to this section for login.

Prerequisite

Ensure the EMS300CP is powered on.

Step 1 Set the PC IP address to 15.15.15.X (e.g., 15.15.15.100).

Step 2 Connect the PC's network port to the energy storage switch box's Ethernet switch port using a network cable.

Step 3 Open a browser on the PC and visit the IP address: 15.15.15.15 to access the EMS300CP Web interface.

Step 4 Click **Login** and choose either of the following methods: **Regular login** or **LDAP login**. After entering the username and password, click **Confirm** to enter the Web interface.

- For **Regular login**, the O&M user's username is "maintain", and the password is "pw1111". Upon first login, the system requires a password change. The password must be longer than the minimum digit length in length and contain at least three of the following four character types: uppercase letters, lowercase letters, numbers, and special characters.
- For **LDAP login**, you need to configure LDAP settings in advance, and then log in using the username and password saved in the LDAP server. For LDAP configuration instructions, please see 13.8 Configure LDAP Server.

> - This manual describes Web operations using the O&M user account as an example.
> - O&M users can view the basic system information, real-time faults, and device monitoring data, as well as configure and modify the control strategy and parameter settings.

--End

2.2 Cybersecurity Mode Configuration

After the first login, cybersecurity mode configuration is required.

Step 1 Determine whether to enable the cybersecurity mode in the pop-up window.

> Disabling cybersecurity mode will weaken the network security protection for the device.

Step 2 Click **Confirm**. The change will be applied after restart.

Step 3 After the system restarts, log in again.

--End

To modify, go to 11.3.9 Cybersecurity Mode Configuration.

2.3 Account Password Reset

Upon first login, change your password.

Step 1 Enter the old password and new password, and confirm the new password.

New password requirements:

- Passwords should contain at least three of the following four character types: uppercase letters, lowercase letters, numbers, and special characters.
- The password length should be no less than the minimum number set by the administrator, and not exceed 32 digits.

Step 2 Click **Confirm**.

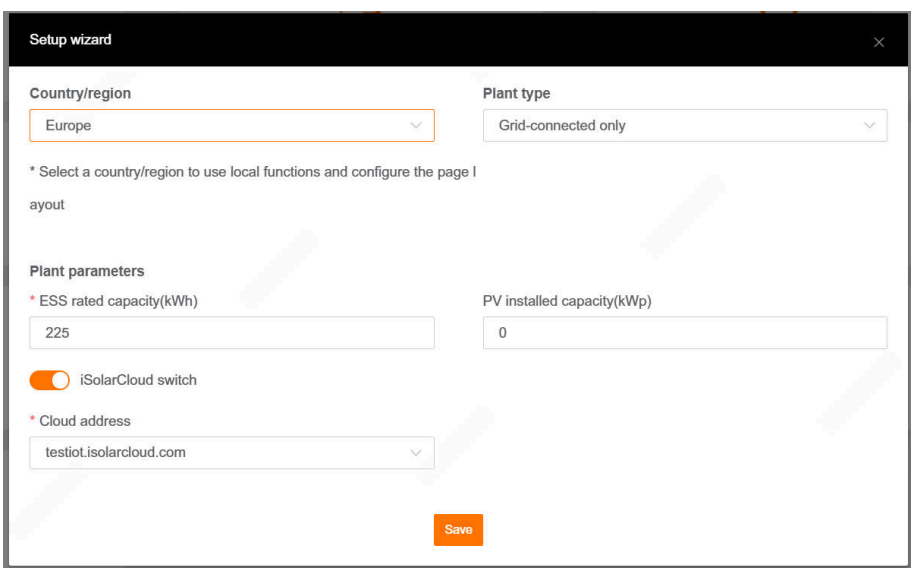
--End

To change the password, click **maintain** > **Change password**.

2.4 Setup Wizard

The default **Country/region** is China. Set this parameter according to actual conditions.

Step 1 Select the country/region where the plant is located. Options include: **China**, **Europe**, **Australia**, **Japan**, **Southeast Asia**, **Middle East and Africa** and **Others**. Then, the system will display region-specific features on the interface accordingly.



If **Japan** is selected in **Country/region**, you need to select a scenario. Options include: **HV/UHV scenario** and **C&I scenario**.

- In HV/UHV scenarios, only energy storage devices and grid devices are displayed in the plant overview diagram.
- In C&I scenarios, devices such as loads, energy storage devices, and diesel generators are displayed in the plant overview diagram.

Step 2 Set the **Plant type**, which defines the current operating scenario of the plant. Options include **Grid-connected only**, **Off-grid only**, and **Grid-connected/off-grid**. This setting directly affects the display of grid-related information in the power flow diagram.

- **Grid-connected only**(default): The power flow diagram shows the grid as online and displays the corresponding parameters.
- **Off-grid only**: The power flow diagram does not display grid status or related information.
- **Grid-connected/off-grid** : The power flow diagram dynamically displays the grid as online or offline based on the plant's actual grid-connected or off-grid status.

Step 3 Set **Plant parameters**.

- **ESS rated capacity**: Enter the actual rated energy storage capacity of the plant.
- **PV installed capacity**: Enter the actual PV installed capacity of the plant.

Step 4 To upload data to iSolarCloud, turn on the **iSolarCloud switch** and select the **Cloud address** corresponding to the selected **Country/region**.

Country/region	Cloud address
China	Chinese server
Australia	Australian server
Europe	European server
Japan, Southeast Asia, Middle East and Africa, and Others	International server

If the remote maintenance function is enabled, the configured server must match its cloud address. Modifying the cloud address will cause the existing remote maintenance link to become invalid.

Step 5 Click **Save** to save the settings.

--End

To modify later, go to11.3.7 Setup Wizard.

2.5 System Time Synchronization

After the first login, system time synchronization is required.

Step 1 Click the drop-down list of **Clock Source** and select **User define**, **NTP**, or **iSolarCloud**. It is recommended to select **User define** during commissioning.

Clock Source	Description
User define	The current system time and time zone can be set in the following two ways: • Select **Use local system time** to synchronize the controller time with the PC time. • Select a time zone from the **Time zone** drop-down list. Manually set the controller time in the **Date** and **Time** fields. It is recommended to select **User define** during commissioning.
NTP (Network Time Protocol)	Synchronize the controller time with the computer system time. • Select a time zone from the **Time zone** drop-down list. • **Primary site address type**: Set the address type of the primary synchronization server site. Options include **IP** and **Domain**. • **Primary server site**: Based on the option selected in **Primary site address type**, set the IP address or domain name of the primary synchronization server. • **Standby site address type**: Set the address type of the standby synchronization server site. Options include **IP** and **Domain**. • **Standby server site**: Based on the option selected in **Standby site address type**, set the IP address or domain name of the standby synchronization server. • Set **Time interval (min)**, which is the interval for NTP synchronization. The value range is [1, 144], with a default value of 5.
iSolarCloud	Synchronize the controller time with the iSolarCloud time.
B code	When the controller communicates with the backend using the IRIG-B time synchronization protocol, B-code time synchronization takes effect. You need to set the corresponding interval in the **Synchronization interval** field. The value range is [1, 144], with a default value of 5.
NTS (Network Time Security)	A security extension to the NTP protocol that provides cryptographic protection for NTP client-server communication. You need to configure the **NTS time sync**

Clock Source	Description
	active server certificate and **NTS time sync standby server certificate** settings. • Select a time zone from the **Time zone** drop-down list. • **Primary site address type**: Set the address type of the primary synchronization server site. Options include **IP** and **Domain**. • **Primary server site**: Based on the option selected in **Primary site address type**, set the IP address or domain name of the primary synchronization server. • **Standby site address type**: Set the address type of the standby synchronization server site. Options include **IP** and **Domain**. • **Standby server site**: Based on the option selected in **Standby site address type**, set the IP address or domain name of the standby synchronization server. • Set **Time interval (min)**, which is the interval for NTP synchronization. The value range is [1, 144], with a default value of 5.

Step 2 Click **Save**.

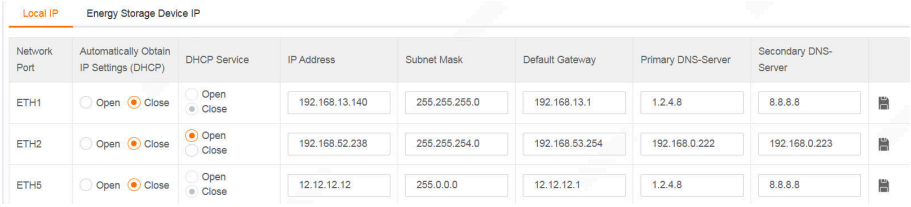
--End

To modify later, go to **System > System time**.

2.6 Configure Controller IP Settings

Configure the IP address of each EMS300CP network port according to the on-site network plan.

Step 1 In the navigation bar, select **System** > **Port parameter** > **Local IP**.



Step 2 Set the IP address for each network port. After completing the settings, click on the right side to save the settings.

- Automatic IP assignment If you enable **Automatically obtain IP settings (DHCP)** for a port, the local area network (LAN) will assign an IP address to the port.
- If Automatically obtain IP settings (DHCP) is disabled, manually enter the parameters such as IP address, subnet mask, and gateway address.

- After modifying the system login port IP and saving, the system access address will be updated accordingly.
- The modification can only be saved successfully when the system is shut down.

Step 3 (Optional) Configure the DHCP service.

a. To perform one-click access, the DHCP service must be enabled. Based on the connection status of the LC, select the corresponding network port and enable its DHCP service. For example, if the LC is connected to the ETH2 port of the controller, only the DHCP service for ETH2 needs to be enabled.

b. Click  on the right side to save the settings.

c. To perform one-click access for energy storage devices, configure energy storage device IP settings by referring to 11.8.2.2 Configure Energy Storage Device IP Settings.

--End

2.7 Configure RS485 Settings

When a device is connected to EMS300CP via RS485, configure the communication parameters for the corresponding port.

Prerequisite

Ensure you know the physical port number to which the device is connected.

Step 1 Click **System** > **Port parameter** > **RS485** to configure **RS485** settings.

Step 2 Click  in the **Operation** column to configure the port function, baud rate, parity bit, and stop bit. The parameters are explained as follows.

Parameter	Description
Serial port	COM1–COM7, cannot be changed.
Port function	• Acquisition • Forwarding to backend
Baud rate	The default value is 9600. Configure according to the actual device.
Parity bit	Configure according to the actual device.
Stop bit	Configure according to the actual device.

The controller serial port's **Baud rate**, **Parity bit**, and **Stop bit** must be consistent with the configuration of the connected device; otherwise, normal communication cannot be established.

--End

2.8 Add a Device

The current system does not support dual-network access mode.

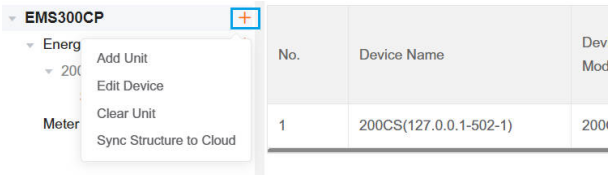
2.8.1 Add Energy Storage Device

Use this function to connect energy storage devices such as LCs or commercial and industrial liquid-cooled energy storage systems to the plant. Only Sungrow energy storage devices can be added.

2.8.1.1 Add a Single Energy Storage Device

Step 1 Click **Device maintenance** > **Device list**.

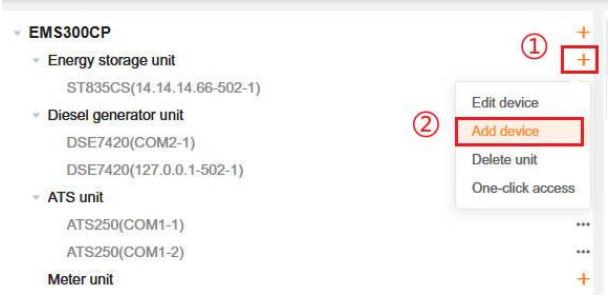
Step 2 Click + on the right side of plant-level root node EMS300CP.



Step 3 Select **Add unit**. In the pop-up window, select **Energy storage unit** from the **Unit type** drop-down list.

Step 4 Click **Confirm**.

Step 5 Click + on the right side of the energy storage unit and select **Add device**.



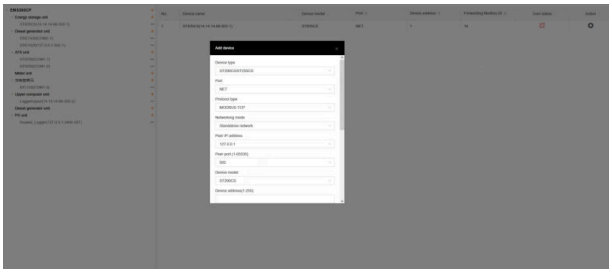
Step 6 In the **Add device** window, select a device type from the **Device type** drop-down list.

Step 7 Select a port. If the NET port is selected, configure the following parameters:

Parameter	Description
Protocol type	MODBUS-TCP by default.

Parameter	Description
SSL encryption	This parameter defaults to **Disable** and can be set to **Enable**. When it is set to **Enable**, **Certificate file** must be selected. For **Certificate file** management, please refer to 11.3.10 Certificate Management. • This parameter is displayed when **Cybersecurity mode configuration** is enabled. • Ensure that the device to be connected is switched to security mode, and that the actual port settings are consistent with those of the peer port in Networking mode.
Networking mode	Select **Standalone network**, and set the following parameters according to the actual networking situation. • Peer IP: The IP address of the LC. • Peer port: the port of the LC.
Device model	Select the model of the device to be connected.
Device address	The value must be an integer in the range of 1–255.
Sub-device quantity	Default: 0. Enter the actual number of sub-devices.

Take ST255CS as an example.



Step 8 Click **Save** to save the settings.

--End

2.8.1.2 Batch Add Energy Storage Devices

Prerequisite

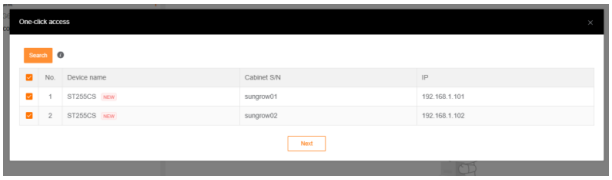
The one-click access function is only applicable to ST200CS, ST835CS, and ST255CS. Before performing one-click access, complete the following operations. In the example below, the ETH2 port of the EMS is connected to the ETH1 port of the LC. Configure the settings accordingly based on the actual connection.

1. The ETH1 port of the LC is **Enabled** by default in the system. No manual enabling is required. To check the enabling status of the ETH1 port of the LC, log in to the LC Web, choose **Settings** > **Communication parameters**, and check whether ETH1 in the Auto access configuration section is set to **Enable**.
2. On the EMS Web, choose **System** > **Port parameter** > **Ethernet** and enable the **DHCP service** for ETH2.
3. On the EMS Web, choose **System** > **Ethernet**, click the **Energy storage device IP** tab, and set the Beginning address and Ending address. The system will assign IP addresses to the energy storage devices within this subnet.

Step 1 Refer to steps 1 to 4 in 2.8.1.1 Add a Single Energy Storage Device to complete the creation of an energy storage unit.

Step 2 Click + on the right side of the energy storage unit and select **One-click access**.

Step 3 Click **Search**. The found devices will be displayed on the page. Select the devices to be added and click **Next**.



Step 4 Click **Complete**. The "Operation successful" message will appear on the page, indicating that the devices have been successfully added.

--End

2.8.2 Add PV Device

Use this function to connect PV devices such as Data Logger and inverters to the plant.

2.8.2.1 Add Data Logger

The system supports adding data loggers of system-defined models and custom models.

2.8.2.1.1 Add Data Logger of System-Defined Model

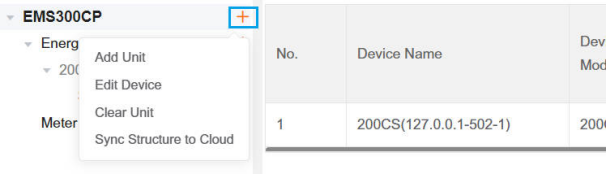
This function can be used to connect a data logger to the plant. Supported devices include Sungrow Logger1000 and Logger4000, as well as third-party data loggers of system-defined models.

Prerequisite

Ensure you know the protocol type, networking mode, and model information of the data logger to be connected.

Step 1 Choose **Device maintenance** > **Device list**.

Step 2 Click + on the right side of plant-level root node EMS300CP.



Step 3 Select **Add unit**. In the pop-up window, select **PV unit** from the **Unit type** drop-down list.

Step 4 Click + on the right side of the PV unit and select **Add device**.



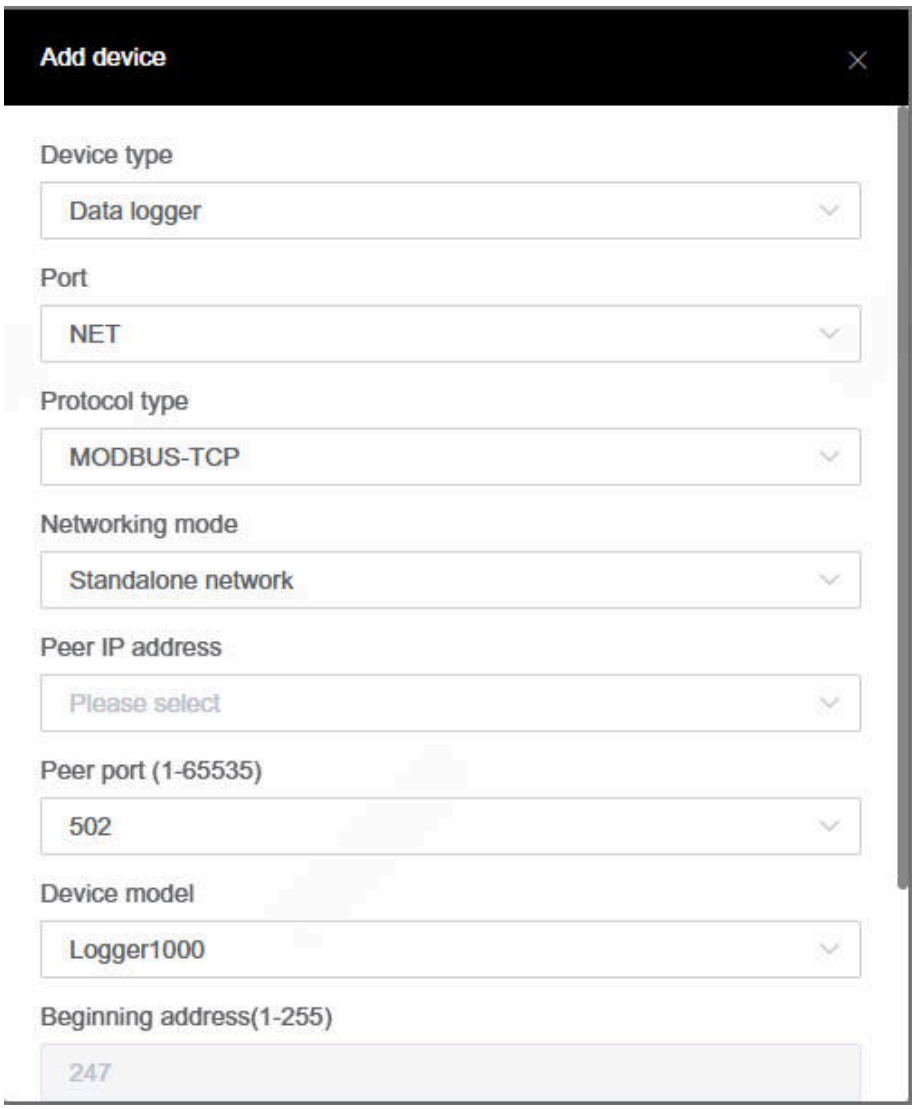
Step 5 In the **Add device** window, select **Data logger** from the **Device type** drop-down list.

Step 6 Select a port. The default fault is **NET**. Configure the following parameters according to actual conditions:

Parameter	Description
Protocol type	IEC104 by default. Can be switched to MODBUS-TCP.
SSL encryption	This parameter defaults to **Disable** and can be set to **Enable**. When it is enabled, **Certificate file** must be selected. For **Certificate file** management, please refer to 11.3.10 Certificate Management. • This parameter is available when **Cybersecurity mode configuration** is enabled and the **Protocol type** is set to **MODBUS-TCP**. • Ensure that the device to be connected is switched to safe mode, and that the actual port settings are consistent with those of the peer port in Networking mode.

Parameter	Description
Networking mode	Select **Standalone network**, and set the following parameters according to the actual networking situation: • **Peer IP**: The IP address of the data logger. • **Peer port**: The port of the data logger.
Device model	The model of the data logger.

Take Logger1000 as an example.



Step 7 Click **Save** to save the settings.

Step 8 (Optional) Configure remote control for the Logger1000.

To perform remote active power regulation for the Logger1000, log in to the Logger1000 Web. On the **Active power** page, set the **Active control mode** to **Remote power control**, and set the **Control method** to **Open-loop control**. For details, refer to **Power control** > **Settings for Active Power Control** > **Remotely Regulating Active Power** > **Open-loop control** in *Logger1000 User Manual*.

Step 9 (Optional) Configure northbound communication interruption protection for Logger1000.

If communication between the PV system and the Logger1000 is interrupted, the PV system should immediately switch to zero power output mode to prevent power export risks caused by uncontrolled PV output.

Log in to the Logger1000 Web and choose **System** > **Forwarding configuration** > **MODBUS** to set **Communication interruption protection**. Set the **Protection switch** to **Enable**, set the **Peer IP** to the EMS's IP address, and adjust the **Port** according to actual conditions. For details, refer to **Configuring Data Communication and Transfer Protocols > Setting Modbus Parameters > Setting Communication Interruption Protection** in *Logger1000 User Manual*.

--End

2.8.2.1.2 Add Data Logger of Custom Model

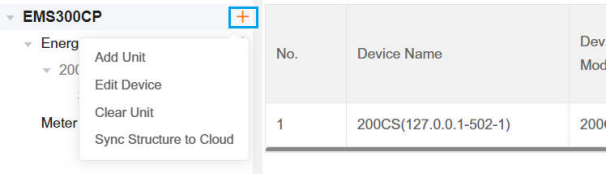
You can use a custom template to add a data logger of a model that is not preconfigured in the system.

Prerequisite

Ensure you know the protocol type, networking mode, and model information of the data logger to be connected.

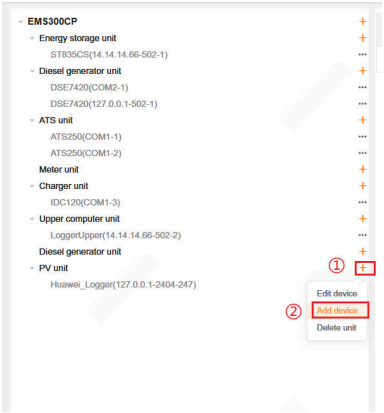
Step 1 Choose **Device maintenance** > **Device list**.

Step 2 Click + on the right side of plant-level root node EMS300CP.



Step 3 Select **Add unit**. In the pop-up window, select **PV unit** from the **Unit type** drop-down list.

Step 4 Click + on the right side of the PV unit and select **Add device**.



Step 5 In the **Add device** window, select **Data logger** from the **Device type** drop-down list.

Step 6 Select a port. The default fault is **NET**. Configure the following parameters according to actual conditions:

Parameter	Description
Protocol type	Select **MODBUS-TCP**.
SSL encryption	This parameter defaults to **Disable** and can be set to **Enable**. When it is enabled, **Certificate file** must be selected. For **Certificate file** management, please refer to 11.3.10 Certificate Management. • This parameter is available when **Cybersecurity mode configuration** is enabled. • Ensure that the device to be connected is switched to safe mode, and that the actual port settings are consistent with those of the peer port in Networking mode.
Networking mode	Select **Standalone network**, and set the following parameters according to the actual networking situation: • **Peer IP**: The IP address of the data logger. • **Peer port**: The port of the data logger.

Step 7 Select **General_Logger** from the **Device model** drop-down list.

Step 8 Select the **Submodel**. If the third-party data logger uses a specific submodel, select the corresponding one.

Step 9 After selecting the **Custom Configuration method**, click **Next**. The **Configure measuring point** window pops up.

a. Configure device parameters.

Parameter	Description
Start address	Default value: 1. Valid range: [1, 255]. Set this parameter according to actual conditions.
Quantity of devices	Default value: 1. Valid range: [1, 30]. Enter the actual number of devices.
Rated active power	Default value: 0. Set this parameter according to the rated active power of the actual device. If the data logger does not support forwarding the rated active power, this value will be used.
Startup	Default value: 170. Set the decimal value corresponding to the startup command according to the communication protocol.
Shutdown	Default value: 85. Set the decimal value corresponding to the shutdown command according to the communication protocol.

b. Set the associated measuring point information. Click **Readback** to retrieve the current collected values of the measuring points.

Parameter	Description
Register address	Configure the actual address of the corresponding device measuring point. Valid range: [0, 65535].
Register type	Specify the register function. It is recommended to use the default type: • 0x4: Input register. • 0x3: Holding register.
Data type	Set this parameter according to the data format of the device measuring point.
Read type	Select the method of reading.
Coefficient	Scaling factor for the raw data. Valid range: [0.000001, 1000000].
Byte order	Specify the data byte sequence, which must be consistent with that in the communication protocol.

Parameter	Description
Function code	• 0x04: - For an input register measuring point, when the function code is set to 0x04, the data collected for this measuring point takes effect. - For a holding register measuring point, when the function code is set to 0x04, the setting for this measuring point does not take effect. • 0x06: Set a single register. • 0x10: Set multiple registers. • 0x06/0x10: Set a single or multiple registers.

c. Click **Save template** in the upper right corner to save the current measuring point configuration as a template, then click to export the template to the local device. You can click to import a local template into the system.

d. Then, click **Confirm** at the bottom of the page.

--End

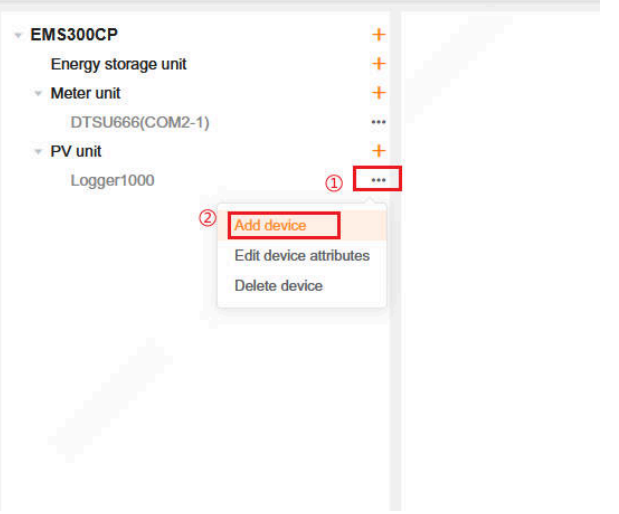
2.8.2.2 Add Inverter

This function is used to connect an inverter to the plant.

Prerequisite

Ensure you know the model and port information of the inverter before proceeding.

Step 1 Click on the right side of the data logger and select **Add device**.



Only Sungrow data loggers support the configuration of subordinate inverters.

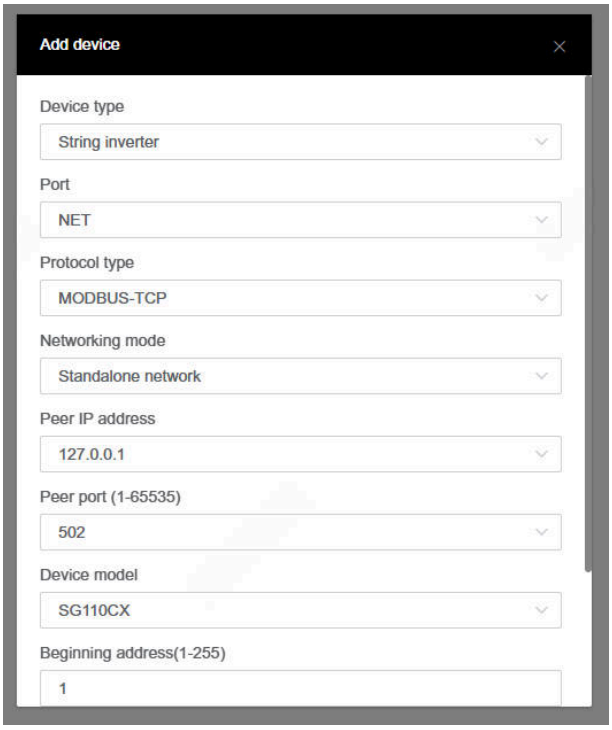
Step 2 In the **Add device** window, select **String inverter** from the **Device type** drop-down list.



Step 3 If **NET** is selected from the **Port** drop-down list, configure the following parameters:

Parameter	Description
Protocol type	MODBUS-TCP by default.
SSL encryption	**Disable** by default. No configuration required for this device. This parameter is available when **Cybersecurity mode configuration** is enabled.
Networking mode	Select **Standalone network**, and set the following parameters according to the actual networking situation: • Peer IP: The IP address of the data logger. • Peer port: The port of the data logger.
Device model	Select the model of the string inverter to be connected.
Start address	Default value: 1. The value must be an integer in the range of 1–255. Configure it according to the forwarding address value on the Web of the data logger.
Quantity of devices	Enter the actual number of devices. Default value: 1. The value must be an integer in the range of 1–80.

Take SG110CX as an example.



Step 4 Click **Save** to save the settings.

--End

2.8.3 Add Meter

The system allows you to add multiple meters of different models, including system-defined models and custom models.

2.8.3.1 Add Meter of System-Defined Model

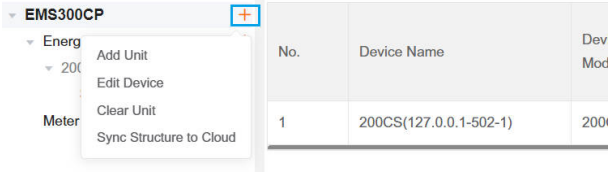
Use this function to connect meters to the plant.

Prerequisite

You have understood the type, access type, and port information of the meter to be connected.

Step 1 Choose **Device maintenance** > **Device list**.

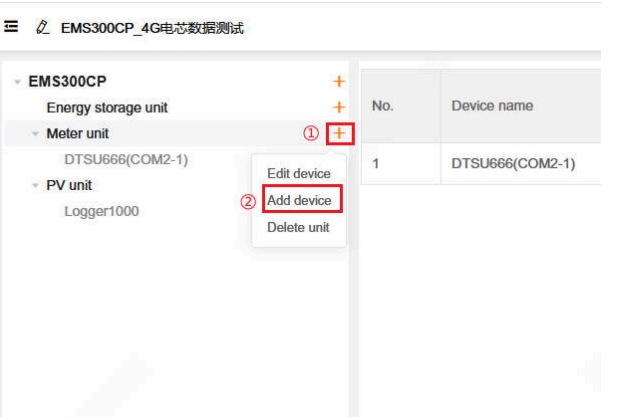
Step 2 Click + to the right of plant-level root node **EMS300CP**.



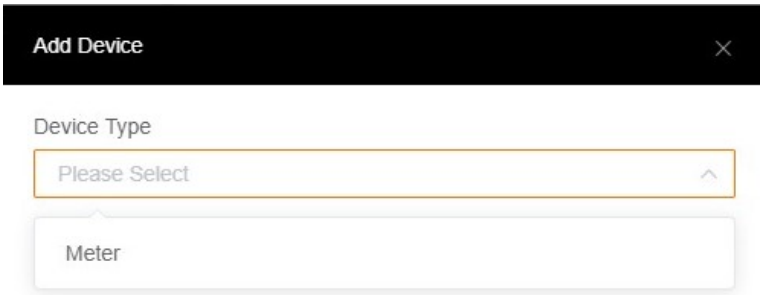
Step 3 Select **Add unit**. In the pop-up window, select **Meter unit** from the **Unit type** drop-down list.

Step 4 Click **Confirm**.

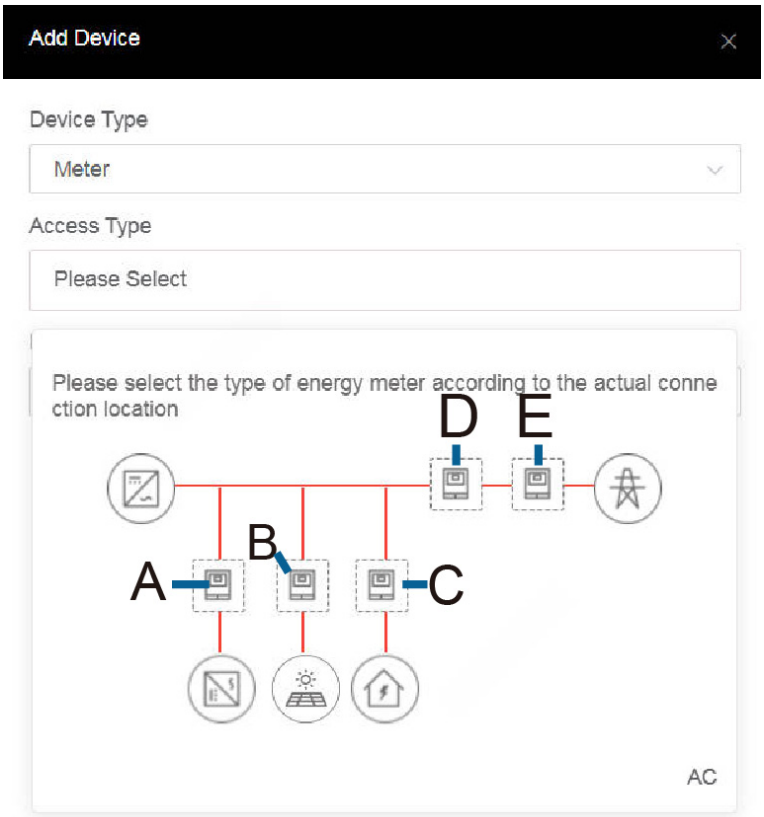
Step 5 Click + to the right of the meter unit and select **Add device**.



Step 6 In the **Add device** window, select **Meter** from the **Device type** drop-down list.



Step 7 In **Access type**, select the type of meter according to the actual connection position. Options include **ESS electricity meter**, **PV electricity meter**, **Load electricity meter**, **Overload monitoring meter**, and **PoC meter**.



Position	Type	Description	Quantity Limit
A	ESS electricity meter	Obtain energy metering values from the ESS side.	≤ 25
B	PV electricity meter	Obtain energy metering values from the inverter side.	≤ 20
C	Load electricity meter	Obtain energy metering values from the load side.	≤ 40
D	Overload monitoring meter	Obtain energy metering values from the main transformer and block overload in real time to protect grid equipment.	≤ 10
E	PoC meter	Obtain energy metering values at the grid connection point.	≤ 4

Step 8 Select the port for meter connection from the **Port** drop-down list.

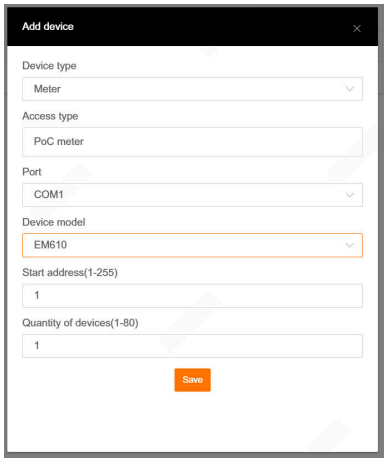
- If the port selected is **COM**, configure the following parameters:

Parameter	Description
Device model	Select the model of the meter.
Start address	Default value: **1**. The value must be an integer in the range of 1–255.
Quantity of devices	Enter the actual number of devices. Default value: **1**. The value must be an integer in the range of 1–80. The maximum number of devices that can be configured varies based on the selected **Access type**.

- If the port selected is **NET**, configure the following parameters:

Parameter	Description
Protocol type	Default value: **MODBUS-TCP**.
SSL encryption	Default value: **Disable**. No configuration is required for this device. This parameter is available when **Cybersecurity mode configuration** is enabled.
Networking mode	Select **Standalone network**, and set the following parameters according to the actual networking situation: - **Peer IP address**: The IP address of the meter that is connected. - **Peer port**: The port of the meter that is connected.
Device model	Select the model of the meter.
Start address	Default value: **1**. The value must be an integer in the range of 1–255.
Quantity of devices	Enter the actual number of devices. Default value: **1**. The value must be an integer in the range of 1–80. The maximum number of devices that can be configured varies based on the selected **Access type**.

Take EM610 as an example.



Step 9 Click **Save**. If the information of the meter appears in the device list on the right, the meter has been successfully added.

Step 10 (Optional) Click in the **Action** column to edit the meter information. The parameter descriptions are as follows. Click **Save** to save the settings.

Parameter	Description
Port	Shows the port type of the meter. Non-editable.
Device name	Specify the name for the meter.
Instruction interval (4–5000) ms	Set the interval for command collection. **18** by default.
Timeout duration (100–5000) ms	Set the communication timeout duration. **1000** by default.
Retry attempts (1–10)	Set the number of retries allowed after a communication timeout. **5** by default.
PT ratio	Set the PT ratio. **1.000** by default.
CT ratio	Set the CT ratio. **1.000** by default.
Meter reverse polarity	If enabled, the reading value will be reversed when the meter is connected in reverse.
Access type	Set the access type of the meter. Options include: • **Load electricity meter** • **PoC meter** • **Overload monitoring meter** • **ESS electricity meter** • **PV electricity meter**

Parameter	Description
Connected to ESS or not	• **Yes**: Connected to energy storage devices. • **No**: Not connected to energy storage devices. This parameter is available only when the **Access type** is set to **Overload monitoring meter**.
Meter purpose	Set the access type of the meter. Options include: • **Same as access type**: The default option, indicating that the meter's purpose is consistent with its access type. This option can only be selected alone and cannot be selected simultaneously with other purposes. • **Monitoring only**: Indicates that the meter data is used for viewing only. This option can only be selected alone and cannot be selected simultaneously with other purposes. • **PoC meter**: Indicates that the meter is used as a PoC meter. It can be simultaneously selected with **Overload monitoring meter**, **Primary frequency regulation**, **Dynamic demand threshold**, **Load electricity meter**, **PV electricity meter**, **ESS electricity meter**, and **Diesel generator meter**. • **Overload monitoring meter**: Indicates that the meter is used as an overload monitoring meter. It can be simultaneously selected with **PoC meter**, **Primary frequency regulation**, **Dynamic demand threshold**, **Load electricity meter**, **PV electricity meter**, **ESS electricity meter**, and **Diesel generator meter**. • **Primary frequency regulation**: It can be simultaneously selected with **PoC meter**, **Overload monitoring meter**, **Dynamic demand threshold**, **Load electricity meter**, **PV electricity meter**, **ESS electricity meter**, and **Diesel generator meter**. Only one meter in the system can be configured with this purpose. • **Dynamic demand threshold**: It can be simultaneously selected with **PoC meter**, **Overload monitoring meter**, **Primary frequency regulation**, **Load electricity meter**, **PV electricity meter**, **ESS electricity meter**, and **Diesel generator meter**.

Parameter	Description
	• **Load electricity meter**: It can be simultaneously selected with **PoC meter**, **Overload monitoring meter**, **Primary frequency regulation**, **Dynamic demand threshold**, and **Diesel generator meter**. • **PV electricity meter**: It can be simultaneously selected with **PoC meter**, **Overload monitoring meter**, **Primary frequency regulation**, **Dynamic demand threshold**, and **Diesel generator meter**. • **ESS electricity meter**: It can be simultaneously selected with **PoC meter**, **Overload monitoring meter**, **Primary frequency regulation**, **Dynamic demand threshold**, and **Diesel generator meter**. • **Diesel generator meter**: It can be simultaneously selected with **PoC meter**, **Primary frequency regulation**, **Overload monitoring meter**, **Dynamic demand threshold**, **Load electricity meter**, **PV electricity meter**, and **ESS electricity meter**. The **Meter purpose** can only be changed when the device is offline.

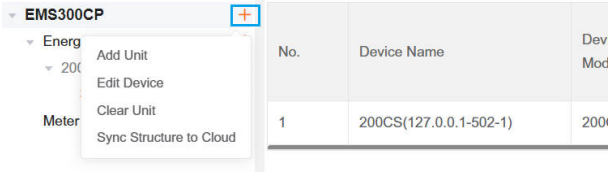
--End

2.8.3.2 Add Meter of Custom Model

You can use a custom template to add a meter of a model that is not preconfigured in the system.

Step 1 Choose **Device maintenance** > **Device list**.

Step 2 Click + to the right of plant-level root node **EMS300CP**.



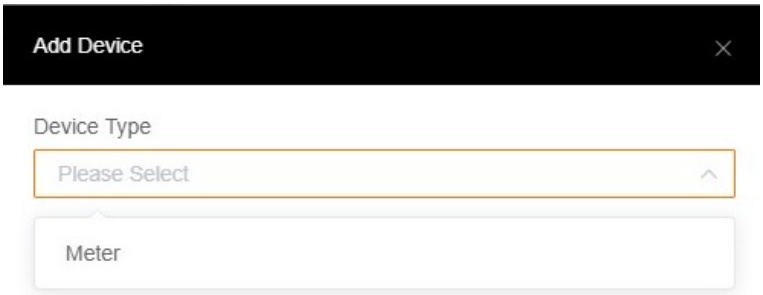
Step 3 Select **Add unit**. In the pop-up window, select **Meter unit** from the **Unit type** drop-down list.

Step 4 Click **Confirm**.

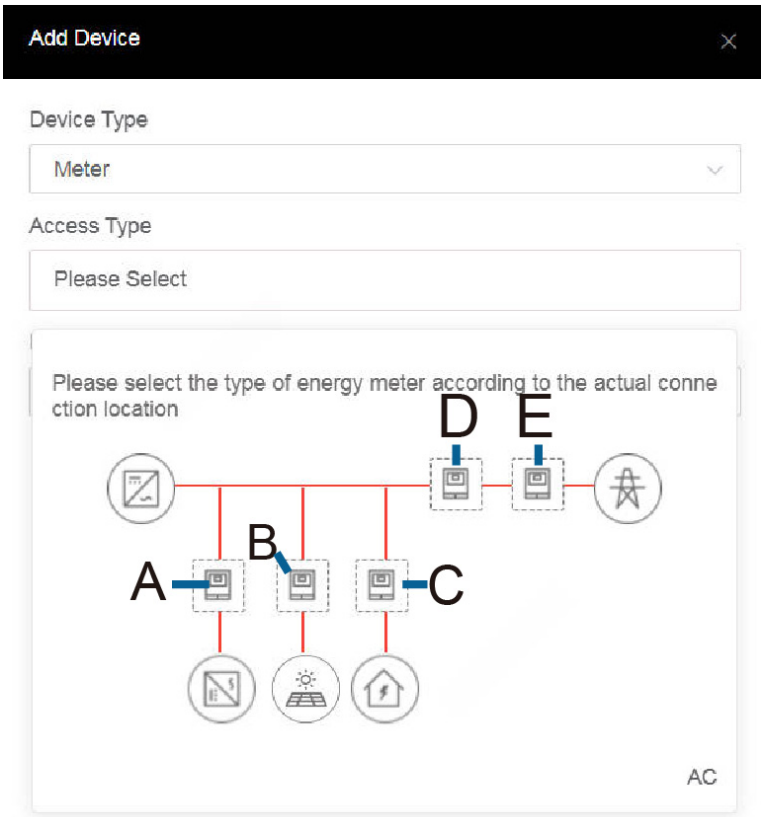
Step 5 Click + to the right of the meter unit and select **Add device**.



Step 6 In the **Add device** window, select **Meter** from the **Device type** drop-down list.



Step 7 In **Access type**, select the type of meter according to the actual connection position. Options include **ESS electricity meter**, **PV electricity meter**, **Load electricity meter**, **Overload monitoring meter**, and **PoC meter**.



Position	Type	Description	Quantity Limit
A	ESS electricity meter	Obtain energy metering values from the ESS side.	≤ 25
B	PV electricity meter	Obtain energy metering values from the inverter side.	≤ 20
C	Load electricity meter	Obtain energy metering values from the load side.	≤ 40
D	Overload monitoring meter	Obtain energy metering values from the main transformer and block overload in real time to protect grid equipment.	≤ 10
E	PoC meter	Obtain energy metering values at the grid connection point.	≤ 4

Step 8 Select the port of the meter connected from the **Port** drop-down list.

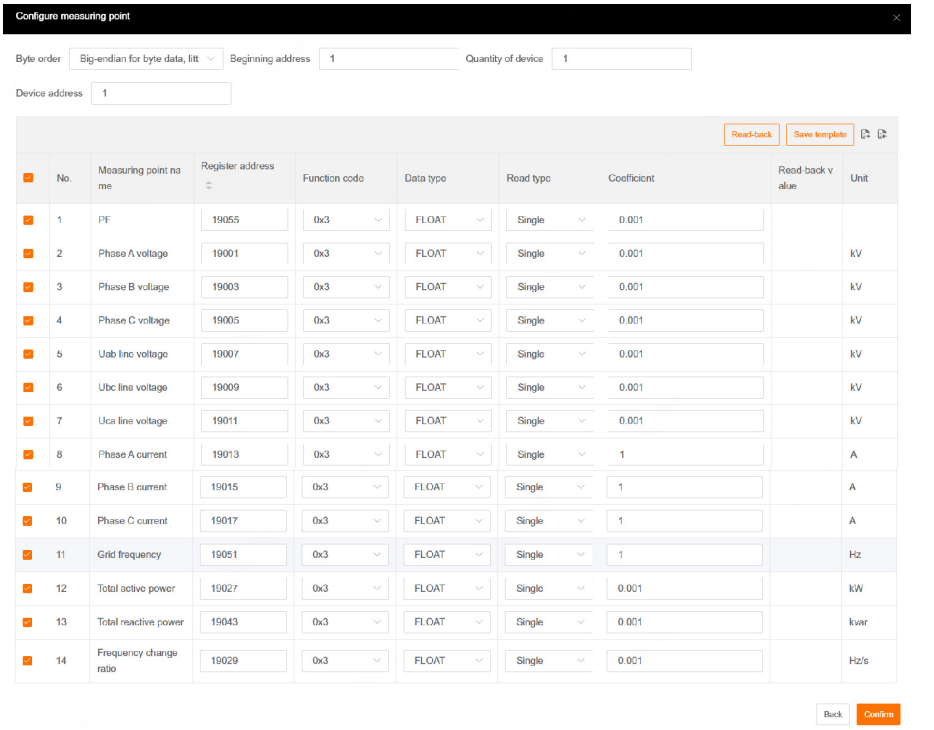
Options include: COM and NET. If the port selected is NET, configure the following parameters:

Parameters	Description
Protocol type	MODBUS-TCP by default.
SSL encryption	**Disable** by default. You don't need to configure this parameter. This parameter is available when **Cybersecurity mode configuration** is enabled.
Networking mode	Choose **Standalone network**. Configure the following parameters as needed: • Peer IP address: The IP address of the meter that is connected. • Peer port: The port of the meter that is connected.

Step 9 Select **Others** from the **Device model** drop-down list.

Step 10 Select the **Submodel**. If the third-party meter models vary, set the third-party model accordingly.

Step 11 After selecting **Custom** from the **Configuration method** drop-down list, click **Next**. The **Configure measuring point** window pops up.



a. Set the measuring point information associated with the meter. Click **Read-back** in the upper right corner to retrieve the current collected values of the measuring points.

b. Click **Save template** in the upper right corner to save the current measuring point configuration as a template, then click to export the template to the local device. You can click to import a local template into the system.

Step 12 Click **Save**. If the information of the meter appears in the device list on the right, the meter has been successfully added.

Step 13 For editing meter parameters, please see Edit meter parameters.

--End

2.8.3.3 Check Meter

Prerequisite

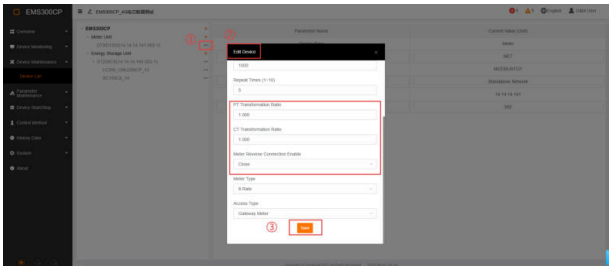
Ensure meter communication is normal.

Step 1 Go to **Device monitoring** > **Other device view** > **Meter unit** and select the required tab.

Step 2 **Direction Check**: Check the **Total active power** of the meter. Taking commonly used gateway meters and ESS energy meters as examples, when the meter is consuming power/charging, this value is negative; when feeding power/discharging, this value is positive. If both conditions are met, the meter wiring is correct. If the value direction is opposite to expectation, check whether the actual meter wiring is abnormal. Adjust the wiring if necessary.

If rewiring on site is not possible, click the ••• icon next to the meter to enable **Meter reverse polarity**.

Step 3 **Data check:** Verify whether the **Current** and **Voltage** values of the meter match the on-site primary actual values. If a constant scaling error exists, click the ••• icon next to the meter and set the **PT transformation ratio** or **CT transformation ratio** for correction.



--End

2.8.4 Add Communication Device

Step 1 Click **Device maintenance** > **Device list**.

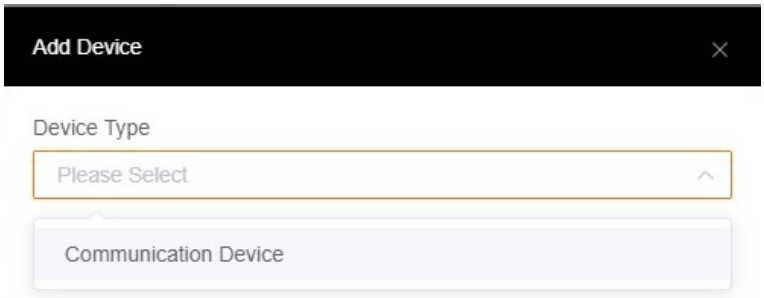
Step 2 Click + on the right side of plant-level root node EMS300CP.

Step 3 Select **Add unit**. In the pop-up window, select **Other unit** from the **Unit type** drop-down list.

Step 4 Click **Confirm**.

Step 5 Click + on the right side of the Other unit and select **Add device**.

Step 6 In the **Add device** window, select **Communication device** from the **Device type** drop-down list.



Step 7 Select the port for device connection from the **Port** drop-down list.

- If the port selected is COM, click ☁ on the right of **Configuration file** to upload the configuration file prepared by the O&M personnel according to the actual conditions of the plant, and fill in **Device address**.
- If the port selected is NET, configure the following parameters:

Parameter	Description
Protocol type	MODBUS-TCP by default.
SSL encryption	**Disable** by default. No configuration required. This parameter is available when **Cybersecurity mode configuration** is enabled.
Networking mode	Select **Standalone network**, and set the following parameters according to the actual networking situation. - Peer IP: The IP address of the communication device. - Peer port: the port of the communication device.
Configuration file	It is the LC package, which contains the point table for the LC. The configuration file needs to be sorted by O&M personnel according to the actual conditions of the plant.
Device address	Enter a value in the range of 1–255 according to actual conditions.

Step 8 Click **Save** to save the settings.

--End

2.8.5 Add Charger

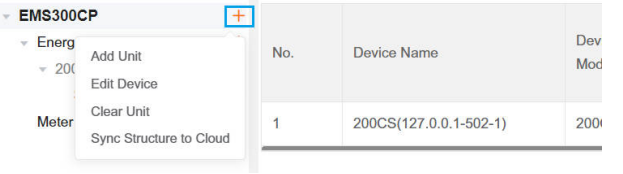
This function connects a charger to the plant.

Prerequisite

Ensure you know the type, port, and other information of the charger to be connected.

Step 1 Click **Device maintenance** > **Device list**.

Step 2 Click + on the right side of the plant-level root node EMS300CP.



Step 3 Select **Add unit**. In the pop-up window, select **Charger unit** from the **Unit type** drop-down list.

Step 4 Click **Confirm**.

Step 5 Click + on the right side of the charger unit and select **Add device**.



Step 6 In the **Add device** window, select **Charger** from the **Device type** drop-down list.

Step 7 Select the port for charger connection from the **Port** drop-down list.

- If the port selected is COM, configure the following parameters:

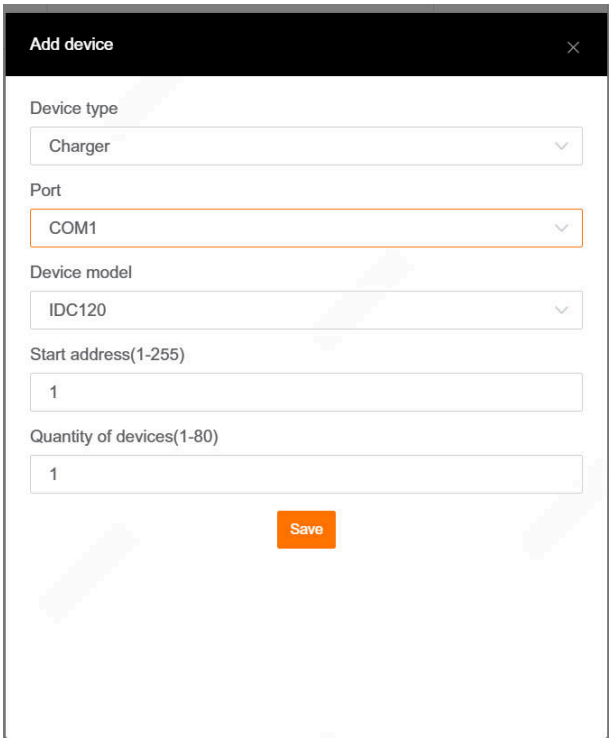
Parameter	Description
Device model	Select the model of the charger actually used in the plant.
Start address	Default value: 1. The value must be an integer in the range of 1–255.
Quantity of devices	Enter the actual number of devices. Default value: 1. The maximum number is 20.

- If the port selected is NET, configure the following parameters:

Parameter	Description
Protocol type	MODBUS-TCP by default.
SSL encryption	**Disable** by default. No configuration required. This parameter is available when **Cybersecurity mode configuration** is enabled.

Parameter	Description
Networking mode	Select **Standalone network**, and set the following parameters according to the actual networking situation. - Peer IP: The IP address of the charger. - Peer port: the port of the charger.
Device model	Select the model of the charger to be connected.
Start address	Default value: 1. The value must be an integer in the range of 1–255.
Quantity of devices	Enter the actual number of devices. Default value: 1. The maximum number is 20.

Taking IDC120 as an example.



Step 8 Click **Save** to save the settings.

--End

2.8.6 Add LOGGER_UPPER Device

In Japan's power systems, the LOGGER_UPPER device is typically used to receive power limit percentage commands issued by the northbound power company (i.e., grid operator). This

device can dynamically adjust the output power of the ESSs or related power equipment based on the requirements of the power company.

Step 1 Click **Device maintenance** > **Device list**.

Step 2 Click + on the right side of plant-level root node EMS300CP.

Step 3 Select **Add unit**. In the pop-up window, select **Upper computer unit** from the **Unit type** drop-down list.

Step 4 Click **Confirm**.

Step 5 Click + on the right side of the upper computer unit and select **Add device**.

Step 6 In the **Add device** window, select **LOGGER_UPPER** from the **Device type** drop-down list.

Step 7 Select a port. The default fault is NET. Configure the following parameters according to actual conditions:

Parameter	Description
Protocol type	MODBUS-TCP by default.
SSL encryption	**Disable** by default. No configuration required. This parameter is available when **Cybersecurity mode configuration** is enabled.
Networking mode	Select **Standalone network**, and set the following parameters according to the actual networking situation. • Peer IP: The IP address of the LOGGER_UPPER device. • Peer port: the port of the LOGGER_UPPER device.
Device model	LoggerUpper by default.
Start address	Default value: 1. The value must be an integer in the range of 1–255.
Quantity of devices	Enter the actual number of devices. Default value: 1. The value must be an integer in the range of 1–80.

Step 8 Click **Save** to save the settings.

--End

2.8.7 Add Diesel Generator

The system allows you to add multiple diesel generators of different models, including system-defined models and custom models.

2.8.7.1 Add Diesel Generator of System-Defined Model

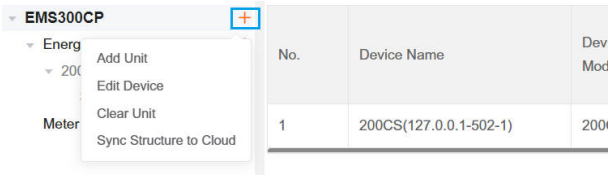
This function connects a diesel generator of a system-defined model to the plant.

Prerequisite

Ensure you know the type, port, and other information of the diesel generator to be connected.

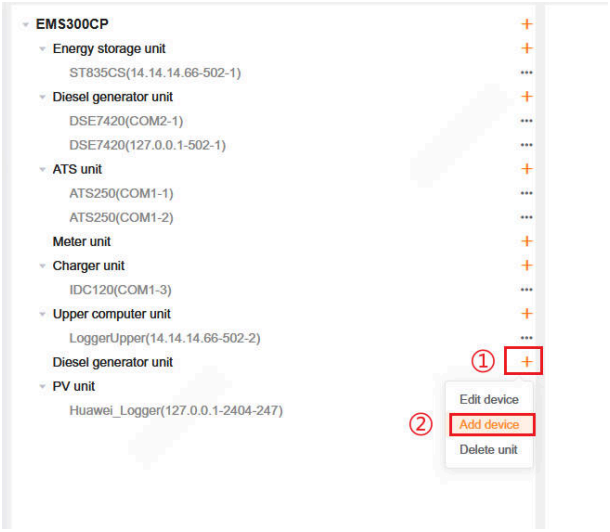
Step 1 Click **Device maintenance** > **Device list**.

Step 2 Click + to the right of plant-level root node **EMS300CP**.



Step 3 Select **Add unit**. In the pop-up window, select **Diesel generator unit** from the **Unit type** drop-down list.

Step 4 Click + on the right side of the diesel generator unit and select **Add device**.



Step 5 In the **Add device** window, select **Diesel generator** from the **Device type** drop-down list.

Step 6 Select the port for device connection from the **Port** drop-down list.

- If the port selected is COM, configure the following parameters:

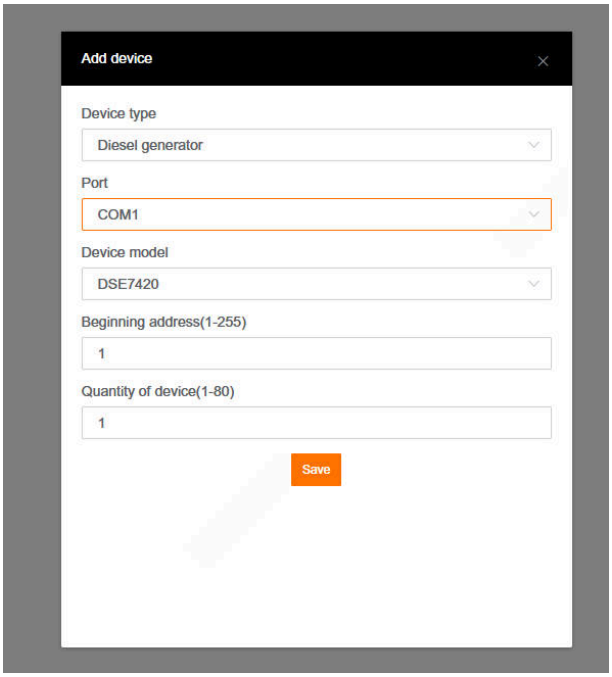
Parameter	Description
Device model	Select the model of the device to be connected.
Start address	Default value: 1. The value must be an integer in the range of 1–255.

Parameter	Description
Quantity of devices	Enter the actual number of devices. Default value: 1. The value must be an integer in the range of 1–80.

- If the port selected is NET, configure the following parameters:

Parameter	Description
Protocol type	MODBUS-TCP by default.
SSL encryption	**Disable** by default. No configuration required. This parameter is available when **Cybersecurity mode configuration** is enabled.
Networking mode	Select **Standalone network**, and set the following parameters according to the actual networking situation. - Peer IP: The IP address of the ATS. - Peer port: the port of the ATS.
Device model	Select the model of the device to be connected.
Start address	Default value: 1. The value must be an integer in the range of 1–255.
Quantity of devices	Enter the actual number of devices. Default value: 1. The value must be an integer in the range of 1–80.

Taking DSE7420 as an example.



Step 7 Click **Save** to save the settings.

Step 8 (Optional) Click in the **Action** column to edit the diesel generator information. The parameter descriptions are as follows. Click **Save** to save the settings.

Parameter	Description	Value
Device name	Specify the name for the diesel generator.	-
Instruction interval (4–5000) ms	Set the interval for collecting instructions.	Range: [4,5000]. **18** by default.
Timeout value (500–5000) ms	Set the communication timeout period.	Range: [500,5000]. **1000** by default.
Retry attempts (1–10)	Set the number of retries allowed after a communication timeout.	Range: [1,10]. **5** by default.
Diesel generator sequence number	Set the priority of the diesel generator in active/standby switching. The smaller the value, the higher the priority. If this parameter is set to **Others**, the diesel generator does not participate in active/standby switching.	**Others** by default.

Parameter	Description	Value
	This parameter cannot be changed while the diesel generator is running. Changes take effect only after the diesel generator is shut down.	
Rated voltage	Configure the actual rated voltage of the diesel generator.	Range: [0,100000].
Rated power (kW)	Configure the actual rated power of the diesel generator.	Range: [1,99999].
Support synchronization	Select whether the diesel generator supports synchronization. • When the model of the diesel generator controller is DSE8610, complete the synchronization-related configuration first and then set this parameter to **Yes**. • This parameter cannot be changed while the diesel generator is running. Changes take effect only after the diesel generator is shut down.	**No** by default.

--End

2.8.7.2 Add Diesel Generator of Custom Model

This function connects a diesel generator of a custom model to the plant.

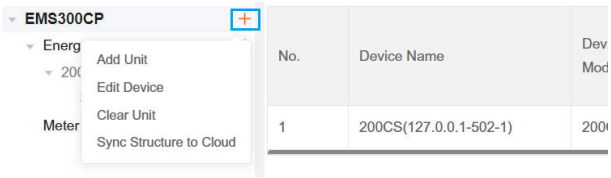
Prerequisite

Ensure you know the type, port, and other information of the diesel generator to be connected.

This feature is available on EMS300CP-SV100.001.00.P029 or later.

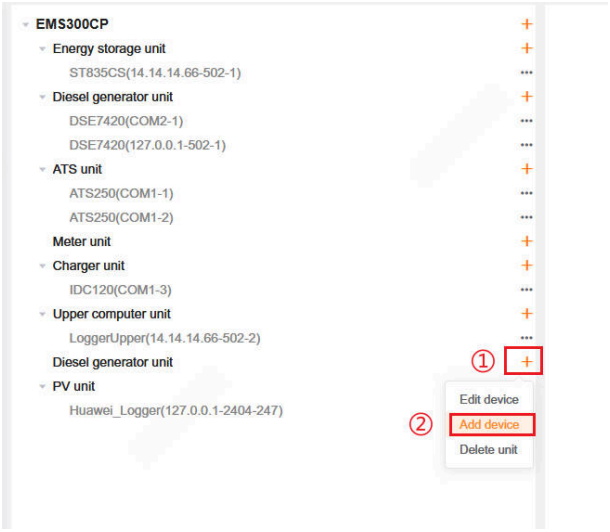
Step 1 Click **Device maintenance** > **Device list**.

Step 2 Click + to the right of plant-level root node **EMS300CP**.



Step 3 Select **Add unit**. In the pop-up window, select **Diesel generator unit** from the **Unit type** drop-down list.

Step 4 Click + on the right side of the diesel generator unit and select **Add device**.



Step 5 In the **Add device** window, select **Diesel generator** from the **Device type** drop-down list.

Step 6 Select the port for device connection from the **Port** drop-down list.

Options include: **COM** and **NET**. If the port selected is **NET**, configure the following parameters:

Parameter	Description
Protocol type	Select **MODBUS-TCP**.
SSL encryption	Default value: **Disable**. No configuration is required for this device. This parameter is available when **Cybersecurity mode configuration** is enabled.
Networking mode	Select **Standalone network**, and set the following parameters according to the actual networking situation: • **Peer IP**: The IP address of the diesel generator.

Parameter	Description
	• **Peer port**: The port of the diesel generator.

Step 7 Select **General_DG** from the **Device model** drop-down list.

Step 8 Select the **Submodel**. If the third-party diesel generator uses a specific submodel, select the corresponding one.

Step 9 After setting the **Configuration method** to **Custom**, click **Next**. The **Configure measuring point** window pops up.

a. Configure device parameters.

Parameter	Description
Byte order	Specify the data byte sequence, which must be consistent with that in the communication protocol.
Start address	Default value: **1**. Valid range: [1, 255]. Set this parameter according to actual conditions.
Quantity of devices	Default value: **1**. Valid range: [1, 30]. Enter the actual number of devices.
Device address	Default value: **1**. The value range is [Start address, Start address + Quantity of devices − 1]. Set this parameter according to the actual device address. It is used for testing the readback of measuring point data.
Startup	Default value: **170**. Set the decimal value corresponding to the startup command according to the communication protocol.
Shutdown	Default value: **85**. Set the decimal value corresponding to the shutdown command according to the communication protocol.
Running	Default value: **1**. Set the decimal value corresponding to the running command according to the communication protocol.
Shutdown	Default value: **2**. Set the decimal value corresponding to the shutdown command according to the communication protocol.

Parameter	Description
Fault	Default value: **3**. Set the decimal value corresponding to the fault command according to the communication protocol.

b. Set the associated measuring point information. Click **Readback** to retrieve the current collected values of the measuring points.

Parameter	Description
Register address	Configure the actual address of the corresponding device measuring point. Valid range: [0, 65535].
Register type	Specify the register function. It is recommended to use the default type: • **0x4**: Input register. • **0x3**: Holding register.
Data type	Set this parameter according to the data format of the device measuring point.
Read type	Select the method of reading.
Coefficient	Scaling factor for the raw data. Valid range: [0.000001, 1000000]. Default value: **1**.
Byte order	Specify the data byte sequence, which must be consistent with that in the communication protocol.
Function code	• **0x04**: - For an input register measuring point, when the function code is set to **0x04**, the data collected for this measuring point takes effect. - For a holding register measuring point, when the function code is set to **0x04**, the setting for this measuring point does not take effect. • **0x06**: Set a single register. • **0x10**: Set multiple registers. • **0x06/0x10**: Set a single or multiple registers.

c. Click **Save template** in the upper right corner to save the current measuring point configuration as a template, then click  to export the template to the local device. You can click  to import a local template into the system.

d. Then, click **Confirm** at the bottom of the page.

Step 10 To edit diesel generator parameters, refer to Edit diesel generator.

--End

2.8.8 Add ATS

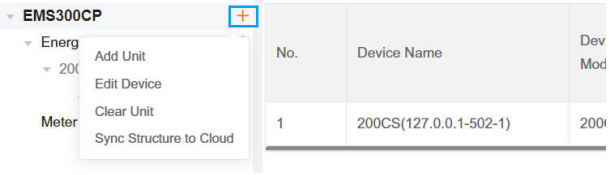
This function connects an ATS to the plant.

Prerequisite

Ensure you know the type and port information of the ATS before proceeding.

Step 1 Click **Device maintenance** > **Device list**.

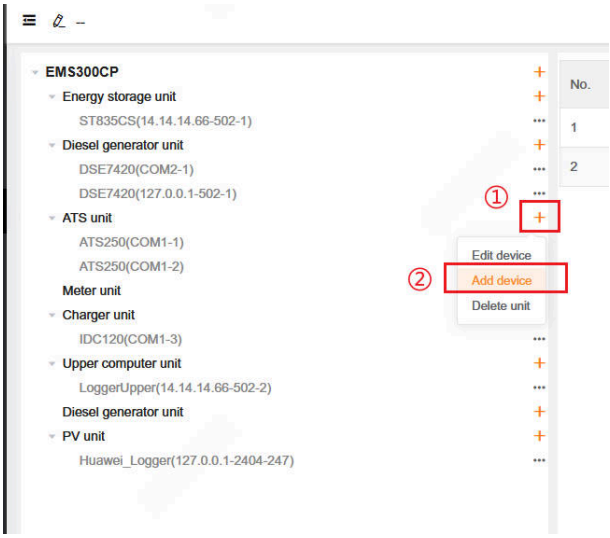
Step 2 Click + on the right side of the plant-level root node EMS300CP.



Step 3 Select **Add unit**. In the pop-up window, select **ATS unit** from the **Unit type** drop-down list.

Step 4 Click **Confirm**.

Step 5 Click + on the right side of the ATS unit and select **Add device**.



Step 6 In the **Add device** window, select **ATS** from the **Device type** drop-down list.

Step 7 Select the port for device connection from the **Port** drop-down list.

- If the port selected is COM, configure the following parameters:

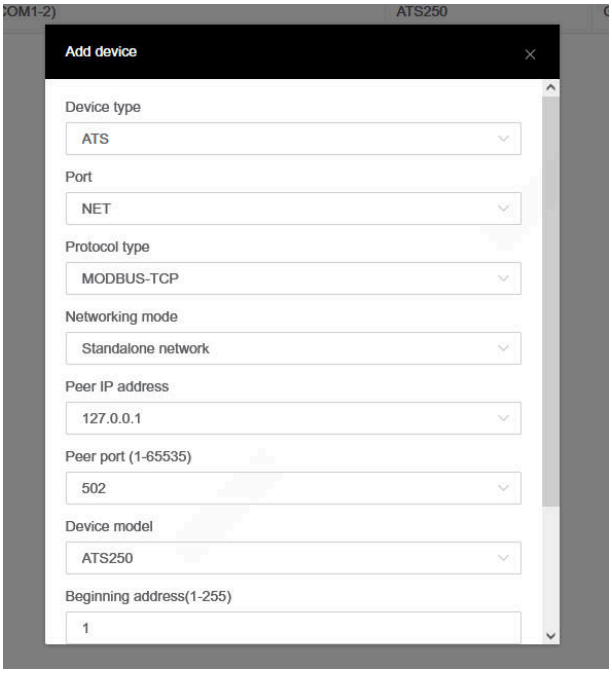
Parameter	Description
Device model	Select the model of the device to be connected.

Parameter	Description
Start address	Default value: 1. The value must be an integer in the range of 1–255.
Quantity of devices	Enter the actual number of devices. Default value: 1. The value must be an integer in the range of 1–80.

- If the port selected is NET, configure the following parameters:

Parameter	Description
Protocol type	MODBUS-TCP by default.
SSL encryption	**Disable** by default. No configuration required. This parameter is available when **Cybersecurity mode configuration** is enabled.
Networking mode	Select **Standalone network**, and set the following parameters according to the actual networking situation. - Peer IP: The IP address of the ATS. - Peer port: the port of the ATS.
Device model	Select the model of the device to be connected.
Start address	Default value: 1. The value must be an integer in the range of 1–255.
Quantity of devices	Enter the actual number of devices. Default value: 1. The value must be an integer in the range of 1–80.

Taking ATS250 as an example.



Step 8 Click **Save** to save the settings.

--End

2.8.9 Check Device Status

This section describes how to check whether the communication status of each added device is normal.

Step 1 Choose **Device maintenance** > **Device list**.

Step 2 Click the unit to be checked. The device list under that unit will be displayed on the right. For example, click **Meter unit**.

Step 3 Check the communication status of each device.



- Online: Indicate that the device's communication is normal and is displayed as .
- Offline: Indicate that the device's communication is abnormal and is displayed as .

If the communication status of a device is offline, please check the configuration parameters and device connections.

--End

2.9 Remote Maintenance

After the remote maintenance function is enabled, authorized users can remotely access and control the system over the network, facilitating fault troubleshooting and daily maintenance, reducing the need for on-site support.

Prerequisite

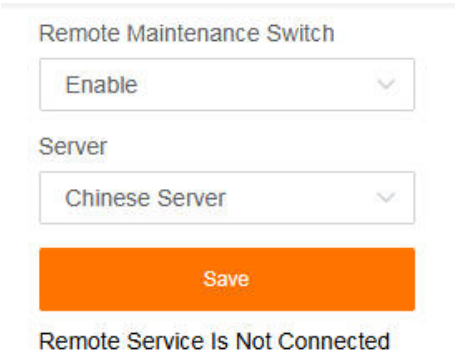
EMS300CP is connected to the external network.

- Go to **System** > **Port parameter** > **Cellular network**, and enable cellular network.

  Applicable only to EMS300CP devices equipped with a 4G communication module.

- Go to **System** > **Port parameter** > **Local IP**, set the IP address according to the addressing scheme of the external network.

Step 1 Click **System** > **Remote maintenance** to enter the corresponding interface.



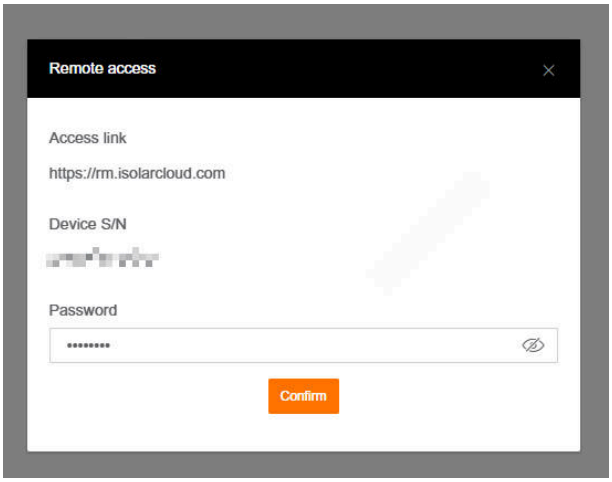
Step 2 Click icon and enable **Remote maintenance**.

- Remote maintenance is supported if this switch is set to **Enable**, and it is required to set the address.
  - Select **Chinese server** for projects in Chinese mainland.
  - Select **European server** for projects in Europe.
  - Select **Australian server** for projects in Australia.
  - Select **International server** for projects in other regions.

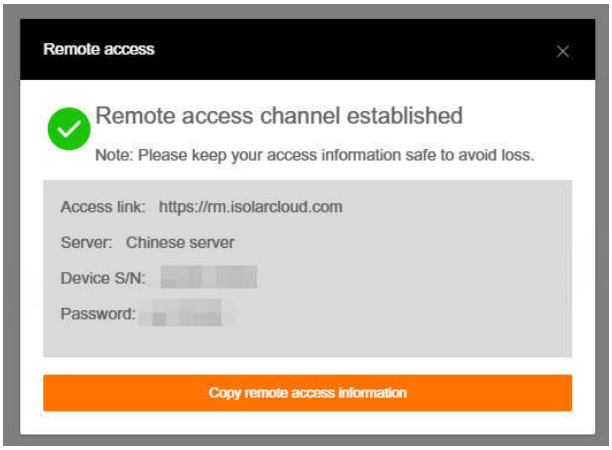
  If the **iSolarCloud switch** in **Setup wizard** is enabled, the server site can only be configured to match the cloud address.

Step 3 Click **Save** to save the settings.

Step 4 To establish a remote access connection, enter a **Password**, and confirm.



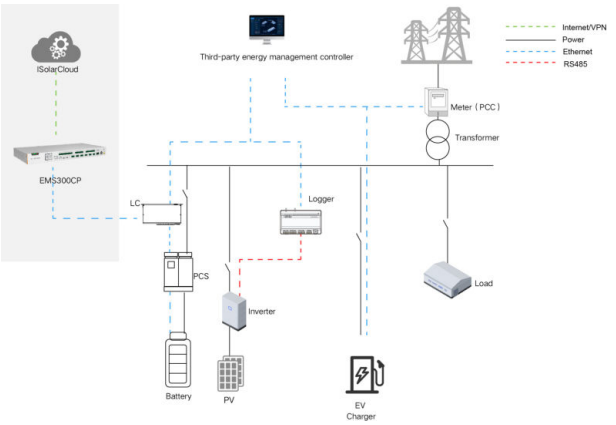
Step 5 You can then click **Copy remote access information** to share the remote maintenance link.



--End

2.10 Maintenance Mode

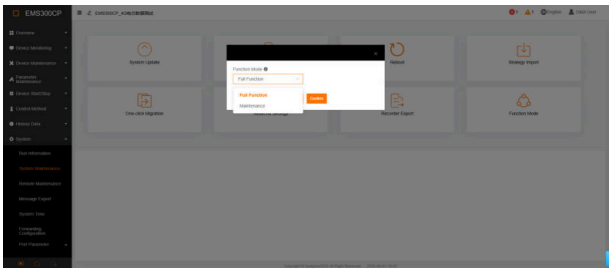
When a customer selects a third-party EMS as the master controller of the entire plant and does not require EMS300CP to act as a slave controller for strategy control over the devices, EMS300CP can be used solely for monitoring the ESS in maintenance mode. The application scenario is shown in the figure below:



After configuring the maintenance mode, users can only monitor and perform maintenance on the system, but cannot implement device control.

Step 1 Choose **System** > **System maintenance**.

Step 2 Click **Function mode**. In the pop-up window, select **Maintenance**.



Step 3 Click **Confirm** to save the settings.

--End

3 Web Main Interface

The following figure shows the Web main interface.

Item	Name	Description
A	Navigation menu	Displays the main functions.
B	Function display area	Displays the function currently queried or parameters currently set.
C	Fault/Alarm	Displays the level and quantity of current system faults and alarms. Click the corresponding value to enter the corresponding interface.
D	Language	Used to switch the language as needed.
E	Username	Displays the current login username.
F	Plant name	Click to edit the name of the plant.

: indicates the connection status of the Ethernet port.

: indicates the cloud access status.

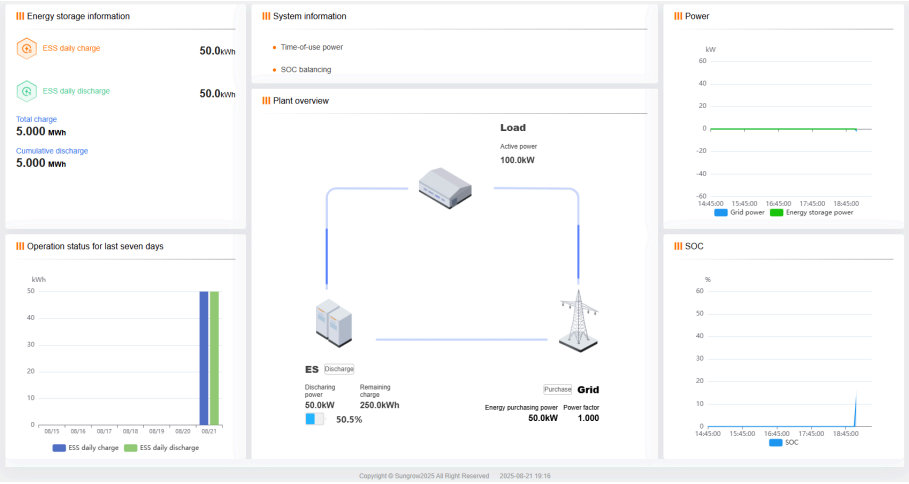
> The figure is for reference only. The actual interface may be different and shall prevail.

4 Overview

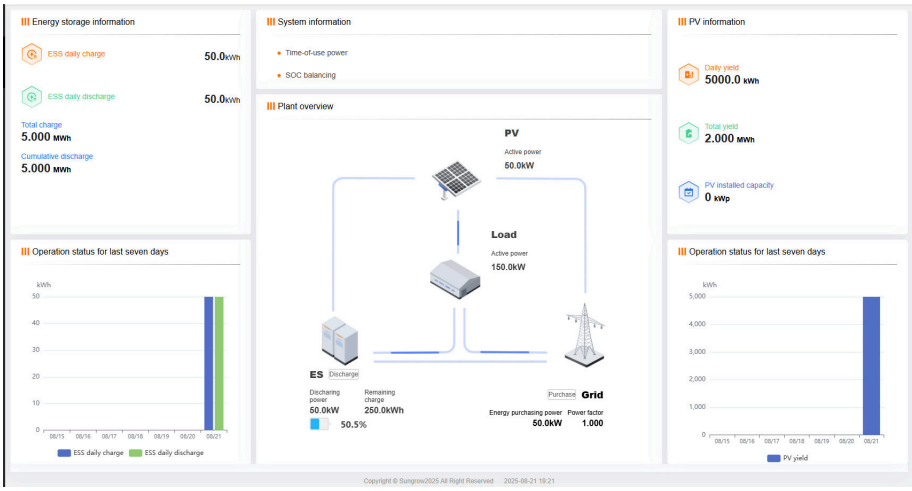
4.1 General Information

Choose **Overview** > **General information** to view the real-time operating information of the plant. The main scenarios include ESS-only, PV-ESS, PV-ESS-Charging, PV-ESS-DG, and PV-ESS-DG-Charging.

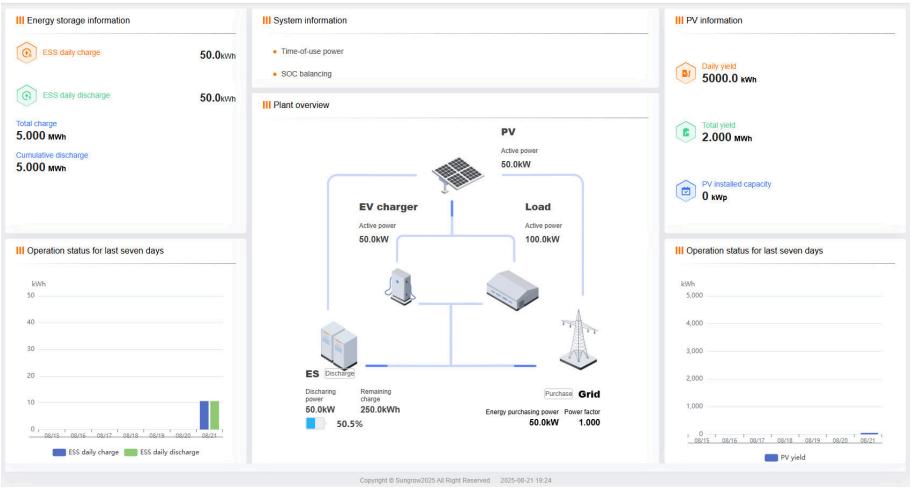
- ESS-only:



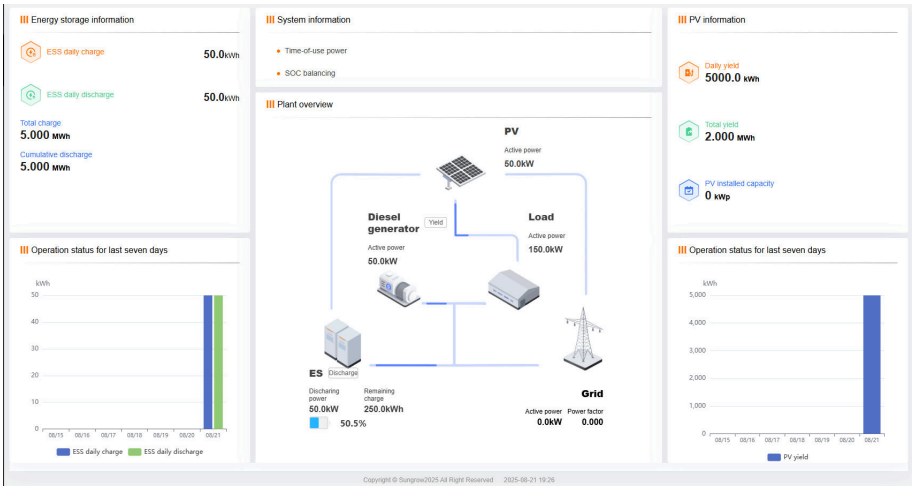
- PV-ESS:



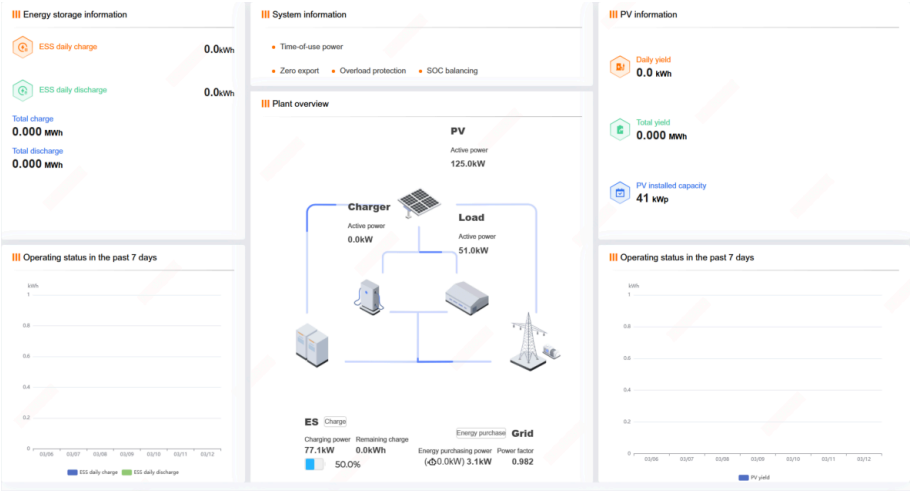
- PV-ESS-Charging:



- PV-ESS-DG:



- PV-ESS-DG-Charging:



> The figures are for reference only. The actual displayed content may dynamically vary based on the connected devices and the configured plant type. Please refer to the actual system interface.

Charge/Discharge

Daily charge/discharge and total charge/discharge of the ESS.

Plant Overview

- **Load**: View the real-time active power of the load.
- **ES**: View the real-time active power and remaining charge.
- **Grid**: View the active power of the plant.
- **PV**: View the active power of the PV system.
- **Charger**: View the active power.
- **Diesel generator**: View the active power of the diesel generator.

Operating Status in the Past 7 Days

- View the operation data of ESS charging and discharging in the past 7 days.
- View the operation data of PV power generation in the past 7 days.

Yield Information

View the daily yield, total yield, and PV installed capacity of the plant.

Power

View grid power and energy storage power.

SOC

View the remaining battery capacity at each time point.

Energy Storage Information

Daily charge/discharge and total charge/discharge of the ESS.

PV Information

Daily yield, total yield, and PV installed capacity.

4.2 Current Alarms

Click **Overview** > **Current fault**. The fault information of devices can be viewed on this interface, as shown below.



No.	Device Name	Fault Name	Type	Time	Fault ID
1	SC50HV_15	Low System Insulation Resistance	Fault	2022-11-30 15:57:10	32441
2	LC200(192.168.16.141-502-1)	PCS unit fault	Alarm	2022-11-30 15:57:10	32341
3	LC200(192.168.16.111-502-1)	BSC unit alarm	Alarm	2022-11-30 09:35:17	32345

> The figure is for reference only. The actual interface may be different and shall prevail.

Click **Fault ID** to view the corresponding solution.

5 Device Monitoring and Maintenance

5.1 Device Monitoring

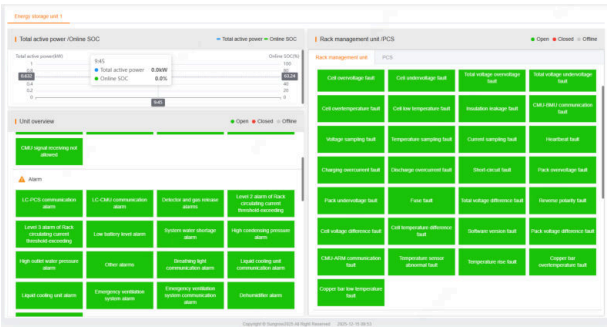
This interface mainly displays detailed working conditions of PV, energy storage and other devices in the plant.

5.1.1 Energy Storage Unit View

This page provides real-time operating information for each energy storage unit.

Procedure

1. Choose **Device monitoring** > **Energy storage unit view** to view the real-time operating information of a device.



2. Click the tab of a local controller in the upper part of the interface to view the real-time data of the ESS.

   More operations

   - **One-click recharge**: Click to issue a recharge command to a target energy storage unit.

     - This function also takes effect when **Active recharge** of a target energy storage unit is disabled.
     - The firmware version of EMS300CP must be P024 or later.

   - **Fault reset**: Click to issue a fault recovery command to a target energy storage unit.

     - The local controller and its sub-devices, BSCs and CMUs, require on-site troubleshooting and resolution of the fault cause before the fault recovery takes effect.
     - The firmware version of EMS300CP must be P024 or later.

   - **Auto-startup on fault recovery**: Click the button to enable or disable this function.
     - Button in green (disabled): When the ESS is shut down, the system enables auto-startup after fault recovery by clicking this button.

- Button in orange (enabled): This function is disabled by clicking this button. After fault recovery, the system will remain in standby and require manual intervention to start.

> The firmware version of EMS300CP must be P025 or later.

5.1.2 Charger Unit View

Users can view the real-time information of each charger here.

Procedure

1. Choose **Device monitoring** > **Charger unit view** to check the real-time information of the chargers.



2. Click a tab of a charger on the screen to view its real-time information.

Users can click  and set the below parameters for each charging connector.

Parameter	Description
Device Start	Turn on to enable the charging connector for use.
Output power settings	Set according to the actual situation.

5.1.3 PV Unit View

On this interface users can view the real-time information of the PV unit.

Procedure

1. Click **Device monitoring** > **PV unit view**.



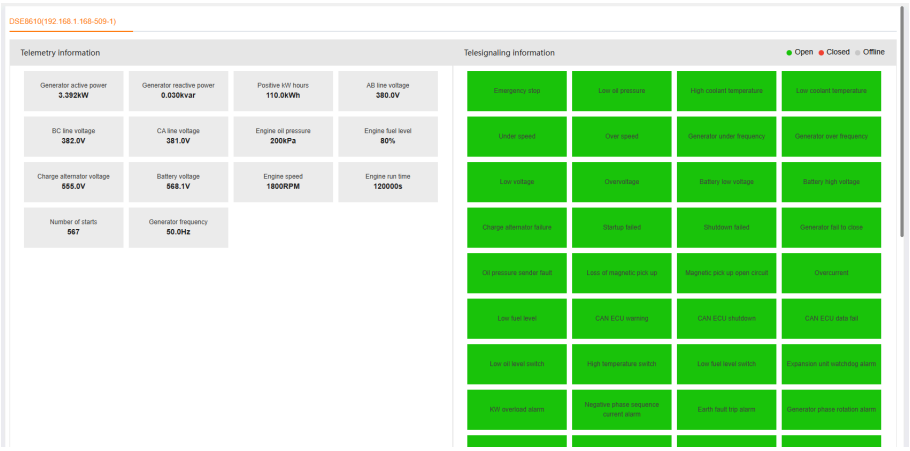
2. Click the tab of a local controller in the upper part of the interface to view the real-time information of the PV unit.

5.1.4 Diesel Generator Unit View

Users can view the real-time information of the diesel generator units connected via MODBUS on this page.

> This feature is available on EMS300CP-SV100.001.00.P029 or later.

Step 1 Click **Device monitoring** > **Diesel generator unit view**.



Step 2 Click the tab of a diesel generator unit at the top of the page to view the telemetry and telesignaling information of the diesel generator.

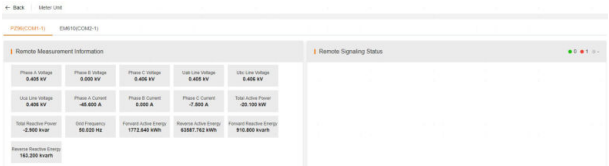
--End

5.1.5 Other Device View

On this page, you can view the telemetry information and telesignaling status of meter units and ATS units.

Procedure

1. Choose **Device monitoring** > **Other device view**.
2. Click a meter unit or ATS unit to view its telemetry information and telesignaling status.



5.2 Device List

Click **Device maintenance** > **Device list**.

Device list On the Device list page, users can manage the connected devices.

For adding devices, please see 2.8 Add a Device.

5.2.1 Edit Device

Modify the name and attributes of the device that has been added.

Step 1 Click **Device maintenance** > **Device list** to enter the corresponding interface.

Step 2 Expand the device list and click ••• on the right of a device.

Step 3 Click **Edit device attributes**. Modify the device attributes in the **Edit device** dialog box.

Step 4 Click **Save** to save the modification.

--End

5.2.2 Delete Device

After the device is dismantled from the site, delete the device on **Device list** interface to keep the consistency.

Step 1 Click **Device maintenance** > **Device list** to enter the corresponding interface.

Step 2 Expand the device list and click ••• on the right of a device.

Step 3 Click **Delete device**.

Step 4 Click **Confirm** in the pop-up window.

--End

6 Parameter Maintenance

6.1 Configure Time-of-Use Periods for Meter

For the DTSD1352-CT/F2C meter, you can configure critical peak, peak, shoulder, valley, and deep valley periods to help users optimize electricity consumption behaviors so as to lower costs while maintaining grid load balance.

Prerequisite

- This function is only applicable to the DTSD1352-CT/F2C meter.
- Before configuring critical peak, peak, shoulder, valley, and deep valley periods, make sure that the meter is properly connected and in normal communication status. For details about device communication status check, see 2.8.9 Check Device Status.
- The **Meter type** of the meter is set to **8-Rate**. For details about how to edit the parameters of the meter, see 2.8.3 Add Meter.

6.1.1 Configure Time-of-Use Period Templates for Meter

Step 1 Click **Parameter maintenance** > **Meter parameters** to enter the corresponding interface.



Step 2 Click  in the **Action** column.

Step 3 Configure a time-of-use period template. For initial setup after system installation, a pop-up window as shown below will automatically appear on the page, prompting you to configure a time-of-use period template.



a. Enter a custom **Template name**.

b. Click the Critical Peak, Peak, Shoulder, Valley, and Deep Valley sections respectively to select time blocks. Drag the handles on the two sides of the selected block to adjust its duration.



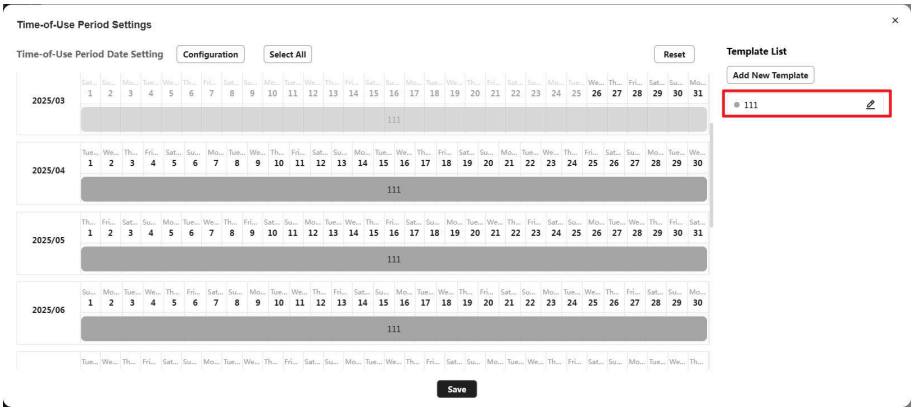
To delete a selected time period, click the Close icon in the upper right corner of the selected block.

c. Repeat step b until the entire 24-hour period is defined without overlaps.

d. Click **Save** to save the settings.



e. The created template will appear in the Template List on the right panel of the **Time-of-use period settings** page.



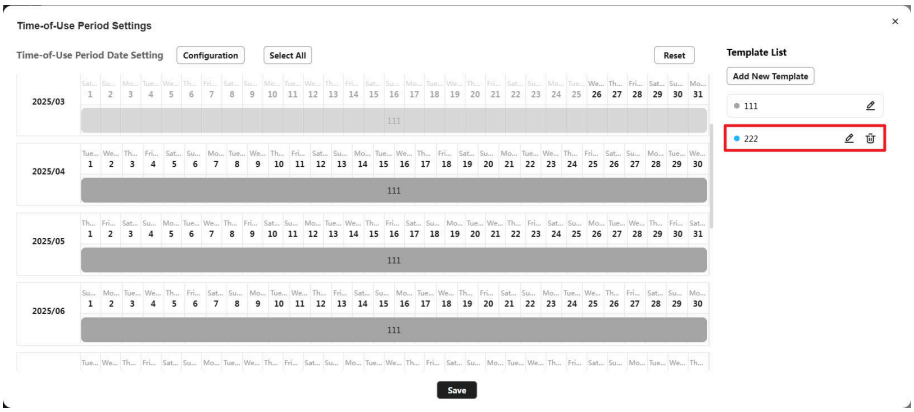
Step 4 (Optional) Add a new time-of-use period template. If the existing time-of-use period templates do not meet requirements, a new template can be added.

a. Click **Add new template** on the **Time-of-use period settings** page.



b. Configure the template following the steps outlined in 3.

c. The created template will appear in the Template List on the right panel of the **Time-of-use period settings** page.



Up to 8 templates are supported.

Step 5 (Optional) Edit an existing time-of-use period template. Click the Edit icon of the desired template to edit it.

Step 6 (Optional) Delete a time-of-use period template. Click the Delete icon of the desired template to delete it.

--End

6.1.2 Configure Time-of-Use Period Strategies for Meter

Prerequisite

- A time-of-use period template has been configured for the meter by referring to 6.1.1 Configure Time-of-Use Period Templates for Meter.

Step 1 Click **Parameter maintenance** > **Meter parameters** to enter the corresponding interface.

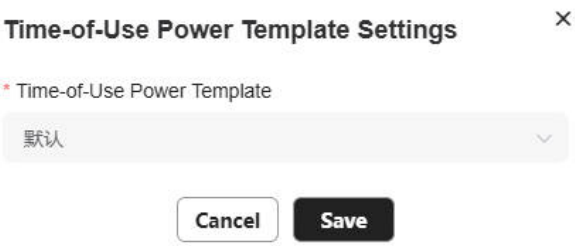


Step 2 Click in the **Action** column.

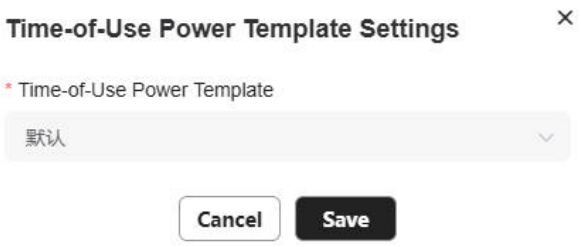
> The system applies a default time-of-use period template initially. Modify or replace it as needed.

Step 3 You can configure time-of-use period strategies for the current year. Choose an appropriate time-of-use period template to configure the time-of-use period strategy.

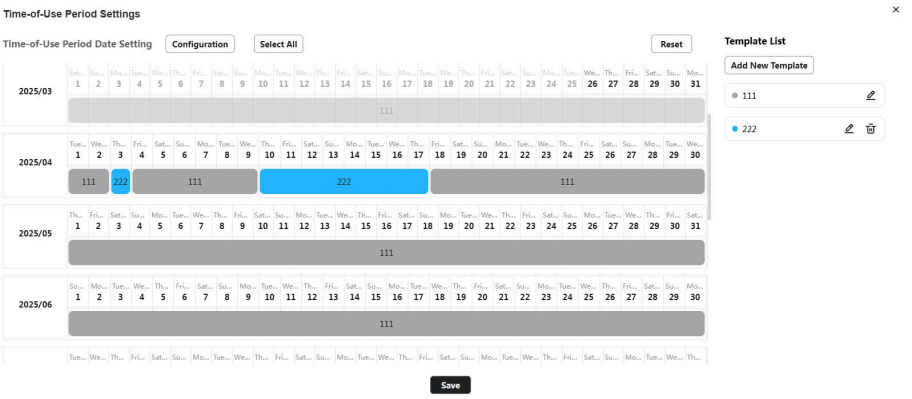
- If the same strategy applies to all days of the current year, select all dates using the **Select all** option, then click **Configuration**. In the pop-up window, select the desired time-of-use period template and click **Save**. The configured strategy will apply to all selected days.



- If different strategies apply to different days, hover over a specific date, select a single day or a date range, then click **Configuration**. In the pop-up window, select the desired time-of-use period template and click **Save**. The configured strategy will apply only to the selected days.

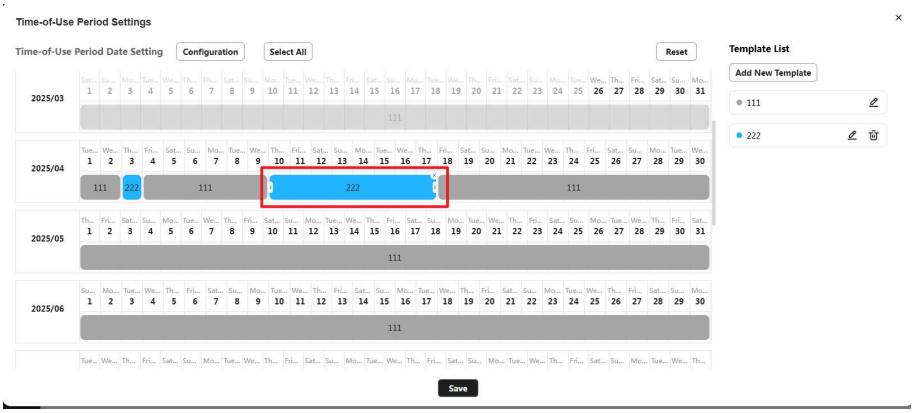


Step 4 Click **Save** to save the configured time-of-use period strategy.



Step 5 (Optional) Delete a time-of-use period strategy.

a. Hover over the configured time block you want to delete, and click the Close icon in the upper right corner of the time block.



b. Click **Save** to save the settings.

--End

6.2 Meter Time Synchronization

The system supports **automatic** and **Manual** time synchronization for meters.

1. Automatic Synchronization

Step 1 Click **Parameter maintenance** > **Meter parameters** to enter the corresponding interface.



Step 2 Set the Meter Time Synchronization Interval. Enter an interval. Range: 0.0-10.0. Default value: 4.0.

Step 3 Click in the Action column. The system will automatically perform periodic time synchronization for the meter based on the set interval.

2. Manual synchronization

Step 4 Click **Parameter maintenance** > **Meter parameters** to enter the corresponding interface.



Step 5 Click in the Action column. The system will perform time synchronization for the meter.

--End

6.3 Configure Charger Parameters

Step 1 Choose **Parameter maintenance** > **Charger parameters**.

Step 2 Set the **Total charger output power (offline) (W)** and **Communication timeout** according to actual conditions.

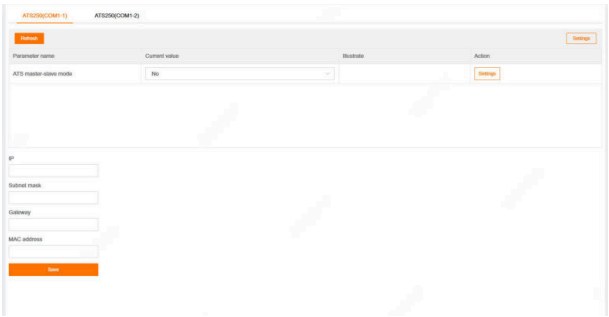
Step 3 Click **Save** to save the settings.

--End

6.4 Configure ATS Parameters

> This configuration is applicable to **South Africa**.

Step 1 Choose **Parameter maintenance** > **ATS parameters**.



Step 2 Click the tab of the ATS that you want to configure, set **ATS master-slave mode**, **Fault reset**, or **Sync check failed fault reset** as needed, and click **Settings** to apply the settings.

- When **ATS master-slave mode** is set to **Yes**, you can configure the **ATS master/slave settings**.
- When **ATS master-slave mode** is set to **No**, the **ATS master-slave mode** is disabled.

Step 3 Set the **IP**, **Subnet mask**, **Gateway**, and **MAC address** of the ATS according to actual conditions.

> After configuring the ATS communication parameters, the ATS needs to be reconnected to the system.

Step 4 Click **Save** to save the settings.

--End

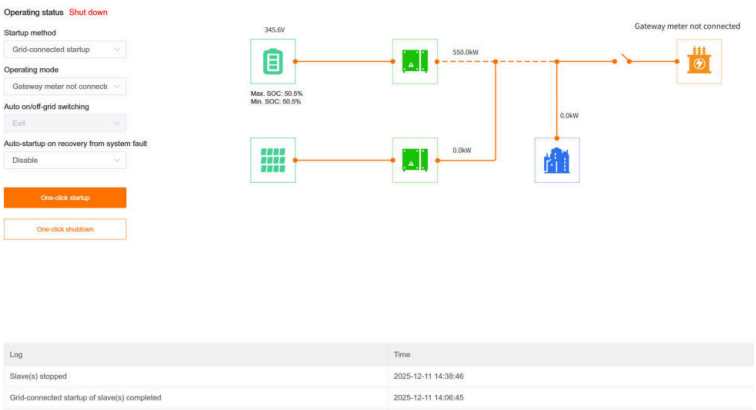
7 Device Start/Stop

7.1 Grid-Connected/Off-Grid Startup

Users can configure the startup settings for the devices and start or stop the devices in the plant in one click.

Configure Startup Parameters

Step 1 Choose **Device start/stop** > **On/off-grid startup**.



Step 2 Select a startup method for devices in the plant from the **Startup method** drop-down list.

- When no ATS is connected, the **Startup method** can be set to **Off-grid startup** or **Grid-connected startup**.
  - Off-grid startup
    When the device is in the off-grid status, select **Off-grid startup** to start all the devices in the plant. After a successful startup, the **Running status** will show "Off-grid".
    Configure the black start parameters before proceeding with the startup. To do this, click ⚙ in the upper-right corner to open the black start configuration window. The descriptions of the parameters are shown below.

Parameters	Description
Black start SOC threshold	Default value: 46. Range: 0–100.
Min. units for system operation	Number of units with the minimum SOC. Default value: 1. Range: 0–20.
Load rated power	Set this parameter according to actual conditions. Range: 0–99999.9.

Parameters	Description
Startup mode	Select a mode based on your actual needs. The supported scenarios of each model for different modes are as follows: • ST129CP: When one unit is connected, VSG mode or off-grid mode can be selected; when multiple units are connected, only off-grid mode is supported. • ST500CP/ST200CS/ST255CS/ST510CS: When one unit is connected, VSG mode or off-grid mode can be selected; when multiple units are connected, only VSG mode is supported. • ST835CS: When one unit is connected, only off-grid mode is supported; when multiple units are connected, only VSG mode is supported.
System waiting time	Default value: 60. Range: 0–100.
System timeout	Default value: 200. Range: 0–0,240.

- Grid-connected startup
  When the device is in the grid-connected status, select **Grid-connected startup** to start all the devices in the plant. After a successful startup, the **Running status** will show “Grid-connected”.

  > At least one LC is needed to start the system. The system starts the LC first, and then the PV system.

- When ATSs are connected, the following options are available for **Startup method**:
  - ATS grid-connected startup: Ensure that the diesel generator circuit breaker QF2 is in the open state. Switch on the grid connection circuit breaker QF1 manually. Then, apply this startup method.
  - ATS off-grid startup (VSG mode): Ensure that the grid connection circuit breaker QF1 and diesel generator circuit breaker QF2 are in the open state. Then, apply this startup method.
    Configure the black start parameters before proceeding with the startup. For details, refer to parameter configuration.
  - ATS off-grid startup (diesel generator): Ensure that the grid connection circuit breaker QF1 is in the open state. Switch on the diesel generator circuit breaker QF2 manually. Then, apply this startup method.
  - ATS grid-connected startup (bypass switch on): Ensure that the bypass switch is in the closed state and the diesel generator circuit breaker QF2 is in the open state.

Switch on the grid connection circuit breaker QF1 manually. Then, apply this startup method.

- ATS startup (bypass switch on, diesel generator): Ensure that the bypass switch is in the closed state and click **Diesel generator startup**. Switch on the diesel generator circuit breaker QF2 manually. Then, apply this startup method.

Step 3 Select the **Operation mode**.

Two operation modes are available, Gateway meter connected and Gateway meter not connected. When the system is in Stop state, you can select Gateway meter connected or Gateway meter not connected for startup.

Step 4 When the system is connected to gateway meter, **Auto on/off-grid switching** can be enabled. When this function is enable, the system will switch between grid-connected startup and off-grid startup according to the voltage changes at the grid-connection point.

> System auto grid-connection and off-grid is not supported in the bypass mode.

Step 5 Enable or disable **Auto-start on recovery from system fault**. This function is enabled by default. When this function is enabled, if a fault occurred in the ESS, the plant will restart automatically after recovering from the ESS fault.

> System auto-startup is not supported in the bypass mode.

Step 6 Click **One-click startup** to perform startup, and click **Yes** in the pop-up dialog box.

--End

One-click shutdown

Users can click **One-click shutdown** to stop the devices in the plant. At this time, the running status will be “Stop”.

View Operation Log

The detailed will be shown on the screen when the off-grid/grid-connected start/stop task is executed.

8 Energy Management

Users can control the energy dispatch of ESS by switching the operating mode of grid-connected active power, grid-connected reactive power, or backup operation, etc.

Set the **Country/region** to Europe by referring to 11.3.7 Setup Wizard.

8.1 Grid-connected active power

Users can select the operating mode of grid-connected active power as needed to achieve effective management and utilization of electricity.

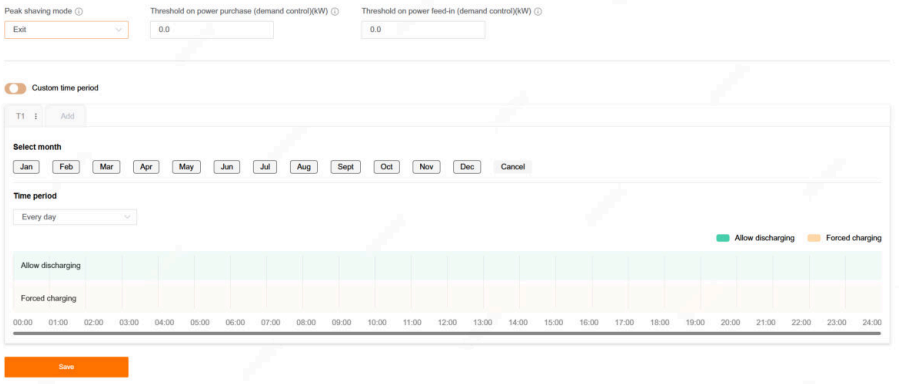
> Only one grid-connected active power control strategy can be enabled at a time.

8.1.1 Self-Consumption

This mode maximizes the use of PV output and the battery energy to power the load, thus minimizing grid energy consumption. You can configure specific time periods for battery charging/discharging based on tariffs in different time periods to reduce electricity cost.

Step 1 Select **Energy management** > **Grid-connected active power**.

Step 2 Select the **Self-consumption** mode.



Step 3 Enable or disable **Peak shaving mode**.

- If **Peak shaving mode** is set to **Commissioning**, the system will implement control based on the Reserved SOC for peak shaving and the demand control status.
  a. Define **Reserved SOC for peak shaving** (%). If the system SOC is higher than the setpoint, the battery discharges to support the load. If the system SOC is lower than this setpoint, energy is purchased from the grid. When the Purchase energy with limited power is reached, the battery continues to discharge to meet the load demand. The default value is 70.0.

> The reserved SOC for peak shaving will take effect only when both of the following conditions are met:
> - The reserved SOC for peak shaving ≥ the power backup lower SOC threshold + 2%.
> - The reserved SOC for peak shaving cannot exceed the SOC upper limit.

b. Set the time periods.

1. Select months for the current time period. You can set different time periods based on seasonal energy demand patterns.
2. Set the cycling mode of **Threshold on power purchase (demand control)** and **Threshold on power feed-in (demand control)**.
   - **Every day** (default): The set **Threshold on power purchase (demand control)** and **Threshold on power feed-in (demand control)** apply to all days. This option is ideal for scenarios where the daily energy demand is relatively stable.
   - **Working days and non-working days**: Click the  icon following the date to set it as a working day or non-working day. At least one working day and one non-working day must be set. After changing, **Time-of-use strategy**, **Time plan**, and **Demand control** will be updated simultaneously.
     Set different values in **Threshold on power purchase (demand control)** and **Threshold on power feed-in (demand control)** based on electricity usage on working days and non-working days.
3. To add more time periods, click **Add** to the right of the default time period. Up to 4 time periods can be added.

   > To delete a time period or modify its name, select a specific one and click the icon ⋮.

4. In the time bars **Threshold on power purchase (demand control)** and **Threshold on power feed-in (demand control)**, click the target time periods to add new ones. Drag and drop the left and right edges of the periods to adjust the duration. The number of time periods cannot exceed 12.

   > The periods for **Threshold on power purchase (demand control)** and **Threshold on power feed-in (demand control)** can overlap.

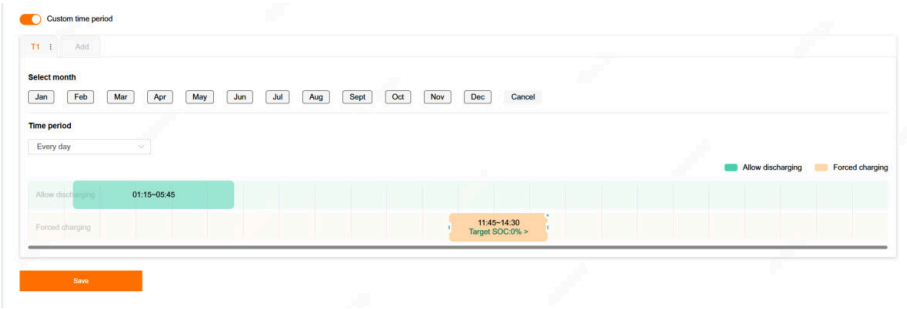
5. In the **Threshold on power purchase (demand control)** column, click an existing time period, and in the **Power (kW)** dialog box, enter the upper limit of the allowable energy purchase power. Default value: 0.0. Range: [0.0, 999999.9]. Click **Confirm**.
6. In the **Threshold on power feed-in (demand control)** column, click an existing time period, and in the **Power (kW)** dialog box, enter the upper limit of the allowable energy feed-in power. Default value: 0.0. Range: [0.0, 999999.9]. Click **Confirm**.

- When **Peak shaving mode** is set to **Exit**:
  a. In **Threshold on power purchase (demand control) (kW)**, set the power import upper limit for the system to purchase energy from the grid. Default value: 0.0. Range: [0.0, 999999.9]. When the energy purchase power exceeds this threshold, the excess power will be drawn from the battery, helping reduce the user's electricity cost.
  The power supply priority for the loads is: PV > grid (within threshold) > battery.

  > This threshold does not apply during forced charging time periods. In this case, the limit is determined by the **Power limit for energy purchase** set in grid-connected power control. If **Purchase energy with limited power** is not enabled, there will be no restriction on battery charging.

  b. In **Threshold on power feed-in (demand control) (kW)**, set the power export upper limit for the system to feed energy into the grid. Default value: 0.0. Range: [0.0, 999999.9]. After the thresholds are set, the system prioritizes load demand, and the surplus PV power is fed into the grid. Only when the feed-in power exceeds the **Threshold on power feed-in (demand control)** will the excess power be absorbed by charging the battery.
  The consumption priority of PV power is: load > grid (within threshold) > battery.

  c. Enable **Custom time period** to add a battery usage plan. Users can create custom charging/discharging time windows, allowing the system to make the most of the PV output in on-peak hours and charge the battery properly in off-peak hours. In this way, electricity cost is reduced.



  1. Select months for the current time period. You can set different time periods based on seasonal energy demand patterns.
  2. Select the cycling mode of **Allow discharging** and **Forced charging**.
     - **Every day** (default): The set **Allow discharging** and **Forced charging** apply to all days. This option is ideal for scenarios where the daily energy demand is relatively stable.
     - **Working days and non-working days**: Click the ⇋ icon following the date to set it as a working day or non-working day. At least one working day and one non-working day must be set. After changing, **Time-of-use strategy**, **Time plan**, and **Demand control** will be updated simultaneously.

Set different **Allow discharging** and **Forced charging** for working days and non-working days.

3. To add more time periods, click **Add** on the right of the default time period.

   To delete a time period or modify its name, select a specific one and click the icon ⋮.

4. On the **Allow discharging** time bar, click the corresponding time periods to add new discharging periods. Then, drag the left or right edge of the periods to adjust the duration. Up to 12 time periods can be added. Within the specified time periods, the battery is allowed to discharge to power the loads.
5. On the **Forced charging** time bar, click the corresponding time periods to add new charging time periods. Then, drag the left or right edge of the time periods to adjust the duration. Up to 12 time periods can be added. Click the added time period, and in the pop-up dialog box, enter the target charging SOC in **Target SOC (%)**. Default value of **Target SOC**: 0. Range: [0, 100]. Click **Confirm**.
   In the specified time period, the battery is charged at its maximum allowable power until reaching the preset target SOC.

   - Battery discharging and forced charging windows can overlap. If a time window allows both battery discharging and forced charging, forced charging will be executed first.
   - During unscheduled periods, the battery is not allowed to discharge or be charged by drawing power from the grid. In this case, the battery can only be charged by PV power.

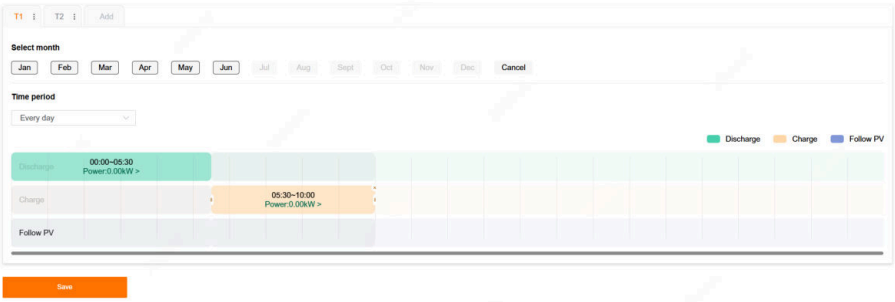
Step 4 Click **Save** to save the settings.

--End

8.1.2 Time Plan

The time plan mode is mainly used in electricity trading scenarios. By leveraging the difference between peak and off-peak electricity prices, you can manually set the time periods and corresponding power for battery charging and discharging to maximize economic benefits. It is recommended to set discharge periods during price peaks and charge periods during price valleys.

Step 1 Choose **Energy management** > **Grid-connected active power**, and select **Time plan**.



Step 2 Select months for the current time period. You can set different time periods based on seasonal energy demand patterns.

Step 3 Select the cycling mode of the battery charging/discharging plan.

- **Every day** (default): The set charging/discharging plan applies to all days. This mode is ideal for scenarios where the daily electricity price is relatively consistent.
- **Working days and non-working days**: Click the ⇋ icon following the date to set it as a working day or non-working day. At least one working day and one non-working day must be set. After changing, **Self-consumption**, **Time-of-use strategy**, and **Demand control** will be updated simultaneously.
  The charging/discharging time periods can be set separately for working days and weekends.

Step 4 To add more time periods, click **Add** on the right of the default time period.

> To delete a time period or modify its name, select a specific one and click the icon ⋮.

Step 5 Set the battery discharging and charging slots within a day.

a. On the **Discharge** time bar, click the corresponding time periods to add new discharging slots. Then, drag the left or right edge of the time periods to adjust the duration. The time period is measured in hours by default.

b. Click the time period. In the Power field, enter the discharging power for the battery. The battery will discharge at the specified discharging power within the set time period.

c. On the **Charge** time bar, click the corresponding time periods to add new charging time periods. Then, drag the left or right edge of the periods to adjust the duration.

d. Click the time period. In the Power field, enter the charging power for the battery. The battery will be charged at the specified charging power within the set time period.

e. On the **Follow PV** time bar, click the corresponding time periods to add new PV-following periods. Then, drag the left or right edge of the time periods to adjust the duration. Within the time period, the rules for ESS charging power are as follows:

- When PV output power is greater than or equal to the maximum ESS charging power, the maximum ESS charging power is applied for charging.
- When PV output power is less than the maximum ESS charging power, the actual PV output power is applied for charging.

- The charging, discharging, and PV-following periods cannot overlap.
- During unscheduled periods, the battery is not allowed to discharge or to be charged by drawing power from the grid. It can only be charged by PV power.

Step 6 Click **Save** to save the settings.

--End

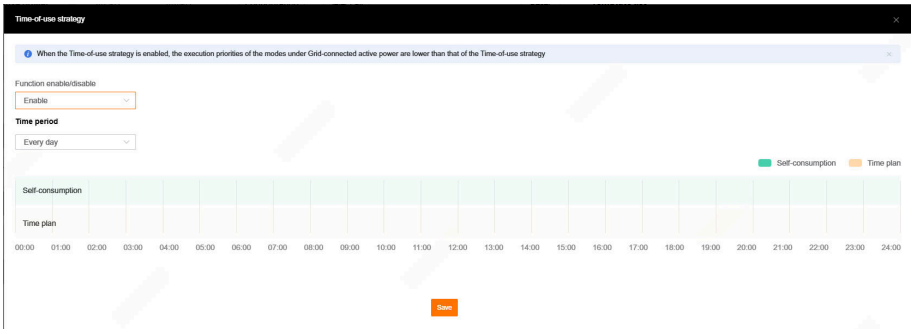
8.1.3 Time-of-Use Strategy

This strategy is mainly used to customize the switching between self-consumption mode and time plan mode by time periods so as to maximize economic benefits.

This feature is supported in EMS300CP-SV100.001.00.P027 or later.

Step 1 Select **Energy management** > **Grid-connected active power**.

Step 2 Click **Time-of-use strategy**.



Step 3 Select **Enable** in **Function enable/disable** to enable the time-of-use strategy.

When time-of-use strategy is enabled, the execution priorities of the modes under Grid-connected active power are lower than those of the Time-of-use strategy.

Step 4 In the **Time period** drop-down list, select the days on which plan applies.

You can apply the plan to every day, or set different charging/discharging plans respectively for working days and non-working days.

- **Every day** (default): The set plan applies to all days.
- **Working days and non-working days**: Click the icon following the date to set it as a working day or non-working day. At least one working day and one non-working day must be set. After changing, **Self-consumption**, **Time plan**, and **Demand control** will be updated simultaneously.
  Set different values in periods separately for different power usage scenarios on working and non-working days.

Step 5 Set the operating time periods for self-consumption mode and time plan mode within a day.

a. Click a time period on the **Self-consumption** time bar to add it (with a minimum interval of 15 minutes). You can adjust the time range by horizontally dragging the left and right edges of the time period with the mouse.
b. Click the time period. In the **Settings** window, set the **Peak shaving mode**, **Threshold on power purchase (demand control) (kW)**, and **Threshold on power feed-in (demand control) (kW)**. During the specified time period, the system operates according to the self-consumption strategy. For details, see steps 3 to 5 in 8.1.1 Self-Consumption.
c. Click a time period on the **Time plan** time bar to add it (with a minimum interval of 15 minutes). You can adjust the time range by horizontally dragging the left and right edges of the time period with the mouse. Within the specified time period, the system operates according to the time plan strategy.

> The time periods for self-consumption and time plan modes cannot overlap.

Step 6 Click **Save** to save the settings.

--End

8.1.4 Forced Mode

The forced mode is mainly used in battery O&M to ensure it operates in compliance with the preset charging/discharging mode and power. Restore the system to the previous working mode after maintenance work is completed.

> This mode only applies to C&I or residential ESS; it does not control PV.

Step 1 In the navigation bar, select **Energy management** > **Grid-connected active power**.

Step 2 Select **Forced mode**.

Step 3 In the **Charging/discharging command** drop-down list, select the desired action based on the actual situations.

- **Stop**
  Stop battery charging or discharging manually. The battery enters standby mode.
- **Charge**
  Enter a power value in **Charging/discharging power**. The battery will be charged at the set charging power until it is fully charged.
- **Discharge**
  Enter a power value in **Charging/discharging power**. The battery will discharge at the set discharging power until it is fully discharged.

Step 4 Click **Save** to save the settings.

--End

8.1.5 VPP Dispatch

In VPP mode, the system operates according to the feed-in power and battery charging/discharging commands from the VPP provider. The system supports API-based command transmission and control.

Commands are received via the iSolarCloud platform and issued to the EMS300CP controller for execution, enabling ESS control. Refer to API usage specification for details.

Step 1 In the navigation bar, select **Energy management** > **Grid-connected active power**.

Step 2 Select the **VPP** mode.

Step 3 Click **Save** to save the settings.

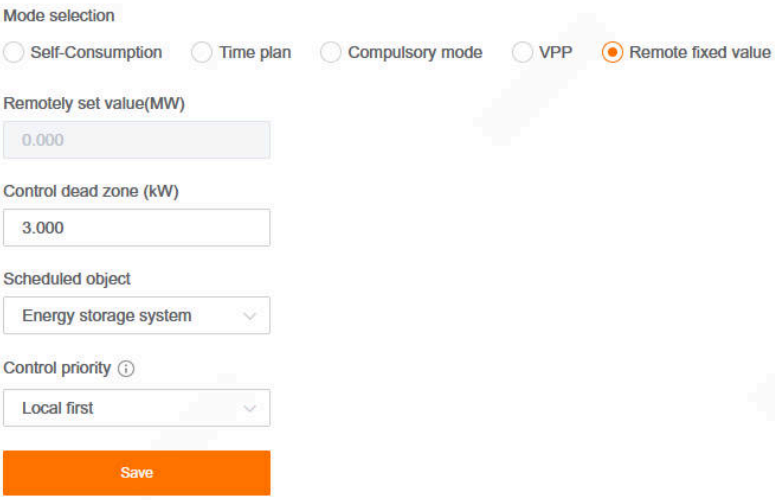
--End

8.1.6 Remote Fixed Value

This function is used to make the plant output active power according to the target value remotely set by the third-party scheduling system.

Step 1 Choose **Energy management** > **Grid-connected active power**.

Step 2 Select the **Remote fixed value** mode.



Step 3 Configure the following parameters as needed:

Parameter	Description	Value
Remotely set value	Displays the active power value set remotely by the third-party dispatch system.	Display only, no need to configure.

Parameter	Description	Value
Control deadband (kW)	Recommended value: 1% of the rated power. When the change in active power is less than this threshold, the system continues to run at the original power level. It defines the range within which the target active power value can fluctuate. For example, if the target active power of the grid-connected point is 10 kW, and the deadband is set to 5 kW, then actual active power may fluctuate between 5 kW and 15 kW during operation, which is within the acceptable range.	Range: [0, max (10, 0.03*ESS rated power)]. Default value: 3.000.
Dispatched object	This parameter is available only when the **Control priority** is set to **Dispatch first**. It defines the closed-loop point for the remotely set value. • **Grid connection point**: Adjust the power at the grid connection point to the setpoint. • **Energy storage system**: Adjust the ESS power to the setpoint.	Default value: **Energy storage system**.
Control priority	• **Local first**: When the power command from the third-party dispatch system conflicts with the local control strategy, the local control strategy takes precedence. • **Dispatch first**: When the power command from the third-party dispatch system conflicts with the local control strategy, the third-party dispatch control takes precedence, while the	The default value is **Local first**.

Parameter	Description	Value
	overload protection function remains effective.	

Step 4 Click **Save** to save the settings.

--End

8.2 Grid-connected Reactive Power

8.2.1 Power Factor Control

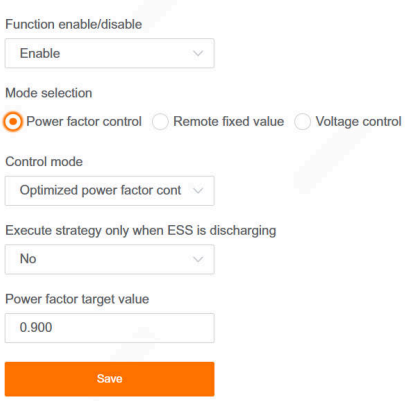
Used to adjust the power factor to reduce the power factor adjustment charges.

Step 1 Choose **Energy management** > **Grid-connected reactive power**.

Step 2 Set **Function enable/disable**.

- **Enable**: Enable the reactive power control function. Proceed to subsequent configurations.
- **Disable**: Disable the reactive power control function.

Step 3 Choose **Power factor control** in **Mode selection**.



Step 4 Choose a **Control mode**.

- In **Optimized power factor control** mode (default), configure the following parameters:

Parameter	Description
Execute strategy only when ESS is discharging	- **Yes**: When the grid power factor decreases, the power factor control strategy will only be executed during discharging of the ESS. - **No**: When the grid power factor decreases, the power factor control strategy will be executed during charging, discharging, and zero power output of the ESS.

Parameter	Description
Power factor target value	Range: 0.800–1.000; 0.900 by default. When the power factor falls below the set value, the system will automatically calculate the reactive power target value based on this target value and the active power at the grid connection point, and coordinate with the PV-ESS system for reactive power regulation.

- **Normal mode**: The power factor can be set with a positive or negative sign, and the following parameters need to be configured.

Parameter	Description
Execute strategy only when ESS is discharging	- **Yes**: When the grid power factor decreases, the power factor control strategy will only be executed during discharging of the ESS. - **No**: When the grid power factor decreases, the power factor control strategy will be executed during charging, discharging, and zero power output of the ESS.
Power factor target value	Range: -1.000– - 0.800 or 0.800–1.000; 0.900 by default. If the absolute value of the power factor is less than the set target value, the target reactive power value of the grid-connection point can be calculated on the basis of the set target value and the active power value of the grid-connection point, and then the reactive power can be regulated by the ESS and PV system. When the directions of reactive power and active power are the same, the power factor is positive; when the directions of reactive power and active power are opposite, the power factor is negative.
Power factor control deadband	Define the allowable fluctuation range for the target power factor value. Range: 0.001–0.200; 0.010 by default.

- **Four-quadrant control mode**: This mode supports setting different power factor values for charging and discharging. The following parameters need to be configured:

Parameter	Description
Execute strategy only when	- **Yes**: When the grid power factor decreases, the power factor control strategy will only be executed during discharging of the ESS.

Parameter	Description
ESS is discharging	- **No**: When the grid power factor decreases, the power factor control strategy will be executed during charging, discharging, and zero power output of the ESS.
Charging power factor target value	Range: -1.000– - 0.800 or 0.800–1.000; 0.900 by default. If the absolute value of the charging power factor is less than the set target value, the target reactive power value of the grid-connection point can be calculated on the basis of the set target value and the active power value of the grid-connection point, and then the reactive power can be regulated by the ESS and PV system. When the directions of reactive power and active power are the same, the power factor is positive; when the directions of reactive power and active power are opposite, the power factor is negative.
Discharging power factor target value	Range: -1.000– - 0.800 or 0.800–1.000; 0.900 by default. If the absolute value of the discharging power factor is less than the set target value, the target reactive power value of the grid-connection point can be calculated on the basis of the set target value and the active power value of the grid-connection point, and then the reactive power can be regulated by the ESS and PV system. When the directions of reactive power and active power are the same, the power factor is positive; when the directions of reactive power and active power are opposite, the power factor is negative.
Power factor control deadband	Define the allowable fluctuation range for the target power factor value. Range: 0.001–0.200; 0.010 by default.

Step 5 Click **Save** to save the settings.

--End

8.2.2 Remote Fixed Value

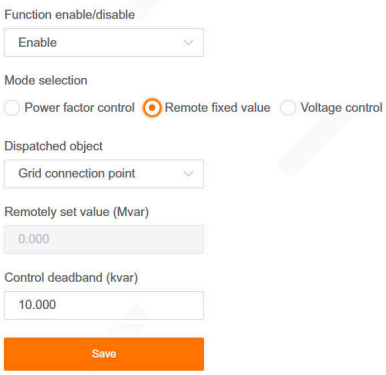
This function controls the plant to output reactive power according to the target value remotely set by the third-party dispatch system.

Step 1 Choose **Energy management** > **Grid-connected reactive power**.

Step 2 Set **Function enable/disable**.

- **Enable**: Enable the reactive power control function. Proceed to subsequent configurations.
- **Disable**: Disable the reactive power control function.

Step 3 Select the **Remote fixed value** mode.



Step 4 Configure the following parameters:

Parameter	Description	Value
Dispatched object	It defines the closed-loop point for the remotely set value.	• **Grid connection point** (default): The remotely set value in reactive power control will be used to perform closed-loop control for the power at the grid connection point. • **Energy storage system**: The remotely set value in reactive power control will be used to perform closed-loop control for the ESS.
Remotely set value	Displays the reactive power value remotely set by the third-party dispatch system.	Display only. No configuration is required.
Control deadband	It defines the range within which the target reactive power value can fluctuate. For example, if the target reactive power at the grid connection point is set to 10 kvar, and the deadband is set to 5 kvar, then the actual reactive power may	Range: [0, max (10, 0.03 × ESS rated power)]. **3.000** by default.

Parameter	Description	Value
	fluctuate between 5 kvar and 15 kvar during operation, which is within the acceptable range.	

Step 5 Click **Save** to save the settings.

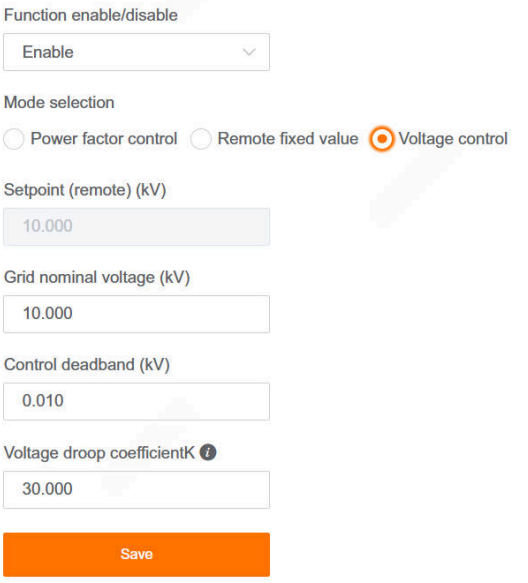
--End

8.2.3 Voltage Control

Control the plant's reactive power according to the preset fixed voltage value.

> This feature is available on EMS300CP-SV100.001.00.P028 or later.

Step 1 Choose **Energy management** > **Grid-connected reactive power**.



Step 2 Set **Function enable/disable**.

- **Enable**: Enable the reactive power control function. Proceed to subsequent configurations.
- **Disable**: Disable the reactive power control function.

Step 3 Select **Voltage control** in **Mode selection**.

Step 4 Configure the following parameters as needed:

Parameter	Description	Value
Setpoint (remote) (kV)	Displays the voltage value remotely set by the third-party dispatch system.	Display only. No configuration is required.
Control deadband	Defines the allowable fluctuation range for the target voltage value.	Range: [0, 1/5 of Rated grid voltage]. **0.010** by default.
Grid nominal voltage (kV)	Enter the actual rated voltage of the grid.	Range:[0.000,1000.000]. **10.000** by default.
Voltage droop coefficient K	The rate at which the voltage changes with the reactive power. Set this parameter according to grid requirements.	Range:[-500000.000,500000.000]. **30.0** by default.

Step 5 Click **Save** to save the settings.

--End

8.3 AI Mode

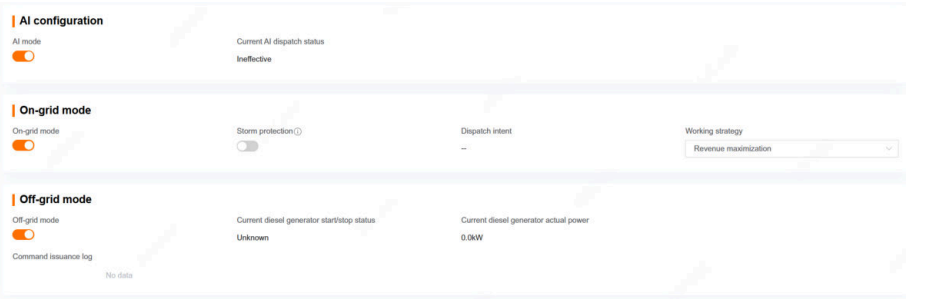
The system precisely predicts PV yield and load demand based on meteorological data and corporate power usage patterns. Through AI-based optimal strategies, it dynamically controls diesel generators, ESS charging and discharging, and load scheduling to maximize economic benefits.

Prerequisite

- The upper computer (iSolarInsight or iSolarCloud) has authorized the AI dispatch algorithm.

  This feature is available on EMS300CP-SV100.001.00.P035 or later.

Step 1 Click **Energy management** > **AI mode**.



Step 2 Click the toggle button next to AI mode to enable it.

Step 3 Enable or disable **On-grid mode** and **Off-grid mode**. Both are enabled by default, meaning that the AI mode takes effect in the corresponding operating status. When the controller communicates with iSolarCloud, the off-grid mode configuration does not take effect.

> - **When the Plant type is On-grid only**: Only the on-grid mode requires configuration.
> - **When the Plant type is Off-grid only**: Only the off-grid mode requires configuration.
> - **When the Plant type is On-grid / off-grid**: Both modes require configuration and cannot be turned off simultaneously.

Step 4 When **On-grid mode** is enabled, configure the **Operating strategy**.

- When the **Operating strategy** is set to **Revenue maximization**, enable or disable **Storm protection** as needed.
  - Enabled: Upon receiving an extreme weather alert, the system charges at maximum capacity until reaching the SOC upper limit, ignoring all preset restrictions. When the extreme weather ends, the system automatically restores to the operating mode before the alert.
  - Disabled (default): The system will work as per the preset operating strategy.
- When the **Operating strategy** is set to **Smart demand control**, the following settings are required.

  > This strategy cannot be enabled concurrently with the **Demand control** strategy.

  a. Set **Mode selection**.
  - **Max. contract demand**: Based on the **Max. allowable demand(kW)** set by the user, an optimal ESS charging/discharging strategy is determined through load forecasting to ensure that sufficient energy is available in the ESS for future demand reduction. All energy will be used for demand reduction, without considering arbitrage.

- **Max. actual demand**: No fixed demand is set for the plant. An optimal ESS charging/discharging strategy is determined through load forecasting to ensure sufficient energy is available in the ESS for future demand reduction.

b. Configure the active periods, time, and other parameters of **Smart demand control**.

- **Execution days**: Select **Working days** (set to execute from Monday to Friday) or **Custom** (user-definable).
- Execution time period: In the time bar, click before and after the corresponding time range to add an execution time period. Adjust the time period by horizontally dragging the left and right edges of the time range with the mouse. The time period is measured in hours by default.

  - In the **Max. contract demand** mode, only one time period is allowed. Clicking the time period enables users to set the **Max. allowable demand(kW)**, with a value range of [0.0, 999999.9]. The value must be greater than the minimum value of the smart demand forecast.
  - In the **Max. actual demand** mode, the number of time periods cannot exceed 12.

- **Statistical period**: Select the time window for demand calculation based on actual conditions.
- **Statistical frequency**: Select how frequently the system updates the current demand value based on actual conditions.

c. Click **Save** to apply the settings.

--End

When the communication between the controller and the upper computer is interrupted, the system responds according to the following logic:

- If active power follows local operating strategies, the controller resumes executing the local strategies.
- If active power follows non-local operation strategies, the controller operates according to the operating mode set for dispatch in the Anomaly handling function.

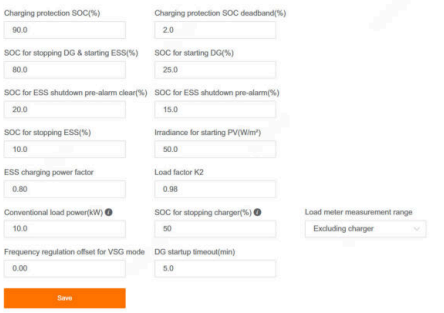
When the commands of this function trigger the controller protection function, the system prioritizes executing the protection commands.

8.4 Off-Grid Operation

In the event of off-grid startup, if the PV power system supplies both the ESS equipment and the loads, the user can set different PV active power for different power supply scenarios.

This function is applicable to off-grid scenarios.

Step 1 Choose **Energy management** > **Off-grid operation**.



The figure is for reference only. The actual user interface may differ.

Step 2 Configure the following parameters:

Parameter	Description	Value
Charging protection SOC	When the maximum SOC across energy storage units ≥ the threshold, the system stops charging. In PV-ESS scenarios, the system limits the PV generation power to bring the charging power to zero. In **ATS running (off-grid, diesel generator)** mode, the system automatically switches to the **ATS running (off-grid, VSG mode)** mode.	Default value: **90.0**. Range: 0.0 to 100.0.
Charging protection SOC deadband	It defines the range within which the target charging protection SOC value can fluctuate.	Default value: **2.0**. Range: 0.0 to 100.0.
SOC for stopping DG & starting ESS (1)	When the ESS SOC ≥ the threshold, a shutdown command is issued to the diesel generator.	Default value: **80.0**. Range: 0.0 to 100.0.
SOC for starting DG (1)	When the ESS SOC ≤ the threshold, a startup command is issued to the diesel generator.	Default value: **25.0**. Range: 0.0 to 100.0.

Parameter	Description	Value
SOC for ESS shutdown pre-alarm clear (3)	When the ESS SOC ≥ the threshold, set the measuring point "ESS shutdown pre-alarm" of the ATS to 0. The firmware version of EMS300CP must be P024 or later.	Default value: **20.0**. Range: 0.0 to 100.0.
SOC for ESS shutdown pre-alarm (3)	When the ESS SOC ≤ the threshold, set the measuring point "ESS shutdown pre-alarm" of the ATS to 1. The firmware version of EMS300CP must be P024 or later.	Default value: **15.0**. Range: 0.0 to 100.0.
SOC for stopping ESS	When the ESS SOC ≤ the threshold, a shutdown command is issued to the ESS. When a meter with the **Meter purpose** set to **Diesel generator meter** is present in the system and the diesel generator is detected to be operating normally, the system will issue a command to close the grid-connected circuit breaker.	Default value: **10.0**. Range: 0.0 to 100.0.
Irradiance for starting PV	When the PV irradiance ≥ the threshold, a startup command is issued to the ESS.	Default value: **50.0**. Range: 0.0–100.0.

Parameter	Description	Value
	This parameter applies to scenarios where PV irradiance data is obtained through a data logger.	
ESS charging power factor	When the maximum SOC across energy storage units < the charging protection SOC, PV active power setpoint = (ESS charging power factor × Min. chargeable power across energy storage units × Number of energy storage units) + (Load factor K2 × Load power).	Default value: **0.80**. Range: 0 to 1.00.
Load factor K2	When the ESS is fully charged and power is supplied only to the loads, PV active power setpoint = Load factor K2 × Load power.	Default value: **0.98**. Range: 0–1.00.
Conventional load power (2)	Set this parameter to the total power demand value of all electrical equipment and loads in the system except chargers. If the value is set too small, the power supplied to chargers will be too high, resulting in insufficient power supply. If the value is set too large, the power supplied to chargers will be too low, affecting charging time.	The default value is **10.0**. The value must be greater than 0. The maximum value cannot exceed the maximum discharge capacity of the ESS.
SOC for stopping charger (2)	When the SOC of the ESS (Number of available energy storage units × Remaining power of a single energy storage unit) < the value of this parameter, the system	Default value: **50**. Range: 0–100.

Parameter	Description	Value
	stops supplying power to the chargers to ensure the power demand of conventional loads. It is recommended to set this value to (Rated power of conventional loads × Required duration) / Total capacity of ESS.	
Load meter measurement range (2)	Select the data collection scope of the load electricity meter based on the actual device configuration: • **Excluding charger**: The data collected by the meter does not include the power consumption of chargers. • **Including charger**: The data collected by the meter includes the power consumption of chargers. This feature is available on EMS300CP-SV100.001.00.P029 or later.	Default value: **Excluding charger**.
Frequency regulation offset for VSG mode (3)	When the system is operating in **ATS running (off-grid, diesel generator)** mode, the VSG frequency is adjusted to finely control the ESS charging power. The core objective is to prevent continuous SOC decline that could lead to shutdown, ensuring that the ESS maintains a low-power charging state while meeting	Default value: **0**. Range: -0.30 to 0.30.

Parameter	Description	Value
	load demand and preventing generator overload. Modify the parameter as follows: **a.** Shut down the system using one-click shutdown, and adjust this parameter in steps of 0.01–0.02 Hz (for example, 0.02 Hz). **b.** Start up the system. After ATS off-grid startup (diesel generator) or ATS off-grid startup (VSG mode) and then switching to ATS running (off-grid, diesel generator), this parameter takes effect. **c.** If, after startup, the ESS charging power meets the low-power charging requirement, no further adjustment is needed. If the ESS charging power does not meet the requirement, return to step a and continue adjustment. The recommended low-power charging range is ≤ 20 kW. If this affects user loads, it may be further reduced to 10 kW.	
DG startup timeout (4)	The waiting time after the digital output (DO) issues the diesel generator startup/ shutdown command. If this time is exceeded, the system assumes the diesel generator has started up or shut down.	Default value: **5.0**. Range: 0–15.0.

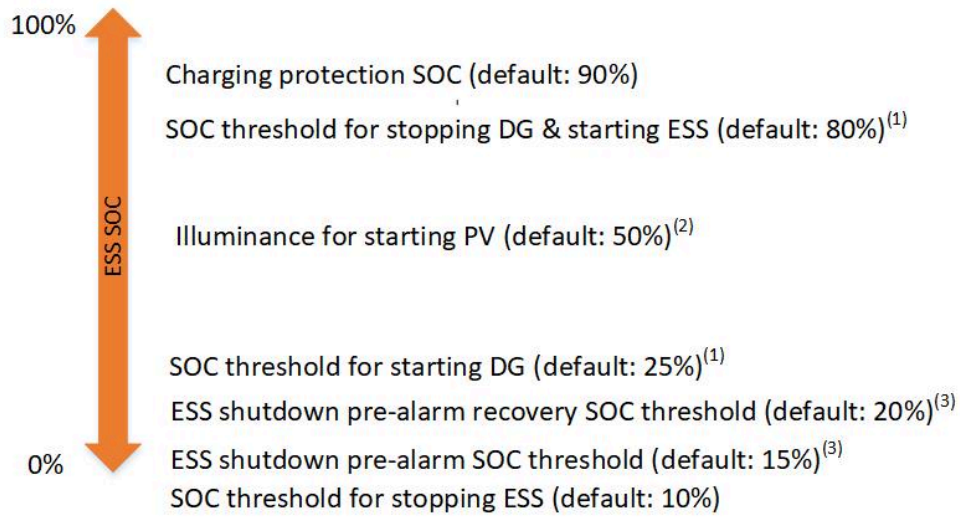
Parameter	Description	Value
DG rated active power (1)	Set the rated active power of the connected diesel generator. When the developer users set the **Diesel generator rated power source** to **Total power setting**, the O&M users need to configure this parameter.	Default value: **125.0**. Range: [0.0,99999.0].

(1) This parameter is displayed only when diesel generators are connected to the plant.
The system supports two diesel generator access methods:

- RS485 communication access: Connect the diesel generator controller through the RS485 interface. For details, see 2.8.7.1 Add Diesel Generator of System-Defined Model.
- DO: Connect the diesel generator through the DO. For details, see 11.8.4 DO for configuring automatic control of the corresponding DO of the diesel generator.

(2) This parameter is displayed only when chargers are connected to the system.
(3) This parameter is displayed only when ATSs are connected to the system.
(4) This parameter is displayed only when diesel generators and ATSs are connected to the system.

The illustration of SOC parameter settings and actual ESS SOC values under the **Off-grid operation** control strategy is as follows:



Step 3 Click **Save** to save the settings.

--End

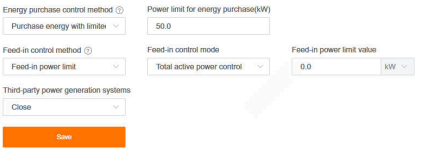
9 Power Control

Set the **Country/region** to Europe by referring to 11.3.7 Setup Wizard.

9.1 Grid-Connected Power Control

To ensure electrical safety and regulatory compliance, users need to set a proper feed-in power limit based on the requirements of the local grid operator, preventing the feed-in power of the system from exceeding the allowable range. In addition, users can set a power limit for energy purchase based on their capacity demands to prevent energy purchased from the grid exceeding the allowable range.

Step 1 Choose **Power control** > **Grid-connected power control**.



Step 2 In the **Energy purchase control method** drop-down list, select **No limit**, **Purchase energy with limited power**, or **Branch power purchase threshold**.

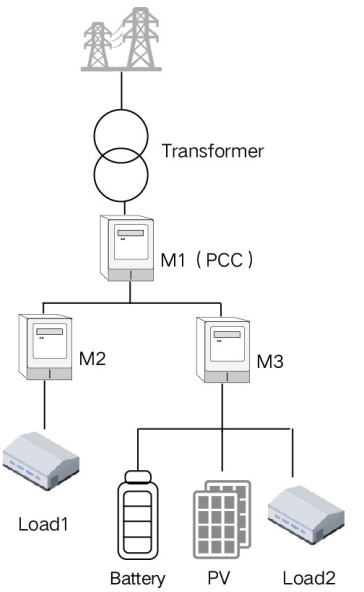
- **No limit**: Indicates no limit on power purchase from the grid.
- **Purchase energy with limited power**: Indicates that there is a power limit for purchasing energy from the grid. The **Purchase energy with limited power** must be set. Enter a proper power limit for energy purchase based on the rated current of the main power source device that is connected to the system or other maximum power demand requirements.
- **Branch power purchase threshold**: This control method is applicable to scenarios where the full plant is controlled based on purchase energy with limited power, while the power purchase threshold in certain areas within the plant requires dynamic control. The **Power limit for energy purchase** must be set to achieve multi-zone flexible control.

  The firmware version of EMS300CP must be P025 or later.

  Example scenario:

  - Plant-level settings: Set the **Power limit for energy purchase** to 866 kW, and use meter M1 for monitoring. (This meter does not need to be connected to the system.)
  - Branch 1: Load-only circuit (Load1), equipped with meter M2. Set the **Meter purpose** of M2 to **Dynamic demand threshold**. It is recommended to set the **Access type** to **Load electricity meter**. For detailed instructions, see Edit Meter.

- Branch 2: Integrated PV-ESS-Load branch, equipped with meter M3. It is recommended to set the **Access type** to **PoC meter**. This branch is required to implement self-consumption, zero export, and demand control. The **Dynamic power purchase threshold** = 866 - Real-time energy purchasing power monitored by M2.



Step 3 In the **Feed-in control method** drop-down list, select **No limit** or **Feed-in power limitation**.

Step 4 If **Feed-in power limitation** is selected, you need to select a unit for the target feed-in power. Options include **kW** and **%**.

Step 5 When the unit **kW** is selected, set a proper feed-in power value based on local regulatory requirements.

Step 6 When the unit **%** is selected, select a basis for limiting the grid-connected power from the **Feed-in power limit ratio calculation basis** drop-down list.

Feed-in power limit = Feed-in power limit ratio × (Feed-in power limit ratio calculation basis + Rated power of third-party power generation system)

- **Rated power**: The dispatched value is calculated based on the rated power of the energy storage unit that is connected.
- **Installed PV power**: The dispatched value is calculated based on the installed PV power of the inverter that is connected. Enter the **Total installed power of modules** based on the actual plant conditions.

Step 7 Set the **Feed-in control mode**.

- **Total active power control**: Default option. The system determines whether to trigger the control strategy based on the total active power.
- **Per-phase active power control**: The system determines whether to trigger the control strategy based on the active power of each phase.

- This function requires a three-phase four-wire meter to measure the A/B/C phase power.
- If **Per-phase active power control** is selected, **Demand control** and **Purchase energy with limited power** are not supported.

Step 8 In the **Third-party power generation systems** drop-down list, select **Open** or **Close**.

When third-party power generation equipment is present in the plant but not connected to the EMS300CP, this parameter must be set.

Step 9 If **Open** is selected in **Third-party power generation systems**, users can specify the rated power in **Rated power of third-party power generation system**. Range: 0–99999999. Unit: kW. Default value: **0**.

Step 10 Click **Save** to save the settings.

--End

9.2 DI Power Regulation

This function allows inverters, ESSs, and chargers to be controlled via signals through the DI ports for emergency stop or recovery.

Prerequisite

The EMS300CP has been connected to an emergency stop device.

Step 1 Choose **Power control** > **Digital input power regulation**.

Step 2 Set the **Emergency stop function**.

- **Shut down inverter**: Upon an emergency stop trigger, shutdown commands are issued to the inverters and chargers in the plant. When the emergency stop is triggered, the inverter stops feeding power to the grid and receiving power from the grid.
- **Shut down inverter and trip battery**: Upon an emergency stop trigger, shutdown commands are issued to the inverters and chargers, and a tripping command is issued to the battery. The inverter stops feeding power to the grid, and the battery ceases all interactions with the inverter or grid, neither charging nor discharging.
- **Off**: Disables the emergency stop function.

The emergency stop ports and functions supported vary by software version.

System Version	Emergency Stop Port	Function Description
EMS300CP-SV100.001.00.P019	DI10 (fixed)	Only supports the inverter emergency stop or battery tripping. If the inverter and battery are shut down upon an emergency stop trigger, a manual startup is required to resume operation.

System Version	Emergency Stop Port	Function Description
EMS300CP-SV100.001.00.P020/P021	DI1 (fixed)	Only supports the inverter emergency stop or battery tripping. If the inverter and battery are shut down upon an emergency stop trigger, an automatic startup is performed to resume operation.
EMS300CP-SV100.001.00.P022–P034	DI port configurable. For details, see 11.8.3 DI.	Only supports the inverter emergency stop or battery tripping. If the inverter and battery are shut down upon an emergency stop trigger, an automatic startup is performed to resume operation.
EMS300CP-SV100.001.00.P035 and later	DI port configurable. For details, see 11.8.3 DI.	Supports the emergency stop of the inverter, battery tripping, or the emergency stop of the charger. If the inverter, battery, and charger are shut down upon an emergency stop trigger, an automatic startup is performed to resume operation.

Step 3 When **Emergency stop function** is set to **Shut down inverter** or **Shut down inverter and trip battery**, configure **Emergency stop status** to specify the condition under which an emergency stop is triggered by the emergency stop signals.

- **Disconnect**: Emergency stop will be triggered when DI is disconnected.
- **Closed**: Emergency stop will be triggered when DI is closed.

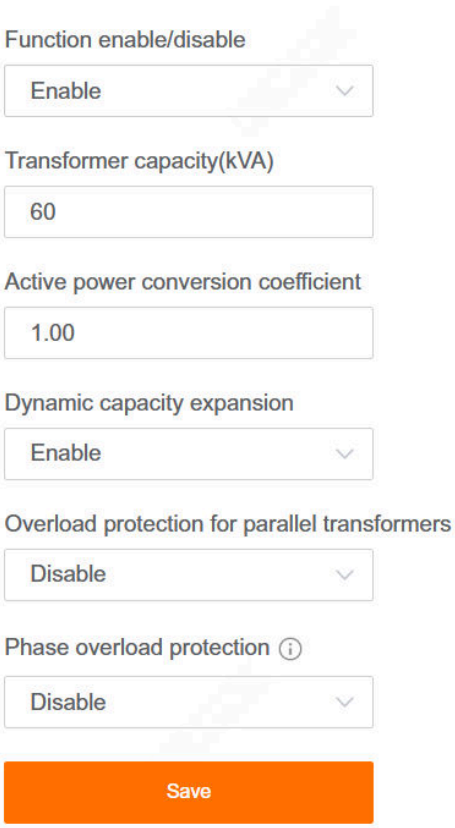
Step 4 Click **Save** to save the settings.

--End

9.3 Overload Protection

Overload protection is used to regulate the charging power of the ESS, so as to ensure the power of the transformer at the PoC does not exceed the rated capacity, thus preventing overload damage.

Step 1 In the navigation bar, select **Power control** > **Overload protection**.



Step 2 Set **Function enable/disable** to **Enable** to activate the **Overload protection** function.

- When only one overload monitoring meter is connected to the system and overload protection for a single transformer is required, **Overload protection for parallel transformers** is set to **Disable**. Configure the following parameters:

Parameter	Description	Value
Transformer capacity	The capacity of the transformer at the PoC. Set this parameter according to actual conditions.	Range: (0, 999999]. Default value: 1.
Active power conversion coefficient	Protection trigger threshold = **Transformer capacity** × **Active power conversion coefficient** (protection is activated when the power on the transformer side is greater than or equal to the threshold).	Range: [0.00, 1.00]. Default value: 1.00.

Parameter	Description	Value
Dynamic capacity expansion	- **Enable**: Prioritizes reducing the ESS charging power during overload. If it is reduced to zero and still overloaded, the ESS will start discharging. - **Disable**: Only reduces the ESS charging power during overload (ESS discharge is prohibited).	It is in **Enable** status by default.
Per-phase overload protection	When it is set to **Enable**, overload protection is triggered when the power of any single phase reaches or exceeds 1/3 of the protection trigger threshold. The per-phase overload protection function requires the meter to use a three-phase four-wire system for power measurement on phases A, B, and C.	**Disable** by default.

- When multiple overload monitoring meters are connected to the system and overload protection for multiple parallel-connected transformers is required, **Overload protection for parallel transformers** is set to **Enabled**, and the following parameters are required.

Parameter	Description	
Dynamic capacity expansion	- **Enable**: Prioritizes reducing the ESS charging power during overload. If it is reduced to zero and still overloaded, the ESS will start discharging. - **Disable**: Only reduces the ESS charging power during overload (ESS discharge is prohibited).	It is in **Enable** status by default.

Parameter	Description	
Transformer capacity	Set the capacity of the transformer connected to the current overload monitoring meter.	Range: (0, 999999].
Impedance voltage	Set the percentage of the impedance voltage for the current transformer.	Range: [0.00, 100.00]. Default value: 4.00.
Active power conversion coefficient	Protection trigger threshold = **Transformer capacity** × **Active power conversion coefficient**. Set to 0 to indicate that the transformer is excluded from overload protection.	Range: [0.00, 1.00]. Default value: 1.00.
DI port	Receives an external DI signal. If the circuit breaker connected to this DI port is open, the corresponding transformer will be excluded from overload protection. The corresponding DI port point should be configured as parallel transformer circuit breaker closing feedback. For details, please see 11.8.3 DI.	-
Remarks	Displays the configuration remarks for the DI port.	-

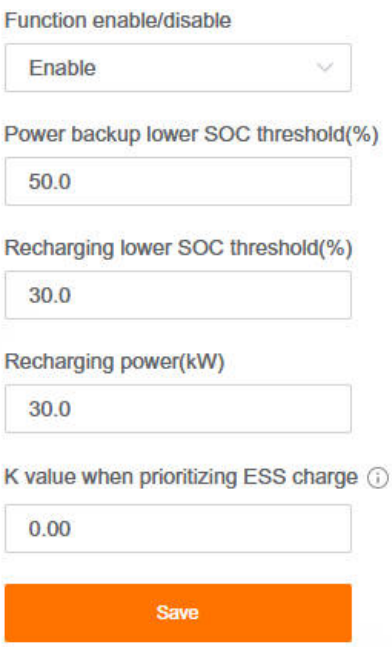
Step 3 Click **Save** to save the settings.

--End

9.4 Power Backup

Power backup is used to protect the charge level of the ESS, so that the ESS operates within the set SOC range when connected to the grid, and some energy is reserved to supply the loads in the event of a grid outage.

Step 1 Choose **Power control** > **Power backup**.



Step 2 Click ⌄ to set **Function enable/disable**.

- **Enable**: Enable the power backup function. Configure the following parameters:

Parameter	Description
Power backup lower SOC threshold	When the ESS SOC ≤ the threshold, the ESS is not allowed to discharge. Default value: 50.0. Range: 0.0–100.0.
Recharging lower SOC threshold	When the ESS SOC ≤ the threshold, the system begins recharging at the configured **Recharging power**. Recharging stops when the ESS SOC ≥ the **Power backup lower SOC threshold**. Default value: 30.0. Range: 0.0–100.0.
Recharging power (kW)	When the ESS SOC ≤ the **Recharging lower SOC threshold**, the ESS will be charged at this specified power.

Parameter	Description
	Default value: 30.0. Set this parameter according to actual conditions.
K value when prioritizing ESS charge	When the ESS SOC < the **SOC lower limit level 1 protection** threshold, if a minimum charging power is set for the ESS (for example, 0.10), the system allocates 10% of the ESS rated active power from the allocable power for charging. Default value: 0.00. Range: 0.00–1.00. This parameter takes effect only when chargers are connected to the system.

SOC in the table refers to the percentage of the current battery power to the total capacity of the battery, namely, the actual available battery power.

- **Disable**: Disable the power backup function.

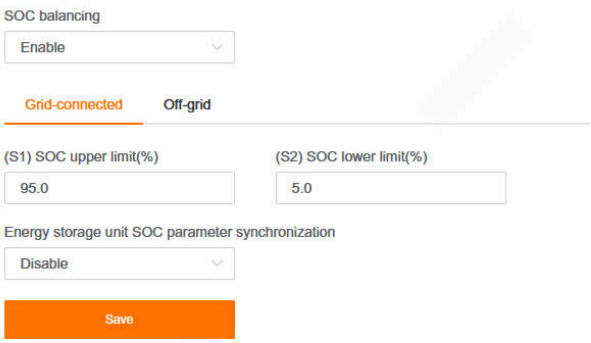
Step 3 Click **Save** to save the settings.

--End

9.5 SOC Protection

To ensure the safe and efficient operation of the ESS, you can configure the SOC protection thresholds to keep the system strictly within the specified SOC range during grid-connected operation.

Step 1 Choose **Power control** > **SOC protection**.



Step 2 Click ⌄ in **SOC balancing**.

- **Enable**: Enable the SOC balancing function. The system distributes power based on the SOC of each energy storage unit to keep the SOC across all energy storage cabinets at similar levels. At the individual energy storage cabinet level, SOC balancing is implemented by the LC.
- **Disable**: Disable the SOC balancing function.

Step 3 Configure the SOC balancing strategy in **Grid-connected** and **Off-grid** modes, respectively.

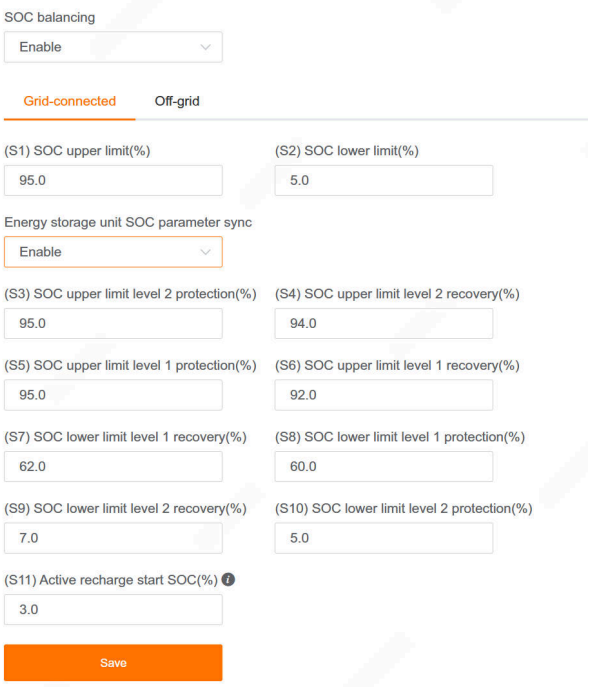
Step 4 Configure the following parameters as needed:

Parameter	Description	Range
SOC upper limit	When the ESS SOC ≥ the threshold and the system is in charging state, the system sends a zero-power command to the LC. Default value: 95.0%. The threshold must meet the following constraints: - SOC upper limit (%) ≥ SOC lower limit (%) + 7; - When **Energy storage unit SOC parameter sync** is enabled, the threshold must also satisfy: SOC upper limit (%) ≤ SOC upper limit level 2 protection (%).	- Grid-connected mode: [0.0, 100.0]. - Off-grid mode: Vary by model. • ST200CS and ST255CS: [3.0, 97.0]. • ST835CS: [5.0, 95.0]. • ST500CP and others: [0.0, 100.0].
SOC lower limit	When the ESS SOC ≤ the threshold and the system is in discharging state, the system sends a zero-power command to the LC. Default value: 5.0%. The threshold must meet the following constraints: - SOC lower limit (%) ≤ SOC upper limit (%) - 7; - When **Energy storage unit SOC parameter sync** is enabled, the threshold must also satisfy: SOC lower limit	

Parameter	Description	Range
	(%) ≥ SOC lower limit level 2 protection (%).	

Step 5 Setting **Energy storage unit SOC parameter sync**.

- **Enable**: The system will transmit the configured thresholds to the LC, which then implements SOC protection.



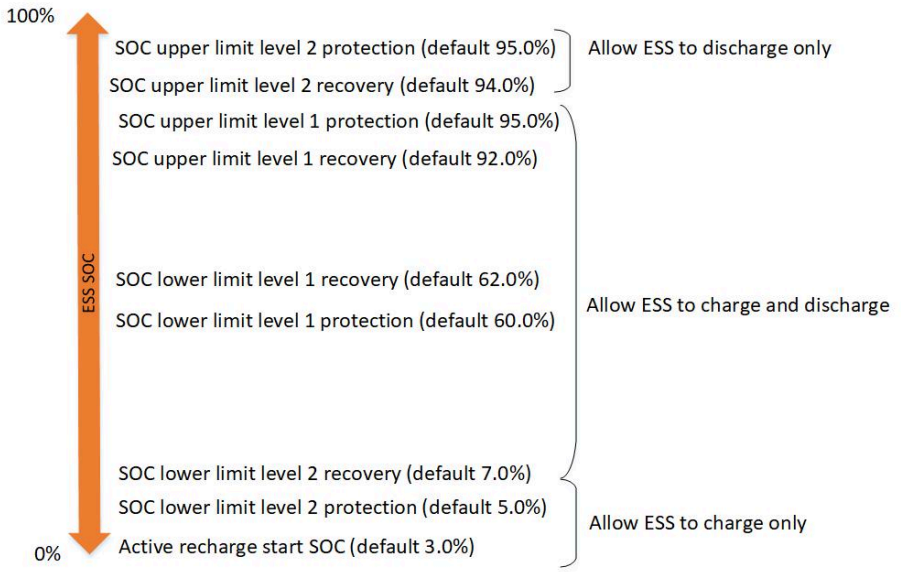
Parameter	Description
SOC upper limit level 2 protection	When the ESS SOC ≥ the threshold, the ESS is prohibited from charging. Default value: 95.0%. The threshold must meet the following constraints: - SOC upper limit level 2 protection (%) ≥ SOC upper limit (%); - SOC upper limit level 2 protection (%) > SOC upper limit level 2 recovery (%); - SOC upper limit level 2 protection (%) ≥ SOC upper limit level 1 protection (%).
SOC upper limit level 2 recovery	When the ESS SOC ≤ the threshold, the ESS resumes charging.

Parameter	Description
	Default value: 94.0%. The threshold must meet the following constraints: - SOC upper limit level 2 recovery (%) ≥ SOC upper limit level 1 recovery (%); - SOC upper limit level 2 recovery (%) < SOC upper limit level 2 protection (%);
SOC upper limit level 1 protection	When the ESS SOC ≥ the threshold, the system sends a notification. Default value: 95.0%. The threshold must meet the following constraints: - SOC upper limit level 1 protection (%) > SOC upper limit level 1 recovery (%); - SOC upper limit level 1 protection (%) ≤ SOC upper limit level 2 protection (%).
SOC upper limit level 1 recovery	Default value: 92.0%. The threshold must meet the following constraints: - SOC upper limit level 1 recovery (%) > SOC lower limit level 1 recovery (%); - SOC upper limit level 1 recovery (%) < SOC upper limit level 1 protection (%); - SOC upper limit level 1 recovery (%) ≤ SOC upper limit level 2 recovery (%).
SOC lower limit level 1 recovery	When the ESS SOC ≥ the threshold, the ESS resumes discharging. Default value: 62.0%. The threshold must meet the following constraints: - SOC lower limit level 1 recovery (%) > SOC lower limit level 1 protection (%); - SOC lower limit level 1 recovery (%) < SOC upper limit level 1 recovery (%).
SOC lower limit level 1 protection	When the ESS SOC ≤ the threshold, the system sends a notification. Default value: 60.0%. The threshold must meet the following constraints: - SOC lower limit level 1 protection (%) ≥ SOC lower limit level 2 protection (%); - SOC lower limit level 1 protection (%) < SOC lower limit level 1 recovery (%).

Parameter	Description
SOC lower limit level 2 recovery	When the ESS SOC ≥ the threshold and the system goes back to the lower level 1 protection status, the system is prohibited from discharging. Default value: 7.0%. The threshold must meet the following constraints: - SOC lower limit level 2 recovery (%) > SOC lower limit level 2 protection (%); - SOC lower limit level 2 recovery (%) ≤ SOC lower limit level 1 recovery (%).
SOC lower limit level 2 protection	When the ESS SOC ≤ the threshold, the ESS is prohibited from discharging. Default value: 5.0%. The threshold must meet the following constraints: - SOC lower limit level 2 protection (%) ≤ SOC lower limit (%); - SOC lower limit level 2 protection (%) < SOC lower limit level 2 recovery (%); - SOC lower limit level 2 protection (%) ≤ SOC lower limit level 1 protection (%).
Active recharge start SOC	When the ESS SOC ≤ the threshold, the system will trigger active recharging. Default value: 3.0%. This setting can only be configured in grid-connected mode. The configuration must comply with the model of the connected ESS and meet the following constraints: - For ST200CS, ST255CS, ST510CS, and ST835CS models: Active recharge start SOC (%) must be ≤ 5 and less than SOC lower limit level 2 protection (%), or can be set directly to 0. - For PT2.0UD and PT2.0HX models: Active recharge start SOC (%) must be ≥ 0 and less than SOC lower limit level 2 protection (%), or can be set directly to 0.

The valid range differs between grid-connected and off-grid modes:
- Grid-connected mode: [0.0, 100.0].
- Off-grid mode: Vary by model.
  - ST200CS and ST255CS: [3.0, 97.0].
  - ST835CS: [5.0, 95.0].
  - ST500CP and others: [0.0, 100.0].

The relationship between the configured SOC parameters of the ESS and the actual ESS SOC under the SOC protection strategy is shown in the following figure:



- **Disable**: In grid-connected operation, the system will convert the configured **SOC upper limit** and **SOC lower limit** into synchronized parameters for the energy storage unit and send them to the LC, which then implements SOC protection.

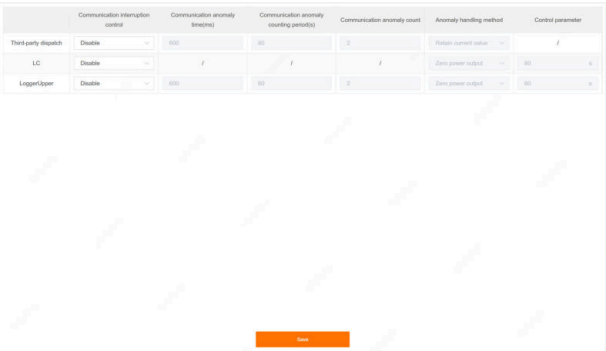
Step 6 Click **Save** to save the settings.

--End

9.6 Anomaly Handling

This function is applicable to automatically executing preset anomaly handling when there is a communication anomaly in Third-party dispatch, LC, or LoggerUpper devices to ensure the stable operation of the system.

Step 1 Choose **Power control** > **Anomaly handling**.



Step 2 Configure the following anomaly check settings as needed. If an anomaly occurs, the system will operate according to the configured **Anomaly handling method**.

Parameters	Description
Communication interruption control	• Enable: Enable anomaly check for the device. • Disable: Disable anomaly check for the device.
Communication anomaly counting period (s)	Anomaly handling can be triggered in the following two ways (these LC parameters cannot be configured for LC): • When a single communication anomaly lasts for a period longer than the set **Communication anomaly counting period**, the system triggers anomaly handling. • When the duration of a communication anomaly exceeds the set **Communication anomaly time**, the system records a communication anomaly event. If the number of communication anomalies occurring within the set **Communication anomaly counting period** reaches the set **Communication anomaly count**, the system triggers anomaly handling. The Communication anomaly counting period (s), Communication anomaly time (ms), and Communication anomaly count for third-party dispatch devices can be modified remotely.
Communication anomaly time (ms)	
Communication anomaly count	
Anomaly handling method	The available options for **Anomaly handling method** vary by device type. • For Third-party dispatch, Retain current value, Zero power output, Full-plant shutdown and History energy management mode are supported. In a cascading scenario, the slave device is not allowed to set the History energy management mode. • For LC, Zero power output is supported. • For LoggerUpper, Retain current value, Zero power output, and Full-plant shutdown are supported.
Control parameter (s)	Only when the **Anomaly handling method** is set to **Zero power output** does it need to be configured, indicating the time required for the system to ramp down from the original operating power to zero.

Parameters	Description
	Default value: 60. Range: [0, 600].

Step 3 Click **Save** to save the settings.

--End

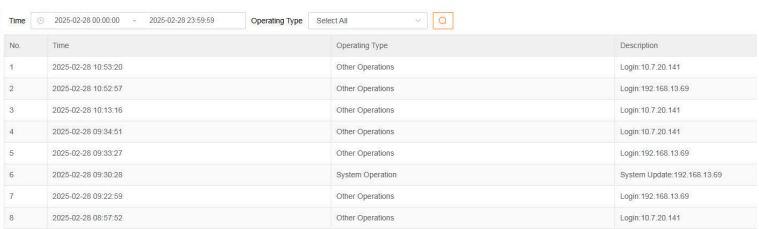
10 History Data

Users can view information such as operation log, history curve, fault records, and dispatch records in this function module.

10.1 Operation Log

It is used to record the Web operations. Users can view specific log content by setting the time range and operation type.

Step 1 Click **History data** > **Operation log**.



Step 2 Set the start and end time in **Time**, and click in **Operation type** to select the operation type.

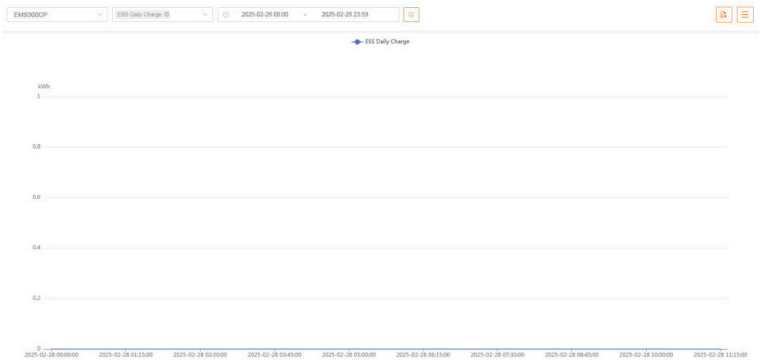
Step 3 Click on the right to view the operation log for the selected time period.

--End

10.2 History Curve

On this interface users can view the data records of parameters of every device in the plant by selecting the device and the parameter.

Step 1 Click **History data** > **History curve** to enter the corresponding interface.



Step 2 Click , select the device and parameter to be viewed, and set the start and end time.

Step 3 Click to view the history curve within the specified time period.

Users can select to view data records in a table or a chart. Click the icons in the following table to switch between display methods.

Icon	Description
	Switch to table form.
	Switch to curve form.

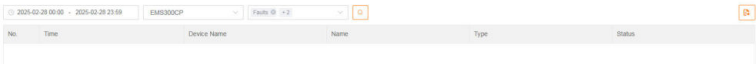
Step 4 Click to export the queried information to local for viewing.

--End

10.3 Fault Records

Search for relevant faults by different selection criteria.

Step 1 Click **History data** > **Fault records**.



Step 2 Set the start and end time and click the icon to select the device name and fault type.

Step 3 Click the icon to view the fault records in the set time period. The fault records mainly include the following information.

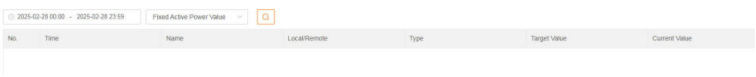
Parameter	Description
Time	The time when the fault occurs.
Device name	The name of the faulty device.
Name	Detailed description of the fault.
Type	There are three types of fault: **Fault**, **Warning**, and **Event**.
Status	The fault status.

Step 4 Click the icon to export the filtered information locally.

--End

10.4 Dispatch Record

Step 1 Click **History data** > **Dispatch records**.



Step 2 Set the start and end time, and click to select the parameter to be viewed.

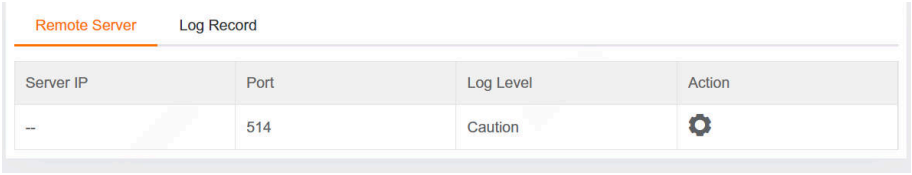
Step 3 Click to view the dispatch records within the specified time period.

--End

10.5 Syslog

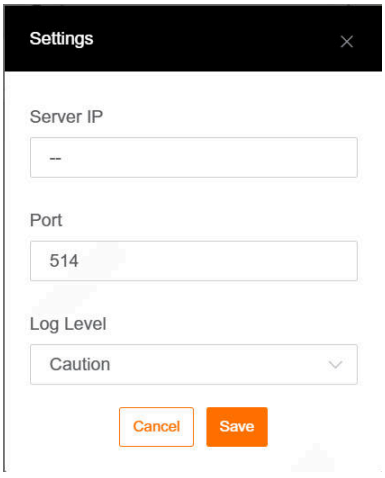
The Syslog feature records the system logs and operation logs of EMS300CP and supports uploading logs of specified levels to a remote server.

Choose **History data** > **Syslog**.



Set the Remote Server for Log Upload

1. Click the **Remote server** tab.
2. Click in the **Action** column to open the **Settings** window.



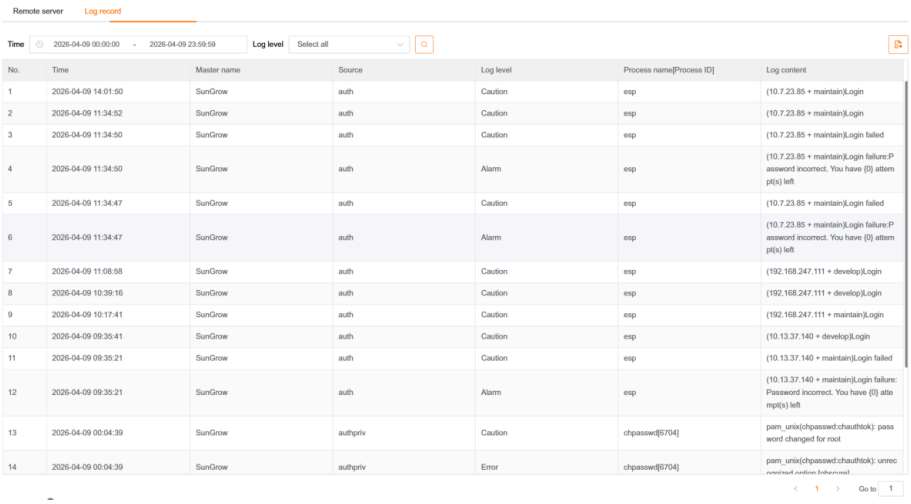
3. Configure the following parameters:
   - Server IP: The IP address of the remote server.
   - Port: The port number of the remote server.

- Log Level: The level of logs to be uploaded.

4. Click **Save** to save the settings.

View Log Record

1. Click the **Log record** tab.



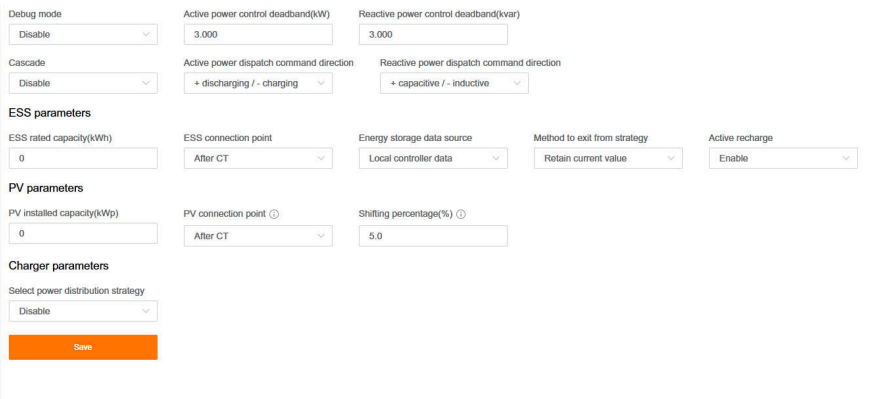
2. Select the start and end time of logs to be viewed in the **Time** selection box.
3. Set the level of logs to be viewed.
4. Click  to view all logs of the specified time period and log level.
5. (Optional) Click  to export logs to your local system.

11 System

11.1 Plant Parameters

This function is to configure the general parameters of operation, ESS, PV, and chargers.

Step 1 Choose **System** > **Plant parameters**.



Step 2 Configure the following general parameters and ESS parameters:

Parameter	Description	Value
Debug mode	• **Enable**: Enable the debug mode. If the debug mode is enabled, the power control command will not be sent to the DC/AC power converter unit or PV inverter. • **Disable**: Disable the debug mode.	Default value: **Disable**.
Active power control deadband	Set this parameter based on the actual power of the plant. It is recommended to set this parameter to 1% of the rated power. It defines the range within which the target active power value can fluctuate. For example, if the target active power of the grid-connected point is 10 kW, and the deadband is set to 5 kW, then the target active power of the grid-connected point can range from 5 KW to 15 kW.	Range: [0, max (10, 0.03*ESS rated power)]. Default value: 3.000.
Reactive power control	Set this parameter based on the actual power of the plant. It is recommended to set this parameter to 1% of the rated power.	Range: [0, max (10, 0.03*ESS rated power)].

Parameter	Description	Value
deadband	It defines the range within which the target reactive power value can fluctuate. For example, if the target reactive power of the grid-connected point is 10 kvar, and the control dead zone is set to 5 kvar, then the target reactive power of the grid-connected point can range from 5 kvar to 15 kvar.	Default value: 3.000.
Cascade	• **Enable**: Enable the function. In this case, select an option in **Master/slave controller setting**. • **Disable**: Disable the function.	Default value: **Disable**.
Master/slave controller setting	Set this parameter if **Cascade** is set to **Enable**. • **Master in cascade**: This controller is a master controller. • **Slave in cascade**: This controller is a slave controller.	Default value: **Master in cascade**.
Active power dispatch command direction	When the on-site dispatch command is reversed, set it to **+ charging / - discharging**. This feature is supported in EMS300CP, whose firmware version is P025 or later.	Default value: **+ charging / - discharging**.
Reactive power dispatch command direction	When the on-site dispatch command is reversed, set it to **+ inductive / - capacitive**. This feature is supported in EMS300CP, whose firmware version is P025 or later.	Default value: **+ inductive / - capacitive**.
Rated capacity of energy storage (kWh)	Set this parameter according to actual ESS rated power.	Range: [0, 9999999]. Default value: 220.
ESS connection point	Specify the connection point of the ESS.	**After CT** by default.

Parameter	Description	Value
Energy storage data source	• **Meter data**: Select this option when the meter type is an ESS electricity meter, from which the EMS collects relevant charging and discharging data. • **Local controller data**: The EMS collects relevant charging and discharging data from the local controller.	The default value is **Local controller data**.
Method to exit from strategy	• **Retain current value**: After exiting the strategy, the ESS will operate based on the original power. • **Apply zero power**: After exiting the strategy, the system will immediately issue a zero power command to the ESS.	Default value: **Retain current value**.
Active recharge	• **Enable**: Enable the active recharge function of the ESS, one-time only. • **Disable**: Disable the active recharge function of the ESS, one-time only. This feature is supported in EMS300CP, whose firmware version is P024 or later.	Default value: **Enable**.

Step 3 When the plant is connected to PV devices, further configure **PV parameters**.

Parameter	Description	Value
PV installed capacity	The actual PV installed capacity of the plant.	Range: [0, 9999999].
PV connection point	Specify the PV connection point. A third-party PV device must be connected after CT.	**After CT** by default.
Replacement percentage (%)	PV&ES replacement step = PV rated power × Replacement percentage	Range: [0.0, 100.0]. Default value: 5.0.

Step 4 When the plant is connected to chargers, further configure **Charger parameters**.

Parameter	Description	Value
Select power distribution strategy	When the connected chargers exclude HYC50-400 models, set up the following: • **Evenly distributed**: Allocate charging power evenly according to the quantity of charging EVs and grid power limits. • **First come first served**: Based on charger sequence and grid power limits, allocate power according to EV needs, prioritizing earlier-sequence EVs for quicker charging. • **Disable**: No power distribution strategy is enabled. When the connected chargers include HYC50-400 models, set up the following: • **Charger-level proportional distribution**: Power is distributed based on the distributable power of the current charger × (maximum demand power of each charger / sum of maximum demand power of all chargers). • **Disable**: No power distribution strategy is enabled.	Default value: **Disable**.

Step 5 Click **Save** to save the settings.

--End

11.2 Run Information

Click **System** > **Operating information** to enter the corresponding interface.


General Information IO Information Forwarding Information

Parameter Name	Current Value (Unit)
System Time	2025-02-28 11:47
ETH1 IP Address	192.168.13.140
ETH2 IP Address	192.168.52.238
ETH5 IP Address	12.12.12.12
Online Device	1Piece
Offline Device	0Piece
Total Number of Connected Devices	1Piece
CPU Utilization	19.2%
Memory Utilization	47.3%
Total number of LC	1Piece
Total LC Available	1Piece
Total Rated Power of Energy Storage	0.275MW
SOC Upper Limit	95%
SOC Lower Limit	5%
Maximum SOC	50.5%
Actual SOC	50.5%
Minimum SOC	50.5%
Maximum Charging Power Allowed	275.0kW
Maximum Discharging Power Allowed	275.0kW
Charging Complete	Incomplete
Discharge Completed	Incomplete
Charge Locked	No

On this interface users can view **General information**, **I/O information**, and **Forwarding information**.

11.3 System Maintenance

11.3.1 System Update

The system allows you to use the update package downloaded via iConfig for updating.

Updates through the iConfig configuration tool are not supported when you log in to the controller through remote maintenance.

Before a system update, complete the following operations:

- Install the iConfig tool. Please contact Sungrow Customer Service for the iConfig installation package.
- Download the corresponding update package in iConfig and keep iConfig open.

Procedures

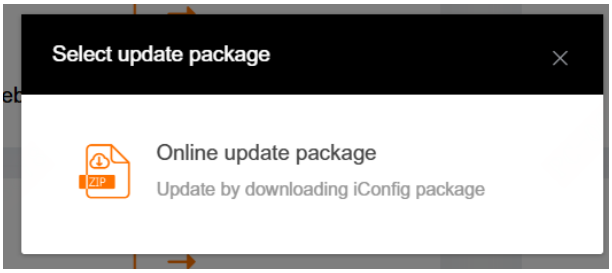
Step 1 In the navigation bar, click **System** > **System maintenance**.

Step 2 Click **System update**, and then on the **Select update package** dialog box, choose **Online update package**.

Step 3 Select an update package after iConfig is detected.

> If the update package is not found, please go to iConfig to download the corresponding update package resource.

Step 4 Click **Confirm**.



--End

After the update, to check whether it is successful, see 12 Firmware Version.

11.3.2 Log Export

Step 1 Choose **System** > **System maintenance**.

Step 2 Click **Log Export_Debugging, operations and other logs**.

Step 3 Select a log type in **Log file type selection** dialog box.

Step 4 Click **Confirm** to export the log.

--End

11.3.3 Reboot

Step 1 Choose **System** > **System maintenance**.

Step 2 Click **Reboot**.

Step 3 Click **Confirm** in the warning dialog box to restart the system.

--End

11.3.4 One-Click Migration

Prerequisite

The **One-click migration** function is used to import the configuration information of other devices or export the configuration information of the current device.

Step 1 Click **System** > **System maintenance**.

Step 2 Click **One-click migration**.

a. Click **Import** and select the file to be imported. The file size should be less than 50 M. Enter **Decompression password** and click **OK** to complete the one-click import of the packet.

> The decompression password is the same as the compression password set during configuration export.

b. Click **Export**, enter the **Compression password**, and click **Confirm** to complete the export.

Please keep the password for the compressed package safe, as it will be required when importing the configuration in the compressed package to a new device later.

--End

The imported file must be in ".zip" format.

11.3.5 Reset All Settings

Step 1 Choose **System** > **System maintenance**.

Step 2 Click **Factory reset**.

Step 3 Click **OK** in the warning dialog box.

--End

This function will delete the IEC104 forwarding protocol point tables, imported third-party point tables, historical data, parameter storage data, fault recording data, historical fault data, previous port packet export data, imported IEC104 collection point tables, third-party FTP record data, as well as device and device-stored configuration files. It will also reset default values for point table configurations and remove non-synchronizable data.

11.3.6 Recording Export

Step 1 Choose **System** > **System maintenance** > **Waveform recording file export**.

Step 2 In the **Log file type selection** dialog box, select log types and specify a time period.

Step 3 Click **Confirm**.

--End

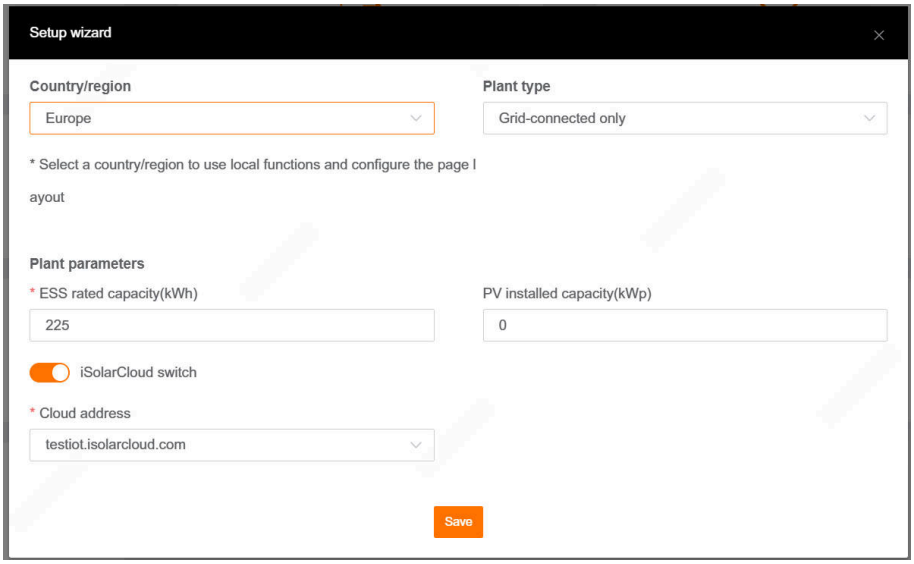
11.3.7 Setup Wizard

After the system is installed and deployed, users can configure server information, and configure or modify the plant type, plant parameters, and iSolarCloud address based on the country/region where the plant is located.

Step 1 Choose **System** > **System maintenance**.

Step 2 Click **Setup wizard**.

Step 3 Select the **Country/region** where the plant is located. Options include: **China**, **Europe**, **Australia**, **Japan**, **Southeast Asia**, **Middle East and Africa** and **Others**. Then, the system will display region-specific features on the interface accordingly.



- If **Japan** is selected in **Country/region**, you need to select a scenario. Options include: **HV/UHV scenario** and **C&I scenario**.
  - In HV/UHV scenarios, only energy storage devices and grid devices are displayed in the plant overview diagram.
  - In C&I scenarios, devices such as loads, energy storage devices, and diesel generators are displayed in the plant overview diagram.
- Please make sure to modify the **Country/region** after the system is shut down or in a fault state, and that the **Function enable/disable** settings of the energy management strategy and power regulation strategy are correct after the modification.

Step 4 Set the **Plant type**, which defines the current operating scenario of the plant. Options include **Grid-connected only**, **Off-grid only**, and **Grid-connected/off-grid**. This setting directly affects the display of grid-related information in the power flow diagram.

- **Grid-connected only**(default): The power flow diagram shows the grid as online and displays the corresponding parameters.
- **Off-grid only**: The power flow diagram does not display grid status or related information.
- **Grid-connected/off-grid** : The power flow diagram dynamically displays the grid as online or offline based on the plant's actual grid-connected or off-grid status.

Step 5 Set **Plant parameters**.

- **ESS rated capacity**: Enter the actual rated energy storage capacity of the plant.
- **PV installed capacity**: Enter the actual PV installed capacity of the plant.

Step 6 To upload data to iSolarCloud, turn on the **iSolarCloud switch** and select the **Cloud address** corresponding to the selected **Country/region**.

Country/region	Cloud address
China	Chinese server
Australia	Australian server
Europe	European server
Japan, Southeast Asia, Middle East and Africa, and Others	International server

If the remote maintenance function is enabled, the configured server must match its cloud address. Modifying the cloud address will cause the existing remote maintenance link to become invalid.

Step 7 Click **Save** to save the settings.

--End

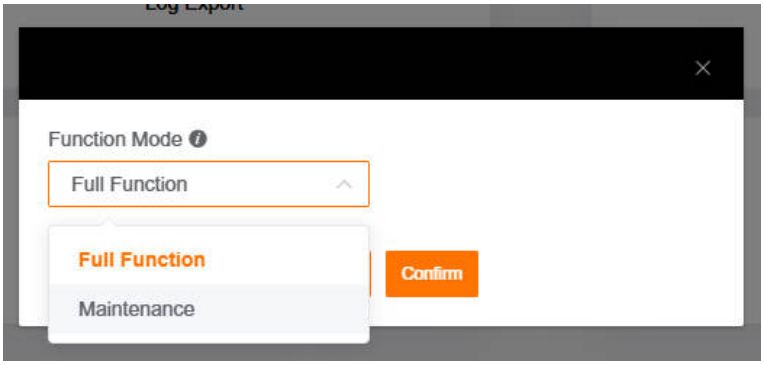
11.3.8 Function Mode

Users can switch the function mode based on actual needs. The system interface will display only the corresponding function menus to ensure a clean and efficient user experience.

Step 1 Choose **System** > **System maintenance**.

Step 2 Click **Function mode**.

Step 3 Select a mode based on your actual needs.



- **Full function**: In this mode, the system supports device monitoring, control strategy management, and maintenance functions.
- **Maintenance**: In this mode, the system only supports maintenance operations such as device monitoring and updates.

Step 4 Click **Confirm** to save your settings.

--End

11.3.9 Cybersecurity Mode Configuration

Cybersecurity mode is designed to enhance the device's cybersecurity protection capacity and comply with the IEC 62443 standard. It is recommended to enable it. Once enabled, the system will disable nonessential services configured by the user, such as IEC 104, Modbus TCP, and HTTP. The default external ports for IEC 104 and Modbus TCP will be switched to encrypted ports. Southbound ports must be configured with SSL encryption certificates according to the requirements of the southbound devices. External communication functions of the device can be restored only after manual reconfiguration.

Step 1 Choose **System** > **System maintenance**.

Step 2 Click **Cybersecurity mode configuration**.

Step 3 Determine whether to enable the cybersecurity mode in the pop-up window.

> Disabling the cybersecurity mode weakens the device's cybersecurity protection capacity.

Step 4 Click **OK**. The change will be applied after a system restart.

--End

11.3.10 Certificate Management

The EMS300CP device supports viewing and importing HTTPS certificates, IEC 104 certificates, Modbus TCP certificates, Modbus TCP collection certificates, NTS time sync active server certificates, and NTS time sync standby server certificates.

Step 1 Choose **System** > **System maintenance**.

Step 2 Click **Certificate management**.

Step 3 Click one of the following tabs as needed: **HTTPS certificate**, **IEC104 certificate**, **Modbus TCP certificate**, **Modbus TCP collection certificate**, **NTS time sync active server certificate**, or **NTS time sync standby server certificate**.

Step 4 To import a certificate, click **Import certificate**, select the corresponding protocol, and upload the certificate file and the private key file.

Step 5 Click **Confirm**.

--End

11.3.11 Public Key Import

To ensure safe system updates, digital signatures are used to verify the authenticity and integrity of update packages. When performing a controller update in cybersecurity mode, please import the public key file for the update package to complete the verification process.

Step 1 Choose **System** > **System maintenance**.

Step 2 Click **Public key import**.

Step 3 Select the public key file in the pop-up window.

The supported file formats for import include:
.zip, .pem, .xml, .sgu, .sgz, .csv, .data, .lic, .crt, and .key.

Step 4 Click **Open** to import the file to the system.

--End

11.3.12 ATS250 Update

Step 1 Choose **System** > **System maintenance**.

Step 2 Click **ATS250 update**. The **Select a firmware file** window opens.

Step 3 Select the **Device type**. Options include All, Master, and Slave.

Step 4 Click **Select a firmware file** and select a local file.

Step 5 Click **Confirm**.

> The update will cause ATSs to shut down.

--End

11.4 Remote Maintenance

After the remote maintenance function is enabled, authorized users can remotely access and control the system over the network, facilitating fault troubleshooting and daily maintenance, reducing the need for on-site support.

Prerequisite

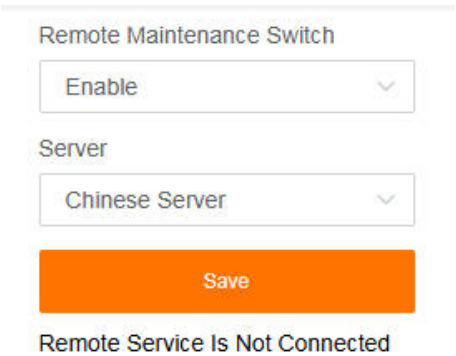
EMS300CP is connected to the external network.

- Go to **System** > **Port parameter** > **Cellular network**, and enable cellular network.

  > Applicable only to EMS300CP devices equipped with a 4G communication module.

- Go to **System** > **Port parameter** > **Local IP**, set the IP address according to the addressing scheme of the external network.

Step 1 Click **System** > **Remote maintenance** to enter the corresponding interface.



Step 2 Click ⌄ in **Remote maintenance switch**.

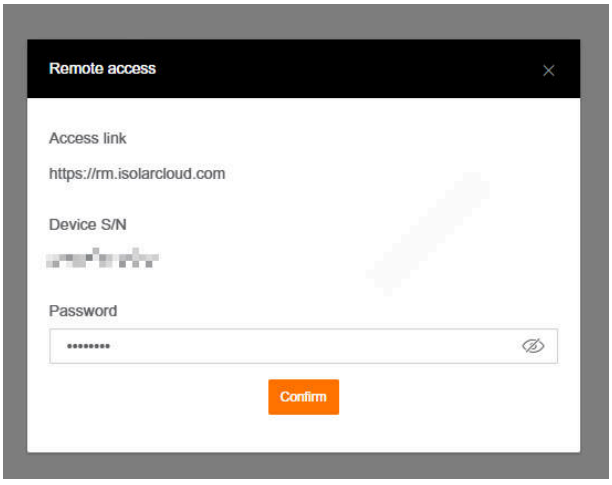
- Remote maintenance is supported if this switch is set to **Enable**, and it is required to set the server sites.
  - Select **Chinese server** for projects in the Chinese mainland.
  - Select **European server** for projects in Europe.
  - Select **Australian server** for projects in Australia.
  - Select **International server** for projects in other regions.

    If the **iSolarCloud switch** in **Setup wizard** is enabled, the server site can only be configured to match the cloud address.

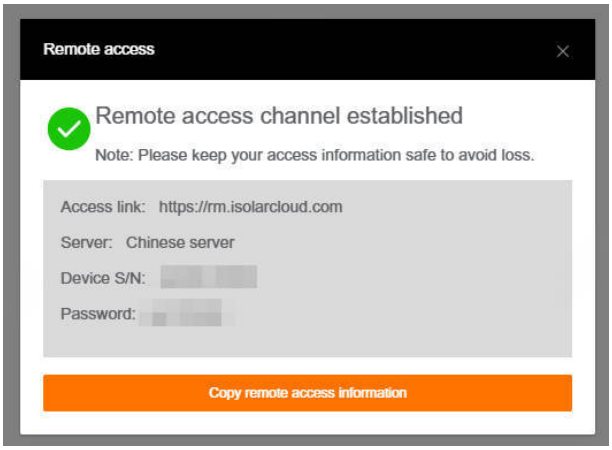
- Remote maintenance is not supported if this switch is set to **Disable**.

Step 3 Click **Save** to save the settings.

Step 4 To establish a remote access connection, enter a **Password**, and confirm.



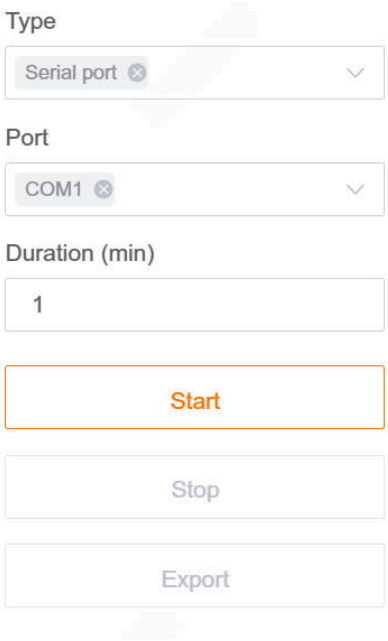
Step 5 You can then click **Copy remote access information** to share the remote maintenance link.



--End

11.5 Message Export

Step 1 Click **System** > **Message export**.



Step 2 Set the **Type**, **Port**, and **Duration**, and click **Start** to start message recording. The recording is automatically stopped when the set duration ends, or it can be manually interrupted by clicking **Stop**.

> You can select multiple types and ports for message recording and export.

Step 3 Click **Export** to export the messages.

--End

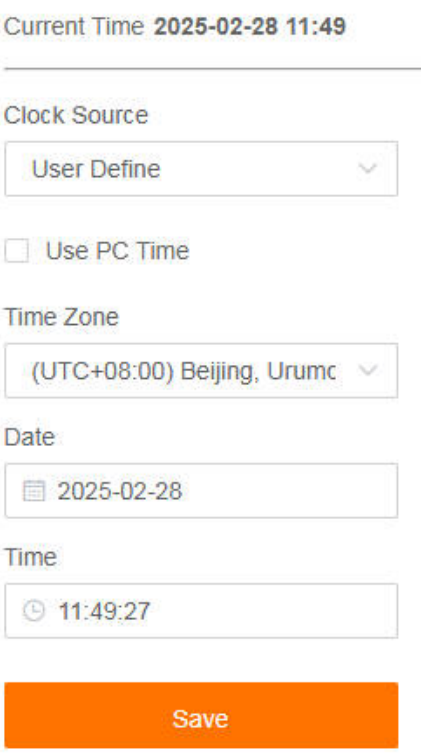
11.6 System Time

The **System time** function allows you to check whether the current system time is correct and synchronize the system time.

> **NOTICE**
>
> **The system time must be set if the controller is used for the first time.**

Procedures

1. Click **System** > **System time**.



2. In the **Clock source** drop-down list, select the corresponding option.

Clock Source	Description
User define	The current system time and time zone can be set in the following two ways: • Select **Use local system time** to synchronize the controller time with the PC time. • Select a time zone from the **Time zone** drop-down list. Manually set the controller time in the **Date** and **Time** fields. It is recommended to select **User define** during commissioning.
NTP (Network Time Protocol)	Synchronize the controller time with the computer system time. • Select a time zone from the **Time zone** drop-down list. • **Primary site address type**: Set the address type of the primary synchronization server site. Options include **IP** and **Domain**.

Clock Source	Description
	• **Primary server site**: Based on the option selected in **Primary site address type**, set the IP address or domain name of the primary synchronization server. • **Standby site address type**: Set the address type of the standby synchronization server site. Options include **IP** and **Domain**. • **Standby server site**: Based on the option selected in **Standby site address type**, set the IP address or domain name of the standby synchronization server. • Set **Time interval (min)**, which is the interval for NTP synchronization. The value range is [1, 144], with a default value of 5.
iSolarCloud	Synchronize the controller time with the iSolarCloud time.
B code	When the controller communicates with the backend using the IRIG-B time synchronization protocol, B-code time synchronization takes effect. You need to set the corresponding interval in the **Synchronization interval** field. The value range is [1, 144], with a default value of 5.
NTS (Network Time Security)	A security extension to the NTP protocol that provides cryptographic protection for NTP client-server communication. You need to configure the **NTS time sync active server certificate** and **NTS time sync standby server certificate** settings. • Select a time zone from the **Time zone** drop-down list. • **Primary site address type**: Set the address type of the primary synchronization server site. Options include **IP** and **Domain**. • **Primary server site**: Based on the option selected in **Primary site address type**, set the IP address or domain name of the primary synchronization server. • **Standby site address type**: Set the address type of the standby synchronization server site. Options include **IP** and **Domain**. • **Standby server site**: Based on the option selected in **Standby site address type**, set the IP address or domain name of the standby synchronization server.

Clock Source	Description
	• Set **Time interval (min)**, which is the interval for NTP synchronization. The value range is [1, 144], with a default value of 5.

3. Click **Save**, and the setting is complete.

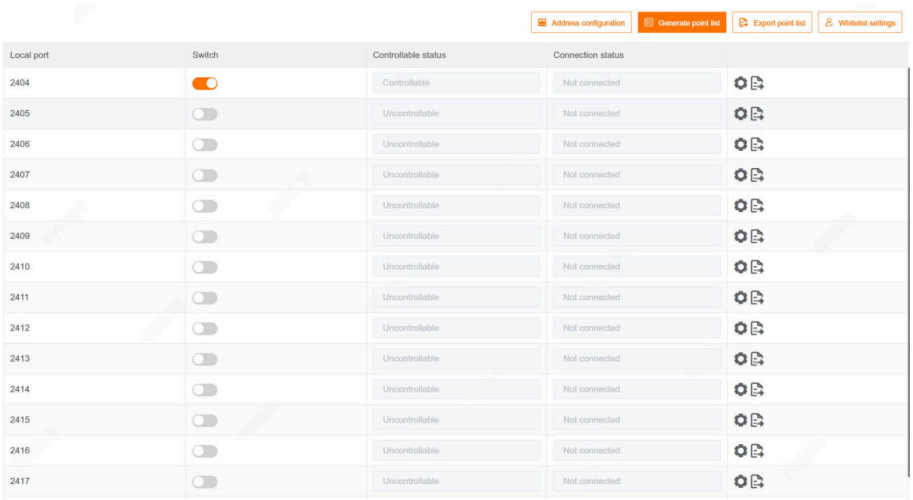
11.7 Forwarding Configuration

11.7.1 IEC104 Forwarding Service Configuration

The IEC104 is a communication protocol used for remote monitoring and control systems. It can transmit various types of information, including telesignaling, telemetry, telecontrol, teleadjusting, and telepulse.

Select a local port, enable IEC104 forwarding service for this port, and configure the point table.

Step 1 Choose **System** > **Forwarding configuration** to enter the **IEC104** tab by default.



Step 2 Select an appropriate port from the local port list and click to enable IEC104 forwarding service for this port.

Step 3 You can view the **Controllable status** and **Connection status** of the local port.

- Controllable status: When displayed as Controllable, it means that this port has been authorized, and commands issued by a third-party dispatch through this port will have actual control effects on the system.
- Connection status: Indicates whether the communication link of the port is normal.

Step 4 Click the SSL encryption icon to enable SSL encryption for the local port.

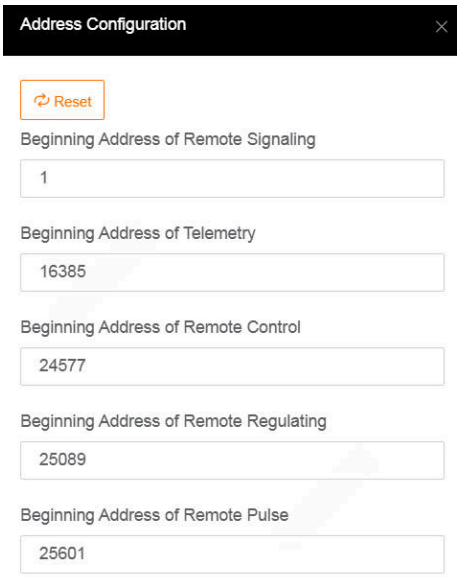
The IEC104 forwarding service operates on ports 2404–2418. The port 2418 is enabled by default with SSL encryption applied, while other ports are disabled by default and do not use SSL encryption. The users can manually enable or disable the Switch icon and SSL encryption icon of the local port.

> **SSL encryption** is available when **Network security mode** is enabled. It is recommended to enable SSL encryption to improve data transmission security.

Step 5 (Optional) Configure the point table.

> If you choose to use the default point table, skip Step 5.

- Click **Address configuration** in the upper right corner of the page. In the pop-up window, enter the beginning addresses of remote signaling, telemetry, remote control, remote regulating, and remote pulse.



  The figure above shows the default addresses configured in the system. You can modify the addresses as needed.
  You can click **Reset** to restore the default address settings.
- Select an enabled local port to configure a custom point table for this port.

  In the third column of the selected port, click to open the **Advanced settings** window. Configure the following parameters:
  - Telesignaling measuring point type: Set the type of measuring point sent from the upper-level device.
  - Telesignaling timestamp: Set the remote signaling time tag sent from the upper-level device.
  - Change reporting: When this parameter is set to enable, if the EMS device detects changes in monitoring data, the changes will be uploaded.

- Configuration file: Click to import the point table configuration file.

Click **Save** to complete the point table configuration.

Step 6 Generate the point table. Click **Generate point table** in the upper right corner. Point tables will be generated for all enabled ports based on the configuration in step 2. If step 5 is skipped, the default point table will be applied.

--End

Export Forwarding Point Table

- Click **Export point table** in the upper right corner to export the point tables of all ports.
- Select a port and click to export its point table to your local system.

Configure Whitelist

Click **Whitelist settings** in the upper right corner of the page to open the setting window.

- If the **Enable whitelist** checkbox is not selected, the default peer IP address is “0.0.0.0”. Any backend device with a valid IP address is allowed to access the controller.
- If the **Enable whitelist** checkbox is selected, enter the peer IP address. Then, only devices with the specified IP address can access the controller.

11.7.2 Modbus Configuration

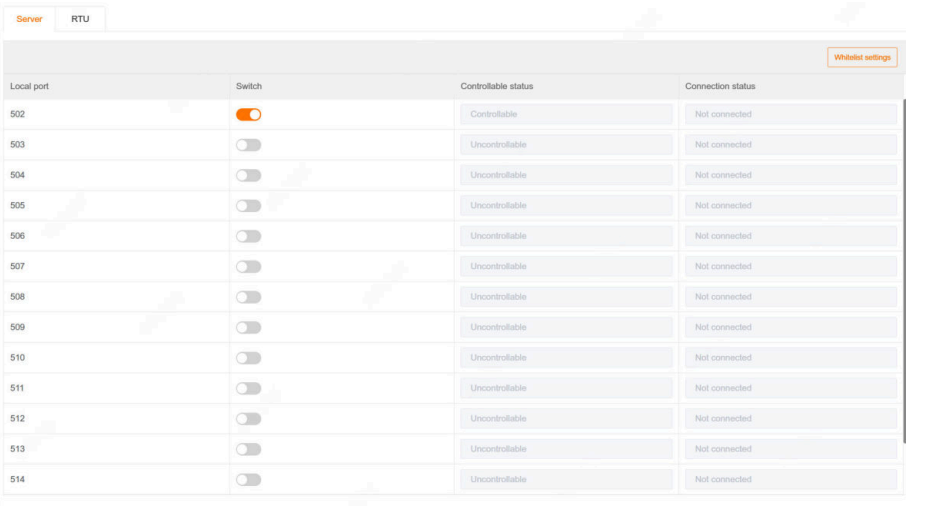
This function is used to configure Modbus forwarding service of the controller.

11.7.2.1 Server

In Server mode, the controller functions as the server and transmits data and instructions with the upper computer server through Modbus TCP protocol.

Step 1 Choose **System** > **Forwarding configuration** > **MODBUS**.

Step 2 Click the **Server** tab.



Step 3 Enable or disable the local port by clicking the icon in the Switch column according to the actual conditions.

Step 4 You can view the **Controllable status** and **Connection status** of the local port.

- Controllable status: When displayed as Controllable, it means that this port has been authorized, and commands issued by a third-party dispatch through this port will have actual control effects on the system.
- Connection status: Indicates whether the communication link of the port is normal.

Step 5 Click the SSL encryption icon to enable SSL encryption for the local port.

Ports 502 to 516 are used for the Modbus forwarding service. The port 516 is enabled by default with SSL encryption applied, while other ports are disabled by default and do not use SSL encryption. The users can manually enable or disable the Switch icon and SSL encryption icon of the local port.

> **SSL encryption** is available when **Network security mode** is enabled. It is recommended to enable SSL encryption to improve data transmission security.

Step 6 For whitelist settings, please see Configure Whitelist.

--End

11.7.2.2 RTU

In RTU mode, the controller transmits data and instructions with the host computer server through Modbus RTU protocol.

Step 1 Choose **System** > **Forwarding configuration** > **MODBUS**.

Step 2 Click the **RTU** tab.

Step 3 Select the serial port name and enter the delay time.

Step 4 Click  to save the settings.

--End

11.7.3 Cloud Transmission Configuration

It is used to upload data to the cloud server.

Prerequisite

EMS300CP is connected to the external network.

- Go to **System** > **Port parameter** > **Cellular network**, and enable cellular network.

  > Applicable only to EMS300CP devices equipped with a 4G communication module.

- Go to **System** > **Port parameter** > **Local IP**, set the IP address according to the addressing scheme of the external network.

Step 1 Click **System** > **Forwarding configuration** > **Cloud Transmission Configuration** to enter the corresponding interface.

Step 2 Click **Upload parameters** to select whether to upload the parameters to the cloud or not.

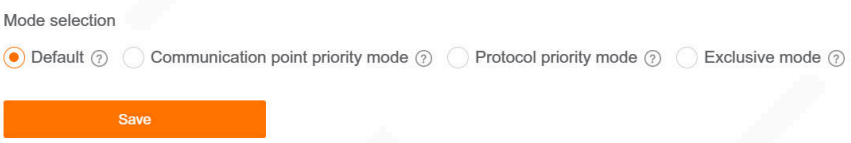
--End

11.7.4 Dispatch Permission Management

The EMS300CP supports multiple dispatch priority modes to meet the permission-management requirements for multi-source dispatch commands in different application scenarios.

> This feature is available on EMS300CP-SV100.001.00.P026 or later.

Step 1 In the navigation bar, select **System > Forwarding configuration** and switch to the **Dispatch permission management** tab.



Step 2 Select a Dispatch permission management mode.

Mode	Description
Default	Based on the sequence of command arrival, the newly received command overrides the previous one. Only respond to the first group of active/reactive power control points.
Communication point priority mode	The higher the priority sequence number, the higher the priority; when a third-party system is in remote status and has the highest priority, respond to its active/reactive power control instructions. Five sets of point priorities can be configured respectively. • This method is only applicable to remote active/reactive fixed value mode. • Different active/reactive control targets cannot have the same priority.
Protocol priority mode	During the control command lockout, a high-priority control command can override a low-priority one. The reverse is not supported. Select the protocols for **High priority**, **Medium priority**, and **Low priority**. Parameters required include: • Protocol: Select a protocol from the drop-down list.

Mode	Description
	• Port No.: Select the port used for forwarding by the protocol from the drop-down list. • Block time: 0 by default. Range: [0.0–14400.0]. If the connection time for this protocol exceeds this limit, the system will switch to a protocol of the next lower priority.
Exclusive mode	Only a third-party system that has obtained exclusive permission is allowed to control the controller, and control commands from an unauthorized third-party system are invalid. You can view the current protocol and port number that have obtained exclusive permissions. • Permission acquisition: After Exclusive mode is selected, the first third-party master station that sends any command can obtain permission. • Permission release conditions (meeting any of the following conditions will terminate the exclusive control of the main station): - The main station that has obtained control rights actively relinquishes permission (by callback command, set the exclusive dispatch permission service port to 0). - Enable an energy management strategy in Energy management. - Disable the port that obtains exclusive permission, or the connection of that port is interrupted. - On Settings of the plant on iSolarCloud, click **Common settings** of the EMS, set **Release exclusive dispatch permission** to **Enable**.

Step 3 Click **Save**.

--End

11.8 Port Parameter

Set ports of the controller on the interface. There are 7 RS485 ports (COM1~COM7).

11.8.1 RS485

On this interface user can view or modify parameters of each port of the controller.

Step 1 Click**System** > **Port parameter** > **RS485**to enter the corresponding interface.

Step 2 Click  in the **Action** column to modify the port function, baud rate, parity bit, and stop bit. The parameters are explained as follows.

Parameter	Description
Serial port	COM1 ~ COM7, cannot be changed.
Port function	• Acquisition • Forwarding background
Baud rate	The default value is 9600. Please fill in according to the actual situation.
Parity bit	Presence and absence, odd and even.
Stop bit	Please select according to the actual situation.

When the controller is connected to a device via a serial port, the **Baud rate**, **Parity bit**, and **Stop bit** of the port must be the same as those of the connected device so that the controller can communicate normally with the device.

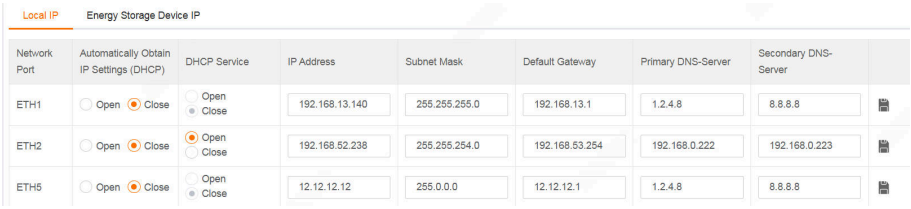
--End

11.8.2 Ethernet

11.8.2.1 Configure Controller IP Settings

This section describes how to configure IP addresses for the network ports of the controller and enable the DHCP service.

Step 1 Click **System** > **Port parameter** > **Ethernet** > **Local IP** to navigate to the corresponding page.



Step 2 Set the IP address for each network port. After completing the settings, click on the right side to save the settings.

- If you enable **Automatically Obtain IP Settings (DHCP)** for a port, the local area network (LAN) will assign an IP address to the port.
- If **Automatically Obtain IP Settings (DHCP)** is disabled, enter the parameters such as IP address, subnet mask, and gateway address.

The default IP address and virtual IP address for each port are as follows:

Table 11-1 Controller IP Address

Port	Default IP Address	Virtual IP Address
ETH1	14.14.14.14	15.15.15.15
ETH2	12.12.12.12	16.16.16.16
ETH5	13.13.13.13	17.17.17.17

> The above IP addresses are for reference only. The actual ones may be different.

Step 3 (Optional) Configure the DHCP service.

a. To perform one-click access, the DHCP service must be enabled. Based on the connection status of the LC, select the corresponding network port and enable its DHCP service. For example, if the LC is connected to the ETH2 port of the controller, the DHCP service needs to be enabled for only ETH2.

b. Click  on the right side to save the settings.

c. To perform one-click access for energy storage devices, configure energy storage device IP settings by referring to 11.8.2.2 Configure Energy Storage Device IP Settings.

--End

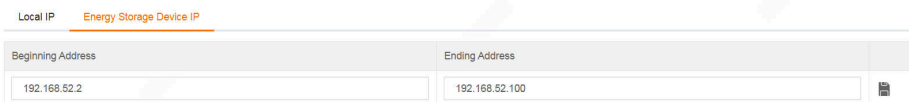
11.8.2.2 Configure Energy Storage Device IP Settings

On the Energy Storage Device IP page, you can set the beginning and ending IP addresses for energy storage device. The system will automatically assign IP addresses within the range to energy storage devices.

> This page is displayed only when the DHCP service is enabled for the ETH ports of the controller.

Step 1 Click **System** > **Port parameter** > **Ethernet** to enter the corresponding interface.

Step 2 Click the **Energy storage device IP** tab.



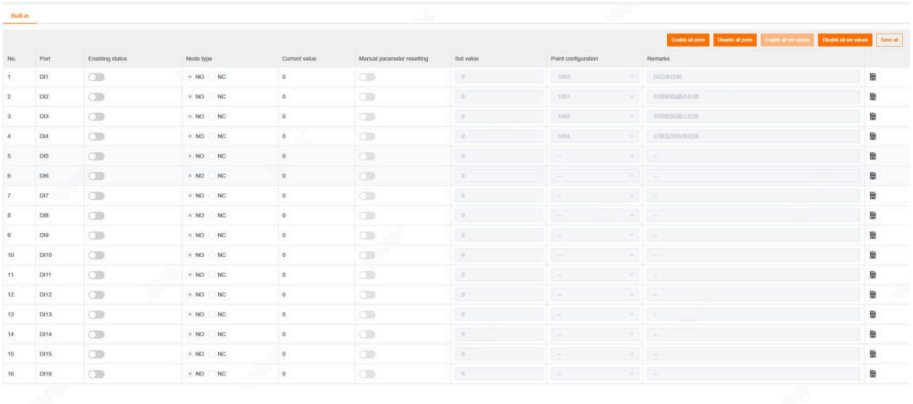
Step 3 Set the **Beginning Address** and **Ending address**. By default, the DHCP service is enabled for the ETH2 port, and the beginning and ending IP addresses are preconfigured for energy storage devices. You can modify the settings as needed. For example, if the LC's ETH1 port (with an IP address of 192.168.1.100) is connected to the controller, the beginning IP address for energy storage devices can be set to 192.168.1.100. Considering that up to 25 devices can be connected, the ending IP address can be set to 192.168.1.150.

Step 4 Click  to save the settings.

--End

11.8.3 DI

Step 1 Choose **System** > **Port parameter** > **Digital input** to enter the **Digital input** page.



Step 2 Configure the following parameters:

Parameters	Description
Enabling status	Click  to switch the status. • : The port is enabled and allows parameter configuration. • : The port is disabled.
Node type	Set this parameter according to actual conditions. Options include **NO** and **NC**.
Current value	Display the current output value of the DI.
Manual value override	• : Enable Manual value override. The value received by the connected device is determined by the **Set value**. • : Disable Manual value override. The **Set value** cannot be modified.
Set value	Set this parameter according to actual conditions. Options include 0 and 1. The default value is 0.
Point configuration	For **Point configuration**, preset configuration can be adopted, where: • 1001: Set to Grid-connected circuit breaker closed feedback on port DI2 by default.

Parameters	Description
	• 1002: Set to Grid-connected circuit breaker open feedback on port DI3 by default. • 1003: Set to DI power control on port DI1 by default. • 1004: Set to Overload monitoring meter switching on port DI4 by default. • 1005–1014: Set to Parallel transformer 1–10 circuit breaker closing feedback.
Remarks	Enter remarks of no more than 20 characters.

Step 3 Click  on the right to save the settings.

Step 4 (Optional) Click **Enable all ports** in the upper right corner of the page to enable all DI ports.

Step 5 (Optional) Click **Disable all ports** in the upper right corner of the page to disable all DI ports.

Step 6 (Optional) Click **Enable manual setting for all** in the upper right corner of the page to enable manual parameter setting for all enabled DI ports.

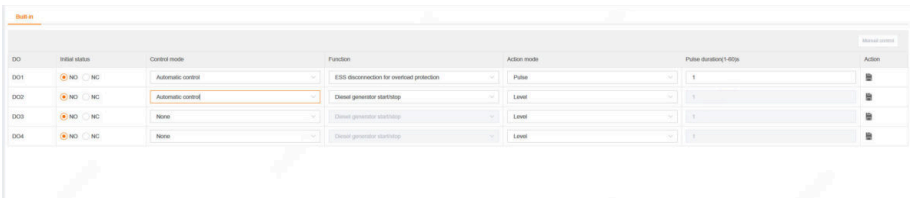
Step 7 (Optional) Click **Disable manual setting for all** in the upper right corner of the page to disable manual parameter setting for all enabled DI ports.

Step 8 (Optional) Click **Save all** in the upper right corner of the page to save all DI settings.

--End

11.8.4 DO

Step 1 Choose **System** > **Port parameter** > **Digital output** to enter the **Digital output** page.



Step 2 Configure the following parameters:

Parameter	Description
Initial status	Set this parameter according to actual conditions. Options include **NO** and **NC**.
Control mode	• None: No control is applied to this DO port. • Automatic control: Control the DO port via automatic control.

Parameter	Description
	• Manual control: After selecting Manual control from the drop-down list, you can click **Manual control** in the upper right corner of the page to control the DO port as needed.
Function	Support automatic control for Diesel generator start/stop, Grid-connected circuit breaker, ESS disconnection for overload protection, Charger disconnection for overload protection, and Diesel generator start upon ESS fault.
Action mode	Select the Pulse or Level action mode.
Pulse duration (1–60) s	When the Action mode is set to Pulse, set the pulse duration as needed. The value range is 1–60.

Step 3 Click  on the right to save the settings.

--End

11.9 Communication Settings

This feature is used to manage the communication connections between the system and the cloud platform (iSolarCloud or third-party cloud).

> This feature is available on EMS300CP-SV100.001.00.P028 or later.

Step 1 Choose **System** > **Communication settings** and click the **iSolarCloud** or **Third-party cloud** tab.

Step 2 Turn on or off the communication switch for each function to enable or disable its communication with the corresponding cloud platform.

--End

12 Firmware Version

Here you can check the firmware version of the controller.

Step 1 Click **System** > **About** to navigate to the corresponding page.

Step 2 Click the field corresponds to **Version** five times to check the firmware version.



The firmware version of the EMS300CP is identified by **Product release software version**, formatted as “EMS300CP-SV100.001.00.P[XXX]". For easier recognition, the firmware version is often shortened and referred to as "P[XXX]."

Name	Value
Product Release Software Version	EMS300CP-SV100.001.00.P017
Product Build Software Version	EMS300CP-SV100.001.00.B005
Strategy Base Version	EMS_BASE_Ver1.00
Platform Release Software Version	SUNSHINE-SV100.001.00.P017
Platform Build Software Version	SUNSHINE-SV100.001.00.B006.08
DRA7DSP1 Software Version	DSP_APP_VER_0.1
System Software Version	A15SYS-SV100.003.00.PA04

--End

13 User Management

An Administrator can create O&M User accounts, reset account passwords, set parameters related to account and login security, and enable R&D debugging mode.

Step 1 The firmware version of EMS300CP should be P020 or later. See 12 Firmware Versionfor how to check the firmware version.

Step 2 An Administrator account is required to proceed with the operations below.

--End

13.1 User Roles and Permissions

The following user roles are available in this system:

- Ordinary User
- O&M User
- Developer
- Administrator

> Developer accounts are available for SUNGROW technical support team only.

Permission	Role		
	Ordinary User	O&M User	Administrator
View real-time plant data	✔	✔	✕
Configure controller port settings	✕	✔	✕
Configure forwarding service for the controller	✕	✔	✕
Manage devices	✕	✔	✕
Set device parameters	✕	✔	✕
Export data	✕	✔	✕
Set control strategies	✕	✔	✕
Perform controller system maintenance	✕	✔	✕
View all O&M Users	✕	✕	✔

Permission	Role		
	Ordinary User	O&M User	Administrator
Create or delete an O&M User account	×	×	✔
Reset account password	×	×	✔
Set parameters related to account and login security	×	×	✔
Enable O&M mode	×	×	✔

13.2 Default Accounts and Passwords

Username	Role	Default password
maintain	O&M user	pw1111
administrator	Administrator	pw1111
develop	Developer	Obtain the S/N through customer authorization and generate a dynamic password.

13.3 Create O&M User Accounts

An administrator can create additional O&M user accounts to meet the O&M needs of the team.

The system provides one O&M user account "maintain" by default.

In addition to the "maintain" account, the administrator can create up to 4 more O&M user accounts.

Username Requirements

- The name can contain uppercase letters, lowercase letters, numbers, and underscores.
- The name must start with a letter.
- The name should be 4–16 characters long.

Password requirements

- Passwords must contain at least three of the following four-character types: uppercase letters, lowercase letters, numbers, and special characters.
- The password length must be longer than the minimum digit length defined by the administrator and shorter than 32 digits.

- If the cybersecurity mode is not enabled, the passwords of all users are permanently valid.
- If the cybersecurity mode is enabled, the administrator can set the password validity period for different types of users in the range of 1-90 days.

Prerequisite

- Log in to the Web as an administrator. See 13.2 Default Accounts and Passwords for details.

Step 1 Choose **User management** on the navigation bar.

Step 2 Click the button **Add** to open the dialog box.

Step 3 Set the username and password.

Step 4 Select **O&M user** in the **Permission** dropdown list.

Step 5 Choose **OK**.

--End

13.4 Deleting O&M User

Prerequisite

- Log in to the Web as an Administrator. See 13.2 Default Accounts and Passwords for details.

Step 1 Choose **User management** on the navigation bar.

Step 2 Click in the “Action” column.

Step 3 Click **Confirm** in the confirmation dialog to delete this user.

Step 4 You can click **Clear users** to delete all user accounts.

--End

13.5 Account Password Reset

13.5.1 Account Password Reset by Administrator

Prerequisite

- Log in to the Web as an Administrator. See 13.2 Default Accounts and Passwords for details.

Step 1 Choose **User management** on the navigation bar.

Step 2 Click in the “Action” column to open the **Modify user** window.

Step 3 Reset the username or password.

Step 4 Click **Confirm**.

Step 5 (Optional) Choose **Password management** on the navigation bar. Click **Password reset** to reset the passwords of O&M and administrator accounts.

> Log in to the EMS300CP Web using the O&M or administrator account with the default password, and you are required to change the password.

--End

13.5.2 Reset Administrator Account Password

An Administrator can reset the account password when it is forgot.

Step 1 Click **Login** in the upper right corner of the page.

Step 2 Click **Forgot password** to open the **Change password** window.

Step 3 Obtain and enter the secret key. The secret key can be obtained via either of the following methods:

- Method 1: If the EMS Web system has established a site on iSolarCloud, scan the QR code in the dialog box or click the link to log in to iSolarCloud, enter the verification code, and obtain the secret key via email or phone used during the site establishment.
- Method 2:If the system has not established a site on iSolarCloud, contact Sungrow Customer Service, provide the verification code, and obtain the secret key.

> For the same device serial number, you can obtain the secret key three times a day at maximum.

Step 4 Enter the new password and double-confirm.

> **Password requirements**
> - Passwords must contain at least three of the following four-character types: uppercase letters, lowercase letters, numbers, and special characters.
> - The password length must be longer than the minimum digit length defined by the administrator and shorter than 32 digits.

Step 5 Click **Confirm**.

--End

13.5.3 Account Password Reset by Pressing RST Button

Reset the O&M and administrator account passwords by pressing the RST button.

Step 1 Press and hold the RST button on the EMS300CP controller for approximately 0.5 to 3 seconds to reset the O&M and administrator account passwords.

Step 2 Log in to the EMS300CP Web using the O&M or administrator account with the default password, and you are required to change the password.

--End

13.5.4 iSolarCloud Account Password Reset

Reset the password of O&M account or administrator account on iSolarCloud.

Prerequisite

Cloud upload configuration has been configured on EMS and a plant has been created on iSolarCloud.

Step 1 Reset the password on iSolarCloud.

- Method one: Log in to iSolarCloud Web to reset the login password for the EMS devices in the plant. For detailed instructions, please see iSolarCloud Web 3.0 User Manual**Device** > **Parameter Setting** > **Common Parameter Settings** > **Common Parameter Settings of Energy Management System** > **System parameters**.

Step 2 Logging into iSolarCloud Web with a reset account and the default password will require the user to change the password.

--End

13.6 Account Protection and Session Security Settings

To enhance account security, you can set limits for login activities and session validity.

Prerequisite

Log in to the Web as an administrator. See 13.2 Default Accounts and Passwords for details.

Step 1 Click **Session management**.

Step 2 Change the account and session security settings.

The following settings are available:

- **Number of illegal visits**: Restricts the maximum number of failed login attempts. If the number of incorrect password attempts exceeds this limit, the account will be automatically locked out. The parameter ranges from 5 to 20, with a default value of 5.
- **Unauthorized access time window [1–24] h**: If the number of incorrect password attempts within this period exceeds the threshold for illegal visit counts, the account will be automatically locked out. The parameter ranges from 1 to 24, with a default value of 24.
- **Session timeout**: Defines the period of inactivity after which the login session will time out. Once timed out, you will be required to log in again. The parameter ranges from 10 to 30, with a default value of 10.
- **User lock duration**: Specifies the duration required for automatic account unlocking following a lockout triggered by consecutive failed login attempts. The parameter ranges from 1 to 60, with a default value of 10.
- **Read before use**: On the Chinese interface, click **Read before use** on the account login page to view the notification.

- **Read before use**: On the interface other than Chinese, click **Read before use** on the account login page to view the notification.

Step 3 Click **Save**.

--End

13.7 O&M Mode

The Administrator must enable **R&D Debugging** to allow Developer users to log in to the Web for debugging.

> - In Network Security Mode, **R&D Debugging** is turned off by default.
> - If Network Security Mode is not enabled, **R&D Debugging** is turned on by default.

Prerequisite

- Log in to the Web as an Administrator. See 13.2 Default Accounts and Passwords for details.

Step 1 Choose **R&D Management** on the navigation bar.

Step 2 Turn on the switch.

The switch will automatically turn off after being on for 24 hours.

--End

13.8 Configure LDAP Server

By configuring the Lightweight Directory Access Protocol (LDAP) server, you can integrate the system's identity authentication with your enterprise's unified user directory. Afterwards, users can log in directly to the controller Web system using their enterprise domain accounts and passwords, enabling secure and convenient single sign-on (SSO).

Prerequisite

- Log in to the Web system as an administrator. See 13.2 Default Accounts and Passwords for details.

Step 1 Click **LDAP management**.

Step 2 In the **LDAP login switch** drop-down list, enable the function.

Step 3 Refer to the following instructions for LDAP server configuration:

Parameter	Description	Value
LDAP server IP address	Enter the IP address of the LDAP server.	/

Parameter	Description	Value
LDAP server port	Enter the port number of the LDAP server.	The port number range is 1–65535.
LDAP server backup IP	Enter the IP address of the standby LDAP server.	/
LDAP server backup port	Enter the port number of the standby LDAP server.	The port number range is 1–65535.
Base distinguished name	Enter the base distinguished name of the LDAP server, which is used to globally and uniquely identify an entry in the directory.	The base distinguished name consists of key-value pairs and contains 1–29 characters (Chinese characters are supported). The format is key=value. Multiple key-value pairs must be separated by half-width commas. Example: ou=SUNGROW,DC=sungrow,DC=cn
SSL encryption	In the drop-down list, choose to enable or disable the Secure Sockets Layer (SSL) encryption.	Disabled by default. Disabling SSL encryption causes data to be transmitted in plaintext, which poses security risks. It is highly recommended to keep it enabled.
Account	Enter the account name for the LDAP server.	The account name must be 4–64 characters long and can contain letters, numbers, and underscores.
Password	Enter the password for the LDAP server. After the initial configuration is complete, if you need to change	The password must be 6–32 characters long and contain at least three of the following four character types: uppercase letters, lowercase

Parameter	Description	Value
	the password, enable **Change password** first.	letters, numbers, and special characters.

Step 4 Click **Save**.

Step 5 Click **Connection test** to test whether the connection to the LDAP server can be successfully established.

--End

13.9 Password Length Setting

The system supports setting password length to enhance system security.

Prerequisite

Log in to the Web as an administrator.

Step 1 Click **Password management**.

Step 2 Enter the minimum number of password characters in the dialog box for **Password length**. Range 8–32 characters. After the setting is applied, all functions involving entering passwords in the system will uniformly apply this minimum password character requirement.

Step 3 Click **Save**.

--End

13.10 Set Forced Password Change in Non-Security Mode

If Network security mode is disabled, it can be configured whether to require a forced password change for the default account upon first login.

Log in to the Web as an administrator. See 13.2 Default Accounts and Passwords for details.

Step 1 Click **Password management**.

Step 2 Set **Forced password change in non-security mode**.

- Start: The default option. Upon first login, a forced password change for the default account is required.
- Disable: Upon first login, a forced password change for the default account is not required.

Step 3 Click **Save**.

--End

14 Port Matrix

Source Device	Source Port	Destination Device	Destination Port	Protocol	Authentication Method	Encryption Method	Description
PC	Any	EMS300CP	8080	HTTP	Username and password	N/A	Disabled by default. It can be enabled.
PC	Any	EMS300CP	8443	HTTPS	Username and password	TLS/SSL	Default access method
PC	Any	EMS300CP	22	SSH	Username and password	TLS/SSL	Disabled by default
Northbound device	Any	EMS300CP	2404–2418	IEC 104	N/A	N/A	When the cybersecurity mode is disabled, the system activates port 2404 by default. When enabled, the system automatically

Source Device	Source Port	Destination Device	Destination Port	Protocol	Authentication Method	Encryption Method	Description
							switches to the encrypted port 2418.
Northbound device	Any	EMS300CP	502–516	Modbus	N/A	N/A	When the cybersecurity mode is disabled, the system activates port 502 by default. When enabled, the system automatically switches to the encrypted port 516.
PC	Any	EMS300CP	9998–9999	UDP	N/A	N/A	Disabled by default, used for internal commissioning, and accessible via

Source Device	Source Port	Destination Device	Destination Port	Protocol	Authentication Method	Encryption Method	Description
							Linux Shell.
PC	Debug port	EMS300CP	/	RS232 protocol	Username and password	N/A	Provides access to Linux through the serial port.
EMS300CP	Any	Network time protocol (NTP) time synchronization server	123	NTP	N/A	N/A	Disabled by default. Enabling will trigger a security warning.

15 Appendix

15.1 Quality Assurance

If product faults occur during the warranty period, SUNGROW will provide free service or replace the product with a new one.

The software security update period for this product aligns with the warranty period. During the warranty, security patches or updates will be provided if any vulnerabilities or compatibility issues are identified.

Evidence

During the warranty period, the customer shall provide the product purchase invoice with a date. In addition, the trademark on the product shall be undamaged and legible. Otherwise, SUNGROW has the right to refuse to honor the quality guarantee.

Conditions

- After replacement, unqualified products shall be processed by SUNGROW.
- The customer shall give SUNGROW a reasonable period to repair the faulty device.

Exclusion of Liability

In the following circumstances, SUNGROW has the right to refuse to honor the quality guarantee:

- The free warranty period for the whole machine or components has expired.
- The device is damaged during transport.
- The device is incorrectly installed, refitted, or used.
- The device operates in harsh conditions beyond those described in this manual.
- The fault or damage is caused by installation, repairs, modification, or disassembly performed by a service provider or personnel not from SUNGROW.
- The fault or damage is caused by the use of non-standard or non-SUNGROW components or software.
- The installation and use range are beyond the stipulations of relevant international standards.
- The damage is caused by unexpected natural factors.

For faulty products in any of the above cases, if the customer requests maintenance, paid maintenance service may be provided based on the judgment of SUNGROW.

> Product dimensions and parameters are subject to change without prior notice. The latest documentation from SUNGROW shall prevail in case of any deviation.

15.2 Contact Information

In case of questions about this product, please contact us. We need the following information to provide you with the best assistance:

- Model of the device
- Serial number (S/N) of the device
- Fault code/name
- Brief description of the fault

For detailed contact information, please visit: **https://www.sungrowpower.com/en/about-us/contact-us**

Sungrow Power Supply Co., Ltd.

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