SmartPVMS
V600R024C00

User Manual (FusionSolar SmartPVMS)

Issue	01
Date	2023-04-20

HUAWEI

HUAWEI DIGITAL POWER TECHNOLOGIES CO., LTD.

Trademarks and Permissions


and other Huawei trademarks are the property of Huawei Technologies Co., Ltd.
All other trademarks and trade names mentioned in this document are the property of their respective holders.

Notice

The purchased products, services and features are stipulated by the contract made between Huawei Digital Power Technologies Co., Ltd. and the customer. All or part of the products, services and features described in this document may not be within the purchase scope or the usage scope. Unless otherwise specified in the contract, all statements, information, and recommendations in this document are provided "AS IS" without warranties, guarantees or representations of any kind, either express or implied. The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.

Huawei Digital Power Technologies Co., Ltd.

Address: Huawei Digital Power Antuoshan Headquarters

Futian, Shenzhen 518043

People's Republic of China

Website: https://e.huawei.com

Preface

Purpose

This document describes the common operations of the SmartPVMS .

Product Version

The following table lists the product versions related to this document.

Product Name	Product Version
SmartPVMS	V600R024C00

Intended Audience

This document is intended for photovoltaic (PV) plant operating personnel and management personnel.

Symbol Conventions

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

Symbol	Description
DANGER	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

Symbol	Description
NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
NOTE	Supplements the important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

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

01 (2023-04-20)

This issue is the first official release of SmartPVMS V600R024C00.

Contents

1 Getting Started

This topic describes how to register an installer, log in to and log out of the system, retrieve the password, and experience the plant functions.

1.1 Overview

The SmartPVMS is a software system for the monitoring and O&M of PV power systems. It aims to display the current and historical running status of PV plants in a real-time and comprehensive manner. It also provides functions such as intelligent alarming, analysis, diagnosis, and O&M to help customers improve the power generation efficiency and lower the O&M cost, achieving refined management and improved profitability. The Smart PV Management System (Cloud) is deployed on a public network, which can be accessed over the Internet through 4G or Wi-Fi. The Smart PV Management System (Cloud) provides the following functions:

Full-lifetime Management Allows You to Learn the Plant Operating Status

- PV plant information on one screen, facilitating management.
- Real-time monitoring of plant-level, device-level, and module-level running data.
- Traceable and presentable plant-level and device-level historical data of multiple types.
- Real-time display of fault alarms, facilitating quick response and troubleshooting.
- Report and alarm push and subscription for learning the plant running status.

Intelligent and Efficient O&M

- Simple and efficient centralized O&M and monitoring.
- Real-time alarm push and troubleshooting suggestions, enabling quick response.
- Accurate locating of arc faults, reducing the onsite troubleshooting time (full optimizer configuration required).
- Mobile O&M/Electronic tickets, delivering simple and efficient O&M.

- Remote health check and proactive optimization, ensuring the healthy and stable operation of PV plants.

Networking Mode

Figure 1-1 shows the system networking.

Figure 1-1 System networking

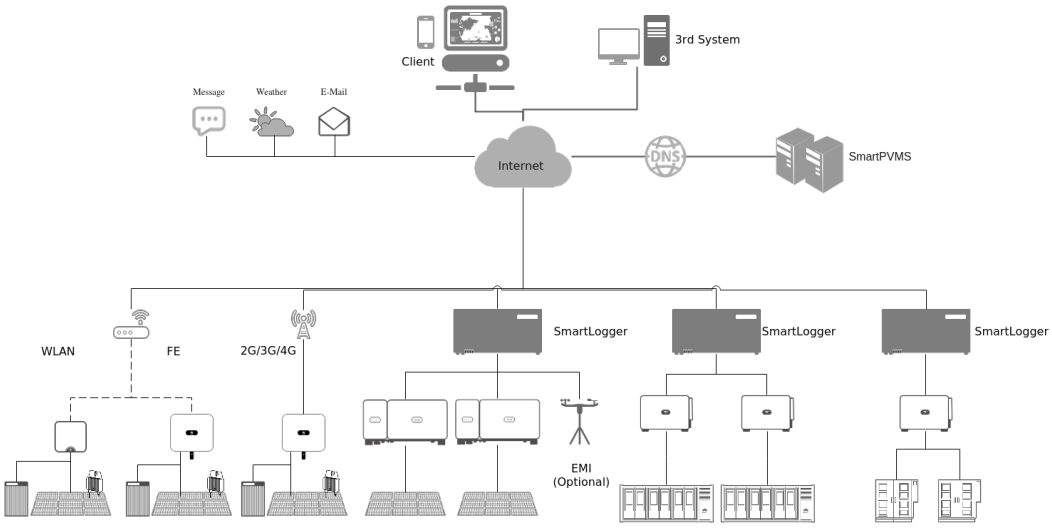


Table 1-1 lists the device types that can be managed by the system.

Table 1-1 Types of supported devices

Device Type	Description
Inverter	Only Huawei inverters can be managed.
SmartLogger	Can be connected to, managed and remotely upgraded on the system, covering performance indicator monitoring, configuration information, alarm information, and log information.
SDongle	
Residential battery	
LG battery	Can be connected to and managed on the system, covering performance indicator monitoring, configuration information, alarm information, and log information. Remote upgrade is not supported.
Electricity meter	Can be connected to and managed on the system, covering performance indicator monitoring, configuration information, and alarm information.
Environmental monitoring instrument	Can be connected to and managed on the system, covering performance indicator monitoring and configuration information.

1.2 User Registration

This topic describes how to register installer and owner accounts.

Register an owner account

The installer registers an account for the owner. The user needs to provide the personal information required for creating the account, such as the name and email address. After the registration is complete, the system sends the account and initial password to the owner by email.

Register an installer account

- If your company has never registered an account in the management system, you can register it through the **Installer Registration** function. Registering the first installer user also enrolls a company.
  a. Open a web browser, enter **https://intl.fusionsolar.huawei.com** in the address box, and press **Enter**. The login page is displayed.
  b. Click **Installer Registration**. The **Installer Registration** page is displayed.
  c. Sign up as an installer as prompted.

  NOTE
  - The email address and user name entered during registration can be logging in to the management system.
  - The installer account is a company administrator account.
- If your company has registered an account in the management system, contact the administrator to add you to the user list. For details, see **3.7.1.2 Creating a User in the Company and Associating the User with the Plant**.

1.3 Login and Logout

This topic describes how to log in to and log out of the management system .

Prerequisites

You have obtained the username or email address and password for logging in to the system.

Context

The OS and browser of your PC must meet the following requirements.

Table 1-2 Configuration requirements

Software Type	Requirements
Browser	• Chrome 79 or later • Firefox ESR 68 or later

Software Type	Requirements
Resolution	1366 x 768 (px) or higher on laptops and PCs. Optimal resolution: 1920 x 1080 (px)

Procedure

Step 1 Open a web browser, enter **https://intl.fusionsolar.huawei.com** in the address box, and press **Enter**. The login page is displayed.

Step 2 Enter the username or email address and password, and click **Log In**.

NOTE

- If you log in to the system for the first time or for the first time after the privacy policy is updated, select the item for agreeing to the terms of use and privacy policy.
- If you have changed your password after login, keep the new password secure. To ensure account security, change the password periodically and keep the new password in mind. Not changing the initial password may cause password disclosure. A password left unchanged for a long period of time may be stolen or cracked. If a password is lost, the user cannot access the system. In these cases, the user is liable for any loss caused to the PV plant.
- For security purposes, do not set the browser to remember the password.

----End

Follow-up Procedure

To log out, move the pointer to  on the home page and choose **Log Out** from the drop-down list box.

1.4 Associate Email Address

If you have verified the email address associated with your account, you can reset your password using the email address when you forgot your login password.

Prerequisites

You have logged in to the management system.

Procedure

Step 1 Choose **System** > **System Settings** > **Personal Settings** from the main menu.

Step 2 In the navigation pane, choose **Modify Personal Info**.

Step 3 On **Associate Email Address** area, click **Verify**.

Step 4 Click **Send Code** and enter the obtained verification code to verify that the email address is valid.

Step 5 Click **OK**.

----End

1.5 Password Retrieval

You can reset the password using the associated email address or contact your installer when you forgot the password.

Procedure

- If you have verified the email address associated with your account, you can reset the password using the email address.
  a. Open a web browser, enter **https://intl.fusionsolar.huawei.com** in the address box, and press **Enter**. The login page is displayed.
  b. Click  . The **Forgot password** page is displayed.
  c. Set a new password as prompted.
- If you have not verified the email address associated with your account, you can contact your installer to reset the password. For details, see **Resetting Password**.

1.6 Demo Site

This section describes how to log in to the system using the guest status to promote the value of the management system to installation providers and proprietors, and browse plant information to help users understand the functions of the management system.

Procedure

Step 1 Open a web browser, enter **https://intl.fusionsolar.huawei.com** in the address box, and press **Enter**. The login page is displayed.

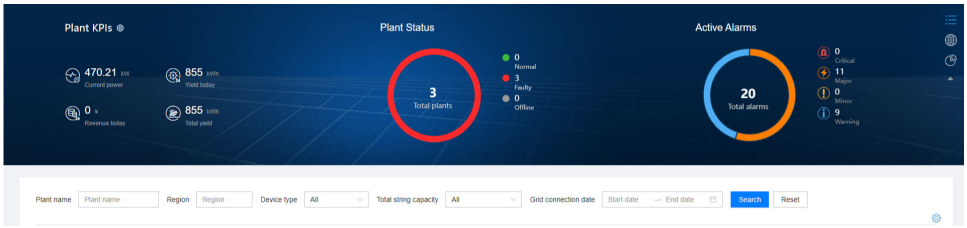
Step 2 Click **Demo Site** to experience the system.

----End

2 I am an Owner

2.1 Home

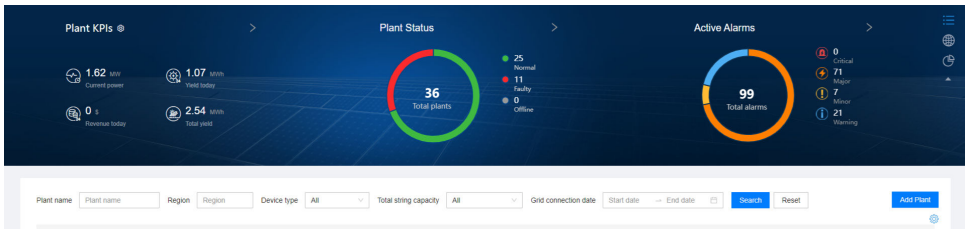
I am an Owner



Function	Function Access	Description
List View **NOTE** If two or more plants are bound to the user, the list view is displayed by default after the user logs in to the system. If only one PV plant is bound to the user, the monitoring page is displayed by default after the user logs in to the system.	Choose **Home** > **Home** > **List View**. Or in the upper-right corner of the home page, click  .	You can view the global information about the plant to learn about the plant running status. • In the **Plant KPIs** area, you can view the energy yield and click  to set the information to be viewed. • In the **Plant Status** area, you can view the real-time status of the plant. • In the **Active Alarms** area, you can view device alarms. • Click the PV plant icon to view details. For details, see **2.2.1 Viewing Plant Running Information**.

Function	Function Access	Description
Map View **NOTE** The management system provides only the capability of map service interconnection. The map service is provided by a third-party map service provider who is responsible for whether map data is available and accurate. If the map information is blank, contact the installer to configure map interconnection parameters.	Choose **Home** > **Home** > **Map View**. Or in the upper-right corner of the home page, click  .	You can intuitively view the location and distribution of a plant in this mode. • Move the pointer to the location of the target PV plant. The PV plant information of the Location, energy yield, and weather window is displayed. • Click the PV plant icon to view details. For details, see **2.2.1 Viewing Plant Running Information**.
KPI View	Choose **Home** > **Home** > **KPI View**. Or in the upper-right corner of the home page, click  .	Displays key energy yield indicators of the plants, facilitating monitoring and management.

I am an Installer



Function	Function Access	Procedure
List View **NOTE** If two or more plants are bound to the user, the list view is displayed by default after the user logs in to the system. If only one PV plant is bound to the user, the monitoring page is displayed by default after the user logs in to the system.	Choose **Home** > **Home** > **List View**. Or in the upper-right corner of the home page, click  .	You can gain an overview of plants and important plant information, and navigate to individual plants for details. • View the running status of the PV plant. – In the **Plant KPIs** area, you can view the energy yield and click  to set the information to be viewed. – In the **Plant Status** area, you can view the real-time status of the plant. – In the **Active Alarms** area, you can view device alarms. • Creating a plant. 1. Click **Add Plant**. 2. In the displayed **Add Plant** dialog box, complete the configuration wizard, and click **Save.** • In the plant list, you can view the status, location, and energy yield of each plant. You can click  to set the plant information to be viewed.
Map View **NOTE** The management system provides only the capability of map service interconnection. The map service is provided by a third-party map service provider who is responsible for whether map data is available and accurate. If the map information is blank, contact the system administrator to configure map interconnection parameters.	Choose **Home** > **Home** > **Map View**. Or in the upper-right corner of the home page, click  .	You can intuitively view the location and distribution of a plant in this mode. • Move the pointer to the location of the target PV plant. The PV plant information of the Location, energy yield, and weather window is displayed. • Click the PV plant icon to view details.

Function	Function Access	Procedure
KPI View	Choose **Home** > **Home** > **KPI View**. Or in the upper-right corner of the home page, click  .	Displays key energy yield indicators of the plants, facilitating monitoring and management.
Dashboard	Choose **Home** > **Home** > **Dashboard**.	The Dashboard allows you to monitor the O&M and operation status of all PV plants in the company. • Displays KPI information modules in six dimensions. 1. In the upper-right corner of the company-level dashboard, click  . 2. In the dialog box that is displayed, select a function block and drag it to set the layout. 3. Click **OK**. • Exit the dashboard display. You can click the logo or title to return to the plant home page.

2.2 Monitoring

This section describes how to monitor the topology of a PV plant to reflect the networking and running status of devices. You can learn about and monitor the running status of devices in real time by browsing views.

2.2.1 Viewing Plant Running Information

By monitoring the plant overview, view, and device information, you can learn about the plant running status in real time.

Context

Based on the functions of managed devices, PV plants can be classified into the following types:

- PV plant: Contains only PV devices and subcomponents, such as the maximum power point tracking (MPPT) and inverter (non-PCS).

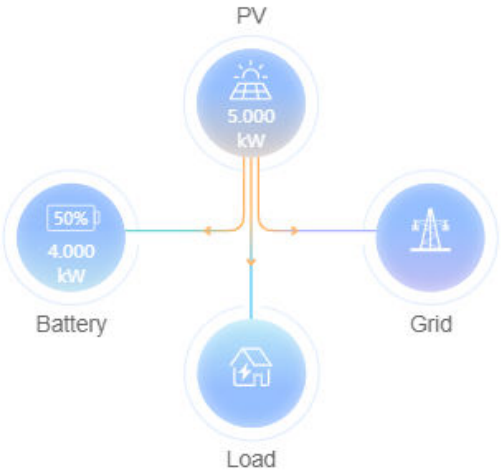
- Energy storage plant: Contains only energy storage devices and subcomponents, such as energy storage containers and energy storage cabinets.
- PV+storage plant: Contains PV devices and energy storage devices.

Viewing Plant Running Information

1. Choose **Monitoring** > **Monitoring** from the main menu.
2. In the navigation tree on the left, click the PV plant to be queried.
3. On the **Overview** page, you can view the basic plant information, energy yield and revenue statistics, real-time status, and energy flow diagram.
   - Weather: displays the weather forecast of the current day and the next two days in the plant location.

     NOTE

     If the weather information is not displayed, contact the installer to configure the weather service.
   - Energy flow diagram: Displays the current power supply direction of the plant.

     NOTE

     The energy flow diagram is displayed only when three or more elements among PV, battery, grid, and load are involved in the system.
   - Environmental benefits: Unlike thermal power plants, PV power plants generate electricity without CO2 emissions, which is equivalent to planting trees. For details, see **5.1 How to Calculate Carbon Emissions Avoided**.
   - Energy management: Displays the energy yield, energy consumption, and self-consumption of a plant in different time dimensions, helping you analyze the energy consumption trend and optimize electricity consumption. In scenarios where energy storage is available, energy storage devices can store excess power and discharge power when PV power is inadequate or unavailable to improve the self-consumption rate.
   - Revenue: Calculates the sum of feed-in revenue of a plant (feed-in electricity × feed-in tariff) and savings in electricity bills (self-consumed electricity × purchase price) to display the benefits brought by the plant.

NOTE

- If revenue data is not displayed, contact the installer to check whether the electricity price is configured.
- If the price unit is inconsistent with the local type, contact the installer to change the currency.

Viewing Charging Pile Running Information

1. Choose **Monitoring** > **Monitoring** from the main menu.
2. In the navigation pane, choose a charging-only plant.
3. On the **Details** page, you can view the basic information, charging status, real-time data, and configuration parameters of the charging pile.
   - **Basic Information**: displays the charging pile model, rated power, and upper limit of the charging power.
   - Charging state and energy charged: displays the charging status, charging duration, and energy charged.
   - **Realtime Data**: displays the rated power, accumulated charged electricity, and working status of the charging pile.
   - **Configuration Parameters**: displays information such as **Maximum Charge Current**, **Switch Between Single and Three Phases**, and **Working Mode**.

Viewing Plant Layouts

- Plant View Introduction

  The plant layouts include physical and logical layouts.
  - Physical layout: Displays the actual installation positions of modules to help you quickly locate a faulty optimizer.
  - Logical layout: Displays the logical relationship between the inverters and the PV modules mounted with optimizers to help you check the connections between the inverters, optimizers, and PV modules.

Figure 2-1 Physical layout

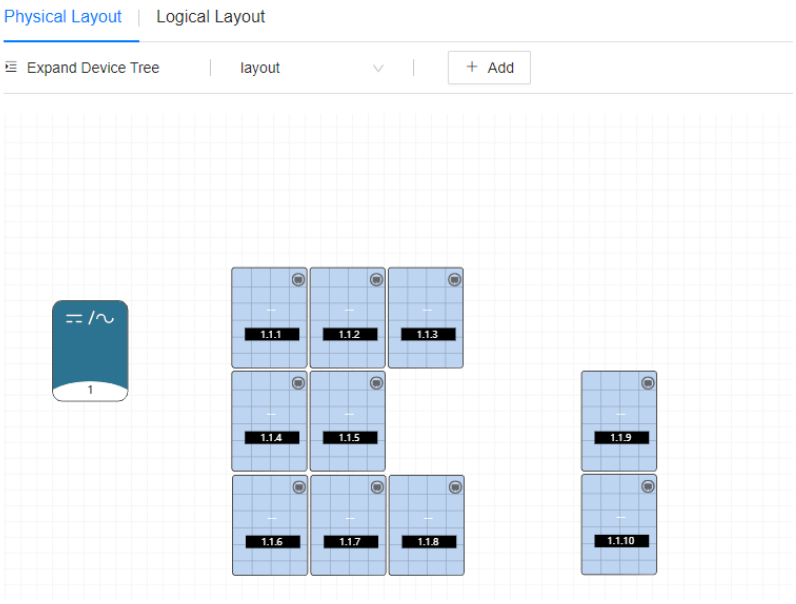
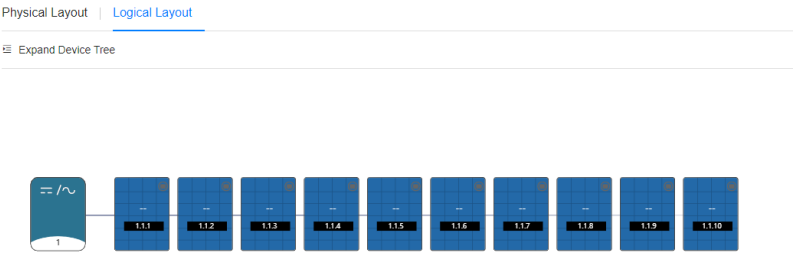


Figure 2-2 Logical layout



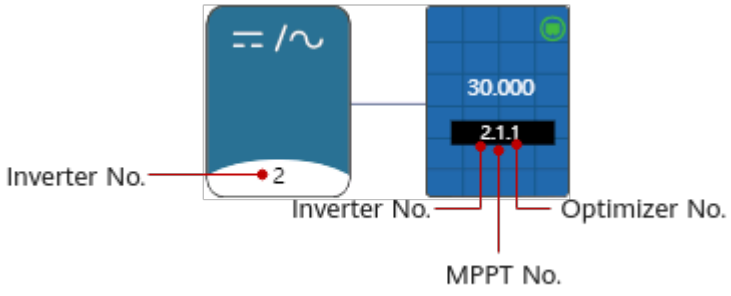
- Viewing the Physical Layout

  On the **Physical Layout** tab page, click to select a layout.

  – Viewing the connection between inverters and PV modules: Click in the lower right corner. The PV modules connected to the same inverter are rendered in the same color.

  – **Figure 2-3** shows the string number.

  Figure 2-3 Number description



- View the energy yield: Click next to **Yield** in the upper right corner to view the energy yield today, this month, and this year, and the total energy.
- Zooming in, zooming out, or restoring a layout: Click and in the lower right corner to zoom in or out the layout. Alternatively, click the layout and scroll the mouse wheel to zoom in or out. Click to restore the layout.
- Click in the upper left corner to display the device tree. Select an optimizer from the device tree and view its position in the layout.
- If there are many PV modules on a tab page, the PV modules connected to the same inverter are displayed as one block.
- In the **Overview** area in the lower left corner, you can view the entire physical layout and drag the blue box to display the selected PV modules.

Viewing Device Running Information

You can view the communication status and basic device information of all devices in the plant.

Click a device name to view the running status of the device. For details, see **2.2.2 Viewing Device Running Information**.

2.2.2 Viewing Device Running Information

You can monitor devices in real time. This helps you learn about the running status of devices in a timely manner.

Context

Table 2-1 Device status description

Status	Color	Description
Running		The device is running properly (including the grid-connected, off-grid, and terminal test status).
Standby		The device is on standby or shut down unexpectedly or on command.
Faulty		The device is faulty or shut down unexpectedly.
Offline		The communication is interrupted.
Loading		The device has been identified and feature information is being collected.

NOTE

If the real-time device data cannot be obtained and the running information is displayed as -, contact the installer to check whether the device is offline or faulty.

Procedure

1. Choose **Monitoring** > **Monitoring** from the main menu.
2. In the navigation tree on the left, click the device to be queried. You can view the detailed information, historical data.

Table 2-2

Tab Page	Description	Procedure
Overview **NOTE** The SmartLogger-level overview page is displayed only when the SmartLogger software version is FusionSolar V800R021C10 or later.	Displays the physical logical relationships and running status of devices and their connected devices in a topology view, and renders devices in different colors based on the running status.	In the subarray topology view and battery topology view, you can perform the following operations: • Move the cursor to the icon of a subcomponent and view the tips that are displayed. • Click a device icon to view the running information about the subcomponent. • Reporting cell statistics consumes a large amount of data. Therefore, the system does not automatically refresh the data. To view the latest cell data, you need to manually refresh. 1. Click **Refresh** in the **Curent Data of battery cell** area. 2. In the dialog box that is displayed, click **OK**, and then click **OK**.
Details	Views the key running parameters of the device. **NOTE** If PV strings are attached to the inverter but the PV string details are empty, contact the installer to configure PV string parameters.	-

Tab Page	Description	Procedure
Historical Information	Queries the running status of a device in a specified period. **NOTE** If the data is incomplete or lost in a certain period, contact the installer to collect the lost data.	1. Choose a device from the navigation tree on the left and click **Historical Information**. 2. On the top of the query page, select the query time and signal point name. 3. Click **Query** to view the historical information query result.

NOTE

The function tab pages vary depending on the device.

2.2.3 Sharing Plant Running Information

The owner can share the plant running information through the Kiosk view with other users who can view the shared information without logging in to the management system.

Procedure

Step 1 Choose **Monitoring** > **Monitoring** from the main menu.

Step 2 In the navigation tree on the left, click the PV plant to be queried. The **Overview** page is displayed by default.

Step 3 On the **Overview** page, click **Kiosk** in the upper right corner.

Step 4 In the dialog box that is displayed, set the Kiosk view as prompted.

Step 5 Click **Copy** to copy the URL and save it to the local PC and click **OK**.

After the setting is complete, you can share the URL with others who need to know the plant information.

NOTE

- The validity period of the URL of the Kiosk view is one year.
- After the Kiosk view is generated, the plant running data is refreshed every 30 minutes. You can refresh the browser to obtain the latest data.

----End

2.2.4 Enabling EMMA

The AI-powered energy management assistant (EMMA) provides intelligent energy scheduling and management functions. Based on big data analysis, it accurately predicts the power generation and consumption, and intelligently

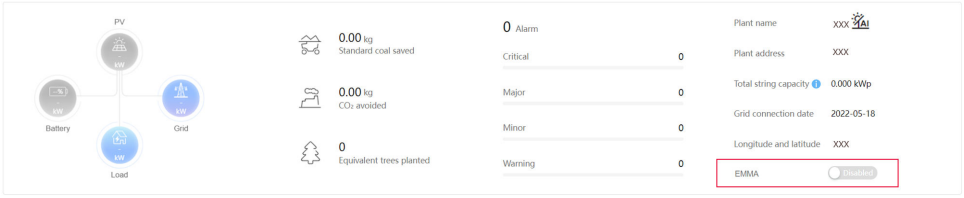
stores, purchases, and sells electricity to achieve optimal system performance and maximize financial benefits.

Procedure

1. Choose **Monitoring** > **Monitoring** from the main menu.
2. In the navigation tree on the left, select the target plant and click **Overview**.
3. When the system determines that the plant meets the conditions for enabling the EMMA function, the **Welcome** dialog box is displayed. You can enable the EMMA function as prompted.

   If you select **Not Now**, you can click

next to **EMMA** and enable the EMMA function as prompted.



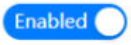
NOTE

Only owners have the permission to enable the EMMA function. After the EMMA function is enabled, owners and installers can view the EMMA revenue and energy forecast and analysis.

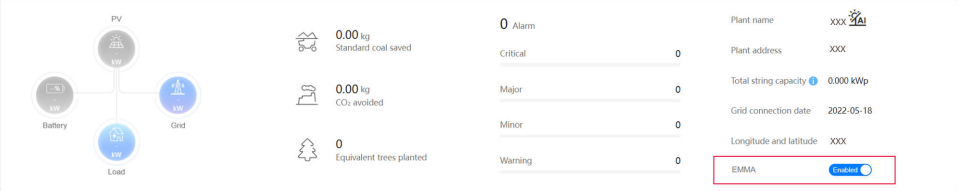
Viewing EMMA Revenue and Energy Forecast

1. Choose **Monitoring** > **Monitoring** from the main menu.
2. In the navigation tree on the left, select a PV plant for which EMMA has been enabled and click the **EMMA** tab to view the revenue information, revenue comparison, and energy forecast and analysis.
   - Viewing revenue information: You can view the number of days when the EMMA function is enabled, revenue increase, and increase rate.
   - Viewing the revenue comparison: In the **Revenue Comparison** area, you can view the comparison between the revenues when EMMA is enabled and disabled.
   - Viewing energy analysis: In the **Energy Forecast** area, you can view details about the energy yield, power consumption, and battery charge and discharge in the past 24 hours, and energy forecast in the next 24 hours.

Disabling EMMA

1. Choose **Monitoring** > **Monitoring** from the main menu.
2. In the navigation tree on the left, select a PV plant for which EMMA has been enabled and click **Overview**.
3. Click 

next to **EMMA** and disable the EMMA function as prompted.



NOTE

- After the EMMA function is disabled, you can still view historical revenue information and revenue comparison.
- You cannot enable EMMA again in the same month after disabling it to ensure the accuracy of revenue calculation. In the next month, when the system determines that the plant meets the conditions for enabling EMMA, you can enable EMMA again as prompted.

2.3 Plant Management

On the **Plant Management** page, you can manage multiple plants in a centralized manner, and query, export, and modify plant information.

Procedure

Step 1 Choose **Plants** > **Plant** > **Plan Management**.

Step 2 On the **Plant Management** page, you can perform the operations listed in **Table 1** as required.

Table 2-3 Plan management operations

Operation	Procedure
Querying Power Plants	Enter a plant name and click **Query**.
Modifying Plant Information	1. Click in the **Operation** column. 2. In the displayed dialog box, enter the basic information about the plant and click **Apply**. 3. Click **Save**.
Export Plant Information	Select the plants to be exported and click **Export** to export the plant information.

Operation	Procedure
Unbinding or Deleting a Device	1. Click in the **Operation** column. In the displayed dialog box, click the **Device List** tab. 2. Select the device and click **Delete**. 3. In the displayed dialog box, **select Unbind** or **Delete** as required and click **OK**. **NOTE** • After a device is unbound, the data of the device and its subdevices is stored in the database. The default data retention period is six months. To change the retention period, contact the system administrator. – If the device is rebound to a plant within the data retention period, the device inherits the retained data. – If the device is not bound to a plant within the data retention period, the data will be automatically deleted. • After a device is deleted, the data of the device and its subdevices is permanently deleted. When the device is rebound to a plant, the device data cannot be restored.

----End

2.4 System

2.4.1 Personal Settings

2.4.1.1 Changing Personal Password

If passwords are disclosed or remain unchanged for a long time, users can change their personal passwords by setting personal information. To improve user security, it is recommended that passwords be changed periodically (for example, every three months).

Context

If you cannot change your password, contact the security administrator.

Procedure

Step 1 Choose **System** > **System Settings** > **Personal Settings**.

Step 2 In the navigation pane, choose **Change Password**.

Step 3 On the **Change Password** tab page, enter **Old password** and set **New password** and **Confirm password**.

Step 4 Click **Apply**.

NOTE

User information is more secure if a password is changed more frequently. If a user forgets the password due to frequent password changes, contact security administrators to reset the password.

----End

2.4.1.2 Modifying Personal Information

When personal information such as mobile numbers and email addresses changes or needs to be supplemented, users can periodically maintain their personal information by setting personal information to ensure its accuracy.

Context

- When you modify your personal information, such as mobile numbers and email addresses, you are obligated to take considerable measures, in compliance with the laws of the countries concerned and the user privacy policies of your company, to ensure that your personal data is fully protected.
- To ensure the security of personal information, such as mobile numbers and email addresses, these data is anonymized on the page, and HTTPS encryption transmission channels are used.

Procedure

Step 1 Choose **System** > **System Settings** > **Personal Settings**.

Step 2 In the navigation pane, choose **Modify Personal Info**.

Step 3 On **Modify Personal Info**, modify personal information as required.

NOTE

If the SMS and email verification codes cannot be obtained, ensure that the remote notification function is configured correctly.

Table 2-4 Parameter description

Parameter	Description	Procedure
Associate Mobile Number	Mobile number associated with a user account.	• Editing the mobile number 1. Click **Edit**. 2. Verify the identity information as prompted and click **Next**. 3. Select a country or region code and enter a new mobile number. 4. Click **OK**. • Verifying the mobile number 1. Click **Verify**. 2. Click **Send Code** and enter the obtained verification code to verify that the mobile number is valid. 3. Click **OK**.
Associate Email Address	Email address associated with a user account.	• Editing the email address 1. Click **Edit**. 2. Verify the identity information as prompted and click **Next**. 3. Enter a new email address. 4. Click **OK**. • Verifying the email address 1. Click **Verify**. 2. Click **Send Code** and enter the obtained verification code to verify that the email address is valid. 3. Click **OK**.
Auto-Logout If No Activity Within	If a user does not perform any operation within the period specified by this parameter after login, the user will be logged out. This parameter can be set for local users and remote users. The default value for the third-party user is 30 minutes and cannot be changed.	1. Click the drop-down list and select a value for **Auto-Logout If No Activity Within**. 2. Click **Save**.

Parameter	Description	Procedure
Welcome Message	You can set the information to be displayed upon the next login.	1. Click **Edit**. 2. Enter the information to be displayed upon the next login. 3. Click **OK**.
Display Associate Contact Information Page	This parameter specifies whether the **Associate Contact Information** page is displayed when the user logs in next time. • If this parameter is enabled, the **Associate Contact Information** page is displayed. • If this parameter is disabled, the **Associate Contact Information** page is not displayed.	• Click **Enable**. • Click **Disable**. **NOTE** In SSO mode, contact information can be associated only on the **Associate Contact Information** page. Exercise caution when setting this parameter.

----End

2.4.1.3 Modifying Personal Client IP Address Control Policies

With the **Update ACL Policy** permission, you can configure your personal client IP address control policies. ACL is short for access control list.

Procedure

Step 1 Choose **System** > **System Settings** > **Personal Settings**.

Step 2 In the navigation pane, choose **Personal Client IP Address Policies**.

Step 3 On the **Personal Client IP Address Policies** page, view or modify your IP address control policies.

----End

2.4.2 Public Notice

This topic describes how to view received public notices to learn messages.

Procedure

Step 1 Choose **System** > **Message Management** > **Announcements**.

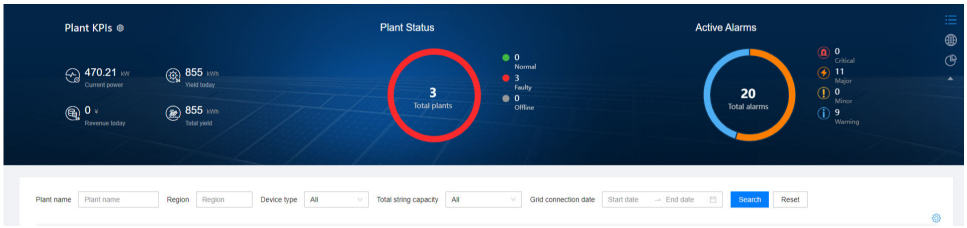
Step 2 Click the **Message Subject** of an unread message. In the displayed **Message** dialog box, view the details about the message.

----End

3 I am an Installer

3.1 Home

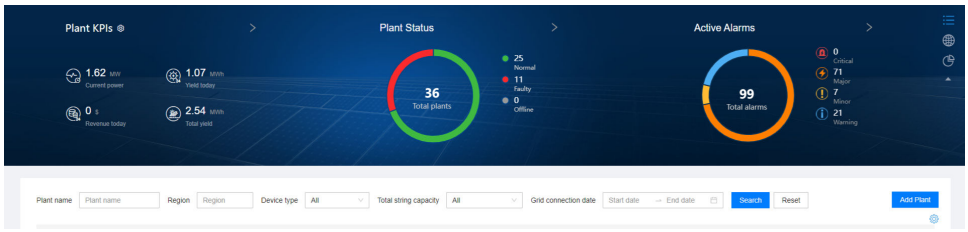
I am an Owner



Function	Function Access	Description
List View **NOTE** If two or more plants are bound to the user, the list view is displayed by default after the user logs in to the system. If only one PV plant is bound to the user, the monitoring page is displayed by default after the user logs in to the system.	Choose **Home** > **Home** > **List View**. Or in the upper-right corner of the home page, click  .	You can view the global information about the plant to learn about the plant running status. • In the **Plant KPIs** area, you can view the energy yield and click  to set the information to be viewed. • In the **Plant Status** area, you can view the real-time status of the plant. • In the **Active Alarms** area, you can view device alarms. • Click the PV plant icon to view details. For details, see **2.2.1 Viewing Plant Running Information**.

Function	Function Access	Description
Map View **NOTE** The management system provides only the capability of map service interconnection. The map service is provided by a third-party map service provider who is responsible for whether map data is available and accurate. If the map information is blank, contact the installer to configure map interconnection parameters.	Choose **Home** > **Home** > **Map View**. Or in the upper-right corner of the home page, click  .	You can intuitively view the location and distribution of a plant in this mode. • Move the pointer to the location of the target PV plant. The PV plant information of the Location, energy yield, and weather window is displayed. • Click the PV plant icon to view details. For details, see **2.2.1 Viewing Plant Running Information**.
KPI View	Choose **Home** > **Home** > **KPI View**. Or in the upper-right corner of the home page, click  .	Displays key energy yield indicators of the plants, facilitating monitoring and management.

I am an Installer



Function	Function Access	Procedure
List View **NOTE** If two or more plants are bound to the user, the list view is displayed by default after the user logs in to the system. If only one PV plant is bound to the user, the monitoring page is displayed by default after the user logs in to the system.	Choose **Home** > **Home** > **List View**. Or in the upper-right corner of the home page, click  .	You can gain an overview of plants and important plant information, and navigate to individual plants for details. • View the running status of the PV plant. – In the **Plant KPIs** area, you can view the energy yield and click  to set the information to be viewed. – In the **Plant Status** area, you can view the real-time status of the plant. – In the **Active Alarms** area, you can view device alarms. • Creating a plant. 1. Click **Add Plant**. 2. In the displayed **Add Plant** dialog box, complete the configuration wizard, and click **Save.** • In the plant list, you can view the status, location, and energy yield of each plant. You can click  to set the plant information to be viewed.
Map View **NOTE** The management system provides only the capability of map service interconnection. The map service is provided by a third-party map service provider who is responsible for whether map data is available and accurate. If the map information is blank, contact the system administrator to configure map interconnection parameters.	Choose **Home** > **Home** > **Map View**. Or in the upper-right corner of the home page, click  .	You can intuitively view the location and distribution of a plant in this mode. • Move the pointer to the location of the target PV plant. The PV plant information of the Location, energy yield, and weather window is displayed. • Click the PV plant icon to view details.

Function	Function Access	Procedure
KPI View	Choose **Home** > **Home** > **KPI View**. Or in the upper-right corner of the home page, click  .	Displays key energy yield indicators of the plants, facilitating monitoring and management.
Dashboard	Choose **Home** > **Home** > **Dashboard**.	The Dashboard allows you to monitor the O&M and operation status of all PV plants in the company. • Displays KPI information modules in six dimensions. 1. In the upper-right corner of the company-level dashboard, click  . 2. In the dialog box that is displayed, select a function block and drag it to set the layout. 3. Click **OK**. • Exit the dashboard display. You can click the logo or title to return to the plant home page.

3.2 Monitoring

3.2.1 Plant Overview

You can view the status of plants and devices.

Prerequisites

Devices have been connected to the management system and bound to a plant. For details about the procedure, see **3.4.1.1.1 Creating a Plant**.

Context

Plants can be classified into the following five types based on their devices:

- PV plant: contains only PV devices and components, such as maximum power point trackers (MPPTs) and inverters (non-PCS).
- Energy storage plant: contains only energy storage devices and components, such as energy storage containers and cabinets.

- PV+storage plant: contains PV devices and energy storage devices.
- PV + storage charging station: contains PV devices, energy storage devices, and charging piles.
- Charging-only station: contains only charging piles.

Viewing the Running Information of a Plant

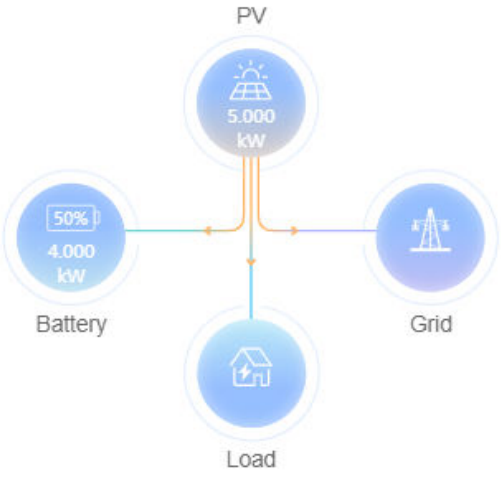
1. Choose **Monitoring** > **Monitoring** from the main menu.
2. In the navigation pane, choose a target plant.
3. On the **Overview** page, you can view the basic plant information, energy yield and revenue statistics, real-time status, and energy flow diagram.
   - Basic plant information: displays the local weather forecast (current day and the next two days), plant address, and string capacity.

     NOTE

     If the system does not display the weather of the place where the plant is located, contact the system administrator to configure the weather service.
   - Energy yield and revenue statistics: displays the energy yield and revenue of the plant. The system calculates the sum of feed-in revenue of a PV plant (Feed-in revenue = Feed-in electricity x Feed-in tariff) and savings in electricity bills (Savings = Self-consumed electricity x Purchase price) to display the benefits from the PV plant.

     NOTE

     - You need to set the electricity prices when adding a PV plant. Otherwise, the system cannot calculate the revenue. For details about the procedure, see **3.4.1.1.1 Creating a Plant**.
     - If the price unit is inconsistent with the local type, contact the company administrator to change the currency. For details, see. For details about the procedure, see **3.7.1.3 Configuring Company Information**.
   - Energy flow diagram: displays the current power supply direction of the plant.

     NOTE

     The energy flow diagram is displayed only when three or more elements among PV, battery, grid, and load are involved in the system.

- Energy management: displays the energy yield, energy consumption, and self-consumption of a plant in different time dimensions, helping you analyze the energy consumption trend and optimize electricity consumption. In the energy storage scenarios, energy is stored and discharged, improving the self-consumption rate.
- Environmental benefits: Unlike thermal power plants, PV power plants generate electricity without CO2 emissions, which is equivalent to planting trees. For details, see **5.1 How to Calculate Carbon Emissions Avoided**.
- Alarm: displays alarms generated in the plant.

NOTE

If a large number of devices connected to the plant report data simultaneously, you may need to wait for 30 to 40 minutes before the real-time data of all devices is reported to the management system.

Viewing Charging Pile Running Information

1. Choose **Monitoring** > **Monitoring** from the main menu.
2. In the navigation pane, choose a charging-only plant.
3. On the **Details** page, you can view the basic information, charging status, real-time data, and configuration parameters of the charging pile.
   - **Basic Information**: displays the charging pile model, rated power, and upper limit of the charging power.
   - Charging state and energy charged: displays the charging status, charging duration, and energy charged.
   - **Realtime Data**: displays the rated power, accumulated charged electricity, and working status of the charging pile.
   - **Configuration Parameters**: displays information such as **Maximum Charge Current**, **Switch Between Single and Three Phases**, and **Working Mode**.

3.2.2 Viewing and Managing Devices

You can monitor devices in real time. This helps you learn about the status of devices in a timely manner and handle exceptions to ensure device safety.

Prerequisites

Devices have been connected to the management system and bound to a plant. For details about the procedure, see **3.4.1.1.1 Creating a Plant**.

Context

Table 3-1 Device status description

Status	Color	Description
Running		The device is running properly (including the on-grid, off-grid, and terminal test status).

Status	Color	Description
Standby		The device is on standby or shut down unexpectedly or on command.
Faulty		The device is faulty or shut down unexpectedly.
Offline		The communication is interrupted.
Loading		The device has been identified and feature information is being collected.

NOTE

- If the real-time device data cannot be obtained and the running information is displayed as -, check whether the device is offline or faulty.
- The function screens vary with devices.

Navigation Path

1. Choose **Monitoring** > **Monitoring** or **Plants** > **Device** > **Device Management** from the main menu.
2. In the navigation pane, select a company or plant, and click the **Device Management** tab page.

   You can manage and view all devices of the company or plant through **Device Management**.

Viewing Device Information

On the **Device Management** page, you can view the communication status and basic information about all devices in a plant. Click a device name or click a device in the navigation pane to view the device overview, details, and historical information. The ESS supports the 3D view. For details, see **Viewing ESS Information**.

- **Overview**: Displays the physical and logical relationships, status, and real-time data of devices and their subordinate devices in a topology view. You can click a device icon to view the running information of subordinate devices.
- **Details**: Displays the key parameters of the device.

  NOTE

  If there are strings connected to the inverter, you need to set string parameters when creating a PV plant. Otherwise, the string details are blank. For details, see **3.4.1.1.1 Creating a Plant**.
- **Historical Information**: Supports query of the device status in a specified period.

  NOTE

  If the data in a certain period is incomplete or lost, you can re-collect the lost data. For details, see **3.7.2.1 Data Recovery**.

Viewing ESS Information

The Smart String Energy Storage System (ESS, commonly in cabinets or containers) has a complex internal structure. The 3D view displays the actual layout and working status of each component inside the system, improving O&M efficiency. In the navigation pane, select the ESS and its components, including the energy storage unit (ESU), energy storage rack (ESR), energy storage module (ESM), and heating, ventilation, and air conditioning (HVAC). Click 3D View to enter the 3D view.

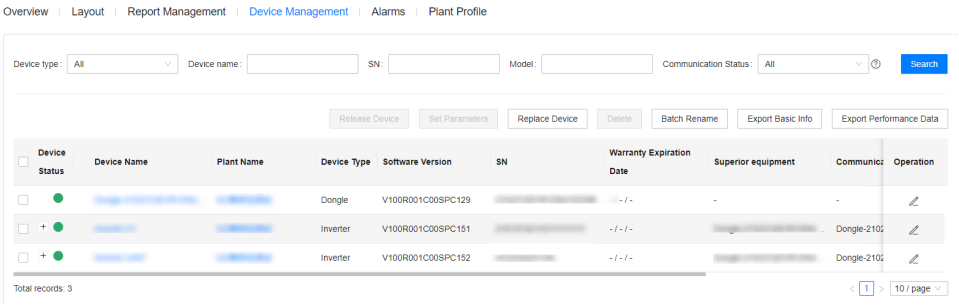
NOTE

o ensure the smoothness and accuracy of 3D views, the PC client must meet certain requirements. For details, see **4.7 What Are the Requirements for Accessing the 3D View of the ESS Smoothly on a PC Client?**.

- Running status and real-time data: Click a component in the navigation pane or click a component in the 3D view to view the actual layout, operating status, and real-time data of the component.
- Details: Click Details to view detailed information about each component.
- Configuration: Click Configuration to set device parameters.
- Historical data: Click Historical Data to query the operating status of each component within a specified period.
- Warning: Click Warning to track and handle the real-time active alarms and historical alarms of components.
- 2D: Click 2D to switch to the 2D view. In the 2D view, click 3D View to switch to the 3D view.
- 3D view rotation: Click and , or press and hold the left mouse key to select the ESS and then move the mouse.
- Fit to screen: Click .
- 3D view zoom-in or zoom-out: Click + and — .
- Current data of battery cell: Select an ESR and then click Current Data of battery cell to view its real-time data.

Configuring Device Information

You can set device parameters, delete devices, and change device names.



- Setting parameters: Select one or more devices of the same model from the device list and click **Set Parameters**. Alternatively, click a device name and set device parameters on the **Configuration** page.

  NOTE

  - The parameters that can be set vary according to the device model. For details about how to set the parameters, see the user manual of the device.

    How to obtain: Visit **https://support.huawei.com/enterprise/en/category/fusion-solar-pid-1600073963553?submodel=doc** and enter your device model to search for the corresponding user manual.
  - For details about how to set energy storage parameters, see **5.4 Battery Control Parameters**.
  - If a user changes the **Authentication Password** of a device in the management system and delivers the password to the device, the device fails to reconnect to the management system after being deleted. In this case, you need to reset the password on the device.
  - If a device is connected to another management system from one management system, delete the device from the original management system and then connect the device to the new management system.
- Deleting a device: Select one or more devices from the device list and click **Delete**.
- Changing a device name:
  - Modifying a Device Name

    In the device list, click in the **Operation** column.
  - Modifying Device Names in Batches

    i. Select the device to be modified.

    ii. Click **Export Basic Info** and download the basic device information file.

    iii. Enter the new device name in the **Device Name_New** column of the exported file based on the site requirements.

    iv. Click **Batch Rename**.

    v. Click **Upload**, select the modified basic device information file, and upload it.

    vi. Click **Execute**.

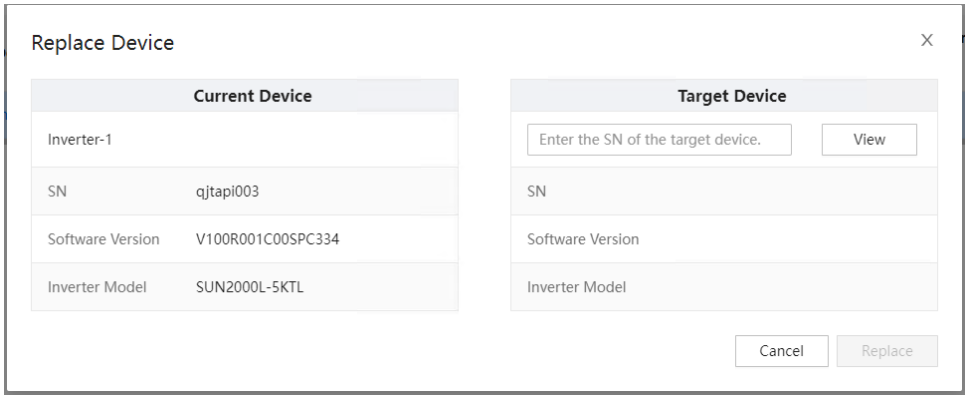
    The execution result is displayed in the lower part.

Replacing a Device

NOTICE

The following conditions must be met for device replacement:

- The current device is disconnected from the management system.
- The target device has been replaced and commissioned. For details, see the *FusionSolar Smart PV Solution-Device Replacement Commissioning Guide*.
- The following types of devices can be replaced: inverter, SmartLogger, optimizer and communications module.



1. Select a device and click **Replace Device**.
2. In the dialog box that is displayed, enter the SN of the **Target Device** and click **View**.
3. Click **Replace**.

   NOTE

   - To replace an optimizer, go to the **Details** page.
   - When an inverter is replaced, the new inverter can inherit the total energy yield data from the old inverter. After the old inverter is replaced, the data is automatically calibrated on the new inverter. If automatic calibration fails due to device disconnection or poor network quality, manually calibrate the device after the fault is rectified. For details, see **4.6 What Should I Do If the Total Energy Yield Fails to Be Automatically Calibrated After an Inverter Is Replaced?**.

Exporting Device Information

- Exporting basic information: Click **Export Basic Info**, or select one or more devices and click **Export Basic Info** to export basic information about all or selected devices.
- Exporting performance data: Select one or more devices and click **Export Performance Data**.

Task Management

Click in the lower right corner of the page to view and process historical tasks for exporting basic information, exporting performance data, and setting parameters.

3.2.3 Viewing and Managing Plant Layouts

After the optimizer is connected to the management system, you can browse the plant view to obtain the PV module status and energy yield.

The plant layouts include physical and logical layouts.

- Physical layout: Displays the actual installation positions of modules to help you quickly locate a faulty optimizer.
- Logical layout: Displays the logical relationship between the inverters and the PV modules mounted with optimizers to help you check the connections between the inverters, optimizers, and PV modules.

NOTE

After optimizers are connected to the management system, the logical layout is displayed by default. You can create a physical layout based on the actual installation positions of the modules. For details, see **3.2.3.1 Automatically Generating a Physical Layout** and **3.2.3.2 Manually Creating a Physical Layout**.

Figure 3-1 Physical layout

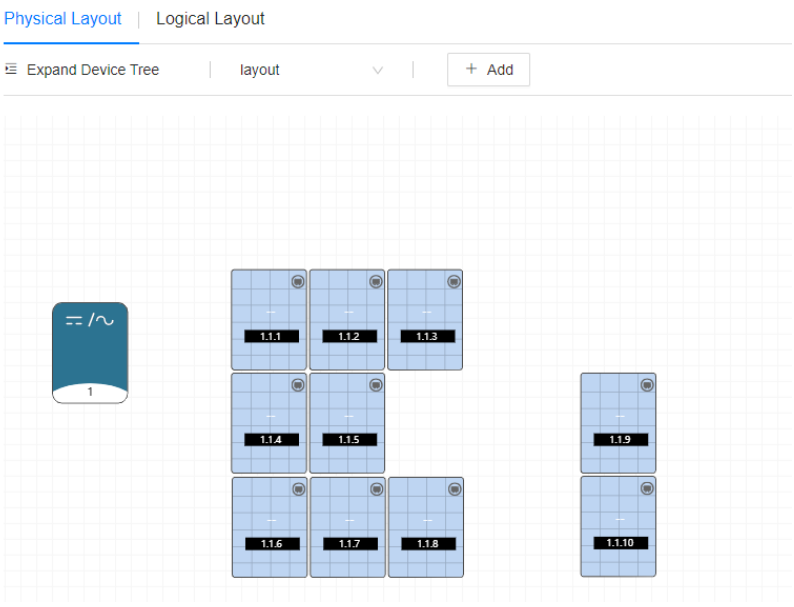
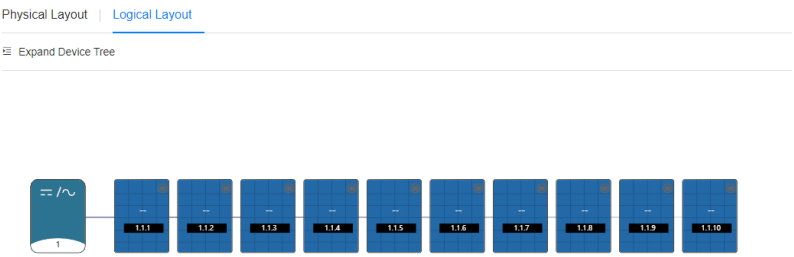


Figure 3-2 Logical layout



3.2.3.1 Automatically Generating a Physical Layout

Context

A large-sized PV plant contains a large number of PV modules. If there is only one physical layout, it is difficult to find or locate PV modules. The system can classify PV modules by area using the **Tab Management** function. Specifically, users can manage PV modules of different areas (for example, on various rooftops) in the same plant by tab page, ensuring efficient optimizer search and locating.

Before creating a physical layout, you are advised to plan tabs based on the PV module areas and manage drawings using the **Drawing Management** function.

Prerequisites

You have correctly pasted the SN labels of the optimizers to a physical layout template, taken a photo of the template, and saved the photo. For details about the physical layout template, see *Smart PV Optimizer Quick Guide*.

Creating a Physical Layout

1. Choose **Monitoring** > **Monitoring** from the main menu.
2. In the navigation pane, choose a plant and click **Layout**.

   NOTE

   By default, the **Physical Layout** tab has been created. If a large number of optimizers need to be managed, you can add more physical layout tabs to distribute the optimizers deployed on different rooftops among multiple physical layouts. For details, see **Tab Management**.
3. Select a physical layout and click **Edit**. The **Physical Layout Configuration** page is displayed.
4. Click **Manage Drawings**, click **Upload**, and upload a physical layout template to the system.

   NOTE

   You can view and manage the uploaded drawings on the **Manage Drawings** tab page. For details, see **Drawing Management**.
5. Click **Identify Drawings**, select the drawing to be added to the physical layout, click **Identify**, and complete drawing identification as prompted.

   NOTE

   When identifying drawings for the first time, set **Layout position**, **Optimizer-to-module ratio**, and **Layout** based on the actual installation of optimizers. These settings will be retained for later identification. To modify the settings, choose **Device List** > **Optimizer-to-module ratio** and **Identify Drawings** > **Set**.
6. **Optional:** If there are multiple drawings, select and identify them one by one, and drag the new PV modules to adjust their positions.

   NOTE

   If PV modules exist on the current tab page, the system adds them to the lower part of the current layout by default. To change the position, click **Set**, select a position next to **Layout position**, and click **Identify** to add the new PV modules to the canvas.

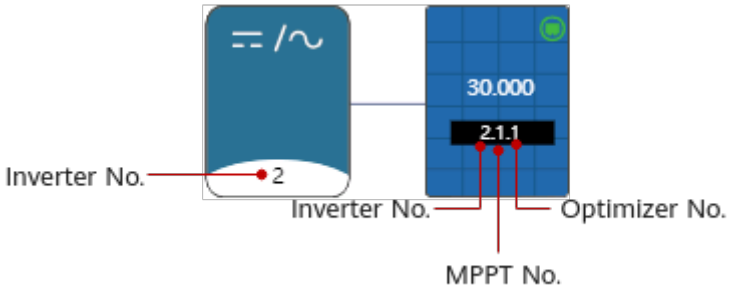
7. Click **Save** to save the physical layout.

Viewing the Physical Layout

On the **Physical Layout** tab page, click to select a layout.

- Viewing the connection between inverters and PV modules: Click in the lower right corner. The PV modules connected to the same inverter are rendered in the same color.
- **Figure 3-3** shows the string number.

Figure 3-3 Number description



- View the energy yield: Click next to **Yield** in the upper right corner to view the energy yield today, this month, and this year, and the total energy.
- Zooming in, zooming out, or restoring a layout: Click and in the lower right corner to zoom in or out the layout. Alternatively, click the layout and scroll the mouse wheel to zoom in or out. Click to restore the layout.
- Click in the upper left corner to display the device tree. Select an optimizer from the device tree and view its position in the layout.
- If there are many PV modules on a tab page, the PV modules connected to the same inverter are displayed as one block.
- In the **Overview** area in the lower left corner, you can view the entire physical layout and drag the blue box to display the selected PV modules.

Tab Management

On the **Physical Layout** tab page, manage the tabs.

- Adding a tab: Click + Add and add a tab as prompted.
- Viewing a tab: Click and select a desired tab.
- Changing a tab name: Click , select a desired tab, click Rename, and change the tab name as prompted.
- Deleting a tab: Click to select a desired tab, click Delete, and delete the tab as prompted.

Drawing Management

On the **Physical Layout Configuration** page, view and manage drawings.

- Upload drawings: Click **Upload** and upload the drawing as prompted.
- Viewing drawings: Double-click a drawing to view its content.
- Deleting a drawing: Select a drawing and click **Delete** to delete the drawing as prompted.

3.2.3.2 Manually Creating a Physical Layout

Prerequisites

The layout diagram of the optimizer installation positions has been prepared.

Creating a Physical Layout

1. Choose **Monitoring** > **Monitoring** from the main menu.
2. In the navigation pane, select a PV plant, and click the **Layout** tab.

   NOTE

   By default, the **Physical Layout** tab has been created. If a large number of optimizers need to be managed, you can add more physical layout tabs to distribute the optimizers deployed on different rooftops among multiple physical layouts. For details about tab management, see **Tab Management**.
3. Select a physical layout and click **Edit**. The **Physical Layout Configuration** page is displayed.
4. Drag graphical elements to the canvas in the right pane based on the layout diagram of the optimizer installation positions and set element installation parameters based on site requirements.
5. After selecting an element, you can move it to adjust its position based on the actual installation positions of the PV modules.
6. After the layout is complete, set **Optimizer-to-module ratio** in the **Device List** area, and drag inverters and optimizers to the corresponding positions for binding.

   NOTE

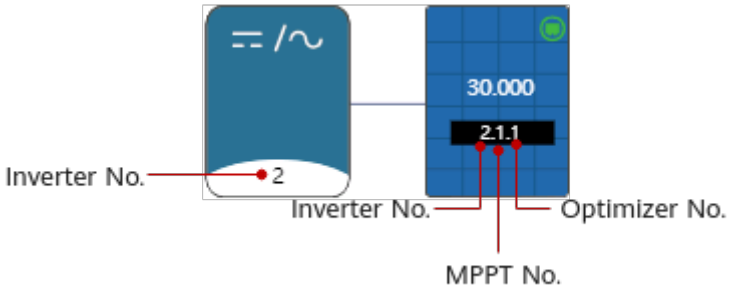
   Optimizer-to-module ratio indicates the number of modules that can be connected to an optimizer. For example, if **Optimizer-to-module ratio** is set to **1:2**, one optimizer is connected to two modules.
7. After the graphical element layout is complete, drag the inverter and optimizer in the **Device List** area to the corresponding graphical element positions.
8. Click **Save** to save the physical layout.

Viewing the Physical Layout

On the **Physical Layout** tab page, click to select a layout.

- Viewing the connection between inverters and PV modules: Click in the lower right corner. The PV modules connected to the same inverter are rendered in the same color.
- **Figure 3-4** shows the string number.

Figure 3-4 Number description



- View the energy yield: Click next to **Yield** in the upper right corner to view the energy yield today, this month, and this year, and the total energy.
- Zooming in, zooming out, or restoring a layout: Click and in the lower right corner to zoom in or out the layout. Alternatively, click the layout and scroll the mouse wheel to zoom in or out. Click to restore the layout.
- Click in the upper left corner to display the device tree. Select an optimizer from the device tree and view its position in the layout.
- If there are many PV modules on a tab page, the PV modules connected to the same inverter are displayed as one block.
- In the **Overview** area in the lower left corner, you can view the entire physical layout and drag the blue box to display the selected PV modules.

Tab Management

On the **Physical Layout** tab page, manage the tabs.

- Adding a tab: Click + Add and add a tab as prompted.
- Viewing a tab: Click and select a desired tab.
- Changing a tab name: Click , select a desired tab, click Rename, and change the tab name as prompted.
- Deleting a tab: Click to select a desired tab, click Delete, and delete the tab as prompted.

3.2.3.3 Optimizer Disconnection Detection

Detects optimizer disconnections, detects faulty optimizers in a timely manner, and rectifies faults to reduce energy yield loss of PV modules.

Procedure

Step 1 Choose **Monitoring** > **Monitoring** from the main menu.

Step 2 In the navigation tree on the left, select a PV plant, and click the **Layout** tab page. If no physical layout diagram is created for the plant, the **Logical Layout** page is displayed.

Step 3 Click **Disconnection detection** in the upper right corner of the page.

- If there are multiple inverters in the plant and all of them are equipped with optimizers, select the inverter to be detected in the displayed dialog box and click **Confirm**.
- If only one inverter in the plant is equipped with an optimizer, the detection task is directly executed after you click **Disconnection detection**.

Step 4 If a disconnected optimizer is detected, you can quickly locate the optimizer based on the physical layout diagram and rectify the fault based on the repair suggestions.

----End

Follow-up Procedure

After the disconnection fault is rectified, perform the disconnection detection again to ensure that the fault is rectified.

3.2.4 Viewing and Managing Report

Displays plant, inverter, PCS, and battery reports in different dimensions and allows you to subscribe to and export reports.

Prerequisites

The email server of the company has been configured. For details, see **3.7.1.4 Configuring an Email Server**.

Context

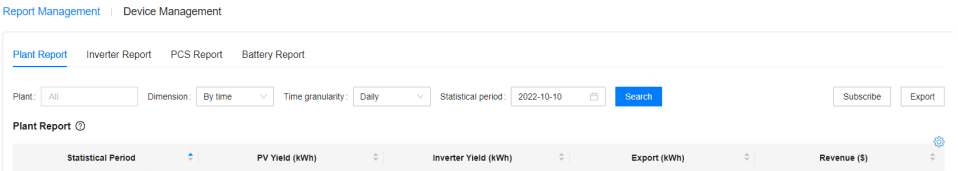
The revenue unit displayed for PV plants is the currency selected by the company to which the plant belongs. If the price unit is inconsistent with the local type, contact the company administrator to change the currency. For details, see **3.7.1.3 Configuring Company Information**.

Procedure

1. Choose **Monitoring** > **Monitoring** or **Reports** > **Reports** from the main menu and select reports as required.
2. In the left pane, select the plant to be queried and click **Report Management**.

   NOTE

   - Plant report: The statistics on yield, consumption, and revenue can be displayed by time or plant.
   - Inverter report: The statistics on yield and running status can be displayed by day, month, and year.
   - PCS report: collects statistics on the energy yield, peak AC power, and power supply from grid of PCSs by year, month, and day.
   - Battery report: The charging and discharging status of batteries can be displayed by day, month, and year.



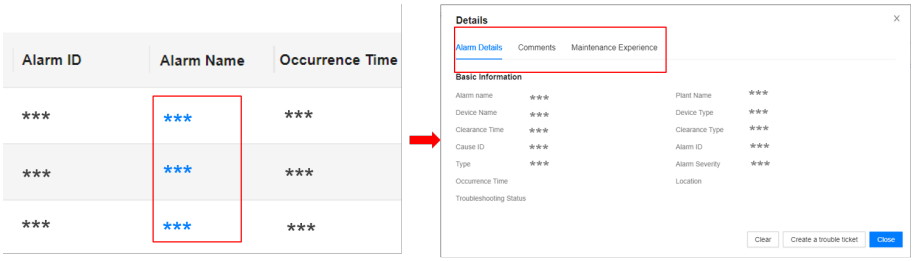
3. Select a report function as required. For details, see **Table 3-2**.

Table 3-2 Report task

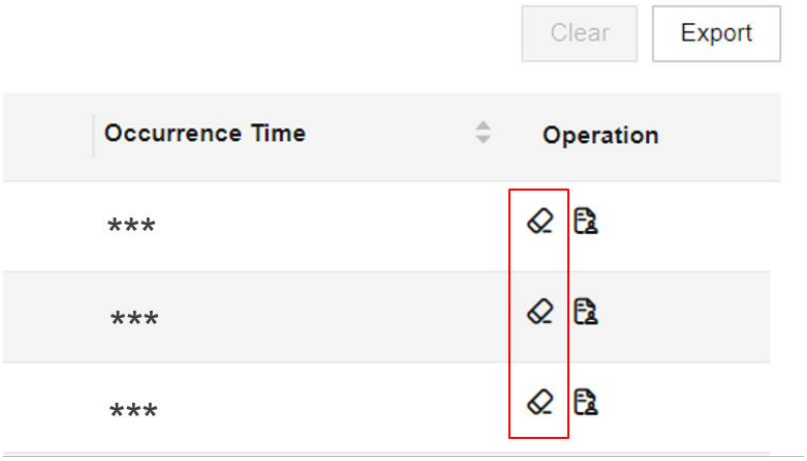
Task	Description	Procedure
Exporting reports	Used to save the query result to the local client.	1. Set the query criteria and click **Export**. 2. After the report is exported successfully, click to download the report.
Subscribing to reports	Used to send the report data of the plant or device to a user's mailbox.	Click **Subscribe**. On the displayed page, click **Add**. **NOTE** The system sends the statistical report of the previous day to the user's mailbox at 04:30 in the time zone corresponding to the selected plant or device.
Downloading or Deleting a Report	You can download or delete the exported report.	1. Click in the lower right corner. 2. In the displayed dialog box, select the exported report and click or .

3.2.5 Viewing and Managing Alarm

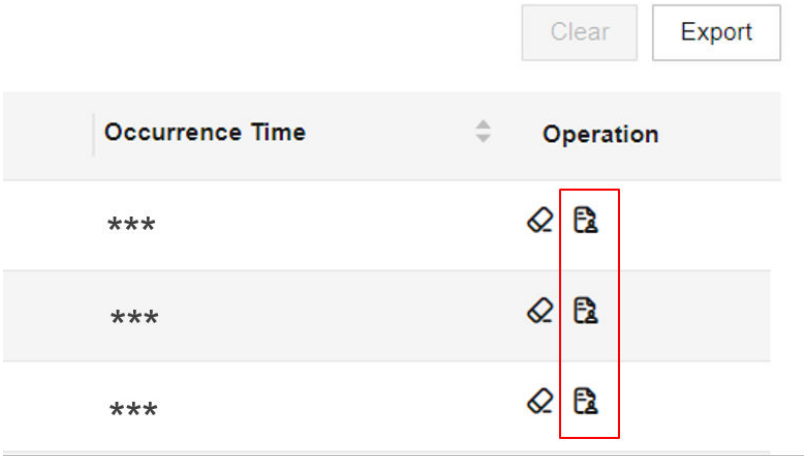
1. Choose **Monitoring** > **Monitoring** from the main menu.
2. On the **Active Alarms** and **Historical Alarms** pages, perform the following operations as required:
   - Querying alarms: Set search criteria and click **Search**.
   - Viewing alarm details: Click an alarm name to view alarm details, handling suggestions, and maintenance experience.



   - Clearing an alarm: If the fault that triggers an alarm is rectified but the alarm is not automatically cleared, click in the **Operation** column or select the alarm and click **Clear** to manually clear the alarm.



- Creating a trouble ticket: To record, track, and monitor the faults or defects that have occurred, click in the **Operation** column to create trouble tickets for the alarms.



- Exporting alarm information: Click **Export** to export all alarms. Alternatively, select desired alarms and click **Export** to export the selected alarms. Then click to download the exported alarms to the local PC.

3.2.6 Viewing Plant Profiles

View and edit the photos of the plant and devices in real time.

Procedure

1. Choose **Monitoring** > **Monitoring** from the main menu.
2. Choose a plant from the navigation pane and click the **Plant Profile** tab.

3. View and edit photos of the plant and devices on the page that is displayed.

3.2.7 Viewing EMMA Revenue and Energy Forecast

The AI-powered energy management assistant (EMMA) provides intelligent energy scheduling and management functions. Based on big data analysis, it accurately predicts the power generation and consumption, and intelligently stores, purchases, and sells electricity to achieve optimal system performance and maximize financial benefits.

Prerequisites

The owner has enabled the EMMA function for the plant.

Viewing EMMA Revenue and Energy Forecast

1. Choose **Monitoring** > **Monitoring** from the main menu.
2. In the navigation tree on the left, select a PV plant for which EMMA has been enabled and click the **EMMA** tab to view the revenue information, revenue comparison, and energy forecast and analysis.
   - Viewing revenue information: You can view the number of days when the EMMA function is enabled, revenue increase, and increase rate.
   - Viewing the revenue comparison: In the **Revenue Comparison** area, you can view the comparison between the revenues when EMMA is enabled and disabled.
   - Viewing energy analysis: In the **Energy Forecast** area, you can view details about the energy yield, power consumption, and battery charge and discharge in the past 24 hours, and energy forecast in the next 24 hours.

3.3 Viewing and Managing Report

Displays plant, inverter, PCS, and battery reports in different dimensions and allows you to subscribe to and export reports.

Prerequisites

The email server of the company has been configured. For details, see **3.7.1.4 Configuring an Email Server**.

Context

The revenue unit displayed for PV plants is the currency selected by the company to which the plant belongs. If the price unit is inconsistent with the local type, contact the company administrator to change the currency. For details, see **3.7.1.3 Configuring Company Information**.

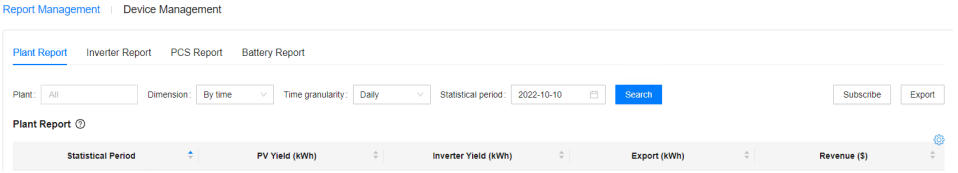
Procedure

1. Choose **Monitoring** > **Monitoring** or **Reports** > **Reports** from the main menu and select reports as required.

2. In the left pane, select the plant to be queried and click **Report Management**.

   NOTE

   - Plant report: The statistics on yield, consumption, and revenue can be displayed by time or plant.
   - Inverter report: The statistics on yield and running status can be displayed by day, month, and year.
   - PCS report: collects statistics on the energy yield, peak AC power, and power supply from grid of PCSs by year, month, and day.
   - Battery report: The charging and discharging status of batteries can be displayed by day, month, and year.



3. Select a report function as required. For details, see **Table 3-3**.

Table 3-3 Report task

Task	Description	Procedure
Exporting reports	Used to save the query result to the local client.	1. Set the query criteria and click **Export**. 2. After the report is exported successfully, click to download the report.
Subscribing to reports	Used to send the report data of the plant or device to a user's mailbox.	Click **Subscribe**. On the displayed page, click **Add**. **NOTE** The system sends the statistical report of the previous day to the user's mailbox at 04:30 in the time zone corresponding to the selected plant or device.
Downloading or Deleting a Report	You can download or delete the exported report.	1. Click in the lower right corner. 2. In the displayed dialog box, select the exported report and click or .

3.4 Plant

You can centrally manage multiple PV plants, upgrade devices, and export logs.

3.4.1 Plant

You can create a PV plant in the management system and manage the PV plant in a centralized manner.

3.4.1.1 Plant Management

You can centrally manage multiple plants and view important information about a single plant. This meets different management requirements.

3.4.1.1.1 Creating a Plant

After a device is connected to the management system, you can create a plant in the management system.

Prerequisites

- You have commissioned devices and set management system parameters. For details, see the *FusionSolar App Quick Guide*.
- You have obtained the SN and registration code of the device to be connected.

  NOTE

  - You can obtain the SN and registration code from the device or scan the QR code attached on the device. If the device does not have a registration code, obtain the SN.
  - If the devices are cascaded, record the SN of only one device so that the system automatically identifies the cascaded device when a PV plant is created.

Procedure

Step 1 Choose **Plants** > **Plant** > **Plant Management**.

Step 2 On the **Plant Management** page, click **Add Plant**.

Step 3 In the displayed dialog box, enter the basic information about the plant and click **Next**.

NOTE

When creating a charging-only plant, set **Plant Type** to **Residential**, set **Charging-only** to **Yes**, and complete the plant creation as prompted.

Step 4 Enter the device SN and registration code, and click **Next**.

NOTE

- You can obtain the SN and registration code from the device or scan the QR code attached on the device. If the device does not have a registration code, obtain the SN.
- If multiple devices need to be connected, click **Add**.
- If the connected devices are cascaded, you only need to enter the SN of one device. The system automatically identifies the SNs of cascaded devices.

Step 5 Set the string capacity.

1. Select an inverter and click **Set String Capacity**.
2. In the displayed dialog box, enter the PV capacity values and click **OK**.
3. Confirm the configured string capacity and click **Next**.

Step 6 On the **Set Electricity Prices** page, set **Feed-in Tariff** and **Purchase Price**, and click **Next**.

NOTICE

- The system can calculate revenue data only after electricity price information is configured. If the default electricity prices set by the company are applicable to your plant, you can click **Use Default Electricity Prices** to apply the company electricity prices.
- If the price unit is inconsistent with the local type, contact the company administrator to change the currency. For details, see Configuring Company Information.

Step 7 On the **Set Other Info** page, perform settings as prompted.

NOTE

When setting the plant time zone, ensure that the plant time zone is the same as the device time zone. Otherwise, the management system delivers the plant time zone to the devices to overwrite the time zone configured on devices after the plant is created.

Step 8 Click **Save**.

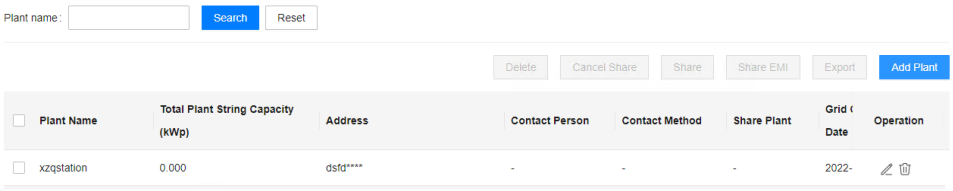
----End

Follow-up Procedure

For details about other operations, see **3.4.1.1.2 Managing Plants**.

3.4.1.1.2 Managing Plants

On the **Plant Management** page, you can manage multiple plants in a centralized manner, such as adding devices, sharing EMIs (environmental monitoring instruments), and modifying plant information.



Adding a Device

After a plant is created, you can bind a new device to the plant.

1. Choose **Plants** > **Plant** > **Plant Management**.
2. Select the plant to which the device is to be bound and click in the **Operation** column.

3. In the dialog box that is displayed, click **Add Devices**.
4. Click **Add**, enter the device SN and verification code, and click **Save**.

Modifying Plant Information

You can modify information such as the electricity price, string capacity, plant name, and plant address.

1. Choose **Plants** > **Plant** > **Plant Management**.
2. Select the plant whose electricity price needs to be modified and click  in the **Operation** column.
   - Modifying electricity prices: On the **Set Electricity Prices** tab page, change the values of **Feed-in Tariff** and **Purchase Price** as required.
   - Modifying the string capacity: On the **Set String Capacity** tab page, modify the string capacity as required.
   - Modifying basic plant information: On the **Set Basic Info** and **Set Other Info** tab pages, modify basic plant information.

Sharing an EMI

Plants in the same time zone can share an EMI.

- Sharing an EMI
  a. Choose **Plants** > **Plant** > **Plant Management**.
  b. Select the plant for which you want to share an EMI in the plant list and click **Share EMI**.
  c. In the displayed dialog box, select the EMI to be shared, and click **Save**.

  NOTE

  A maximum of one EMI can be shared for each plant.
- Canceling EMI sharing
  a. Choose **Plants** > **Plant** > **Plant Management**.
  b. Select the plant with a shared EMI and click **Share EMI**.
  c. In the dialog box that is displayed, click **Reset** and then **Save**.
  d. In the dialog box that is displayed, click **OK**.

Sharing a Plant

After being authorized by the plant owner, a plant can be shared with other users in the management system.

- Sharing a plant
  a. Choose **Plants** > **Plant** > **Plant Management**.
  b. Select a plant in the plant list and click **Share**.
  c. In the dialog box that is displayed, share the plant as prompted.

  NOTE

  A shared plant cannot be shared again.

- Canceling plant sharing
  a. Choose **Plants** > **Plant** > **Plant Management**.
  b. In the plant list, select a plant that has been shared and click **Cancel Share**.
  c. In the dialog box that is displayed, select the desired plant and click **Cancel Share**.

  NOTE

  Only the owner who has offered a shared plant can cancel the plant sharing.

Deleting a Plant

1. Choose **Plants** > **Plant** > **Plant Management**.
2. Select a plant in the plant list and click **Delete** or click in the **Operation** column.

NOTE

If there are a large number of devices in a plant, it takes about 10 to 20 minutes to delete the plant.

3.4.1.2 Plant Migration

To change the company of a plant due to business changes, you can migrate the plant to another company.

Context

- An installer account registered through **Installer Registration** on the login page is called the company administrator account.
- After an intra-company plant migration task is created, the system directly executes the migration task without the approval of the company administrator and plant owner.
- After an inter-company plant migration task is created, the migration task can be executed only after being approved by an administrator of the target company and the plant owner.

Constraints

- Only company administrators can create migration tasks.
- The currency of the company to which the plant belongs must be the same before and after the migration.
- In multi-cluster scenarios, migration is not supported across clusters.
- If the owner is associated with both the plant to be migrated and other plants, the personal account of the owner and other plants will be migrated at the same time.

Migration Scope

- Intra-company: For details about plant migration between different subsidiaries of the same company, see **3.4.1.2.1 Intra-company**.

- Inter-company: For details about plant migration between different companies, see **3.4.1.2.2 Inter-company**.

3.4.1.2.1 Intra-company

Procedure

1. Choose **Plants** > **Plant** > **Plant Migration** from the main menu.
2. Click **Create Migration Task**.
3. In the dialog box that is displayed, select the plant to be migrated from the navigation tree on the left, click  , and click **Next**.
4. Select **Intra-company**, set related parameters as prompted, and click **Confirm** to complete the task creation.

   After a migration task is created, plant migration is performed immediately.

Related Operations

Task	Description	Procedure
Viewing task details	A company administrator can view details about completed migration tasks.	On the **Closed** tab page, click  to view task details.

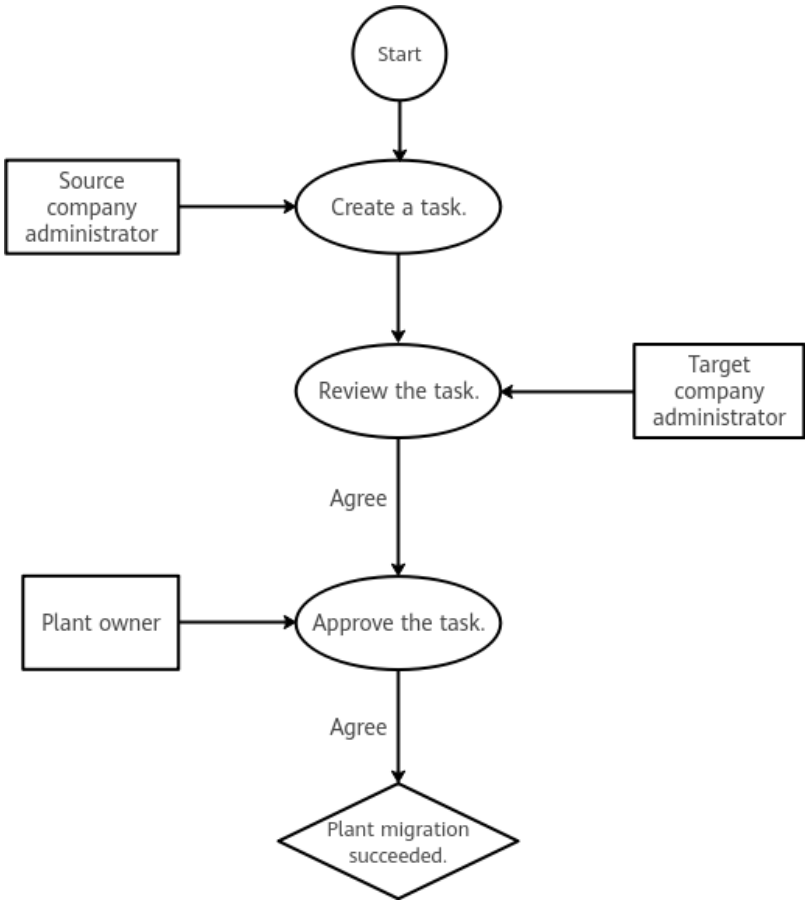
3.4.1.2.2 Inter-company

Prerequisites

When creating an inter-company migration task, you have obtained the target company name and code from **System** > **Company Management** > **Company Info**.

Procedure

Figure 3-5 Inter-company plant migration process



- Creating a task as an administrator of the source company
  a. Choose **Plants** > **Plant** > **Plant Migration** from the main menu.
  b. Click **Create Migration Task**.
  c. In the dialog box that is displayed, select the plant to be migrated from the navigation tree on the left, click >, and click **Next**.
  d. Select **Inter-company**, set related parameters as prompted, and click **Confirm** to complete the task creation.

     After an administrator of the target company and the plant owner approve the application, the system executes the migration task.
- Approving a task as an administrator of the target company
  a. Choose **Plants** > **Plant** > **Plant Migration** from the main menu.
  b. On the **To-Do** tab page, click in the **Operation** column, or select one or more tasks from the task list and click **Process**.
  c. In the dialog box that is displayed, click **Approve** or **Reject** as required.

  NOTE

  After a company administrator approves the application, notify the plant owner to log in to the FusionSolar App and approve the application.

- Approving a task as the plant owner

  The plant owner logs in to the FusionSolar App and selects the migration task to be approved in **Message center** for approval.

Related Operations

Task	Description	Procedure
Canceling a migration task	An administrator of the source company can cancel a migration task that is being approved. **NOTE** If the migration status of a plant is successful, the migration task of the plant cannot be canceled by an administrator of the source company.	1. On the **Processing** tab page, click in the **Operation** column, or select one or more tasks from the task list and click **Cancel**. 2. In the dialog box that is displayed, click **Yes**.
Viewing task details	A company administrator can view details about completed migration tasks.	On the **Closed** tab page, click to view task details.

3.4.1.3 Plant License

You can view the license status of the controlled plant.

Procedure

1. Choose **Plants** > **Plant** > **Plant Management**.
2. In the navigation tree on the left, choose **Plant License**.
3. View the license status of the controlled plant on the current page.

   NOTE

   After the plant license expires, the related devices of the plant are displayed as offline on the Device Management page.

3.4.2 Device

Manage mediation packages on devices, upgrade devices, export device logs, and manage device licenses.

3.4.2.1 Viewing and Managing Devices

You can monitor devices in real time. This helps you learn about the status of devices in a timely manner and handle exceptions to ensure device safety.

Prerequisites

Devices have been connected to the management system and bound to a plant. For details about the procedure, see **3.4.1.1.1 Creating a Plant**.

Context

Table 3-4 Device status description

Status	Color	Description
Running		The device is running properly (including the on-grid, off-grid, and terminal test status).
Standby		The device is on standby or shut down unexpectedly or on command.
Faulty		The device is faulty or shut down unexpectedly.
Offline		The communication is interrupted.
Loading		The device has been identified and feature information is being collected.

NOTE

- If the real-time device data cannot be obtained and the running information is displayed as -, check whether the device is offline or faulty.
- The function screens vary with devices.

Navigation Path

1. Choose **Monitoring** > **Monitoring** or **Plants** > **Device** > **Device Management** from the main menu.
2. In the navigation pane, select a company or plant, and click the **Device Management** tab page.

   You can manage and view all devices of the company or plant through **Device Management**.

Viewing Device Information

On the **Device Management** page, you can view the communication status and basic information about all devices in a plant. Click a device name or click a device in the navigation pane to view the device overview, details, and historical information. The ESS supports the 3D view. For details, see **Viewing ESS Information**.

- **Overview**: Displays the physical and logical relationships, status, and real-time data of devices and their subordinate devices in a topology view. You can click a device icon to view the running information of subordinate devices.
- **Details**: Displays the key parameters of the device.

  NOTE

  If there are strings connected to the inverter, you need to set string parameters when creating a PV plant. Otherwise, the string details are blank. For details, see **3.4.1.1.1 Creating a Plant**.

- **Historical Information**: Supports query of the device status in a specified period.

  NOTE

  If the data in a certain period is incomplete or lost, you can re-collect the lost data. For details, see **3.7.2.1 Data Recovery**.

Viewing ESS Information

The Smart String Energy Storage System (ESS, commonly in cabinets or containers) has a complex internal structure. The 3D view displays the actual layout and working status of each component inside the system, improving O&M efficiency. In the navigation pane, select the ESS and its components, including the energy storage unit (ESU), energy storage rack (ESR), energy storage module (ESM), and heating, ventilation, and air conditioning (HVAC). Click 3D View to enter the 3D view.

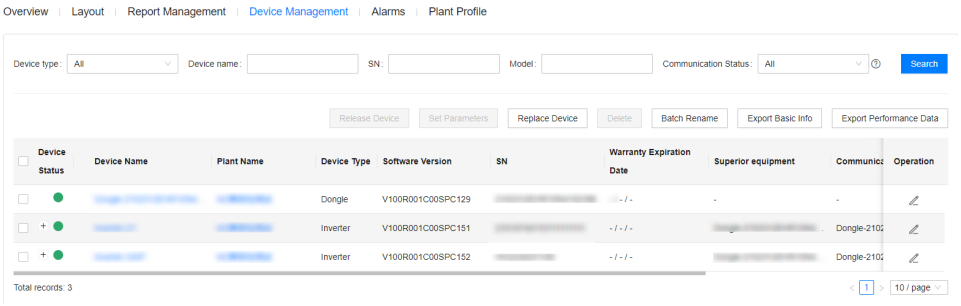
NOTE

o ensure the smoothness and accuracy of 3D views, the PC client must meet certain requirements. For details, see **4.7 What Are the Requirements for Accessing the 3D View of the ESS Smoothly on a PC Client?**.

- Running status and real-time data: Click a component in the navigation pane or click a component in the 3D view to view the actual layout, operating status, and real-time data of the component.
- Details: Click Details to view detailed information about each component.
- Configuration: Click Configuration to set device parameters.
- Historical data: Click Historical Data to query the operating status of each component within a specified period.
- Warning: Click Warning to track and handle the real-time active alarms and historical alarms of components.
- 2D: Click 2D to switch to the 2D view. In the 2D view, click 3D View to switch to the 3D view.
- 3D view rotation: Click and , or press and hold the left mouse key to select the ESS and then move the mouse.
- Fit to screen: Click .
- 3D view zoom-in or zoom-out: Click + and — .
- Current data of battery cell: Select an ESR and then click Current Data of battery cell to view its real-time data.

Configuring Device Information

You can set device parameters, delete devices, and change device names.



- Setting parameters: Select one or more devices of the same model from the device list and click **Set Parameters**. Alternatively, click a device name and set device parameters on the **Configuration** page.

  NOTE

  - The parameters that can be set vary according to the device model. For details about how to set the parameters, see the user manual of the device.

    How to obtain: Visit **https://support.huawei.com/enterprise/en/category/fusion-solar-pid-1600073963553?submodel=doc** and enter your device model to search for the corresponding user manual.
  - For details about how to set energy storage parameters, see **5.4 Battery Control Parameters**.
  - If a user changes the **Authentication Password** of a device in the management system and delivers the password to the device, the device fails to reconnect to the management system after being deleted. In this case, you need to reset the password on the device.
  - If a device is connected to another management system from one management system, delete the device from the original management system and then connect the device to the new management system.
- Deleting a device: Select one or more devices from the device list and click **Delete**.
- Changing a device name:
  - Modifying a Device Name

    In the device list, click  in the **Operation** column.
  - Modifying Device Names in Batches

    i. Select the device to be modified.

    ii. Click **Export Basic Info** and download the basic device information file.

    iii. Enter the new device name in the **Device Name_New** column of the exported file based on the site requirements.

    iv. Click **Batch Rename**.

    v. Click **Upload**, select the modified basic device information file, and upload it.

    vi. Click **Execute**.

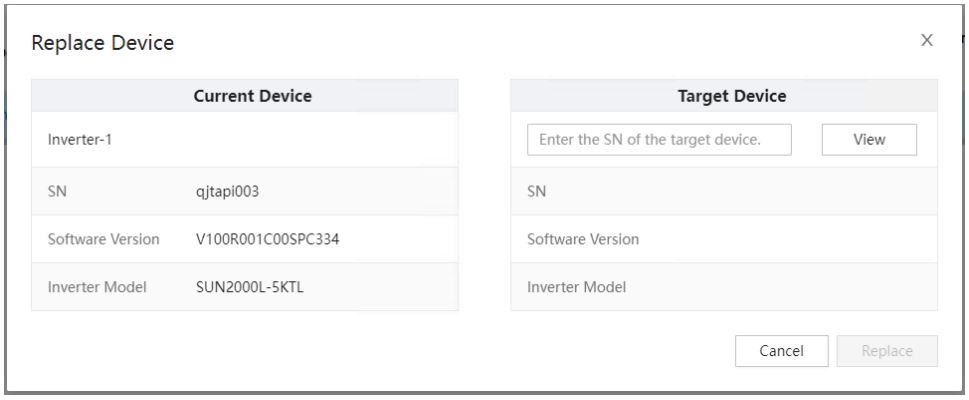
    The execution result is displayed in the lower part.

Replacing a Device

NOTICE

The following conditions must be met for device replacement:

- The current device is disconnected from the management system.
- The target device has been replaced and commissioned. For details, see the *FusionSolar Smart PV Solution-Device Replacement Commissioning Guide*.
- The following types of devices can be replaced: inverter, SmartLogger, optimizer and communications module.



1. Select a device and click **Replace Device**.
2. In the dialog box that is displayed, enter the SN of the **Target Device** and click **View**.
3. Click **Replace**.

   NOTE

   - To replace an optimizer, go to the **Details** page.
   - When an inverter is replaced, the new inverter can inherit the total energy yield data from the old inverter. After the old inverter is replaced, the data is automatically calibrated on the new inverter. If automatic calibration fails due to device disconnection or poor network quality, manually calibrate the device after the fault is rectified. For details, see **4.6 What Should I Do If the Total Energy Yield Fails to Be Automatically Calibrated After an Inverter Is Replaced?**.

Exporting Device Information

- Exporting basic information: Click **Export Basic Info**, or select one or more devices and click **Export Basic Info** to export basic information about all or selected devices.
- Exporting performance data: Select one or more devices and click **Export Performance Data**.

Task Management

Click in the lower right corner of the page to view and process historical tasks for exporting basic information, exporting performance data, and setting parameters.

3.4.2.2 Device Upgrade

This topic describes how to remotely upgrade a device through the SmartPVMS.

Prerequisites

The software package of the target version has been uploaded.

Procedure

Step 1 Choose **Plants** > **Device** > **Upgrade Management.**

Step 2 Click the **Device Upgrade** tab. On the page that is displayed, click **Create Update Task** to create an upgrade task.

Step 3 In the dialog box that is displayed, enter the task information and click **OK**.

NOTICE

- Upgrade now: Device upgrade is performed immediately after the upgrade task is created, without asking the user for confirmation.
- Upgrade after user authorization: After an upgrade task is created, the system pushes an upgrade message to all concerned residential plant owners. Residential plant owners need to log in to the system using an app and confirm whether to perform the upgrade. Once a residential plant owner confirms that the upgrade can be performed, the corresponding device can be upgraded. If a device upgrade message is not confirmed within 48 hours after the upgrade task is added, the upgrade result of the concerned devices is marked as timeout.

Step 4 In the displayed dialog box, click **I Know**.

Step 5 In the upgrade task list, click to view the upgrade details.

----End

3.4.2.3 Device Log Export

Allows users to export and view device logs, optimizer logs, and battery storage logs.

Procedure

Step 1 Choose **Plants** > **Device** > **Device Log Export**.

Step 2 On the **Log Export**, **Optimizer Log Export**, and **Battery Log Export** tab pages, you can perform the following operations:

- **Start Export**: In the log list, select one or more devices whose logs need to be exported and click **Start Export**to create an export task.
- **Save Log**: After the logs are exported, select the device whose logs need to be saved and click **Save Log**to download the logs to the local PC.

NOTE

- After the logs are exported successfully, the logs will be automatically cleared after 24 hours if the logs are not saved to the local PC.
- After the logs are saved successfully, the logs will be automatically cleared after 2 hours.

- **Stop Export**: Select one or more ongoing export tasks and click **Stop Export**to stop the selected tasks.

----End

3.4.2.4 Device License Management

This section describes how to check device license status on the **Device License Management** page. When the license files are about to expire or have expired, or the I-V curve or smart tracking function needs to be enabled for devices, you can apply for and update the licenses in a timely manner to ensure that the I-V curve and smart tracking function can be used properly.

Context

Before starting the I-V curve scanning, you need to load the corresponding device licenses.

Procedure

1. Choose **Plants** > **Device** > **Device License Management** from the main menu.
2. Table 3-5 describes the operations related to device license management.

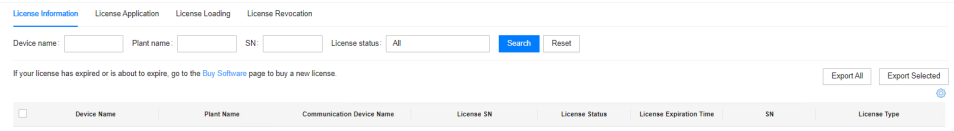


Table 3-5 Operations related to device license management

Task Name	Procedure
Checking license information	You can view the license of the target device on the **License Information** tab page.
Applying for device licenses	1. On the **License Application** tab page, click **Export All** or select the devices for which you want to apply for licenses, and click **Export Selected**. 2. After exporting the application form, send it to system administrator to apply for a license file.

Task Name	Procedure
Loading device licenses	1. On the **License Loading** tab page, click **Upload License** to upload license files. 2. After the license files are uploaded successfully, click **Load All** to load the licenses for all devices. Alternatively, select the devices for which licenses need to be loaded and click **Load Selected** to load the licenses for the selected devices. During the loading, click **Stop Loading** to stop all loading tasks. If you select the loading tasks to be stopped and then click **Stop Loading**, the selected tasks will be stopped.
Revoking device licenses	1. On the **License Revocation** tab page, select one or more target devices and click **Revoke License**. 2. Revoke the device license as prompted. **NOTE** 1. For devices whose licenses have been revoked, click **Export All Revocation Codes** or **Export Selected Revocation Codes** to export the license revocation codes of all or selected devices. After obtaining the revocation codes, contact system administrator to apply for new license files using the ESNs and revocation codes of the current licenses.

3.4.2.5 Device Inspection

You can perform preventive maintenance inspection on devices and obtain reports about the running status and health status of the devices for maintenance and quick fault location.

Procedure

Step 1 Choose **Plants** > **Device** > **Device Inspection** from the main menu.

Step 2 In the device list, click  in the **Operation** column, or select one or more devices to be inspected and click **Start Inspection** to create an inspection task.

Step 3 Click  in the **Operation** column, or select one or more devices that are being inspected and click **Stop Inspection** to stop the inspection task.

Step 4 After the inspection is complete, select one or more devices and click **Export Report** to download the inspection reports.

----End

3.4.2.6 String Settings

The I-V curve diagnosis can be performed only after string parameters are set.

Prerequisites

The I-V license of the corresponding device has been loaded.

Procedure

Step 1 Choose **Plants** > **Device** > **Configure Strings** from the main menu.

Step 2 Set string details as prompted.

1. Select the plant in the navigation tree on the left, select the target device in the device list on the right, and click **Next**.
2. Select the module model and click **Next**.
3. Set the actual string parameters and click **Next**.
4. Confirm that the string parameters are set correctly, and click **Finished**.

----End

3.4.2.7 Module Library Management

Common module information templates are available. If the preset templates cannot meet requirements, you can customize templates through module library management to improve the accuracy of I-V curve diagnosis.

Context

A maximum of 100 templates can be added at a time. If a template is in use, modifying or deleting the template does not affect the use by the configured PV modules.

Procedure

Step 1 Choose **Plants** > **Device** > **Module Library Management** from the main menu.

Step 2 On the **Module Library Management** page, perform the following operations as required.

Table 3-6 Module library management

Operation	Procedure
Querying a module information template	Set the search criteria and click **Search**.
Adding a module information template	• Adding a single module information template Click **Add**. In the dialog box that is displayed, enter the module information and click **Save**. • Adding module information templates in batches 1. Click **Download Template**, edit the module information in the downloaded template file, and save it. 2. Click **Import** and select the edited template file.

Operation	Procedure
Exporting a module information template	1. In the list, select the module information template to be exported. 2. Click **Export** to save the exported module information file to the local PC.
Deleting a module information template	Select the module information template to be deleted and click **Delete**.

----End

3.5 Maintenance

You can learn the real-time status, location distribution, and alarm information of PV plants through O&M, and quickly trace and handle PV plant faults.

3.5.1 Real-time Status

The real-time status of plants allows you to learn about the plant status, location, and alarm information, facilitating quick tracking and handling of plant faults.

Procedure

Step 1 Choose **Maintenance** > **Maintenance** > **Real-Time Status** from the main menu.

- View the plant status and evaluate the plant advantages by comparing the plants in the same environment.
  a. In the Plant Status Center area, select a maximum of five plants to be compared and click the VS in the upper-left corner.In the displayed Comparison of plants dialog box, view the plant comparison charts about power per MW and specific energy (kWh/kWp).
  b. Drag below a comparison chart to display the plant comparison chart in the specified period.

  NOTE

  - Click to remove a plant that participates in the comparison.
  - Click to add a plant for comparison.
- View the plant map to learn about the geographical distribution of the plant.
  – In the list in the **Plant Status Center** area, select a plant and click . The location details of the plant are displayed under the SmartPVMS, and the alarms of the plant are displayed in the **Plant Alarm Center** area.

- Under the SmartPVMS, enter a plant name to search for the plant, or select **All** as the plant status. The plants that meet the search criteria are displayed on the map.

  NOTE

  Move the pointer over a plant icon to display the plant details.

  Click in the lower-left corner of the map to switch between maps.

  Click in the lower-left corner of the map. In the **Map Settings** dialog box, set the default map and API key.

- View the alarms of the PV plant, and acknowledge and trace the alarms.
  a. In the **Plant Alarm Center** area that displays active and acknowledged alarms, click to expand the alarm cause and handling suggestions.
  b. Analyze and handle the alarm based on the alarm cause.
     - Click **Clear**. In the displayed dialog box, click **OK**. The alarm is deleted from the list.
     - Click **New Ticket**. In the dialog box that is displayed, set related information and submit the defect elimination process. The handler will receive the defect elimination task.
     - Click **Device details** to view the device details.

----End

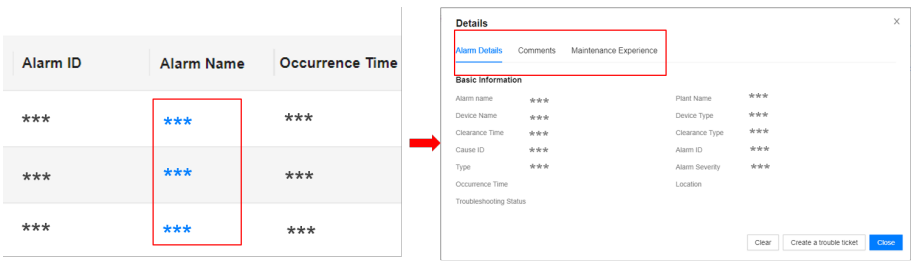
3.5.2 Alarm Management

3.5.2.1 Viewing and Managing Alarms

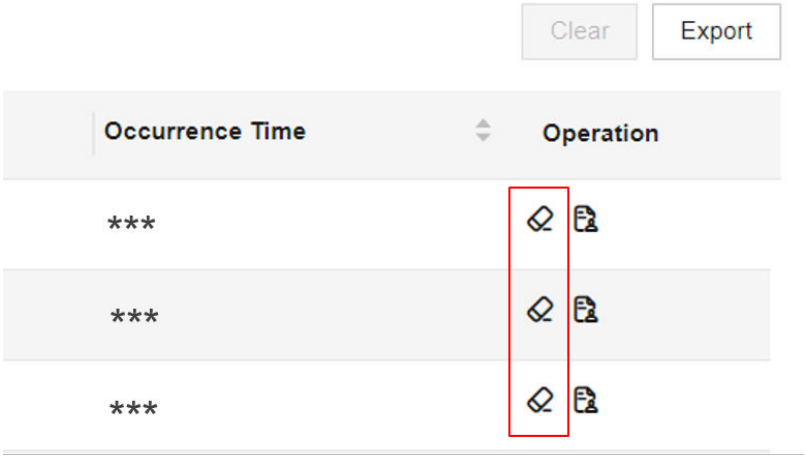
You can view and manage current and historical alarms of devices and the system, and trace and handle their real-time and historical alarms.

Procedure

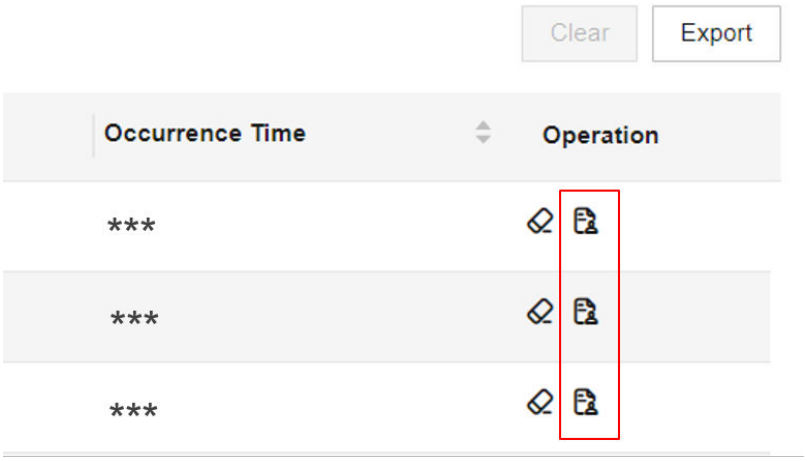
1. Choose **Maintenance** > **Maintenance** > **Alarm Management** from the main menu.
2. On the **Active Alarms** and **Historical Alarms** pages, perform the following operations as required:
   - Querying alarms: Set search criteria and click **Search**.
   - Viewing alarm details: Click an alarm name to view alarm details, handling suggestions, and maintenance experience.



- Clearing an alarm: If the fault that triggers an alarm is rectified but the alarm is not automatically cleared, click in the **Operation** column or select the alarm and click **Clear** to manually clear the alarm.



- Creating a trouble ticket: To record, track, and monitor the faults or defects that have occurred, click in the **Operation** column to create trouble tickets for the alarms.



- Exporting alarm information: Click **Export** to export all alarms. Alternatively, select desired alarms and click **Export** to export the selected alarms. Then click to download the exported alarms to the local PC.

3.5.2.2 Alarm Configuration

3.5.2.2.1 Configuring Notification Rules

Notification rules enable O&M personnel to email notifications about concerned alarms so that they can handle alarms in real time.

Prerequisites

The email server of the company has been configured. For details, see **3.7.1.4 Configuring an Email Server**.

Context

- The alarm push rule takes effect only for newly reported alarms. If an alarm has been reported to the management system before the push rule takes effect, no notification email will be sent.
- When a new alarm that meets the push rule is reported to the management system, the push rule is triggered immediately to send an email to the specified users.
- If the time zone of the recipient is different from that of the server, the alarm generation time in the email is displayed based on the time zone of the server.
- By default, the rules are sorted by the enabled and disabled states, and the rules in the same state are sorted by update time in descending order.
- A maximum of 20 notification rules can be created.

Procedure

1. Choose **Maintenance** > **Maintenance** > **Alarm Management** from the main menu.
2. In the navigation pane, choose **Push Configuration**.
3. On the **Push Settings** page, click **Add**.
4. In the **Create Rule** dialog box, set the rule as prompted.

   NOTE

   To send notifications to relevant personnel, you need to enter their personal information, such as email addresses. You are obligated to take considerable measures, in compliance with the laws of the countries concerned and the user privacy policies of your company, to ensure that the user's personal information is fully protected.
5. Click **Save**.

Related Tasks

- Deleting a rule: You can select a redundant rule from the rule list and click **Delete** to reduce the rule maintenance workload.
- Enabling/disabling a rule: You can select a rule that is not used temporarily from the rule list and click **Disable**. To use a disabled rule, select the rule and click **Enable**.
- To back up, collect, review, and modify rules: You can click **Export** on the rule page to back up, check, and collect rules. You can click **Modify** in the **Operation** column to modify rules.

  NOTE

  When the notification rules are exported, the email addresses of the recipient users are exported. You are obligated to take considerable measures, in compliance with the laws of the countries concerned and the user privacy policies of your company, to ensure that the user's personal information is fully protected.

3.5.2.2.2 Redefine Alarm

To quickly search for and handle key device alarms to which you pay special attention, you can redefine these alarms. The management system provides three types of alarm redefinition rules: redefine alarm name, redefine alarm type and redefine alarm severity.

Table 3-7 description of the function of redefining alarms.

Table 3-7 Function of Redefining Alarms

Task Description	Operation entry	Procedure
Configuring Redefinition Alarms	1. Choose **Maintenance** > **Maintenance** > **Alarm Management** from the main menu. 2. In the navigation tree on the left, choose **Redefine Alarm**.	1. In the device tree and select a target device. 2. Click the operation column  . 3. Enter the **New Alarm Name** and **New Alarm Severity** based on the site requirements. 4. Click the operation column  , saving customized alarm information. **NOTE** After saving redefinition alarms, the redefined alarm status is changed to enabled after the synchronization is complete.
Clearing Redefining Alarm Rules **NOTE** After saving redefinition alarms, the alarm redefinition rule can be cleared.		Use either of the following methods to clear redefinition alarms: • On the **Redefine Alarm** page, Click  in the row where the indicator to be cleared is located. • On the **Redefine Alarm** page, Select the target data to be cleared and click **Clear** above the page.

Task Description	Operation entry	Procedure
enabling Redefining Alarm Rules **NOTE** After saving redefinition alarms, the alarm redefinition rule can be enabled redefining alarm rules.		Use either of the following methods to enable redefinition alarms: • On the **Redefine Alarm** page, click  the row of the target data row to be enabled. • On the **Redefine Alarm** page, select the target data for which redefinition alarm rules need to be enabled, click **Enable** in the upper part of the page.
Disabling Redefining Alarm Rules **NOTE** After saving redefinition alarms, the alarm redefinition rule can be disabled Redefining alarm rules.		Use either of the following methods to disable redefinition alarms: • On the **Redefine Alarm** page,Click  the row of the target data row to be disabled. • On the **Redefine Alarm** page, select the target data for which redefinition alarm rules need to be disabled, click **Disable** in the upper part of the page.
Refresh the redefined alarm		On the **Redefine Alarm** page, click **Refresh** in the upper part of the page to refresh the redefined alarm page.

Task Description	Operation entry	Procedure
Batch Redefinition Rule Application		On the **Redefine Alarm** page, click  in the operation column for the target alarm in the active alarm list to apply **Alarm Severity** and **Alarm Type** specified in the alarm rule to other rules in batches.
Batch Apply to Devices		1. In the device tree and choose a target device. 2. You can click Batch Apply below the active alarm list to apply the selected alarm rules to other devices in batches. **NOTE** Rules for applying an empty rule: For two devices of the same type, if the redefinition alarm rule is not set for one device and you want to apply the rule to another device that has been configured with an alarm rule, the redefinition alarm rule that has been set on the other device is cleared.

3.5.3 Task Management

Manages inspection tasks and defect elimination tasks to ensure the normal running of plant devices.

3.5.3.1 (Optional) Basic Information Configuration

You can set inspection items and node handlers based on the site requirements.

Context

- You can use the common inspection items preset by the management system for routine O&M of PV plants. You can add, delete, or modify the preset inspection items as required by using the **Set Inspection Items** function.

- Node handlers refer to the executors of each node during the inspection task transfer. You can specify handlers for different nodes to facilitate unified management of the O&M process.

  If the node handlers are not set, all users who have permissions on the plant are displayed when you select node handlers during task execution. If there are a large number of users who have permissions on the PV plant, you are advised to use the **Set Handlers** function. After the node handlers are set, only the configured handlers are displayed when you select handlers for the next node during task execution, improving the work efficiency.

Procedure

Step 1 Choose **Maintenance** > **Maintenance** > **Task Management** from the main menu.

Step 2 Set inspection items and node handlers. For details about the procedure, see **Table 3-8**.

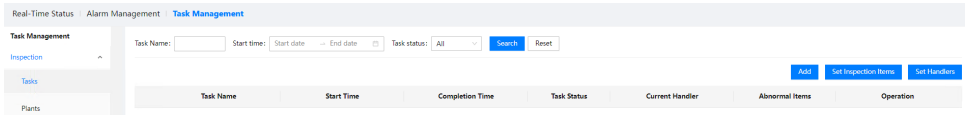


Table 3-8 Basic information configuration

Operation	Procedure
Setting inspection items	On the **Task List** or **Plant List** page, click **Set Inspection Items**. In the displayed dialog box, select a plant in the navigation tree on the left. • Adding an inspection item 1. Click **Add**. 2. In the displayed dialog box, enter related information and click **OK**. • Adding multiple inspection items 1. Click **Download Template**, edit related content in the downloaded template file, and save it. 2. Click **Import** and select the edited template file.
Setting handlers	1. On the **Task List** or **Defect Elimination** page, click **Set Handlers**. 2. In the displayed dialog box, click any position in the area of each node to set executors of the node.

----End

3.5.3.2 Inspection

Inspection tasks are used to check plant devices, detect device exceptions in a timely manner, and report the exceptions for handling.

Context

After creating and assigning inspection tasks on the management system, users need to execute and accept the tasks on the FusionSolar App.

Procedure

- Create and assign inspection tasks on the management system.
  a. Choose **Maintenance** > **Maintenance** > **Task Management** from the main menu.
  b. Manage and track tasks on the **Task List** or **Plant List** page.

     The **Task List** displays inspection task execution information by task. The **Plant List** displays plant inspection information by plant. For details about the procedure, see **Table 3-9**.

     Table 3-9 Task management

Operation	Procedure
Creating an inspection task	1. Click **Add**. The **Add** dialog box is displayed. 2. Enter **Task name** and **Description**, select the PV plant to be inspected, click **OK**, and click **OK**. The task enters the **To be assigned** state.
Assigning an inspection task	1. On the **Task List** page, click **Execute** in the **Operation** column of the unassigned task. 2. In the displayed dialog box, set **Operation** and **Comments**, and click **Submit**. • If you select **Submit** for **Operation** and set the executor of the next node, the task enters the **Not started** state. • If you select **Transfer** for **Operation**, the task is transferred to another O&M engineer for assignment.
Viewing task details	• In **Task List**, click + or **Details** in the **Operation** column to view the location and inspection result of the PV plant. • In **Plant List**, click + to view the historical inspection results of the plant.

- Process assigned inspection tasks on the FusionSolar App.
  a. Tap **Maintenance** on the home screen of the FusionSolar App. The **Plant status** screen is displayed by default.
  b. On the **Plant status** screen, tap **Task** > **Inspection Task**.
  c. On the **Inspection Task** screen, view and process inspection tasks.

----End

3.5.3.3 Defect Elimination

Defect elimination tasks are used to handle and eliminate device defects in a timely manner to ensure safety.

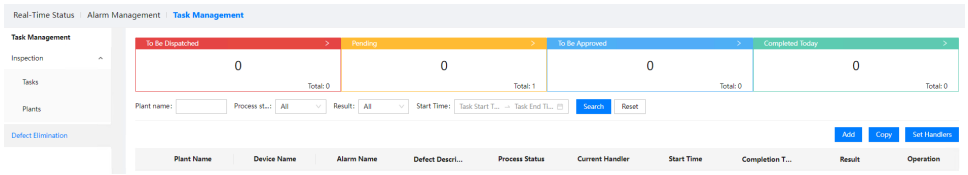
Procedure

Step 1 Choose **Maintenance** > **Maintenance** > **Task Management** from the main menu.

Step 2 In the navigation pane, choose **Defect Elimination**.

Step 3 Create a defect elimination task on the **Defect Elimination** page.

- Method 1: Create a defect elimination task by **Add**.
  a. Click **Add**.
  b. In the displayed dialog box, enter related information as prompted and click **Submit**.
     The task enters the **In Elimination** state.
- Method 2: If defects occur again on a device for which defect elimination has been performed or defects are not completely eliminated, you can create a defect elimination task by **Copy**.
  a. In the defect elimination task list, select the target task and click **Copy**.
  b. In the displayed dialog box, enter related information as prompted and click **Submit**.
     The task enters the **In Elimination** state.



Step 4 Process a defect elimination task on the **Defect Elimination** page. For details about the procedure, see **Table 3-10**.

Table 3-10 Processing a defect elimination task

Task Status	Description	Procedure
To be dispatched	After the current handler returns a task in the **In Elimination** state to the creator, the task enters the **To Be Dispatched** state. The creator can re-assign or cancel the task.	1. Click  in the area of **To Be Dispatched**. The **To Be Dispatched** page is displayed. 2. In the defect elimination task list, click **Execute** in the **Operation** column. 3. In the displayed dialog box, set **Operation** and **Handling suggestion**, and click **Submit**. – If you select **Submit** for **Operation** and set the executor of the next node, the task enters the **In Elimination** state. – If you select **Discarded** for **Operation**, the task ends.
In elimination	Process a defect elimination task.	1. Click  in the area of **In Elimination**. The **In Elimination** page is displayed. 2. In the defect elimination task list, click **Execute** in the **Operation** column. 3. In the displayed dialog box, set **Result** and **Operation**, and click **Submit**. – If you select **Submit** for **Operation** and set the executor of the next node, the task enters the **To Be Approved** state. – If you select **Back** for **Operation**, the task is returned to the upper-level handler and the task enters the **To Be Dispatched** state.
To be approved	Accept the completed defect elimination task to ensure that the defects are completely eliminated.	1. Click  in the area of **To Be Approved**. The **To Be Approved** page is displayed. 2. In the defect elimination task list, click **Execute** in the **Operation** column. 3. In the displayed dialog box, set **Operation** and **Acceptance opinion**, and click **Submit**. – If you select **Submit** for **Operation**, the defect elimination task ends. – If you select **Back** for **Operation**, the task is returned to the upper-level handler for defect elimination again. The task enters the **In Elimination** state.

Step 5 View details about defect elimination tasks on the **Defect Elimination** page.

- View details about historical defect elimination tasks.

  In the defect elimination list, click **Details**.

- View details about today's defect elimination tasks.
  a. Click in the area of **Eliminated Today**. The **Eliminated Today** page is displayed.
  b. In the defect elimination list, click **Details** to view details about the defect elimination tasks that have been processed today.
     You can view **Task Details**, **Workflow Processing**, and **Flowchart**.

----End

3.6 Value-Added Services

3.6.1 Smart I-V Curve Diagnosis

Supports I-V curve scanning and diagnosis of PV strings to quickly detect faults and risks.

3.6.1.1 Setting String Details

The I-V curve diagnosis can be performed only after string parameters are set.

Prerequisites

The I-V license of the corresponding device has been loaded.

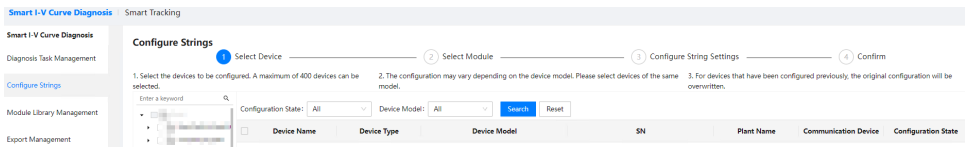
Procedure

Step 1 Choose **Value-Added Services** > **Value-Added Services** > **Smart I-V Curve Diagnosis** from the main menu.

Step 2 In the navigation tree on the left, click **Configure Strings**.

Step 3 Set string details as prompted.

1. Select the plant in the navigation tree on the left, select the target device in the device list on the right, and click **Next**.
2. Select the module model and click **Next**.
3. Set the actual string parameters and click **Next**.
4. Confirm that the string parameters are set correctly, and click **Finished**.



----End

3.6.1.2 Creating a Smart I-V Curve Diagnosis Task

Scans all PV strings to collect voltage and current data, diagnoses faults, and generates diagnosis reports for O&M.

Prerequisites

The I-V license of the corresponding device has been loaded. For details about the procedure, see **3.4.2.4 Device License Management**.

Context

- Diagnosis tasks are executed from 9:00 to 16:30. If a scheduled task fails to be executed for the first time, the system automatically retries every 30 minutes until the task is completed. If the retrying time exceeds the diagnosis period, this task will be ended. Then you can create a new task or wait for the task to be executed next time.
- If the irradiance is less than 600 W/m^2, the I-V scanning cannot be started. It can be started only when the irradiance meets the requirement.
- The I-V curve diagnosis is not available for inverters connected to optimizers.

Procedure

Step 1 Choose **Value-Added Services** > **Value-Added Services** > **Smart I-V Curve Diagnosis** from the main menu.

Step 2 Create a diagnosis task on the **Diagnosis Task Management** page.

1. Click **Add Diagnosis Task**.
2. Select the plant in the navigation tree on the left, select the target device in the device list, and click **Next**.
3. On the **String Settings** page, check whether the string information is configured.
   - If the string information is configured, click **Next**.
   - If the string information is not configured, click **Configure** in the Operation column. In the dialog box that is displayed, configure string details and click **Next**.
4. On the **Configure task** page, set task details and click **Finished**.

Table 3-11 Diagnosis task parameters

Parameter	Description
Cleaning Status	Specifies the cleaning status of strings. Select **Cleaned** or **Not cleaned** based on the actual cleaning status.
Environmental parameters	– The system automatically calculates the PV module plane irradiance and PV module backsheet surface temperature. – Manually setting: The PV module plane irradiance and PV module backsheet surface temperature need to be manually specified.

Parameter	Description
Execution Mode	– Now: The diagnosis task is executed immediately after being created. – Schedule for later: The scheduled diagnosis task is executed only once. – Repeat: The scheduled diagnosis task is executed periodically.
Diagnosis Mode	– Expert ▪ In this mode, the system references the recent PV string diagnosis results to prevent false diagnosis caused by environmental factors. ▪ This mode is used for routine O&M of PV plants. It is based on multiple recent I-V diagnosis results to improve the diagnosis accuracy. – Common ▪ In this mode, the system directly performs diagnosis and displays the real-time PV string diagnosis result. There may be a difference in multiple diagnosis results due to environmental factors. ▪ This mode is suitable for scenarios such as initial I-V diagnosis, I-V diagnosis after system configuration changes, I-V diagnosis after onsite changes, and manual fault verification.
Automatic Emai	After the related information is specified, diagnosis reports will be sent to the specified email address. **NOTE** You need to configure the company email server. For details, see **3.7.1.4 Configuring an Email Server**.

Step 3 Manage completed and scheduled tasks on the **Diagnosis Task Management** page. For details about the procedure, see **Table 3-12**.

Table 3-12 Managing diagnosis tasks

Task Status	Procedure
Completed	• Click to view the detailed diagnosis result. – The **Legend** area displays the fault type. You can click to view the troubleshooting suggestions and handle the fault accordingly. – In the **Inspection Details** area, click **View** to view the basic string information and I-V curve. – In the **Inspection Details** area, select a PV string to view its I-V curve comparison analysis diagram. • Click . In the dialog box that is displayed, you can export corresponding reports as required. After the report is successfully exported, you can download the exported report as prompted. • Click or to view diagnosis object details or delete a diagnosis task that has been executed. • Click to cancel a task in the **Diagnosing** state. • Click or select multiple diagnosis tasks and click **Rerun diagnosis** to re-execute one or more diagnosis tasks.
Scheduled	You can delete and modify a scheduled task.

----End

Follow-up Procedure

After the report is exported, you can view and download the report on the **Export Management** page. For details, see **3.6.1.4 Export Management**.

3.6.1.3 Module Library Management

Common module information templates are available. If the preset templates cannot meet requirements, you can customize templates through module library management to improve the accuracy of I-V curve diagnosis.

Context

A maximum of 100 templates can be added at a time. If a template is in use, modifying or deleting the template does not affect the use by the configured PV modules.

Procedure

Step 1 Choose **Value-Added Services** > **Value-Added Services** > **Smart I-V Curve Diagnosis** from the main menu.

Step 2 In the navigation tree on the left, choose **Module Library Management**.

Step 3 On the **Module Library Management** page, perform the following operations as required.

Table 3-13 Module library management

Operation	Procedure
Querying a module information template	Set the search criteria and click **Search**.
Adding a module information template	• Adding a single module information template Click **Add**. In the dialog box that is displayed, enter the module information and click **Save**. • Adding module information templates in batches 1. Click **Download Template**, edit the module information in the downloaded template file, and save it. 2. Click **Import** and select the edited template file.
Exporting a module information template	1. In the list, select the module information template to be exported. 2. Click **Export** to save the exported module information file to the local PC.
Deleting a module information template	Select the module information template to be deleted and click **Delete**.

----End

3.6.1.4 Export Management

Users can view and manage exported reports.

Procedure

1. Choose **Value-Added Services** > **Value-Added Services** > **Smart I-V Curve Diagnosis** from the main menu.
2. In the navigation tree on the left, choose **Export Management**.
3. On the **Export Management** page, view, download, or delete the exported reports.

   Click or in the **Operation** column to download or delete the reports.

3.6.1.5 Self-Learning Configuration

The self-learning configuration function improves the accuracy and efficiency of the **Smart I-V Curve Diagnosis** function of the FusionSolar SmartPVMS,

preventing invalid diagnosis or misdiagnosis triggered by weather conditions or short-time shading.

Enabling I-V Self-Learning

1. Choose **Value-Added Services** > **Value-Added Services** > **Smart I-V Curve Diagnosis** from the main menu.
2. In the navigation pane, click **Self-Learning Configuration**.
3. Select the target plant and click **Batch Configure**, or click  in the **Operation** column.
4. Click , set **Start and End Time** and **Max. Concurrent Devices**, and click **Save**.

Disabling I-V Self-Learning

1. Choose **Value-Added Services** > **Value-Added Services** > **Smart I-V Curve Diagnosis** from the main menu.
2. In the navigation pane, click **Self-Learning Configuration**.
3. Select the PV plant for which I-V self-learning has been enabled and click **Batch Configure**, or click  in the **Operation** column.
4. Click  , and click **Save**.

3.6.2 Smart Tracking

Helps users monitor the running status of the smart tracker and displays the energy yield improvement facilitated by the smart tracker through array comparison.

3.6.2.1 Smart Tracking

The tracker angle is adjusted based on tracker status and weather conditions to ensure the maximum energy yield and avoid damage to PV modules due to unfavorable weather, in order to increase plant revenue.

Prerequisites

- The SDS license of the corresponding device has been loaded.
- The SDS mode is supported only when the NCU (Network Control Unit) is connected to the management system via the SmartLogger3000.

Procedure

Step 1 Choose **Value-Added Services** > **Value-Added Services** > **Smart Tracking** from the main menu.

Step 2 In the navigation tree on the left, click the plant to be queried. Information about all trackers of the plant is displayed on the right.

Step 3 Set the tracker control mode. For details about the procedure, see **Table 3-14**.

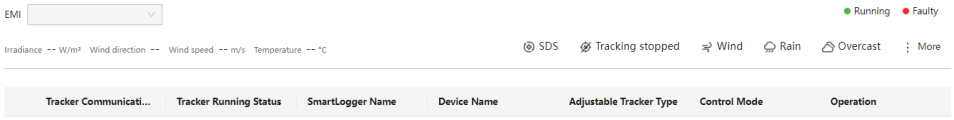


Table 3-14 Tracker control mode

Mode	Description	Procedure
SDS (Smart DC System)	Trackers are controlled by the smart tracking algorithm to automatically adjust the angle based on sunlight for maximum energy yield.	1. Click **SDS**. 2. In the displayed dialog box, select the target array and click **Confirm**.
Tracking stopped	Trackers stop automatically adjusting the angle.	1. Click **Tracking stopped**. 2. In the displayed dialog box, select the target array and click **Confirm**.
Weather	Set PV arrays in **Wind**, **Rain**, **Overcast**, or **Snow** mode based on weather conditions for protection.	Click **Wind**, **Rain**, **Overcast**, or **Snow**. In the dialog box that is displayed, select the target array and click **Confirm**.
Auto	Trackers operate based on the parameters and algorithms set by the vendor. The tracker angle can be automatically adjusted based on sunlight for maximum energy yield.	1. Click **Auto**. 2. In the displayed dialog box, select the target array and click **Confirm**. **NOTE** After the smart tracking algorithm is enabled, trackers are controlled by the smart tracking algorithm in **Auto** mode.
Manual	Manually adjust the tracker angle based on the tracker status and weather conditions.	1. Click **Manual**. The **Manual** dialog box is displayed. 2. Select the target array in the navigation tree on the left, enter the azimuth on the right pane, and click **Confirm**. **NOTE** If the azimuths of multiple arrays are the same, select **Keep all arrays in sync** to set the azimuths in batches

Mode	Description	Procedure
Maintenance	Trackers are in maintenance.	1. Click **Maintenance**. 2. In the displayed dialog box, select the target array and click **Confirm**.
Fault Rectification	Tracker faults are to be cleared.	1. Click **Fault Rectification**. 2. In the displayed dialog box, select the target array and click **Confirm**.

----End

3.6.2.2 Smart Comparison

Displays the energy yield improvement by comparing the energy yield of PV arrays that use and do not use the Smart DC System (SDS) to help users evaluate the SDS feature.

Prerequisites

The SDS license of the corresponding device has been loaded.

Procedure

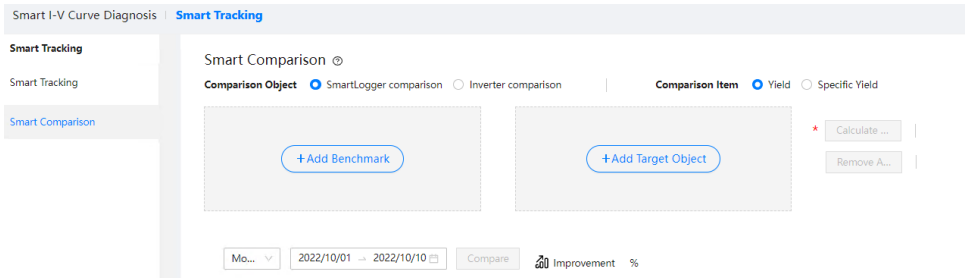
Step 1 Choose **Value-Added Services** > **Value-Added Services** > **Smart Tracking** from the main menu.

Step 2 In the navigation tree on the left, choose **Smart Comparison**.

Step 3 Specify **Comparison Object** and **Comparison Item**.

NOTE

- If the trackers are connected to the management system through the SmartLogger, you are advised to select **SmartLogger comparison**. If the trackers are connected to the management system through the inverter, you are advised to select **Inverter comparison**.
- If the string capacities of **reference object** and **comparison object** are the same, you can select **Yield** or **Specific Yield** as required. If the string capacities of **reference object** and **comparison object** are different, you are advised to select **Specific Yield**.



Step 4 Click **Add Benchmark** and **Add Target Object** to select the reference and comparison objects.

Step 5 Calculate the benchmark.

1. Click **Calculate Benchmark**. In the displayed dialog box, set the start date and end date.

   NOTE

   If abnormal data exists in the specified period, click to remove abnormal data.

2. Click **OK**.

Step 6 **Optional:** Remove abnormal data.

1. Click **Remove Abnormal Data**. In the displayed dialog box, set the start date and end date.
2. Click to remove abnormal data and click **OK**.

Step 7 Select a time period and click **Compare** to view the yield comparison result.

NOTE

The improvement value and the yield comparison curves do not contain the removed abnormal data.

Step 8 **Optional:** Click **Export** to export the comparison data.

----End

3.6.3 Software and Service Purchase

3.6.3.1 Service Purchase

You can purchase warranty services online to extend the warranty period of devices.

Prerequisites

The region of the plant where the device resides has been set to China or Germany.

Context

Online service purchase is available only in China and Germany.

Procedure

Step 1 Choose **Value-Added Services** > **Buy** > **Buy Services**.

Step 2 Select the target device and click **Refresh Warranty Information** to refresh the warranty information. The warranty period of the device is displayed in the device area.

Step 3 Select the devices whose warranty state is **Expiring** and click **Extend Warranty**.

NOTE

A maximum of 50 devices in the same region can be selected to purchase warranty services for them.

Step 4 On the displayed Huawei PV official website, purchase the warranty service as prompted.

----End

Follow-up Procedure

After the warranty service is purchased successfully, return to the service purchase page of the management system, select the devices for which you have purchased a warranty service, and click **Refresh Warranty Information** to refresh the warranty information to verify that the warranty validity period is the same as the purchased one.

3.6.3.2 Software Purchase

You can view the I-V license expiration date on the software purchase page. If the license enters the grace period or has expired, renew the license offline to continue using the Smart I-V Curve Diagnosis function.

Procedure

Step 1 Choose **Value-Added Services** > **Buy** > **Buy Software**.

Step 2 Select the target devices and click **Refresh I-V License** to refresh the license status.

The license status is displayed in the device area.

----End

3.7 System

3.7.1 Company Management

Company administrators can create and manage companies and users, maintain company information, and configure email servers based on service requirements.

3.7.1.1 Creating a company

Create a company under the root node or create a subsidiary under a company node based on service requirements.

Context

- The system administrator or a user who has the rights of the system administrator can select the root node to create a company, or select a company from the navigation tree on the left to create a subsidiary for the company.
- An installer user can create a subsidiary for the company to which the installer belongs, or select a target subsidiary and create a lower-level subsidiary for the selected subsidiary.

Procedure

1. Choose **System** > **System** > **Company Management** from the main menu.
2. Click **Add Company**.
3. In the dialog box that is displayed, enter the basic information about the company.

   NOTE

   - When a company is created under the root node, a company administrator account of the installer role is also created.
     - **Username**: Indicates the username used by the company administrator to log in to the management system.
     - **Email**: Indicates the personal email address of the company administrator. The email address can be used to log in to the management system, receive subscribed reports, alarm push messages, and verification codes for password retrieval.
   - **Start date of safe running**: Indicates the day when the plant starts to generate energy normally. It is mainly used to calculate the safe running days of the plant.
   - **Longitude and latitude**: Indicates the location and scope of a company. Click . On the displayed map, drag the circle to set the longitude and latitude, and drag the hollow area of the arc to set the radius.
4. Click **OK**.

Follow-up Procedure

After a company is created, you can click the **Company Info** tab page to supplement or modify the basic information about the company.

Related Operations

- Modifying company information: Select the target company, click the **Company Info** tab page, and modify or supplement the basic information about the company.
- Deleting a company:
  a. Select the target company and click **Delete Company**.

     NOTE

     - Before deleting a company, you need to delete the users and PV plants managed by the company.
     - If a subsidiary already exists under the company, delete the subsidiary first.

  b. Click **OK**.

3.7.1.2 Creating a User in the Company and Associating the User with the Plant

After an administrator or installer creates a user and adds the user to a role, the user has the rights of the role. User authorization is complete.

Creating a User

1. Choose **System** > **System** > **Company Management** from the main menu.

2. Choose a company or subsidiary from the navigation tree on the left and click **Add user**.
3. In the displayed dialog box, enter the basic information about the user and click **Next**.

   NOTE

   The email address used to log in to the management system.
4. Select a role to which the user belongs and click **Next**.
5. Select the plant associated with the user and click  .

   NOTE

   When the user is an **installer** and associated with plants, the installer can manage the associated plants within the permission of the user's role, but cannot create new plants. If the user is associated with a company, the installer can manage all plants under the associated company and has the permission to create new plants.
6. click **Confirm**.

Resetting Password

1. Choose **System** > **System** > **Company Management** from the main menu.
2. In the navigation tree on the left, choose Company or Subsidiary.
3. Select the target user and click in the **Operation** column.
4. In the dialog box that is displayed, set the new password.

Related Operations

- Modifying user information: Select the target user and click .
- Resetting user password: Select the target user and click .
- Deleting a user: Select the target user and click .

  NOTE

  - The current user cannot be deleted.
  - Deleting a logged-in user will force a logout of the user. Therefore, exercise caution when performing this operation.
- Disabling a user: Select the target user and click .
- Enabling a user: Select the target user and click .
- Export personal information: Only the system administrator with the user management permission can modify or export user information. If you need to export personal information, contact and authorize the system administrator to export the information.

3.7.1.3 Configuring Company Information

After a company is created, a system administrator or user who has the system management permission can add or modify the basic information about the company.

Procedure

1. Choose **System** > **System** > **Company Management** from the main menu.
2. In the navigation tree on the left, choose the target company and click **Company Info**.
3. On the **Company Info** page, add or modify basic company information.
   - **Currency**: You can select a currency based on the site requirements.

     NOTE

     The revenue unit displayed for PV plants is the currency selected by the company to which the plant belongs. You cannot switch the currency unit by switching the system language.
   - **Support for poverty alleviation PV plant**: When the status is  , the poverty alleviation PV plant can be connected.
   - **Title/Logo on the home page**: You can customize the title and company logo on the home page as needed.
   - **Title/Logo on the dashboard**: You can customize the title and company logo on the dashboard as needed.
4. Click **Save**.

3.7.1.4 Configuring an Email Server

Configure an email server for the company to send subscription emails to users for service functions such as report subscription and alarm push. For data security during communication, you are advised to configure the email server certificate. To prevent certificate expiration or private key leakage, you need to periodically update the certificate (once every three months is recommended). If the certificate is about to expire, update them in a timely manner.

Prerequisites

- The interconnected email server must support the Simple Mail Transfer Protocol (SMTP).
- You have obtained the server information from the SMTP server administrator, such as the domain name or IP address, port number, whether identity authentication is required, user name, and user password.
- The SMTP port is available.
  - In common connection mode, port 25 is used.
  - In TLS connection mode, port 587 is used.
  - In SSL connection mode, port 465 is used.

Context

- If a company has multiple levels of subsidiaries, the email server must be configured based on the following rules:
  - If a company has configured an email server but no subsidiary has, all subsidiaries use the email server to send subscription emails.
  - If no email server is configured for a subsidiary, the email server configured for the upper-level subsidiary is used by default to send

subscription emails. The email server configured for the lower-level subsidiary cannot be used.

Company Level						Email Server	Subscribing to Emails	Sender Email
Company						Unconfigured	Subscription is not allowed.	An email server needs to be configured.
	Level-1 subsidiary					Configured	Subscription is allowed.	Use the email server configured for the level-1 subsidiary to send subscription emails.
		Level-2 subsidiary				Unconfigured	Subscription is allowed.	
			Level-3 subsidiary			Configured	Subscription is allowed.	Use the email server configured for the level-3 subsidiary to send subscription emails.
				Level-4 subsidiary		Unconfigured	Subscription is allowed.	
					.....	Unconfigured	Subscription is allowed.	

- To ensure data security and improve the security of sending notifications, the TLSv1.2 protocol is recommended on the email server.
- To send notifications, you need to enter personal data such as email addresses. You are obligated to take considerable measures, in compliance with the laws of the countries concerned and the user privacy policies of your company, to ensure that users' personal data is fully protected.

- For personal data security, the personal data, such as email addresses, are anonymized on the user interface and encrypted during transmission.
- Google Mailbox Service limits the number of emails that a user can send every day and the number of recipients of each email. If they exceed the limit, you are advised to switch to an unlimited mailbox service.

Restriction Type	Description	Quantity Limit
Number of emails per day (For internal and external recipients)	Maximum number of emails that can be sent per day	2000 (500 for trial accounts)
Number of automatically forwarded emails	The number of emails that are automatically forwarded to other accounts is not counted in the maximum number of emails that can be sent per day.	10,000
Auto-forward email filter	Account filter for automatically forwarding emails	20
Number of recipients of each email (For internal and external recipients)	Addresses in the **To**, **Cc**, and **Bcc** fields of a single email	2000 (500 for external recipients)
Number of recipients of each email sent through **SMTP** (**POP** or **IMAP** users) or **Gmail API** (For internal and external recipients)	Addresses in the **To**, **Cc**, and **Bcc** fields of a single email This includes emails sent via smtp-relay.gmail.com or smtp.gmail.com.	100
Total number of recipients per day (For internal and external recipients)	The system counts the number of email addresses (recipients) each time an email is sent. Five emails to each of the 10 addresses are counted as 50 recipients.	10000
Number of external recipients per day	Email addresses other than your primary domain name, including the domain alias and alternate domain name	3000

Restriction Type	Description	Quantity Limit
Number of unique identity recipients per day (For internal and external recipients)	Each email address (each unique identity recipient) is counted only once a day: • Five emails to each of the 10 addresses are counted as 10 unique identity recipients. • Five emails sent to a single address are counted as one unique identity recipient.	3000 (2000 for external recipients, and 500 for external recipients of the trial account)

NOTE

The preceding description is for reference only. Google Mail may change the maximum number of emails that can be sent. Visit https://support.google.com and search for **Gmail sending limit** to view the latest description.

Procedure

1. Choose **System** > **System** > **Company Management** from the main menu.
2. In the navigation tree on the left, choose the target company and click **Mailbox**.
3. Set the domain name or IP address of the SMTP server, sender email address, and server port.

   NOTE

   - The sender email address must be registered on the interconnected SMTP server and must be complete. Otherwise, the email fails to be sent. Recipients can view the email address when receiving the email. You are not advised to use a personal email address to send notifications.
   - If the SMTP server requires secure connections, you are advised to enable the default TLS secure connection. When the SMTP server does not require secure connections, the default port number of SMTP is 25. To ensure that emails are sent successfully, check that the email server port is available and the configuration certificate is valid.
   - If the SMTP server requires user identity verification, obtain the username and user password from the SMTP server administrator.
     - The username must be the same as that contained in the value of **Sender email address**. You are not advised to use a personal username.
     - If no authorization code is available for logging in to the SMTP email server, set the password to the password of **Sender email address**. Otherwise, set the password to the authorization code for logging in to the SMTP email server.
4. **Optional:** If **Enable secure connection over SMTP (Applies when an email server certificate for SMTP server is already installed. TLS is recommended.)** is selected, choose TLS or SSL, import a certificate and CRL. For data security purpose, TLS is recommended.
   - Configuring certificates

i. Obtain an email server SSL/TLS certificate and save it to your local PC.

NOTE

- For details about how to obtain the mail server certificate, see FAQs.
- The certificate is used for two-way authentication between the system and the email server. The system and the email server can communicate with each other only after both of them trust the certificate.
- For data security, the notification function supports only the email server certificate generated using the TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 or TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 signature algorithm.

ii. Press win+R to open the **Run** dialog box, enter **CMD**, and click **OK**.

iii. Run the following command to switch to the keytool directory:

cd /d <*Directory storing keytool*>

NOTE

- In most cases, *Directory storing keytool* is *JDK installation path***bin**.
- Keytool is a Java runtime environment (JRE) command. Ensure that the JRE has been installed on the local PC.

iv. In the **cmd** window, run the following command to convert the certificate format and encrypt the keystore:

keytool -import -file *<Path for saving the original certificate>|<Name of the original certificate>* **-keystore** *<Path for saving the certificate after conversion>|<Name of the certificate after conversion>*

```
Enter keystore Password:
Reenter New Password:
```

The file name extension of the converted certificate is .keystore. Remember the password set here. You need to enter the password when importing the certificate.

NOTE

The keystore password is user-defined and must contain 6 to 32 characters. For security purposes, it is recommended that the keystore password meet the following requirements:

- Cannot contain the user name or its reverse.
- Contain at least one uppercase letter (A to Z), one lowercase letter (a to z), and one digit (0 to 9).
- Contain at least one of the following special characters: !"#$%&'()* +,-./:;<=>?@[\]^`{_|}~ and spaces.

v. Click **Configure Certificate**.

vi. In the **Configure Certificate** dialog box, click ... next to **Certificate file** and select the certificate after format conversion.

vii. In the **Certificate password** text box, enter the keystore password set in **4.iv**.

viii. Click **Save**.

– Configuring the CRL

i. Obtain the latest CRL from the CA and save the CRL to your local PC.
ii. Click **Configure CRL**.
iii. In the **Configure CRL** dialog box, click ... next to **CRL file** and select the CRL.
iv. Click **Save**.

5. Click **Test** to check whether the system is connected to the email server properly.
   - If the test successfully, **Test email sent successfully. The email server is available.** is displayed on the user interface.
   - If the test fails, check whether the email settings are correct. If the email server still cannot be connected after the parameter are correctly set, contact the system administrator.
6. Click **Apply**. In the displayed **Warning** dialog box, click **OK**.

NOTE

If you click **Test** but do not click **Apply**, only the connectivity between the system and the email server is tested, and the entered parameter values are not saved to the database. The entered parameter values are saved to the database only after you click **Apply**.

Follow-up Procedure

After interconnecting with an SMTP server, the system sends notifications to specified personnel by email through the SMTP server.

3.7.1.5 Default Electricity Prices

You can set an electricity price for each time period to accurately calculate the revenue.

Procedure

Step 1 Choose **System** > **System** > **Company Management** from the main menu.

Step 2 In the navigation pane, select the target company , click **Default Electricity Prices**.

Step 3 On the **Default Electricity Price** page, manage the electricity price for power supply and purchase. For details about other operations, see **Table 3-15**.

Table 3-15 Operations allowed on the Default Electricity Price tab page

Operation	Procedure
Adding electricity price	1. Click **Add**. 2. Set **Date Range**, **Start Time**, **End Time**, and **Electric price**, and click **Save**.
Adding a time range	Click ⊕, set parameters as required, and click **Save**.

Operation	Procedure
Deleting a date range	Click .
Deleting a time range	Click **Delete**.
Modifying a time range and electric price	Modify parameters as required and click **Save**.

NOTE

If the price unit is inconsistent with the local type, contact the company administrator to change the currency. For details, see **3.7.1.3 Configuring Company Information**.

----End

3.7.1.6 Managing a Northbound API Account

You can manage northbound APIs to provide plant and device data to them for displaying or using the data in a customized manner.

Context

Only the company administrator can create and manage northbound API accounts.

- An installer account registered through **Installer Registration** on the login page is the company administrator account. Choose **System > Company Management > User Management**, and the user displayed as in the **Role Name** column is the company administrator.
- The permission to access northbound APIs is enabled by the company administrator during northbound account creation. For details about the API login and data access, see **https://support.huawei.com/enterprise/en/doc/EDOC1100261860**.

Creating a Northbound Account on the SmartPVMS

1. Choose **System** > **System** > **Company Management** from the main menu.
2. Click **Northbound Management**.
3. Click **Add**. In the dialog box that is displayed, set basic information such as **System name**, **Deadline**, **Associated account**, **Username**, and **Password**.
4. Enable **Plant list** in the interface list and select the plant associated with the user. The northbound user has the permission to access plant data.

   NOTE

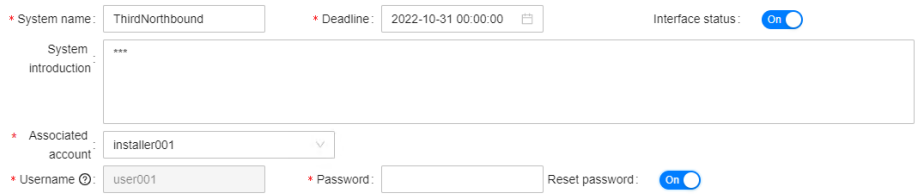
   To select all plants under a company, select the company.
5. **Optional:** In the interface list, enable the desired interfaces and select the required information as prompted.
6. Click **OK** to save the settings.

Table 3-16 Field description

Field	Description
System name	Name of the third-party system that needs to access northbound APIs.
Deadline	Expiry date after which users cannot access northbound APIs.
Interface status	This function is enabled by default. When this function is disabled, users cannot use this account to access northbound APIs.
Associated account	The associated account must be a SmartPVMS account and is used to receive northbound API change messages.
Username	Username of the northbound API account. **NOTE** The northbound username cannot be the same as the username for logging in to the SmartPVMS.
Password	Password of the northbound API account.

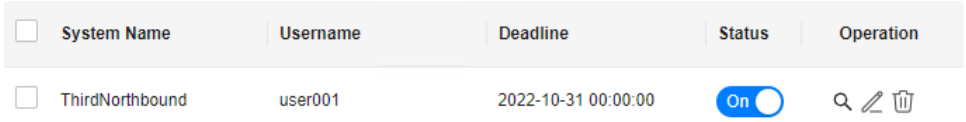
Resetting a Northbound User Password

1. Choose **System** > **System** > **Company Management** from the main menu.
2. Click **Northbound Management**.
3. Click in the **Operation** column. In the dialog box that is displayed, click Off next to **Reset password** and set a new password.



Managing a Northbound System

1. Choose **System** > **System** > **Company Management** from the main menu.
2. Click **Northbound Management**.
3. View or modify northbound API account information as required.



Scenario	Operation
Closing a northbound API account	Click  in the **Status** column.
Viewing northbound API account details	Click  in the **Operation** column.
Modifying northbound API account information	Click  in the **Operation** column.
Deleting a northbound API account	Click  in the **Operation** column or select one or more northbound API accounts to be deleted and click **Delete**.

3.7.2 Data Amendment

3.7.2.1 Data Recovery

After the communication between the device and the system recovers, you can create a data synchronization task to synchronize data to ensure the integrity of the plant data.

Procedure

Step 1 Choose **System** > **Business Configuration** > **Data Amendment**. The **Data Recovery** page is displayed.

Step 2 Under the root node in the left pane, select device.

Step 3 **Optional:** Select the device type.

Step 4 Select the time range for supplementary collection.

Step 5 Click **Create Tasks**.

Step 6 In the displayed dialog box, click **Yes**.

The synchronization progress of the device is updated in the right pane.

----End

Follow-up Procedure

You can perform the following operations on the **Synchronize Data** page.

Operation	Note	Procedure
Querying supplementary collection tasks	You can view the status of supplementary collection tasks and retry or cancel a task.	1. Select the device under the root node on the left. 2. Specify the time range for supplementary collection. 3. Click **Query Tasks**.
Retrying data collection	You can re-collect the data that is in the **Canceled** or **Failed** state.	In the supplementary collection task list, select the **Canceled** or **Failed** state and click **Retry**.
Canceling the supplementary collection of data	Cancel a **Running** task.	In the supplementary collection task list, select the task whose progress does not reach 100% and click **Cancel**.

3.7.2.2 Data Repair

If the collected device running data is incorrect, you can use the data repair function to correct the data.

Procedure

Step 1 Choose **System** > **Business Configuration** > **Data Amendment**.

Step 2 In the right pane, click the **Data Repair** tab.

Step 3 Export repair data.

1. Click **Export Repair Data**.
2. In the dialog box that is displayed, select devices and the time period, and then click **Next**.

   NOTE

   The data of a maximum of 10 devices can be exported at a time, and the time span cannot exceed three months.
3. Select the signal points to be repaired and click **OK**.

   NOTE

   A maximum of 10 signal points can be exported at a time.

Step 4 Open the data exported in **Step 3** and correct the signal data.

Step 5 Create a repair task.

1. Click **Create Repair Task**.

2. In the displayed dialog box, create a repair task as prompted.

----End

3.7.2.3 Manual Aggregation

If the report data of a device in a specified period is missing, you can aggregate the report data manually.

Procedure

Step 1 Choose **System** > **Business Configuration** > **Data Amendment**.

Step 2 In the right pane, click the **Manual Aggregation** tab.

Step 3 Specify the devices and time period.

Step 4 Click **Create Task**.

Step 5 In the dialog box that is displayed, click **Yes**.

The page displays the data aggregation progress and whether the aggregation succeeded or not.

----End

3.7.3 Personal Settings

3.7.3.1 Changing Personal Password

If passwords are disclosed or remain unchanged for a long time, users can change their personal passwords by setting personal information. To improve user security, it is recommended that passwords be changed periodically (for example, every three months).

Context

If you cannot change your password, contact the security administrator.

Procedure

Step 1 Choose **System** > **System Settings** > **Personal Settings**.

Step 2 In the navigation pane, choose **Change Password**.

Step 3 On the **Change Password** tab page, enter **Old password** and set **New password** and **Confirm password**.

Step 4 Click **Apply**.

NOTE

User information is more secure if a password is changed more frequently. If a user forgets the password due to frequent password changes, contact security administrators to reset the password.

----End

3.7.3.2 Modifying Personal Information

When personal information such as mobile numbers and email addresses changes or needs to be supplemented, users can periodically maintain their personal information by setting personal information to ensure its accuracy.

Context

- When you modify your personal information, such as mobile numbers and email addresses, you are obligated to take considerable measures, in compliance with the laws of the countries concerned and the user privacy policies of your company, to ensure that your personal data is fully protected.
- To ensure the security of personal information, such as mobile numbers and email addresses, these data is anonymized on the page, and HTTPS encryption transmission channels are used.

Procedure

Step 1 Choose **System** > **System Settings** > **Personal Settings**.

Step 2 In the navigation pane, choose **Modify Personal Info**.

Step 3 On **Modify Personal Info**, modify personal information as required.

NOTE

If the SMS and email verification codes cannot be obtained, ensure that the remote notification function is configured correctly.

Table 3-17 Parameter description

Parameter	Description	Procedure
Associate Mobile Number	Mobile number associated with a user account.	• Editing the mobile number 1. Click **Edit**. 2. Verify the identity information as prompted and click **Next**. 3. Select a country or region code and enter a new mobile number. 4. Click **OK**. • Verifying the mobile number 1. Click **Verify**. 2. Click **Send Code** and enter the obtained verification code to verify that the mobile number is valid. 3. Click **OK**.

Parameter	Description	Procedure
Associate Email Address	Email address associated with a user account.	• Editing the email address 1. Click **Edit**. 2. Verify the identity information as prompted and click **Next**. 3. Enter a new email address. 4. Click **OK**. • Verifying the email address 1. Click **Verify**. 2. Click **Send Code** and enter the obtained verification code to verify that the email address is valid. 3. Click **OK**.
Auto-Logout If No Activity Within	If a user does not perform any operation within the period specified by this parameter after login, the user will be logged out. This parameter can be set for local users and remote users. The default value for the third-party user is 30 minutes and cannot be changed.	1. Click the drop-down list and select a value for **Auto-Logout If No Activity Within**. 2. Click **Save**.
Welcome Message	You can set the information to be displayed upon the next login.	1. Click **Edit**. 2. Enter the information to be displayed upon the next login. 3. Click **OK**.
Display Associate Contact Information Page	This parameter specifies whether the **Associate Contact Information** page is displayed when the user logs in next time. • If this parameter is enabled, the **Associate Contact Information** page is displayed. • If this parameter is disabled, the **Associate Contact Information** page is not displayed.	• Click **Enable**. • Click **Disable**. **NOTE** In SSO mode, contact information can be associated only on the **Associate Contact Information** page. Exercise caution when setting this parameter.

----End

3.7.3.3 Modifying Personal Client IP Address Control Policies

With the **Update ACL Policy** permission, you can configure your personal client IP address control policies. ACL is short for access control list.

Procedure

Step 1 Choose **System** > **System Settings** > **Personal Settings**.

Step 2 In the navigation pane, choose **Personal Client IP Address Policies**.

Step 3 On the **Personal Client IP Address Policies** page, view or modify your IP address control policies.

----End

3.7.4 Message Management

3.7.4.1 Public Notice

This topic describes how to view received public notices to learn messages.

Procedure

Step 1 Choose **System** > **Message Management** > **Announcements**.

Step 2 Click the **Message Subject** of an unread message. In the displayed **Message** dialog box, view the details about the message.

----End

3.7.4.2 Sending a Public Notice

This topic describes how to create, send, and delete public notices.

Procedure

Step 1 Choose **System** > **Message Management** > **Send Announcement**.

The messages created by the current user are displayed. You can click a message subject to view the message details.

Step 2 Click **Add**. The **Create message** dialog box is displayed.

Step 3 Select the Individuals or Roles, and set **Subject** and **Content**.

Step 4 Perform either of the following operations as required:

- Click **Send** to send the message. The message status is **Sent**.
- Click **Save** to save but not send the message. The message status is **Draft**.

NOTE

For a message in **Draft** state, you can click the message subject to edit, save, or send the message.

----End

4 FAQs

This section describes the common faults of the SmartPVMS client, possible causes of the faults, and troubleshooting methods.

4.1 How Do I Obtain a Mail Server Certificate on Google Chrome?

Question

How do I obtain a mail server certificate on Google Chrome?

Answer

NOTE

Operations on the browser may vary depending on browser versions but are similar to the examples in the following steps. You are advised to perform the operations based on actual situations.

Step 1 In the address box on Google Chrome, enter the IP address for logging in to the mail server and press **Enter**.

Step 2 Press **F12**. On the displayed console, click the **Security** tab and click **View Certificate**.

NOTE

If the console is not displayed after you press **F12**, allow the console to be displayed in the pop-up blocker and press **F12** again.

Step 3 In the **Certificate** window, click the **Certificate Path** tab, and then select the certificate root path, for example, **IT Root CA**.

Step 4 Click the **Details** tab and click **Copy to File**.

Step 5 In the displayed **Certificate Export Wizard** window, click **Next**.

Step 6 Select **Base64 code X.509 (.CER)** for **Export Format** and click **Next**.

Step 7 Click **Browse**. In the displayed **Save As** dialog box, select the certificate storage path, enter a name for the certificate, and click **Save**.

Step 8 Click **Next**.

Step 9 In the displayed dialog box, click **Finish**."The export was successful." is displayed.

----End

4.2 How Do I Obtain a Mail Server Certificate on Firefox?

Question

How do I obtain a mail server certificate on Firefox?

Answer

NOTE

Operations on the browser may vary depending on browser versions but are similar to the examples in the following steps. You are advised to perform the operations based on actual situations.

Step 1 In the address box on Firefox, enter the IP address for logging in to the mail server and press **Enter**.

Step 2 Click on the left of the address box.

Step 3 Click **More Information**.

Step 4 On the **Security** tab page, click **View Certificate**.

Step 5 On the **Details** tab page, click **Export**.

Step 6 Select the certificate storage path, enter a name for the certificate, and click **Save**.

----End

4.3 What Do I Do to Avoid the Logout When No Operation Is Performed on the SmartPVMS Page for a Long Time?

When users use browser to visit the SmartPVMS, avoid the Logout When No Operation Is Performed on the SmartPVMS Page for a Long Time.

Problem Description

To prevent other users from performing unauthorized operations, the SmartPVMS allows you to set related idle parameters. If you do not perform operations on the

SmartPVMS page for a long time, you will automatically log out of the client and the current page is switched back to the login page. In this case, you need to log in to the client again. This is not friendly for some special application scenarios, such as presentation or large-screen display.

Procedure

1. Choose **System** > **System Settings** > **Personal Settings**.
2. In the navigation tree on the left, choose **Personal Settings** > **Modify Personal Info**.
3. On the **Modify Personal Info** page, modify the property of **Auto-logout if no activity within** .
4. Click **Apply**.

NOTE

To prevent other users from performing unauthorized operations during the absence of a login user, you are advised to enable the **Auto-logout if no activity within** function after the special application scenarios are finished.

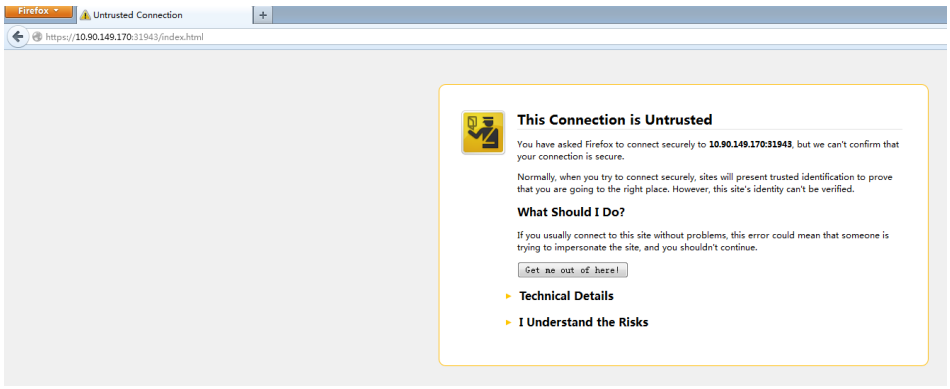
4.4 How Do I Handle the Problem of Certificate Error or Security Alarm Displayed in the Web Browser

Symptom

- When the Google Chrome is used to log in to system, the system displays a connection error message as shown in **Figure 4-1**.
- When the Mozilla Firefox is used to log in to system, the system displays a connection error message as shown in **Figure 4-2**.

Figure 4-1 A connection error prompted by the Chrome

Figure 4-2 A connection error prompted by the Firefox



Procedure

NOTE

Operations on the browser may vary depending on browser versions but are similar to the examples in the following steps. You are advised to perform the operations based on actual situations.

- Install the security certificate in Google Chrome.

  Please select whether to execute the subsequent operations according to the following scenarios.

  a. Obtaining the Trust Certificate from the SmartPVMS Server.

     Use FileZilla to download the **trust.cer** certificate file from the **/opt/oss/NetEco/etc/ssl/er** directory on the SmartPVMS server as user **ossuser** to the local PC.

  b. Installing the Trust Certificate on the Browser:

     i. Open Google Chrome and click in the upper right corner of the browser Icon Go to **Customise and control Google Chrome** Interface.

     ii. Click **Settings**.

     iii. Click **Show advanced settings**, Click again **Manage certificates**.

     iv. Importing Steps in a Trusted Root Certification Authorities **a** Certificates that have been saved to the local computer, click **Import**.

     v. Click **Next step** Browse **Selecting a certificate**.

     vi. Click **Next step**.

     vii. Click **Next step**.

     viii. Click **Completed**.

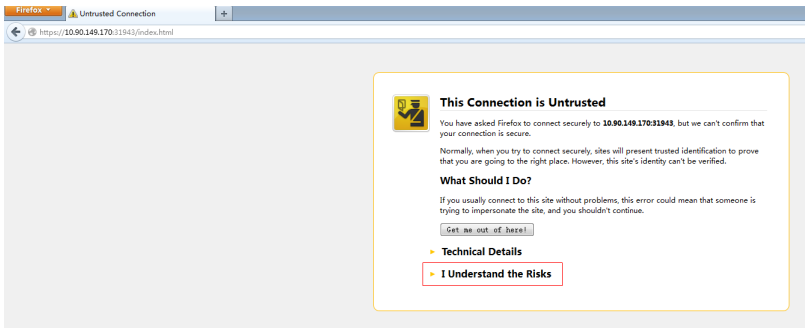
     ix. The **Security Warning** dialog box is displayed. Select **Yes(Y)**.

     x. Click **Yes** Restart the browser.

- Add the exception in Mozilla Firefox.

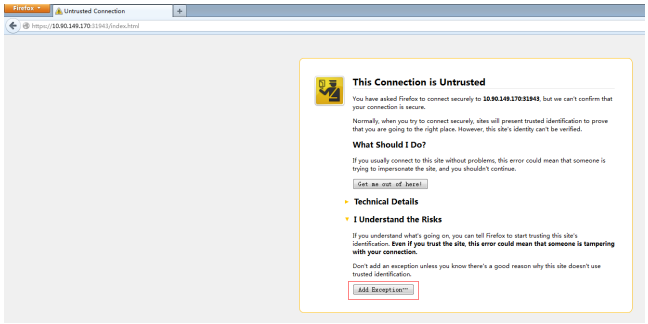
  a. Click **I Understand the Risks** as shown in **Figure 4-3**.

Figure 4-3 Clicking I Understand the Risks



b. In the expanded area, click **Add Exception** as shown in **Figure 4-4**.

Figure 4-4 Adding exception.



c. Click **Confirm Security Exception** as shown in **Figure 4-5**.

Figure 4-5 Confirming security exception

4.5 How Do I Solve the Problem of Empty Data in SmartPVMS Reports?

Symptom

Some fields in a record on the SmartPVMS report page are empty. Specifically, the data of a certain hour, day, month, or year is missing on the report page.

Possible Causes

- Report summarization mechanism
  - The hourly report data of the previous hour is summarized at the fifteen minute of each hour. After the summarization is complete, you can query the report data.
  - Daily report data is collected at 02:00 every day. After the data is summarized, you can query the report data.
  - The monthly and yearly report data is collected after the month and year. After the data is summarized, you can query the report data.
- Possible causes for some empty fields in a record on the report page
  - The device with missing records is not installed in the plant.
  - The data records of the corresponding device in the time range are missing in the historical data.
  - The counter values of some time points are empty, and the data reported by the monitoring module is invalid.
- Possible causes for missing hourly, daily, monthly, or yearly data on the report page
  - The query time is earlier than the plant creation time, and historical data is not recollected.
  - The data records of the corresponding device in the time range are missing in the plant historical data.

Procedure

1. On the main menu of the WebUI, choose **Monitoring** > **Device Management**, select the corresponding plant, and check whether the device is displayed.
   - If yes, go to 2.
   - If no, check whether the device is installed in the plant.
     - If the device is installed, add the device instance to the settings. After the data is summarized in the next hour, check whether the data record exists.
     - If the device is not installed, it is normal that no data is displayed.
2. On the main menu of the WebUI, choose **System** > **Business Configuration** > **Data Modification**. On the **Data Recovery** tab page of the **Data**

Modification page, check whether data records of the device are available in the specific time range.

- If yes, go to **3**.
- If no, select the device whose historical data needs to be re-collected, and re-collect the data of the corresponding time range.

3. On the main menu of the WebUI, choose **Monitoring** > **Monitoring**. Click **Historical Information** and check whether the data of the counters at the corresponding time is empty.
   - If yes, the data reported by the plant is invalid. In this case, contact technical support.
   - If no, check whether the report statistics are still empty on the next day. If the data is still empty, go to **4**.
4. If the report data is still missing after successful re-collection, perform the following steps:
   a. On the main menu of the WebUI, choose **System** > **Business Configuration** > **Data Modification**. On the **Data Modification** page, click the **Manual Aggregation** tab.
   b. Select the device whose data needs to be re-collected and set parameters as prompted.
   c. If **Task Status** is **Finished** on the **Manual Aggregation** page, choose **Device Management** > **Report** > **Report Management** to check whether the report data has been restored. If the data is still missing, contact technical support.

4.6 What Should I Do If the Total Energy Yield Fails to Be Automatically Calibrated After an Inverter Is Replaced?

Symptom

After the inverter is replaced successfully, if the automatic calibration of the total energy yield fails due to device disconnection or poor network quality, you can manually calibrate the energy yield after the device recovers.

Procedure

1. Choose **Monitoring** > **Monitoring** from the main menu.
2. In the navigation pane, select a plant, and click the **Device Management** tab page.
3. Export the device performance data.
   a. Select the target inverter and click **Export Performance Data**.
   b. Select **Cumulative energy** and click **OK**.
   c. In the **Export** dialog box that is displayed, enter **Task name**, set **Start date** and **End date**, and click **OK**.

NOTE

Start date: You are advised to set this parameter to 30 days before the old device is disconnected. For example, if the old device is disconnected on September 30, set this parameter to August 30.

End date: You are advised to set this parameter to any date after the device is disconnected.

d. In the **Export Performance Data** dialog box that is displayed, click .

e. Open the downloaded performance data file and record the latest valid values.

4. Calibrate the energy parameters.

a. Select the target inverter and click **Set Parameters**.

b. In the displayed dialog box, click **Feature Parameter**.

c. Enter a valid value in **Correction of lifetime energy** obtained in **3.e**.

d. Click **Set**.

4.7 What Are the Requirements for Accessing the 3D View of the ESS Smoothly on a PC Client?

To ensure that the 3D view of the ESS can be rotated, zoomed in, and zoomed out without frame freezing, the PC client must meet the following requirements.

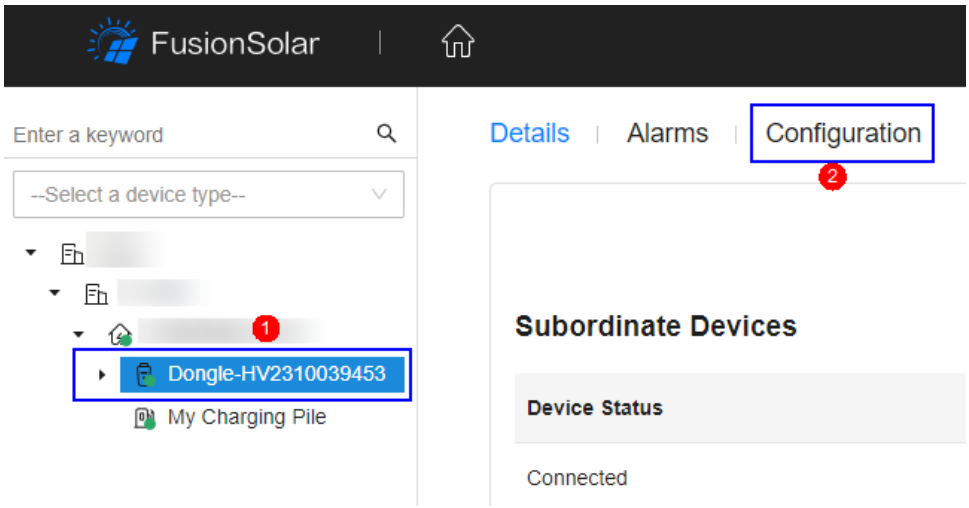
Configuration	Requirement
Recommended	Processor: Intel(R) Core(TM) i7-11800H @2.30 GHz Memory: 16 GB Graphics card: independent graphics card, 4 GB video RAM Operating system (OS): Windows 10
Minimum	Processor: Intel(R) Core(TM) i5 Memory: 4 GB Graphics card: integrated graphics card, 2 GB video RAM OS: Windows 10

4.8 How Do I Set the ModBus-TCP Parameter?

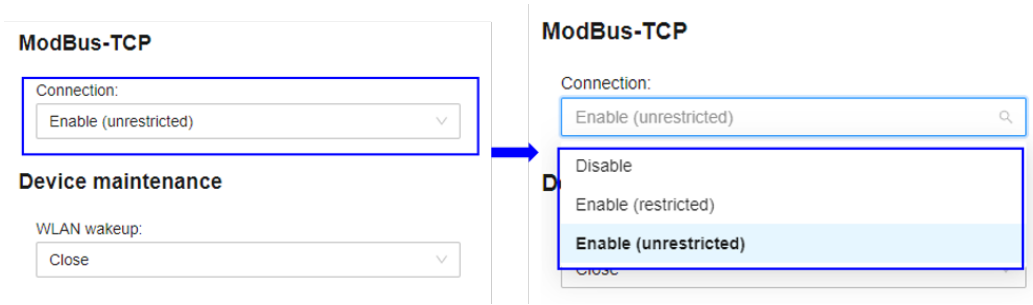
The chargers can implement dynamic power by connecting to the DTSU666-FE meter or the WLAN/FE Smart Dongle in the PV system through virtual meter networking to obtain RS485 meter detection data. When the virtual meter networking is used, set **ModBus-TCP** to **Enable (unrestricted)**. When an FE meter is used, set **ModBus-TCP** to **Disable**.

Procedure

1. Choose **Monitoring** > **Monitoring** from the main menu.
2. In the navigation pane, select the WLAN/FE Smart Dongle in the PV+ESS +Charger plant and click **Configuration**.



3. Set the **ModBus-TCP** parameter on the **Configuration** page.

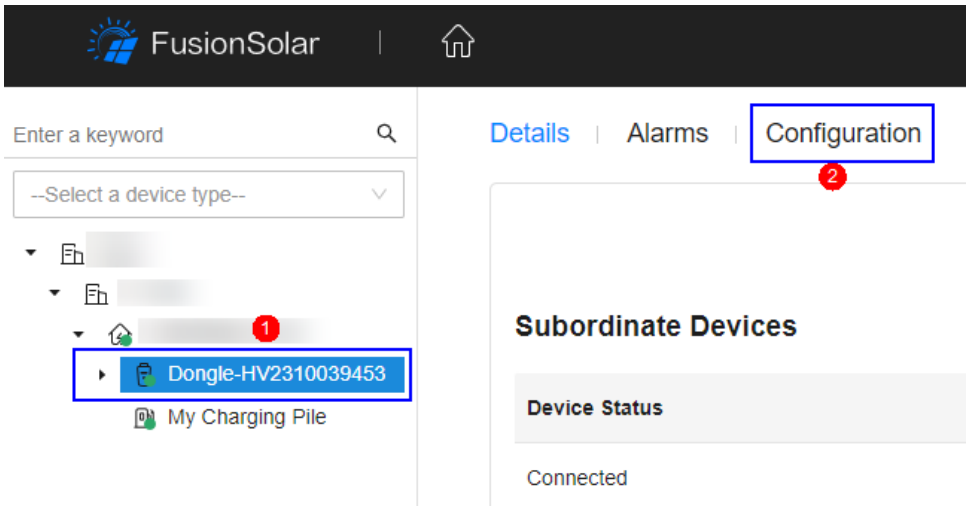


4. Click **Set**.

4.9 How Do I Configure the Dongle to Connect to a Third-Party Management System?

Procedure

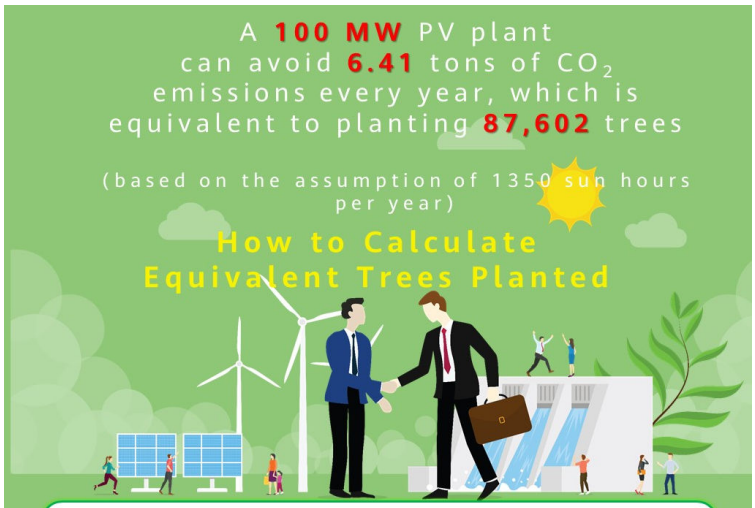
1. Choose **Monitoring** > **Monitoring** from the main menu.
2. In the navigation pane, select the WLAN/FE Smart Dongle in the PV+ESS +Charger plant and click **Configuration**.



3. In the Management System - 1 area, set parameters related to the third-party management system.
4. Click **Set**.

5 Reference

5.1 How to Calculate Carbon Emissions Avoided



Greenhouse gas emissions have increased global temperatures, leading to serious consequences such as sea level rise and extreme weather events (floods, droughts, hurricanes, etc.).

Unlike thermal power plants, PV power plants generate electricity without CO_2 emissions, which is equivalent to planting trees.

How much CO_2 can be avoided for each kilowatt-hour of electricity generated from PV? How many trees are equivalent to the CO_2 emissions avoided?

Fossil fuels saved and CO_2 emissions avoided *

If fossil fuels are used, 1 kWh of electricity consumes 400 g coal (international standard value), generating about 475 g CO_2 (global average value). When PV is used, no CO_2 is emitted.

Formula:

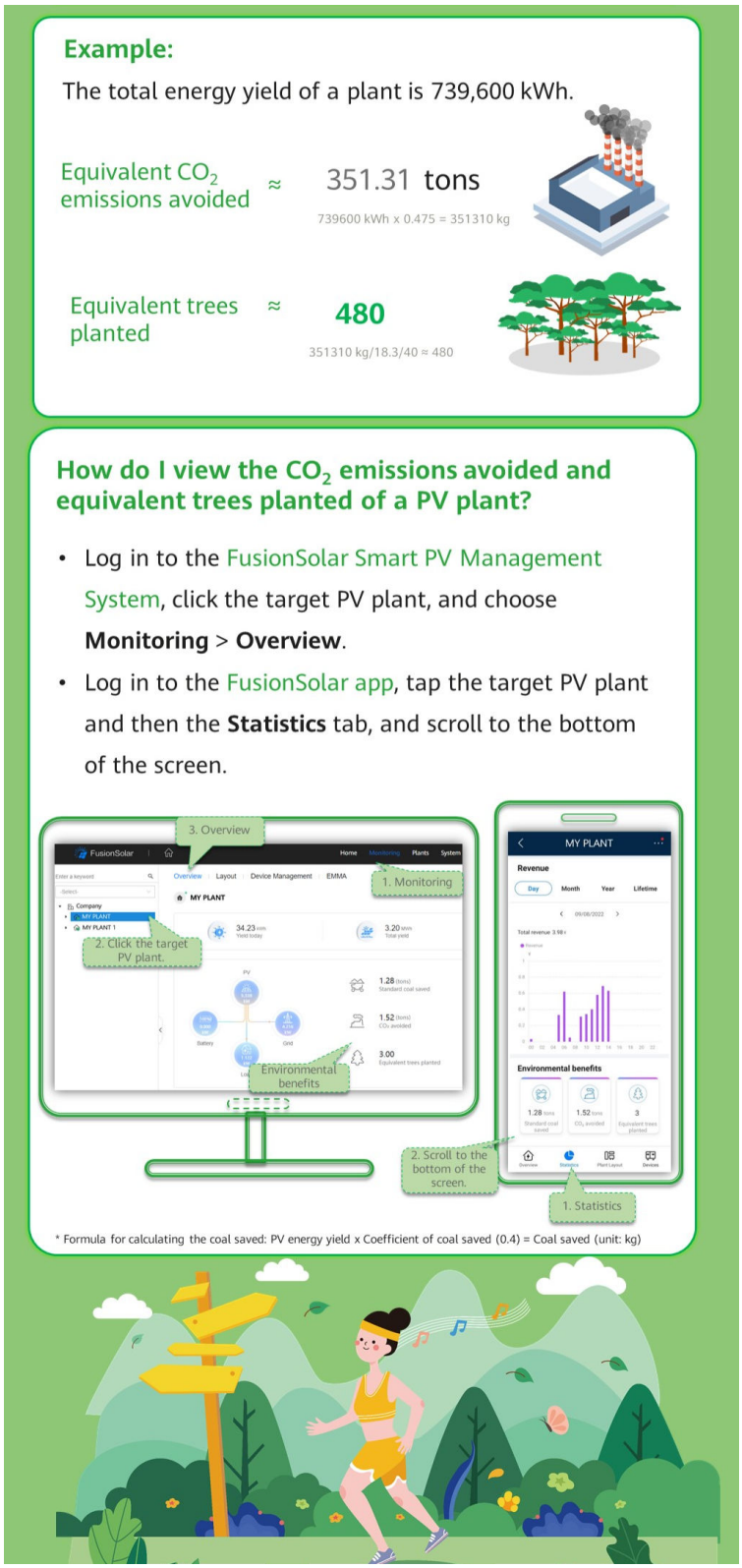
- PV energy yield x Coefficient of CO_2 emissions avoided (0.475) = CO_2 emissions avoided (unit: kg)

Equivalent trees planted

For example, if the lifecycle of a tree is 40 years, the average CO_2 that can be absorbed each year reaches 18.3 kg.

Formula:

- CO_2 emissions avoided/Coefficient of equivalent trees planted (18.3)/40 = Equivalent trees planted


Example:
The total energy yield of a plant is 739,600 kWh.
Equivalent CO_2 emissions avoided ≈ 351.31 tons
739600 kWh x 0.475 = 351310 kg
Equivalent trees planted ≈ 480
351310 kg/18.3/40 ≈ 480
How do I view the CO_2 emissions avoided and equivalent trees planted of a PV plant?
• Log in to the FusionSolar Smart PV Management System, click the target PV plant, and choose Monitoring > Overview.
• Log in to the FusionSolar app, tap the target PV plant and then the Statistics tab, and scroll to the bottom of the screen.
3. Overview
1. Monitoring
2. Click the target PV plant.
Environmental benefits
MY PLANT
Revenue
Environmental benefits
2. Scroll to the bottom of the screen.
1. Statistics
* Formula for calculating the coal saved: PV energy yield x Coefficient of coal saved (0.4) = Coal saved (unit: kg)

5.2 Environment Parameters

Parameter	Unit	Definition	Formula	PV+Storage	PV-Only	Storage-Only	Remarks
Global irradiation	kWh/m²	Total solar radiation energy measured by an environmental monitoring instrument (EMI).	/	Optional	Optional	Optional	An EMI is required.
Average temperature	°C	Average ambient temperature measured by the EMI in the plant.	/	Optional	Optional	Optional	
CO_2 avoided	kg	Amount of CO_2 emitted by burning fossil fuel to produce the same amount of power generated by the plant. 1 kWh of power is equivalent to about 475 g of CO_2 emission (global average value).	Energy yield (kWh) of the plant x per kWh CO_2 emission (0.475)	Supported	Supported	Not supported	If the value changes, contact the system administrator to modify the value.
Equivalent trees planted	N/A	Number of trees that can absorb the amount of CO_2 avoided by the plant. A tree absorbs 18.3 kg of CO_2 in one year and has a lifespan of 40 years.	CO_2 avoided/CO_2 absorbed by a tree in one year (18.3)/40	Supported	Supported	Not supported	

Parameter	Unit	Definition	Formula	PV+Storage	PV-Only	Storage-Only	Remarks
Standard coal saved	kg	Amount of standard coal needed to produce the amount of PV power generated by the plant. 0.4 kg of standard coal is needed to produce 1 kWh of power.	Energy yield (kWh) of the plant x Standard coal needed per kWh (0.4)	Supported	Supported	Not supported	

5.3 Power Parameters

Parameter	Unit	Definition	Formula	PV+Storage	PV-Only	Storage-Only	Remarks
Total string capacity	kWp	Total capacity of PV arrays installed in the PV plant.	Total capacity of the strings connected to all inverters	Supported	Supported	Not supported	This parameter is configured during plant creation.
Power per MWp	kW/MWp	Power generated per MWp.	Active power/Total string capacity x 1000	Supported	Supported	Not supported	-

Parameter	Unit	Definition	Formula	PV+Storage	PV-Only	Storage-Only	Remarks
Theoretical yield (daily/monthly/yearly)	kWh	Theoretical amount of power that can be generated by the PV arrays installed in a plant.	Hourly: Hourly global irradiation x String capacity Daily: Daily irradiation x String capacity Monthly: Total theoretical yield of each day in a month Yearly: Total theoretical yield of each month in a year	Supported	Supported	Not supported	An EMI is required.
PV output power	kW	Total output power of PV arrays.	PV output power	Supported	Supported	Not supported	-
PV yield	kWh	Total yield of PV arrays in a given reporting period.	Hourly: PV yield each hour Daily: PV yield each day Monthly: Total yield of each day in a month Yearly: Total yield of each month in a year	Supported	Supported	Not supported	-

Parameter	Unit	Definition	Formula	PV+Storage	PV-Only	Storage-Only	Remarks
Inverter yield	kWh	Yield of a plant.	Hourly: Inverter output energy each hour Daily: Inverter output energy each day Monthly: Total inverter output energy of each day in a month Yearly: Total inverter output energy of each month in a year	Supported	Supported	Supported	-
Total yield	kWh	Total output energy of the PV plant throughout the lifetime.	Total PV energy yield	Supported	Supported	Not supported	-
Performance ratio	%	Ratio of measured output energy to total irradiation received by the plant.	PV energy yield/ Theoretical energy yield	Supported	Supported	Not supported	An EMI is required
Specific yield	kWh/kWp	Ratio of the energy yield to the total string capacity.	PV energy yield/Total PV string capacity	Supported	Supported	Not supported	-

Parameter	Unit	Definition	Formula	PV+Storage	PV-Only	Storage-Only	Remarks
Consumption (daily/monthly/yearly)	kWh	Power consumed by the loads during a given reporting period.	Daily: Amount of power consumed by the loads each day Monthly: Total amount of power consumed by the loads each day in a month Yearly: Total amount of power consumed by the loads each month in a year	Supported	Supported	Supported	-
Feed-in to grid (daily/monthly/yearly)	kWh	Amount of power fed to the power grid from the plant in a give reporting period.	Daily: Amount of power fed to the grid from the plant each day Monthly: Total amount of power fed to the grid from the plant each day in a month Yearly: Total amount of power fed to the grid from the plant each month in a year	Supported	Supported	Supported	A power meter is required. Otherwise, the amount of power purchased from or fed to the grid cannot be displayed.

Parameter	Unit	Definition	Formula	PV+Storage	PV-Only	Storage-Only	Remarks
Supply from grid (daily/monthly/yearly)	kWh	Amount of power purchased from the grid in a given reporting period.	Daily: Amount of power purchased from the grid each day Monthly: Total amount of power purchased from the grid each day in a month Yearly: Total amount of power purchased from the grid each month in a year	Supported	Supported	Supported	
Self-consumption (daily/monthly/yearly)	kWh	PV energy consumed by loads and charged to batteries. It includes the amount of PV power consumed directly by loads and the amount of PV power stored in batteries.	Daily: Daily PV yield – Daily feed-in to grid Monthly: Total amount of self-consumed power of each day in a month Yearly: Total amount of self-consumed power of each month in a year	Supported	Supported	Not supported	-

Parameter	Unit	Definition	Formula	PV+Storage	PV-Only	Storage-Only	Remarks
Self-supplied power (daily/monthly/yearly)	kWh	Load consumption from PV. It includes the amount of PV power consumed directly by loads and the amount of PV power discharged from batteries.	Daily: Daily power consumption – Daily supply from grid Monthly: Total amount of self-supplied power of each day in a month Yearly: Total amount of self-supplied power of each day month in a year	Supported	Supported	Not supported	-
Load power	kW	Load consumption power.	Load consumption power	-	-	-	Supported when loads exist. Not supported when no load exits.

Parameter	Unit	Definition	Formula	PV+Storage	PV-Only	Storage-Only	Remarks
Self-consumption power	kW	Power of PV energy consumed locally.	When feeding to the grid: PV output power – Feed-in power When purchasing power from the grid: PV output power	Supported	Supported	Not supported	When the active power of the bi-directional meter is a positive value, the power is the feed-in power. When the active power of the bi-directional meter is a negative value, the power is the power of supply from the grid.

Parameter	Unit	Definition	Formula	PV+Storage	PV-Only	Storage-Only	Remarks
Battery charge/ discharge power	kW	Battery charge/ discharge power.	Battery charge/ discharge power	Supported	Not supported	Supported	If the symbol before the power value is +, the battery is charging. If the symbol before the power value is –, the battery is discharging.
Yield loss due to curtailment	kWh	Energy yield loss caused by power limitation at the grid-connection point.	Theoretical yield x Performance ratio – Actual PV yield	Supported	Supported	Not supported	An EMI is required.
Revenue loss due to curtailment	-	Loss of revenue due to power limitation.	Yield loss due to curtailment x Feed-in tariff	Supported	Supported	Not supported	If the price unit is inconsistent with the local type, contact the company administrator to

Parameter	Unit	Definition	Formula	PV+Storage	PV-Only	Storage-Only	Remarks
PV revenue	-	Revenues from photovoltaic power generation. It consists of two parts, which are revenue of power fed in to the grid and the saved electricity bills. Electricity prices need to be configured.	Revenue of power fed in to the grid (power fed to the grid x feed-in tariff) + Saved electricity bills (self-supplied power x electricity price)	Supported	Supported	Not supported	change the currency. For details, see **3.7.1.3 Configuring Company Information**.
On-grid duration	h	The time period during which the inverter is connected to the power grid.	Daily: daily on-grid duration Monthly: total daily on-grid durations in a month Year: total monthly on-grid durations in a year	Supported	Supported	Not supported	The string capacity needs to be configured. If the string capacity is not configured, the calculated on-grid duration will be inaccurate.
Peak Power	kW	Maximum active power of a plant in a statistical period.	Maximum active power of a plant in a statistical period	Supported	Supported	Supported	-

Parameter	Unit	Definition	Formula	PV+Storage	PV-Only	Storage-Only	Remarks
Load Rate	%	Ratio of the peak power to the string capacity of a plant in a statistical period.	Daily: Daily peak power/ String capacity Monthly: Monthly peak power/String capacity Yearly: Yearly peak power/ String capacity	Supported	Supported	Not supported	The string capacity needs to be configured. The load rate can be calculated only when the string capacity is configured.
Planned Yield	kWh	Planned energy yield in a statistical period.	Planned energy yield in a statistical period	Supported	Supported	Not supported	Contact the system administrator to configure the planned yield.
Plan Completion Rate	%	Ratio of the actual feed-in energy to the planned yield of a plant in a statistical period.	Monthly: Monthly feed-in energy/ Planned monthly yield Yearly: Yearly feed-in energy/ Planned yearly yield	Supported	Supported	Not supported	

NOTE

Unless otherwise specified, the energy yield in this document refers to AC power yield.

5.4 Battery Control Parameters

Battery parameter settings

Table 5-1 Battery parameters

Parameter Name	Description
Maximum charge power (kW)	Retain this parameter to the maximum charge power. Additional configuration is not required.
Maximum discharge power (kW)	Retain this parameter to the maximum discharge power. Additional configuration is not required.
End-of-charge SOC (%)	Set the charge cutoff capacity.
End-of-discharge SOC (%)	Set the discharge cutoff capacity. If the battery is not charged in a timely manner, the battery capacity will attenuate irreversibly. The resulting battery faults are not covered under warranty. You are advised not to set End-of-discharge SOC to 0.
Charge from grid	If **Charge from grid** function is disabled by default, comply with the grid charge requirements stipulated in local laws and regulations when this function is enabled.
Grid charge cutoff SOC (%)	Set the grid charge cutoff SOC.

Table 5-2 Battery working mode description

Parameter Name	Description
Maximum self-consumption	This mode applies to areas where the electricity price is high, or areas where the FIT subsidy is low or unavailable. Excess PV energy is stored in batteries. When PV power is insufficient or no PV power is generated at night, batteries discharge to supply power to the loads, improving the self-consumption rate of the PV system and the self-sufficiency rate of residential energy, and reducing electricity costs.

Parameter Name	Description
Fully fed to grid	This mode applies to the grid-tied scenario where PV energy is fully fed to the grid. This mode maximizes the PV energy for grid connection. When the generated PV energy in the daytime is greater than the maximum output capability of the inverter, the batteries are charged to store energy. When the PV energy is less than the maximum output capability of the inverter, batteries discharge to maximize the output energy of the inverter to the grid.
TOU	This mode applies to scenarios where the price difference between peak and off-peak hours is large. You can manually set the charging and discharging time period, for example, the charging time period when the electricity price is low at night, to save electricity costs. Priority of excess PV energy: ● Charge preference: When the PV power is greater than the load power, the excess PV energy is used to charge batteries. After the charge power reaches the maximum value or the battery is fully charged, the excess PV energy is fed to the grid. ● Fed to grid preference: When the PV power is greater than the load power, the excess PV energy is preferentially fed to the grid. After the inverter output power reaches the maximum value, the excess PV energy is used to charge batteries. (Applicable to scenarios where the FIT is higher than the electricity price. Batteries are used only for backup power.) Maximum charge power of grid (kW): Specifies the maximum charge power allowed by the grid, which is determined by the local power grid company. If there is no requirement, the default maximum value configured on the ESS is used.

Table 5-3 Description of forced charge/discharge parameters

Parameter Name	Description
Charge/Discharge	Specifies whether to charge or discharge the battery.
Charge/Discharge power (kW)	Specifies the forced charge/discharge power.
Charge/Discharge setting mode	Set the charge and discharge mode.
Charge/Discharge duration (min)	Sets the charge and discharge duration.

Parameter Name	Description
Remaining charge/ discharge duration (min)	Indicates the remaining charge and discharge duration. This parameter cannot be set.
Charged/ Discharged energy (kWh)	Indicates the charged or discharged battery level. This parameter cannot be set.
Charged/ Discharged duration (min)	Indicates the charged and discharged duration. This parameter cannot be set.

Table 5-4 Feature parameter

Parameter Name	Description
Off-grid mode	If this parameter is set to **Enable**, the ESS switches to the off-grid mode when the grid fails.
Backup power SOC	If the battery SOC reaches the set value, the battery stops discharging.

Capacity Control Parameters (Peak Shaving)

The Peak Shaving function can reduce the maximum peak power obtained from the grid during peak hours by configuring the power supply power in self-use mode or TOU mode, thereby reducing power consumption costs.

Parameter	Description	Range
Capacity control	1. Before enabling **Capacity control**, set **Charge from grid** to **Enable**. 2. Before disabling **Charge from grid**, set **Capacity control** to **Disable**.	• Disable • Active capacity limit
Backup power SOC for peak shaving (%)	The value of this parameter affects the peak shaving capability. A larger value indicates stronger peak shaving capability.	[0.0, 100.0] Backup power SOC for peak shaving > Backup power SOC (when BackUp is enabled) > End-of-discharge SOC
Start date	• Set the peak power range based on the start time and end time. The peak power is	-
End dete		

Parameter	Description	Range
Peak power (kW)	configured based on electricity prices in different time segments. You are advised to set the peak power to a low value when the electricity price is high. • A maximum of 14 time segments are allowed.	[0.000, 1000.000]

NOTE

- The capacity control function is unavailable when the energy storage working mode is set to **Fully fed to grid**.
- When capacity control has been enabled, you must first disable capacity control and then set the energy storage working mode to **Fully fed to grid**.

5.5 Acronyms and Abbreviations

A	
AC	Alternating Current
AFCI	Arc-Fault Circuit Interrupter
API	Application Platform Interface
APP	Application
C	
CMU	Central Monitoring Unit
D	
DC	Direct Current
DCDC	Direct Current Distribution Box
E	
EMI	Environmental Monitoring Instrument
ESM	Energy Storage Module
ESC	Energy Storage Controller
ESU	Energy Storage Unit
ESR	Energy Storage Rack
ESS	Energy Storage System

F	
FTP	File Transfer Protocol
H	
HTTPS	Hypertext Transfer Protocol Secure
I	
IV	Current-Voltage
K	
KPI	Key Performance Indicator
M	
MPPT	Maximum Power Point Tracking
N	
NAT	Network Address Translation
NCU	Network Control Unit
NTP	Network Time Protocol
P	
PV	Photovoltaic
PCS	Power Control System
PID	Potential Induced Degradation
S	
SDS	Smart DC System
SN	Serial Number
SMTP	Simple Mail Transfer Protocol
SOC	State Of Capacity
SOH	State Of Health
SSL	Secure Sockets Layer
T	
TCP	Transmission Control Protocol
TCU	Tracker Control Unit
TLS	Transport Layer Security

U	
UDP	User Datagram Protocol
URL	Universal Resource Locator
UTC	Coordinated Universal Time