iMaster NetEco
V600R022C00

Smart I-V Curve Diagnosis User Manual

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About This Document

Purpose

This document describes the Smart I-V Curve Diagnosis function of the Smart PV Management System (SmartPVMS), and provides solutions to common faults.

Intended Audience

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

Symbol Conventions

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

Symbol	Remarks
DANGER	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.

Symbol	Remarks
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 updates made in previous issues.

02 (2022-07-15)

This issue is the second official release of iMaster NetEco V600R022C00.

01 (2022-04-12)

This issue is the first official release of iMaster NetEco V600R022C00.

Contents

1 Function Description

Functions

Smart I-V Curve Diagnosis allows Huawei inverters to scan PV strings and generate an I-V curve, which is then analyzed simultaneously in the Smart PV Management System (SmartPVMS) to diagnose PV strings and generate alarms for faulty PV modules.

A large number of PV plant statistics show that PV module quality and faults are important factors that affect energy yields. As the PV industry is becoming mature, how to identify faulty PV modules in a convenient and efficient way and how to take appropriate measures to rectify faults are the key to increasing energy yields and decreasing investment risks, and are also the development trend of operation and maintenance (O&M).

Smart I-V Curve Diagnosis helps scan and diagnose the PV strings connected to an inverter or in an entire PV plant to detect faults and risks and ensure plant safety. In addition, the operation wizard makes O&M easier and faster.

Features

- Promptly detecting faults and risks of PV modules
  - All PV modules in a PV plant are scanned periodically through annual inspection, which helps promptly detect faulty PV modules. Timely processing of faulty PV modules helps improve energy yields and prevents faults from escalating.
  - PV strings are scanned in real time for any output exceptions to detect faults and risks.
  - SmartPVMS analyzes the data simultaneously, which has little impact on energy yields and ensures high reliability.
- Improving the O&M efficiency
  - Wizard-based remote operation is supported.
  - I-V curves are analyzed automatically.
  - Reports are generated automatically.
  - Rectification suggestions are provided for located faults to improve O&M quality and efficiency.

Key Performance Indicator

- Huawei inverter I-V scanning duration (string open circuit to short circuit) < 1s
- Huawei inverter I-V scanning resolution: 128 data points
- Huawei inverter I-V scanning voltage precision: 0.5%
- Huawei inverter I-V scanning current precision: 0.5%
- Scanning of a single inverter does not require the inverter to be shut down, so energy yields will barely be affected.

2 Supported Inverter Models

Equipment	Model	Version
Huawei commercial smart inverter	SUN2000-36KTL	SUN2000 V200R002C00SPC126 or later
	SUN2000-42KTL	
	SUN2000-50KTL	
	SUN2000-43KTL-IN-C1	
	SUN2000-50KTL-C1	
	SUN2000-33KTL-JP	
	SUN2000-40KTL-JP	
	SUN2000-55KTL-HV-D1	SUN2000HA V100R001C00SPC101 or later
	SUN2000-60KTL-HV-D1	
	SUN2000-55KTL-HV-D1-001	
	SUN2000-60KTL-HV-D1-001	
	SUN2000-55KTL-IN-HV-D1	
	SUN2000-70KTL-C1	SUN2000 V300R001C00SPC127 or later
	SUN2000-75KTL-C1	
	SUN2000-50KTL-M0	
	SUN2000-60KTL-M0	
	SUN2000-65KTL-M0	
	SUN2000-63KTL-JPM0	
	SUN2000-70KTL-INM0	

Equipment	Model	Version
	SUN2000-50KTL-JPM0	
	SUN2000-50KTL-JPM1	
	SUN2000-33KTL-JP	
	SUN2000-40KTL-JP	
	SUN2000-90KTL-H0	SUN2000HA V200R001C30SPC117 or later
	SUN2000-100KTL-H0	
	SUN2000-90KTL-H1	
	SUN2000-100KTL-H1	
	SUN2000-105KTL-H1	
	SUN2000-90KTL-H2	
	SUN2000-100KTL-H2	
	SUN2000-95KTL-INH0	
	SUN2000-95KTL-INH1	
	SUN2000-63KTL-JPH0	
	SUN2000-100KTL-USH0	
	SUN2000-100KTL-H1	
	SUN2000-63KTL-JPH0	
	SUN2000-100KTL-H2	
	SUN2000-105KTL-H1	
	SUN2000-90KTL-H2	
	SUN2000-95KTL-INH1	
	SUN2000-175KTL-H0	SUN2000HA V300R001C00SPC128 or later
	SUN2000-185KTL-INH0	
	SUN2000-185KTL-H1	
	SUN2000-196KTL-H0	
	SUN2000-200KTL-H2	
	SUN2000-215KTL-H0	
	SUN2000-193KTL-H0	
	SUN2000-196KTL-H1	
	SUN2000-125KTL-JPH0	

Equipment	Model	Version
	SUN2000-196KTL-H3	
	SUN2000-200KTL-H3	
	SUN2000-215KTL-H3	
	SUN2000-125KTL-JPH1	
	SUN2000-100KTL-M0	SUN2000 V500R001C00SPC120 or later
	SUN2000-110KTL-M0	
	SUN2000-125KTL-M0	
	SUN2000-100KTL-M1	
	SUN2000-100KTL-INM0	
	SUN2000-111KTL-NHM0	
	SUN2000-75KTL-M1	
Huawei distributed smart inverters	SUN2000-4.95KTL-JPL1	SUN2000L V200R001C00SPC120 or later
	SUN2000-4.95KTL-NHL2	
	SUN2000-2KTL-L1	
	SUN2000-3KTL-L1	
	SUN2000-3.68KTL-L1	
	SUN2000-4KTL-L1	
	SUN2000-4.6KTL-L1	
	SUN2000-5KTL-L1	
	SUN2000-6KTL-L1	
	SUN2000-3KTL-M0	SUN2000MA V100R001C00SPC142 or later
	SUN2000-3KTL-M1	
	SUN2000-4KTL-M0	
	SUN2000-4KTL-M1	
	SUN2000-5KTL-M0	
	SUN2000-5KTL-M1	
	SUN2000-6KTL-M0	
	SUN2000-6KTL-M1	
	SUN2000-8KTL-M0	
	SUN2000-8KTL-M1	

Equipment	Model	Version
	SUN2000-10KTL-M0	
	SUN2000-10KTL-M1	
	SUN2000-12KTL-M0	
	SUN2000-12KTL-M1	
	SUN2000-8KTL-M2	
	SUN2000-10KTL-M2	
	SUN2000-12KTL-M0	
	SUN2000-12KTL-M2	
	SUN2000-15KTL-M0	
	SUN2000-15KTL-M2	
	SUN2000-17KTL-M0	
	SUN2000-17KTL-M2	
	SUN2000-20KTL-M0	
	SUN2000-20KTL-M2	
	SUN2000-40KTL-M3	SUN2000MAV100R001C20SPC109 or later
	SUN2000-44KTL-M3	
	SUN2000-36KTL-M3	
	SUN2000-30KTL-M3	
	SUN2000-29.9KTL-M3	
	SUN2000-20KTL-M3	
	SUN2000-15KTL-M3	
	SUN2000-17KTL-M3	
	SUN2000-23KTL-M3	
	SUN2000-24.5KTL-M3	
	SUN2000-28KTL-M3	
	SUN2000-25KTL-NAM3	
	SUN2000-30KTL-NAM3	
	SUN2000-42KTL-M3	
	SUN2000-43KTL-INM3	
	SUN2000-50KTL-M3	

Equipment	Model	Version
	SUN2000-33KTL-NH	
	SUN2000-40KTL-NH	
	SUN2000-33KTL-NAM3	
	SUN2000-36KTL-NAM3	
	SUN2000-40KTL-NAM3	

3 Smart I-V Curve Diagnosis License Management

3.1 License Description

Description

Smart I-V Curve Diagnosis can be used only after a license is purchased. The license file for Smart I-V Curve Diagnosis is stored in a Huawei inverter. The inverter SN uniquely maps to the license.

The license for Smart I-V Curve Diagnosis is a fixed-term license. When the license goes beyond **License Deadline**, the system provides a warning asking the customer to replace it with a new license.

The license can still be used for 60 days (grace period) after the **License Deadline**. After the **Grace period** expires, the Smart I-V Curve Diagnosis function will be disabled.

NOTICE

- The SmartPVMS can be used to manage licenses for all inverters in multiple PV plants.
- The SmartLogger can be used to manage licenses for all inverters in a PV array.
- The FusionSolar app or SUN2000 app can be used to manage the license for a single Huawei commercial inverter.

License Application Procedure

1. The customer exports a license application file and sends it to a technical support engineer.
2. The technical support engineer transfers the obtained license file to the customer.

3. The customer imports and loads the license file to an inverter, thereby obtaining the permission to use the Smart I-V Curve Diagnosis function.

3.2 License Management on the SmartPVMS

Prerequisites

- You have logged in to the SmartPVMS as an installer.
- You have created a PV plant and added devices to the PV plant. The devices are running properly.

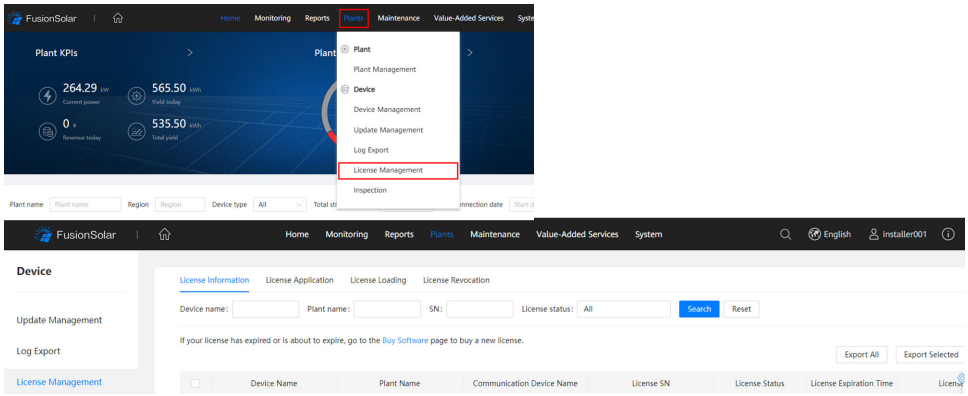
NOTE

The software version corresponding to the user interface (UI) snapshots in this section is iMaster NetEco V600R022C00. The UIs could vary with software versions and are for reference only.

Procedure

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

Figure 3-1 Device license management



Step 2 Perform operations according to **Table 3-1**.

Table 3-1 Operations related to license management

Task Name	Task Description	Procedure
Viewing license information	For routine O&M, the license validity and function usage are queried routinely to check whether the license is about to expire and solve the problems in a time manner. In this way, the device can function properly.	Navigate to the **License Information** tab page to view the license of the target device.
Exporting the license application file	The license application file contains the content required for applying the device license. Export the license application file to apply for a new device license if the license has expired.	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 technical support engineers to apply for a license file.
Loading a device license	If the license has not been loaded for the device or the license is about to expire, you need to load a new license file to the device so that the device functions properly.	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. **NOTE** A license file uniquely maps to a device SN. The license can be successfully loaded only if the license file uniquely maps to the device SN.

Task Name	Task Description	Procedure
Revoking a license	Before a device is replaced, the current device license needs to be revoked so that the revocation code can be generated and used for applying for a new device license. After the device is replaced, you can load the new license file to the device, and then the device functions properly.	1. On the **License Revocation** tab page, select one or multiple target devices and click **Revoke License**. 2. Revoke the device license as prompted. 3. After the license is revoked, click **Export All Revocation Codes**, or select one or multiple target devices and click **Export Selected Revocation Codes**. After obtaining the revocation codes, contact technical support engineers to apply for new license files using the ESNs and revocation codes of the current licenses.

----End

3.3 License Management Through the SmartLogger

Prerequisites

- You have logged in to the SmartLogger WebUI.
- Devices have been added to the SmartLogger and operate normally.
- You have logged in as an advanced user, a special user, or the admin user.

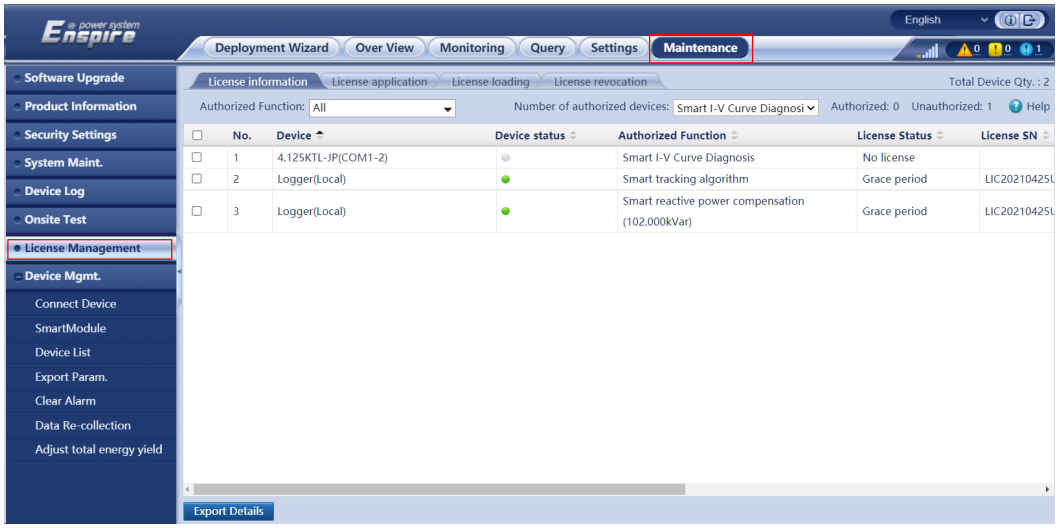
NOTE

The software version corresponding to the user interface (UI) snapshots in this section is SmartLogger3000 V300R001C00SPC060. The UIs could vary with software versions and are for reference only.

Procedure

Step 1 Choose **Maintenance** > **License Management** on the main menu.

Figure 3-2 License management



Step 2 Perform operations according to **Table 3-2**.

Table 3-2 Operations related to license management

Task Name	Task Description	Procedure
Querying license information	For routine O&M, the license validity and function usage are queried routinely to check whether the license is about to expire and solve the problems in a time manner. In this way, the device can function properly.	1. Choose **License information** to view the license information about the target device. 2. Select the target device and click **Export Details** to save the license information about the target device to the PC.
Exporting the license application file	The license application file contains the content required for applying the device license. Export the license application file to apply for a new device license if the license has expired.	1. Choose **License application**. 2. Select the target device (multiple devices can be selected) and click **Export License Appli File**.

Task Name	Task Description	Procedure
Loading a device license	If the license has not been imported for the device or the license is about to expire, you need to import the new license file to the device, ensuring that the device functions properly.	1. Choose **License loading**. 2. Click **Upload License** and select the license file to be imported. 3. Select the target device (multiple devices can be selected) and click **Load License** to load the device license. **NOTE** A license file uniquely maps to a device SN. The license can be successfully loaded only if the license file uniquely maps to the device SN.
Revoking a license	Before a device is replaced, the current device license needs to be revoked so that the revocation code can be generated and used for applying for a new device license. After the device is replaced, you can import the new license file to the device, and then the device functions properly.	1. Click **License revocation**. 2. Select the target device (multiple devices can be selected) whose license needs to be revoked. 3. Click **Revoke License**. 4. Enter the user password and click **Submit**. 5. Click **Export Revo Code File**. **NOTE** If you export revocation codes of devices whose **License Status** is **Normal**, the system will prompt you to re-select devices.

----End

3.4 License Management on the FusionSolar App or SUN2000 App

Prerequisites

- The solar inverter has been connected to the mobile phone installed with the FusionSolar app or SUN2000 app.
- You have logged in to the app as an advanced user or an installer user.
- The FusionSolar app or SUN2000 app can be used to manage the license for a single inverter at a time.

NOTE

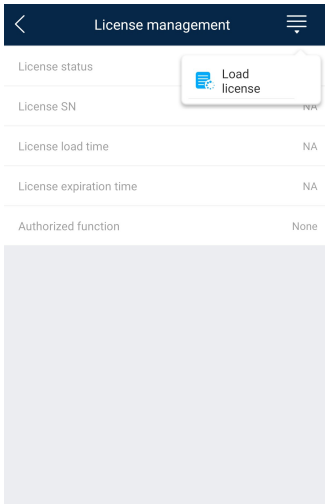
The software version corresponding to the user interface (UI) snapshots in this section is FusionSolar 5.7.011 and SUN2000 3.2.00.014. The UIs could vary with software versions and are for reference only.

Procedure

Step 1 Choose **Maintenance** > **License management** on the main menu.

Step 2 Tap  in the upper right corner of the screen.

Figure 3-3 License management



Step 3 Tap **Load license**.

Step 4 Select the license file to be loaded and confirm the loading.

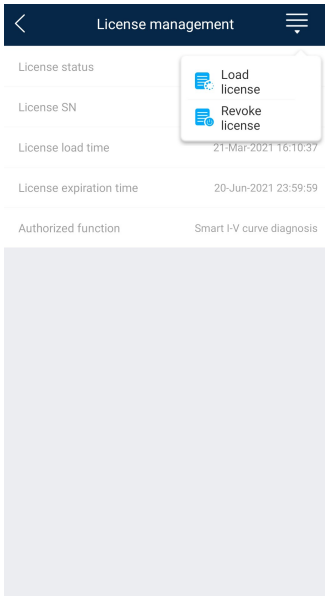
----End

Follow-up Procedure

Before a device is replaced, the current device license needs to be revoked so that the revocation code can be generated and used for applying for a new device license.

Step 1 Tap **Revoke license**.

Figure 3-4 Revoke license



Step 2 Tap **Export revocation code**.

----End

4 Smart I-V Curve Diagnosis

4.1 Smart I-V Curve Diagnosis on the SmartPVMS

Prerequisites

- You have logged in to the SmartPVMS as an installer.
- The Smart I-V Curve Diagnosis license has been loaded and is valid.

NOTE

The software version corresponding to the user interface (UI) snapshots in this section is iMaster NetEco V600R022C00. The UIs could vary with software versions and are for reference only.

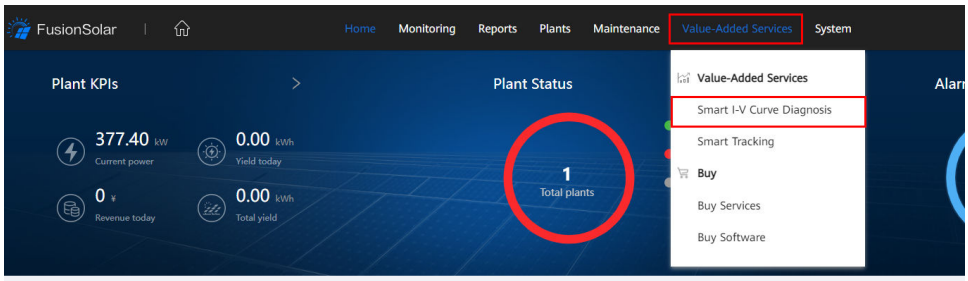
Context

To ensure accurate diagnosis results, you are advised to connect eight or more PV strings to an inverter.

Setting String Details

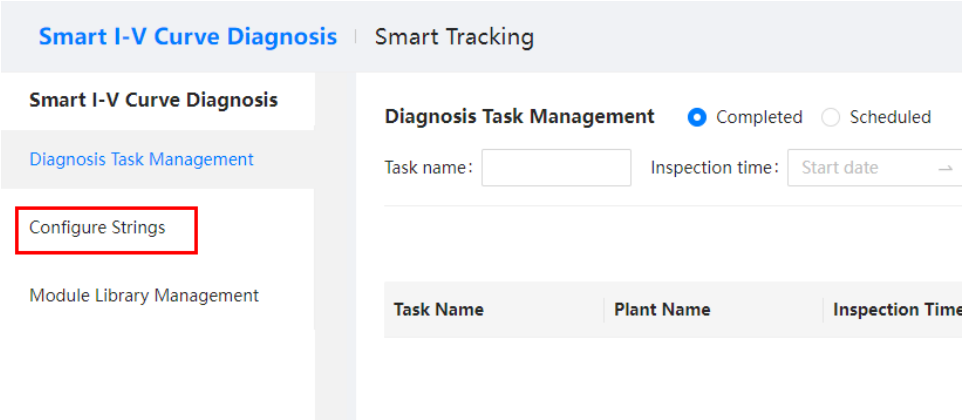
Step 1 Choose **Value-Added Services** > **Value-Added Services** > **Smart I-V Curve Diagnosis** from the main menu.

Figure 4-1 Smart I-V curve diagnosis



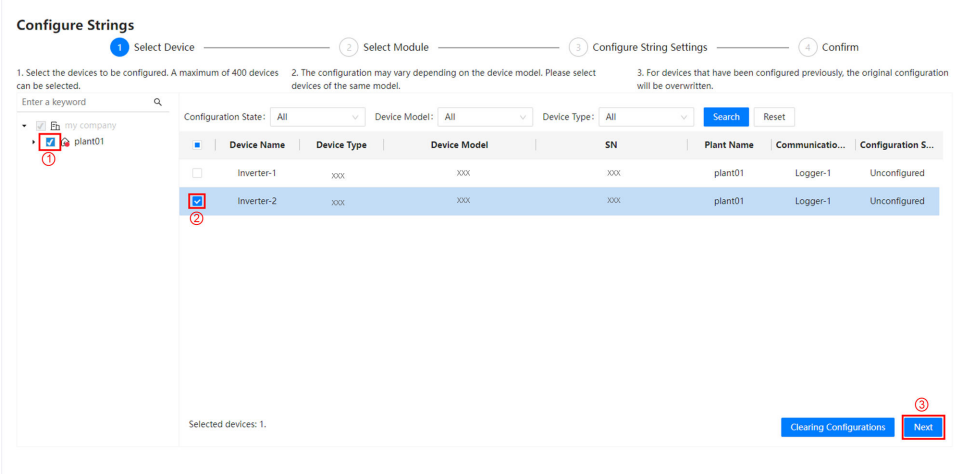
Step 2 Click **Configure Strings**.

Figure 4-2 String management



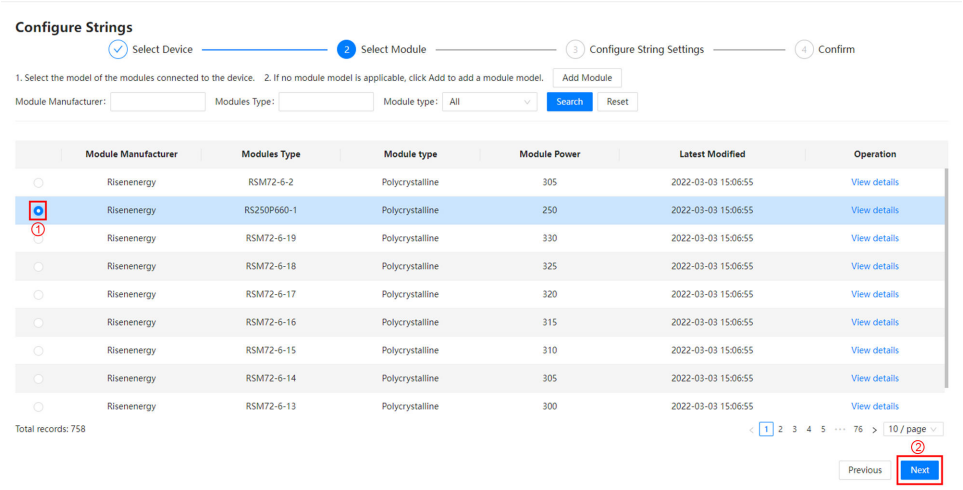
Step 3 Select the plant in the navigation tree on the left, select one or multiple target devices in the device list on the right, and click **Next**.

Figure 4-3 Selecting target devices



Step 4 Select the module model and click **Next**.

Figure 4-4 Selecting the module

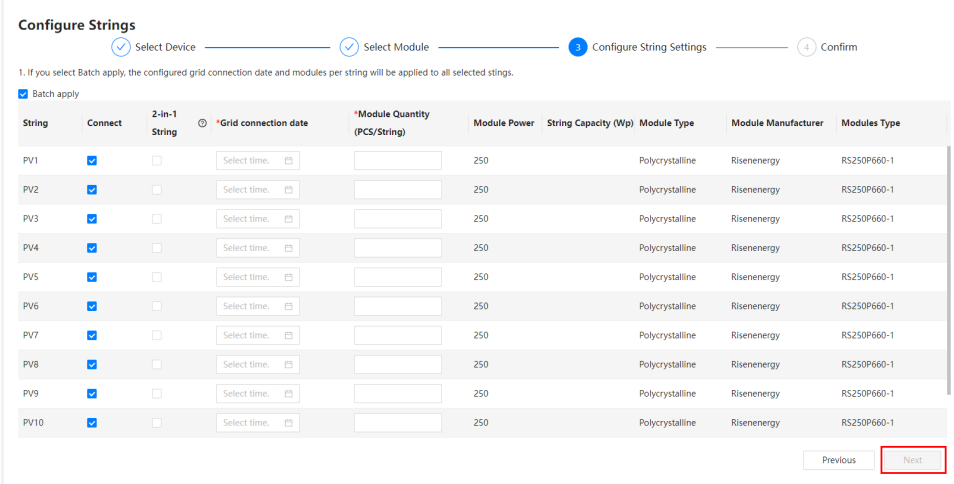


NOTE

Common modules have been preset in the management system. You can click **View details** to view module parameter details.

Step 5 Set string parameters as prompted and click **Next**.

Figure 4-5 Setting string parameters



NOTE

String capacity = Rated power of a PV module x Number of PV modules in a PV string.

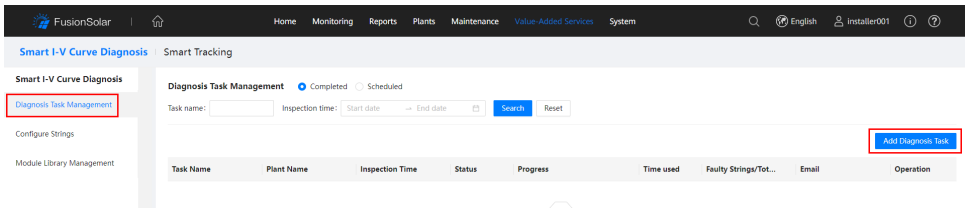
Step 6 Confirm that the string parameters are set correctly, and click **Finished**.

----End

Creating a Smart I-V Curve Diagnosis Task

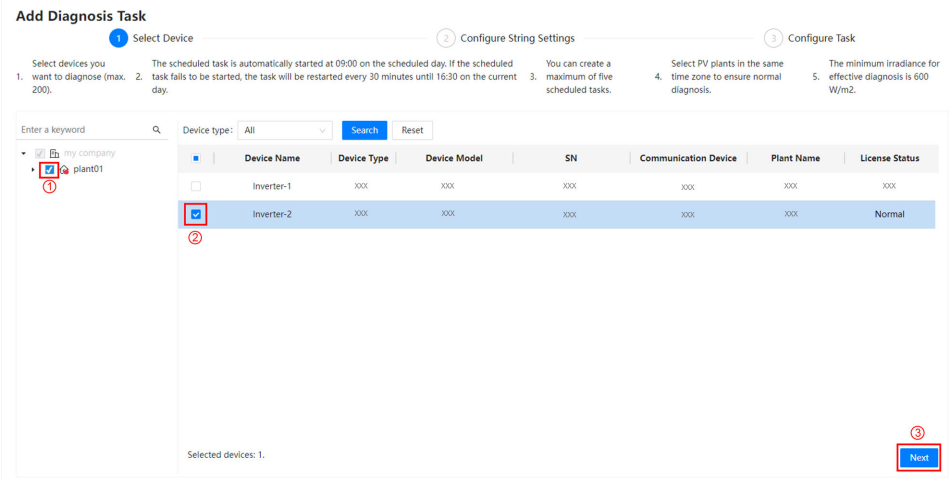
Step 1 Choose **Diagnosis Task Management** > **Add Diagnosis Task**.

Figure 4-6 Creating a diagnosis task



Step 2 Select the plant in the navigation tree on the left, select one or multiple target devices in the device list, and click **Next**.

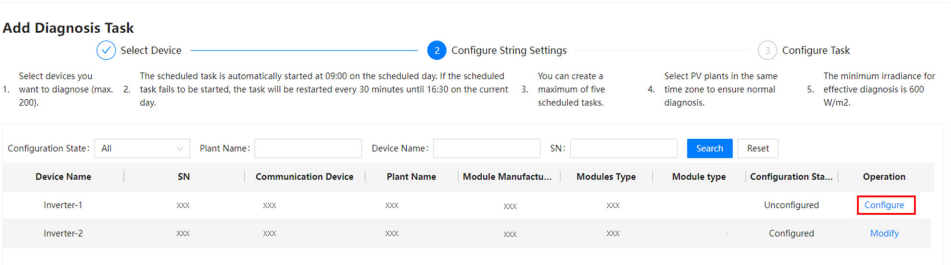
Figure 4-7 Selecting target devices



Step 3 Check whether 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**.

Figure 4-8 Configuring String Information



Step 4 Set I-V diagnosis task parameters and click **Finished**.

Figure 4-9 Setting task parameters

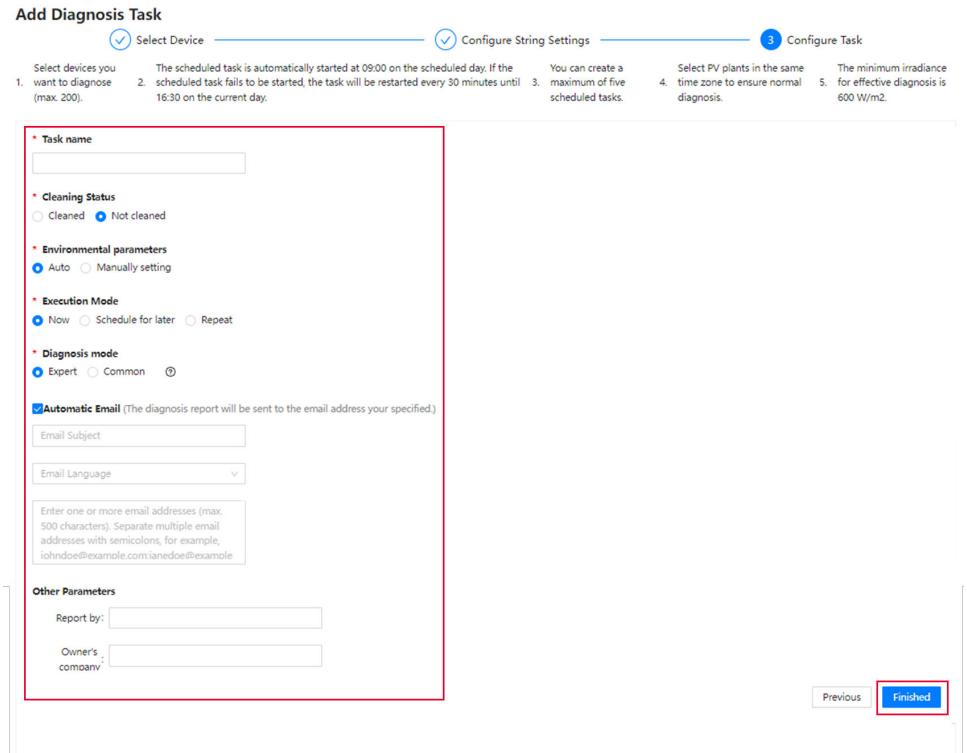


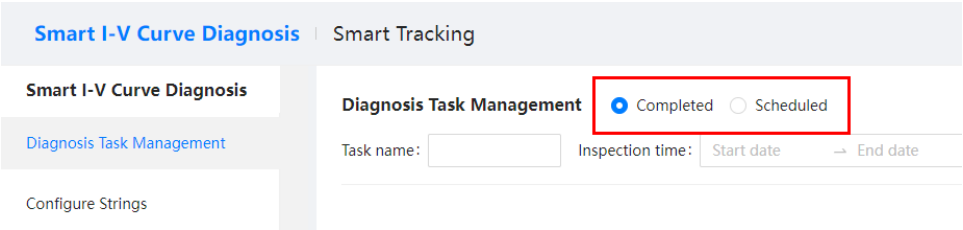
Table 4-1 Diagnosis task parameter description

Parameter	Description
Task name	Enter a task name.
Cleaning Status	Specify the cleaning status of strings. Select **Cleaned** or **Not cleaned** based on the actual cleaning status.
Environmental parameters	• Auto: 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.
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: Automatically learns from diagnosis results in the previous 24 hours and provides professional conclusions. • Common: Provides diagnosis that shows real-time fault status.

Parameter	Description
Automatic Email	After the related information is specified, diagnosis reports will be sent to the specified email address.
Other Parameters	Specify the information as required.

Step 5 On the **Diagnosis Task Management** page, you can view **completed** and **scheduled** tasks.

Figure 4-10 Viewing completed and scheduled tasks



----End

4.2 Viewing Smart I-V Curve Diagnosis Results on the SmartPVMS

Prerequisites

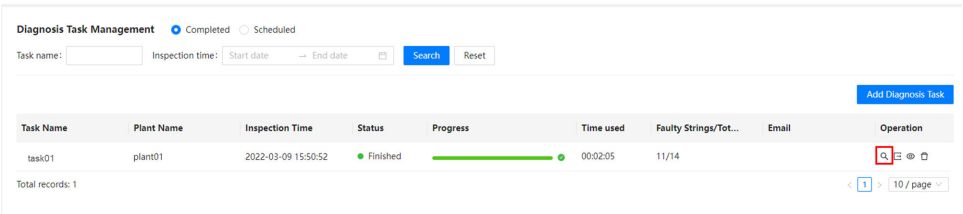
- You have logged in to the SmartPVMS as an installer.
- Smart I-V curve diagnosis has been completed.

NOTE

The software version corresponding to the user interface (UI) snapshots in this section is iMaster NetEco V600R022C00. The UIs could vary with software versions and are for reference only.

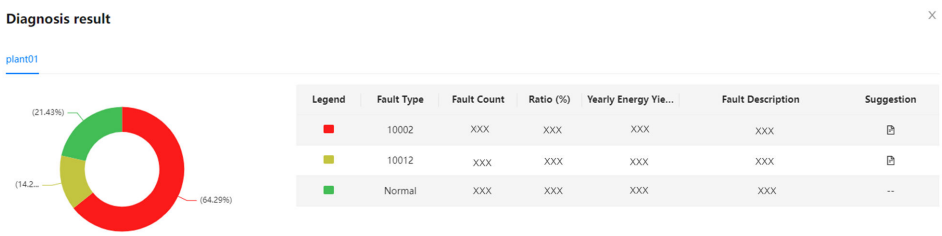
Viewing Diagnostics Results

Step 1 On the **Diagnosis Task Management** page, click to view the detailed diagnosis report.



- View the diagnosis results.

Figure 4-11 Diagnosis result



- In the **Inspection Details** area, click **View** to view the I-V curve data of a PV string.

Figure 4-12 Inspection details

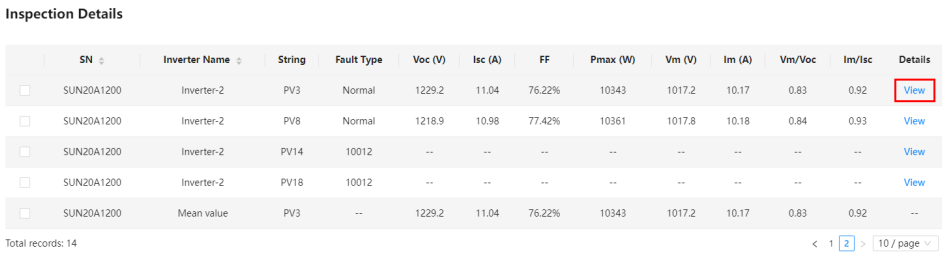
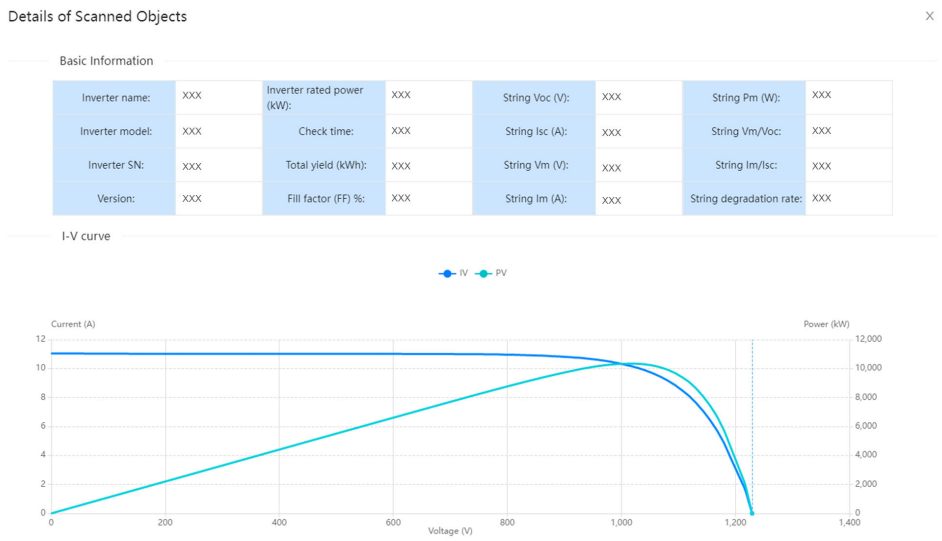
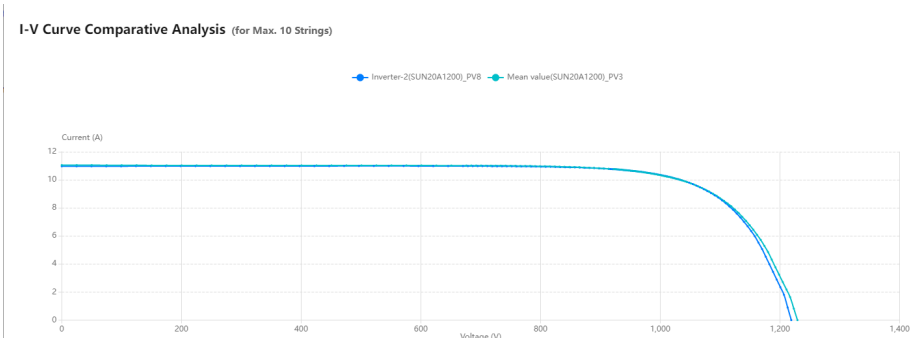


Figure 4-13 Smart I-V curve diagnosis



- In the **Inspection Details** area (as shown in **Figure 4-12**), select any PV string and the PV string marked as **Mean value**. In the **I-V Curve Comparative Analysis** area, you can view the I-V curve comparison analysis chart between the selected PV string and the median PV string.

Figure 4-14 String I-V curve comparison

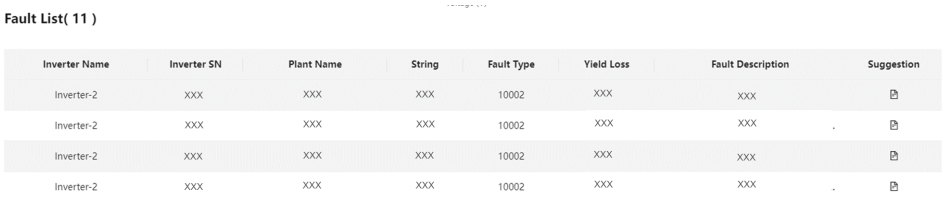


NOTE

Mean value refers to the median power of the strings connected to an inverter. (For example, in the case of 20 W, 30 W, 40 W, 50 W, and 60 W strings, the I-V curve of the 40 W string is the mean value curve.)

- In the **Fault List** area, view fault details.

Figure 4-15 Fault list

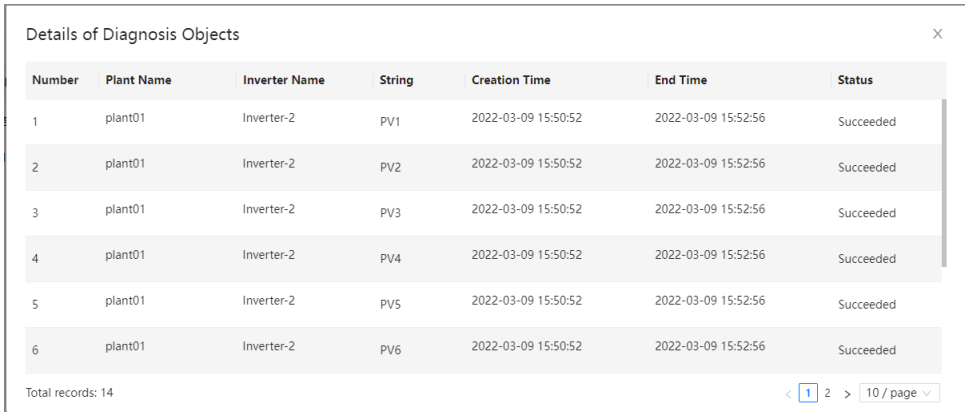


Fault List(11)

Inverter Name	Inverter SN	Plant Name	String	Fault Type	Yield Loss	Fault Description	Suggestion
Inverter-2	XXX	XXX	XXX	10002	XXX	XXX	
Inverter-2	XXX	XXX	XXX	10002	XXX	XXX	
Inverter-2	XXX	XXX	XXX	10002	XXX	XXX	
Inverter-2	XXX	XXX	XXX	10002	XXX	XXX	

Step 2 Click to view the diagnosis status.

Figure 4-16 Diagnosis status



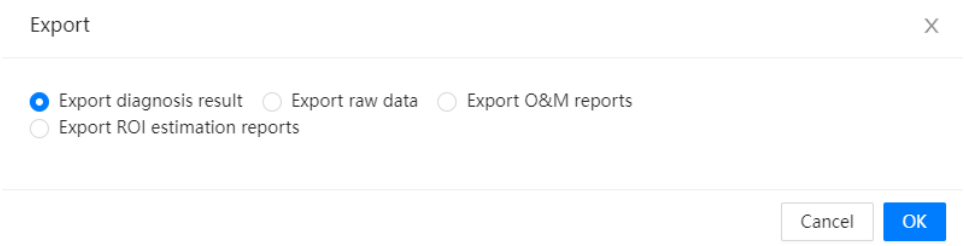
Details of Diagnosis Objects

Number	Plant Name	Inverter Name	String	Creation Time	End Time	Status
1	plant01	Inverter-2	PV1	2022-03-09 15:50:52	2022-03-09 15:52:56	Succeeded
2	plant01	Inverter-2	PV2	2022-03-09 15:50:52	2022-03-09 15:52:56	Succeeded
3	plant01	Inverter-2	PV3	2022-03-09 15:50:52	2022-03-09 15:52:56	Succeeded
4	plant01	Inverter-2	PV4	2022-03-09 15:50:52	2022-03-09 15:52:56	Succeeded
5	plant01	Inverter-2	PV5	2022-03-09 15:50:52	2022-03-09 15:52:56	Succeeded
6	plant01	Inverter-2	PV6	2022-03-09 15:50:52	2022-03-09 15:52:56	Succeeded

Total records: 14 1 2 10 / page

Step 3 Click to export reports.

Figure 4-17 Export



----End

5 License Fault Management Table

No.	Fault Symptom	Cause Analysis	Troubleshooting Methods
1	**Device License Management** is not displayed on the SmartPVMS WebUI.	The SmartPVMS software version does not support the license management function.	Upgrade the SmartPVMS.
2	Failed to export the license application file from the SmartPVMS.	1. Communication between the SmartPVMS client and server is abnormal. 2. The SmartPVMS server is abnormal.	1. Fix the communication between the SmartPVMS client and server. 2. Fix the SmartPVMS server.
3	The device list in the license application file exported from the SmartPVMS is incorrect.	The target device is incorrectly selected for exporting the license application file.	Select the correct target device and export the license application file again.
4	Failed to upload the license file to the SmartPVMS.	1. Communication between the SmartPVMS client and server is abnormal. 2. The SmartPVMS server is abnormal.	1. Fix the communication between the SmartPVMS client and server. 2. Fix the SmartPVMS server.

No.	Fault Symptom	Cause Analysis	Troubleshooting Methods
5	Failed to load the license file on the SmartPVMS.	1. The communication between the SmartLogger and the inverter is disconnected. 2. The communication between the SmartLogger and the SmartPVMS is disconnected. 3. The license file does not match the inverter SN. 4. The inverter software version does not support the license management function. 5. The SmartLogger software version does not support the license management function.	1. Fix the communication between the SmartLogger and the inverter. 2. Fix the communication between the SmartLogger and the SmartPVMS. 3. Contact the supplier or Huawei customer service center and purchase the Smart I-V Curve Diagnosis function or apply for a license. 4. Upgrade the inverter. 5. Upgrade the SmartLogger.
6	Failed to revoke the license on the SmartPVMS.	1. The communication between the SmartLogger and the inverter is disconnected. 2. The communication between the SmartLogger and the SmartPVMS is disconnected.	1. Fix the communication between the SmartLogger and the inverter. 2. Fix the communication between the SmartLogger and the SmartPVMS.
7	Failed to export the license revocation code file from the SmartPVMS.	1. Communication between the SmartPVMS client and server is abnormal. 2. The SmartPVMS server is abnormal.	1. Fix the communication between the SmartPVMS client and server. 2. Fix the SmartPVMS server.
8	The device list in the license revocation code file exported from the SmartPVMS is incorrect.	The target device is incorrectly selected for exporting the license revocation code file.	Select the correct target device and export the license revocation code file again.
9	Failed to export the license information code file from the SmartPVMS.	1. Communication between the SmartPVMS client and server is abnormal. 2. The SmartPVMS server is abnormal.	1. Fix the communication between the SmartPVMS client and server. 2. Fix the SmartPVMS server.

No.	Fault Symptom	Cause Analysis	Troubleshooting Methods
10	The device list in the license information file exported from the SmartPVMS is incorrect.	The target device is incorrectly selected for exporting the license information file.	Select the correct target device and export the license information file again.
11	**Device License Management** is not displayed on the SmartPVMS WebUI.	The SmartLogger software version does not support the license management function.	Upgrade the SmartLogger.
12	Failed to export the license application file from the SmartLogger.	The SmartLogger is abnormal.	Fix the SmartLogger.
13	The device list in the license application file exported from the SmartLogger is incorrect.	The target device is incorrectly selected for exporting the license application file.	Select the correct target device and export the license application file again.
14	Failed to upload the license file on the SmartLogger.	• The SmartLogger is abnormal. • The license file (package) name or format is abnormal.	• Fix the SmartLogger. • Contact the supplier or Huawei customer service center to obtain the license file (package).
15	Failed to load the license file on the SmartLogger.	1. The communication between the SmartLogger and the inverter is disconnected. 2. The license file does not match the inverter SN. 3. The inverter software version does not support the license management function. 4. The SmartLogger software version does not support the license management function.	1. Fix the communication between the SmartLogger and the inverter. 2. Contact the supplier or Huawei customer service center and purchase the Smart I-V Curve Diagnosis function or apply for a license. 3. Upgrade the inverter. 4. Upgrade the SmartLogger.
16	Failed to revoke the license on the SmartLogger.	The communication between the SmartLogger and the inverter is disconnected.	Fix the communication between the SmartLogger and the inverter.
17	Failed to export the license revocation code file from the SmartLogger.	The SmartLogger is abnormal.	Fix the SmartLogger.

No.	Fault Symptom	Cause Analysis	Troubleshooting Methods
18	The device list in the license revocation code file exported from the SmartLogger is incorrect.	The target device is incorrectly selected for exporting the license revocation code file.	Select the correct target device and export the license revocation code file again.
19	Failed to export the license information file from the SmartLogger.	The SmartLogger is abnormal.	Fix the SmartLogger.
20	The device list in the license information file exported from the SmartLogger is incorrect.	The target device is incorrectly selected for exporting the license information file.	Select the correct target device and export the license information file again.
21	Failed to load the license file on the app.	1. The inverter SN does not match the license file. 2. Communication between the app and inverter is disconnected.	1. Load the license file that matches the inverter SN. 2. Fix the communication between the app and inverter.
22	Failed to revoke the license file on the app.	1. The paired inverter is incorrect. 2. Communication between the app and inverter is disconnected.	1. Select the correct inverter for pairing. 2. Fix the communication between the app and inverter.

