### iMaster NetEco V600R022C00

## Smart I-V Curve Diagnosis User Manual

 Issue
 02

 Date
 2022-07-15





HUAWEI DIGITAL POWER TECHNOLOGIES CO., LTD.

#### Copyright © Huawei Digital Power Technologies Co., Ltd. 2022. All rights reserved.

No part of this document may be reproduced or transmitted in any form or by any means without prior written consent of Huawei Digital Power Technologies Co., Ltd.

#### **Trademarks and Permissions**

NUAWEI 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: <u>https://e.huawei.com</u>

## **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
	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	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
	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**

About This Document	ii
1 Function Description	1
2 Supported Inverter Models	3
3 Smart I-V Curve Diagnosis License Management	8
3.1 License Description	8
3.2 License Management on the SmartPVMS	9
3.3 License Management Through the SmartLogger	11
3.4 License Management on the FusionSolar App or SUN2000 App	
4 Smart I-V Curve Diagnosis	16
4.1 Smart I-V Curve Diagnosis on the SmartPVMS	16
4.2 Viewing Smart I-V Curve Diagnosis Results on the SmartPVMS	21
5 License Fault Management Table	25

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

Equipment	Model	Version	
	SUN2000-50KTL-JPM0		
	SUN2000-50KTL-JPM1		
	SUN2000-33KTL-JP		
	SUN2000-40KTL-JP		
	SUN2000-90KTL-H0		
	SUN2000-100KTL-H0		
	SUN2000-90KTL-H1		
	SUN2000-100KTL-H1		
	SUN2000-105KTL-H1		
	SUN2000-90KTL-H2		
	SUN2000-100KTL-H2		
	SUN2000-95KTL-INH0		
	SUN2000-95KTL-INH1	V200R001C30SPC117 or	
	SUN2000-63KTL-JPH0	later	
	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	
	SUN2000-185KTL-INH0	later	
	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		
	SUN2000-110KTL-M0	later		
	SUN2000-125KTL-M0			
	SUN2000-100KTL-M1			
	SUN2000-100KTL-INM0			
	SUN2000-111KTL-NHM0			
	SUN2000-75KTL-M1			
Huawei distributed	SUN2000-4.95KTL-JPL1	SUN2000L		
smart inverters	SUN2000-4.95KTL-NHL2	later		
	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		
	SUN2000-3KTL-M1	later		
	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	SUN2000MAV100R001C20S
	SUN2000-44KTL-M3	PC109 or later
	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.

🎁 FusionSolar 🕕 🔐	Home	Monitoring Reports	Plants Maintenance	Value-Added Services Syst					
Plant KPIs		Plant	Plant Plant Management	>					
264.29 w     Carreet power     0 v     Revenue today	5655.50 kv/h           Vielał today           535.50 kv/h           535.50 kv/h           Tread yield		Device     Device Management     Update Management     Log Export     License Management						
Plant name Plant name F	legion Region Device typ	e All v Total str	Inspection	innection date Start					
🎢 FusionSolar	⊢ ŵ	Home Mon	itoring Reports	Plants Maintenance	Value-Added Services	System	Q	🕐 English	은 installer001 (j)
Device	License Informatio	n License Application	License Loading L	icense Revocation					
Update Management	Device name:	Plant nam	ie:	SN: Lic	ense status: All	Search	Reset		
Log Export	If your license has	expired or is about to expire	e, go to the Buy Software	e page to buy a new license.				Export	All Export Selected
License Management		Device Name	Plant Name	Communication	Device Name	License SN	License Status	License Expiratio	n Time License

Figure 3-1 Device license management

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

Task Name	Task Description	Procedure
Viewing license informati on	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 <b>License Information</b> tab page to view the license of the target device.
Exporting the license applicati on 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.	<ol> <li>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.</li> <li>After exporting the application form, send it to technical support engineers to apply for a license file.</li> </ol>
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.	<ol> <li>On the License Loading tab page, click Upload License to upload license files.</li> <li>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.</li> <li>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.</li> </ol>

 Table 3-1 Operations related to license management

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.	<ol> <li>On the License Revocation tab page, select one or multiple target devices and click Revoke License.</li> <li>Revoke the device license as prompted.</li> <li>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.</li> </ol>

----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.

#### 

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.

e power system						English	~ (if)
Enspire		Deploym	ent Wizard Over View Moni	itoring Query S	Settings Maintenance		<u>A</u> <u>0</u> <u>1</u> <u>1</u>
<ul> <li>Software Upgrade</li> </ul>	Lic	ense info	rmation License application 🔨 Lice	ense loading 🗡 License i	revocation		Fotal Device Qty. : 2
Product Information	Auth	norized Fi	unction: All	Number of auth	orized devices: Smart I-V Curve Diagnosi 🗸	Authorized: 0 Unauth	orized: 1 🛛 😧 Help
<ul> <li>Security Settings</li> </ul>		No.	Device 🗢	Device status 🗘	Authorized Function 🗘	License Status 🗘	License SN 🗘
<ul> <li>System Maint.</li> </ul>		1	4.125KTL-JP(COM1-2)	0	Smart I-V Curve Diagnosis	No license	
Device Log		2	Logger(Local)	•	Smart tracking algorithm	Grace period	LIC20210425U
<ul> <li>Onsite Test</li> </ul>	0	3	Logger(Local)	•	Smart reactive power compensation (102.000kVar)	Grace period	LIC20210425L
License Management							
Device Mgmt.	•						
Connect Device	1						
SmartModule							
Device List							
Export Param.							
Clear Alarm							
Data Re-collection							
Adjust total energy yield							
							•
	Expo	rt Details					

Figure 3-2 License management

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

Task Name	Task Description	Procedure
Querying license informati on	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.	<ol> <li>Choose License information to view the license information about the target device.</li> <li>Select the target device and click Export Details to save the license information about the target device to the PC.</li> </ol>
Exporting the license applicati on 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.	<ol> <li>Choose License application.</li> <li>Select the target device (multiple devices can be selected) and click Export License Appli File.</li> </ol>

Table 3-2 Operations related to license management

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.	<ol> <li>Choose License loading.</li> <li>Click Upload License and select the license file to be imported.</li> <li>Select the target device (multiple devices can be selected) and click Load License to load the device license.</li> <li>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.     </li> </ol>
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.	<ol> <li>Click License revocation.</li> <li>Select the target device (multiple devices can be selected) whose license needs to be revoked.</li> <li>Click Revoke License.</li> <li>Enter the user password and click Submit.</li> <li>Click Export Revo Code File.</li> <li>NOTE         If you export revocation codes of devices whose License Status is Normal, the system will prompt you to re-select devices.     </li> </ol>

----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

agement 🗮
Load
NA NA
NA
NA
None

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.

#### D 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

Smart I-V Curve Diagnosis	Smart Tracking		
Smart I-V Curve Diagnosis	Diagnosis Task Ma	anagement 📀 Complete	d 🔘 Scheduled
Diagnosis Task Management	Task name:	Inspection time:	Start date →
Configure Strings			
Module Library Management	Task Name	Plant Name	Inspection Time

**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
------------	-----------	--------	---------

Configure Strings	Select De	vice —		2 Select	t Module	(3) C	Configure String Set	ttings ———	(4) Confin	m
1. Select the devices to be co can be selected.	nfigured. A	maximum	of 400 devices 2. T dev	he configuration may ices of the same mod	y vary depending on the device del.	model. Please select	3. For devic will be over	es that have been o written.	configured previously, t	he original configuratio
Enter a keyword	٩	Configura	ation State: All	V Dev	vice Model: All	V Device Type:	All	Search	Reset	
• 🚺 🖓 plant01			Device Name	Device Type	Device Model		SN	Plant Name	Communicatio	Configuration S
U			Inverter-1	XXXX	>>>		XXX	plant01	Logger-1	Unconfigured
			Inverter-2	XXXX	XXXC		XXX	plant01	Logger-1	Unconfigured
										3
		Selected	I devices: 1.						Clearing Config	jurations Next

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

gu	Select Device	(	2 Select Module	3 Configu	rre String Settings 4	Confirm
. Select the m	nodel of the modules connected	to the device. 2. If no module mo	del is applicable, click Add to add a r	nodule model. Add Module		
Iodule Manu	facturer:	Modules Type:	Module type: All	✓ Search Rese	t	
	Module Manufacturer	Modules Type	Module type	Module Power	Latest Modified	Operation
	Risenenergy	RSM72-6-2	Polycrystalline	305	2022-03-03 15:06:55	View details
0	Risenenergy	RS250P660-1	Polycrystalline	250	2022-03-03 15:06:55	View details
0	Risenenergy	RSM72-6-19	Polycrystalline	330	2022-03-03 15:06:55	View details
	Risenenergy	RSM72-6-18	Polycrystalline	325	2022-03-03 15:06:55	View details
	Risenenergy	RSM72-6-17	Polycrystalline	320	2022-03-03 15:06:55	View details
	Risenenergy	RSM72-6-16	Polycrystalline	315	2022-03-03 15:06:55	View details
	Risenenergy	RSM72-6-15	Polycrystalline	310	2022-03-03 15:06:55	View details
	Risenenergy	RSM72-6-14	Polycrystalline	305	2022-03-03 15:06:55	View details
	Risenenergy	RSM72-6-13	Polycrystalline	300	2022-03-03 15:06:55	View details
tal records: 7	758				< 1 2 3	4 5 ··· 76 > 10/page
						Previous Nex

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

Configu	ire Strings	Select Device –		Select Module		— 3 Configur	e String Settings —	(4) Ca	onfirm
1. If you sele	ct Batch apply, th	e configured grid o	connection date and modules pe	er string will be applied to all se	lected stings.				
String	Connect	2-in-1 String	*Grid connection date	*Module Quantity (PCS/String)	Module Power	String Capacity (Wp)	Module Type	Module Manufacturer	Modules Type
PV1			Select time.		250		Polycrystalline	Risenenergy	RS250P660-1
PV2			Select time.		250		Polycrystalline	Risenenergy	RS250P660+1
PV3			Select time.		250		Polycrystalline	Risenenergy	RS250P660-1
PV4			Select time.		250		Polycrystalline	Risenenergy	RS250P660-1
PV5			Select time.		250		Polycrystalline	Risenenergy	RS250P660-1
PV6			Select time.		250		Polycrystalline	Risenenergy	RS250P660-1
PV7			Select time.		250		Polycrystalline	Risenenergy	RS250P660-1
PV8			Select time.		250		Polycrystalline	Risenenergy	RS250P660-1
PV9			Select time.		250		Polycrystalline	Risenenergy	RS250P660-1
PV10			Select time.		250		Polycrystalline	Risenenergy	RS250P660-1
								Pr	evious Next

#### **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

🎢 FusionSolar 🛛 🕯	λ	Home Monitorin	g Reports	Plants	Maintenance	Value-Added Services	System	Q	🕐 English	음 installer001	i ?
Smart I-V Curve Diagnosis	Smart Tracking										
Smart I-V Curve Diagnosis Diagnosis Task Management	Diagnosis Task Manag Task name:	ement O Completed	O Scheduled	<ul> <li>End date</li> </ul>	e s	earch Reset					
Configure Strings										Add	Diagnosis Task
Module Library Management	Task Name	Plant Name	Inspection Tim	ne	Status	Progress	Time used	Faulty Strings/Tot	Email	0	peration

**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

Add Diagnosis Tasl	k								
1 Se	elect De	evice			— 2 Configu	ire String Settings		3 Configure T	lask 🛛
Select devices you 1. want to diagnose (max. 2 200).	The s task t day.	cheduled task is fails to be starte	s automatically starte d, the task will be res	d at 09:00 on the scher tarted every 30 minute	duled day. If the sched as until 16:30 on the cu	uled You can create a urrent 3. maximum of fiv scheduled tasks	e 4. time zone to ensure diagnosis.	ne same Th normal 5. eff W/	e minimum irradiance for fective diagnosis is 600 /m2.
Enter a keyword	۹	Device type:	All	✓ Search R	eset				
Fn my company     Im my company			Device Name	Device Type	Device Model	SN	Communication Device	Plant Name	License Status
0			Inverter-1	XXX	XXXX	XXXX	X0X	XXX	XXX
			Inverter-2	XXXX	XXXX	XXX	XOX	X00X	Normal
		0							
		Selected der	vices: 1.						Next

**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

Add Diagnosis Tas	<b>k</b> elect Device ———		2	Configure String Settings			3 Configure Tasl	¢
Select devices you     The scheduled task is automatically started at 09:00 on the scheduled day. If the scheduled     You can create a     Select PV plants in the same     The minimum irradiance for       1. want to diagnose (max.     2. task fails to be started, the task will be restarted every 30 minutes until 16:30 on the current     3. maximum of five     4. time zone to ensure normal     5. effective diagnosis is 600       200).     day.     www.met.     www.met.     www.met.     www.met.     W/m2.								
Configuration State: All	V Plant I	Jame :	Device Name:	SN:		Search	Reset	
Device Name	SN	Communication Device	Plant Name	Module Manufactu	Modules Type	Module type	Configuration Sta	Operation
Inverter-1	X00X	XXXX	X00X	2005.	X00X		Unconfigured	Configure
Inverter-2	X00X	2000	XXXX	300X	XOOX		Configured	Modify

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

#### Figure 4-9 Setting task parameters

d Diagnosis Task		
Select Device	🕢 Configure String Settings	3 Configure Task
elect devices you The scheduled task is automatically started at ant to diagnose 2. scheduled task fails to be started, the task will nax. 200). 16:30 on the current day.	09:00 on the scheduled day. If the You can create a be restarted every 30 minutes until 3. maximum of five scheduled tasks.	Select PV plants in the same The minimum irradian 4. time zone to ensure normal 5. for effective diagnosis diagnosis. 600 W/m2.
Task name		
Cleaning Status Cleaned Oleaned		
Environmental parameters		
Auto Manually setting		
Execution Mode		
Now Schedule for later Repeat		
Diagnosis mode		
Expert Common ③		
Automatic Email (The disonoris report will be cent to the email address)	weir marified)	
Email Subject	you specifica.	
Email Language V		
Enter one or more email addresses (max. 500 characters). Separate multiple email		
addresses with semicolons, for example,		
ther Parameters		
Report by:		
Owner's company		
		Previous Finished
		Previous

Table 4-1	Diagnosis	task	parameter	description
-----------	-----------	------	-----------	-------------

Parameter	Description						
Task name	Enter a task name.						
Cleaning Status	Specify the cleaning status of strings. Select <b>Cleaned</b> or <b>Not cleaned</b> based on the actual cleaning status.						
Environmental parameters	<ul> <li>Auto: The system automatically calculates the PV module plane irradiance and PV module backsheet surface temperature.</li> </ul>						
	<ul> <li>Manually setting: The PV module plane irradiance and PV module backsheet surface temperature need to be manually specified.</li> </ul>						
Execution Mode	<ul> <li>Now: The diagnosis task is executed immediately after being created.</li> </ul>						
	<ul> <li>Schedule for later: The scheduled diagnosis task is executed only once.</li> </ul>						
	<ul> <li>Repeat: The scheduled diagnosis task is executed periodically.</li> </ul>						
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

Smart I-V Curve Diagnosis	Smart Tracking
Smart I-V Curve Diagnosis	Diagnosis Task Management O Completed Scheduled
Diagnosis Task Management	Task name:     Inspection time:     Start date     ->     End date
Configure Strings	

----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.

#### D 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 <sup>Q</sup> to view the detailed diagnosis report.

Diagnosis Task Ma	nagement O Completed	Scheduled						
Task name:	Inspection time:	Start date → End date		iearch Reset				
								Add Diagnosis Task
Task Name	Plant Name	Inspection Time	Status	Progress	Time used	Faulty Strings/Tot	Email	Operation
task01	plant01	2022-03-09 15:50:52	• Finished	0	00:02:05	11/14		Q E @ 8
Total records: 1								< 1 > 10/page $\vee$

• View the diagnosis results.

#### Figure 4-11 Diagnosis result

gnosis result							Х
01							
(21.4394)	Legend	Fault Type	Fault Count	Ratio (%)	Yearly Energy Yie	Fault Description	Suggestion
		10002	XXX	xxx	XXX	XXX	Ð
	-	10012	xxx	XXX	XXX	XXX	Ð
2		Normal	XXX	XXX	XXX	XXX	

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

#### Figure 4-12 Inspection details

Inspecti	on Details												
	SN ¢	Inverter Name 💠	String	Fault Type	Voc (V)	lsc (A)	FF	Pmax (W)	Vm (V)	Im (A)	Vm/Voc	lm/lsc	Details
	SUN20A1200	Inverter-2	PV3	Normal	1229.2	11.04	76.22%	10343	1017.2	10.17	0.83	0.92	View
	SUN20A1200	Inverter-2	PV8	Normal	1218.9	10.98	77.42%	10361	1017.8	10.18	0.84	0.93	View
	SUN20A1200	Inverter-2	PV14	10012									View
	SUN20A1200	Inverter-2	PV18	10012									View
	SUN20A1200	Mean value	PV3		1229.2	11.04	76.22%	10343	1017.2	10.17	0.83	0.92	
Total record	is: 14										<	1 2 > 1	0 / page $\vee$



Details	of Scanned Objec	ts							×
	Basic Information								
	Inverter name:	XXX	Inverter rated power (kW):	XXX	String Voc (V):	XXX	String Pm (W):	XXX	
	Inverter model:	XXX	Check time:	xxx	String Isc (A):	xxx	String Vm/Voc:	XXX	
	Inverter SN:	xxx	Total yield (kWh):	xxx	String Vm (V):	xxx	String Im/Isc:	xxx	
	Version:	XXX	Fill factor (FF) %:	xxx	String Im (A):	xxx	String degradation rate:	XXX	
	I-V curve								
				- <b>-</b> IV	- <b>-</b> - PV				
12	ûrrent (A)							Power (kW) 12,000	
10							<hr/>	10,000	
8								8,000	
6								4,000	
2								2,000	
0	200		400	600 Voltage (V)	800	1,000	1,200	0 1,400	

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

Fai	ult List( 11 )				9			
	Inverter Name	Inverter SN	Plant Name	String	Fault Type	Yield Loss	Fault Description	Suggestie
	Inverter-2	XXX	XXX	XXX	10002	XXX	XXX	Ð
	Inverter-2	XXX	XXX	XXX	10002	XXX	XXX .	D
	Inverter-2	XXX	XXX	XXX	10002	XXX	xxx	Ð
	Inverter-2	XXX	XXXX	XXX	10002	XXX	XXX .	Ð

#### **Step 2** Click **(a)** to view the diagnosis status.

#### Figure 4-16 Diagnosis status

Details o	f Diagnosis Obje	ects				
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
otal record	s: 14					< 1 2 > 10/page



#### Figure 4-17 Export

Export	×
<ul> <li>Export diagnosis result</li> <li>Export raw data</li> <li>Export O&amp;M reports</li> <li>Export ROI estimation reports</li> </ul>	
	Cancel
End	

Issue 02 (2022-07-15) Copyright © Huawei Digital Power Technologies Co., Ltd.

# **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.	<ol> <li>Communication between the SmartPVMS client and server is abnormal.</li> <li>The SmartPVMS server is abnormal.</li> </ol>	<ol> <li>Fix the communication between the SmartPVMS client and server.</li> <li>Fix the SmartPVMS server.</li> </ol>
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.	<ol> <li>Communication between the SmartPVMS client and server is abnormal.</li> <li>The SmartPVMS server is abnormal.</li> </ol>	<ol> <li>Fix the communication between the SmartPVMS client and server.</li> <li>Fix the SmartPVMS server.</li> </ol>

No.	Fault Symptom	Cause Analysis	Troubleshooting Methods
5	Failed to load the license file on the SmartPVMS.	<ol> <li>The communication between the SmartLogger and the inverter is disconnected.</li> <li>The communication between the SmartLogger and the SmartPVMS is disconnected.</li> <li>The license file does not match the inverter SN.</li> <li>The inverter software version does not support the license management function.</li> <li>The SmartLogger software version does not support the license management function.</li> </ol>	<ol> <li>Fix the communication between the SmartLogger and the inverter.</li> <li>Fix the communication between the SmartLogger and the SmartPVMS.</li> <li>Contact the supplier or Huawei customer service center and purchase the Smart I-V Curve Diagnosis function or apply for a license.</li> <li>Upgrade the inverter.</li> <li>Upgrade the SmartLogger.</li> </ol>
6	Failed to revoke the license on the SmartPVMS.	<ol> <li>The communication between the SmartLogger and the inverter is disconnected.</li> <li>The communication between the SmartLogger and the SmartPVMS is disconnected.</li> </ol>	<ol> <li>Fix the communication between the SmartLogger and the inverter.</li> <li>Fix the communication between the SmartLogger and the SmartPVMS.</li> </ol>
7	Failed to export the license revocation code file from the SmartPVMS.	<ol> <li>Communication between the SmartPVMS client and server is abnormal.</li> <li>The SmartPVMS server is abnormal.</li> </ol>	<ol> <li>Fix the communication between the SmartPVMS client and server.</li> <li>Fix the SmartPVMS server.</li> </ol>
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.	<ol> <li>Communication between the SmartPVMS client and server is abnormal.</li> <li>The SmartPVMS server is abnormal.</li> </ol>	<ol> <li>Fix the communication between the SmartPVMS client and server.</li> <li>Fix the SmartPVMS server.</li> </ol>

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.	<ul> <li>The SmartLogger is abnormal.</li> <li>The license file (package) name or format is abnormal.</li> </ul>	<ul> <li>Fix the SmartLogger.</li> <li>Contact the supplier or Huawei customer service center to obtain the license file (package).</li> </ul>
15	Failed to load the license file on the SmartLogger.	<ol> <li>The communication between the SmartLogger and the inverter is disconnected.</li> <li>The license file does not match the inverter SN.</li> <li>The inverter software version does not support the license management function.</li> <li>The SmartLogger software version does not support the license management function.</li> </ol>	<ol> <li>Fix the communication between the SmartLogger and the inverter.</li> <li>Contact the supplier or Huawei customer service center and purchase the Smart I-V Curve Diagnosis function or apply for a license.</li> <li>Upgrade the inverter.</li> <li>Upgrade the SmartLogger.</li> </ol>
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.	<ol> <li>The inverter SN does not match the license file.</li> <li>Communication between the app and inverter is disconnected.</li> </ol>	<ol> <li>Load the license file that matches the inverter SN.</li> <li>Fix the communication between the app and inverter.</li> </ol>
22	Failed to revoke the license file on the app.	<ol> <li>The paired inverter is incorrect.</li> <li>Communication between the app and inverter is disconnected.</li> </ol>	<ol> <li>Select the correct inverter for pairing.</li> <li>Fix the communication between the app and inverter.</li> </ol>