

Operation Manual

1+X Modular Inverter

String Diagnosis



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1 System Introduction

The diagram of the string diagnosis system is shown as follows:



figure 1-1 String Diagnosis System Diagram

Product Function						
PVS	Collect IV data and report it to SCU.					
Invertor DSD	Perform IV scanning and voltage regulation accordingly upon receiving					
Inventer DSP	command from SCU.					
	Synchronize data interaction between inverter DSP and PVS, and read					
	real-time information.					
SCU	Perform smart string diagnosis based on the IV data uploaded by PVS,					
	and present the diagnosis result and report on the web interface.					

NOTICE

- String diagnosis is available only for 1+X series inverters.
- The use of Y-type PV connectors in the connection between the module and the inverter is not supported.

2 Operating Environment Requirements

Prerequisites for use

- Weather conditions: Sunny and cloudless days, with solar irradiance ≥500W/m².
- Recommended time for diagnosis: 10:00-14:00.
- The precondition for test-retest consistency is that the retest should be conducted within 30 minutes after the first test. In the case of two tests performed at an interval of over 30 minutes, since the solar irradiance and incident angle will change over this period of time, the actual IV curve may also change, thus affecting the consistency of the diagnosis results.

Software version requirements

Before deploying the string diagnosis system, make sure the PVS, DSP, and SCU software versions meet the corresponding requirements in the tables below.

Software versions required to enable RS485 wired/DC PLC communication between PVS and SCU are listed respectively as follows:

Software	Version
PVS software	PVS_24MH_V03_V03_C or later
	Host DSP: MDSP_OPAL-C_V1_B.sgu or later
DSP software	Client DSP: SDSP_OPAL-C_V1_B.sgu or later
SCU software	SCU-SV100.001.00.P000B001.zip or later

table 2-1 Support RS485 wired communication only

table 2-2 Support RS485 wired communication and DC PLC communication

Software	Version
PVS software	PVS_24MH_V03_V03_E or later
	Host DSP: MDSP_OPAL-C_V1_J.sgu or later
DSP software	Client DSP: SDSP_OPAL-C_V1_J.sgu or later
SCU software	SCU-SV100.001.00.P012B000.zip or later

NOTICE

- Please use SUNGROW PVS.
- RS485 wired communication and DC PLC communication should not be adopted together for PVS communication in the same system.
- The DSP software and SCU software should be upgraded together to matching versions so that they can work normally.

3 Login Steps

3.1 Login (PC)

Step 1 Connect the PC to the debugging network port with a network cable.

Step 2 Configure the IP address of the PC. Set the IP address of the PC to the same network segment as the NET address of the smart unit board.



Default IP address of the "NET1" port: 12.12.12.12. Default IP address of the "NET2" port: 14.14.14.14.

- Step 3 Enter the IP address of NET1 or NET2 port. You will then enter the homepage as a visitor by default.
- **Step 4** Click ⁽¹⁾ in the upper right corner of the page to select your preferred language.
- Step 5 Click to enter the login page.

Step 6 Enter the default password: pw1111, and click Login to enter the page as an O&M User.

To keep your information safe, please change the password at your first login.

- - End

3.2 Login (Mobile)

- Step 1 Enable WLAN on the mobile device (e.g., a mobile phone). Then, search for the hotspot, such as SG-xxx (xxx represents the device SN), and enter the password: ESPWifi@123.
- **Step 2** Open a browser on the phone, and enter the address (11.11.11.1) or domain (sungrow.net) to access the WEB interface. You will then enter the homepage as a visitor by default.
- **Step 3** Click ⁽¹⁾ in the upper right corner of the page to select your preferred language.

Step 4 Click **b** to enter the login page.

Step 5 Enter the default password: pw1111, and click Login to enter the page as an O&M User.



To keep your information safe, please change the password at your first login.

- - End



4 WEB Configuration

4.1 Add PVS

Step 1 Click "Device → Device List" on the navigation bar.

Step 2 Click Add Device on the Device List page.

G SG4400UD	≡						🙁 17	▲0 ⊕English	LO&M User
🖬 Overview 👻	+ Ad	d Device							1 Delete
Device Monitoring		No.	Device Name	Device Model	Port \$	Device Address 😄	Forwarding Modbus I	Com Status	Operation
🗙 Device 🔺									
Device List					No Data				
Firmware Update									
Fault Recorder									
Smart Diagnosis									
 History Data 									
• System •									
About									

NOTICE

- The string diagnosis feature can be used only after the PVS supporting RS485 wired communication or DC PLC communication is added.
- RS485 wired communication and DC PLC communication should not be adopted together for PVS communication in the same system.
- Before construction, please record the location of the inverter unit to which the PVS is connected, and match the actual location with the device address shown on the web interface. In this way, after the diagnosis is completed, you can find the string connected to the PVS easily according to the diagnosis results.

- - End

4.2 Add/Edit Module

Step 1 Click "Smart Diagnosis -> String Diagnosis" on the navigation bar.

Step 2 Choose PV configuration on the right side of this page.

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Cverview	-	String Di	agnosis Diagnosis Re	esults PV Configuration	ion					
Device Monitoring		Newly adde	d module							
X Device	•	No.	Module Model	Maximum Power Point Current(Im/A)	Short Circuit Current(I sc/A)	Open Circuit Voltage (Voc/V)	Max. Power Point Volt age(Vm/V)	Maximum Power(Pm/ W)	Module Status	Operation
Smart Diagnosis	•	1	U01	9.060	9.640	38.400	31.400	285.000	Activated	0 6 8
String Diagnosis										
Fault Diagnosis										
History Data	*									
System	•									
 About 										

Step 3 Click Newly added module or edit the parameters of the default modules (2 by default) on the PV configuration page.

G SG4400UD	Ξ					Ø 17 ▲0 ⊕E	nglish 💄 O&M User
tt Overview 👻	String Diagnosis Diagnos	is Results PV Configuration					
Device Monitoring	Newly added module	Edit Module					
🗶 Device 👻	No Module Model	PV Model UO1	Maximum Power Point	9.060 A	mum Power(Pm/	Module Status	
Smart Diagnosis A	1 101		Current(Im/A)		000	Activated	0.00
String Diagnosis		Short Circuit 9,640	A Open Circuit	38.400 V			
Fault Diagnosis		Current(Isc/A)	Voltage(Voc/V)				
		Max. Power Point 31.400	∨ Maximum	285.000 W			
G History Data 👻		Voltage(Vm/V)	Power(Pm/W)				
o System 👻		First Year Decay 0.030	Later Year Decay	0.007			
About		Coefficient Please pro when mod ameters	cceed with care Ifying default par	Please proceed with care when modifying default par ameters			
				Cancel OK			

Step 4 Click ^(C) after completing the configuration of module parameters.

Currently, string diagnosis can only be enabled for the system consisting of modules of the same type.

NOTICE

Please complete the configuration in compliance with the actual parameters of PV modules in the plants.

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4.3 Set Associated Inverter Unit and Modules

Step 1 Click "Smart Diagnosis→String Diagnosis" on the navigation bar.

Step 2 Click Operation on the String Diagnosis tab page.

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H Overview +	String D	iagnosis Diagnosis Results PV Configura	tion		
Device Monitoring	Start Diagn	osb			
X Device V	No.	Combiner Box Name	Details of Associated Unit	Associated Module	Operation
📀 Smart Diagnosis 🔺	1	PVS-16(COM1-1)	Unassociated	Unassociated	۵
String Diagnosis					
Fault Diagnosis					
History Data •					
System -					
About					

Step 3 Set the associated inverter unit and modules of the PVS on the PVS Settings window.

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	PVS Setti	ngs								×			
Overview Verview	Start Comb	biner PVS-16(COM1-1)										
🗶 Device 👻	No. Conne	cted Please Select		Inverter Uni	t Diagram Locat	ion					ion		
Ø Smart Diagnosis	1 Inverter	Unit											
String Diagnosis	Тур	pe of Please Select											
Fault Diagnosis	Conne Mo	dule											
 History Data 	String St	tatus • Connected	: 0 🔶 Uncon	nected: 24									
O System v		• PV1	• PV2	• PV3	• PV4	• PV5	• PV6	• PV7	• PV8				
About		• PV9	PV10	• PV11	• PV12	• PV13	• PV14	• PV15	 PV16 				
		• PV17	 PV18 	• PV19	 PV20 	• PV21	PV22	• PV23	 PV24 				
									Cancel Co	alim			

Step 4 Click Start Diagnosis on the String Diagnosis page.

- The PVS is not associated with any inverter unit or module by default.
- The PVS can only be associated with modules that are enabled.
- In the event of low irradiance or irradiance changing greatly, click **Start Diagnosis**, there will be a prompt about whether to continue diagnosis on the page.
- Once the diagnosis is started, the **String Diagnosis** page will be locked, in case module parameters or other parameters are modified by mistake during the diagnosis process. You may still perform actions on other pages.
- If the diagnosis is started when the system operates in limited power mode, there will be a temporary increase in dispatch power.

NOTICE

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- The diagnosis cannot be started with power dispatch in process in the background. Please stop the power dispatch first, and then start the diagnosis.
- PVS associated with the same inverter unit should be connected to the same COM port.
- During plant construction, please check whether relevant settings have been completed correctly according to the string status shown on the PVS Settings window.
- During the PVS deployment on site, be sure to mark respectively the strings connected and the strings unconnected, as well as the string current.

- - End

4.4 Check IV Diagnosis Results and Reports

Step 1 Click "Smart Diagnosis – String Diagnosis" on the navigation bar.

SG4400UD	=				😫 17 🛕 0 🌐 English 💄 O&M User
E Overview 👻	String Di	iagnosis Diagnosis Results PV Configura	tion		
Device Monitoring	Start Diagno	osta			
X Device -	No.	Combiner Box Name	Details of Associated Unit	Associated Module	Operation
😋 Smart Diagnosis 🔺	1	PVS-16(COM1-1)	Unassociated	Unassociated	٥
String Disgnosis					
Fault Diagnosis					
 History Data 					
o System 👻					
 About 					



						S 🗛 0 😂 English 👗 O&M Use
String Diagnosis Diagnosis	Results PV Co	nfiguration				
Abnormal 2023-06-27 14:06:	:28					Original Data Report Download
				96 String Nat	nber	Norma 0 Norma 0 Some of the second of th
	No.	Combiner Box Nam e	String	Diagnosis Results	Cause Analysis	Advice
	1	PVS-16(COM1-1)	PV1	Test Anomaly	I. IV scanning is abnormal due to pa ratel votage mismatch. Z. More or less PV modules are conf igured in the string. J. PV modules are not of the same t ype	 Check whigher the inverter to which the string is connected reports "Parallel Mismatch of String"; If: a correct the fault and then jertime the Y came scan again; If the inverter to which the string is connected does not report "Parallel Mismatch of String"; Check which there is the string is to connected does not report "Parallel Mismatch of String"; Check which there is the string are to common to be it. If a context the problem and then perturbate the V rounds and the perturbate the variant string. If the number of configured PV modules is not too many or too text, check the sampling parameters of case PV module is to exclusion there are PV module in the board context or program context of the sampling parameters are simplify.

Step 2 Click Diagnosis Results on the right page to view the detailed diagnosis results.

- You can view up to 10 pieces of history string diagnosis data.
- You can download the diagnosis results in the form of original data or a report.
- During on-site O&M, please inspect the modules according to cause analysis and suggestions provided in the diagnosis results.

- - End

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