

## **Smart IV Curve Diagnosis on FusionSolar7**



# Huawei Technologies Co. Ltd.

Version	Created by	Date	Remarks
01	Huawei e84081311	4.06.2021	IV Curve

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This document describes how to create an IV curve diagnosis task and view the diagnosis result details on FusionSolar 7.

#### Prerequisites

- The license status of the commercial and utility device to be scanned is normal.
- The inverter connection mode must be Huawei inverters
- SmartLogger+FusionSolar to ensure smooth scanning.
- The Smart Energy Center with an optimizer cannot be scanned.
- A maximum of 200 Smart Energy Centers can be used for IV curve diagnosis.
- The Smart Energy Centers in the IV curve diagnosis task cannot participate in other diagnosis tasks.
- The inverter with an optimizer cannot be scanned. Do not select this type of device.

#### **Requirements for IV curve diagnosis:**

- Cleaning status of the strings must be consistent during diagnosis.
- 2. The solar irradiance must be above the lower limit (400 W/m<sup>2</sup>) during I-V curve diagnosis.
- 3. String configuration information must be correct.
- 4. Inverters connected to optimizers do not support I-V curve diagnosis.
- A maximum of 200 inverters can be diagnosed at a time (about 10 minutes).
- It is recommended that strings be cleaned before diagnosis to reveal the actual status of the diagnosed modules.
- You are advised to perform diagnosis between 11:00 am and 13:00 pm. Ensure that the front and rear rows of the strings are not blocked.
- You are advised to start I-V curve diagnosis when the device power is not limited. If I-V curve diagnosis is started when the device power is limited, the irradiation prediction and diagnosis result may be inaccurate.

## Procedure

## 1. Import the license for commercial and utility inverters

If you have a residential inverter skip this step.

Contact your Huawei distributor to purchase license for commercial and utility inverters.

From the home page choose System and select the License Management





Upload the license: select Device License Management $\rightarrow$ License Loading $\rightarrow$ Upload License $\rightarrow$ Browse and choose the license $\rightarrow$ Upload

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License Manage	License Information License Application License Loading License Revocation	
License Information	Device name: Plant name: Device SN: License status: All	Loading status: All
License File	Search Reset	
Device License Mana	Upload License × Upload License	Load All Load Selected Stop Loading
	Device Name License file Loading Tiple Loading	) Progress Loading Status Licens
	Note: license file format: .dat or .zip; maximum size: 10 MB.	
	Cancel	No Da
		Total records: $0 < 0 > 10 / page \lor$

Load the license: after the license was uploaded load the license. Choose Load All if you have the license for all the inverters or choose Load Selected if you have license only for some inverters

			Upload Lice	ense Load All I	Load Selected	Stop Loadi
	Communication Device					
Plant Name	Name	License Upload Time Lice	ense Loading Time	Loading Progress	Loading Status	1
	Plant Name	Communication Device Plant Name Name	Plant Name Communication Device License Upload Time Lice	Upload Lice Plant Name Communication Device License Upload Time License Loading Time	Upload License Load All Load All Plant Name Communication Device License Upload Time License Loading Time Loading Progress	Upload License Load All Load Selected Plant Name Communication Device License Upload Time License Loading Time Loading Progress Loading Status



### 2. Set the string capacity

#### Choose **Plant** menu→**Plant** Management

🎢 FusionSolar 🛛 🕥		Home Reports	Plants	Maintenance	System	e	Q	🛞 English	Eugen2021	<b>(</b> )	?
Plant KPIs		Plant Statu	In Plant			Real-Time	Alarm	3			
Current power	52.34 kwb Vield today 5.51 kwb Total yield	Tots	Plant Device Upgra Device	Management Plant Mar Management Management de Manageme	nt		0 al alarms	) () () ()	0 Critical 0 Major 0 Minor 0 Waming		

#### Select the plant and choose Edit:

	Hon	ne Reports	Plants	Maintenance	System				Q	🛞 English	A Euger	12021	í	?
											•			
	Plant name:		Searc	h Reset										
I							Add Plant	Share EMI	Sh	are Ca	ancel Sharin	g	Delet	е
	Plant Na	ime	Tot (kV	tal Plant String Vp)	Capacity	Address		Contact Person		Contact	t Method	Opera	ation	
	My pl	ant	4.9	50		Bacău,*******		GigiA		gigi_an	don*******	2	Ū •	*
	Total records: 1										< 1 >	<b>4</b> 07	age 🗸	/

From Set String Capacity select the inverter and choose Set String Capacity  $\rightarrow$  set string capacity for each string or select Batch apply if all are the same  $\rightarrow$  Apply  $\rightarrow$  Save



Set Basic Info Add E	Devices Set Stri	ng Capacity	Set Electricity Prices	Set Other Info	
Total plant string capacity (kWp	p): 22.3200				Set String Capa
Device Name	Device Type	Device Model	SN		String Capacity (kWp)
HV1990065821	Inverter	SUN2000-15KT	'L-M0 HV19	90065821	22.320
	Batch apply	Strin	g quantity: 4		
	PV1 capacity:	5580 Wn	PV2 capacity: 5580	Wn	
	PV3 capacity:	5580 Wp	PV4 capacity: 5580	Wp	

#### **3.** Configure sting details

#### From Maintenance menu choose Smart Diagnosis

🎢 FusionSolar ା බ		Home Reports Plants	Maintenance System	⊠ Q	🚱 English 🔮 Eugen2021 (i) 🥐
Plant KPIs		Plant Status	Maintenance	Real-Time Alarms	>
1.17 kw	52.71 kwh	$\frown$	Real-Time Status Alarm Management		O Critical
Current power	Yield today	1/	Task Management	o	🚱 0 Major
← € Revenue today	5.51 MWK Total yield	Total plants	Smart Diagnosis	Total alarms	① 0 Minor
			Smart Track Smart Diagnosis		0 Warning
Plant name Plant name	Region Region Device type	All v Total string capacity A	II V Grid connection date	Start date End date Search	Reset Add P

From Smart Diagnosis tab choose Configure Strings→select the plant→Configure Stings Details



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Real-Ti	ime Status   Alarm M	Management	Task Management   Sn	nart Diagnosis	l Smart Trackir	ng					
Smart Dia	ignosis	Task name:	Check time:	itart date → Er		Search Reset					
I-V Curve											
Module Li	Configure Strings							×		Configure String	gs Add Diagnosis Task
									Progress		Operation
	Enter a keyword	۹	Inverter type: All	∨ Inverter national	ime:	Configuration state	: All 🗸				
	🔻 📄 📄 ATI Energ	99 NDONE					Search	Configure String Details			
			Plant Nam	e Ir	nverter Type	Inverter Name	Device SN	Configuration State			
			My plant	St	tring inverter	HV1990065821	HV1990065821	Ungonfigured			
			Total records: 1					< 1 > 10 / page ∨			$<$ 0 $>$ 10/page $\vee$

Configure the string details accordingly with the panel's technical data:

Z Batch apply String quantity	4				Add Ten	nplate Parameter Descript
String *Module Qu	a 2-in-1 S	*Module Manufacturer	Module Model	*Module Type	*Max. Modu	lle Po String Capacity (W
- PV1 18	Y	Yînglî Solar ∨	YGE 72 CELL-310	Polycrystalline 🗸	310.0	V 5580
*Max. module power (Pmax)	310	*Optimal mo	dule operating v 36.3	*Optimal modu	le operating c 1	8.53
*Module open-circuit voltag	45.6	*Module sho	ort-circuit current 8.99	*Maximum pow	er (Pmax) te	-0.42
*Open-circuit voltage (Voc) t	-0.32	*Short-circui	t current (lsc) te 0.05	*Module type	1	Polycrystalline
*Module manufacturer	Yingli Solar	*Cell quantit	y (PCS/module) 72	*Grid connectio	n date	2020-07-02
*Module degradation rate in	2.5	*Module deg	gradation rate fr 0.7	Module model	,	YGE 72 CELL-310
Fill factor (%)	75.53	Nominal mo	dule efficiency (%) 16			

## Add a template if your panel is not in the list.

From **Configure String Details** choose Add Template $\rightarrow$  fill the panel technical details and save. After this operation you should find your panel model in the list.



	Task n	ame:		Check time: Start date 😁 End da	te 🖆 Search Reset					
	Configu	ure String [	Details						Х	rings gs
	🗌 Bat	tch apply	String q	Add				Add Template	Parameter Description	
		String	*Mo				Parar	neter Description	String Capacity (W	
	+	PV1	18	*Max. Module Power (P	*Optimal module operati		*Optimal module operati		5580	
	+	PV2	18	*Module open-circuit vo	*Module short-circuit cu		*Maximum power (Pmax		5580	
<	+	PV3	18	*Open-circuit voltage (V	*Short-circuit current (lsc		*Module type	Polycrystalline	5580	
	+	PV4	18	*Module manufacturer	*Cell quantity (PCS/mod	60 ~	Nominal module efficien		5580	
				Fill factor (%)			Module Model		Cancel	
								Cancel Save		
								仑	•	

#### 4. Add diagnosis task

From Smart Diagnosis menu choose Add Diagnosis Task→select the inverter→Start Scanning

Task name:	Add I-V Curve Diagnosis Task		×
		Operation Suggestions	Configure Strings Add Diagnosis Task
	Requirements for I-V curve diagnosis:	Suggestions for string diagnosis:	Operation
	<ol> <li>Cleaning status of the strings must be consist diagnosis.</li> <li>The solar irradiance must be above the lower W/m<sup>3</sup>) during I-V curve diagnosis.</li> </ol>	nt during 1. A maximum of 200 inverters can be diagnosed at a time (about 10 minutes). 2. It is recommended that strings be cleaned before diagnosis to reveal the actual status mit (400 of the diagnosed modules. 3. You are advised to perform diagnosis between 11:00 am and 13:00 pm. Ensure that the	
Total records: 0	Task name	My plant IV Curve test	< 0 > 10/page ×
	Select device	Enter a keyword Selected devices: 1 Q	
	String cleaning	Cleaned      Not cleaned	
	Environmental parameters	Auto     Manually setting	
		Cancel Start Scanning	



## 5. View and export scanning results

Check in the task list the result:

	Task Na	атте	aulty U	Tola U	Check T'n	ie		Starr	ing Progress			Operation
-	My plan	t	1	1	2021-06-03 17	:30:46			- •	Time used: 00:02	::28	V'ew Details
Fault Lis	My plai	nt										<ul> <li>✓ Export</li> </ul>
				10016		Fault Type	e Fault C	ount	Ratio (%)	Fault Descri	iption	Suggestion
						<b>CO1</b> 5	1		100.00	Excessively low	string	View
	Fault Type	(100%)	Strir	· ς νος (1	v) sz (A)	FF	Pmax (W);	Vm (V)	lm (A)	Vm/Voc	lm/lsc	Details
	Fault Type 100° 6	(100%) Inverter Name 🗘 HV2050018213	Strir 2V	rg Voc (1 1 602.1	v) sc (Á) ) 7.81	FF 0.7336	Pmax (W) 3451	Vm (V) 198.2	lm (A) 5,93	Vm/Voc 0.83	Im/Isc	Details View

	Inverter name:	HV2050018	Inverter rated power (KW):	5.000	String Voc (V):	602.0	String Pm (W):	3451
	Inverter model:	SUN2000-5	Check time:	2021-06-03	String isc (A):	7.81	String Vm/Voc:	0.83
	Inverter SN:	HV2050018	Total yfeld (kWh):		String Vm (V):	498.2	String invise:	0.89
	Versions	V100	Elli factor (EE) Sic	73 3696	String im (A):	6.93	String degradation	
Cur	-V curve		THE DECK OF A	- <b>-</b> IV	<ul> <li>PV</li> </ul>		rate: Pow	ver (kW)
Cur 8	-V curve			- <b>-</b> - IV	• PV	499	rate: Pow	er (KW) 3,500
Cur 8	-V curve			IV	<ul> <li>PV</li> </ul>		rate: Pow	er 0(W0 
Cur 8 6	-V curve			IV	• PV		Pow	er (xW) 3,500 2,500 2,500
Cur 8 6	-V curve			IV	• PV		Pow	er (kW) 3,500 2,500 2,500 1,500

## Export the IV Curve report:

Task name:	Check	time: Start date → End date	🗎 Search	Reset									
	Configure Strings									figure Strings	Add Diagnosis Task		
	Task	Name Fa	aulty U	Total Un	Check Tim	ne	Scanning Progre			ing Progress		Operation	
-	My plan	t	1	1	2021-06-03 17	30:46				Time used: 00:02:28		View Details	
Fault List	My plant	:											✓ Export
		10016				Fault Ty	Type Fault Count		unt	Ratio (%) Fault Des		ption	Suggestion
						<b>1</b> 00	1016 1			100.00 Excessively Ic		string	View
												U	
	Fault Type	Inverter Name 🍦	String	Voc (V)	lsc (A)	FF	Pmax	(W)	Vm (V)	Im (A)	Vm/Voc	lm/lsc	Details
	10016	HV2050018213	PV1	602.0	7.81	0.7336	345	1	498.2	6.93	0.83	0.89	View
		Mean value	PV1	602.0	7.81	0.7336	345	1	498.2	6.93	0.83	0.89	