

Organismo accreditato
Accredited body

**ESTI - European Solar Test Installation
Energy and Efficiency Renewables Unit
Dir. C - Energy, Mobility and Climate
DG Joint Research Centre - European Commission**

Via E. Fermi, 2749, TP450
21027 ISPRA (VA) – Italia
<https://ec.europa.eu/jrc/en/research-facility/european-solar-test-installation>



DT00465LAT/006

Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

Riferimento
Contact

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Tabella allegata al Certificato di
Accreditamento
Annex to the Accreditation Certificate

00465 Calibration REV. 006
UNI CEI EN ISO/IEC 17025:2018

Attività oggetto di accreditamento
Accredited activities

Misure ottiche / Optical measurements
- **Irradiazione solare / Solar irradiance (SOT-12)**

Scopo fisso
Fixed scope

Via E. Fermi, 2749
21027 ISPRA (VA)
Italia

A

Misure ottiche / Optical measurements
- **Irradiazione solare / Solar irradiance (SOT-12)**

Scopo flessibile
Flexible scope

Via E. Fermi, 2749
21027 ISPRA (VA)
Italia

A

In esterno, presso Clienti
Onsite customer premises

EXT

L'incertezza di misura riportata nelle seguenti tabelle è da intendersi come incertezza estesa ottenuta moltiplicando l'incertezza tipo per il fattore di copertura k corrispondente ad un livello di fiducia di circa il 95%. Eventuali deviazioni sono puntualmente indicate.

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Settore / Calibration field (SOT-12) Irradiamento solare / Solar irradiance								
Strumento Instrument	Misurando Measurand	Condizioni Additional parameters	Campo di misura Measurement range	Incertezza ⁽¹⁾ Uncertainty		Metodo/Procedura Method / Procedure	Sede Location	
Photovoltaic device (cell, module)	Linearity of Current vs Irradiance	n.a.	up to $\pm 100\%$	0,16 %	(abs)	IEC 60904-10:2020	A	
Bifacial photovoltaic device (cell, module)	Bifaciality coefficient	n.a.	ϕ_{Isc}	up to 100%	0,88 %	(rel)		IEC TS 60904-1-2:2019
			ϕ_{Voc}	up to 100%	0,14 %	(rel)		
			ϕ_{Pmax}	up to 100%	1,36 %	(rel)		
			BiFi _{rel}	up to $\pm 1 \%$ /(W·m ⁻²)	0,0060 %/(W·m ⁻²)	(abs)		
			P _{maxBiFi100}	up to 1200 W	1,15 %			
			P _{maxBiFi200}	up to 1200 W	1,66 %			

¹ In case of a relative measurement range (i.e. expressed as %), the uncertainty has to be intended either as a relative value (marked as 'rel') of the actual value of the measurand (itself expressed as %) or as an absolute value (marked as 'abs') over the entire measurement range.

Campo di accreditamento flessibile ⁽²⁾ Flexible accreditation scope						
Strumento Instrument	Misurando Measurand	Condizioni Additional parameters	Campo di misura Measurement range	Incertezza ⁽³⁾ Uncertainty	Metodo/Procedura Method / Procedure	Sede Location
Primary photovoltaic reference cell	Current	Simulated sunlight	up to 1 A	2,4 %	IEC 60904-4	A
		Natural sunlight	up to 1 A	0,52 %		A, EXT
Photovoltaic device (cell)	Current	Simulated sunlight	up to 40 A	0,46 %	IEC 60904-1 IEC 60904-1-1 IEC TS 60904-1-2 IEC 60904-2 IEC 60904-3 IEC 61853-1 IEC 60891	A
	Voltage		up to 400 V	0,08 %		
	Power		up to 1200 W	0,84 %		
	Efficiency		up to 100%	0,84 % (rel)		
	Series resistance	up to 200 Ω	10 %			
	Current	Natural sunlight	up to 40 A	0,48 %		
	Voltage		up to 400 V	0,38 %		
	Power		up to 1200 W	0,95 %		
	Efficiency		up to 100%	0,95 % (rel)		
	Series resistance		up to 200 Ω	10 %		

(continua)

² The laboratory has flexibility to perform calibration including the methods listed in the table and to adopt new revisions and amendments of them, without varying measurand, measurement range and uncertainty. The laboratory (under its own responsibility) maintains a list of methods adopted under this flexible scope for consultation on website: <https://ec.europa.eu/jrc/en/research-facility/european-solar-test-installation>.

³ In case of a relative measurement range (i.e. expressed as %), the uncertainty has to be intended either as a relative value (marked as 'rel') of the actual value of the measurand (itself expressed as %) or as an absolute value (marked as 'abs') over the entire measurement range.

Campo di accreditamento flessibile ⁽⁴⁾						
Flexible accreditation scope						
Strumento Instrument	Misurando Measurand	Condizioni Additional parameters	Campo di misura Measurement range	Incertezza ⁽⁵⁾ Uncertainty	Metodo/Procedura Method / Procedure	Sede Location
<i>(continua)</i>						
Fotovoltaico (modulo)	Current	Simulated sunlight	up to 40 A	0,58 %	IEC 60904-1 IEC 60904-1-1 IEC TS 60904-1-2 IEC 60904-2 IEC 60904-3 IEC 61853-1 IEC 60891	A
	Voltage		up to 400 V	0,22 %		
	Power		up to 1200 W	0,95 %		
	Efficiency		up to 100%	0,95 % (rel)		
	Series resistance		up to 200 Ω	10 %		
	Current	Natural sunlight	up to 40 A	0,50 %		
	Voltage		up to 400 V	0,86 %		
	Power		up to 1200 W	1,2 %		
	Efficiency		up to 100%	1,2 % (rel)		
	Series resistance		up to 200 Ω	10 %		

(continua)

⁴ The laboratory has flexibility to perform calibration including the methods listed in the table and to adopt new revisions and amendments of them, without varying measurand, measurement range and uncertainty. The laboratory (under its own responsibility) maintains a list of methods adopted under this flexible scope for consultation on website: <https://ec.europa.eu/jrc/en/research-facility/european-solar-test-installation>.

⁵ In case of a relative measurement range (i.e. expressed as %), the uncertainty has to be intended either as a relative value (marked as 'rel') of the actual value of the measurand (itself expressed as %) or as an absolute value (marked as 'abs') over the entire measurement range.

Campo di accreditamento flessibile ⁽⁶⁾							
Flexible accreditation scope							
Strumento Instrument	Misurando Measurand	Condizioni Additional parameters	Campo di misura Measurement range	Incertezza ⁽⁷⁾ Uncertainty	Metodo/Procedura Method / Procedure	Sede Location	
(continua)							
Photovoltaic device (cell, module)	Spectral responsivity	n.a.	up to 2 A/W	2,5 %	IEC 60904-8 IEC 60904-8-1 IEC 60904-7 IEC 60904-3	A	
	Spectral mismatch factor		up to 1,5	0,36 %			
	Temperature coefficient of:	Simulated sunlight	Current	up to ±5 %/°C	0,0055 %/°C (abs)		IEC 60891
			Voltage	up to ±5 %/°C	0,0057 %/°C (abs)		
			Power	up to ±5 %/°C	0,0093 %/°C (abs)		
		Natural sunlight	Current	up to ±5 %/°C	0,0049 %/°C (abs)		
			Voltage	up to ±5 %/°C	0,0075 %/°C (abs)		
			Power	up to ±5 %/°C	0,0089 %/°C (abs)		

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⁶ The laboratory has flexibility to perform calibration including the methods listed in the table and to adopt new revisions and amendments of them, without varying measurand, measurement range and uncertainty. The laboratory (under its own responsibility) maintains a list of methods adopted under this flexible scope for consultation on website: <https://ec.europa.eu/jrc/en/research-facility/european-solar-test-installation>.

⁷ In case of a relative measurement range (i.e. expressed as %), the uncertainty has to be intended either as a relative value (marked as 'rel') of the actual value of the measurand (itself expressed as %) or as an absolute value (marked as 'abs') over the entire measurement range.