

List of accredited test procedures (D-K-11140-02-00)

Revision date: 23.02.2023

Monofacial PV modules

Standard	Title	Edition	Release	Status
IEC 60904-1	Photovoltaic devices - Part 1: Measurement of photovoltaic current-voltage characteristics	2.0	2006-09	Revised
		3.0	2020-09	Valid

Measurement quantity / Calibration item	Range		Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾
Short-circuit current Solar modules	16 mA	to 50 A	IEC 60904-1:2020	0.9%
Open-circuit voltage Solar modules	10 mV	to 420 V	IEC 60904-1:2020	0.6%
Current at maximum power Solar modules	16 mA	to 50 A	IEC 60904-1:2020	1.3%
Voltage at maximum power Solar modules	10 mV	to 420 V	IEC 60904-1:2020	1.0%
Maximum power Solar modules	0,2 W	to 5 kW	IEC 60904-1:2020	1.1%
Fill factor of IV-curve Solar modules	0%	to 100%	IEC 60904-1:2020	1.0%
Efficiency Solar modules	0%	to 100%	IEC 60904-1:2020	1.3%

Bifacial PV modules

Standard	Title	Edition	Release	Status
IEC TS 60904-1-2	Photovoltaic devices - Part 1-2: Measurement of current-voltage characteristics of bifacial photovoltaic (PV) devices	1.0	2019-01	Valid

Measurement quantity / Calibration item	Range		Measurement conditions / procedure	Expanded uncertainty of measurement ¹⁾
Short-circuit current Solar modules	16 mA	to 50 A	IEC TS 60904-1-2:2019	1.4%
Open-circuit voltage Solar modules	10 mV	to 420 V	IEC TS 60904-1-2:2019	0.7%
Current at maximum power Solar modules	16 mA	to 50 A	IEC TS 60904-1-2:2019	1.7%
Voltage at maximum power Solar modules	10 mV	to 420 V	IEC TS 60904-1-2:2019	1.2%
Maximum power Solar modules	0,2 W	to 5 kW	IEC TS 60904-1-2:2019	1.8%
Fill factor of IV-curve Solar modules	0%	to 100%	IEC TS 60904-1-2:2019	1.4%
Efficiency Solar modules	0%	to 100%	IEC TS 60904-1-2:2019	1.9%
Short-circuit current bifaciality Solar modules	0%	to 100%	IEC TS 60904-1-2:2019	0.8%
Open-circuit voltage bifaciality Solar modules	0%	to 100%	IEC TS 60904-1-2:2019	1.0%
Maximum power bifaciality Solar modules	0%	to 100%	IEC TS 60904-1-2:2019	1.6%
Rear irradiance driven power gain yield (BiFi) Solar modules	0 W/(W/m ²)	to 5 W/(W/m ²)	IEC TS 60904-1-2:2019	14.0%

Abbreviations used:

IEC International Electrotechnical Commission
 TS Technical Specification
 CMC Calibration and measurement capabilities

¹⁾ The expanded uncertainties according to EA-4/02 M:2022 are part of CMC and are the best measurement uncertainties within accreditation. They have a coverage probability of approximately 95 % and have a coverage factor of $k = 2$ unless stated otherwise. Uncertainties without unit are relative uncertainties referring to the measurement value unless stated otherwise.