

1. SOLAR I-V MAIN FEATURES

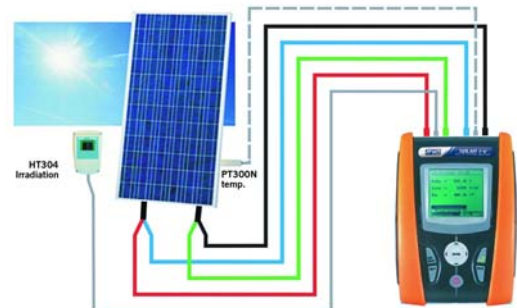


SOLAR I-V: use as PV certifier

SOLAR I-V performs all tests on Single phase PV plants by using of SOLAR-02 remote unit which, after a preliminary synchronisation, save in independent way the values of irradiance and temperature. Only at the end of test the remote unit should be connected via wireless RF with the master to download the recorded data

SOLAR I-V: use as I-V curve checker

SOLAR I-V allows the on field measurement of I-V curve as well as of the main parameters of a single module and of a whole photovoltaic system up to a maximum of 1000V and 10A



With SOLAR-02 remote unit the irradiance and temperature measured values are shown at display also in independent mode (ideal solution during a pre-test on installation) besides test/recording with SOLAR I-V

The HT304 reference cell permits to performs solar irradiance measurements both on PV modules in Monocrystalline and Polycrystalline silicon material





2. ELECTRICAL SPECIFICATIONS

Accuracy is calculated as \pm [% readings + (no. of digits) * resolution] at 23°C \pm 5°C, con relative humidity <80%HR

2.1. CERTIFIER OF SINGLE PHASE PV INSTALLATION

DC Voltage

Range (V)	Resolution (V)	Accuracy
15.0 \div 999.9	0.1	\pm (0.5%rdg + 2dgt)

AC TRMS Voltage

Range (V)	Resolution (V)	Accuracy
50.0 \div 265.0	0.1	\pm (0.5%rdg + 2dgt)

Max crest factor: 1.5

DC Current (by external transducer clamp)

Range (mA)	Resolution (mA)	Accuracy
-1100 \div -5	0.1	\pm (0.5%rdg + 0.6mV)
5 \div 1100		

The value of current is ALWAYS displayed with positive sign ; The value of current transduced in voltage less then 5mV is zeroed

AC TRMS Current (by external transducer clamp)

Range (mA)	Resolution (mA)	Frequency (Hz)	Accuracy
1 \div 1200	0.1	47.5 \div 63.0	\pm (0.5%rdg + 0.6mV)

Max crest factor: 2.0 ; The value of current transduced in voltage less then 5mV is zeroed

FS DC & AC clamp (A)	Resolution (A)	Minimum read value (A)	
		DC	AC
1 < FS \leq 10	0.001 0.05		0.01
10 < FS \leq 100	0.01 0.5		0.1
100 < FS \leq 1000	0.1 5A		1

DC Power (V_{mis} > 150V, I_{mis} > 10%FS)

FS clamp (A)	Range (W)	Resolution (W)	Accuracy
1 < FS \leq 10	0.000k \div 9.999k	0.001k	\pm (0.7%rdg)
	10.00k \div 99.99k	0.01k	
10 < FS \leq 100	0.000k \div 9.999k	0.001k	
	10.00k \div 99.99k	0.01k	
100 < FS \leq 1000	0.00k \div 99.99k	0.01k	
	100.0k \div 999.9k	0.1k	

V_{mis} = voltage correspondent to measured power

AC Single phase power (@ PF = 1, V_{mis} > 200V, I_{mis} > 10%FS)

FS clamp (A)	Range (W)	Resolution (W)	Accuracy
1 < FS \leq 10	0.000k \div 9.999k	0.001k	\pm (0.7%rdg)
	10.00k \div 99.99k	0.01k	
10 < FS \leq 100	0.000k \div 9.999k	0.001k	
	10.00k \div 99.99k	0.01k	
100 < FS \leq 1000	0.00k \div 99.99k	0.01k	
	100.0k \div 999.9k	0.1k	

V_{mis} = voltage correspondent to measured power



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PV single phase certifier and I-V curve checker

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Frequency

Range (Hz)	Resolution (Hz)	Accuracy
47.5 ÷ 63.0Hz	0.1	±(0.2%rdg+1dgt)

Irradiance (by reference cell HT304)

Range (mV)	Resolution (mV)	Accuracy
1.0 ÷ 100.0	0.1	±(1.0%rdg + 5dgt)

Temperature (by external probe PT300N)

Range (°C)	Resolution (°C)	Accuracy
-20.0 ÷ 100.0	0.1	± (1.0%rdg +1°C)



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2.2. I-V CURVE MEASUREMENT

VDC Voltage

Range (V)	Resolution (V)	Accuracy
5.0 ÷ 999.9	0.1	$\pm(1.0\%rdg+2dgt)$

(*) The I-V curve and Rs measurements start for VDC > 15V and the accuracy is defined for VDC > 20V

IDC Current (by internal sensor) – Detection of I-V Curve

Range (A)	Resolution (A)	Accuracy
0.10 ÷ 10.00	0.01	$\pm(1.0\%rdg+2dgt)$

Max Power (@ Vmpp >30V, Impp >2A)

Range (W)	Resolution (W)	Accuracy
50 ÷ 999	1	$\pm(1.0\%rdg+6dgt)$

Vmpp = voltage on point of maximum power ; Impp = current on point of maximum power

NOTE 1 Max measurable value of Power must include FF value(~ 0.7) → Pmax = 1000V x 10A x 0.7 = 7000W

NOTE 2 Test is stopped and the message "Thermal instability" occurs if the instrument detects Voltage > 700V and Current I > - 0.038*V + 37.24 - 0.5

Irradiance (by reference cell HT304)

Range (mV)	Resolution (mV)	Accuracy
1.0 ÷ 100.0	0.1	$\pm(1.0\%rdg+5dgt)$

Temperature of module (by PT300N probe)

Range (°C)	Resolution (°C)	Accuracy
-20.0 ÷ 100.0	0.1	$\pm(1.0\%rdg+1^{\circ}C)$



3. GENERAL SPECIFICATIONS

DISPLAY AND MEMORY:

Features:	128x128pxl custom LCD with backlight
Memory capacity:	256kbytes
Saved data:	max 99 yield test ; >249 curves (I-V curve test)

POWER SUPPLY:

SOLAR I-V internal power supply:	6x1.5V alkaline batteries type LR6, AA, AM3, MN 1500
Autonomy of SOLAR I-V:	> 200 curve (measurement of I-V curve) approx 120 hours (yield test)
SOLAR-02 power supply:	4x1.5V alkaline batteries type AAA LR03
SOLAR-02 max recording time (@ IP=5s):	approx 1.5h

OUTPUT INTERFACE

PC communication port:	optical/USB
Interface with SOLAR-02 :	wireless RF communication (max distance 1m)

MECHANICAL FEATURES

Size:	235 (L) x 165 (W) x 75 (D) mm
Weight (batteries included):	1.2kg

ENVIRONMENTAL CONDITIONS:

Reference temperature:	23°C ± 5°C
Working temperature:	0° ÷ 40°C
Working humidity:	< 80% UR
Storage temperature (batt. not included):	-10 ÷ 60°C
Storage humidity:	< 80% UR

GENERAL REFERENCE STANDARDS:

Safety: IEC/EN61010-1	
Safety of measurement accessories:	IEC/EN61010-031
I-V curve measurement:	IEC/EN60891
Insulation: doubl	e insulation
Pollution degree:	2
Overvoltage category:	CAT II 1000V DC, CAT III 300V AC to ground Max 1000V among inputs P1, P2, C1, c2
Max altitude of use:	2000m

This instrument complies with the requirements of the European Low Voltage Directives 2006/95/EEC (LVD) and EMC 2004/108/EEC