

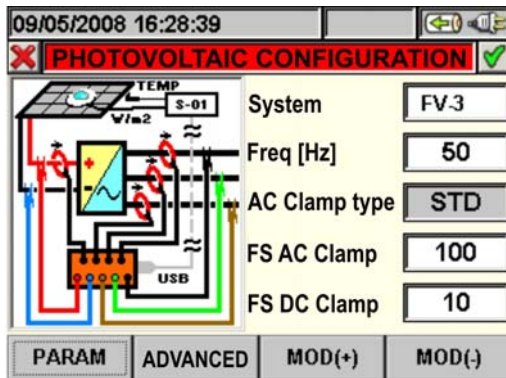
1. SOLAR300N MAIN FEATURES



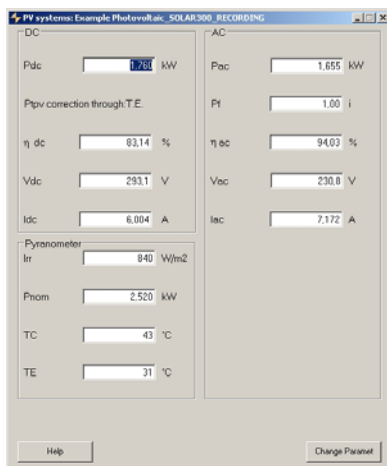
SOLAR300N performs all tests on PV plants by using of SOLAR-02 remote unit which, after a preliminary synchronisation, save in independent way the values of irradiance and temperature. Only at the end of test the remote unit should be connected again with the master unit to download the recorded data



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 SOLAR300N



A synoptic connection scheme on the display helps the user while connecting the instrument to the installation (Single or Three phase) under test



Final result of a PV test performed with SOLAR300N and downloaded by TopView software. Possible export in XLS and PDF format files

2. ELECTRICAL SPECIFICATIONS

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

DC Voltage

Range (V)	Resolution (V)	Accuracy	Input impedance
0.0 ÷ 1000.0	0.1	\pm (0.5%rdg + 2dgt)	10M Ω

Voltage values <2.0V are zeroed

AC TRMS Voltage – Phase-Neutral – Single Phase / Three Phase plants

Range (V)	Resolution (V)	Accuracy	Input impedance
0.0 ÷ 600.0	0.1	\pm (0.5%rdg + 2dgt)	10M Ω

Voltage values <2.0V are zeroed

Max. crest factor: 2

AC TRMS Voltage – Phase - Phase - Three Phase plants

Range (V)	Resolution (V)	Accuracy	Input impedance
0.0 ÷ 1000.0	0.1	\pm (0.5%rdg + 2dgt)	10M Ω

Voltage values <2.0V are zeroed

Max. crest factor: 2

AC Voltage Anomalies – Phase-Neutral Single Phase plants

Range (V)	Resolution Voltage (V)	Accuracy Voltage	Resolution Time (ms)	Accuracy Time
0.0 ÷ 600.0	0.2	\pm (1.0%rdg+2dgt)	10	\pm 10ms

Max. crest factor: 2

Voltage values <2.0V are zeroed

The meter could be connected to external VTs with selectable ratio from 1 to 3000

Voltage threshold adjustable from \pm 1 to \pm 30%

AC Voltage Anomalies – Phase-Phase Three Phase plants

Range (V)	Resolution Voltage (V)	Accuracy Voltage	Resolution Time (ms)	Accuracy Time
0.0 ÷ 1000.0	0.2	\pm (1.0%rdg+2dgt)	10	\pm 10ms

Max. crest factor: 2

Voltage values <2.0V are zeroed

Voltage threshold adjustable from \pm 1 to \pm 30%

AC Voltage spikes – Phase-Earth voltage – Single/Three phase plants

Range (V)	Resolution Voltage (V)	Accuracy Voltage	Response interval (50Hz)	Accuracy Time (50Hz)
-1000 ÷ -100	1	\pm (2.0%rdg+60V)	78 μ s – 2.5ms (SLOW)	\pm 10ms
100 ÷ 1000				
-6000 ÷ -100	15	\pm (10%rdg+100V)	5 μ s - 160 μ s (FAST)	
100 ÷ 6000				

Adjustable threshold from 100V to 5000V

Max number of recorded spikes: 20000

DC and AC TRMS Current with external transducers (STD)

Range (mV)	Resolution (mV)	Accuracy	Input impedance	Overload protection
0.0 ÷ 1000.0	0.1	\pm (0.5%rdg + 0.06%FS)	510k Ω	5V

AC Current with FLEX transducer – NPV systems – Range 300A

Range (A)	Resolution (A)	Accuracy	Input impedante	Overload protection
0.0 ÷ 49.9	0.1	$\pm(0.5\%rdg+0.24\%FS)$	510k Ω	5V
50.0 ÷ 300.0		$\pm(0.5\%rdg+0.06\%FS)$		

Measure performed by HTFLEX33D clamp, crest factor max = 3
Current values < 1A are zeroed

AC Current with FLEX transducer – NPV systems – Range 3000A

Range (A)	Resolution (A)	Accuracy	Input impedante	Overload protection
0.0 ÷ 3000.0	0.1	$\pm(0.5\%rdg+0.06\%FS)$	510k Ω	5V

Measure performed by HTFLEX33D clamp, crest factor max = 3
Current values < 5A are zeroed

Ac Inrush current

Range (A)	Resolution (A)	Accuracy	Resolution time (ms) at 50Hz	Accuracy time (ms) at 50Hz
Dep.on clamp	Dep.on clamp	$\pm(1.0\%rdg+0.4\%FS)$	10	± 10

Max crest factor = 3
Max number of recording anomalies: 1000

Voltage and Current Harmonics

Range (Hz)	Resolution	Accuracy (*)
DC ÷ 49 th	0.1V / 0.1A	$\pm (5\%rdg + 5dgt)$

(*) To be added to the accuracy of the related RMS parameter

DC Power (Vmeas > 150V, Imeas > 10% FS clamp)

Parameter	FS clamp	Range [W]	Resolution [W]	Accurcay
POWER	10A	0.000 ÷ 9.999k	0.001k	$\pm (0.7\%rdg+3dgt)$
	100A	0.00 ÷ 99.99k	0.01k	
	1000A	0.1 ÷ 999.9k	0.1k	

Vmeas = voltage which the power measurement is performed

AC Power Single and Three phase (@ PF = 1, Vmeas > 200V, Imeas > 10% FS clamp)

Parameter [W, VAR, VA]	FS clamp	Range [W, VAR, VA]	Resolution [W, VAR, VA]	Accuracy
Active power Reactive power Apparent power	FS ≤ 1A	0 ÷ 9.999k	0.1 ÷ 0.001k	$\pm (0.7\%rdg+3dgt)$
	1A ≤ FS ≤ 10A	0.000 ÷ 99.99k	0.001k ÷ 0.01k	
	10A ≤ FS ≤ 100A	0.00 ÷ 999.9k	0.01k ÷ 0.1k	
	100A ≤ FS ≤ 3kA	0.0 ÷ 9.999M	0.1k ÷ 0.01M	

Vmeas = voltage which the power measurement is performed

AC Energy Single and Three phase (@ PF = 1, Vmeas > 200V, Imeas > 10% FS clamp)

Parameter [Wh, VARh, VAh]	FS clamp	Range [Wh, VARh, VAh]	Resolution [Wh, VARh, VAh]	Accuracy
Active energy Reactive energy Apparent energy	FS ≤ 1A	0 ÷ 9.999k	0.1 ÷ 0.001k	$\pm (0.7\%rdg+3dgt)$
	1A ≤ FS ≤ 10A	0.000 ÷ 99.99k	0.001k ÷ 0.01k	
	10A ≤ FS ≤ 100A	0.00 ÷ 999.9k	0.01k ÷ 0.1k	
	100A ≤ FS ≤ 3kA	0.0 ÷ 9.999M	0.1k ÷ 0.01M	

Frequency

Range (Hz)	Resolution (Hz)	Accuracy
42.5 ÷ 69.0Hz	0.1	±(0.2%rdg+1dgt)

Power factor (cosφ) – Single Phase / Three Phase plants

Range	Resolution [°]	Accuracy [°]
0.20 ÷ 0.50	0.01	1.0
0.50 ÷ 0.80		0.7
0.80 ÷ 1.00		0.6

Flicker – Single/Three phase plants

Parameters	Ange	Resolution	Accuracy
Pst1', Pst Plt	0.0 ÷ 10.0	0.1	Compliance to EN50160

Irradiance (by SOLAR-01 unit and PYRA input)

Range (mV)	Resolution (mV)	Accuracy	Overload protection
0.00 ÷ 12.0	0.01	± (1.0%rdg + 5dgt)	5V
0.0 ÷ 120.0	0.1		

Irradiance (by SOLAR-02 unit and PYRA/CELL input)

Range (W/m ²)	Resolution (W/m ²)	Accuracy
0 ÷ 1400	1 + INT (100 * 0.1/K)	±(1.0%rdg + INT(1000 * 0.1/K))

K = sensitivity of irradiance sensor used (expressed in mV/kW/m² or in uV/W/m²)

Probe sensitività	Range (mV)	Resolution (mV)	Accuracy
K<10	0.00 ÷ 15.00	0.01	±(1.0%rdg+0.1mV)
K≥10	0.00 ÷ 65.00	0.02	

Temperature (by SOLAR-01 unit and TEMP input)

Range (°C)	Resolution (°C)	Accuracy	Overload protection
0 ÷ 100	1	± (1.0%rdg +2dgt)	5V

Temperature (by SOLAR-02 unit and TEMP input)

Range (°C)	Resolution (°C)	Accuracy
-20 ÷ 100	0.1	± (1.0%rdg +1°C)

3. GENERAL SPECIFICATIONS

DISPLAY:

Features:	graphic TFT with backlight, ¼ VGA (320 x 240pxl)
Touch screen:	present
Colours:	64k
Contrast:	adjustable

POWER SUPPLY:

SOLAR300 internal power supply:	Li-ION, 3.7V rechargeable battery
Battery life:	> 6 hours
External power supplier:	AC/DC 100-240V 50/60Hz / 5VDC adapter
Auto power off:	after 5 minutes without using the instrument (no external power)
SOLAR-01 power supply:	2x1.5V alkaline batteries type AA LR06
SOLAR-02 power supply:	4x1.5V alkaline batteries type AAA LR03
SOLAR-0x max recording time (@ IP=5s):	approx 1.5h

MEMORY AND PC INTERFACE

Internal memory:	15 Mbyte
External memory:	USB memory stick
External memory:	compact flash card
Operative system:	Windows CE
PC communication port:	USB

MECHANICAL FEATURES

Size:	235 (W) x 165 (L) x 75 (D) mm
Weight (batteries included):	1.0 kg
IP degree:	IP50

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, IEC/EN61010-2-032
Insulation:	double insulation
Pollution degree:	2
Overvoltage category:	CAT IV 600V to ground, max 1000V between inputs
Max altitude of use:	2000m
Quality networks:	IEC/EN50160
Quality of power measurements:	IEC/EN61000-4-30 class B
Flicker:	IEC/EN61000-4-15, IEC/EN50160
Unbalance:	IEC/EN61000-4-7, IEC/EN50160

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

1. GENERAL SPECIFICATIONS OF I-V 400 METER

HT ITALIA enlarges its range of products for photovoltaic system introducing the new **I-V 400**

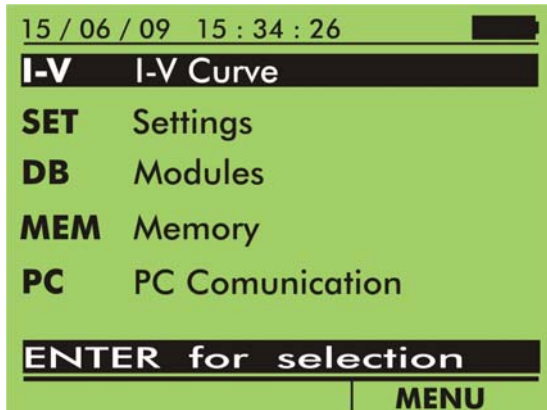
The instrument allows the on field measurement of I-V curve as well as of the main parameters of a single module and of a whole photovoltaic system up to a maximum of 1000V and 10A

The acquired data are then worked out and transferred to the reference conditions (STC) in order to compare them with the rated data declared by the manufacturer of those modules

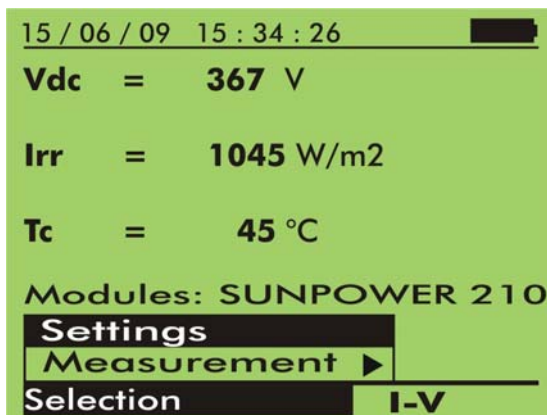
The comparison between the detected and the rated data permits to immediately determine whether the string or the module respect the parameters declared by the manufacturer

I-V 400 manages an internal database of the most common photovoltaic modules. Such a database can be updates at any time by the user both through the management software and directly through the instrument's interface

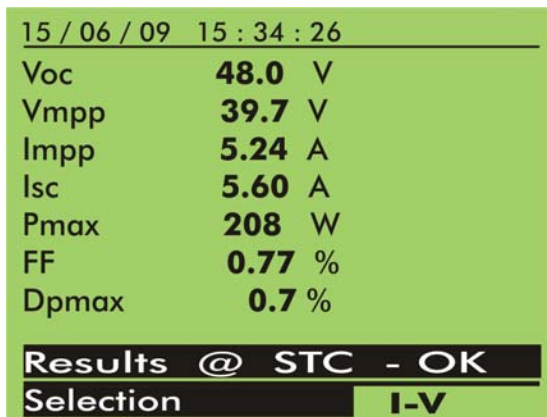




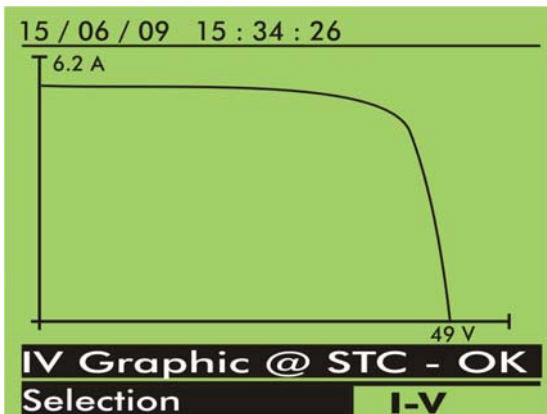
A very user-friendly main menu permits to **I-V 400** the access to all available internal features in easy to way mode



The **I-V 400** interface is realized by a menu level structure management which is easy and intuitive



The immediate display of results allows to evaluate the technical features of the modules. **I-V 400** also provides an indication (OK/NO) for the correspondence between the detected and the rated features declared by the manufacturer



I-V 400 permits to evacuate also by graphical mode the I-V curve of panels both on standard reference (STC) and operating conditions



2. ELECTRICAL SPECIFICATIONS (*)

Accuracy is given as \pm [% reading + (number of dgts) x resolution] at 23°C \pm 5°C, <80%HR

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

IRRADIANCE (with reference cell HT304)

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

TEMPERATURE OF CELL (with PT300N probe)

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

(*) Technical specifications can be modified without advise



3. GENERAL SPECIFICATIONS

DISPLAY:

Feature: LCD custom, 128x128 pxl with backlight

POWER SUPPLY:

Power supply: 6x1.5V alkaline battery type AA LR06
Low battery indication: "□" symbol is shown at display
Battery life: >200 test
AutoPowerOFF: after 5 minutes of idleness

MEMORY AND PC INTERFACE

Memory size: 256Kbytes
Number of saved curves: >200
PC interface: optical/USB (with C2006 cable)

MECHANICAL SPECIFICATIONS

Sizes: 235 (L) x 165 (W) x 75 (H) mm
Weight (included batteries): 1.2kg

ENVIRONMENTAL CONDITIONS:

Reference temperature: 23°C ± 5°C
Working temperature: 0° ÷ 40°C
Working humidity: <80%HR
Storage temperature: -10 ÷ 60°C
Storage humidity: <80%HR

STANDARD REFERENCE:

Safety: IEC/EN61010-1, IEC/EN61010-031
Insulation: double insulation
Measurements: IEC/EN60891
Pollution degree: 2
Category of measurement: CAT II 1000V, CAT III 300V to gnd, 1000V max between inputs
Max altitude of use: 2000m

**This instrument complies with the European Directive on low voltage 2006/95/CE (LVD)
and with EMC 2004/108/CE**