

E-1000

Smart I-V curve tracer
Entec Solar

**The fastest and most precise
I-V curve tracer on the market**

Reduce the time employed on your O&M tasks, commissioning test, and quality control campaigns, with the new I-V curve tracer, E-1000. All of the above while you maintain the highest measurement precision standards.

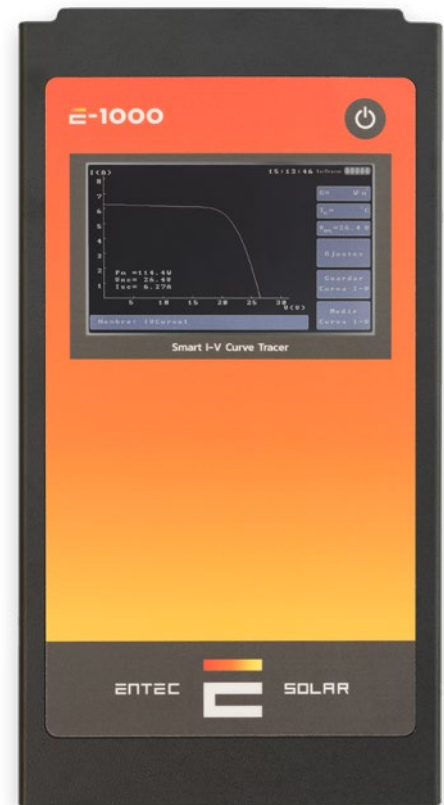


E-1000, I-V curve tracer

Within Entec Solar's objective of creating hardware tools to help people in their daily tasks, the E-1000 I-V curve tracer has been developed. The E-1000 has been developed in collaboration with QPV (www.qpv.es), company specialized in performance tests of large PV plants and in PV module quality controls, who has exposed the actual necessities in the measurement of PV modules in large PV plants. The union between Entec's experience in hardware developments and QPV's experience in PV module quality control has resulted in the fastest and most precise I-V curve tracer on the market, E-1000, "The Smart I-V curve tracer"

This high precision instrument allows for the measurement of up to 200 I-V curves per hour, either of PV modules or entire PV strings of up to 1000V and 20A. Additionally, it includes several new elements like: a bar-code reader for the automatic identification of each PV module under test and its position in the PV plant; an automatic report generation tool which eliminates hours of data processing; an automatic measurement option freeing the operator's hands during connection and disconnection; a wireless sensor (E-Sens) for measuring irradiance and module temperature with a range of up to 2km; a mobile and tablet app to control the E-1000 remotely; and many other options which will change your way of carrying out PV module measurement campaigns.

In addition, by means of a WiFi connection, the E-1000 synchronizes with PVET® (www.pvet.es) servers for data processing, data registry of all historic measurements, and allowing data comparison and failure diagnosis in all your PV plants.



Main characteristics

- The fastest I-V tracer on the market. Allows the measurement of up to 200 I-V curves per hour, of either PV module or entire PV strings up to 1000V and 20A.
- Unmatched precision of 0.5% at the Maximum Power Point (MPP) and 0.3% at VOC and ISC. And by using Entec's irradiance and temperature sensors a global precision at standard test conditions (STC) below 3%.
- 4-point measurement system to increase precision and avoid errors due to voltage drops in cabling.
- Registers in the same file the measurement data and the bar-code of each PV module under test with the bar-code reader accessory.
- Automatically generates a daily report, saving hours of data processing.
- Reduced weight and dimensions for ease of use.
- Measurement of I-V curves according to IEC-61829 and extrapolation to STC according to IEC-60891 and using the E-Sens wireless logger with a range up to 2km
- Versatile and configurable measurement of irradiance and cell temperature with the E-Sens wireless logger; i.e.: reference cell, calibrated PV modules, PT-1000.
- Remote control and visualization with the mobile App or local control and visualization using a tactile color screen.
- Backpack carrying option and automatic measurement in order to speed up the measurement campaigns and keeping operators hands free for other tasks.



E-1000 specifications

Input voltage range	0-1000V
Input current range	0.1-20A
Accuracy	$\pm 0.3\%$ ± 2 digits (voltage and current) $\pm 0.5\%$ $\pm 0,1W$ (power)
Resolution	15mV 0.3mA
Measurement time	30-200ms (typical)
Whole measurement cycle time	≤ 3 sg
Measurement points	200
Operating temperature	-10 to +65°C
Battery life	10 hours continuous operation. (Over 2000 I-V curves)
Dimensions	298x160x50mm
Weight	1.3kg
Protection	Over voltage, Over-current, Reverse polarity
Data storage and format	SD card 12KB per I-V curve file in .csv format
Safety	CAT II- 1000V, EN-61010-1
Standards	I-V curve measurement according to IEC-61829 Extrapolation to STC according to IEC-60891
Warranty	2 years

E-Sens specifications

Voltage inputs	1 x 2V channel for irradiance measurement 1 x 60V channel for Voc of a reference module
Temperature inputs	3 x PT1000 inputs
Voltage accuracy	$\pm 0.3\%$
Temperature accuracy	$\pm 0.3^\circ\text{C}$. Class B
Resolution	0.45mV for 60V channel, 0.015mV for 2 V channel
Measurement interval	1 second for irradiance channel 2 seconds for all other channels
Wireless range	Several hundred meters up to 2km
RF frequency	433MHz, (915Mhz for U.S.A)
Operating temperature	-10 to +65°C
Battery life	15 hours continuous operation
Dimensions	195x95x29mm
Weight	265 grams
Protection	Over voltage, Reverse polarity
Data storage and format	uSD card
Safety	EN-61010-1
Warranty	2 years

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developments for the photovoltaic
solar energy industry”

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