Regulations and standard in accordance with which the test instrument is manufactured and tested:

IEC 61010-1/EN 61010-1/ VDE 0411-1	Safety requirements for electrical equipment for measurement, control and laboratory use – General requirements
EN 60529 VDE 0470, part 1	Test instruments and test procedures Degrees of protection provided by enclosures (IP code)
DIN EN 61326-1 VDE 0843-20-1	Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements

Regulations and Standards for Use of the Test Instrument

IEC 62446 VDE 0126-23	Grid connected photovoltaic systems – Minimum requirements for system documentation, commissioning tests and inspection

Characteristic Values

Standard Measuring Ranges			
Voltage [V]	**Current [A]**	**Temperature**	**Irradiation**
25, 100, 500, 1000	2, 5, 10, 20	–40 to +100 °C with Pt1000	0 to 1300 W/m² (standard sensor)

The measuring ranges can be combined with each other. The measuring instrument automatically selects the ideal measuring range.

Computer Unit

Miniature industrial PC, real-time clock, no moving mechanical parts such as hard disks, fans etc.

A-D sampling rate: max. 100 kHz, resolution: 12 bit

Measuring accuracy for characteristic I-U curve better than 1%, peak power ±5%

Data from several thousand measurements are automatically saved at the device permanently (flash memory)

Measuring Unit

Sampling rate	Max. 100 kHz,
Resolution	0.01 to 0.25 V, 0.005 to 0.001 A (depending on selected measuring range)
Measuring accuracy	Better than 1%

Ascertainment of Peak Power

Tolerance	±5%
Reproducibility	±2%

Measurement duration for separate measurement of individual modules: > 20 ms (approx. 100 pairs of measured values), and thus the capacitive characteristics of the device under test have no influence on measurement.

- 4-conductor measurement cable to the generator prevents systematic voltage measuring errors
- Irradiation reference sensor (Phox) with integrated Pt1000 temperature sensor
- Supplementary measurement of temperature at the back of the module is possible (a second Pt100 input is provided)
- Commercially available reference sensors such as the ISET-Sensor® can be connected via interference-free cable connection
- Connection is only permissible to direct voltage sources with current limiting (e.g. photovoltaic generators)

Sensor Connection Pin Allocations

Temperature (external): 4 pin female chassis socket, Lumberg KFV40
Pin 1: current source + (~1 mA)
Pin 2: Pt100 +
Pin 3: Pt100 –
Pin 4: current source – (~1 mA)

Irradiance: 8 pin female chassis socket, Lumberg KFV81 (plug: SV81)
Pin 1: irradiance +
Pin 2: Pt1000 (reference) +
Pin 3: irradiance –
Pin 4: current source + (~1 mA)
Pin 5: current source – (~1 mA)
Pin 6: unused (do not connect)
Pin 7: unused (do not connect)
Pin 8: Pt1000 (reference) –

Ambient Conditions

Accuracy	0 to + 40 °C
Operation	0 to + 40 °C
Storage	–10 to + 85 °C (without batteries)
Relative humidity	
Operation	10 to 90% (non-condensing), no condensation allowed
Storage	5 to 95% no condensation allowed

Power Supply

Rechargeable batteries	Li-Ion-Accumulator, 11.25 V, 8850 mAh, 99.6 Wh (continuous operation: approx. 8 hr.)
Power consumption	Approx. 40 W
External power pack	In: 90 to 263 V AC, 47 to 63 Hz, 40 W, Out: 16 V DC

- UL approval
- Integrated charge controller for protection against overcharging and excessively depleting the batteries
- Charge level indication by means of LED on the housing (status display on the PROFITEST PV)