INNOVATIONS IN OPTICS

LumiProbe™
PV Characterization Module

Photovoltaic Cell/Solar Panel Testing

*Prototype Stage

Features

NEW PRODUCT

- IEC 60904-1 & -5 compliant
- ASTM E948-16 compliant
- Compact, low cost, efficient
- Turnkey/out-of-the-box experience
- Automatic programmable gain adjustment
- Up to 50,000 I-V data points (400µV/40µA precision)
- Load resolution adjustment for rapid testing
- Lower measurement error using Kelvin probe
- 1-20VDC operating range @ 2A - 40WMAX
- Hybrid V & I sweep using electronic load control
- Full detailed PV characterization
- Temperature sensing and correction
- Real-time data logging and on-board storage
- High-speed communication via USB-C
- Flash and continuous I-V testing capable
- Controlled via LumiSun Control Center; full LabVIEW compatibility for seamless integration with third-party devices

Parameters Tested

- I_{SC} short-circuit current
- V_{OC} open-circuit voltage
- I_{MP} maximum current point
- V_{MP} maximum voltage point
- MPP maximum power point
- R_S & R_{SH} series and shunt resistance
- EQE external quantum efficiency
- J_{SC} current density
- FF fill factor
- η efficiency
- T measured temperature
- NOCT nominal operating cell temperature

The LumiProbe™ series includes our new innovative, compact I-V hardware module for LED solar simulators that meets IEC 60904-1, IEC 60904-5, and ASTM E948-16 for standardized test methods of electrical performance of different types of photovoltaic cells & solar panels. The measured voltage ranges from 0-20VDC with maximum test-point power of 40W. The voltage step of 400µV and low measurement error of less than 0.1% makes it a highly accurate instrument for complete PV cell characterization.

While use with our proprietary LumiSun Control Center optimizes LumiProbe's capabilities, we offer full compatibility with LabVIEW for ease of integration with third-party devices and the same plug and play experience. All the communication is streamlined via a USB-C cable, ensuring reliable data transfer.

LumiProbe offers comprehensive measurement and analysis capabilities for photovoltaic (PV) cells and solar panels, enabling in-depth performance assessments. When integrated with a compatible solar simulator, like the LumiSun-50, LumiProbe provides spectral responsivity across a wide wavelength range of 350nm to 1250nm at varying illumination intensities. Additionally, temperature tracking and control are present to study the performance of different types of solar panels under varying real-world conditions.

Users can control I-V point density and customize the sweep grid to define where the data are collected on the curve. A hybrid voltage-current sweep approach enhances precision at critical regions. Front-edge indicator LED strip provides real-time system status feedback.

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10-K Gill Street, Woburn, MA 01801
p: (781) 933-4477
www.innovationsinoptics.com
sales@innovationsinoptics.com

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LumiProbe™

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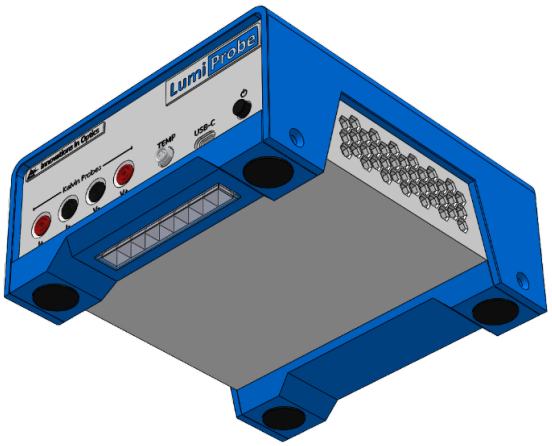
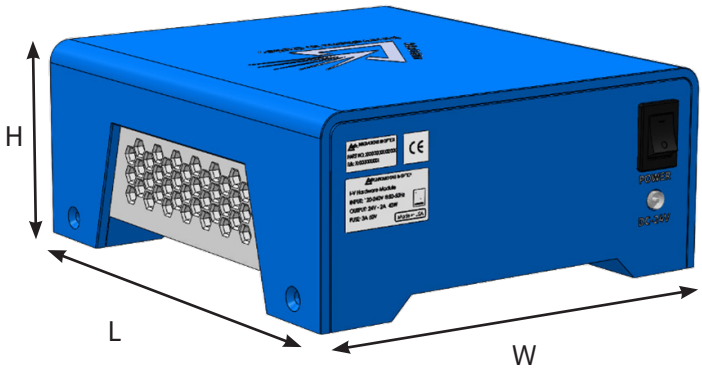
LumiProbe™ Specifications

PARAMETER	SPECIFICATION	COMMENT
IEC Compliance	Yes	IEC 60904-1 and IEC 60904-5
ASTM Compliance	Yes	ASTM E948-16
Input Power	120-240 VAC @ 50-60Hz	Universal wall adapter (included in box)
DUE Operating Envelope	1-20VDC - 40WMAX	DUT's maximum power output for testing
I-V Data Points	50,000	Load density adjustment to the user's needs
Test Methods	Flash & Continuous	User-defined/customizable
Maximum Power Point (MPP) Identification	Yes	Sweeps I-V plot for maximum power point
R_{SERIES} and R_{SHUNT} Testing	Yes	Quantifies non-idealities on the PV cell structure
Spectral Responsitivity Test (EQE)	Yes	When paired with a monochromatic source
Temperature Sensor	Yes	Adhesive Platinum RTD (included in box) 3-Wire
Thermal Sensing & Correction	Yes (Correction is optional)	Temp control in parallel to I-V points to +/- 0.1°C Temp correction when paired with solar simulator
Kelvin Probe (4-Wire)	Yes	Kelvin probes alligator to banana (included in box)
PC Communication	Via USB-C	Cable is included in box; data are stored on the device
Software Interfaces/GUI	LumiSun Control Center & LabVIEW	LumiSun GUI use prioritized; LabVIEW interface is offered for integration of system with other devices
LED Indicator/Strip	Yes	Indicates the system state
Dimensions (L x W x H)	220 x 200 x 90 (mm)	8.66 x 7.8 x 3.54 (in)

LumiProbe™ Additional Views





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