INNOVATIONS IN OPTICS

Class AAA, LED Solar Simulator

LumiSun™-50

Features

- Class AAA Compliant
- Long Life Multispectral LEDs
- Irradiance from 0.1 to 1.5 Suns
- Adjustable Output Spectra
- Uniform & Stable Illumination
- Lower Cost than Lamp Systems
- User-friendly Front Panel GUI
- Steady-state or Pulsed Modes

Applications

- PV Cell Testing & Research
- Photochemistry & Biology
- Materials Testing

LumiSun™-50 is an innovative, compact benchtop LED solar simulator that meets ASTM E927, IEC 60904-9, and JIS C 8904-9 Class AAA for spectral match, uniformity of irradiance, and temporal stability requirements. Output power can be varied from 0.1 to 1.5 Suns, and user-friendly operation is supported by a front-panel touchscreen. Remote digital control is enabled by an RS-485 interface with Modus RTU communication protocol. LumiSun™-50 incorporates the same leading LED array and optics architecture as our OEM solar simulators used by leading PV manufacturers worldwide.

LumiSun™-50 provides AAA illumination over a 50mm x50mm area, making it ideal for use in research labs to measure the efficiency and spectral response of photovoltaic cells, as well as a range of other applications such as photobiology, solar degradation, and other sunlight research studies. Unlike bulky lamp-based solar simulators, LumiSun™-50 employs a multi-wavelength array of long lifetime LEDs that are driven independently and can be set to closely emulate the spectral output of the sun. The unit offers three preset solar reference spectra, and the flexibility to create user-defined spectra by varying the output of the individual LEDs. The design incorporates Innovations in Optics, Inc.'s patented light collection optics to project light extremely uniformly across the whole field of illumination - a major improvement over existing LED based designs on the market.

The LED light source of the LumiSun™-50 is contained within an air-cooled housing that can rotate the angle of the illumination plane. The optimal working distance is adjusted by converging a pair of red dots from integrated laser pointers.

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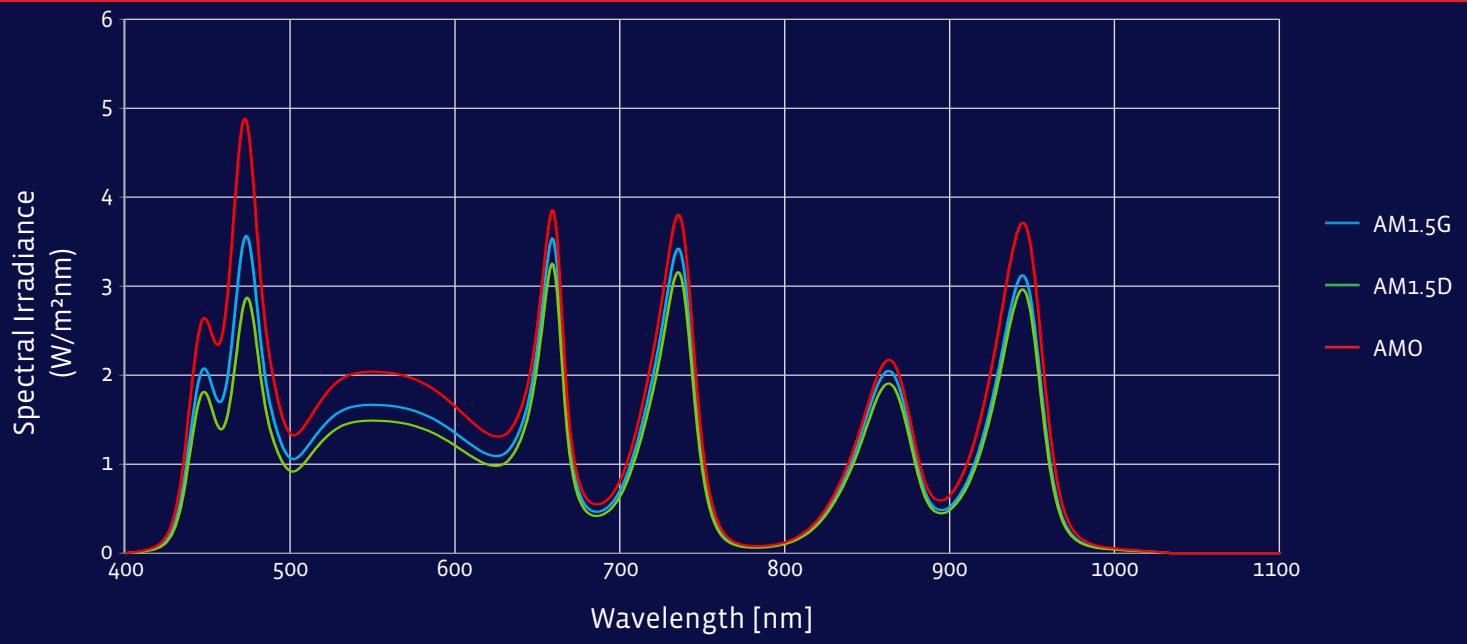
LumiSun™-50 Solar Simulator Pre-programmed Spectra



Measured spectral irradiance distribution at 1.0 Sun. Long Life Multispectral LEDs.
Three solar reference spectra shown, others are user-selectable

LumiSun™-50

Wavelength range nm	Measured Irradiance W/m²	% of Total
400 - 500	186.4	20.5%
500 - 600	184.8	20.3%
600 - 700	158.9	17.5%
700 - 800	127.6	14.1%
800 - 900	101.4	11.2%
900 - 1100	149.3	16.4%
Total	**908.4***	**100%**

***Note on the spectral and total irradiance**

Total solar irradiance of the AM1.5 Global spectrum (AM1.5G) is defined as 1000W/m² integrated over wavelength interval 0-4µm. The above total of 908.4 W/m² is an abridged definition of 1 Sun irradiance when integrating over the 400-1100nm interval. See ASTM G173 – 03 (2020) reference solar spectrum.

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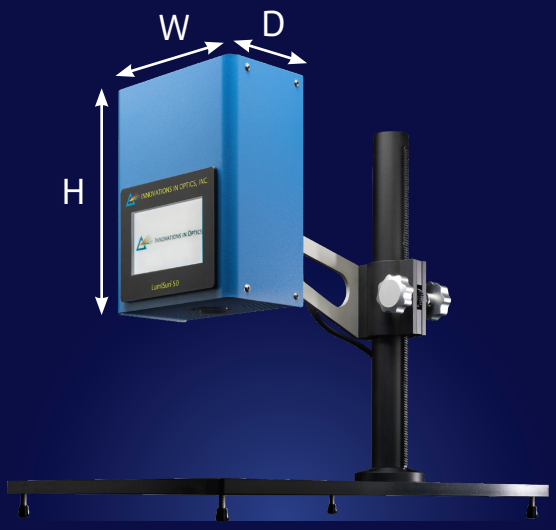
LumiSun™-50 Specifications

Parameter	Specification	Comments
Solar Simulator class	AAA rated	IEC 60904-9 Ed. 2, ASTM E927-19
Solar simulator type	Steady state & pulsed	External trigger, 200µs minimum pulse width.
Irradiance range of solar simulator class	0.1 to 1.5 Sun	400 - 1100 nm.
Illumination Area	50 mm x 50 mm	At working distance.
Working distance (W.D.)	151 mm	Source exit aperture to test plane.
Maximum angle subtended at (W.D.)	29°	Source aperture rim to corner of test plane.
Warm up time for stable irradiance	5 minutes	From a cold start.
Long term instability (LTI) of irradiance	≤ 0.3%	60 hours after 5-minute warm up.
Operating environment	20°c to 40°c	< 85%, relative humidity, non-condensing.
Thermal sensors	Safety shutdown	LED and driver PCBs.
Communication protocol	MODBUS RTU	RS-485
Weight	0.5 kg	Without rack and pinion mounting hardware.
Power input	24 VDC	< 100W power consumption

Dimensions

Height	Width	Depth
207 mm	159 mm	95 mm



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