

Light sources for solar simulation

Solar simulator with fiber optic coupling

- Collimated beam at fiber output with 15 mm diameter
- Output 1 sun (min)

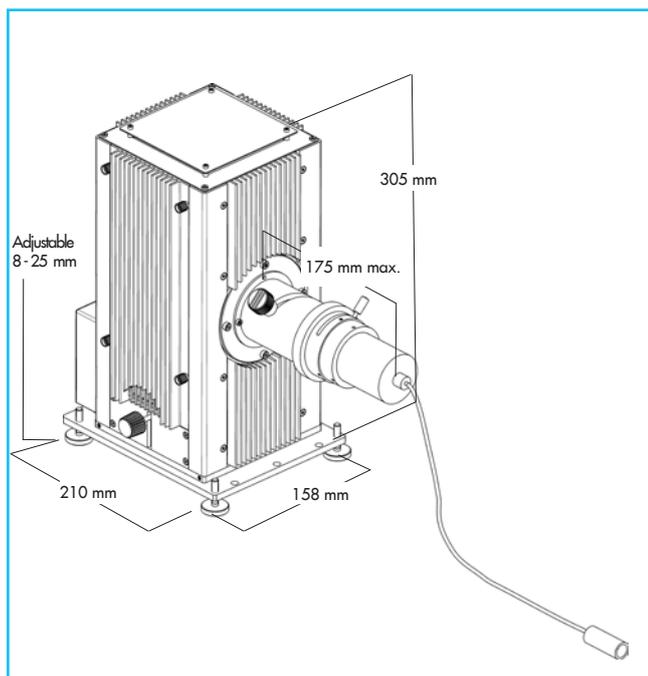
This solar simulator provides a low cost alternative to the fully featured and more expensive large area solar simulator systems. The optical system of this source produces a uniform, collimated beam of 15 mm diameter provided from a 1 m long fiber optic.

Housing and lamp

The lamp housing is a free standing unit and holds the arc lamp, arc lamp ignitor, the collecting and collimating optics, cooling fan, external lamp adjusters and the necessary electronics. It is designed to operate different arc lamps under optimal and necessary conditions. The ignitor is built into the housing, minimizing stray radiated and conducted EMI. The lamp type is a high pressure 300 W Xenon short arc. It is ozone free and has negligible output below 260 nm.

Power supply

The highly regulated power supply LSN254 provides constant current to the Xenon lamp. The current is adjustable in order to maintain constant light output. For specifications of the power supply go to „Arc lamp power supplies, specifications“ on www.lot-qd.com/lightsources (“Arc light sources”).



System design

The system is designed to produce an output of min. 1 sun at a distance of 200 mm from the fiber optic end. The beam diameter is 15 mm for illumination of a 1 square cm area.

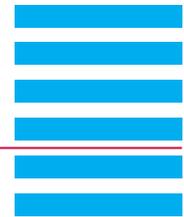
The optical system does include a fiber optic focusing assembly which focuses the collimated light from the lamp directly into the fiber. A closed filter holder for mounting the air mass filter meeting IEC specifications is also part of the optical system. An iris diaphragm is included between the filter holder and the fiber coupler. This allows manual adjustment of the output intensity from 20 – 100 %.

The output of the fiber comes with a fiber collimating optic. It collimates the diverging output from the fiber. The collimating optic holder is prepared to accept a second optional lens, so the collimated beam can be focused one focal length away from the optional lens.

The nominal magnification is defined as the ratio of the focal lengths of lens 2 to lens 1. The optic can be positioned on the fiber to produce a more diverging or converging beam.

Spectral match

No solar simulator accurately matches the sun’s spectrum and the simulator spectrum changes somewhat with lamp age. The terrestrial solar spectrum itself greatly varies with sun altitude and atmospheric constituents. The Xe lamp spectrum must be filtered to match standard air mass spectra. But air mass filters are only an approximation of an average of atmospheric conditions.



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Accessories

If additional spectral shaping of the output is required many solutions are available by adding filters to the optical path. We offer open and closed filter holders which directly mount in front of the fiber coupler.

For measuring the output or adjusting the output intensity we provide a handheld power meter with a cw thermopile head for measurements in the range of 1 mW to 2 W.

Shutters

An electronic (or manual) shutter is available that can be integrated into the optical system. It allows zero compensation, closes off the beam and especially prevents organic cells from heating. The electronic shutter requires 24 V DC (0,25 A) to open. The optional shutter driver provides an open/close switch on the front panel and a TTL input (via BNC), allowing driving the shutter from another source.

As an option we offer the stand-alone countdown timer LSZ162. It operates together with the shutter driver.

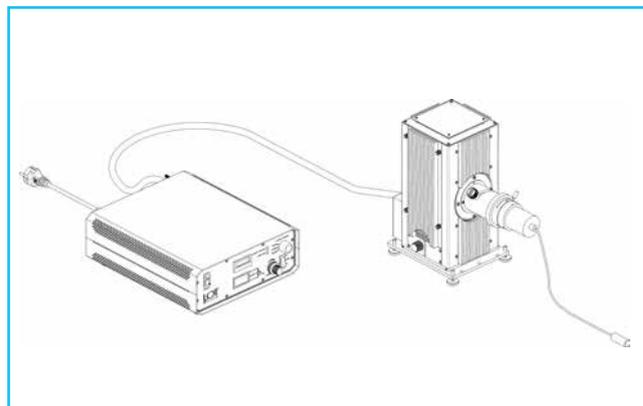
Safety

These solar simulators emit considerable levels of UV radiation harmful to the eyes and skin. Personnel working near this source should wear UV protective goggles and avoid direct exposure of the output beam to the skin!

Specifications

Illumination field	15 mm diam. ¹⁾
Irradiance uniformity	not specified
Irradiance	1 sun (min) ¹⁾
Working distance	200 mm (recommended)
Spectral match	AM filters: IEC 60904-9, Class B
Temporal stability	1 % RMS, IEC 60904-9 Class A
Lamp type	Xenon short arc, 300 W, ozone free, average life: 1000 h
Input	100 - 240 VAC, 50 - 60 Hz.

¹⁾ at 200 mm working distance of the end of the fiber



Ordering information

LSO400	Full spectrum solar simulator with fiber optic coupling, no AM filter included Please choose filter from below.
Filters	
LSZ185	Air mass 0 (outer space)
LSZ289	Air mass 1,5-global, (direct and diffuse) through atmosphere, 48°
Replacement lamp	
LSB530	300 W Xe arc lamp, ozone free
For lamp specifications go to "DC Short arc lamps, specifications" on www.lot-qd.com/lightsources ("Arc light sources").	
Accessories	
LSZ158	Manual shutter
LSZ160	Electronic shutter
LSZ161	Optional driver for electronic shutter
LSZ162	Optional countdown timer for shutter driver
LSZ012	Handheld radiometer
LSZ020	Solar UV - NIR detector Spectral range: 200 - 2100 nm, flat above 700 nm