



Light sources for solar simulation

Solar simulator, 51 x 51 mm² field

- 1 sun (1000 W/m²) irradiance for 51 x 51 mm² uniform field
- Compact size
- Different solar spectra with interchangeable filters
- UV version available

This solar simulator is designed to produce output power equivalent to 1 sun (1000 W/m²). The optical system of this source produces a 51 x 51 mm² uniform, collimated output beam.

Housing and lamp

The lamp housing is a free standing unit that holds the arc lamp, arc lamp ignitor, the collecting and collimating optics, cooling fan, external lamp adjusters and necessary electronics. It is designed to operate different arc lamps under optimal and necessary conditions. The ignitor is built into the housing, thus minimizing stray radiated and conducted EMI. The lamp type is a high pressure 1000 W xenon short arc. It is ozone-free and has a negligible output of below 260 nm.

Power supply

The highly regulated power supply LSN555 provides constant current to the xenon lamp. The current is adjustable to maintain constant light output. For specifications of the power supply go to „Arc lamp power supplies“ on www.lot-qd.com/lightsources („Arc light sources“).



Spectral match

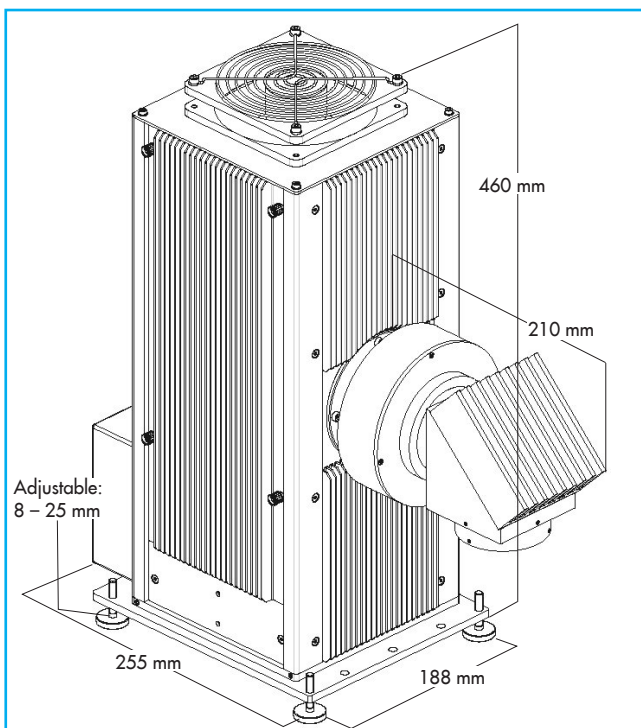
No solar simulator accurately matches the sun's spectrum and the simulator spectrum changes somewhat with lamp age. The terrestrial solar spectrum itself greatly varies with sun altitude and atmospheric constituents. The Xe lamp spectrum must be filtered to match standard air mass spectra. But air mass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

Care should be taken to measure the beam power in the primary spectral regions of interest in order to reduce the effects of this mismatch. For solar cell applications it is best to use a calibrated solar cell of the same general type as the test cell being used. The measurement is thus made with a sensor of essentially the same spectral response as the test cell. This allows for variation in spectral output of the source without significant error in the results.

Full spectrum or UV version

The full spectrum system (250 - 2500 nm) comes with a 90° beam turner and Al-mirror. The beam turner can be rotated 360° about the optical axis to produce a horizontal or vertical beam. The working distance is 220 mm away from the end of the optical system. The optical system includes a closed filter holder for mounting different air mass filters that meet IEC class A specifications. For your convenience, all optics in the optical system are fixed, so that no optical adjustments are necessary.

The UV system comes with a UVB/UVA dichroic mirror which turns the output by 90°. The mirror reflects 280 - 400 nm while reducing the VIS and IR output of the lamp to shape the spectral output. Optional UV blocking filters can be used behind the dichroic to further



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shape the spectral output, for example an atmospheric edge filter, which simulates the UV edge of the sun. For transmittance/reflectance curves of the optional UV filters go to www.lot-qd.com/lightsources ("Solar simulators"), "Low cost solar simulator, up to 35 mm beam diameter".

Accessories

By adding filters to the optical path a great variety of spectral output shapings become possible. We offer open and closed filter holders which directly mount into the solar simulator beam path.

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.

Electronic shutter

The standard solar simulator comes with an electronic shutter which is integrated into the optical system. The shutter closes off the beam and especially prevents organic cells from heating. A stand-alone shutter driver provides an open/close switch on the front panel and a TTL input (via BNC), allowing to drive the shutter from another source.

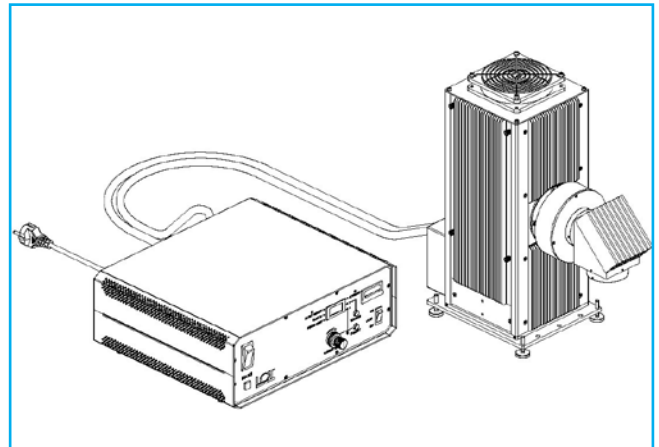
As an option we offer the stand-alone countdown timer LSZ162. It operates together with the shutter driver, the time can be adjusted to 0.02 - 99 minutes or hours.

Safety

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

Specifications

Illumination field	51 x 51 mm ² square
Irradiance uniformity	IEC 60904-9: ± 5 %, class B ± 2 %, class A
Beam collimation	± 4°
Working distance	180 - 190 mm (recommended)
Irradiance	1 sun (min.) @ 220 mm
Spectral match	AM filters: IEC 60904-9, class A
System optics	LS0805: N-BK7 LS0805-Q: Suprasil II
UV system	UVB/UVA dichroic mirror, 280 - 400 nm
Temporal stability	1% RMS, IEC 60904-9, class A
Lamp type	Xenon short arc, 1000 W, ozone free, average life: 1000 h
Input	90 - 250 VAC, 48 - 63 Hz



Ordering information

LS0805	Full spectrum solar simulator, with integrated shutter, no AM filter, class ABA system
LS0805-Q	Full spectrum solar simulator, with integrated shutter, no AM filter, class ABA system, with all optics made of UV quartz
Filters for full spectrum solar simulator	
LSZ185	Air mass 0 (outer space)
LSZ389	Air mass 1.5 global, (direct and diffuse) through atmosphere, 48°
Replacement lamp	
LSB551	1000 W Xe arc lamp, ozone free
UV solar simulators	
LS0705	UV solar simulator with UVB/UVA 90° beam turner
LS0707	UV solar simulator, with integrated shutter and UVB/UVA 90° beam turner
Filters for UV solar simulator	
LSZ176	Atmospheric edge filter, 290 - 4400 nm
LSZ177	VIS-IR blocking filter, 290 - 400 nm, 650 - 800 nm
LSZ178	UVC blocking filter, 280 - 4400 nm
LSZ179	UVB/C blocking filter, 320 - 480 nm, 700 - 4400 nm
LSZ323	Open filter holder for 50 mm square or diameter
Accessories	
LSZ162	Optional timer for shutter driver
LSZ012	Handheld radiometer
LSZ020	Solar UV-NIR detector, spectral range range: 200 - 1200 nm, flat above 700 nm
LS0041	Si reference cell, open version
LS0042	Si reference cell, shunted version
For specifications of the reference cell go to www.lot-qd.com/lightsources , „Solar simulators“, „Reference solar cells“.	