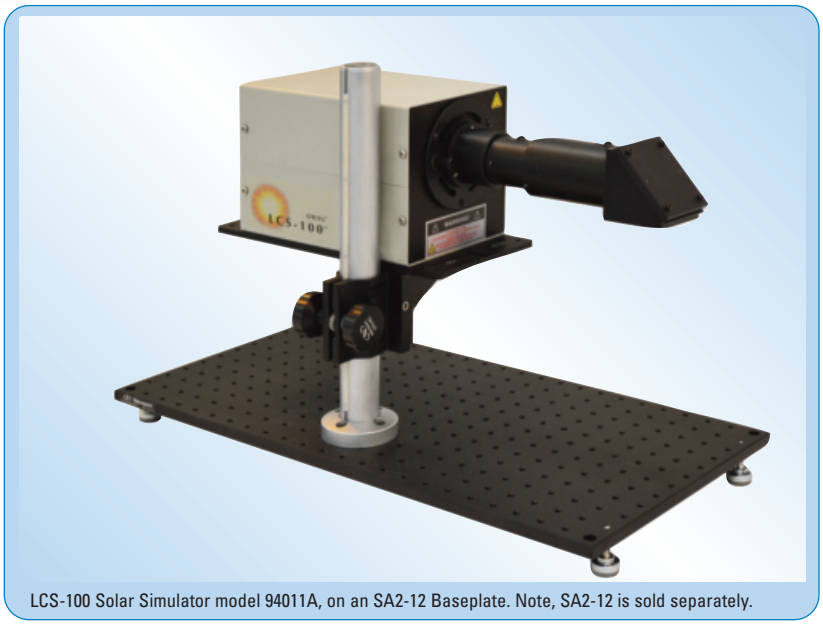
LCS-100 Series Small Area Solar Simulators



LCS-100 Solar Simulator model 94011A, on an SA2-12 Baseplate. Note, SA2-12 is sold separately.

- Low cost alternative for PV cell research requiring small area of illumination
- Standards compliant to current ASTM and IEC for AM1.5G operation at 1.0 SUN output
- Compact design - integrated power supply, ignitor, homogenizer and lamp housing
- Includes lamp hour counter to monitor lamp lifetime
- Simple, "drop-in" lamp assembly requires no lamp alignment
- Integrated 2 inch filter holder

ORIEL® INSTRUMENTS
A Newport Corporation Brand

The LCS-100 Series Solar Simulators are intended for researchers requiring the performance of a certified system over a small area of illumination. These 1.5 x 1.5 inch (38 x 38 mm) Simulators meet Class ABB as defined by the ASTM and IEC standards. They include an AM1.5G filter; other air mass filters are available as options.

Simplicity and Economy

Simplicity and economy were the design criteria for these Solar Simulators. The electronics are built into the lamp housing and are factory pre-set to run the lamp at the proper current and voltage – just power the system and ignite the lamp! There are no high voltage cables to connect, no power supply settings to optimize, and no optical alignments required. They operate a 100 W Xe lamp with integrated reflector. Replacement lamp assemblies simply drop in place with no lamp adjustment required.

For Those Familiar with The Oriel 96000 Solar Simulator...

Many of our customers are familiar with the Oriel 96000 Solar Simulator. The LCS-100 Series is the next generation of the 96000 - designed to meet the current demands of PV Researchers. It offers better performance and a simpler design in a smaller footprint, and for the same price!

Adjust Working Distance to Maintain Output Irradiance

The LCS-100 Series generate over 1 SUN irradiance with an AM1.5G filter; as the lamp ages, the working distance is adjusted to allow continued 1 SUN operation over the 750 hours of the lamp's life.

Table 1 shows the output intensities at various distances. Note, Class ABB is certified only at the working distance of 7.0 inches (178 mm) + 1 inches (25 mm).

Table 1 Typical Output Power from LCS-100 Solar Simulators

Distance from the Illuminator (inches (mm))	Readings with Optional AM0 Filter (mW/cm²)	Readings with Standard AM 1.5G Filter (mW/cm²)	Readings with Standard AMDir Filter (mW/cm²)
5 (127)	247	161	221
6 (152)	184	119	179
7 (178)	151	100	142
8 (203)	126	82	117
9 (229)	105	69	99

AM1.5G Standard Filter

An AM1.5G is the standard filter for the LCS-100. An optional AM0 filter and AM direct filter is available. For other Air Mass filters, contact an Oriel Technical Sales Engineer at 1-800-714-5393 or oriel.sales@newport.com.

Manual or Electronic Shutter

We offer two models of LCS-100 Systems; both include a simple manual slide shutter to close off the beam for safety reasons. We also offer a model with an electronic shutter for external trigger applications. The shutter drive has an open/close switch and a TTL input. The rise/fall time of the shutter blade is ~0.l second, but there is a delay before the blade starts to close the shutter.

Optional Reference Cell Recommended

A calibrated reference cell is an integral part of solar simulator calibration and solar cell I-V characterization. The Oriel model 91150V consists of a readout device and a 2 x 2 cm calibrated solar cell made of monocrystaline silicon. The cell is also equipped with a thermocouple assembled in accordance with IEC 60904-2. The certification is accredited by NIST to the ISO-17025 standard and is traceable both to the National Renewable Energy Laboratory (NREL), and to the International System of Units (SI). It reads solar simulator irradiance in "sun" units; one SUN is equal to 1000 W/m² at 25 °C and AM 1.5G. The Readout Meter includes two BNC connectors for analog outputs for the sun irradiance and the temperature.

We also offer the Cells with KG windows in place of the quartz window; the available window material choice is KG5.

Mounting the LCS-100

Both models of the LCS-100 include an optical rod assembly for vertical translation of the instrument, as shown in Figures 4 and 5. These rod assemblies can be hard mounted to either an inch or metric optical table, breadboard or baseplate. Four mounting feet are included for customers who wish to remove the rod assembly and "sit" the Simulator on a surface. For those customers who do not have the option of hard mounting the Simulator to an optical surface, we recommend ordering the SA2-12 (Inch) or M-SA2-12 (metric) Baseplate; these baseplates are 12 x 24 inch (304 x 610 mm). The SA2-12 has 1/4 - 20 holes on 1 inch centers; the M-SA2-12 has M6 holes on 25 mm centers.

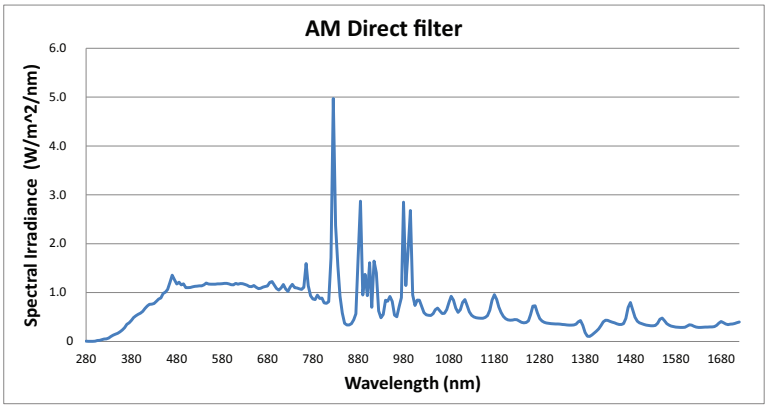


Fig. 1 Spectral output of LCS-100 Solar Simulator with standard AM Direct filter.

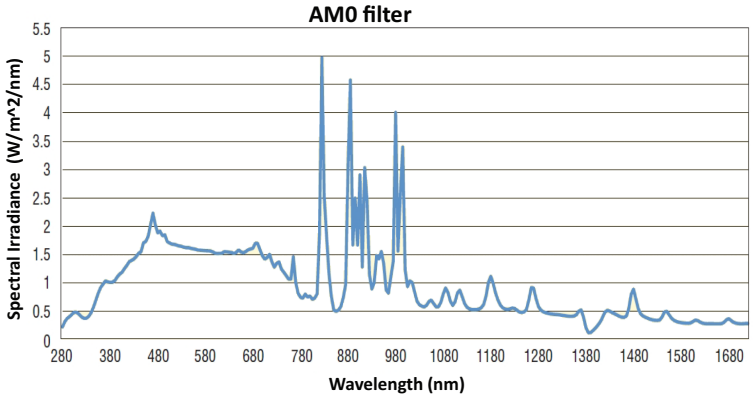


Fig. 2 Spectral output of LCS-100 Solar Simulator with AM0 filter in place of the AM1.5G filter.

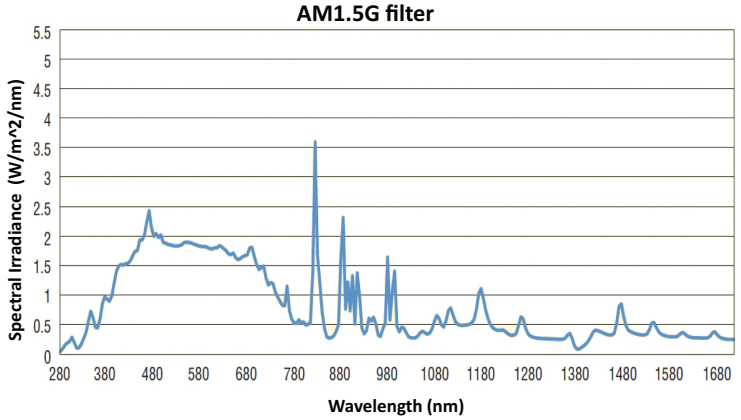


Fig. 3 Spectral output of LCS-100 Solar Simulator with standard AM1.5G filter.

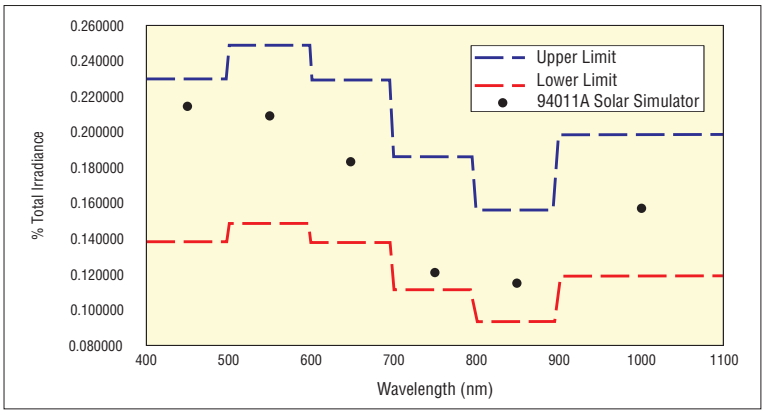


Fig. 4 Certification data from 94011A Solar Simulator showing the Class A spectral match.

Specifications

Beam Size	1.5 x 1.5 in. (38 x 38 mm)
Spectral Match Classification	A - IEC 60904-9 (2007) A - ASTM E927-10 (2015)
Beam Non-uniformity	B - IEC 60904-9 (2007) B - ASTM E927-10 (2015)
Temporal Instability	B - IEC 60904-9 (2007) B - ASTM E927-10 (2015)
Collimation Angle	< 6 °
Nominal Working Distance	7.0 in. (178 mm)
Lamp Power	100 W Xenon
Lamp Life *	750 Hrs
Input Power	100 - 240 VAC, 50/60 Hz, 130 W

* While still maintaining class ABB, 1 SUN

Ordering Information

LCS-100 Series Solar Simulators

Model	Description
94011A	LCS-100 Solar Simulator, Manual Shutter Only
94011A-ES	LCS-100 Solar Simulator, Manual and Electronic Safety Shutter

Accessories

Model	Description
6252	Replacement 100 W Xenon Lamp Assembly
81011-LCS	AM0 Filter
81389-LCS	AM Direct Filter
91150V	Calibrated Reference Cell and Meter, Quartz Window
91150-KG5	Calibrated Reference Cell and Meter, KG5 Window
SA2-12	Solid Aluminum Optical Breadboard, 12 x 24 in., 1/4-20 Holes on 1 inch grid
M-SA2-12	Solid Aluminum Optical Breadboard, 300 x 600 mm, M6 holes on 25 mm grid
81088A-LCS	AM 1.5 Global Filter

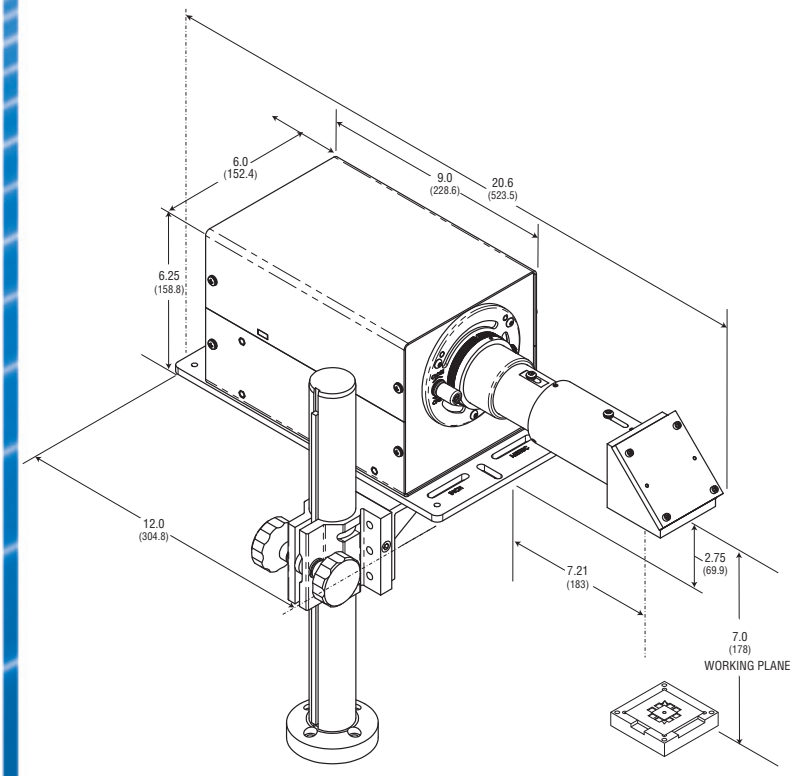


Fig. 4 Dimensional diagram of LCS-100 Solar Simulator, model 94011A

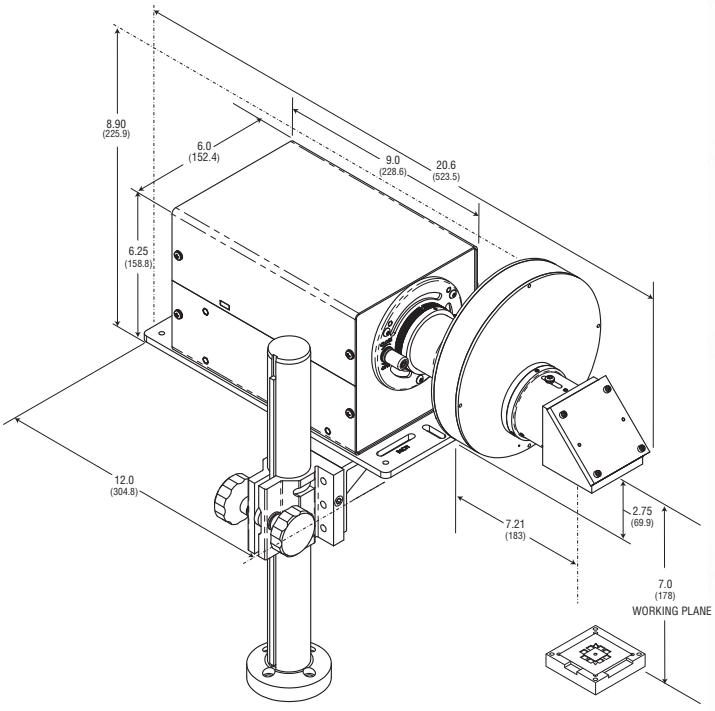


Fig. 5 Dimensional diagram of LCS-100 Solar Simulator, model 94011A-ES

Newport®

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