Model X-1100

Pulsed Light for Research and Development

Supporting the needs for investigating High Energy Pulsed Light applications

PERFORMANCE WITH A LOW COST

The X-1100 is an advanced, laboratory R&D system – a highly integrated, flexible, high-intensity Pulsed Light system that scientists, engineers and researchers use to experiment and define processes to address new applications with optimized solutions. Designed in a compact, benchtop unit, the X-1100 delivers light with a broad continuous spectrum which includes deep ultraviolet, visible and far infrared making it an ideal tool for challenging photonic applications where either high photon energy in the UV region or broad solar-like light is required.

VERSATILITY and EASE-OF-USE

A flexible and user-friendly touch screen computer interface insures ease of operator programming pulse parameters; energy, duration, timing. The system can calculate energy set by the user and also measure the actual pulse using a built-in oscilloscope. Sequence of pulses with varying on and off times can also be created to enable more complex energy delivery schemes. Storing and retrieving these recipes, user access control and event logging are standard features of the X-1100. Universal mains power requirements match standard 90 Vrms, 115 Vrms or 220 Vrms outlets.

Key Specifications and Features

Max Radiant Pulse Energy	9 J/cm^2*
Peak Radiant Power	8 kW/cm^2*
Pulse Duration Range	100 – 6000us
Lamp Spectrum	190 to 1100 nm (Spectra options available)
Range of options available	Lamp Housings, Sample Chambers, Linear Stage

Sets up in minutes, with multiple user screens- graphical user interface (GUI)
Operator touchscreen interface provides user control of all energy exposure settings
Benchtop design with small footprint, and connects to standard mains voltage- 90v,120v, 220v

** With model LH-840 lamp housing and lamp type C (190-1100nm).*

SPECIFICATIONS

(All specifications are typical unless otherwise noted)

The X-1100 system is comprised of a benchtop unit, a separate sealed air-cooled lamp housing and a sample chamber. User touchscreen interface provides programmability of all high pulse characteristics. Optional lamp housing selections are enclosed, air-cooled and contain flashlamp, reflector and air filters. Specifications for the X-1100 system are shown below.

Max radiant energy delivered *	J/cm^2	9
Peak radiant power delivered*	kW/cm^2	8
Output spectrum - lamp C	nm	190 -1100
Energy to lamp	J/pulse	37.5 - 2500
Max power to lamp, continuous	J/sec	750
Voltage range	v	1000 - 3000
Pulse rate, max @ 2500 J/pulse	pps	0.3
Pulse rate, max @ 37.5 J/pulse	pps	20
Treatment area*	cm	2.54 x 40.6
Pulse length, range	µsec	100 - 6000
Pulse length, increments	µsec	100
Pulse spacing, min	ms	60
Operator interface		Touch-Screen
Recipe storage/recall		Yes
Pulse sequence modes		Single, Burst, Continuous
Pulses in sequence	#	1 - 40
Mains AC power	V_{rms}	1-Phase, 90-250 V_{rms}, 50/60 Hz
		10 A @ 115 V, 5 A @ 230 V
Outline dimensions W x L X H	cm	34 x 49 x 36
Weight	kg (lbs.)	34 (75)
Operating temperature		0-40℃ (32-104°F)
Relative humidity		10-90% (non-condensing)

* Optical energy depends on (1) max electrical pulse energy, (2) size of treatment area, (4) distance from lamp housing window and (4) lamp spectrum. Specifications shown are for model LH-840 lamp housing 2.54 cm (1 inch) from lamp housing window. Radiant energy for all lamp housing options is shown in table below.
Specifications subject to change without notice

Lamp Housing Model	Treatment Area		Radiant Pulse Energy*
	(cm)	(cm^2)	Max (J/cm^2)
LH-912	13.97 dia.	153	7
LH-820	7.62 x 25.4	194	7
LH-830	7.62 x 30.5	232	5
LH-840	2.54 x 40.6	103	9
LH-851	2.54 x 50.8	129	6
LH-870	2.54 x 76.2	194	3

SPECIFICATIONS

(All specifications are typical unless otherwise noted)

System Configurability Options

The X-1100 is available with a family of options designed to support researchers implementing a range of materials studies under different treatment areas and exposure levels. Included in the family of accessory options are lamp housings, sample chambers and a linear stage. Each lamp housing can be quickly connected and disconnected to the X-1100 using the rear panel plug. Lamp housing cables may be ordered in 3 or 6-meter lengths

Lamp Housings

Specification	Model LH-912	Model LH-820	Model LH-830
Treatment Area - W X L [1]	13.9 (5.5) diameter	7.62 x 25.4 (3.0 x 10)	7.62 x 30.48 (3.0 x 12)
Flash lamp type	Spiral	U-shape with Elliptical Reflector	U-shape with Elliptical Reflector
Window Opening- W X L	16 (6.3) diameter	11.4 x 30.9 (4.5 x 12.8)	11.4 x 30.9 (4.5 x 12.8)
Outline Dimensions- H X W X L	20 x 24.2 x 16.2 (7.9 x 9.5 x 6.0)	41.9 x 15.2 x 19.4 (16.5 x 6.0 x 7.6)	47.x 15.2 x 19.4 (18.5 x 6.0 x 7.6)
Lamp Cooling	Air-cooling: 1274 m^3/hr. @ 750Pa.	*	*
Air filter	Light Blocking	*	*
Lamp spectra options	Type A or B or C spectra	*	*
High Voltage and Control Cables	Length: 3 or 6 meters	*	*
Weight	5.9 kg (13 pounds)	5.9 kg (13 pounds)	8.2 kg (18 pounds)

Specification	Model LH-840	Model LH-851	Model LH-870
Treatment Area - W X L [1]	2.54 x 40.6 (1.0 x 16)	2.54 x 50.8 (1.0 x 20)	2.54 x 76.2 (1.0 x 30)
Flash lamp type	Linear with Elliptical Reflector	Linear with Elliptical Reflector	Linear with Elliptical Reflector
Window Opening - W X L	8.9 x 53.3 (3.5 x 21)	8.9 x 53.3 (3.5 x 21)	8.9 x 80 (3.5 x 31.5)
Outline Dimensions - W X D X L	17.8 x 19 x 76.2 (7.0 x 7.5 x 30)	17.8 x 19 x 76.2 (7.0 x 7.5 x 30)	17.8 x 19 x 98.8 (7.0 x 7.5 x 38.9)
Lamp Cooling	Air-cooling: 1274 m^3/hr. @ 750 Pa.	*	*
Air filter	Light Blocking	*	*
Lamp spectra options	Type A or B or C spectra	*	*
High Voltage and Control Cables	Length: 3 or 6 meters	*	*
Weight	14.5 kg (32 pounds)	11.6 kg (25.5 pounds)	14.4 kg (32 pounds)

All specifications are typical unless otherwise noted ($T_{ambient}$ @ +25° C) and subject to change without notification.

*** Specification same as LH-912**

All dimensions: cm (inches)

[1] Treatment area located at 2.54 cm (1.0 inch) from window face

Model LH-912 Lamp Housing mounted on Model LC-916 Sample Chamber

Model LH-840 Lamp Housing with 40.6 cm (16 inch) linear lamp

Model LH-820 Lamp Housing with U-shaped lamp.

SPECIFICATIONS

(All specifications are typical unless otherwise noted)

Lamp Housing Cooling

The enclosed flashlamp housings have been designed for continuous forced air cooling to insure the lamp temperature is maintained during operation. When the system is being shut down, air cooling should continue for a minimum of 5 minutes after lamp is flashed. Air volume of 300 cubic feet per minute is required. Light-blocking air exhaust filters are provided on the housing. A blower kit—including a blower, mains power cord, air filter, flexible aluminum ducting and hose clamps—is available for order to provide adequate cooling for the lamp housing and flashlamp

Sample Chamber – model LC-916

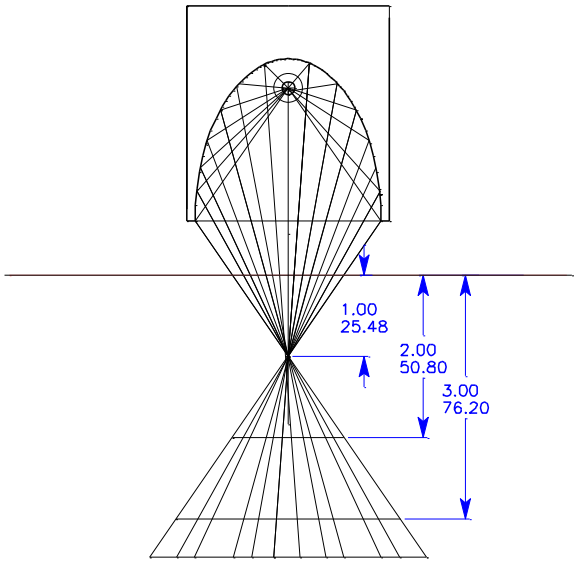
Model LC-916 is a stainless steel manually operated sample chamber designed to mate with model LH-912 spiral lamp housing providing shielding for the operator from the intense light generated during each lamp flash. The chamber door is interlocked to ensure that the lamp cannot be flashed if the chamber door is open. A slide-out shelf lets researchers use small laboratory samples to achieve proof-of-principle validation and establish process variables**.**

Sample Chamber – model LC-917

Model LC-917 is a stainless-steel sample chamber with enclosed air

cooled lamp housing and linear flashlamp mounted on top. Sample tray is shown located in position 1 just below the chamber window. Tray may be moved to 11 unique positions to adjust pulse energy reaching sample on tray. Chamber access door is shown open. Interlocks prevent lamp flashing when access door is open

Ray trace drawing illustrating how light is distribution under the lamp from the elliptical reflector contained in the lamp housing, model LH-840. Dimensions are from chamber window – (inches/mm).



SPECIFICATIONS

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Linear Stage

The Linear Stage, model LS-845, is a semi-automatic material handling system designed to interface with the X-1100 and LS-840 Lamp Housing. This accessory enables the user to develop and optimize processes for static, indexing and reel-to-reel applications.

The Linear Stage integrates the LH-840 (16 in. linear lamp) optical source to provide a single axis of linear motion for area sintering. The sample tray is 45.7 cm wide x 35.5 cm long (18 x 14 in.) with a treatment area up to 25 cm wide x 300 cm long (10 x 12 in.) The Linear Stage offers speed adjustment over a range of 5 to 100 mm/second (0.8 to 19.6 ft./minute). A light mask with aperture width adjustable between 1cm and 8 cm (0.39 in and 3.15 in) establishes a well-defined region where light is incident on the sample. The distance of the sample from the lamp housing can be adjusted over a range of 2.5 cm to 7.6cm (1 to 3 in.). A stepper motor drive allows for precise staging of the sample with digital control of SPEED, STEP and POSITION. An electrical interlock and light tight door insures that the operator is not exposed to the high intensity light used in the sintering/curing process.

Users control the SPEED, STEP, and POSITION through the control panel on the Linear Stage. The Mode and operation of the Linear Stage is controlled through the X-1100 touchscreen user interface.

The Linear Stage can be operated in three distinct modes:

Center Mode
The carriage moves forward, centering under the lamp. The lamp is flashed. The carriage is returned to the home position.

Step mode
The carriage moves forward a programmed distance and stops. The lamp is flashed. This sequence is repeated until the carriage reaches the end of travel, and then the carriage automatically returns home.

Continuous Mode
The carriage is moved forward at a programmed speed. Each time the carriage travels a set distance the lamp is flashed. When the carriage reaches the end of travel, the carriage automatically returns home.

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