Complete LED Characterization Systems from Gamma Scientific

GAMMA SCIENTIFIC™

Spectroradiometer
Gamma Scientific's spectroradiometer systems for LED measurements provide high accuracy and near-perfect repeatability via RadOMA back-thinned CCD array technology. The results are highly repeatable, precise, millisecond measurements of LED spectra of all colors.

Four models cover a very wide spectral range, from ultraviolet to near infrared. The RadOMA's exceptional low-light measurement capability and superior blue-light region sensitivity further enhances accuracy for determination of LED's half-power bandwidth, peak wavelength, color temperature, luminance and proper binning.

Luminous and Radiant Intensity
The basic LED measurement system includes an optical system which meets the CIE publication 127 conditions A and B. This optical system includes a fiber-optically coupled 1.0 square centimeter measurement detector with baffle tubes to set the proper distance from it to the tip of the LED.

Test Sockets
Gamma Scientific offers a variety of precision and ultra-precision LED measurement sockets. These sockets accommodate regular, miniature and sub-miniature LED's and feature a locking flange that snaps firmly into place, ensuring good alignment with the mechanical axis. Each test socket has banana connectors for use with high-precision power supplies. Extra leads are provided to measure the junction resistance of the LED to determine the diode temperature. Our list of available test sockets is continually growing as new LED types become available.

Luminous and Radiant Flux (Power)
The model GS-IS12-TLS is a barium sulfate coated integrating sphere designed to measure the total power of the LED. The sphere has a port for the test socket which places the entire body of the LED package inside the sphere. This meets the current CIE recommendation. The sphere is a 12 inch (30 cm) diameter, which allows the user to achieve very low uncertainty measurements. A 6 inch (15 cm) version is also available.

Spatial Radiation Measurements
For measurement of the angular dependent spatial radiation pattern, Gamma Scientific offers the model 940-LED goniometer as a plug-in addition to the LED measurement system. The 940-LED's feature set includes a high-speed USB interface, two automated axes, including an automated axial range that eliminates the extra step of manual LED rotation associated with non-motorized axial-range units and comprehensive, built-in sockets to accommodate a wide variety of LED's. The goniometer has resolution to 0.001° to provide extremely detailed measurements of the spatial radiation pattern. The 940-LED can also be used as an alternative method to determine the luminous or radiant flux of an LED while eliminating measurement errors due to integrating sphere geometry.

Software
Gamma Scientific's spectral LED measurement systems come standard with the GS940LED control and data acquisition software. It gives the user complete control of the measurement system and offers Keithley 2400 Series and 2602 SourceMeter™ integration. The software also offers MS Excel integration for test sequence generation and report generating.

System Features

- *Recommended geometry from CIE Pub. No. 127*
- *Exceptional accuracy via high-resolution bandwidth coverage*
- *Superior wavelength and color accuracy via low thermal*
- *expansion coefficient materials*
- *Near-real-time measurement*
- *High resolution: up to 0.4 nm between data points*
- *Spectral ranges: 200-780 nm, 260-900 nm,*
- *300-1100 nm, and 380-800 nm*
- *Cooled, back-thinned high-end CCD Array*
- *USB interface*
- *Windows-based control/analysis software with integrated Keithley 2400 Series and 2602 SourceMeter™ control with MS Excel integration*
- *NIST-traceable calibrations*
- *Wide variety of test sockets for many LED types*

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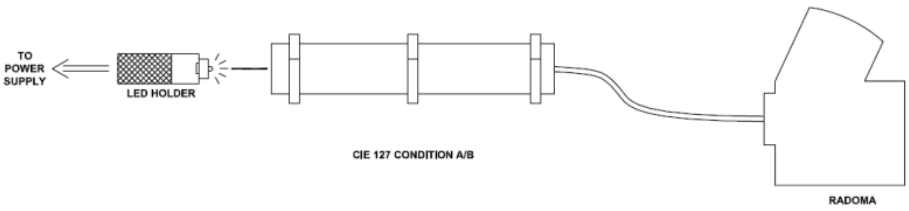
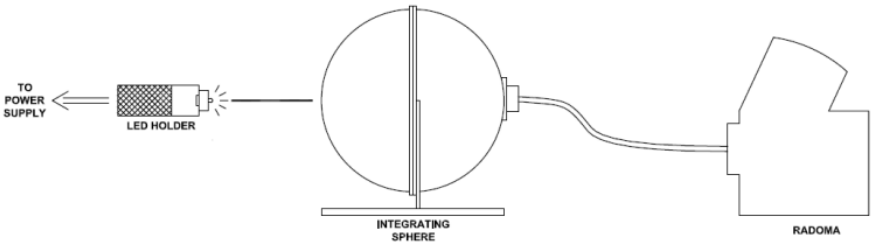
SYSTEM CONFIGURATIONS

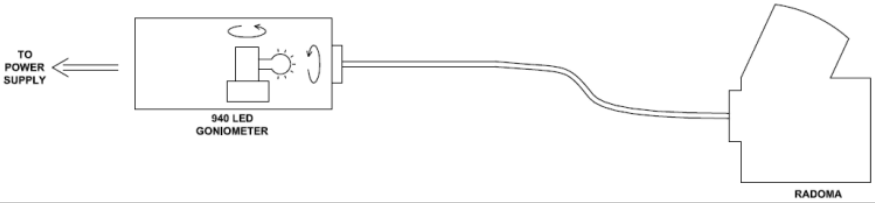
SYSTEM CONFIGURATION(A): LUMINOUS/RADIANT INTENSITY (CANDELAS OR WATTS PER STERADIAN)

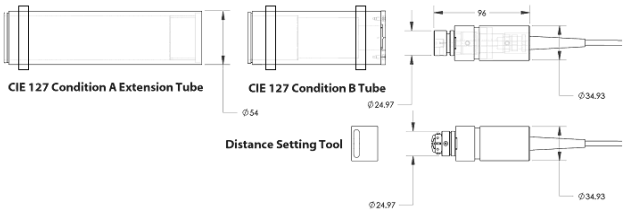


SYSTEM CONFIGURATION(B): LUMINOUS/RADIANT FLUX (LUMENS OR WATTS)



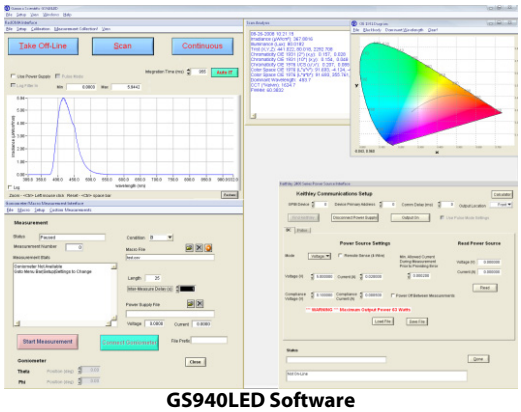
SYSTEM CONFIGURATION(C): SPATIAL GONIOMETRIC MEASUREMENTS





NOTE: Dimensions in millimeters

CIE Pub. 127 Geometry	Distance between the detector and LED tip	Solid Angle (steradians)
Condition A	316 mm	0.001
Condition B	100 mm	0.01



GS940LED Software

LED Test Sockets

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SPECIFICATIONS

Detector and Wavelength Specifications				
Spectrometer	**GS-1290-LED-0**	**GS-1290-LED-1**	**GS-1290-LED-2**	**GS-1290-LED-3**
Nominal Spectral Range	200-800 nm	260-880 nm	300-1100 nm	380-780 nm
Datapoint Interval	0.6 nm	0.6 nm	0.9 nm	0.4 nm
Spectral Bandwidth	Built-In User Selectable Half-Power Bandwidth (HPBW) **Bold is factory setting**			
	10 nm	10 nm	20 nm	10 nm
	5.0 nm	5.0 nm	10 nm	5.0 nm
	2.5 nm	**2.5 nm**	5.0 nm	**2.5 nm**
	1.8 nm	1.8 nm	**2.7 nm**	1.4 nm
	1.2 nm	1.2 nm	1.8 nm	1.0 nm
Wavelength Repeatability	0.02 nm	0.02 nm	0.03 nm	0.02 nm
Wavelength Accuracy	+/- 0.1 nm	+/- 0.1 nm	+/- 0.2 nm	+/- 0.1 nm
Accuracy[1]				
Luminous Intensity	± 1%	± 1%	± 1%	± 1%
Luminous Flux	± 1%	± 1%	± 1%	± 1%
Chromaticity (CIE1931 xy)[2]	x,y=±0.0015	x,y=±0.0015	x,y=±0.002	x,y=±0.0015
Dominant Wavelength[2]	± 0.5 nm	± 0.5 nm	± 0.5 nm	± 0.5 nm
Sensitivity[3]				
Luminous Intensity (10:1 signal-to-noise)	0.002 mcd to 15 kcd	0.002 mcd to 15 kcd	0.002 mcd to 15 kcd	0.002 mcd to 15 kcd
Luminous Flux (12" sphere ; 10:1 signal-to-noise)	0.1 mlm – 240 klm	0.1 mlm – 240 klm	0.1 mlm – 240 klm	0.1 mlm – 240 klm
Measuring time (range)	8 msec to 60 sec	8 msec to 60 sec	8 msec to 60 sec	8 msec to 60 sec
Meas. Time at 1 mcd (10:1 signal-to-noise)	40 msec	40 msec	40 msec	40 msec

Specifications Below Apply to All Spectrometers	
Stray Light	Less than 1 x 10^{-4} (at 8 times the HPBW from HeNe Laser Line)
Spectral Sensor	Temperature-Stabilized Back-Thinned 1024x128 element CCD Array
Electrical Resolution	16 Bit
Dynamic Range (single scan)	64,000:1
Computer Interface	USB 2.0
Control Software	GS940LED Analysis software for Windows
Dimensions:	12.1" L x 6" W x 11.8" H (30.8 cm L x 15.1 cm W x 29.9 cm H)
Weight	10 lbs (4.6 kg)

940LED Goniometer Specifications	
Automated horizontal range, theta	-90° to +90°
Minimum horizontal angle resolution	0.001°
Maximum horizontal rotation rate	15° per second (@ 1° measurement interval)
Automated axial range, phi	0° to 180°
Minimum axial angle resolution	0.1°
Computer interface	USB
Power requirement	External DC supply (included)
LED positioning Tool	Linear adjustment to set the center of rotation of the LED per CIE Publication 127

1: Accuracy specifications assume sufficient signal to noise and are valid immediately after proper calibration, relative to the calibration standard.
2: Applies to colored LEDs with sufficient signal-to-noise ratio.
3: Sensitivity specifications assume a 10:1 signal-to-noise ratio for white 5000K CCT LED's.
Specifications are subject to change at any time without notice

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