

Eigenlite™ RS-5 Digital Light Source System

PRODUCT SUMMARY

The Eigenlite™ RS-5 linear programmable digital light source provides a versatile way to test and characterize CCD, CMOS, and other image sensors, cameras and detectors. When combined with one of our wide range of projector options, it becomes the ultimate instrument for photometric and radiometric calibration; delivering near perfect linearity and uniformity — giving the sensor or camera engineer/manufacturer an unparalleled foundation with which to calibrate and verify the quality and consistency of their imaging components and products.

The Model RS-5 consists of a Model 21750 linear programmable light source controller and a feedback-stabilized LED optical head.

Spectral output selections for the optical heads range from the UV region into the near infrared, offering either narrow-band, quasi-monochromatic, or broadband white light. Each head provides a single calibrated spectrum. The controller display reads in absolute NIST-traceable radiometric and/or photometric units.

The Model RS-5 is equipped with both manual and computer interface control. Computer control is by simple ASCII commands over a built in RS-232 port. A single operator can perform a host of highly accurate measurements in just a matter of minutes. Using the serial computer interface, many users have produced fully automated sensor and camera testing systems which automatically generate transfer function data and report figures of merit (i.e. photon and gamma transfer), sensitivity, responsivity, electronic gain, defect maps etc. With the RS-5's linearity, dynamic range, uniformity, and fully digital control, you are never limited by your needs or imagination.

And behind the system's calibration stands the pre-eminent measurement expertise at Gamma Scientific. Gamma Scientific produces the most stable and accurate light measurement and generation equipment available today.



FEATURES

- High-resolution digital brightness control provides near perfect linearity and uniformity.
- Light level setting to 1 part in 65,535, in absolute, NIST-traceable, radiometric and/or photometric units.
- Linearity deviation of less than 0.25% RMS of full scale over the entire brightness adjustment range.
- Spectral distributions ranging from the UV into the near infrared, RGB, and broadband white.
- Computer controllable with simple commands that easily integrate into test systems.
- 100x longer light source lifetimes with nearly zero down-time – no lamp change required.

APPLICATIONS

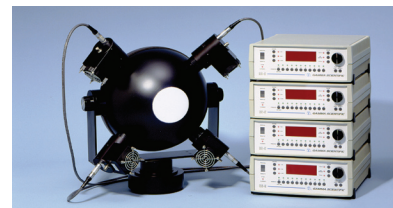
- Photometric and radiometric calibration and testing of sensors and imaging systems.
- Design of illumination sources.
- CCD, CMOS and other sensor performance measurements: charge capacity, electronic gain, responsivity, saturation, noise equivalent power, quantum efficiency, non-linearity, equivalent ISO film speed.



Minimum configuration of the RS-5 system with the 21750 power supply/controller and a 42200 series Optical Head.



RS-5 system configured with a 42250 series Uniform Illuminator option for providing uniform illumination to a sensor plane.



Four RS-5 systems, each with a different color optical head, configured on a 12-inch integrating sphere to provide a computer controlled, colorimetrically tunable, uniform light source.



GAMMA SCIENTIFIC

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SPECIFICATIONS

General Description	Linear Programmable Light Source Controller. Stabilized LED source. Computer and manual control with digital front panel display. CW and pulsewidth modulation. Calibrated in absolute optical units.
Source Geometry	38 mm diameter extended source. Choice of projection beam, lambertian/super-lambertian, or uniform illuminator options.
Wavelength	Almost any center wavelength from 360-1550 nanometers.
Spectral Bandwidth	8-300 nm depending on center wavelength and spectrum. (can be narrowed on request)
Output Power	Depends on center wavelength, spectrum, and illuminator configuration (i.e. F#, lambertian subtense, and illumination field size)
Irradiance	< 1 nanowatt/cm ² to >2 mw/cm ²
Illuminance	< 1 nanolux to >8000 Lux
Radiance	< 1 nanowatt /cm ² *sr ⁻¹ to >2 mw/cm ² *sr ⁻¹
Luminance	< 1 nanocd/m ² to >80,000 cd/m ²
Linear Brightness Adjustment Specifications	
Dynamic Adjustment Range	16 bits or 1 part in 65535
Signal-to-Noise Ratio	>96 dB at full scale
Non-linearity	0.1% nominal (RMS of full scale)
Pulse width modulation	0 to 500 kHz
Settling time	<1.0 second (<<0.1 second for 1% uncertainty)
Repeatability	>99.99% (after settling)
Absolute NIST-traceable accuracy	± 5% of dial setting at full scale (± 1% by request)
Brightness Instability	
Short term drift (1 hour)	Offset: <0.0002% of full scale Gain: <1.0% of full scale
Drift with temperature	Offset: <0.0002% of full scale/1°C Gain: <0.02% of full scale/1°C
Long term drift (1 year)	<1.0% of full scale
Irradiance/Illuminance Non-Uniformity	Depends on Illuminator configuration (i.e. F#, lambertian subtense, and illumination field size)
Irradiance/illuminance	<0.1% to 10% over a 25 mm diameter aperture
Radiance/luminance	<0.1% to 10% over a 60 degree subtense
Spectral Shift with Brightness	1-30 nm depending on center wavelength, spectrum and filter options: <2 nm typical for most wavelengths. Shift is repeatable and can be completely characterized with optional calibration.
Standard Calibrations Available	Radiant intensity, Spectral Radiant intensity Luminous intensity, Spectral Luminous intensity Irradiance, Spectral Irradiance (requires Part number 42250 Uniform illuminator option) Illuminance, Spectral Illuminance (requires Part number 42250 Uniform illuminator option) Radiance, Spectral Radiance (requires Part number 42255 radiance/Luminance converter) Luminance, Spectral Luminance (requires Part number 42255 radiance / Luminance converter) Flash energy in lux*sec or watt*sec



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