

# Model S471 Portable Optometer

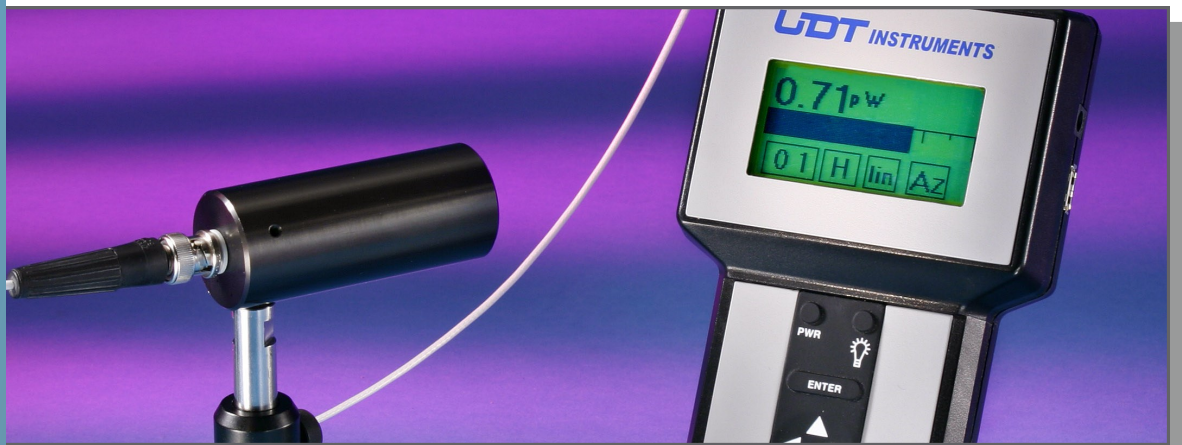


**GAMMA SCIENTIFIC**  
*Light Measurement Solutions*



# **GAMMA SCIENTIFIC** *Light Measurement Solutions*

## Model S471 Portable Optometer



### About Gamma Scientific

With over 50 years of experience in developing light measurement instruments, Gamma Scientific is trusted by the world's leading organizations to provide accurate results.

Based in San Diego, Gamma Scientific manufactures laboratory grade spectroradiometers, spectrometers, spectrophotometers and integrating spheres.

Gamma Scientific also operates an ISO 17025, NVLAP accredited laboratory performing ENERGY STAR, LM-79 and LM-80 tests for LEDs.

### About UDT Instruments

UDT Instruments, a Gamma Scientific company, manufactures precision photometers, radiometers, colorimeters and photosensors for optical measurement applications.

Gamma Scientific  
9925 Carroll Canyon Road  
San Diego, CA 92131  
858-279-8034  
contact@gamma-sci.com  
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The Model S471 is a high-quality [handheld optometer](#), ideal for all of your photometric, radiometric and fiber optic measurement needs. The S471 is designed to be used in a laboratory setting or field environment. The instrument is microprocessor controlled and has three measurement data-presentation options: direct display measurement with analog bar; RS-232 computer interface and analog voltage input.

In addition to its exceptional technical and functional characteristics, this system is fully compatible with all UDT Instruments sensor heads in any configuration. All calibrations are performed in Gamma Scientific's [NVLAP accredited testing laboratory](#).

## Features

- High accuracy measurements
- Wide dynamic range
- Computerized high-speed update rate
- Programmable averaging readings in low pass or boxcar average
- Large calibration capacity
- Large monochrome LCD graphics/backlight
- Calibration data/accessories information display
- Long operational battery life or direct external power
- Simple touch keypad
- Portable and durable
- Optional USB to serial bridge converter





# **GAMMA SCIENTIFIC** *Light Measurement Solutions*

## Model S471 Portable Optometer Specifications

### Accuracy/Precision

	Full Scale	A to D Convertor Resolution	Measurement $\pm$ (% of full scale)
A	4.12 mA	8 nA	$\pm 0.01\%$
B	412 $\mu$ A	800 pA	$\pm 0.02\%$
C	41.2 $\mu$ A	80 pA	$\pm 0.02\%$
D	4.13 $\mu$ A	8 pA	$\pm 0.01\%$
E	416 nA	800 fA	$\pm 0.04\%$
F	45.4 nA	87 fA	$\pm 0.01\%$
G	4.12 nA	8 fA	$\pm 0.01\%$

- **Update Rates**
  - RS-232 (Display Enabled) > two times per second
  - RS-232 (Display Enabled) up to 53 times per second
- **Measurement**
  - Direct measurement-RS232 interface and analog output
- **Analog Output**
  - $\pm 4.0$  Volts
- **Communication Rate**
  - 9600 Baud
- **Operational Battery Life**
  - Backlight off-32 hours
  - Backlight on-24 hours
- **Operating Temperature Range**
  - 10°C to 60°C
- **Storage Temperature Range**
  - -20°C to 35°C for < 1 year
- **Power Source (AC)**
  - Universal input desktop power supply
  - 100-240V, 7A, 50-60 Hz
  - TUV, CSA, UL, CE approved
- **Power Source (DC)**
  - Rechargeable integral battery pack
  - 5 NiMH AA, 1800-mAhr batteries
- **Calibration Capacity**
  - 9 continuous calibrations or 50 single-point calibrations
- **Calibration Traceability**
  - All calibrations traceable to the National Institute of Standards and Technology (NIST)

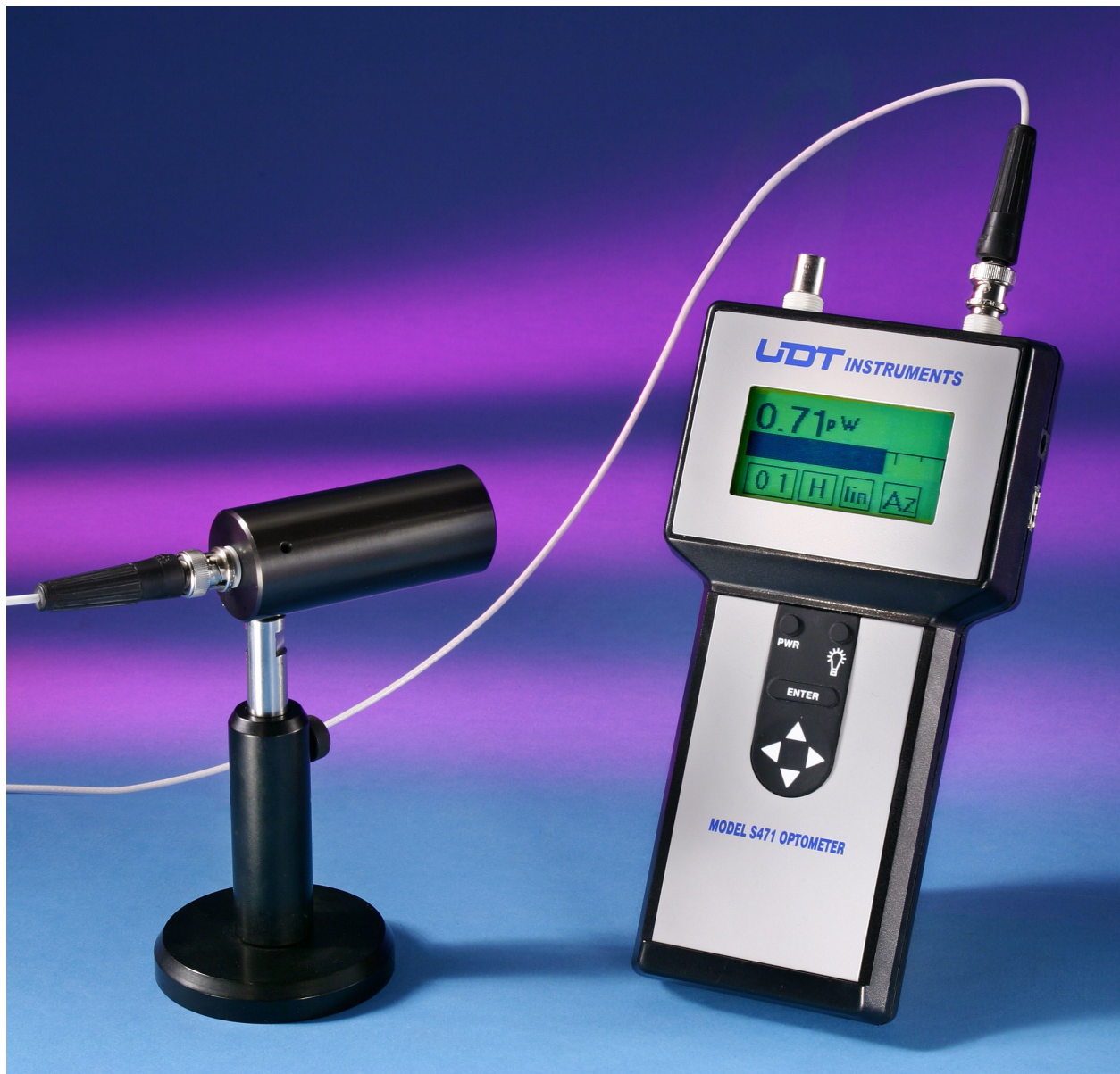
\*Standard Operating Range for Gamma Scientific Instruments- Temperature: Minimum: 0°C (32°F) - Maximum: 35°C (95°F); Relative Humidity (Non-Condensing): Minimum: 20% - Maximum 70%

\*\*The information contained in this data sheet is based on Gamma Scientific's internal evaluation and is subject to change at any time without notice.

\*\*\*Revised on April 14, 2015



# Model S471-LED Optometer



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## Model S471-LED Optometer

### About UDT Instruments

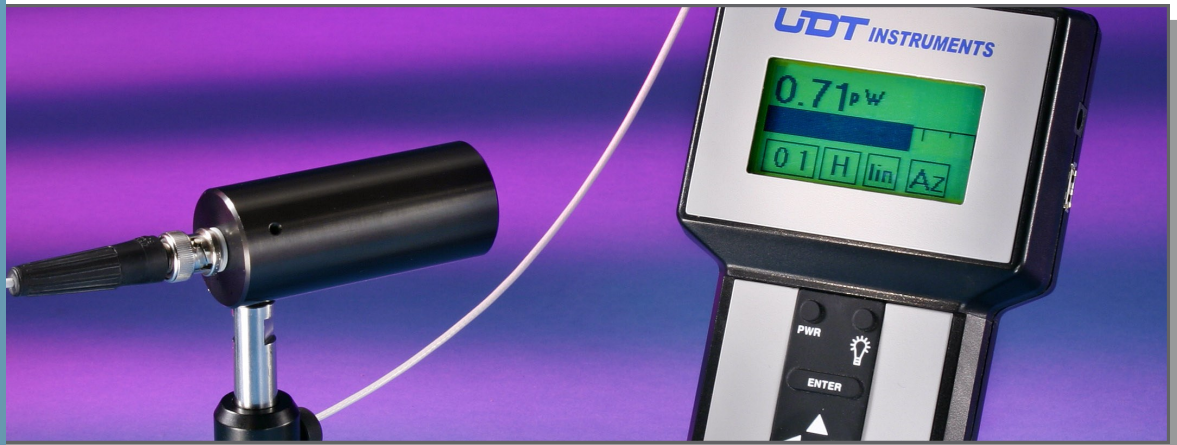
For over 40 years UDT Instruments, a Gamma Scientific company, has been trusted by the world's leading organizations to provide accurate light measurement systems.

UDT Instruments manufactures precision photometers, radiometers, colorimeters and photosensors for optical measurement applications.

UDT Instruments designs the most accurate photometric filters in the world, with an unsurpassed ability to match the human eye's sensitivity to color and light intensity. Each sensor includes a NIST-traceable calibration.

High-performance optometers from UDT Instruments can be combined with our integrating spheres and detectors to create complete photometric and radiometric test systems with industry leading accuracy.

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The UDT Model S471-LED handheld optometer is specifically configured for all your LED measurement needs. It is designed for use in a laboratory setting or production environment. The Model S471 is microprocessor controlled and has three measurement data-presentation options: direct display measurement with analog bar, RS-232C computer interface, and analog voltage input.

The unit comes standard with a photometric detector and LED holding sockets designed to meet the recommended CIE Publication 127 document on measurements of the luminous intensity (candelas) of LEDs. The sockets accommodate regular, miniature and sub-miniature LEDs and feature a locking flange that snaps firmly into a CIE Condition A or B baffle tube, ensuring precise alignment of the LEDs mechanical axis. In addition, the finger clamps and locking flange ensure the distance from LED tip to detector is precisely set and conforms to CIE Publication 127.

The sockets feature banana connectors for use with high-precision power supplies. Extra leads are provided to measure the junction resistance of the diode for monitoring the diode temperature.

For total luminous flux measurements (lumens), UDT offers integrating spheres designed specifically for LED measurements.

The UDT S471-LED comes with a world-class photopic fit that is unmatched by any other instrument. It can also be configured with a radiometric detector for radiant intensity and total radiant flux measurements.

In addition to its exceptional technical and functional characteristics, this system is fully compatible with all UDT Instruments sensor heads in any configuration, making it easy to configure your S471-LED to a wide variety of applications, including illuminance, irradiance, and fiber-optic measurements.

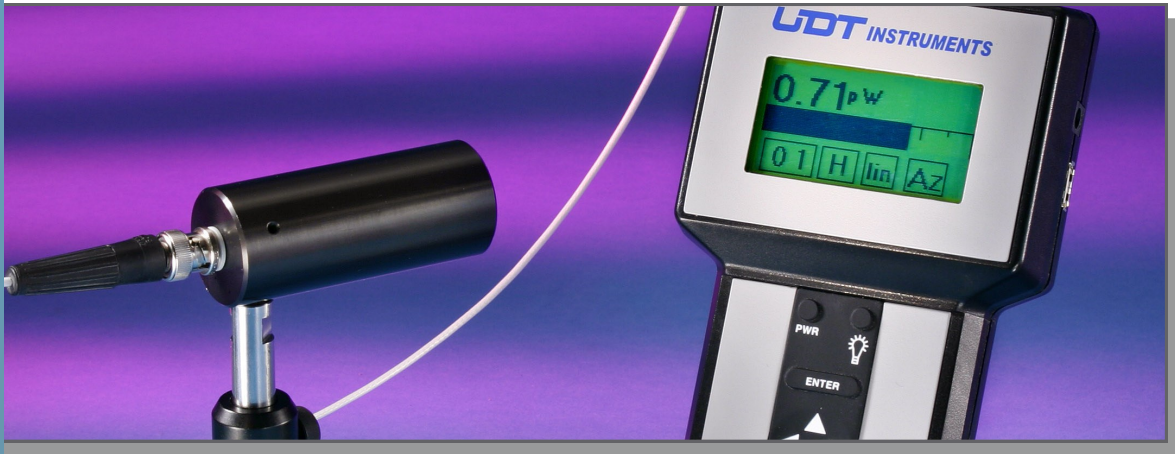
The system comes with a factory calibration which is traceable to the National Institute of Standards and Technology (NIST).





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## Model S471-LED Optometer



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### Features

- Meets CIE Publication
- World-Class Photopic Response
- RS-232C Computer Interface
- Compact and Light-weight
- Rechargeable NiMH Battery Powered

### Applications

- Luminous/Radiant Intensity Measurements
- Total Luminous/Radiant Flux Measurements
- Research and Development Testing
- Device Brightness Measurements
- Tunnel Brightness Measurements
- Signal Brightness Measurements
- Equipment and Device Illumination Measurements



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### Model S471-LED Optometer Specifications

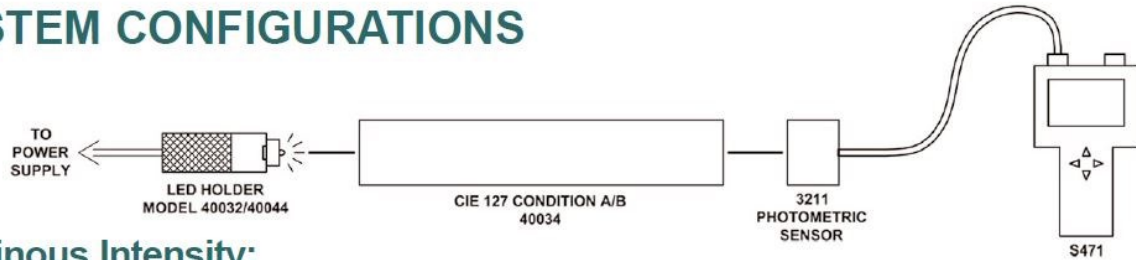
Receptor	Silicon photocell with photopic correction and 1 cm <sup>2</sup> circular aperture per CIE127
Relative Spectral Response	< 3% f1' CIE spectral luminous efficiency V( $\lambda$ )
Measurement Speed	RS-232 (Display Enabled) > 2 times per second RS-232 (Display Disabled) Up to 53 times per second
Units	Candela, Lumen, Watts/steradian, and/or Watts
Calibration Uncertainty	Luminance Calibration $\pm 2\%$
Repeatability	$\pm 0.04\%$
Temperature/Humidity Drift	Electronically corrected for temperature drift
Calibration Capacity	9 continuous calibrations or 50 single point calibrations
Calibration Traceability	Traceable to NIST
Reference Luminance	1; set by measurement or numerical input
Display Modes	Linear / Log
Analog Outputs	$\pm 4.0$ VDC
Display	Monochrome 128x64 pixel LCD; Up to 5-digits of Precision; 4.3" LCD Touch Panel
Data Communication	RS-232C; 9600 baud
Power Source	AC: 100-240V, 7A, 50-60 Hz; TUV, CSA, UL, CE Approved; DC: rechargeable integral battery pack; Five NiMH AA, 1800-mAhr batteries
Recharge Time	< 4 hours
Operating Temp. Range	10 to 35°C
Storage Temp./Humidity Range	-20 to 60°C
Dimensions	36 x 114 x 234 mm (1.4 x 4.5 x 9.25 in.)
Weight	590g (1.3 lbs.)

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## SYSTEM CONFIGURATIONS



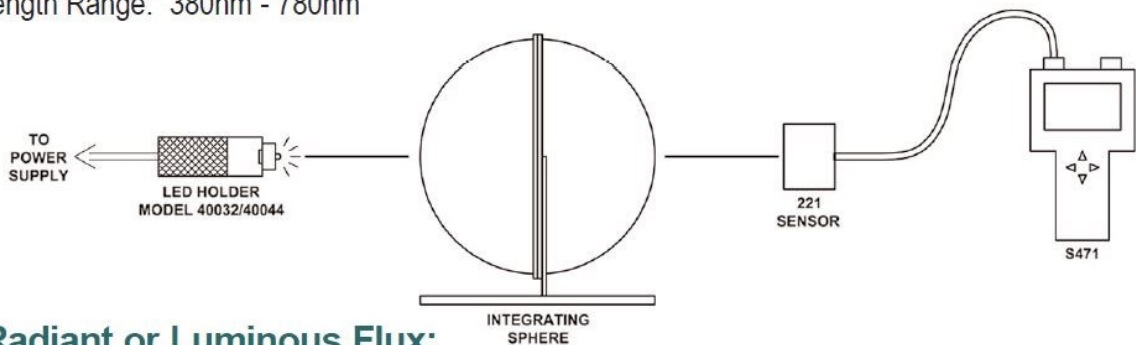
### Luminous Intensity:

Measurement Range:

CIE Condition A: 50 e-03 to 80,000 cd

CIE Condition B: 0.5 e-03 to 8,000 cd

Wavelength Range: 380nm - 780nm



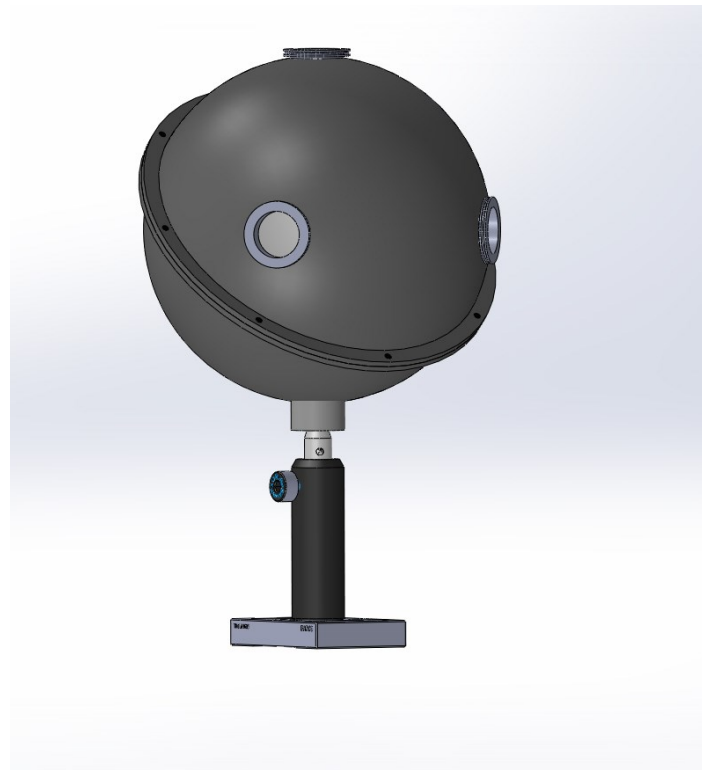
### Total Radiant or Luminous Flux:

Measurement Range: 100 e-09 watts to 3.5 watts

Wavelength Range: 350nm - 1100nm



LED Holders with Alignment Tool



Integrating Sphere for Total Flux