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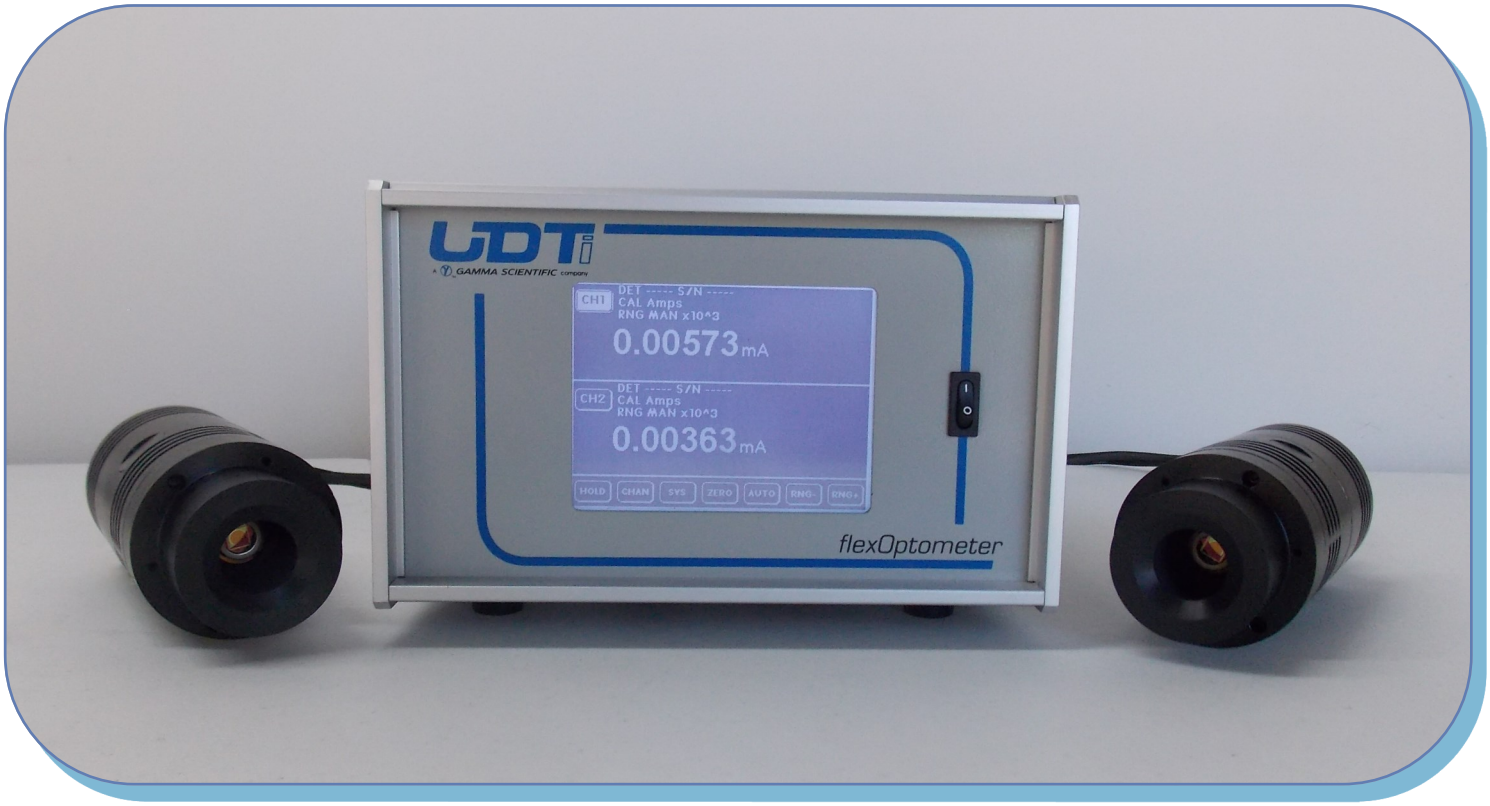

UDT Instruments flexOptometer

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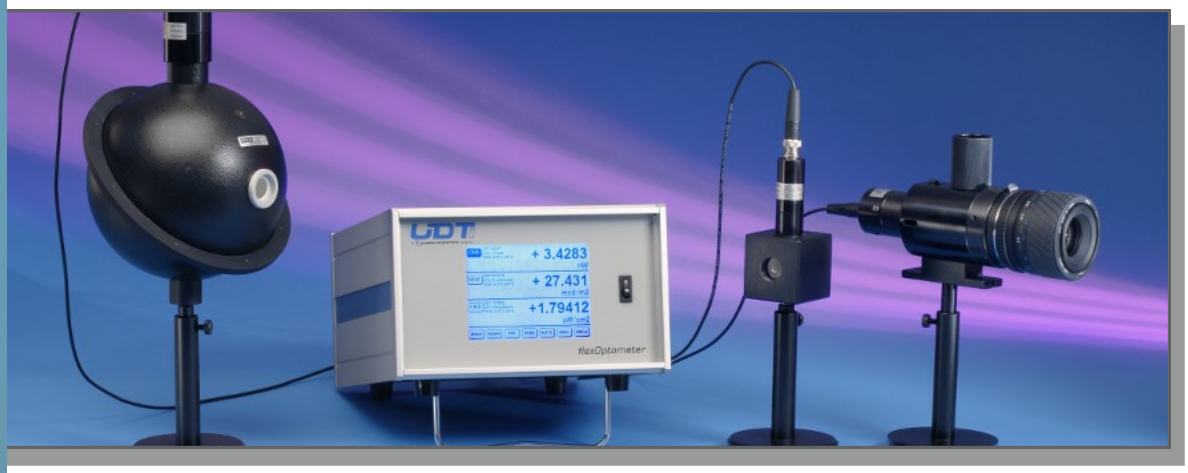
flexOptometer Photometer-Radiometer



The UDT Instruments flexOptometer from Gamma Scientific is a high-performance radiometer/photometer designed to operate as either a stand-alone instrument or a computer-controlled, full-function photometric, radiometric or fiber optic measurement tool.

The new model is available with a single head or with up to four interchangeable sensor heads for optimal flexibility. The 4-channel, flexOptometer includes a new touch-screen backlit LCD interface that offers the end user immediate readout results.

Highly configurable via the USB, RS-232, RS-485, and IEEE-488.2 computer interfaces, it is easy to integrate into existing lab instrument architectures. The new light-measuring instrument offers faster, more accurate measurements than any previously available optometric system.

The electronic design is based on Gamma Scientific's advanced performance, highly reliable, TIA-3000 measurement systems, which have become the primary working standards of several National Standards Labs. The transimpedance amplifier design gives very stable DC measurements down to the femtowatt (10^{-15} watt) level. It also includes a pulse-integrator for pulsed energy measurements.

The instrument is designed as a laboratory grade optometer, with the robustness to operate flawlessly on even the most rigorous production lines. The optometer can be configured with UDTi's extensive collection of optical sensors making it suitable for a wide variety of light measurement applications. Simply put, the flexOptometer is the ideal instrument for measurement applications such as display, LED, laser power, fiber optics, strobe or signal measurements.

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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flexOptometer Photometer-Radiometer

Features

- Available in single and multi-channel configurations
  - Model S470 Single-Channel
  - Model S480 Dual-Channel
  - Model S490 Four-Channel
- Touch screen back-lit LCD display
- Configurable from 1 to 4 measurement Sensor heads
- USB, RS-232-, RS-485, and IEEE-488.2 computer interfaces
- Low-light level measurements down to $<20 \times 10^{-12}$ Watts or $<5 \times 10^{-3}$ lux
- Silicon, photomultiplier, germanium and indium-gallium- arsenide (InGaAs) sensors available
- Configurable with World-class photopic sensors (f1' < 1%)

Applications

- Display Measurements
- LED Measurements
- Fiber-optic Measurements
- Laser Power Measurements
- Strobe & Signal Measurements
- Lamp Measurements
- Night-Vision Testing
- Customized Optics for Any Application

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flexOptometer Photometer-Radiometer

Electronic	Integrator
Eight Photometric/Radiometric Ranges	Four Integrate Ranges
Range-to-Range Linearity <0.1% for most ranges (<0.25% for most sensitive range)	Range-to-Range Linearity <0.1% for most ranges (<0.25% for most sensitive range)
Sensitivity: 10^{-15} to 10^{-3} Amps	Sensitivity: 10^{-14} to 10^{-3} coulomb
Resolution: $1x10^{-15}$ Amps	Decay Error: analog-approx. 0.01% / sec
Dark Current Suppression: 50 nA Max	Digital-holds reading indefinitely
Noise: $<5x10^{-15}$ Amps	
Frequency Roll-off: <10 Hz on most sensitive range	
A-to-D converter: 24-bit for each decade	

Radiometric/Photometric Ranges		
Radiometric Units*	**Range**	**Sensor Configuration**
Irradiance	< 0.020 nanoWatts/cm² to 3000 microWatts/cm²	Model 221
	< 0.055 nanoWatts/cm² to 8000 microWatts/cm²	Model 247
Irradiant Energy	<0.04 nanoJoules/cm² to 1.0 microJoules/cm² **	Model 221
	<0.075 nanoJoules/cm² to 1.0 microJoules/cm² **	Model 247
Radiant Flux	< 0.020 nanoWatts to 3000 microWatts	Model 221
	< 0.055 nanoWatts to 8000 microWatts	Model 247
Photometric Units*		
Luminous Intensity	< 0.0001 candelas to 10,000 candelas	Model 424 CIE 127 Condition B Configuration
Illuminance	< 0.005 lux to 500,000 lux	Model 211
Luminance	< 0.007 candela/m² to 1,200,000 candela/m²	Model 2153
Illuminant Energy	<0.005 lux*seconds to 10 lux*seconds ***	Model 211

General	
Automatic/Manual ranging	
Microprocessor Controlled Functions	
High Voltage circuit for photomultipliers (300-1500 Volts)	
Thermo-electric coolers for Sensor and filter stabilization	
USB, RS-232, RS-485 and IEEE-488.2 Communications	
Analog Output	
Power Input: 12.0 volts DC	
Operating Temperature Range: 0 to 50° C	
Humidity: 0% to 95% RH non-condensing	
Length (flexOptometer)	13.00 inches (33.02 cm)
Width (flexOptometer)	8.55 inches (21.72 cm)
Height (flexOptometer)	5.22 inches (13.26 cm)

*Ranges based on system configured with a 1 square centimeter silicon sensor and corresponding accessories
**Model 221 Maximum integrated energy 4.0 microJoules/cm² . Lower energy pulses will allow the average energy measurement to very accurate
**Model 247 Maximum integrated energy 10.5 microJoules/cm² . Lower energy pulses will allow the average energy measurement to very accurate
***Model 211 Maximum integrated energy 450 lux*seconds . Lower energy pulses will allow the average energy measurement to very accurate

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flexOptometer Photometer-Radiometer

Sensors & Accessories (see Photosensors & Sensor Heads datasheet for more information)			
UV/Visible		**Photometric**	
221	Silicon Sensor (350-1100nm) 1cm^2 active area	211	Photometric Sensor with Cosine Receptor (Illuminance)
222	Silicon Sensor (200-400nm) 1 cm^2 active area	265	Photometric Display Brightness Sensor (Luminance)
268UVA	Low Profile UVA Optimized Sensor Head (365 nm)	268P	Low-Profile Photometric Sensor with Cosine Receptor
268UVC	Low Profile UVC Optimized Sensor Head (254 nm)	2153	Photometric Sensor with 13 degree FOV Lens (Luminance)
268BLUE	Low Profile Blue Optimized 450 nm Sensor	424	LED Photometric Sensor (CIE 127 Luminous Intensity)
Radiometric		**Laser Power**	
247	Flat Response Sensor	264	Miniature Attenuated Laser Sensor Head
268R	Low Profile Flat Response Sensor	268LP	Low Profile Laser Sensor Head
424R	LED Radiometric Sensor (CIE 127 Radiant Intensity)	**Infrared**	
		261	Miniature Infrared Germanium Sensor (800-1750nm)
		280	Miniature Infrared InGaAs Sensor (800-1750nm)

*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 July 15, 2015

UDTi

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C Series flexOptometers

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C Series flexOptometers

The C Series flexOptometers are thermo-electrically cooled photometer/ radiometer systems designed for high-sensitivity measurement applications. The C Series includes an integrated controller that is compatible with UDTi thermo-electrically cooled silicon and indium gallium arsenide (InGaAs) detectors.

C Series flexOptometers offer 10 times greater sensitivity than the standard flexOptometer products, making it the ultimate tool for measurement of low light levels. The C1 model provides single stage cooling of the detector, and the C2 model provides dual stage cooling for applications that require a detector/filter combination. For high sensitivity applications, cooling of the detector and the filter is critical to accurate measurements.

The C Series flexOptometers have eight measurement ranges accessible through the front panel touch display or via serial and USB interfaces.

Options include high-accuracy photometric correction filters (f1' ~0.8%), flat response filters, and NVIS compatibility filters with field-of-view lenses, making the C1 and C2 Series flexOptometers the standard for any light measurement requirement.

C Series flexOptometers allow for extremely low dark current levels <70 femtoamps; 70 $x10^{-15}$ amps, at room temperature with the silicon detector) and excellent stability.

Standard calibrations are available for any configuration of the C1 and C2 series of flexOptometers from Gamma Scientific's NVLAP accredited testing laboratory.

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C Series flexOptometers

Features

- Temperature stabilized silicon and InGaAs detectors available covering 200 – 2600 nm
- Temperature stabilized correction filters available
- High accuracy photopic correction f1'~0.8%
- NVIS compatibility filters and lenses
- High sensitivity down to 10^{-13} Watts or 10^{-6} lux
- Eight decades of dynamic range
- USB, RS-232 computer control

Applications

- Display measurement photometry
- LED radiometry
- Night-vision compatibility measurements
- Metrology lab primary standard detector
- Customized optics available for any application

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C Series flexOptometers

C Series flexOptometer Specifications		
Gain	10^{10} to 10^{3} amps	
Range	Eight decades; touch front panel display readout in auto range or manual range. Computer controlled output through serial RS-232 or USB protocol.	
Output	Direct measurement output with your selected sensor calibration responsivity; i.e.: Watts, lux, cd/m²	
Linearity	Range-to-Range Linearity < 0.05%	
Temperature Variation	<5 ppm (parts-per-million) per degree Celsius	
Noise	<70 femtoamps; <70 X 10^{-15} on range 10^{10}; averaged system measurement with a temperature stabilized silicon sensor	
Frequency Roll-Off	**Gain**	**Half Power Frequency**
	10^{3}	35 KHz
	10^{4}	2200 Hz
	10^{5}	220 Hz
	10^{6}	100 Hz
	10^{7}	100 Hz
	10^{8}	100 Hz
	10^{9}	48 Hz
	10^{10}	12 Hz
Length (Sensor)	4.15 inches (10.5 cm)	
Diameter (Sensor)	2.5 inches (6.4 cm)	
Length (flexOptometer)	13.00 inches (33.02 cm)	
Width (flexOptometer)	8.55 inches (21.72 cm)	
Height (flexOptometer)	5.22 inches (13.26 cm)	
Temperature Stability	Short term (1 hr.) < 0.001° C, long term (24 hr.) < 0.003° C	
Bipolar Output Current	+ 1.5 amp max	
Maximum TEC Output Power	12 Watts	
Power	External Switching Power Supply 12 Volts DC; 5.0 amps minimum	

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***Revised on June 9, 2015