

BTS256-E

<https://www.gigahertz-optik.com/en-us/product/bts256-e/>

Product tags: VIS



Description

Traditional lux meters are increasingly being replaced by spectral light meters such as the [MSC15](#). However, the lighting industry also needs high accuracy spectral light meters that can handle more complex measurements. These include measurement of pulse width modulated light and the ability to measure both internal and external illumination, determination of thermal transient behavior of lamps, and so on. The primary criterion that such meters must always meet is the quality of their photometric features. Additional electronic features may improve usability and display quality, but they cannot compensate for substandard measurement results.

BTS256-E – compact, hand-held meter for complex measurements

With the BTS256-E, Gigahertz-Optik GmbH offers a light meter that is perfectly suited for complex measurements in the lighting industry. Its technical concept guarantees high-quality measurement of illuminance, spectrum, color, and color rendering index ([video](#)). The heart of this compact device is its BiTec sensor which combines two different sensor technologies, i.e. a Si photodiode with a V-lambda filter and a spectroradiometer unit that is based on a CMOS diode array.

The Si photodiode offers extraordinary properties in terms of dynamic range, linearity, and speed of measurements. Combining the two allows mutual correction ([BTS technology](#)) in order to ensure even higher accuracy. Another unique feature is its ability to perform time-synchronized measurements of pulse-width modulated light and hence guarantee correct illuminance measurements in PWM lighting systems.

The spectrometer ensures high accuracy in luminous spectral measurements and has a 10 nm optical bandwidth in the spectral range between 380 nm and 750 nm. An optical bandwidth correction function according to CIE 214 is incorporated, further improving the quality of values (e.g. peak wavelength) that are calculated based on the spectral measurement data. Given its compact size, the unit exhibits outstanding scattered light performance which provides extraordinary precision even in complex measurements. Another key feature of this compact light meter is the remote-controlled shutter for automatic dark signal correction.

A significant consideration for precise illuminance measurements of lighting systems is the field of view of the measurement optics. Correct illuminance measurements are only possible with a precise cosine field of view function for the different angles of incidence.

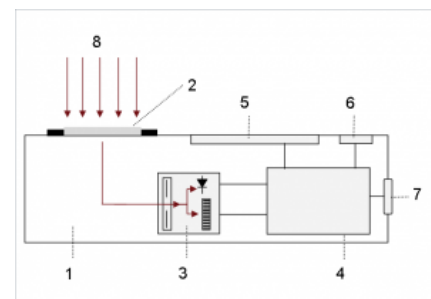
The device is extremely easy to use thanks to the intuitive menu and the supplied software with which it can be controlled remotely. The device housing is watertight for outdoor light measurements.

Calibration of the BTS256-E

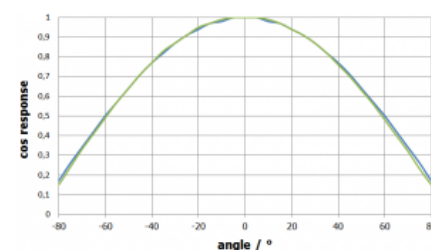
One essential quality feature of photometric devices is their precise and traceable calibration. The BTS256-E is calibrated by Gigahertz-Optik's calibration laboratory that is accredited by DAkkS (D-K-15047-01-00) for the *spectral responsivity* and *spectral irradiance* according to ISO/IEC 17025. The calibration also included the corresponding accessory components. Every device is delivered with its respective calibration certificate.

Options for the BTS256-E light meter

- Software development kit for integration of the device in the user's own software



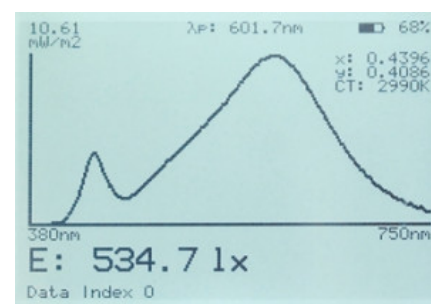
1) BTS256-E 2) Precision cosine diffuser 3) BiTec sensor with Si photodiode, CMOS diode array spectrometer and shutter 4) Microprocessor 5) Display 6) Control Buttons 7) USB 2.0 interface 8) Light incident



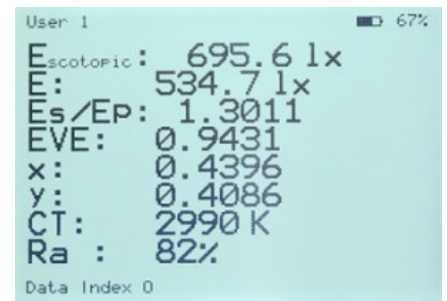
Precise cosine-corrected field of view function



Robust aluminum housing with tripod mount



Standard display for the illuminance and spectrum

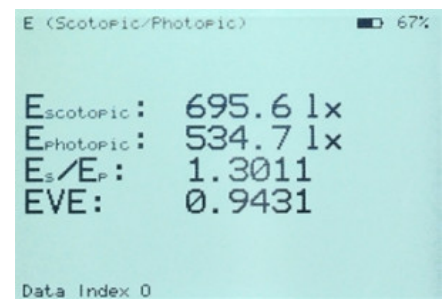


User 1 67%

E_{scotopic} : 695.6 lx
 E : 534.7 lx
 E_s/E_p : 1.3011
EVE: 0.9431
 x : 0.4396
 y : 0.4086
CT: 2990 K
Ra : 82%

Data Index 0

Display with user configuration of the measured variables



E (Scotopic/Photopic) 67%

E_{scotopic} : 695.6 lx
 E_{photopic} : 534.7 lx
 E_s/E_p : 1.3011
EVE: 0.9431

Data Index 0

Ratio of the scotopic and photopic illuminance with the EVE factor as per IES TM-24-13

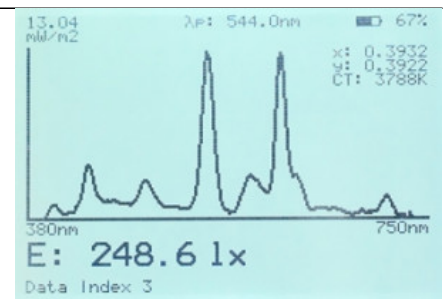


Info 67%

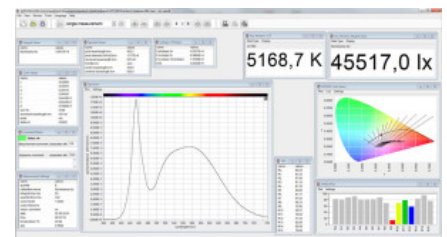
Array Signal Resolution: Low
Array Exposure Time Mode: Pre-Measure
Array Act. Exposure Time: 0.333s
Array Max. Exposure Time: 10.000s
Shutter Function: Active
Array Scale to Diode: Yes
Observer Settings: 2°
Diode Measure Time: 100ms
Diode Synchronisation: No
Diode Offset Compensation: No
Diode A(z) Correction: Dynamic
Logger Diode+Array Clock: 10s
Logger Diode Clock: 0.2s
Auto Switch Off: 30m
Auto Backlight Off: 10m

Data Index 0

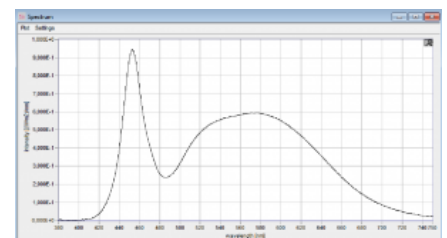
The measurement parameters protocol is saved together with a measurement data file



Standard display with illuminance, x,y color coordinates, color temperature and emission spectrum of an energy saving lamp



S-BTS256 user software with modular setup desktop



The graphical display module can be zoomed

Specifications

General

Short description	Spectroradiometer for the illuminance (photopic, scotopic, melanopic), spectrum, light color, and color rendering index.
Main features	Mobile measurement device, BiTec sensor with a V-Lambda photodiode and low stray light CMOS spectroradiometer with a 10 nm optical bandwidth and additional optical bandwidth correction (CIE214), remote-controlled Offset shutter, precise cosine-corrected field of view, data logger, automatic PWM synchronization.
Measurement range	1 lx to 199,000 lx, 380 nm to 750 nm.
Typical applications	Precise spectral light meter for the lighting industry.
Calibration	Factory calibration, traceable to international Standards.

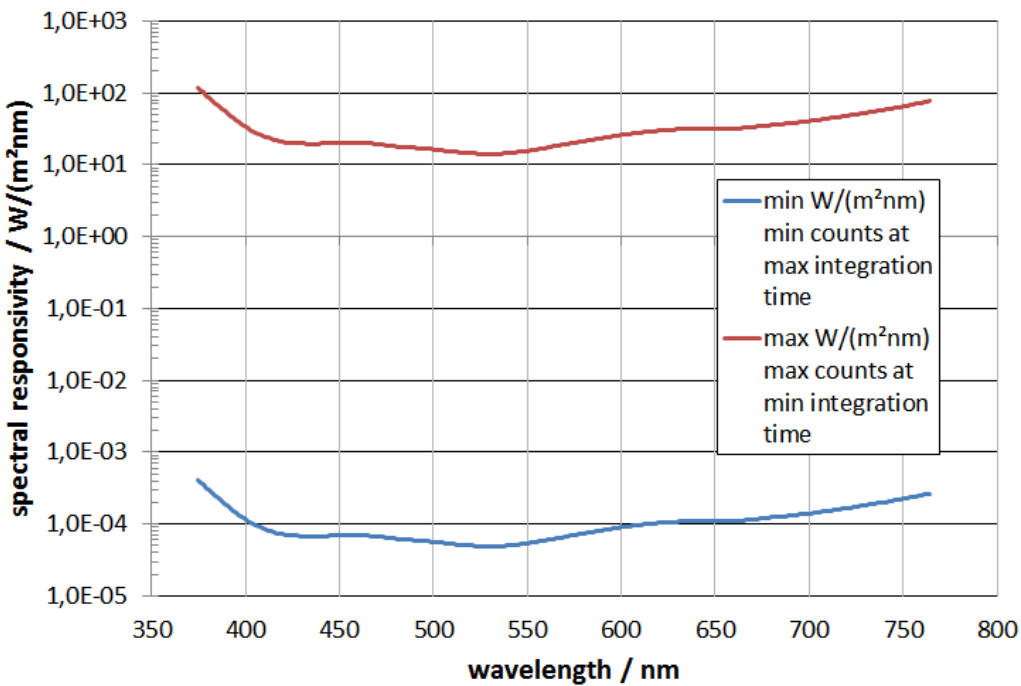
Product		
Sensor	class B DIN 5032 part 7 or AA according to JIS C 1609-1:2006 class A DIN 5032 part 7 for f1', u, f3 and f4 or general precision class according to JIS C 1609-1:2006	
Sensor	Bi-Technology sensor with a photometric broadband detector and a array spectrometer. Integrated aperture for automatic dark signal adjustment.	
Input optics	Diffuser window with 20mm diameter, cosine corrected field of view, f2 ≤ 3 %	
Calibration uncertainty	Illuminance +/-2.2%	
Spectral Detector		
Chip	CMOS diode-array	
Spectral range	(380 - 750) nm	
Optical Bandwidth	10 nm	
Data Resolution	1 nm	
Integration Time	(5.2 - 30000) ms	
Shutter	Automatic aperture for dark signal measurements with the same integration time as that of light measurements. Aperture delay = 100ms.	
Typical measurement time	199,999 lx ≤ 5ms (white light)	
	100 lx ≤ 1s (white light)	
Color measurement range spectral	(1- 199,999) lx	
Scotopic	Scotopic measurement range spectral (1 - 199,999) lx Calibration uncertainty of scotopic Illuminance +/-2.2%	
Peak wavelength	+/- 1nm	
Dominant wavelength	+/- 1nm	
Repeatability Δx and Δy	+/- 0.0001 (Standard illuminant type A)	
	+/- 0.0002 (LED)	
Δy Δx uncertainty	+/- 0.002 (Standard illuminant type A)	
	+/- 0.005 (typ. LED)	
CCT Measurement range	(1700 - 17000) K	
ΔCCT	+/- 50K (standard illuminant type A)	
	+/- 4% (depending on the LED spectrum)	
CRI (color rendering index)	Ra and R1 to R15	
Stray Light	6E-4 (Blue LED)	
	6E-4 (Green LED)	
	6E-4 (Red LED)	
	1E-3 (White LED)	
Calibration uncertainty	Spectral irradiance	
	λ	u(k=2)
	(380 - 399) nm:	± 7 %
	(400 - 750) nm:	± 4 %
	Spectral irradiance responsivity (380 - 750) nm	

Integral Detector

Filter	Spectral responsivity with fine CIE photometric matching. Online correction of the photometric matching through spectral measurement data (spectral mismatch factor correction)
f1' (spectral mismatch)	≤6% (uncorrected) ≤3% ($f1' \cdot a^*(s_z(\lambda))$) respectively $F^*(s_z(\lambda))$ corrected by spectral data, done automatically by BTS technology)
max. illuminance	≥199,999 lx
Noise equivalent illuminance	≤ 0.01lx
ADC	12Bit
Measurement time	(0.1 - 6000) ms

Graphs

Spectral responsivity


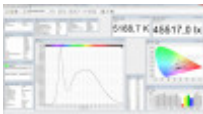



f2 (directional response/cosine error)

Miscellaneous

Microprocessor	16Bit, 25ns instruction cycle time
Power Supply	5VDC, 450mA per USB
Interface	USB 2.0 (Type B USB-Port) Option WiFi: WiFi 2,4 GHz (external antenna, range > 100m)
Temperature range	Operation: -10°C bis +30°C Storage: -10°C to +50°C
Dimensions	159mm x 85mm x 45mm (Length x Width x Height)
Weight	500g
Transport case	333mm x 280mm x 70mm 650g

Configurable with

Product Name	Product Image	Description	Go to product
S-SDK-BTS256		Software Development Kit for BTS256 variants.	https://www.gigahertz-optik.com/en-us/product/s-sdk-bts256/
S-BTS256		Application software for BTS256 variants.	https://www.gigahertz-optik.com/en-us/product/s-bts256/
GB-GD-360-RB40		Goniometer for the measurement of 2π sources	https://www.gigahertz-optik.com/en-us/product/gb-gd-360-rb40/

Purchasing information

Article-Nr	Modell	Description
Product		
	BTS256-E	BTS256-E, Users guide (G or E), User Software S-BTS256 on CD, USB cable for use with PC and battery charging, USB power adapter (EU, USA or GB), BHO-17 Hard-top casing
	BTS256-E WiFi	BTS256-E WiFi, Users guide (G or E), User Software S-BTS256 on CD, USB cable for use with PC and battery charging, USB power adapter (EU, USA or GB), BHO-17 Hard-top casing
Re-calibration		
15300751	K-BTS256E-E-S	Recalibration of a BTS256-E's illuminance and spectral irradiance sensitivity. Calibration certificate.
Software		
15298218	S-SDK- BTS256	Software Development Kit; Software and users guide on CD

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