

BTS256-E

<https://www.gigahertz-optik.de/en-us/product/BTS256-E>

Product tags: VIS , Spectral Data , SSL , Color Temperature , CRI , Waterproof , WiFi , Luminous Color , LED , Photometry , General lighting



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, handheld 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

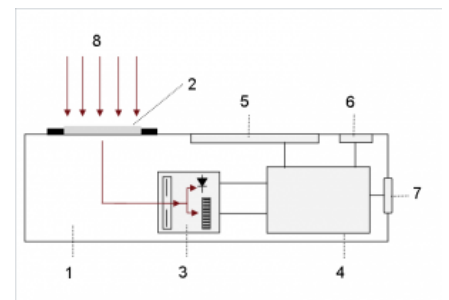
One essential quality feature of photometric devices is their precise and traceable calibration. The BTS256-E is calibrated by Gigahertz-Optik's calibration laboratory that is accredited by DAkkS (D-K-15047-01-00) for the *spectral responsivity* and *spectral irradiance* according to ISO/IEC 17025. The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

Options for the BTS256-E light meter

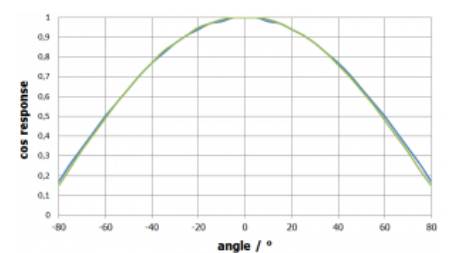
- Software development kit for integration of the device in the user's own software



BTS256-E for complex measurements in lighting technology



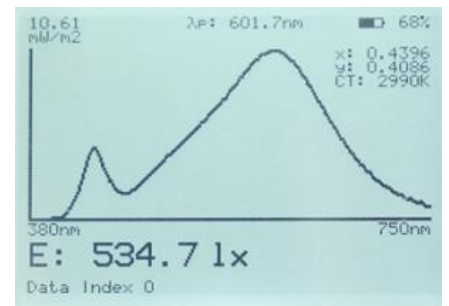
1) BTS256-E 2) Precision cosine diffuser 3) BiTec sensor with Si photodiode, CMOS diode array spectrometer and shutter 4) Microprocessor 5) Display 6) Control Buttons 7) USB 2.0 interface 8) Light incident



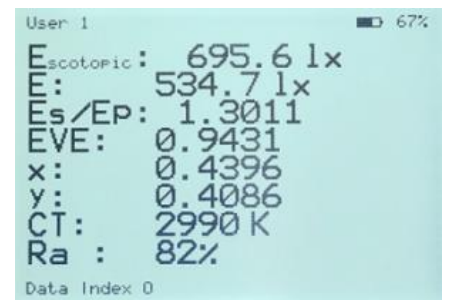
Precise cosine-corrected field of view function



Robust aluminum housing with tripod mount



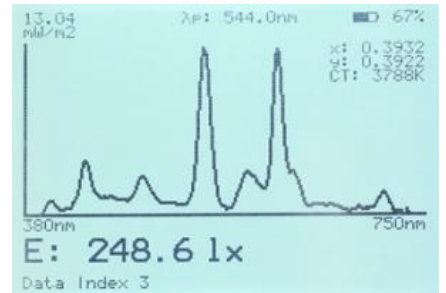
Standard display for the illuminance and spectrum



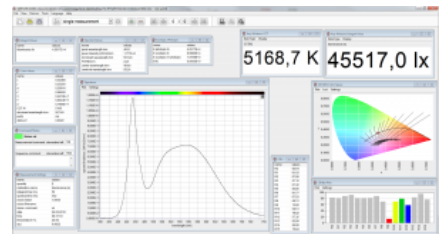
Ratio of the scotopic and photopic illuminance with the EVE factor as per IES TM-24-13



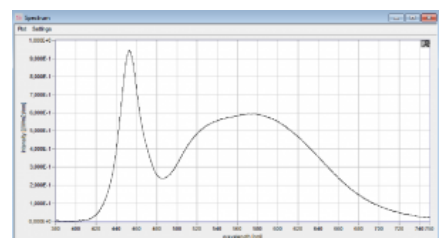
The measurement parameters protocol is saved together with a measurement data file



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. |
| Range of measurement | 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 | |
| Lightmeter | 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 |
| Light sensor | Bi-Technology sensor with a photometric broadband detector and a array spectrometer. Integrated aperture for automatic dark signal adjustment. |
| Input optic | Diffuser window with 20mm diameter, cosine corrected field of view, $f_2 \leq 3\%$ |
| Calibration uncertainty | Illuminance +/-2.2% |
| Spectral Detector | |
| Chip | CMOS diode-array |
| Wavelength 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. |
| Typ. Measurement Time | 199,999 lx \leq 5ms (white light) 100 lx \leq 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 |
| $\Delta x, \Delta y$ reproducibility | +/- 0.0001 (Standard illuminant type A) +/- 0.0002 (LED) |
| $\Delta x, \Delta y$ uncertainty | +/- 0.002 (Standard illuminant type A) +/- 0.005 (typ. LED) |
| CCT Measurement range | (1700 - 17000) K |
| Δ CCT | +/- 50K (standard illuminant type A) +/- 4% (depending on the LED spectrum) |

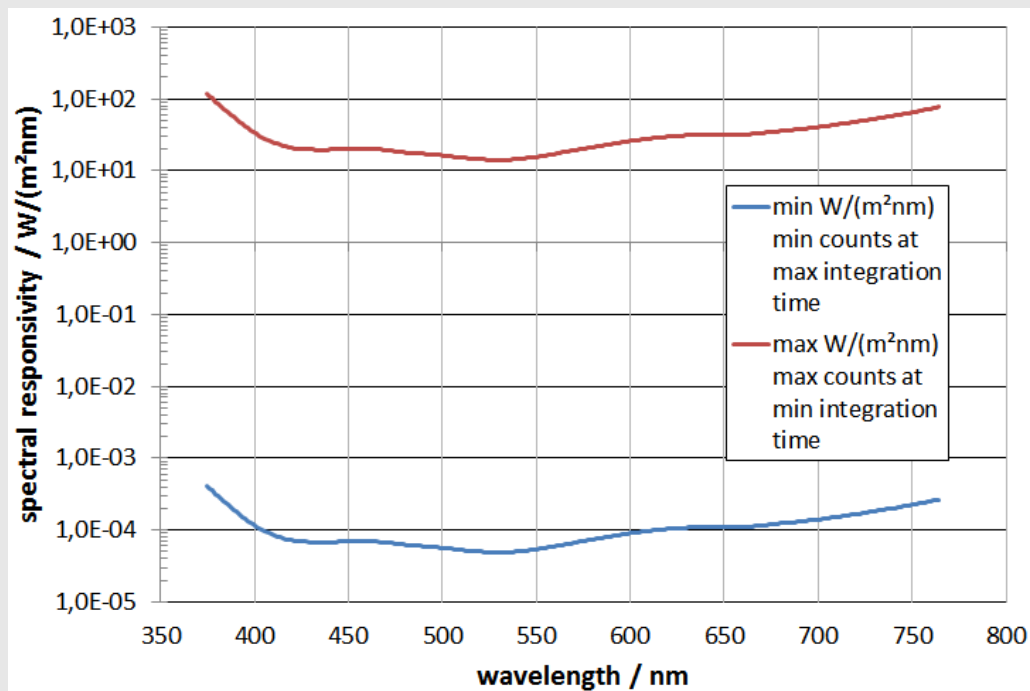
| | |
|-----------------------------|--|
| CRI (color rendering index) | Ra and R1 to R15 |
| Stray Light | 6E-4 (Blue LED) 6E-4 (Green LED) 6E-4 (Red LED) 1E-3 (White LED) |
| Calibration uncertainty | Spectral irradiance (380 - 399 nm): +/- 7 % (400 - 750 nm): +/- 4 % Spectral irradiance responsivity (380 - 750) nm |

Integral Detector

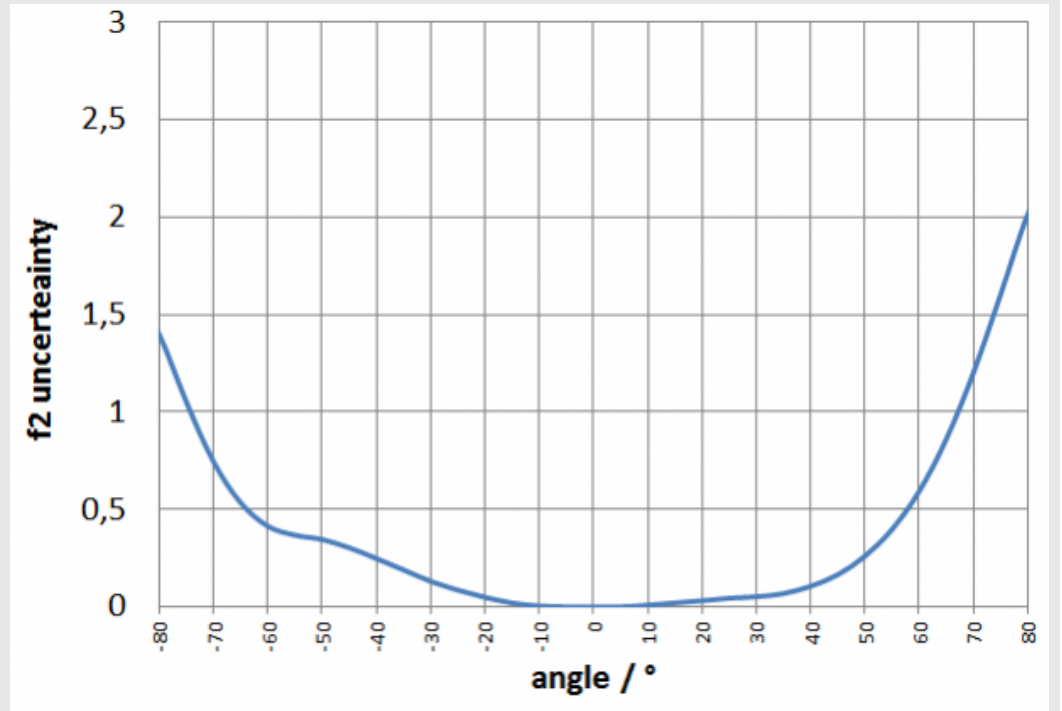
| | |
|------------------------------|---|
| Filter | Spectral responsivity with fine CIE photometric matching. Online correction of the photometric matching through spectral measurement data (spectral mismatch factor correction) |
| f1' | ≤6% (uncorrected) ≤3% (f1' a*(s ₂ (λ)) respectively F*(s ₂ (λ)) corrected by spectral data, done automatically by BTS technology) |
| Max. measurable illuminance | ≥199,999 lx |
| Noise equivalent illuminance | ≤ 0.01lx |
| Resolution | 12Bit |
| Measurement Time | (0.1 - 6000) ms |

Graphs

spectral irradiance responsivity



f2 uncertainty



Miscellaneous

| | |
|------------------|---|
| Microprocessor | 16Bit, 25ns instruction cycle time |
| Charging voltage | 5VDC, 450mA per USB |
| Interface | USB 2.0 (Type B USB-Port) Option WiFi: WiFi 2,4 GHz (external antenna, range > 100m) |
| Temperature | 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 |
| hard-top casing | 333mm x 280mm x 70mm 650g |

Configurable with

| Produktname | Product Image | Description | Show product |
|--------------|---------------|---|---|
| S-SDK-BTS256 | | Software Development Kit for BTS256 variants. | https://www.gigahertz-optik.de/en-us/product/S-SDK-BTS256 |

Purchasing information

| Article-Nr | Modell | Description |
|-----------------------|---------------|--|
| Product | | |
| 15298279 | 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 |
| 15298419 | 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-BTS256-E | Recalibration of the BTS256-E. Including calibration certificate |
| Software | | |
| 15298218 | S-SDK- BTS256 | Software Development Kit; Software and users guide on CD |