Gigahertz-Optik

Spectral light meter BTS256-EF

Spectral light meter BTS256-EF with flicker measurement function for general lighting - lamps and luminaires

BTS256-EF

Spectral light meter BTS256-EF

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.

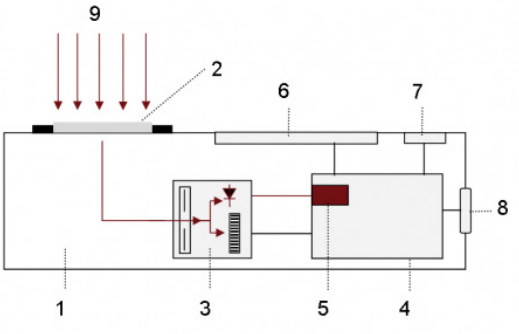
Manufacturers of lamps and luminaires for general lighting purposes must consider light flicker when qualifying product safety in terms of EMC immunity requirements. In addition to the influence of mains voltage fluctuations, flicker effects caused by the lamp and the luminaire itself must be taken into account.

With the BTS256-EF, Gigahertz-Optik GmbH, a renowned measuring device manufacturer, offers a universal measuring device for the determination of all relevant light parameters in general lighting. Combined with a programmable AC source, the BTS256-EF becomes a comprehensive flicker test system for lamps and luminaires including voltage fluctuation immunity tests IEC TR 61547-1:2017.

BTS256-EF – Highquality, spectral light and color measurement meter

The BTS256-EF is a high-quality measuring device for photometric and colorimetric measurement of general lighting products and conditions. A special feature of the meter is a Bi-Tec sensor. This consists of a fast photodiode and a CMOS array detector. Thus, the meter supports all the requirements of a modern light meter:

- Cosine field of view illuminance measurement for accurate evaluation of extended illumination (class B DIN 5032 part 7 or AA according to JIS C 1609-1:2006)
- Flicker measurement
- Spectral measurement technology, required for LED light, color, color rendering, color effects
- Photodiode for synchronization to pulse width modulated light and flicker measurement



Principle illustration of the BTS256-EF
1) BTS256-EF 2) Precision cosine diffuser
3) BiTec sensor with Si photodiode, CMOS diode array spectrometer and shutter 4) Photometric Si-photodiode with fast amplifier 5) Microprocessor 6) Display 7) Control Buttons 8) USB 2.0 interface 9) Light incident

Measurands

- 1 lx to 199.000 lx
- 360 nm to 830 nm
- flicker frequency between 0.25 Hz and 5 kHz

Spectral light meter BTS256-EF

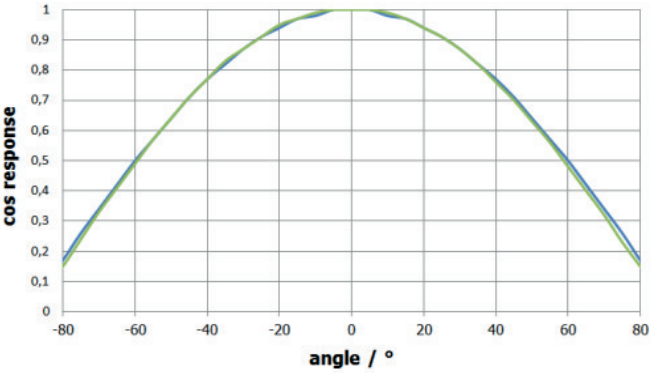
- alpha-opic measurement (CIE: TN-003)
- Compact and robust design for mobile use

BTS256-EF for complex measurements in lighting technology, including flicker measurement

BTS256-EF – Flicker meter

In its function as a light-flicker meter, the BTS256-EF supports all current flicker measurements:

- Percent Flicker (IES: RP-16-10, CIE: TN-006)
- Flicker Index (IES: RP-16-10, CIE: TN-006)
- FFT Frequency component analysis
- Pst Short term flicker severity (CIE: TN-006, IEC TR 61547)
- Stroboscopic Visibility Measure, SVM (CIE: TN-006, IEC TR 63158)
- Mp ASSIST Flicker perception metric



BTS256-EF light meter with precise cosine field of view function

BTS256-EF – Meter for photosynthetically active radiation (PAR) in plant growth

LED grow lights need to be measured in terms of the Photosynthetically Active Radiation (PAR) they produce. This function is supported by the BTS256-EF. The Photosynthetic Photon Flux Density (PPFD) in µmol/(m^2*s) can be measured which is a measure of the total number of photons within the PAR wavelength range that reach a surface each second per square meter area. Furthermore, the daylight integral (DLI) can be displayed which represents the total amount of photosynthetically active radiation received by a plant in the course of a day.

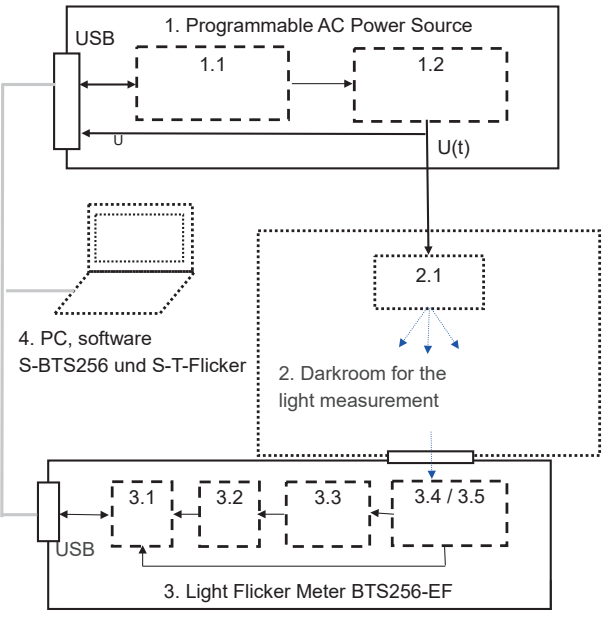
Calibration of the BTS256-EF

One essential quality feature of photometric devices is their precise and traceable calibration. The BTS256-EF is calibrated by Gigahertz-Optik's calibration laboratory that was 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.

Spectral light meter BTS256-EF

Options for the BTS256-EF light meter

- Software development kit for integration of the device in the user's own software
- In connection with the software tool S-T-Flicker and the programmable AC Source LPS-CH-500 Gigahertz-Optik GmbH offers a functional extension of the BTS256-EF for an test system according to the IEC TR 61547-1:2017 Equipment for general lighting purposes - EMC immunity requirements - Part 1: An objective light flicker and fluctuation immunity test method.



Principle illustration light-flicker test system 1.1 Test waveform generator 1.2 Amplifier 2.1 Lamp/luminaire under test 3.1 Data processor light 3.2 Light data acquisition 3.3 Anti-aliasing filter 3.4 Fast photodetector 3.5 Spectral radiometer 4. User software with flicker measurement tool

Specifications BTS256-EF

Using as a handheld device without software, limited by internal storage:

Measure-ment Time (Sensor)	Sam-pling rate	Frequency uncertainty at acceptable S/N ratio	FFT frequency resolution
50 ms	50 kHz	1 % ± 0,5 Hz	25 Hz
12000 ms	33 Hz	1 % ±0,02 Hz	0,1 Hz

When controlled by software is the analysis according to the table left or following high-resolution analysis possible:

Measurement Time (Sensor)	Sam-pling rate	Frequency uncertainty at acceptable S/N ratio	FFT frequen-cy resolution
5 ms to 180s	up to 50 kHz	1 % ± 0,5 Hz	up to 0,005 Hz

Specifications BTS256-EF

Specifications	
spectral range	(360 - 830) nm
Measurement range	(1 - 190000) lx
Input optics	Diffuser window with 20mm diameter, cosine corrected field of view, f2 Error ≤ 3%
Sensor	Bi-Technology sensor with a photometric broadband detector and a array spectrometer. Integrated aperture for automatic dark signal adjustment.
Integration Time	(5,2 - 30000) ms
Optical Bandwidth	10 nm, mathematical optical bandwidth correction according to CIE 214 can be automatically applied
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)
Interface	USB 2.0 (Type B USB) Option WiFi: WiFi 2,4 GHz (external antenna, range > 100m)
temperature range	Operation: -10°C bis +30°C Storage: -10°C bis +50°C
Housing	Splashproof IP54
Dimensions	159mm x 85mm x 45mm (Length x Width x Height)
Weight	500g

Gigahertz-Optik

With its innovative and high-quality products as well as application solutions, Gigahertz-Optik enjoys a high regard from its international customers within the field of optical radiation measurement technology. As a manufacturer, Gigahertz-Optik offers standard and custom-made solutions. Regular investments in new technologies ensure that Gigahertz-Optik is able to offer modern measuring solutions to its customers in industry and science.

Broadband light measurement devices
- UV Radiometer
- Photometer
- Hazard

Spectral light meter
- Handheld devices
- High-end devices
- UV Spectroradiometer
- Weather-proof devices
- Light transmission

Complementary products
- Integrating spheres
- Integrating sphere light sources
- Calibration standards
- Electronics, optomechanics
- Optically diffuse materials

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