CSS-45

Product tags: VIS

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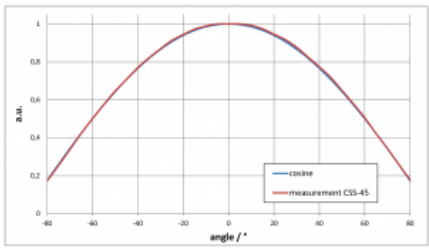
Description

Some light measurement applications require the light sensor to be installed within a measurement system or operated remotely. Industrial applications often require integration with PLC systems. Continuous and remote operation requires light measurement sensors to be robust. For such tasks, Gigahertz-Optik offers the compact spectral light sensor CSS-45. It is a precise spectroradiometer covering the wavelength range 360 nm to 830 nm.

Spectroradiometer sensor CSS-45

Spectroradiometer sensor with outstanding light measurement characteristics

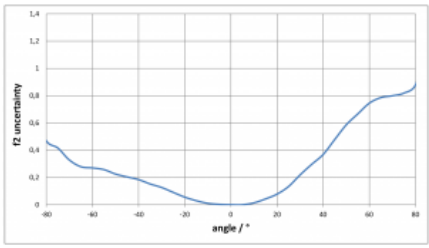
- Individual wavelength and linearity correction guarantee precise measurements of light sources irrespective of intensity and spectral distribution.
- Mathematical bandwidth correction according to CIE 214 for accurate colorimetric measurements.
- Another unique feature of the CSS-45 is its electromechanical shutter which enables the remote-controlled dark adjustment of the sensor. This is essential for temperature-independent and long-term operation of array spectrometers.
- Diffuser with a precise cosine adjustment (f2 ≤ 1.5 %) for measuring the illuminance and irradiance of extended light sources and lighting equipment.
- Wide range of illuminance measurement from 1 lx to 350.000 lx, covering applications from emergency lighting to broad daylight conditions.



CSS-45 cosine field of view

Robust and compact

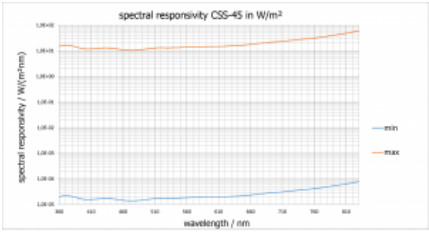
The compact metal housing features an M6 threaded hole and a V-groove around the device for universal attachment of the CSS-45. The dimensions are given in the technical drawing available for download. The housing with its splash-proof electrical connectors meets the requirements of protection class IP62. For IP65 rated protection, a sensor variant with glass dome is required.



Angle dependent f2 error of CSS-45

Interfaces and Software

The sensor offers both an RS-485 and a USB interface for remote operation. The addressable RS-485 interface allows very long supply lines. Multiple CSS-45 sensors can be operated together under RS-485 control as well as in USB remote operation. In addition to the provided end-user software, a software development kit (SDK) is optionally available for simplified integration of the sensor into user written software.



Typical spectral responsivity

Schematic draft of CSS-45 sensor
1) Incident light 2) Cosine diffuser 3) electromechanical shutter 4) array spectrometer 5) CPU 6) temperature sensor 7) USB connector 8) RS-485 connector 9) V-groove 10) M6 mounting thread

Numerous metrics for a wide field of measurement applications

The CSS-45 includes an integrated processor. It calculates a comprehensive set of radiometric, photometric and colorimetric quantities from the measured spectral measurement data.

Use of CSS-45 as a handheld instrument by combining it with the control unit CSS-D

Additional metrics support further applications:

- Horticultural lighting – PAR measurement Photosynthetic Photon Flux Density (PPFD) in µmol/m²s
- Human Centric Lighting – melanopic irradiance and illuminance (CIE S 026:2018), melanopic daylight equivalent illuminance
- Phototherapy – total irradiance for bilirubin, Ebi, in mW/cm2 (IEC 60601-2-50) as well as average spectral irradiance in µW/cm2/nm (American Academy of Pediatrics)

- Enables CCT measurements to be fully automated in the official DALI Alliance tests in accordance with IEC 62386-209 (colour control gear).

Accessories

The light sensor CSS-45 can be combined with the control unit CSS-D in order to be used as a handheld light meter.

Traceable factory calibration

An essential quality feature of light measuring instruments is their precise and traceable calibration. The calibration laboratory of Gigahertz-Optik GmbH guarantees the high quality and traceability of their factory calibrations. Calibration of the CSS-45 is confirmed by a factory calibration certificate.

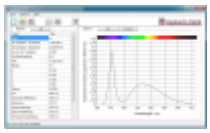
Specifications

General	
Short description	Remote spectroradiometric detector for universal use in radiometric and photometric measurement setups.
Main features	Remote operation via USB 2.0 or RS 485. Compact, robust, splashproof housing with universal mounting options. Direct output of radiometric, photometric, colorimetric and specialist functions. Precision cosine diffuser. Remote controlled dark level shutter. Application software.
Measurement range	1 lx to 350,000 lx (for white LED), 360 nm to 830 nm.
Typical applications	Photometric and radiometric setups requiring remote positioning of single or multiple detectors. Use with positioning equipment e.g.for mapping. Industrial monitoring, grow lights, blue light phototherapy, human centric lighting.
Calibration	Factory calibration. Traceable to international calibration standards.
Product	
Input optics	Diffuser window with 10 mm diameter, cosine corrected field of view, $f_2 \leq 1.5$ %

Measured Quantity	Illuminance photopic Illuminance scotopic Spectral Irradiance Color coordinates (x,y) CCT CRI (color rendering index) PAR– PPFD Melanopic irradiance Melanopic illuminance (equivalent melanopic lux) Melanopic daylight equivalent illuminance Total irradiance for bilirubin (E_{bi}) Average spectral irradiance for bilirubin (AAP)
CSS-45	Detector head for illuminance and light color. (Class B according DIN 5032-7 or AA according to JIS C 1609-1:2006)
Spectral Detector	
Spectral range	(360 - 830) nm
Optical Bandwidth	10 nm optical bandwidth correction applied according to CIE 214
Measurement range typ. white LED	(1 - 350,000) lx (1E-3 - 500) lm with 150 mm integrating sphere (diameter)
Repeatability Δx and Δy	± 0.0002
Δy Δx uncertainty	± 0.002 (Standard illuminant A)
CCT Measurement range	(1700 - 17000) K
ΔCCT	± 50 K (standard illuminant type A) ± 4 % (depending on the LED spectrum)
Peak wavelength	± 1 nm
Calibration	
Calibration uncertainty	Illuminance (standard illuminant A) ± 3 % Illuminance (typ. LED) ± 4 % *(Traceable to national standard. Uncertainty of the standard is included)*
Miscellaneous	
Interface	USB 2.0, RS 485
Temperature range	Operation: 10°C to +30°C Storage: -10°C to +50°C
Power Supply	5 VDC by USB (3.5 - 25) VDC by custom plug max. current 500 mA
Weight	130 g, only sensor without cables

Dimensions	45 mm diameter 53 mm height* * height without WT protection dome
Housing	Splashproof/Watertight class: CSS-45: IP62 CSS-45-WT: IP65

Configurable with

Product Name	Product Image	Description
S-SDK-MSC15		Software Development Kit for MSC15 and CSS-45 variants for full measurement device control and implementation in own software.
S-MSC15		Application software for MSC15 and CSS-45 variants for measurement device control, measurement mode setup and data export.