CSS-45

https://www.gigahertz-optik.com/en-us/product/css-45/

Product tags: VIS ,



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.



Spectral radiometer sensor

Spectroradiometer sensor with outstanding light measurement characteristics

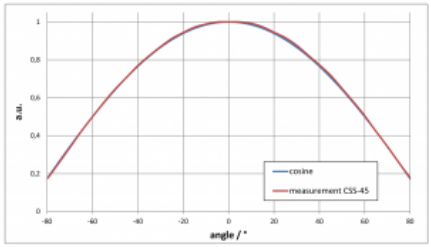
- Individual wavelength and linearity correction guarantee precise measurements of light sources irrespective of intensity and spectral distribution.
- Mathematical bandwidth correction according to CIE 214 for accurate colorimetric measurements.
- Another unique feature of the CSS-45 is its electromechanical 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 ($f_2 \leq 1.5$ %) 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.



Spectroradiometer sensor CSS-45

Robust and compact

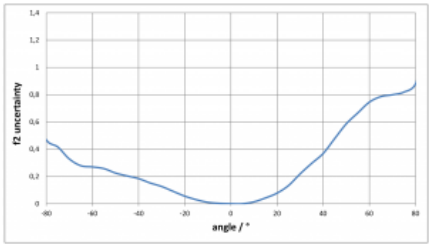
The compact metal housing features an M6 threaded hole and a V-groove around the device for universal attachment of the CSS-45. The dimensions are given in the technical drawing available for download. The housing with its splash-proof electrical connectors meets the requirements of protection class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



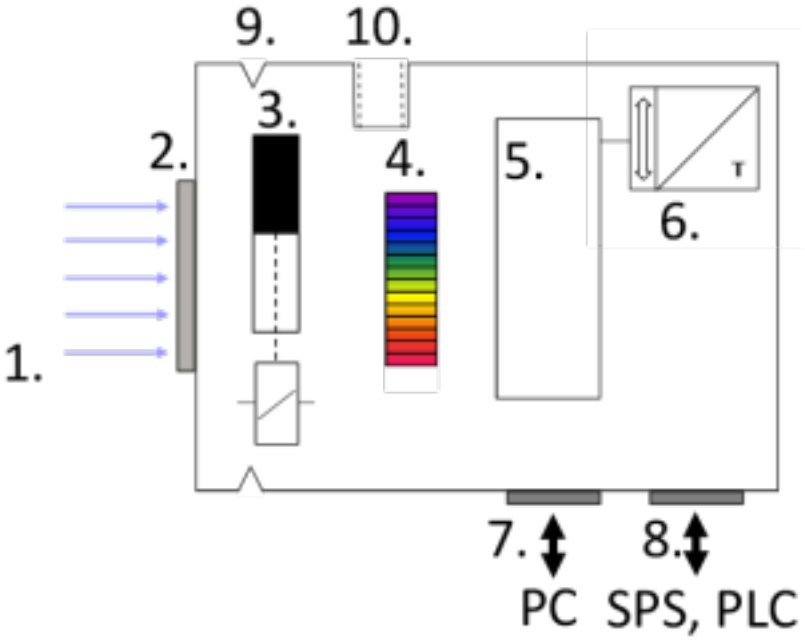
CSS-45 cosine field of view

Interfaces and Software

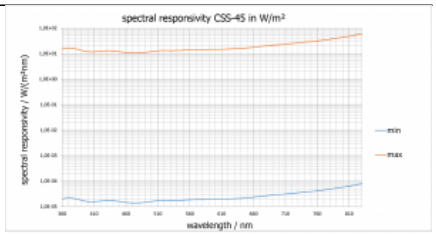
The sensor offers both an RS-485 and a USB interface for remote operation. The addressable RS-485 interface allows very long supply lines. Multiple CSS-45 sensors can be operated together under RS-485 control as well as in USB remote operation. In addition to the provided end-user software, a software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



Angle dependent f2 error of CSS-45



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



Typical spectral responsivity



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

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.

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

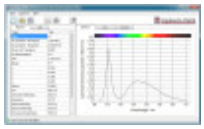
General	
Short description	Remote spectroradiometric detector for universal use in radiometric and photometric measurement setups.
Main features	Remote operation via USB 2.0 or RS 485. Compact, robust, splashproof housing with universal mounting options. Direct output of radiometric, photometric, colorimetric 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

Downloads

Type	Description	File-Type	Download
technical drawing	CSS-45 technical drawing	pdf	https://www.gigahertz-optik.com/assets/Uploads/V127682.pdf
CSS-45 Technical datasheet	CSS-45 brochure	pdf	https://www.gigahertz-optik.com/assets/Technical_Datasheet_CSS-45_CSS-D_210x297_EN_RZ_2022_Vers1_web.pdf
Brochure	Light measurement solutions for general and specialized lighting	pdf	https://www.gigahertz-optik.com/assets/Uploads/generallighting-broschuere-DINA4-hoch-v2.pdf

Configurable with

Product Name	Product Image	Description	Go to product
S-SDK-MSC15		Software Development Kit for MSC15 and CSS-45 variants for full measurement device control and implementation in own software.	https://www.gigahertz-optik.com/en-us/product/s-sdk-msc15/
S-MSC15		Application software for MSC15 and CSS-45 variants for measurement device control, measurement mode setup and data export.	https://www.gigahertz-optik.com/en-us/product/s-msc15/
ISS-30-TLS Tunable LED Light Source		Spectral tunable LED light source with uniform field of view, high dynamic range, equipped with spectral reference sensor and variable aperture controlled by an intuitive application software	https://www.gigahertz-optik.com/en-us/product/iss-30-tls-tunable-led-light-source/

Purchasing information

Article-Nr	Modell	Description
Product		
15308867	CSS-45	Meter, USB cable, software, calibration certificate. Optional carry case BHO-24, control unit CSS-D.
15310128	CSS-45-HI	Meter with additional OD1 attenuation, USB cable, software, calibration certificate. Optional carry case BHO-24, control unit CSS-D.
15308950	CSS-45-WT	Splash-proof measurement device, USB cable, software, calibration certificate.
15309361	CSS-D	Control unit for CSS-45. Connector cable.
Calibration		
15310446	KP-CSS45-E-S	Option: DIN EN ISO/IEC 17025:2018 Test Certificate (DAkkS) Spectral irradiance measurement in wavelength range from 360nm to 830nm.
Re-calibration		
15308903	K-CSS45-E	Re-calibration of a CSS-45's spectral irradiance including wavelength adjustment. Calibration certificate.
15309228	K-CSS45-WT-E	Re-calibration of a CSS-45-WT's spectral irradiance including wavelength adjustment. Calibration certificate.
15311529	KKP-CSS45-E-S	Factory Calibration Certificate with DIN EN ISO/IEC 17025:2018 Test Certificate.
Software		
15306347	S-SDK-MSC15	Software Development Kit for software implementation of the CSS-45 into custom software.
15310347	S-SRK-CSS45	Software readout kit, for use with RS485 interface
Accessories		
15308887	BHO-24	Carry case for CSS-45 and accessories.

Article-Nr	Modell	Description
15309091	CSS-45-Z01	RS-485 interface connector for CSS-45.
15309559	CSS-45-Z02	25 m long RS485 cable for CSS-45.

Contact, Calibration, Service & Support

We are known worldwide for excellent technical consulting and after sales support. Contact us to find together the best solution for you. Our services:

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- After-Sales Support
- Calibrations & Re-Calibrations (ISO/IEC 17025 Calibration Services, factory calibration, Calibration of Third-Party Products)
- Repairs & Updates
- OEM & Feasibility Consulting of Customized Solutions

Send us your inquiry or contact us by phone or e-mail. We would welcome your feedback too or review us on Google.

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