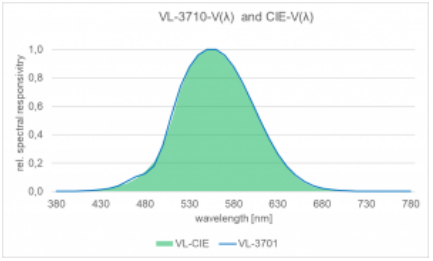
VL-3701

https://www.gigahertz-optik.com/en-us/product/vl-3701

Product tags: VIS

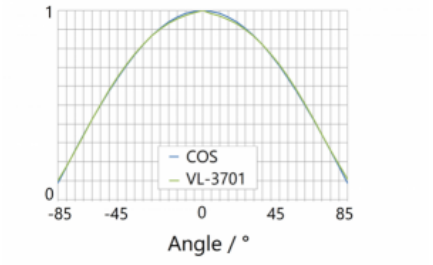
Description

Illuminance is the most frequently made measurement within general and specialist lighting applications. The two most important qualities required of a high precision illuminance detector are a spectral responsivity that is very well matched to the ideal V(λ) photopic curve and a spatial response that provides cosine correction. The VL-3701 meets the high standards of DIN Class A classification for both these parameters.



Typical spectral responsivity of the VL-3701 detector.

Photometric detectors offer a convenient solution for measuring illuminance (lux) simply, quickly and over a very wide dynamic range. When suitably calibrated, additional photometric quantities including luminance (cd/m^2), luminous flux (lumens), and luminous intensity (cd) can be measured in conjunction with accessories such as lenses, integrating spheres and goniometers.



Typical field of view with precise cosine correction

Product description

VL-3701 illuminance detector

The model VL-3701 is a high quality photometric detector calibrated for the measurement of illuminance and has proven itself over many years in numerous demanding industrial and scientific applications. The detector can be connected to all Gigahertz-Optik measuring devices and transimpedance amplifiers.

P-9710 Portable measuring device with VL-3701-2 detector for illuminance (lux) measurements

For the precise measurement of illuminance, the VL-3701 detector is constructed with a 7mm diameter diffuser that provides a cosine corrected field of view (Figure 2) and a photometrically corrected photodiode. The specifications of both meet the high requirements of quality class A of DIN 5032 part 7.

To ensure that this detector head is appropriate for the widest range of source spectra including most traditional lighting technologies and white light LEDs, Gigahertz-Optik pays particular attention to the implementation of the spectral photometric sensitivity V(λ) (Figure 1) in accordance with the CIE standard. A multi-layer optical correction filter from our own production is incorporated. This takes into account the spectral sensitivity of the photodiode and the spectral transmission of the input optics. The entire manufacturing process is subject to the quality management of the Gigahertz-Optik measuring laboratory. Quality assurance includes an individual calibration of the relative spectral sensitivity of each detector.

The high-quality Si photodiode offers a strictly linear relationship between the measurement signal and the illuminance in the range from pico-amps (10^{-12} A) to one milliamp (10^{-3} A). In connection with the Gigahertz-Optik P-9710 meter (Figure 3), a linear measuring range of up to 330000 lx with a resolution of better than 0.001 lx.

The robust detector housing is made of aluminum and offers a 2 m long, highly flexible connection cable. The threaded hole on the side or the circumferential V-groove on the front side enable the detector to be securely attached and enable it to be used with front tubes and optics. The detector's low profile of only 20 mm allows its use even in restricted spaces. The detector can also be offered in a splash-proof version.

Calibration

Meaningful measurements in absolute units such as illuminance in lx require the calibration of a measuring device with traceability to National Metrology Institute (NMI) standards. The Gigahertz-Optik calibration laboratory has been accredited since 1993 by the PTB (Physikalisch-Technische Bundesanstalt) and the DAkkS (the German national accreditation body) for the calibration of spectral sensitivity and spectral irradiance. Since then, our factory calibrations have been based on the calibration standards and quality management of the accredited calibration laboratory. Thus, the factory calibrations of Gigahertz-Optik already offer the highest level of traceability and have been accepted as a quality standard by customers all over the world for many years.

To meet the particular requirements of some industrial sectors, part of the calibration laboratory is accredited by the DAkkS as a test laboratory according to DIN EN ISO / IEC 17025. For this reason, in addition to the factory certificate, Gigahertz-Optik can optionally offer a DIN EN ISO / IEC 17025 certificate for the detector VL-3701 in connection with a measuring device.

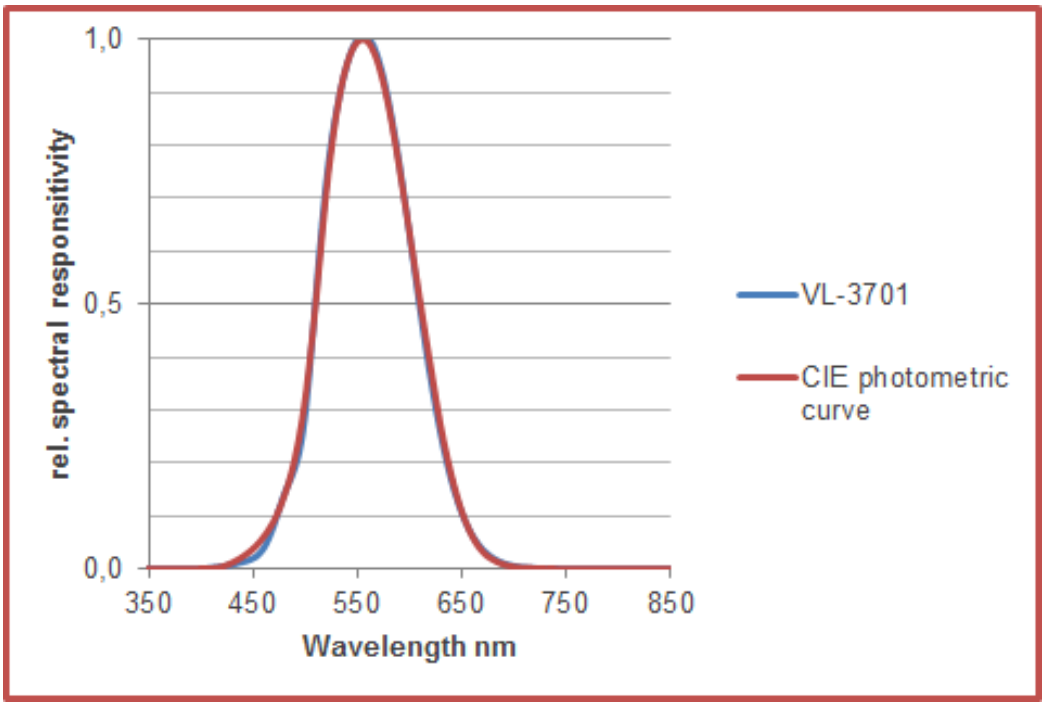
As standard, the VL-3701 detector is calibrated for both its illuminance responsivity and relative spectral responsivity.

Measuring device

The VL-3701 detector can be used with all of the Gigahertz-Optik measuring devices (optometers) and transimpedance amplifiers. The connector type of the detector must be selected to match the signal input connector of the measuring device.

Specifications

General	
Short description	Photometric detector for measuring illuminance according to quality class A DIN-5032 part 7. For use with all measuring devices and transimpedance amplifiers.
Main features	Illuminance detector. Input optics with a cosine field of view and photometrically corrected photodiode correspond in their specifications to the high requirements of quality class A of DIN-5032 part 7. The model VL-3701 is therefore suitable for demanding photometric measurement tasks. The detector can be used with all measuring devices and transimpedance amplifiers of gigahertz optics.
Measurement ranges	Maximum illuminance e.g. in connection with P-9710: 330,000 lx Resolution with P-9710: 2 mlx

typical applications	Measurement of illuminance in general and special lighting. Measurement tasks accompanying production.
Calibration	Calibration of illuminance sensitivity in A / lx. Calibration of the relative spectral responsivity.
Calibration	
Calibration uncertainty	irradiance ± 3.2 %
Specification	
spectral responsivity	photometric V(λ)
f1' (spectral mismatch)	f1' ≤ 3 %
typical responsivity	0.5 nA/lx
Max. signal current	1 mA
Input optics	Diffuser window 7mmØ
f2 (directional response/cosine error)	f2 ≤ 1.5 %
Connector	coaxial cable 2m Long, with BNC (-1), calibration data (-2) or ITT (-4) connector
temperature range	(5 - 40) °C
typical responsivity	
min. signal current	depends on optometer
f2 (directional response/cosine error)	[image src="/var/www/html/web/assets/32512d4daa/f2-VL-3701png4.png" id="6384" width="600" height="748" class="leftAlone ss-htmleditorfield-file image" title="f2 VL 3701png4"]
Rise time	2 µs
Options	
Accessories	WQ: Optional waterproof retrofitting of the VL-3701 detector using quartz dome and o-ring reinforcement of the base plate.

Downloads

Type	Description	File-Type	Download
VL-3701-1	Dimension	pdf	https://www.gigahertz-optik.com/assets/Uploads/100012-v2.pdf
VL-3701-2	Dimension	pdf	https://www.gigahertz-optik.com/assets/Uploads/neu-100006-vl-3701-2.pdf
VL-3701-4	Dimension	pdf	https://www.gigahertz-optik.com/assets/Uploads/neu-101851-vl-3701-4.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	Show product
P-9710		High-quality device for measurement of CW-, single pulse and modulated radiation. Features: Optometer for all detector heads with calibration data plug. Measurement modes: CW, pulse energy, dose, peak-to-peak, effective luminous intensity (Blondel-Rey), data logger, battery, main power, RS232	https://www.gigahertz-optik.com/en-us/product/p-9710
P-9710-2		High quality optometer for pulse-energy measurements of short pulses in photometric, radiometric and LASER application. Features: pulse energy measurement, CW, dose, simple and safe detector exchange, battery, main power, RS232	https://www.gigahertz-optik.com/en-us/product/p-9710-2
P-9710-4		High quality optometer for pulse-energy measurements of short pulses in photometric, radiometric and LASER application Features: pulse energy measurement with external Trigger input, CW, dose, simple and safe detector exchange, battery, main power, RS232	https://www.gigahertz-optik.com/en-us/product/p-9710-4
GB-GD-360-RB40		Goniometer for the measurement of 2π sources. Features: Measurement of the luminous and radiant intensity distribution as well as luminous flux and radiant power from compact spot lamps and light-emitting diodes. Measurement distance 100 mm to 2000 mm. Remote control. Optional Lightmeters, user software, etc.	https://www.gigahertz-optik.com/en-us/product/gb-gd-360-rb40
X1		Four-channel USB optometer designed for mobile use. Features: Compact device for use with all photometric, radiometric, colorimetric, plant-physiologic and photo-biologic measurement heads from Gigahertz-Optik. USB interface. Battery operation or power supply USB.	https://www.gigahertz-optik.com/en-us/product/x1

Product Name	Product Image	Description	Show product
X1-2		Four-channel RS232 optometer designed for mobile use. Features: Compact device for use with all photometric, radiometric, colorimetric, plant-physiologic and photo-biologic measurement heads from Gigahertz-Optik. USB and RS232 interface. Battery operation or power supply USB.	https://www.gigahertz-optik.com/en-us/product/x1-2
X1-RM		Optometer in 3HE housing for use in 19” racks. Features: Its USB and RS232 remote interface and two additional RS232 device interfaces make the device highly flexible when it comes to system integration. Its four signal inputs enable use with all photometric, radiometric, colorimetric, plant-physiologic and photo-biologic measurement heads from Gigahertz-Optik.	https://www.gigahertz-optik.com/en-us/product/x1-rm
X1-PCB		Optometer module. Feature: The X1 optometer is available as a printed circuit board either with or without a housing and is suited for applications that do not require a keyboard or display. Four signal inputs enable connection with all measuring heads from Gigahertz-Optik.	https://www.gigahertz-optik.com/en-us/product/x1-pcb
X1-PCBC		Optometer module. Feature: The X1 optometer is available as a printed circuit board either with or without a housing and is suited for applications that do not require a keyboard or display. Four signal inputs enable connection with all measuring heads from Gigahertz-Optik.	https://www.gigahertz-optik.com/en-us/product/x1-pcbc
TR-9600		High-speed 1µs or 100ns rise time data logger optometer. Features: Laboratory device for recording of clocked intensity progress readings in single light flashes, flash sequence or modulated light. Calculation of pulse data e.g. peak intensity, pulse length, pulse half width , pulse energy and pulse repeat rate, etc.	https://www.gigahertz-optik.com/en-us/product/tr-9600
P-9802		Light meter for laboratory use with up to 24 measurement heads. Features: For use with up to 24 photometric and/or radiometric measurement heads. RS232 interface.	https://www.gigahertz-optik.com/en-us/product/p-9802
P-9801		Eight-channel optometer. Features: State-of-the-art 8 channel laboratory optometer with a signal amplifier and sample & hold ADC per channel for clocked recording of the measurement signals. RS232 and IEEE488 interface. Trigger input and output.	https://www.gigahertz-optik.com/en-us/product/p-9801
P-2000		Two-channel optometer. Features: For use with most photometric and radiometric detectors supplied by Gigahertz-Optik. Modes: CW, pulse energy from both single and multiple flashes, effective luminous intensity (Blondel-Rey), data logger and others.	https://www.gigahertz-optik.com/en-us/product/p-2000
UMDP		Detector ports for the hollow spheres of the UM series modular construction integrating spheres. Features: Mounts for attaching detectors, fiber optic connectors and fiber pipes.	https://www.gigahertz-optik.com/en-us/product/umdp
P-9202-4		Fast response time trans-impedance signal amplifier. Features: High quality analogue amplifier with current-voltage conversion. Minimal diode offset voltage for short circuit operations. Bandwidths of up to 330kHZ. 1µs rise time. Large I-U amplification range from 10pA/V to 1mA/V.	https://www.gigahertz-optik.com/en-us/product/p-9202-4

Product Name	Product Image	Description	Show product
P-9202-5		Universal trans-impedance signal amplifier. Features: High quality analogue amplifier with current-voltage conversion. Minimal diode offset voltage (1mV) for short circuit photodiode operations. 5µs to 20ms rise time depending on the amplification. Large I-U amplification range – 1×10-10A/V to 1×10-3 A/V.	https://www.gigahertz-optik.com/en-us/product/p-9202-5
P-9202-6		Highly sensitive trans-impedance signal amplifier. Features: High quality analogue amplifier with current-voltage conversion with minimal diode offset voltage (0.5mV) for short circuit photodiode operation of . 2.5s to 25s rise time depending on the amplification. Large I-U amplification range – 1×10-11A/V to 1×10-4 mA/V.	https://www.gigahertz-optik.com/en-us/product/p-9202-6
PLL-1701		High-speed dual input optometer for measurement of CW, modulated radiation and optical fibers in W. Features: Optometer with electrical input (BNC) and optical input with small integration sphere for W measurement of optical fibers. Logarithmic and linear amplifier, USB and RS422 interface.	https://www.gigahertz-optik.com/en-us/product/pll-1701
P-21		High-quality touchscreen device for measurement of CW-, single pulse and modulated radiation. Features: Optometer for all detector heads with calibration data plug. Measurement modes: CW, pulse energy, dose, peak-to-peak, effective luminous intensity (Blondel-Rey), data logger, battery, main power, USB	https://www.gigahertz-optik.com/en-us/product/p-21

Purchasing information

Article-Nr	Modell	Description
Product		
15295230	VL-3701-1	Detector with –1 connector, protective cap, calibration certificate
15295224	VL-3701-2	Detector head with –2 connector, protective cap, calibration certificate
15297138	VL-3701-4	Detector head with –4 connector, protective cap, calibration certificate
Calibration		
15300577	K-FOV	Calibration, calibration certificate
15300178	K-SAZ-08	Simulated calibration correction factors for visible LED sources out of the Gigahertz-Optik GmbH lamp emission spectrum database. Monochromatic LEDs in 10nm steps and white LEDs.
15310564	KP-P9710VL3701-E-I	Option: DIN EN ISO/IEC 17025:2018 Test Certificate (DAkkS) Illuminance responsivity according to standard CIE 210:2014. In combination with P-9710 optometer.
15311941	KP-VL3701X1-E-I	Option: DIN EN ISO/IEC 17025:2018 Test Certificate (DAkkS) Illuminance responsivity according to standard CIE 210:2014. In combination with X1 optometer.
Re-calibration		
15300155	K-VL3701-I	Re-calibration, calibration certificate
15300580	K-SI-SR	Re-calibration, only together with K-RW-3701-I

Article-Nr	Modell	Description
15310565	KKP-P9710VL3701-E-I	Factory Calibration Certificate with DIN EN ISO/IEC 17025:2018 Test Certificate. In combination with P-9710 optometer.
15311940	KKP-VL3701X1-E-I	Factory Calibration Certificate with DIN EN ISO/IEC 17025:2018 Test Certificate. In combination with X1 optometer.
15311040	KKP-VL3701-SR	Factory Calibration Certificate with DIN EN ISO/IEC 17025:2018 Test Certificate. Relative spectral sensitivity within the wavelength range from 380 to 780 nm in 10 nm steps. Only in combination with an absolute calibration (factory calibration).
Options		
100150	/WQ	Optional waterproof retrofitting