

# X1-3

<https://www.gigahertz-optik.com/en-us/product/x1-3/>

**Product tags:** UV , VIS , Multi-Channel , Handheld device



## Description

### Photobiological Safety Meter

Optical radiation from artificial and natural light sources can effect a photobiological reaction on human skin and eye with the risk of damage due to overexposure. Regulations, standards and guidelines that include effective limit values are published for equipment safety and occupational safety in the workplace. Equipment safety requirements that are internationally agreed on require manufacturer's to classify, design criteria and warning labels for their products, whereas workplace safety tends to be more national requiring health hazard protection of employees including published exposure limit values, threat analysis and precautionary measures. The most current regulations are:

- IEC 62471:2006 and EN 62471:2008 for equipment safety
- 2006/25/EC guideline and DIN EN 14255-1 for safety of workplaces
- IEC TR 62778:2014 for the assessment of blue light hazard of light sources and luminaires

### Integral measurement technology

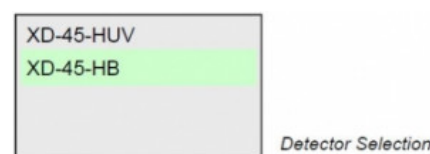
Gigahertz-Optik GmbH, as a world class manufacturer of high-end filter photometers, colorimeters and radiometers has manufactured light meters for light hazard measurement and assessment since 1992. The early single sensor design of the hazard light meter was later replaced by dual or multi-cell detectors for improved measurement uncertainty (the spectral sensitivity function can be better tuned) and also for simpler operation. The latest design model X1-3 light hazard meter conforms to the 2006/25/EC, IEC 62471, EN 62471, EN 14255-1 and IEC TR 62778 measurement criteria for the evaluation of hazard exposure.

### Integral measurement technology vs. double monochromator

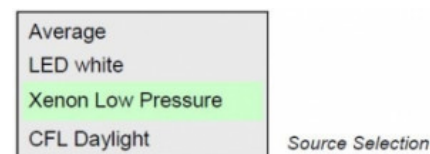
The integral measurement technology is a supplemental or alternative measurement method to the double grating monochromator spectroradiometer the most accurate UV radiometric instrument for this application. The double monochromator based instrument is expensive, laboratory based, delicate and includes multiple parts making it difficult to move. Now a portable, hand-held and lower cost solution is available with Gigahertz-Optik's X1-3 light hazard meter. The complete instrument consists of the compact display unit, XD-45-HB blue light hazard detector and XD-45-HUV UV hazard detector. It is designed specifically for the evaluation of the potential health risk due to exposure from UV and blue light for workplace safety and product classification. Its simple use and price level supports the needs of lamp distributors, light source systems and luminaire manufacturers, institutional and industrial safety engineers, hygienists and others required to perform routine and periodical health hazard optical radiation measurements independently without third party testing laboratories.



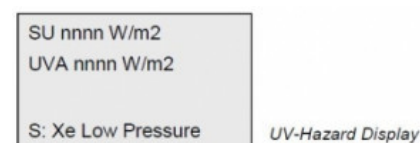
*Gigahertz-Optik X1-3 display unit is one of the most compact and ergonomically styled multi-channel light meters available.*



*X1-3 Detector Selection*



*X1-3 Source Selection*



*UV Hazard Display*



*Blue Hazard Display*

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## Calibration

Gigahertz-Optik GmbH emphasizes that accurate conformal UV and blue light hazard light measurements require a knowledge of basic radiometry, following proper radiometric techniques and understanding the applicable standards! The published CIE 220 approved our way of calibration since we measure the relative spectral sensitivity of each integral sensor. This data can be used for the correction of e.g. the spectral mismatch. This shows that beside know-how in producing such a meter as well a very good equipped calibration laboratory is needed. Gigahertz-Optik can offer both on a highest level, furthermore each device is shipped with a calibration certificate which evidences a traceable calibration back to national standards.

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## X1-3 Display unit

For on site light hazard measurements in the ultraviolet, blue and visible spectral range Gigahertz-Optik manufactures different detector heads each in multiple sensor design like the most common [XD-45-HB](#) and [XD-45-HUV](#). To read out this multi-cell detectors the X1-3 display unit is used, the key features are:

- Four channel electronics for multi-cell detectors
- Wide dynamic range (0.1 pA to 200 µA amplifier)
- Low noise for high sensitivity (0.1 pA resolution)
- Auto ranging gain control
- Four column alphanumeric backlit display
- Powerful microprocessor operation
- Large data storage memory
- Simple to use menu supported operation
- Ergonomic hand-held meter design
- Battery or USB power operation
- USB interface

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## Quick Operation Guide

After switching on the meter the main menu is opened by pressing the menu button. Depending on the measurement application the UV hazard or blue light hazard detector, connected to the meter, is selected by its model number. The detector calibration data is activated by the enter key and the display is automatically set to the correlating measurement values. If the light source characteristics in the application are not known an average calibration factor is used. A light source emission spectrum dependent measurement uncertainty is factored into the average instruments uncertainty. If the light source can be indisputably identified a light source dependent calibration correction factor can be selected from a library in the menu to reduce measurement uncertainty. The instrument is then ready for actual measurements.

## Specifications

### General

Short description	Radiometer for the measurement of UV and Blue-light hazard of lamps and luminaires.
Main features	Compact gauge in ergonomic design for one hand control. Three-channel detector head XD-45-HUV for the measurement of the UV hazard risk for Skin and eye. Four channel blue light hazard detector XD-45-HB for the measurement of blue-light hazard and illuminance. 200 mm tube adapter for simplified measurements of the radiance. Battery powered with two AA cells. USB-Interface.
Measurement range	In accordance with the specifications of the detector heads XD-45-HUV and XD-45-HB.
Typical applications	Mobile gauge for the check of hazard risk at workplaces with principal danger by UV- and blue-light radiation. For the classification of UV lamps spectral measurement devices are recommendet.
Calibration	<p>Meter: Calibration and comparison of the current responsivity in each of the seven gain ranges.</p> <p>Detector heads: Calibration of the actinic responsivity of each of the detector head channel. Calibration of the relative spectral responsivity of each of the detector head cells.</p> <p>Calibration certificate with description of the calibration procedure, reference standards used and calibration values.</p>








### Product

Firmware	Individual set-up for use with XD-45HB, XD-45-HB&XD-45-HB-SRT200 and XD-45-HUV only
Display	LCD graphic display 97x32 pixel, 14.3mm x 35.8mm, text 4 rows each 14 characters Switchable LED-backlight
Offset correction	automatic correction, as well after range transcending
Parameter adjustment	Remote control or front panel buttons (menu), set values permanently stored (eeprom).
Front panel control	3 buttons, menu system
Sensor	see tab configurable with

### Miscellaneous

Power Supply	<p>Two AA batteries, operating time about 250 h. without display backlight.</p> <p>Powered by USB-Interface.</p>
Interface	USB V1.1 (HID Device)
Temperature range	<p>Operating: (5 to 40) °C</p> <p>Storage: (-10 to 50) °C</p>
Humidity	<80%, non-condensing
Dimensions	<p>XD-45-HUV detector: 45 mm diameter, 30 mm high</p> <p>FOV adapter: 60 mm diameter, 49 mm high</p>
Warranty	12 month
Weight	<p>XD-45-HUV detector: 200 g with cable</p> <p>FOV adapter: 50 g</p>
Info	Regular recalibration of the current calibration is recommended. Especially when very small measurement currents have to be measured. In the case of very high humidity, fault currents of the radiometer are possible at low measuring currents and should be taken into account.

## Configurable with

Product Name	Product Image	Description	Go to product
XD-45-HB		Detector for Blue-Light Hazard Measurements	<a href="https://www.gigahertz-optik.com/en-us/product/xd-45-hb-2/">https://www.gigahertz-optik.com/en-us/product/xd-45-hb-2/</a>
XD-45-HUV		Detector for UV Hazard Measurements	<a href="https://www.gigahertz-optik.com/en-us/product/xd-45-huv/">https://www.gigahertz-optik.com/en-us/product/xd-45-huv/</a>
S-SDK-X20		Software Development Kit for X20 variants (X1 and HCT99).	<a href="https://www.gigahertz-optik.com/en-us/product/s-sdk-x20/">https://www.gigahertz-optik.com/en-us/product/s-sdk-x20/</a>
S-X1		Application software for X1 variants.	<a href="https://www.gigahertz-optik.com/en-us/product/s-x1/">https://www.gigahertz-optik.com/en-us/product/s-x1/</a>
K-xx-C		Calibration of the signal current sensitivity of optometers. Features: calibration of all gain stages, traceable calibrated current source, calibration certificate	<a href="https://www.gigahertz-optik.com/en-us/product/k-xx-c/">https://www.gigahertz-optik.com/en-us/product/k-xx-c/</a>
UV-3711		Detector head for the measurement of irradiance of UV radiation in W/m <sup>2</sup> in the spectral range 280 nm - 320 nm (UV-B).	<a href="https://www.gigahertz-optik.com/en-us/product/uv-3711/">https://www.gigahertz-optik.com/en-us/product/uv-3711/</a>
UV-3717		Detector head for the measurement of irradiance of UV radiation in W/m <sup>2</sup> in the spectral range from 315 nm to 400 nm with low crosstalk from radiation above 400 nm (UV-A).	<a href="https://www.gigahertz-optik.com/en-us/product/uv-3717/">https://www.gigahertz-optik.com/en-us/product/uv-3717/</a>

## Purchasing information

Article-Nr	Modell	Description
<b>Product</b>		
15298892	X1-3	Meter, Hard case, 2 x 1.5 V AA batteries, manual
15298011	XD-45-HB	Detector head, protection cap, calibration certificate
15298013	XD-45-HUV	Detector head, protection cap, 80° FOV Adapter, calibration certificate
<b>Calibration</b>		

Article-Nr	Modell	Description
15311981	KP-XD45HBX1-E-I	Option: DIN EN ISO/IEC 17025:2018 Test Certificate (DAkks).  Integral irradiance in the wavelength range from 300nm to 700nm and illuminance. In combination with X1 optometer.
15311983	KP-XD45HUVX1-E-I	Option: DIN EN ISO/IEC 17025:2018 Test Certificate (DAkks).  Integral irradiance in the wavelength range from 315 nm to 400 nm and the ICNIRP / ACGIH weighted integral irradiance in the wavelength range from 200 nm to 400 nm. In combination with X1 optometer.
15311979	KP-XD45HUVXD45HBX1-E-I	Option: DIN EN ISO/IEC 17025:2018 Test Certificate (DAkks).  XD-45-HUV Integral irradiance in the wavelength range from 315 nm to 400 nm and the ICNIRP / ACGIH weighted integral irradiance in the wavelength range from 200 nm to 400 nm.  XD-45-HB Integral irradiance in the wavelength range from 300nm to 700nm and illuminance. In combination with X1 optometer.
<b>Re-calibration</b>		
15300671	K-X1-C	Current calibration and adjustment of optometer X1 1. Calibration certificate
15300460	K-XD45HB-I	Re-calibration of irradiance responsivity with calibration certificate
15311980	KKP-XD45HBX1-E-I	XD-45-HB Factory Calibration Certificate with DIN EN ISO/IEC 17025:2018 Test Certificate. In combination with X1 optometer.
15300459	K-XD45HUV-I	Re-calibration of irradiance responsivity with calibration certificate
15311982	KKP-XD45HUVX1-E-I	XD-45-HUV Factory Calibration Certificate with DIN EN ISO/IEC 17025:2018 Test Certificate. In combination with X1 optometer.
15311978	KKP-XD45HUVXD45HBX1-E-I	XD-45-HB and XD-45-HUV Factory Calibration Certificate with DIN EN ISO/IEC 17025:2018 Test Certificate. In combination with X1 optometer.
<b>Options</b>		
15298007	XD-45-HB-SRT200	Front Adapter with exchangeable 11 mrad and 100 mrad apertures
15309267	XD-45-HB-SRT200-AI	Front Adapter with exchangeable 11 mrad and 100 mrad apertures. Tube manufactured of aluminum including black inner coating. Suitable for higher temperatures at measurement location.
<b>Software</b>		
15298167	S-X1	User software for the X1
15298071	S-SDK-X20	For software implementation of the X20 optometer board or X1 device into custome made software. Supply of .dll's and LabView VI's for device communication.

## Contact, Calibration, Service & Support

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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

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