

- © Hand-held Dual-channel Meter for Field Service and Laboratory Use
- © Dual Cell UV-A Irradiance and Illuminance Detector Head
- © 0.0002 to 900 mW/cm<sup>2</sup> & 0.01 to 199,999 lx measurement range
- © Cosine Corrected Field of View
- © CW Measurement Mode for DC and AC Light
- © Snapshot Hold Function
- © Dose Measurement Mode
- © Quick & Easy Handling
- © Economical Price
- © RS232 Remote Control and Data Collection



Combining a UV-A irradiance and photometric illuminance detector into one instrument is highly useful in two applications:

**1) Liquid Penetrant Testing** using the dye penetration examination process is a widely used method for the detection of surface cracks in nonporous metal and non-metal materials in NDT. For highest sensitivity, a fluorescent dye is used as the penetrating liquid and the test is carried out under UV-A ultraviolet 'blacklight' light sources. To reliably test with fluorescent agents, an adequate level of UV-irradiance containing a very low proportion of white (visible) light must be generated at the object under test to ensure proper contrast.

**DIN EN 1956, ASTM and MIL Standards** exist that describe the general conditions and standard practices for the penetrant test examinations, including the procedures to be followed.

The minimum requirements for the illumination or irradiation conditions, test procedures to be used for checking these levels and suitable measurement equipment specifications are also covered.

## 2) Photostability

The current ICH (International Conference for Harmonization) guidelines specify that drug and drug products must be phototested to ensure that exposure to light does not cause photo-

chemical degradation of the product or packaging. The product under test must receive a **measured** dose of both UV-A (200 watt-hours per square meter) and Visible (1.2 million lux-hours) optical radiation exposure. This requires both radiometric and photometric measurements in terms of illuminance in lux and UV-A (315 to 400 nm) irradiance in W/m<sup>2</sup> multiplied by exposure time in hours.

UV-A fluorescent and Xenon or Metal Halide simulated ID65 light sources are the only sources specified in the ICH guidelines.

Most often the phototesting is performed in a photostability chamber with long fluorescent light sources mounted above the products under test. Since this is an extended source type of measurement rather than a point source configuration, the detector angular sensitivity should be cosine corrected using a diffuser. This way the incoming light signals are properly weighted according to the cosine of the angle of incidence.

Profiling the photostability chamber for uniformity over the exposure plane is an important procedure since products placed in different areas inside the chamber should be uniformly exposed to the same light levels.

## X9s Meter

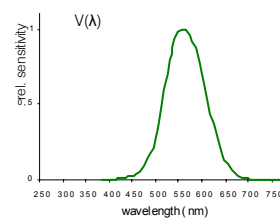
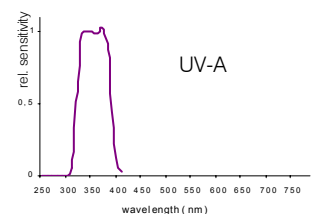
Besides its precise measurement capability the X9s meter's ("Xnine eight") most outstanding

feature is its easy handling. To measure, the user simply switches on the meter and selects either the CW (lx or W/cm<sup>2</sup>) or Dose (lxh or J/cm<sup>2</sup>) mode. The LCD characters are 9 mm high for easy viewing. The X9s is a compact handheld battery operated instrument.

## XD-9502 Detector Head

The compact detector housing integrates two precision light detectors, one for illuminance and one for UV-A irradiance.

The **photometric detector** (lx) satisfies the requirements of DIN quality class B (DIN 5032 Part 7), and is suitable for use as a qualified industrial measuring instrument. This qualification governs the acceptable tolerances of the photometric response function (V(λ)) and the accuracy of the



cosine function in particular.

The **UV-A detector** offers a spectral sensitivity characteristic according to DIN 5031 and the CIE, where the UV-A range is defined from 315 to 400 nm. The detector design effectively blocks the neighboring UV-B and visible light regions. The detector head is cosine corrected with a diffuser.

## Traceable Calibration

Calibration is traceable to the ISO EN 17025 accredited part of

Gigahertz-Optik's Calibration Laboratory for Optical Radiation Quantities.

## Custom Label:

All meters in the X9 family are ready made for custom design and labeling. Customization may include the meter front panel, function/mode set-up, detector heads, manuals and calibration certificates. Contact the factory for details and assistance.

The company for more details.

## Operation

The X9s is simple to operate. To measure, connect the detector and switch on the meter.

## Detector Selection

Selection of the photometric or UV-A detector is easily done in the menu mode.

## CW Measurement

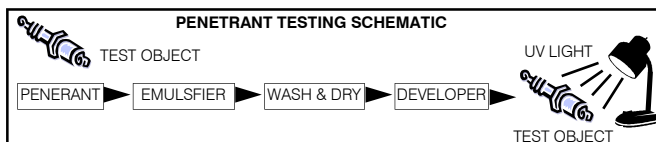
CW mode is used to measure continuous DC or AC signals.

## Dose Measurement

Measurement values are accumulated at a logger rate of 1 s and displayed as dose. The measurement is manually started and stopped.

## Stop/Run Function

Current reading can be 'frozen' by pressing 'stop' button.



X9s Specifications& Ordering Information

Specifications: X9s Meter

Signal Input	
Detector Input	Photocurrent to voltage converter amplifier with following voltage to voltage amplifier (x10). 7 decade stepped gain ranges with max. gain signal values from 200.0 $\mu$ A to 200.0 pA . Automatic range switching. 12 bit ADC with up to 14 bits at longer integration times.
Signal Processing	A/D converter with 20 ms time interval. 500 ms integration through averaging of multiple measurements.
Frequency Range	Signal conversion from 0.166 Hz to >300 MHz. .
Detector Connector	9 pin MDSM9 socket . Connected detector identification if meter switched ON (VL-3704-4 and LDM-9901-4 only).

Range Specifications				
Range (A/V)	Max. Input Value	Slew-Rate (10 - 90%)	Error (with offset compensation) 1 year, 23°C $\pm$ 5°C. $\pm$ ( % of reading + % of range),	Permitted Detector Capacitance
1x10-4	200.0 $\mu$ A	30 ms	0.2 %* + 0.05 %	2 nF
1x10-5	20,00 $\mu$ A	30 ms	0.2 %* + 0.05 %	2 nF
1x10-6	2,000 $\mu$ A	30 ms	0.2 %* + 0.05 %	2 nF
1x10-7	200,0 A	30 ms	0.2 %* + 0.05 %	10 nF
1x10-8	20,00 nA	30 ms	0.2 %* + 0.05 %	10 nF
1x10-9	2,000 nA	30 ms	0.2 %* + 0.05 %	10 nF
1x10-10	200,0 pA	30 ms	0.2 %* + 0.05 %	10 nF

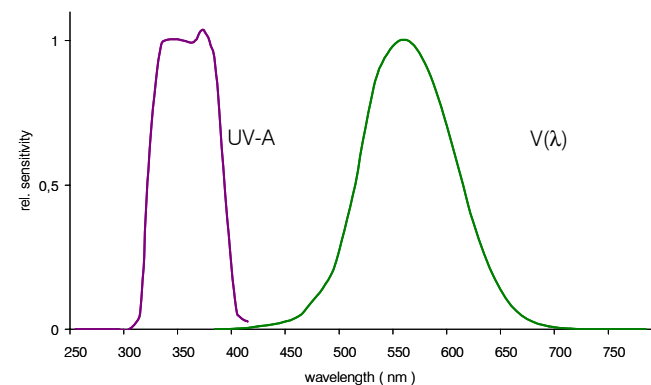
Functions	
Parameter Settings	Retention of the last settings in continuous memory. 3 function buttons.
Measurement Quantity	Ampere calibrated with DKD calibrated current source. Current signal of UV-A and UV-B detector multiplied with calibration correction factor to display irradiance in mW/cm <sup>2</sup> and illuminance in lx.

General	
Display	6 character LCD. Character height 9 mm. Indication of measurement quantities lx and cd/m <sup>2</sup> , battery low, peak, stop
Operating Temperature	5 to 40 °C (41 to 104 ° F) (75 % rel. H, non-condensing). Storage Temperature: 0 to 50°C (32 to 122 °F).
Dimensions/Weight	120 x 65 x 22 mm / 150 g (4.7 x 2.6 x 0.9 in / 0.33 lb).
Power	9 V one-piece battery. Operation time about 100 h. Operation from a AC plug-in power supply 230V/50 Hz on option, erases battery operation.

Interface	
RS232	9600 Baud, 8 8D, 1S,N. 8 pin plug Hirose, type 3260-8S1. Power supply operation recommended for remote control.

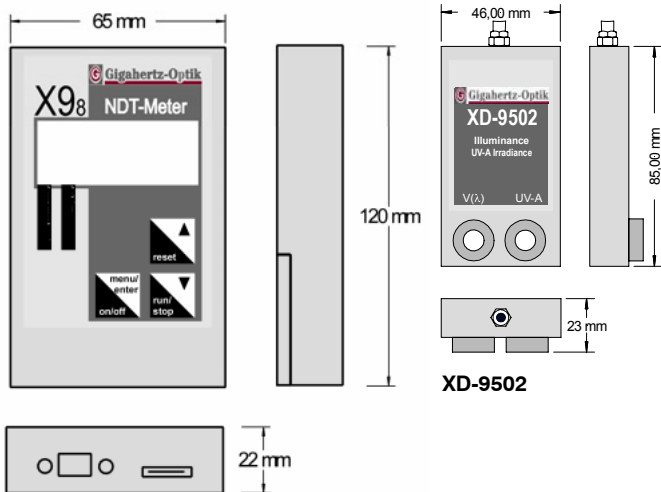
X9s with Detector Head	
typ. UV-A measurement range	0.025 to 900 mW/cm <sup>2</sup> with max. 0.00005 mW/cm <sup>2</sup> resolution
typ. Illuminance measurement range	0.2 to 999,000 lx with 0.004 lx resolution
Dose range	0.00001 to 900,000 lxs and 0.00001 J/cm <sup>2</sup> to 900,000 J/cm <sup>2</sup>

Spectral sensitivity characteristic



spectral sensitivity characteristic of both X9s detectors

Dimensions



Ordering Information	
X9 8	Illuminance & UV-A Irradiance Meter including detector head . Detector calibration data stored in memory . Includes battery and handbook.
X9Z-01	RS232 interface cable to connect the X9 meter with 9 PIN SUB-D PC standard socket
X9Z-02	External AC power unit for the X9 meter including meter modification (cancels battery operation)
BHO-04	Hard case to carry and store the X9 8 with detector.