X9$_{11}$ Hand-held UV-C Irradiance Meter

- © **Hand-held Single Channel UV-C Irradiance Meter**
- © **Measurement Range 0.05 to 1000 mW/cm² with 0.001 mW/cm² Resolution**
- © **Solar Blind UV-C Sensitivity**
- © **NIST Traceable Calibration at 254 nm**
- © **Solid-state Detector with Cosine Corrected Field of View**
- © **CW Mode with Snapshot Hold Function**
- © **Dose Measurement Mode**
- © **Easy to Use**
- © **Battery Operation**
- © **RS232 Remote Control Operation**



UV-C Radiation
Short wavelength high energy ultraviolet radiation in the UV-C spectral range from 100 to 280 nm is used in the ***germicidal/ bactericidal sterilization*** of air and water. UV-C at 253.7 nm is also employed in ***eprom erasure*** and the ***cleaning*** of sensitive surfaces in the semiconductor industry. ***UV curing*** is another area where UV-C is applied.

UV-C Light Sources
Due to its high and pre-dominantly monochromatic output at 253.7 nm, ***low pressure mercury*** is the light source of choice in these applications. Medium and high pressure Hg as well as metal halide and other broadband UV sources are also used, especially in UV curing.

Light Source Life-time
The life time of high power UV-C sources is limited. Therefore the UV-C intensity must be monitored periodically to control the process condition.

UV-C Detectors
Optical radiation detectors used in UV-C applications are subject to extreme stress due to the high energy UV-radiation involved. Special precautions are needed to ensure that the detector's life is longer than that of the light source.
Also, detector sensitivity must focus on the specified source spectra using UV resistant components.

Detector Stability
Radiometric detectors used for UV-C measurement and monitoring must be designed to remain stable with minimal degradation from long term exposure to the high irradiance and energy levels typically found in this application.

UV-C Isolation
The detector must be able to isolate the UV-C radiation and not allow any out-of-band signal to contaminate the reading.

Cosine Field of View
A precise cosine corrected field of view, simple operation for inexperienced users and an attractive price level are also desirable.

X9$_{11}$ Meter
Besides it's precise measurement capability the X9$_{11}$ (Xnine eleven) meter's most outstanding feature is its easy handling. To measure, the user simply connects the detector head and switches on the meter. The LCD characters are 9 mm high for easy viewing. The X9$_{11}$ is a compact handheld battery operated instrument. AC option is available.

UV-3718 Detector Head
A new technology solid-state solar blind photodiode detector was chosen for use in the UV-3718 detector head because of its UV stability and solar blind spectral sensitivity characteristic. The UV sensitivity of the detector is limited to 265 nm focusing response to the 254 nm spectral range.
Also, the detector employs a carefully designed diffuser to provided a precise cosine correction of the detector, which is of equal importance in maintaining low measurement uncertainties.

Traceable Calibration
Calibration is traceable to the ISO EN 17025 accredited part of Gigahertz-Optik's Calibration Laboratory for Optical Radiation Quantities and NIST standards.
Calibration of the detectors irradiance sensitivity at 254 nm as well as an individually measured plot of spectral sensitivity is part of the calibration certificate.

Custom Labeling:
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.



Operation
The X9$_{11}$ is simple to operate To measure, connect the detector and switch on the meter.

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.

Peak Hold Measurement
Peak Hold mode is used to search for "hot-spot" light intensities. The peak intensity measured is frozen on the display.

Stop/Run Function
Current reading can be 'frozen' by pressing 'stop' button.

X9$_{11}$ Specifications & Ordering Information

Specifications: X9$_8$ 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 µA 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.

Range Specifications

Range (A/V)	Max. Input Value	Slew-Rate (10 - 90%)	Error (with offset compensation) 1 year, 23°C ±5°C ±(% of reading + % of range),	Permitted Detector Capacitance
1x10-4	200.0 µA	30 ms	0.2 % + 0.05 %	2 nF
1x10-5	20,00 µA	30 ms	0.2 % + 0.05 %	2 nF
1x10-6	2,000 µA	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

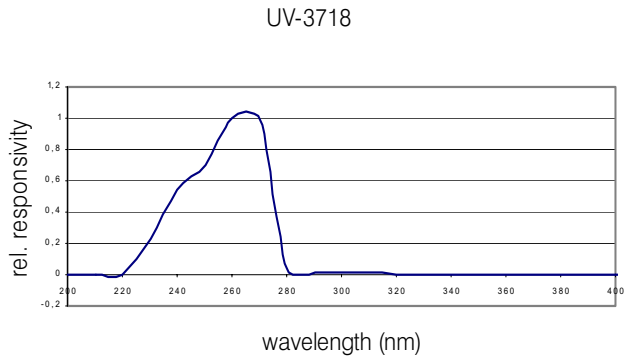
Function	
Parameter Settings	Retention of the last settings in continuous memory. 3 function buttons.
Measurement Quantity	Ampere calibrated with DKD calibrated current source. Current signal multiplied with calibration correction factor to display irradiance in mW/cm².

General	
Display	6 character LCD. Character height 9 mm. Indication of measurement quantities lx and cd/m², 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.

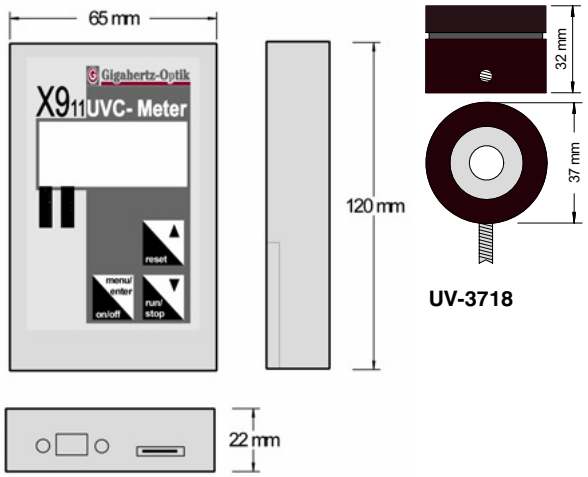
Interface	
RS232	9600 Baud, 8 8D, 1S,N. 8 pin plug Hirose, type 3260-8S1. Power supply operation recommended for remote control.

Specifications: X9$_{11}$ with UV-3718 UV-C Detector Head	
Typ. Irradiance Measurement Range	0.05 to 1000 W/cm² with 0.001 mW/cm² resolution
Dose Measurement Range	0.00001 J/cm² to 100.000 J/cm²
Detector Dimensions	Dia. 37 mm dia.. Height 32 mm; Cos. diffuser dia. 7 mm; Cable length 2 m

Spectral Sensitivity UV-3718



Dimensions



Ordering Information	
X9 11	UV-C irradiance and dose meter. Calibration data stored in memory. Includes battery and handbook.
UV-3718-4	UV-C irradiance detector head with factory calibration certificate. ITT type connector (-4).
X9Z-01	RS232 interface cable to connect the X9 meter with 9PIN SUB-D PC standard socket
X9Z-02	External AC power unit for the X9 meter including meter modification (cancels battery operation)
BHO-04	Hard Carrying Case