

Analog Sensors • UV Radiation Safety Detector

PMA1120-S-05-100



Measures Hazardous UV Radiation in the Workplace According to ACGIH Guidelines

Applications

- Industrial and Laboratory Safety
- Hospital Monitoring
- Germicidal Lamps Monitoring
- Commercial Lighting
- Safety Glass Testing
- Welding
- UV Curing and Printing

Features and Benefits

- High Sensitivity
- Dynamic Range 2×10^5
- Excellent Long-Term Stability
- Cosine Corrected
- NIST Traceable Calibration
- Radiometric Units and Max. Exposure Time

The PMA1120-S-05-100 UV Radiation Safety Detector gives an accurate measurement of hazardous radiation to which an industrial worker may be subject. The meter indicates how long a worker may remain at the measured position before reaching the threshold limit value (TLV) proposed by the ACGIH¹. The TLV of 3 millijoules/cm² in an 8 hour period has been chosen by the ACGIH as one which can be tolerated, even if repeated every work day, without causing any long term effect.

The TLV exposure dose has been chosen by the ACGIH as one which can be tolerated, even if repeated every work day, without causing any long term effect. The TLV for occupational exposure takes into consideration the risks of acute and chronic injury to both the eye and skin.

The eye is the most radiation sensitive organ, therefore the dose which will cause no eye damage is the maximum allowable radiation dose. Actinic ultraviolet radiation (UV-B and UV-C) is strongly absorbed by cornea and conjunctiva. Overexposure of these tissues cause keratoconjunctivitis, commonly referred to as welder's flash or arc-eye.

Measurements of eye damaging radiation in rabbits and in monkeys show a peak sensitivity at 270nm and a minimal dose for damage of about 4-5 millijoules per square centimeter. Ultraviolet radiation damage is gradually repaired depending on degree of damage. Damage from a minimal dose should be repaired within 24 hours.

The meter reading should be of the highest intensity at a site. The worker's natural avoidance of the usually bright UVR light source, and the closing down of the pupil's size because of bright light provide additional safety from the measured UVR when it emanates from a visually bright source. Even without these normally occurring safety enhancements not exceeding the TLV will provide adequate protection.

The TLV for UV radiation specified by ACGIH applies to sources which subtend an angle less than 80°. Sources which subtend a greater angle need to be

measured only over an angle of 80°.

The instantaneous value indicates how long an exposure at the intensity being measured is required to produce a dose of 3 mJ/cm². The PMA can also be set to continuously monitor UV and sound an alarm when the preset dose or irradiance level is reached.

Calibration

The PMA1120-S-05-100 detector is calibrated with a NIST traceable quartz-halogen lamp. Since the spectral response of the detector does not follow exactly the ACGIH spectral weighting function, a spectral mismatch correction has to be made if the meter is used with a different source. The correction can be permanently programmed into a data logger.

The measured irradiance should be multiplied by the correction factor as provided below. Yearly re-calibration is required.

Light Source	Correction Factor
Quartz-Halogen Lamp	1.00
Xenon Arc Lamp	1.19
Direct Sunlight	0.16
Low Pressure Mercury Lamp	2.49
Metal Halide Lamp	1.65

Specifications

Spectral Response	Follows ACGIH UV Hazard Action Spectrum Figure 1
Angular Response	5% for angles <60°, Figure 2
Range	0-100 [µW/cm ²] 0 Volts-5 Volts
Input Voltage	+10-24VDC
Operating Environment	32 to 120 °F (0 to +50 °C) No Precipitation
Cable	7 ft. Straight Cable (2.2m)
Diameter	1.6" (40.6mm)
Height	1.8" (45.8 mm)
Weight	3.7 oz. (105 grams) W/O Cable
Irradiance from Typical Sources	Solar Radiation, 30°. SZA, 3mm Ozone, Clear Sky: Approx. 1100 W/m ²
150W Xenon Lamp at 8"	180 W/m ²

Wire Connections

Wire Color	PMA1120-W-05-100 Signal
White and Yellow	Analog Output • (0 to Supply - 0.5 Volts) • Connect Wires Together
Black	Analog/Power Ground, Connect Wires Together
Pink	+10 to +24VDC Power Input
Blue	Power Ground
Braid	Cable Shield

Ordering Information

PMA11200	UV Radiation Safety Detector
See list of accessories for mounting hardware available.	

References

- ¹ "Documentation of the threshold limit values for Physical Agents in the Work Environment" American Conference of Governmental Industrial Hygienists, Inc.
- ² Sliney, D.H., The Merits of an Envelope Action Spectrum for UVR Exposure Criteria, Am. Industr. Hyg. Assn. J., 33 (9):644-653, 1972

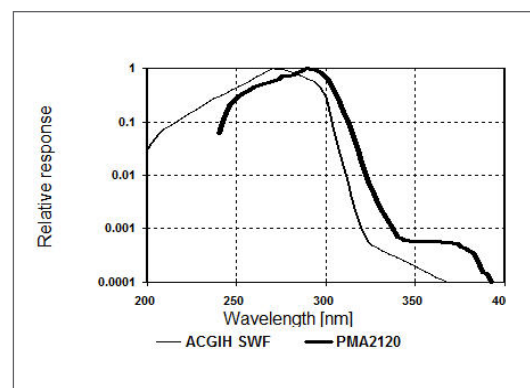


Fig. 1. PMA1120-S-05-100 Spectral Response

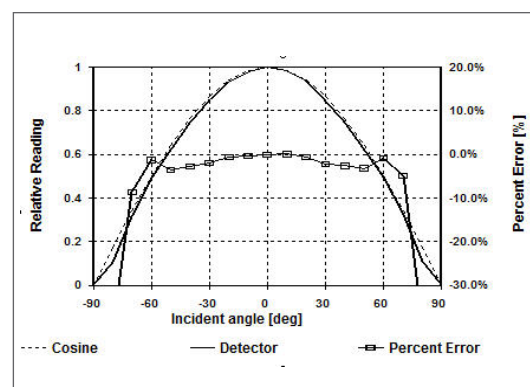


Fig. 2. PMA1120-S-05-100 Angular Response