

Sensors • Quantum Detector

PMA2132

Measures Photosynthetically
Active Radiation from 400 to 700nm



Applications

- Agriculture
- Photobiology
- Meteorology and Climatology
- Environmental Monitoring
- Educational

Features and Benefits

- High Sensitivity
- Wide Dynamic Range
- Excellent Long-Term Stability
- Cosine Corrected
- NIST Traceable Calibration
- Hermetic Enclosure

The PMA2132 Quantum detector measures the photon flux in wavelength range from 400 to 700nm. The PMA2132 has a water-proof enclosure and can operate outdoors or in a wet environment.

There is a proportional relationship between a number of photons absorbed in 400 to 700nm band and the rate of photosynthesis in plants.

The energy of a photon is proportional to its frequency and therefore inversely proportional to wavelength. In order to produce a signal proportional to the photon flux (number of photons per unit of area per second) the detector's spectral power response (in Amps/[W/cm²]) must be inversely proportional to the photon's frequency and therefore proportional to wavelength (Fig. 1.).

Traditionally the quantum flux is measured in micro-moles (also called micro - Einsteins) per second per square meter.

The conversion factor is:

$$1\text{mE/s/m}^2 = 1\text{m mole/s/m}^2 = 6.02 \times 10^{17} \text{ quanta/s/m}^2$$

The angular response of the PMA2132 detector is cosine corrected and suitable for measurements of diffuse radiation or radiation from extended sources.

Calibration

The PMA2132 detector is calibrated by transfer from a NIST traceable quartz-halogen standard lamp. The quantum flux at a distance of 50cm in the wavelength range of 400 to 700nm is calculated based on the lamp's spectral power distribution. The PMA2132 detector is then exposed to this radiation and adjusted accordingly.

The basic radiometric uncertainty of this calibration is under 5%. The measurement of some artificial sources with strong spectral lines may be loaded with an additional error caused by spectral differences between the ideal quantum response and the detector's response. In such cases a correction may be calculated based on the sources spectral distribution. The detector requires yearly re-calibration.

Specifications	
Spectral Response	Quantum Response (400-700nm) Figure 1
Angular Response	5% for Angles <80°, Figure 2
Range	20,000 uEinsteins/Second/m ²
Display Resolution	0.1 uEinsteins/Second/m ²
Operating Environment	-40 to 120°F (-40 to +50°C) Outdoors
Temperature Coefficient	<0.15% °C for Solar Radiation
Cable	50ft (15m) or optional 1ft Retractable
Diameter	1.6" (40.6mm)
Height	1.8" (45.8mm)
Weight	7.1 oz. (200 grams)
Ordering Information	
PMA2132	Quantum detector
See list of accessories for mounting hardware available.	

SL/Sensors/PMA2132_04/2016

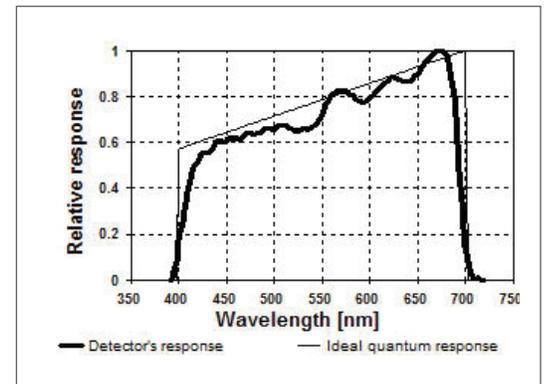


Fig. 1. PMA2132 Spectral Response

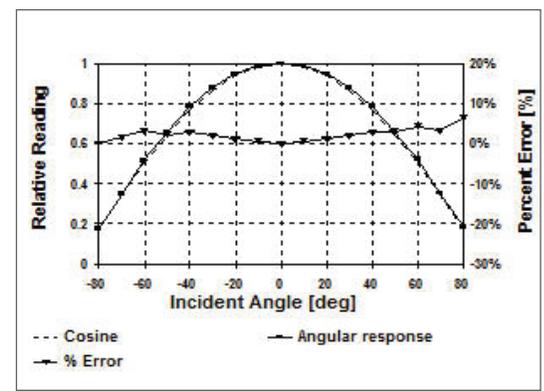


Fig. 2. PMA2132 Angular Response