

**PD204L Cos
SEALED ILLUMINANCE DETECTOR
WITH PRE-AMPLIFIER**

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Handbook Update Log

<u>Issue</u>	<u>Date</u>	<u>Pages changed</u>
A	27/8/99	New Issue
B	2/4/01	New cosine design

The PD204L Cos data logger compatible illuminance detector comprises of a silicon photodiode detector with filter glasses and a transimpedance amplifier for a voltage output. Each detector is sealed in a waterproof enclosure and operates from a single rail power supply.

SPECIFICATION:

Spectral Response:	Ref. graph. Matches CIE photopic curve (typically within 1% integrated error) ref figure 1.
Cosine Corrected Input:	Within $\pm 5\%$ up to 70° . Ref. figure 2
Sensitivity*:	10 μ Volts / Lux * Other ranges available on request.
Max. Power Density:	2×10^5 Lux for linear operation
Calibration (@ 20°C)	$\pm 5\%$ Traceable to BSi standards.
Diffuser Area:	176 mm ² ,15mm ϕ .
Detector Type:	Silicon Photodiode 33 mm ² area.
Temperature Range:	-10 to +60 °C
Temperature Dependence:	Sensitivity <0.1% / °C (typical) Amplifier DC offset Ref. figure 3.
Input Supply:	7 to 15V DC
Cable:	5 meter screened multicore
Mounting:	Two M4 tapped holes on a 43mm PCD.
Housing:	Black anodised aluminium, also available in stainless steel.
Weight:	250grams (including cable)

SPECTRAL RESPONSE:

Photometry is the measurement of visible light. Macam's photopic filter and photodiode closely matches the response of the standard human eye as published by the CIE (CIE $V(\lambda)$). The integrated spectral error is less than $\pm 1\%$ for most types of light source (including mercury line source and sodium discharge). This means you do not have to apply correction factors to measurements taken under different illumination conditions. It also means that the diode/filter will accurately measure mixtures of different sources such as daylight and artificial light.

Sensitivity is given in units of Amps per Lux and is wavelength independent.

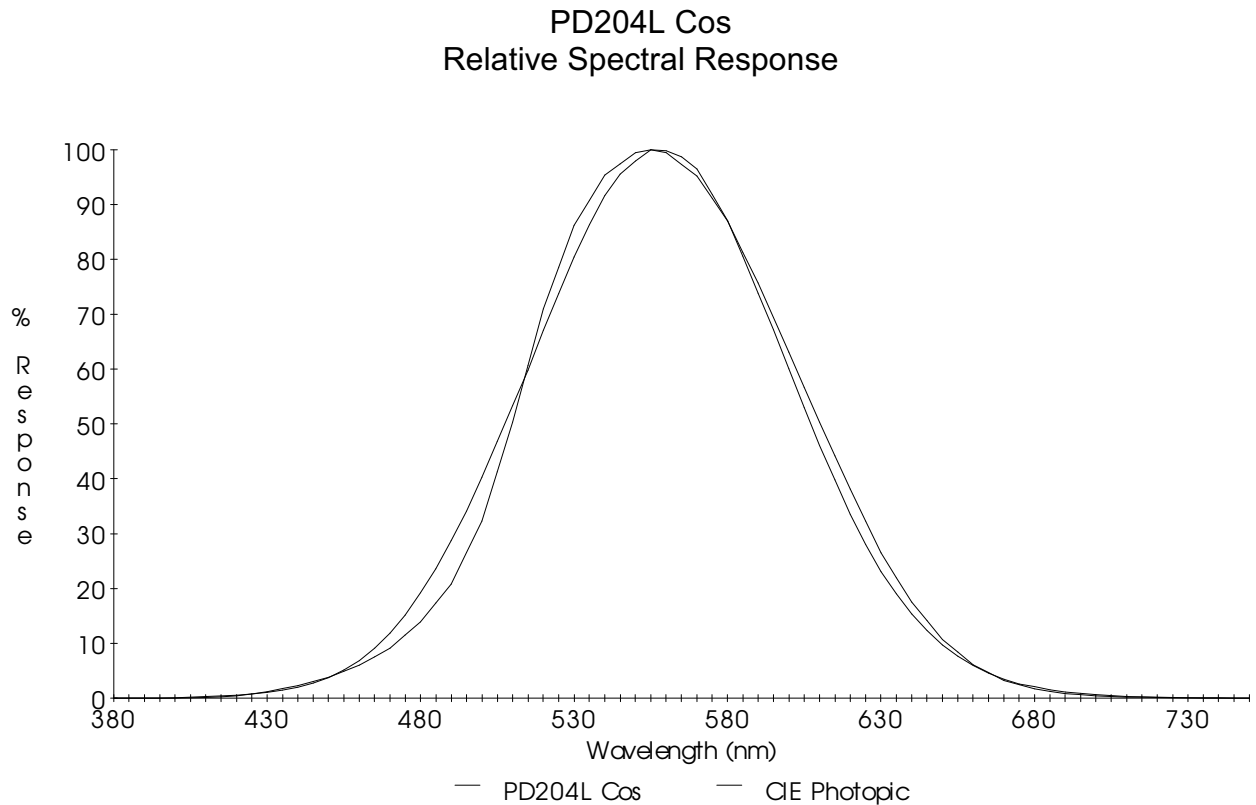


Figure 1

COSINE ANGULAR RESPONSE:

Illuminance is a measurement of visible light incident on a unit area (Lumens/m²). A detector will measure this reliably when the light beam is perpendicular to the detector's surface. Accurate measurements of illuminance require that the detector should respond to light over a 180° field of view. More importantly, this response should be proportional to the cosine of the angle of light incident on the detector. To ensure that the integration of light from all angles is correct, the cosine diffuser fitted to the front of the filter ring is profiled such that the angular response of the detector decreases with $\cos(i)$ as the angle between the source and detector increases from 0 to 90°.

Typical PD204L Cos Cosine Angular Response

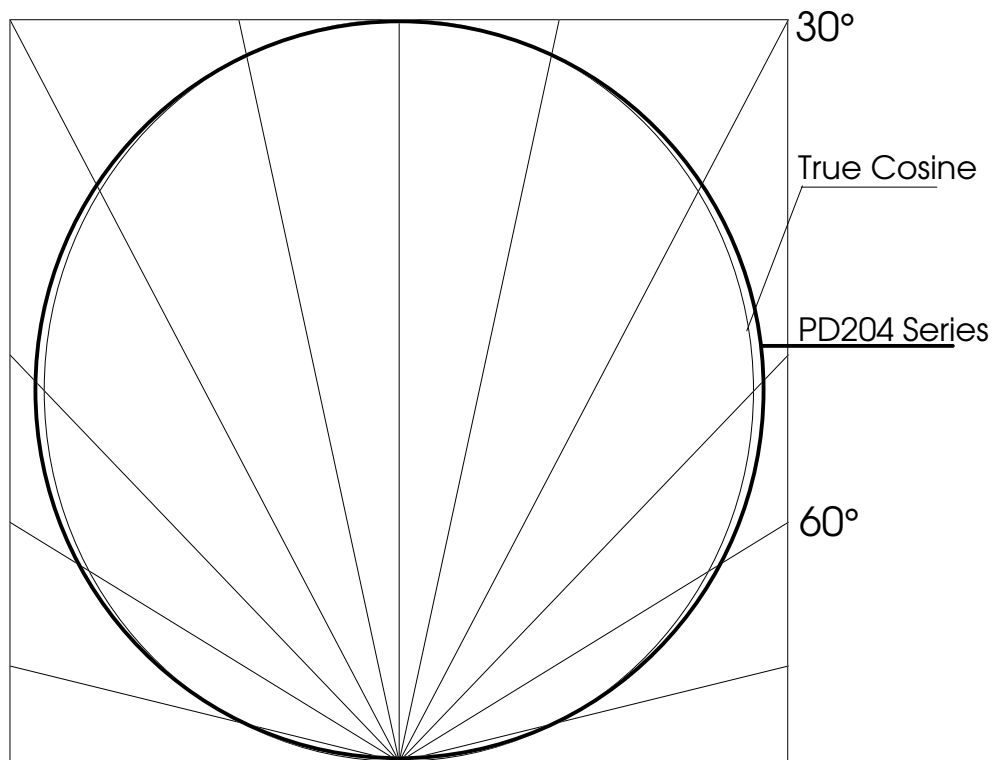


Figure 2

Macams cosine diffusers are corrected to match the cosine response to within $\pm 3\%$ up to angles of 70°. This ensures that the meter correctly reads illuminance or visible light flux density whether it is measuring scattered light (from an overcast sky) or a point source (a single lamp in a dark room).

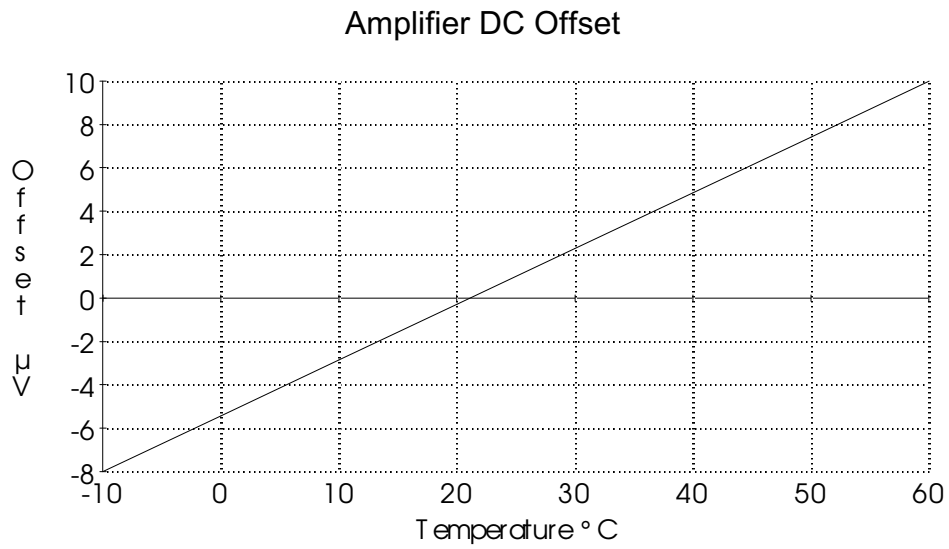


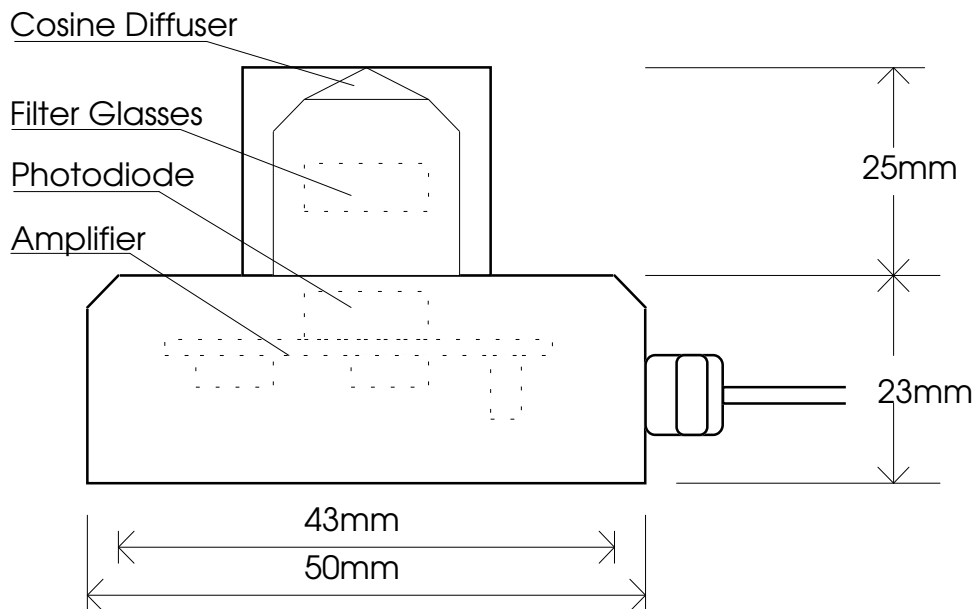
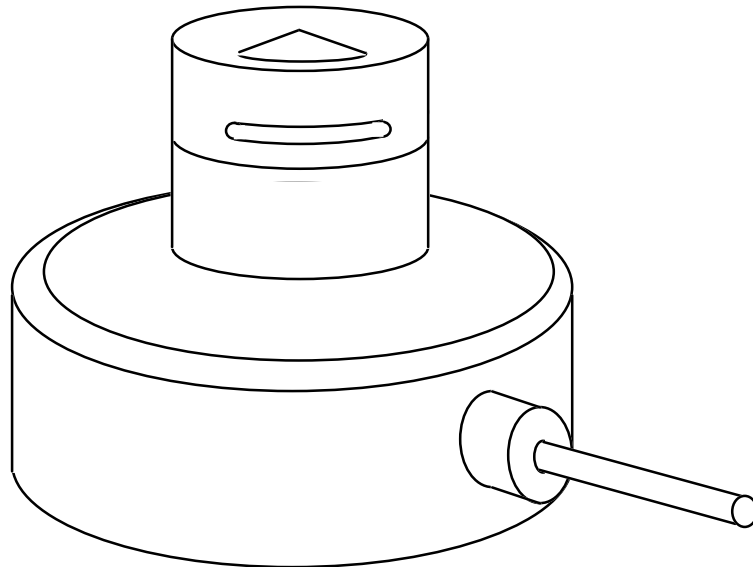
Figure 3

PD204* Cos Wiring

SUPPLY (+)	-----	RED
SUPPLY (-)	-----	YELLOW
OUTPUT (+)	-----	BLUE
OUTPUT (-)	-----	GREEN

NOTE: DO NOT LINK OUTPUT (-) TO SUPPLY (-) ON DATA LOGGER. DO NOT CONNECT CABLE SCREEN TO DATA LOGGER.

OUTLINE DRAWINGS:



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