LDM-9901: Luminance Detector

Luminance detectors that are characterized as quality class A or B, in accordance with DIN 5032 Part 7, need to be constructed from carefully selected elements. These include optics with achromatic correction and low stray light, and a photopic detector with a response curve that has been carefully adapted to the ideal V(λ) function. Add an expensive telescopic finder and a focusing optical system for locating the target area and these luminance detector heads become too costly for many applications. The widely used auxiliary lenses that can be attached to illuminance detector heads for luminance measurement are not a good alternative, since they typically do not satisfy the requirements of DIN 5032 Part 7.
An economical alternative which does satisfy the requirements of IEC 61223-2-5 and DIN 5032 Part 7 is the LDM-9901. It is a high quality photometric detector for determining luminance in cd/m^2. Its properties satisfy the requirements for Quality Class B of DIN 5032 Part 7.

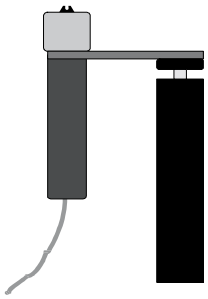
The LDM-9901 detector key components are:

- achromatically corrected low stray light lens to collect light with a 1° field of view
- high-quality photodiode with accurate V(λ) correction filter
- sight for locating the target measuring area

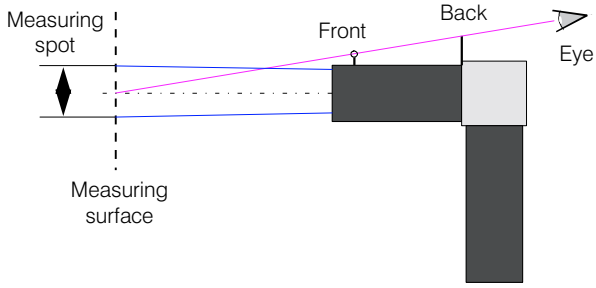
The low-stray-light achromatic corrected objective is designed so that in its useable measurement range of 40 cm to infinity it is not necessary to make focusing adjustments to the lens. The 1° field of view means that the diameter of the measurement spot differs depending on the measuring distance.
The adaptation for photopic vision offers a f_1'of ≤ 5 %. This means that the LDM-9901 detector can be used to measure the output of monitors, LED displays and other sources without suffering from an unacceptable increase in measurement uncertainty due to the quasi-monochromatic type radiation of these sources.

The LDM-9901 detector has an externally mounted targeting These back and front sights are adjusted for measuring distances of 70 cm, 140 cm and ∞ as shown below. In order to locate the object to be measured, the detector head is held in front of the eye at such a distance (about 25 cm) that the back and front sights appear sharp. Depending on the observer's age, other distances may be appropriate. The two sights are then aligned with the desired part of the object being measured.
The sights consists of a black slotted V-notch and a white ball. The following figure shows the different alignments for various measuring distances.
In many applications a luminance detector is used with a tripod. An adapter plate to attach the detector and tripod are offered as options.
The detector is connected to the optometer via a 1 m flexible connecting cable .
Calibration of luminance sensitivity in A/(m^{2}cd^{-1}) is carried out at Gigahertz-Optik's Calibration Laboratory and is confirmed by a factory certificate.

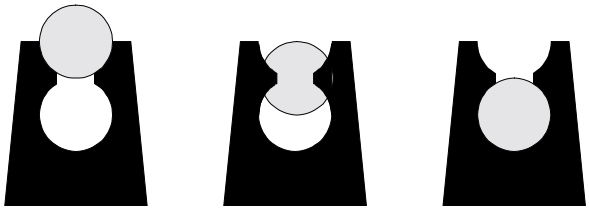
Distance to Spot Comparison	
distance	spot diameter
0.5 m	~ 31 mm
0.7 m	~ 35 mm
1 m	~41 mm
5 m	~ 120 mm
10 m	~ 220 mm
50 m	~ 1000 mm
100 m	~ 2000 mm



Tripod Adapter (Option)



Notch and Bead Sight



70 cm *140 cm* *Infinity*
Notch and Bead Sight at difference Distances

LDM-9901 Comparison to DIN 5032 Class B Limits (%)			
Characteristics	Symbol	LDM-9901	DIN
Calibration Uncertainty	U_{kal}	1.5	4
V(λ) Match Characteristic	f_1	5	6
UV Response Characteristic	u	0.01	2
IR Response Characteristic	r	0.01	2
Linearity Characteristic	f_3	0.2	2
Fatigue Characteristic (at 1 klx)	f_5	0.1	1
Temperature Dependence Characteristic	f_6	1	10

Ordering Information & typical Specifications

Model	λresp	Wavelength Range	f1	Typical Sensitivity	Imax	Sensing Area	cable	Operation Temp.	plug	package
	Photometric		≤ %	pA/cd*m^2	mA	Lens	m			page
LDM-9901	V(λ)	380-780 nm	5	25	1	22 mm Ø	2	0-40°C	1, 2, 4	92
LDM-99Z-02	Ambient light shade made by elastic rubber to place the LDM-99 direct on the monitor surface									
K-LDM9901	Calibration of integral luminance sensitivity in A/cd/m^2. Including K-SR in new detector order.									
KDW-S	Calibration of spectral sensitivity at one or multiples wavelengths									