

Optoelectrical Sensors For Pyrotechnical Effects

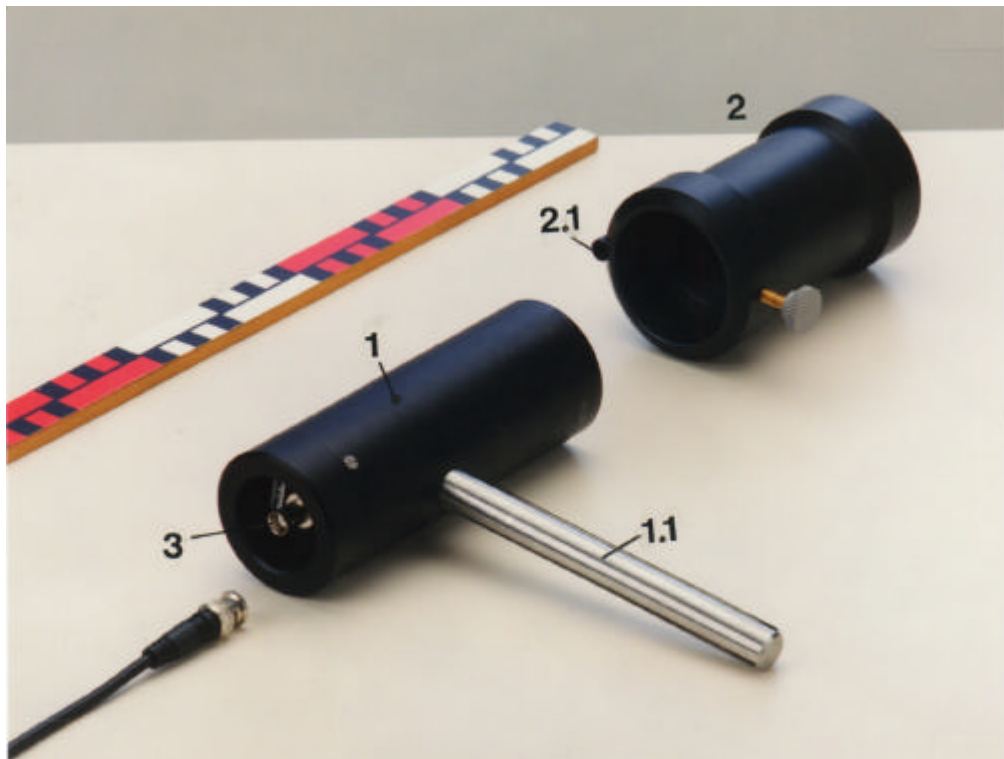


Fig.1 Optical sensor with tubus and fixing rod.

1. PURPOSE

The optoelectrical sensor measures the radiant intensity of pyrotechnic light sources, for instance, as a function of time. The output current of the sensor is linearly dependent on the incident light power over more than 4 decades. The output voltage (for an internal loading resistance of 1 k ohm) is linear over about 3 decades. With a typical limiting frequency of the Si-photocell of >1kHz also quick ignitions can be observed. So the appliance is suitable for measuring ignition delays, flame intensities and the burning time of charges. By means of BNC-cables the appliance can be directly connected to oscilloscopes, recorders (plotters), digital voltmeters or suitable current or voltage amplifiers, when weaker light signals are to be measured over greater distances.

Optoelectrical Sensors For Pyrotechnical Effects

2. CONSTRUCTION

The sensor head consists of the aluminium sensor housing (1) with the internal Si- photocell inside, the fixing rod (1.1) and the tubus (2) with adjusting device (2.1).

This adjusting device consists of a thin tube for adjusting it to a light source.

The sensor consists of a Si-photocell with a large light-sensitive surface of 14 mm diameter and is placed in the centre of the Al-housing. The incident radiation is concentrated with the aid of a 2-lens condenser. A circular aperture reduces the effects of radiation sources outside the desired coverage zone (see Fig.2). The PVC-tubus is used for the coverage of a distant measuring object (distance: > 1m). It permits the easy adjustment of the sensor and prevents light shining in, for instance due to sunlight or reflection. In the distance of appr. 10 m the area covered has a diameter of appr. 0.6 m. The sensor is fixed by means of the fixing rod (diameter 16, INOX). It is connected via the BNC-socket (3) and a coaxial cable and free from interferences.

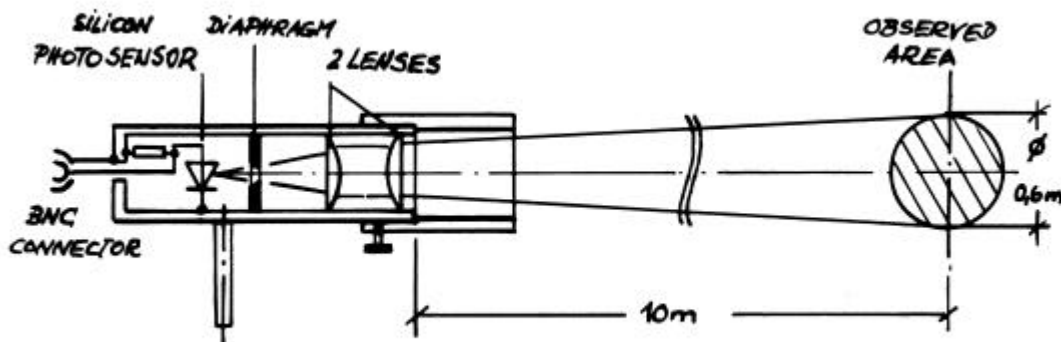


Fig.2 Construction and optical features

Optoelectrical Sensors For Pyrotechnical Effects

3. Data

Spectral Response

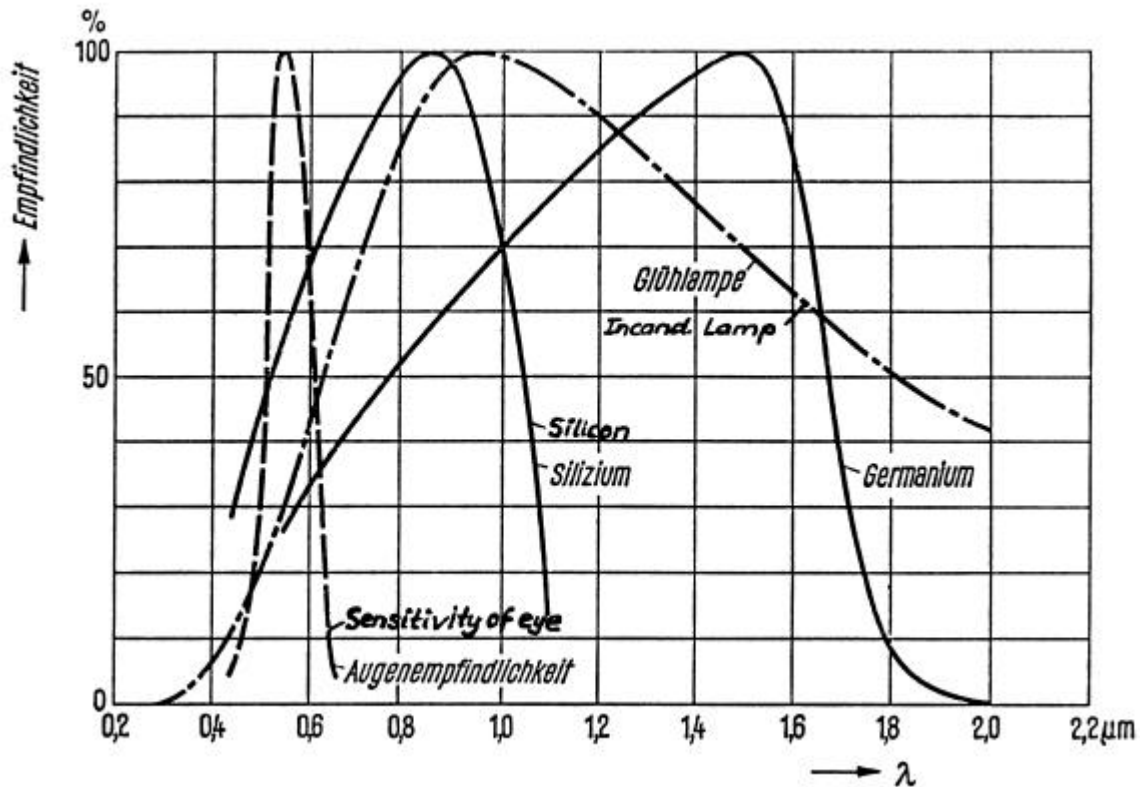


Fig.3 Relative sensibility of different light sensors compared to the spectral emission of an incandescent lamp 2800°K.

Output voltage: max. 600 mV
 Output current: max. 0.5 mA
 Frequency range: appr. 1 kHz
 Response time: appr. 1 kHz
 Internal load resistance: 1 k ?

Mechanical dimensions:
 Length: 270 mm (with tubus)
 160 mm (sensor head)
 Diameter: 80/81 mm
 Weight: appr. 2 kg



Optoelectrical Sensors For Pyrotechnical Effects

4. APPLICATION OF OPTOELECTRICAL SENSOR

