

Finalist in the 1999 Commercial Technology Achievement Awards Program by Laser Focus World

# Ultrafast Powermeter for CO<sub>2</sub>-Laser\*



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## Description

### Sensor

The ultra fast thermopile for CO<sub>2</sub>-Laser consists of a anisotropic thermoelectric thin film grown epitaxially on a substrate. Any heating of the surface gives rise to voltage signal proportional to the temperature on the surface. The sensor responds linearly from the detection level up to the damage threshold with rise times typically of 20 ns. The thermopile displays dc signals as well as pulses or fluctuations of power.

### Sensor head

The sensor is mounted on a watercooled aluminium housing with a ZnSe Lense of 1,5" to focus beam diameter of 1,5" on the sensor element. Watercooling provides stable reference temperature on back side of the element to ensure long time stability of measured signal.

Behind the watercooled part of the housing an amplifier is integrated to amplify the signal to a system sensitivity to about 100mV/ Watt. The amplifier allows broadband amplification form DC-1 MHz and is equipped with a noise reduction for dc measurements with lower bandwidth of DC-10 kHz.

### Hints of use

For using the thermopile with high accuracy of <3% it is necessary to adjust position of the center of the beam to the center of the thermopile by watching the signal when laser is switched off. Adjustment has to be done so that no drift is noticeable at switching off the laser. Please do adjustment at low power . For further information please read documentation.

### Technical Data

Power region	0-40	Watt
destruction threshold for cw radiation	150	
destruction threshold for 1 ms pulses	20 000	
Beam diameter ( smaller diameter on request )	15-30	mm
Bandwith	DC-1 MHz/DC-10 kHz (low sensitivity) DC-0.3 MHz/DC-10 kHz (100 mV/W)	
Sensitivity ( 300 kHz version )	100 mV/Watt	
noise at 300 kHz/10 kHz	20 / 5	mV
couple to 50 Ohm dc		
weight/length/diameter	300-500g /3,6"/2,5	
Low power version: -20 Watt/ high sensitivity 300 mV/W on request		
custom design on request		