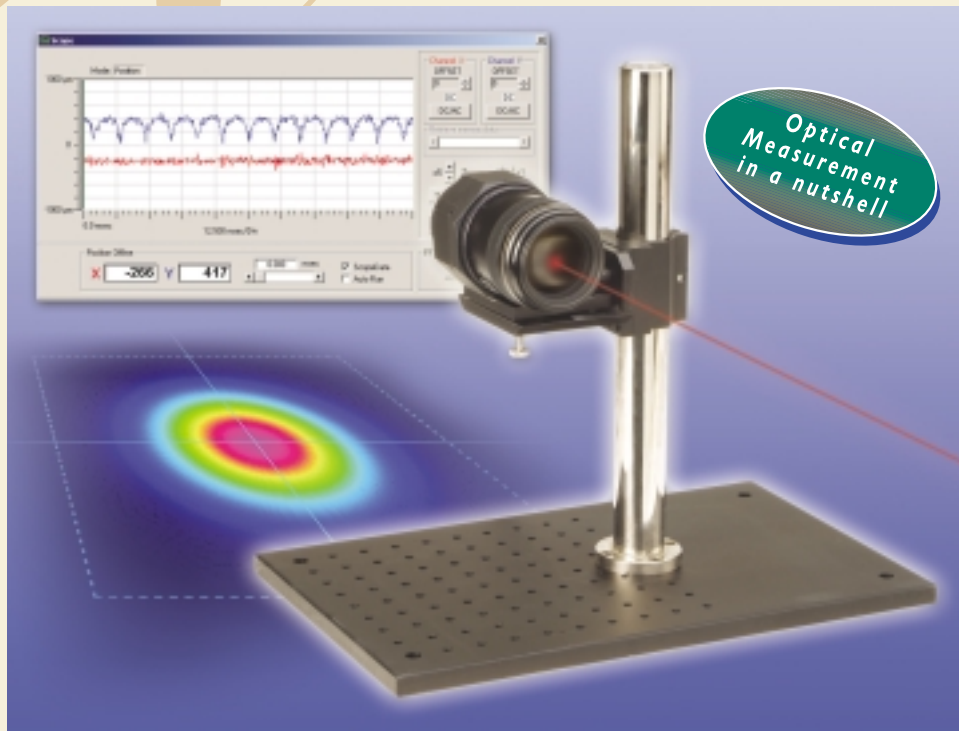


# AngleMeter

## Wide Aperture



## Monitoring Laser Beam Deviations

AngleMeter measures laser beam deviations with respect to the housing (in mRad), by monitoring the beam angle in two orthogonal directions. The new instrument meets customer's requirements for a variety of optical testing, both for laboratory and production floor. Equipped with a large input aperture lens and a high-accuracy detection capability (provided by CMOS or PSD type detectors), the system measures minute deviations in a relatively large field of view.

### Main Applications

- Alignment of beam delivery system
- Monitoring of moving optical devices, such as gimballed cameras and seekers
- Goniometric measurements of optical scanners
- Wobble measurements of rotating glass disc
- Alignment of CD optical heads
- Remote monitoring of optical mirrors
- Alignment of mechanical systems and optical tables

### Main Software Features

- Real time display of Angle and Power
- Three operation modes for digital data (PSD versions): Display, Scope and Remote operation
- Scope Mode for saving and analyzing memory data (up to 4KHz Position, up to 8KHz Power)
- Beam image display and target reticles (CMOS version)
- Data streaming via RS232 TCP/IP
- Multiple systems operation
- Direct data logging to Excel files
- Angle offset canceling for ambient light compensation



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## Concept of Operation

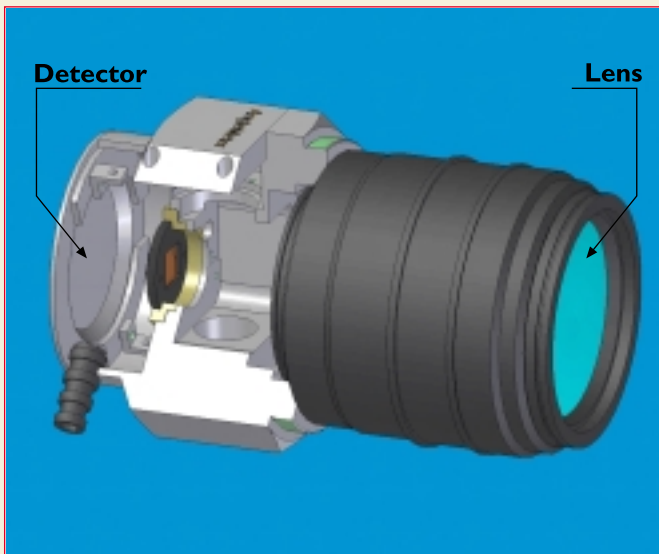
Typical measurement includes two-elements working in conjunction with each other:

One is our high pointing stability laser with built-in Pan & Tilt mechanism (PN: LaserOn), and the other is the AngleMeter system. In a typical configuration the laser is attached to the moving surface or shines into a moving mirror, and the reflection is captured by the AngleMeter head. The head configuration sketch shows a detector head (CMOS or PSD based), accurately placed at the focal length of the collimating lens.

In order to meet a wide application range, a variety of AngleMeter configurations are offered, differing from each other in the sensor type & size and in the collimating lens. Using different focal lengths lens, the system offers large fields of view with high accuracy, or smaller fields of view with extreme accuracy.

Several standard focal length lens are available: 50mm, 85mm, 100mm and 200mm.

For example: The 85mm f #1.8 lens features large numerical aperture, enabling input aperture of 47mm, the minimum resolvable angle is below 1Sec



## Main Features

- Real time measurement of laser angular displacement and power
- Flexible configurations, enabling a tailor-made solution at a moderate off-the-shelf product price
- Extensive software features for various customers
- CW or pulsed beams
- Multiple device control via USB
- TCP/IP Communication protocol and remote control
- ActiveX software for integration in customer's application program

### Also, for the PSD versions only:

- Analog bandwidth up to 60 KHz
- **Parallel modes of operation:** analog and digital data (USB versions)
- High precision power supply provided
- External trigger for synchronized data acquisition



## General

<b>Focal Length:</b>	Changing the optical focal length from 50mm to 100mm will decrease the field of view by a factor of two and increase resolution by the same factor.
<b>Weight:</b>	Sensor head with lens and 3m long cable 990 gr
<b>Filters:</b>	Optional per special order (Red filter/ND/BandPass)
<b>Environmental:</b>	Operating temperature 0° - 50°c
<b>Spectral range:</b>	350-1100nm
<b>Power supply voltage:</b>	±18V (PSD versions)
<b>Current consumption:</b>	200mA (PSD versions)
<b>Power input range:</b>	Standard 10µW-2500µW

### Notes:

To maintain full calibration accuracy, attenuating optical filters (ND) may be necessary for operation with beams greater than 2.5mW per detector. Saturating "non-linear" effects depend on the beam size, type and wavelength. Data update rate depends on computer resources, other application programs operating in parallel, and # of measuring devices activated by the program. Ambient light may affect overall accuracy.



# Specifications

## Sensor head (Typical)

### Dimensions (Default) :

80 mm diameter, 110mm long,  
(See drawing, using 50mm lens, f#1.8)

### Type :

Dual-axis Lateral Effect sensor (PSD) or CMOS

### Cable :

3m long, attached to sensor head

Dimensions of sensor head may vary according to lens type selected.

## Lens

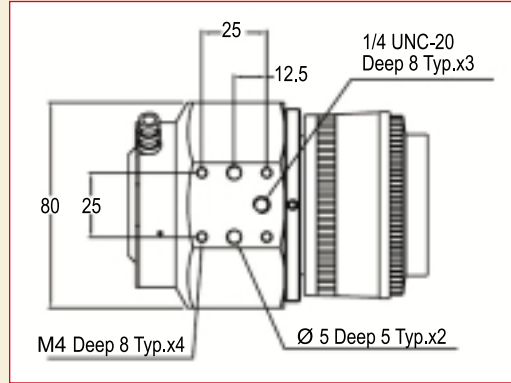
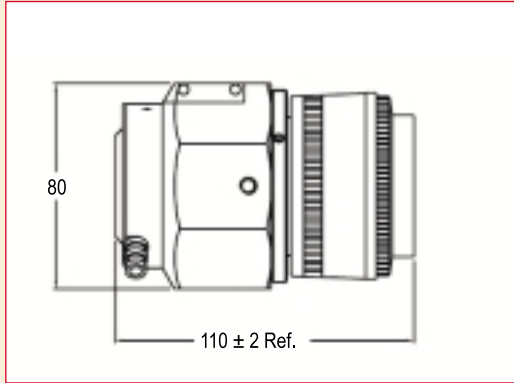
According to lens list

## Electronic Box (PSD versions)

92.5mm x 75mm x 22.5mm

Weight : 215gr

Dimensions are in mm



Models	CMOS USB2	PSD4 USB	PSD4 USB HR	PSD9 USB	PSD4 Analog	PSD4 Analog HR	PSD9 Analog
<b>Optics Focal lens</b>	50mm f1.8	50mm f1.8	50mm f1.8	50mm f1.8	50mm f1.8	50mm f1.8	50mm f1.8
<b>Sensor Size (mm)</b>	4.7 x 3.4 CMOS	4 x 4 PSD	4 x 4 Work Area [1x1]	9 x 9 PSD	4 x 4 PSD	4 x 4 Work Area [1x1]	9 x 9 PSD
<b>Field of View</b>	90X65 mRad	80X80 mRad	20X20 mRad	180X180 mRad	80X80 mRad	20X20 mRad	180X180 mRad
<b>Angle</b>	20µRad	15µRad	3µRad	30µRad	5µRad	1µRad	10µRad
<b>Resolution</b>							
<b>Angle Accuracy</b>	Max dev. 100µRad	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
<b>Power Measurement</b>	No	Yes	Yes	Yes	Yes	Yes	Yes
<b>Power accuracy</b>	---	±5%	±5%	±5%	±5%	±5%	±5%
<b>Interface</b>	USB2 Camera	Analog &USB1	Analog &USB1	Analog &USB1	Analog 0-10V	Analog 0-10V	Analog 0-10V
<b>Update rate</b>	30Hz 3 beams simultan.	Analog 60KHz Digital 40Hz Burst 4KHz	Analog 60KHz Digital 40Hz Burst 4KHz	Analog 30KHz Digital 40Hz Burst 4KHz	60KHz	60KHz	30KHz
<b>Response time</b>	nSec	>20µS	>20µS	>60µS	>20µS	>20µS	<60µS
<b>Multiple beams meas.</b>	Yes, in one unit	Several units in parallel	Several units in parallel	Several units in parallel	No	No	No

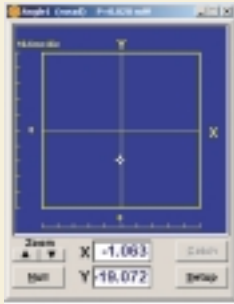


# Software Presentations

## Typical screen presentation of the PSD (USB versions):



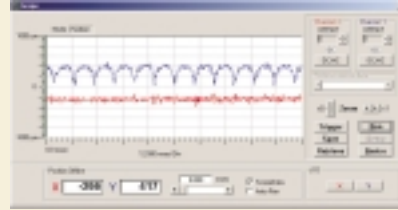
### Angle



RealTime display of X,Y beam angle.  
features:  
Set relative center,  
Perform zooming, alarm  
setting,Average



### Scope



A simultaneous, real-time oscilloscope type display of beam angle deviations (or power fluctuations) as a function of time. Up to 4K points can be saved at a time to memory, with zoom, hold, offset, DC/AC and triggering mode operations.



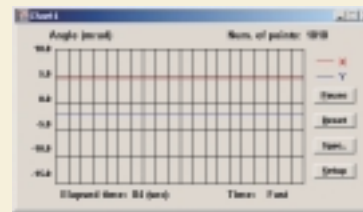
### Power



Display power with analog and digital displays.  
More features:  
Change measuring units,  
load a filter file, perform  
ambient light suppression.



### Chart

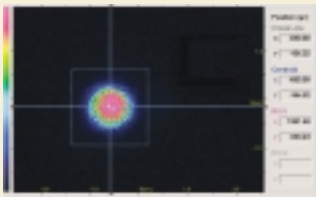


Display changes in the X,Y angle (or in Power) versus time, with autoscaling

## Typical screen presentation of the CMOS version:



### Angle



Multiple laser beam angle measurements can be made simultaneously in real time (up to 3 beams)  
A 2D contour map of the beam is displayed in real time, with zooming capabilities.



# Ordering Information

All PSD versions contain a sensor head with attached cable, an electronics box, a stabilized power supply and carrying case  
The PSD USB versions also contain operation software on CD disk.  
Lens to be selected from Lens List.

#### CMOS USB2-Lens:

A P&P camera with USB2.0 interface and attached cable, selected Lens from list, software on CD disk, carrying case

#### PSD4 USB-Lens:

A sensor head based on a 4mmx4mm PSD

#### PSD4 USB HR-Lens:

A sensor head based on a 4mmx4mm PSD and preset central work area of 1mm x 1mm

#### PSD9 USB-Lens:

A sensor head based on a 9mmx9mm PSD

#### PSD4 Analog-Lens:

A sensor head based on a 4mmx4mm PSD

#### PSD4 Analog-HR Lens:

A sensor head based on a 4mmx4mm PSD and a preset central work area of 1mm x 1mm

#### PSD9 Analog-Lens:

A sensor head based on a 9mmx9mm PSD

#### Lens List:

- 50mm f#1.8

- 85mm f#1.8

- 100mm f#4

- 200mm f#5.6



# Host Computer Requirement

Pentium IV , 2.4GHz with 256MB RAM, 100MB HDD free, one CD ROM, Windows 2000/XP, 64MB 16 bit color VGA, one free high speed USB 2.0 port for CMOS version or one free USB 1.1 port for PSD-USB versions.



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