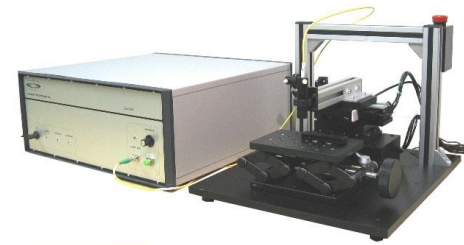


# Microcam

## Fiber-based Profilometer

### System Specifications



System Model	Microcam-3D		Microcam-4D
Technology	Low-coherence interferometry		
Light wavelength	1310 nm (51.6 $\mu\text{in.}$ ), infrared		
Light bandwidth	Broadband light		
Pointer for alignment purposes	In-probe red laser @ 650 nm (25.6 $\mu\text{in.}$ )		
Instrument safety	Class 1M laser product <sup>1</sup> < 20 mW of infrared, < 5 mW of in-probe laser pointer		
<b>Non-contact measurements</b>			
Depth of field	Depends on selected probe parameters, see Parameter Selection for Standard Probes table on next page		
Scanning depth range options	3.5 mm (0.138")	7 mm (0.275")	5 mm (0.197")
Acquisition (A-scan) rate	2.1 kHz	1.05 kHz	100 kHz
Axial (Z-axis) resolution <sup>2</sup>	< 0.5 $\mu\text{m}$ (19.69 $\mu\text{in.}$ )		
Light spot size <sup>2</sup> (Lateral (X-Y-axis) resolution)	4.1 - 146 $\mu\text{m}$ (161.4 - 5748 $\mu\text{in.}$ ), depending on desired probe parameters, see Parameter Selection for Standard Probes table on next page		
Roughness (Ra) range	from 0.05 $\mu\text{m}$ (1.97 $\mu\text{in.}$ )		
Standoff distance	1 - 100 mm (0.118" - 3.93") for standard probes, up to 1 m (3.28') for non-standard probes		
Repeatability <sup>3</sup>	< 1 $\mu\text{m}$ (39.4 $\mu\text{in.}$ )		
<b>Thickness measurements</b>			
Thickness measurement range (optical in air)	10 $\mu\text{m}$ - 3.5 mm 394 $\mu\text{in.}$ - 0.138"	10 $\mu\text{m}$ - 7 mm 394 $\mu\text{in.}$ - 0.275"	20 $\mu\text{m}$ - 5 mm 787 $\mu\text{in.}$ - 0.197"
Typical materials	glass, polymers, multi-layer films, coatings, plastics, silicone, liquids, specular or non-specular		
Sample reflectivity	0.1 - 100 %		

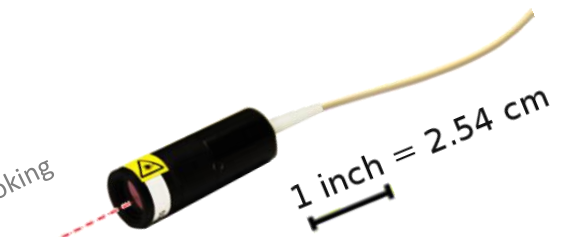
<sup>1</sup> Class 1M laser product: Visible and invisible laser radiation. Do not stare into beam or view directly with optical instruments.

<sup>2</sup> Light spot size and axial resolution are independent of each other.

<sup>3</sup> The stated repeatability pertains to a non-scanning system. The repeatability value of the motion mechanism is usually bigger; this can be effectively addressed by the use of a glass reference plate.

Interferometer Hardware		
System model	Microcam-3D	Microcam-4D
Interferometer enclosure	4U (19") rackable enclosure 17.5" (W) x 17.5" (D) x 7" (H) / 445 (W) x 445 (D) x 178 (H) mm	
Weight	17 to 20 kg (37.5 to 44 lb)	25 kg (55 lb)
Power requirements	AC 110V - 240V single phase; 2A for 110 V and 1A for 220 V; 50 Hz/60 Hz	
Operating temperature range	15 - 30°C (59 - 86°F)	
Operating relative humidity	6 - 95% relative, noncondensing	
Data output	USB	

Standard forward-looking probe



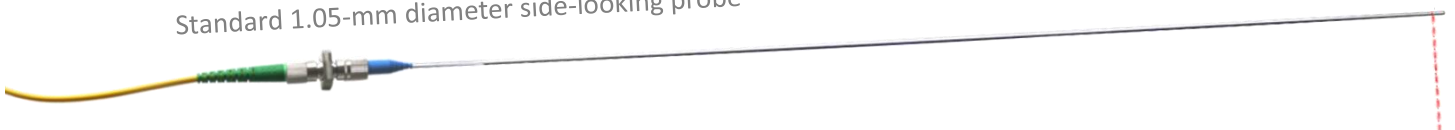
Fiber-Based Optical Probes	
<b>Standard probe, forward looking</b>	Diameter: 18 mm, length: 8 to 12 cm, bending fiber radius: 50 mm Focal length: choice of 12.7 to 75 mm (see table below for probe parameter selection)
<b>Standard probe, side looking (90°)</b>	Diameter: 18 mm, length: 8 to 12 cm, bending fiber radius: 50 mm focal length: choice of 30 to 75 mm (see table below for probe parameter selection)
<b>Standard probe small diameter, forward looking</b>	30 cm long, with diameter choice of: 4.6 mm with 15.5 mm standoff distance 3.05 mm with 5 mm standoff distance 2.4 mm with 3 mm standoff distance
<b>Standard probe small diameter, side looking (90°)</b>	30 cm long, with diameter choice of: 4.6 mm with 10.5 mm standoff distance 3.05 mm with 2.5 mm standoff distance 2.4 mm with 1.3 mm standoff distance 1.05 mm with 0.75 mm standoff distance 0.5 mm with 0.5 mm standoff distance
<b>Custom probes</b>	Custom probes are designed and built to suit specific applications. Probes can be extra-long, feature extra-small diameters, or be combined with rotational scanners or galvanometers for efficient strip scanning.

**Maximum fiber length** 1200 m  
**Operating temperature range** -279°C to +100°C / -470°F to +212°F  
 Special probes for high temperatures and extreme environments are built upon request.  
**Instrument safety** Class 1M laser product: Visible and invisible laser radiation. Do not stare into beam or view directly with optical instruments.

The following table shows the relationship of the probe light spot size (lateral resolution), focal length, depth of field, and aperture. Depth of field is the distance on either side of the focal plane where light spot size is  $\sqrt{2}$  (approx. 1.42) bigger than the spot size in focus.

Parameter Selection for Standard Probes			Focal length				
			12.7 mm	19.0 mm	30.0 mm	50.0 mm	75.0 mm
Aperture	1 mm	Light spot size ( $\mu\text{m}$ )	24.7	37.0	58.4	97.4	146.0
		Depth of field ( $\mu\text{m}$ )	739	1654	4124	11455	25773
	2.4 mm	Light spot size ( $\mu\text{m}$ )	8.8	13.1	20.7	34.5	51.7
		Depth of field ( $\mu\text{m}$ )	93	207	517	1437	3233
	4 mm	Light spot size ( $\mu\text{m}$ )	6.4	9.5	15.0	25.1	37.6
		Depth of field ( $\mu\text{m}$ )	49	110	274	760	1710
	7.6 mm	Light spot size ( $\mu\text{m}$ )	-	4.1	6.5	10.9	16.3
		Depth of field ( $\mu\text{m}$ )	-	21	52	143	322

Standard 1.05-mm diameter side-looking probe



<b>Most Popular Accessories</b>	
<b>2-axes inspection station with manual elevator</b>	60 x 60 mm (optional: 100 x 100 mm or larger)
<b>3-axes inspection station</b>	60 x 60 x 25 mm (optional: 100 x 100 x 50 mm)
<b>4-axes inspection station</b>	3 linear axes with one rotation axis
<b>Galvo scanner</b>	Choice of: 5 x 5 mm field of view with standoff distance of 7.5 mm 10 x 10 mm field of view with standoff distance of 25 mm 15 x 15 mm field of view with standoff distance of 42 mm 30 x 30 mm field of view with standoff distance of 87 or 95 mm 54 x 54 mm field of view with standoff distance of 126 mm 90 x 90 mm field of view with standoff distance of 215 mm
<b>Rotational scanner</b>	Integrated with a side-looking probe selected to suit the application. Makes up to 30 rotations per second.
<b>2-axes motion controller</b>	2U (19") rackable enclosure
<b>3-axes motion controller</b>	3U (19") rackable enclosure
<b>4-axes motion controller</b>	3U (19") rackable enclosure
<b>Galvo controller</b>	3U (19") rackable enclosure
<b>13 U rack mount</b>	19" rack for mounting interferometer, PC, and motion controller
<b>Granite table</b>	18" (W) x 24" (D) x 4" (H) / 559 (W) x 610 (D) x 102 (H) mm Weight: 198 lbs / 90 kg
<b>2-way or 4-way optical switch for probe multiplexing</b>	Internal to interferometer enclosure. Multiplexing additional probes is possible with additional switches.

### Standard Microcam profilometer system includes:

- Microcam-3D or Microcam-4D interferometer
- Small form factor (SFF) PC or laptop
- 2-axes inspection station with manual probe height adjustment and a 2-axes motion controller
- 1 standard probe
- Novacam data acquisition software V 4.3
- 1 year warranty

