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# **Laser Focus Sensor**

## **for Use with the Nanopositioning and Nanomeasuring Machine NMM-1**



## **LFS-Series**

## Design and Operation

Our Laser Focus Sensor is an optical scanning sensor that has been specially designed for use with our NMM-1 Nanopositioning and Nanomeasuring Machine and operates as a zero-point sensor. All metrological procedures, i.e., motions of the object being measured on all three coordinate axes, are controlled by our NMM-1 Nanopositioning and Nanomeasuring Machine, based on signals transmitted by our Laser Focus Sensor.

The complete Laser Focus Sensor consists of a sensor head, electronics unit, CCD-camera, and a monitor, and is combined with a microscope equipped with a CCD-camera in order to allow optically tracking the location of the beam spot on the surface of the object being scanned, which allows readily picking out, and returning to, areas of interest on its surface.

Light from a cold-light source conducted by a fiberoptic light guide provides the illumination needed by the CCD-camera in order to minimize heat transfer to the NMM-1 Nanopositioning and Nanomeasuring Machine.

Our Laser Focus Sensor may be used on virtually any surface whose reflectance exceeds 4 %. It also allows making measurements on a wide variety of materials, such as steel, aluminum, silicon, or (black or white) paper.

## The Laser-Focus-Sensor's Electronics Unit



## Special Features and Benefits

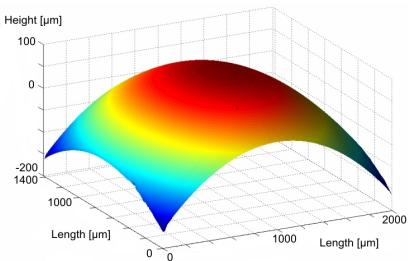
- The major benefit of the Laser-Focus Sensor we have developed for use with our NMM-1 Nanopositioning and Nanomeasuring Machine is the facilities it provides for making measurements covering large volumes ranging up to 25mm x 25 mm x 5 mm at nanometer resolutions.
- Noncontacting measurements
- Simple alignment and operation
- High spatial resolution
- Simple calibration with used in conjunction with our NMM-1 Nanopositioning and Nano-measuring Machine
- Compactly designed
- Offers a choice of two working distances

## Technical Data

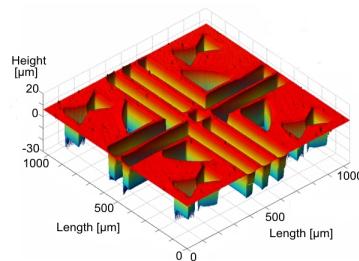
Dynamic range:	$\pm 1.5 \mu\text{m}$
(varies with the lens employed)	
Resolution:	< 1 nm
(noise limited)	
Working distance	
standard:	1.5 mm
optional:	10.1 mm
Spot diameter on the illuminated surface:	$\sim 0.8 \mu\text{m}$
Output voltage:	$\pm 10 \text{ V}$
(sum-and-difference signals)	
Wave length:	635 nm
Beam power:	$\sim 400 \mu\text{W}$

## Applications

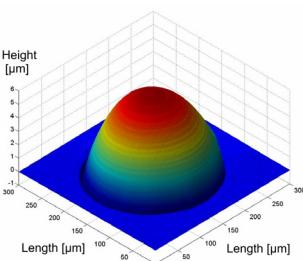
- Accurate metrological surface profiling in conjunction with our NMM-1 Nanopositioning and Nanomeasuring Machine
- Noncontacting scanning of surfaces at high reproducibilities
- Ultraprecise 3D-measurements covering large volumes, for example:



Hemispherical Lens



Test Plate



Oil Drop ( $V = 133 \text{ pico liter}$ )

## SIOS Meßtechnik GmbH

Am Vogelherd 46  
D-98693 Ilmenau, Germany  
Phone: +49-(0)3677-64470 E-mail: [info@sios.de](mailto:info@sios.de)  
Fax: +49-(0)3677-64478 URL: <http://www.sios.de>

We will be pleased to advise you: