



2023 PRODUCTS

Precision in Measurement

PRECISION IN MEASUREMENT

Length • Angle • Straightness • Vibration • Temperature



Content

SIOS Meßtechnik GmbH	4
Measuring devices and sensors	6
<i>Length measurement</i>	6
<i>Length, differential length and angle measurement</i>	8
<i>Displacement, angle and straightness measurement and calibration</i>	11
<i>Vibration measurement</i>	12
<i>Vibration measurement on micro-objects</i>	14
<i>Tactile thickness measurement and calibration</i>	15
Frequency and amplitude stabilized lasers	16
Nanopositioning	18
Precision climate measuring station	19
OEM and customized solutions	20
Technical datasheets	21
Interesting webinars	22
Contact us	23

*Founded in 1991 with roots originating at the Technical University of Ilmenau, **SIOS Meßtechnik GmbH** is a developer and manufacturer of precision measuring instruments and combines scientific accuracy and quality with industrial efficiency.*

Our close proximity to science and research guarantees a high expertise for today and for the upcoming future. The focus of our measuring instruments is on laser interferometric measuring systems.

Our products provide reliable and highly accurate results for a variety of measurement tasks in science and research, quality control, product development and calibration.

Measurement tasks

- length
- angle
- straightness
- vibrations
- mass
- force
- temperature

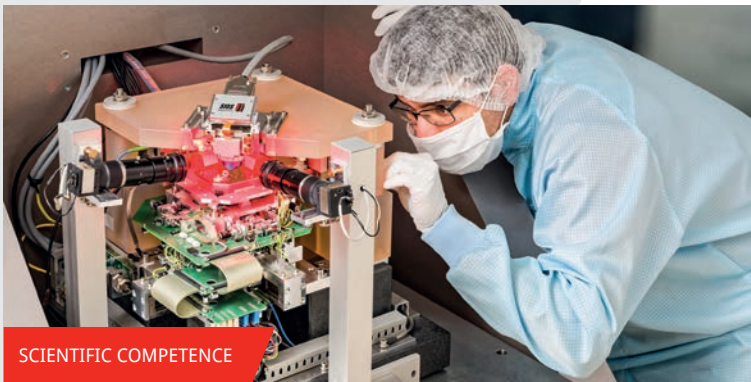
Our product range also includes nanometer measurement technology, special measuring workstations and customized measuring solutions.



INDUSTRIAL PERFORMANCE

Precision in Measurement for

- quality control
- calibration
- OEM applications
- R&D support
- volumetric compensation for machines
- customized solutions



SCIENTIFIC COMPETENCE

Precision in Measurement for

- fundamental research
- traceable applications
- metrological assemblies
- vacuum and cleanroom applications
- dynamic data acquisition
- customized solutions

Measuring devices and sensors

Length measurement

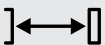
Universal length measuring systems of the highest accuracy for measurements and calibrations of guides, measuring workstations and positioning tables, measuring machines and machine tools and for multiple coordinated measurements.

The measuring systems are easy to handle, have integrated alignment aids and are able to work with just a reflective surface as a reflector.



Laser interferometer model SP 5000 NG

- single measuring beam
- for measuring arrangements free of Abbe error
- angular measurement range by using a reflector up to $\pm 12.5^\circ$
- suitable for x-y positioning for measurements in combination with plane mirrors
- compact device with system case for free mobility
- OEM and vacuum versions of the device are possible on demand



up to 5 m
and more



0.1 $\mu\text{m}/\text{m}$



5 μm^*

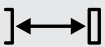
*rotary point dependent

A modification of the standard device is the SP 15000 NG, which allows an extended measuring range. This measuring system is ideally suited for calibrations and measurements of large positioning units like CMM's large machine tools or axis. We recommend the use of wireless temperature sensors or the climate measuring station to achieve the best results.

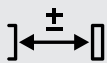


Long-Range laser interferometer model SP 15000 NG

- for long distance measuring ranges
- tilting angle of reflector up to $\pm 22.5^\circ$
- compact device with suitcase for free mobility



$\leq 80 \text{ m}$



$0.1 \mu\text{m/m}$

Measuring devices and sensors

Length, differential length and angle measurement

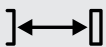
Highly stable laser interferometer with two parallel measuring beams for a wide variety of applications in the field of science and for industrial use.

Due to differential measurement a remarkable stability for long-term usage and a compensation of influences of environmental changes during the measurement can be achieved.

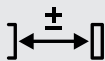


Differential laser interferometer model SP 5000 DI

- ultra-stable, high-resolution long-term measurement
- beam distance 21 mm (other beam distances on request)
- extremely low temperature sensitivity < 20 nm / K



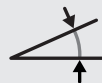
2 m
with plane-mirror
5 m
with reflector



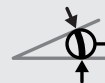
0.1 $\mu\text{m}/\text{m}$



5 μm



± 1.5 arcmin
with plane-mirror
 $\pm 12.5^\circ$
with reflector



0.001 arcsec

Length, differential length and angle measurement

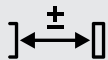


Differential laser interferometer model SP 5000 DI/F

- special design for feedback applications
- beam distance 14 mm (other beam distances on request)
- extremely low temperature sensitivity < 20 nm / K



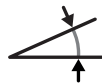
2 m
with plane-mirror
5 m
with reflector



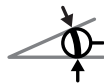
0.1 $\mu\text{m}/\text{m}$



5 μm



± 1.5 arcmin
with plane-mirror
 $\pm 15^\circ$
with reflector



0.001 arcsec

Measuring devices and sensors

High-precision laser interferometers with three perfectly parallel aligned and independently working measuring beams for simultaneous measurements of length and angles. Either a mirror or the original SIOS reflector unit be used as a reflector. An alignment aid can be integrated in the sensor to align the beam directions to the direction of target movement.



Triple beam laser interferometer model SP 5000 TR

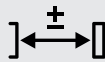
- simultaneous length measurements as well as pitch and yaw angle acquisition with the highest accuracy
- beam distances 12 mm
- OEM and vacuum versions of the device are available



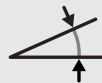
up to 5 m
and more



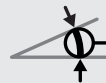
20 μm



0.1 $\mu\text{m}/\text{m}$



$\pm 12.5^\circ$
with reflector
 $\pm 1.5 \text{ arcmin}$
with plane-mirror



0.002 arcsec

Displacement, angle and straightness measurement

High precision laser calibration system with multiple beams for simultaneous measurements of length, angle and straightness, for calibration and alignment of axes. Highly demanded in the machine tool field and CMM calibration, up to volumetric calibration. We recommend the use of wireless temperature sensors or the climate measuring station to achieves the best results.

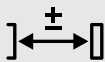


Calibration laser interferometer model SP 15000 C3/C5/C6

- interferometric measurement up to 5 DOF simultaneously, Roll angle sensors optionally available
- diverse accessories for attachment of sensor head and optical components available
- calibration software according to DIN and ISO standards



up to 50 m



0.1 $\mu\text{m}/\text{m}$



$\pm 5^\circ$



0.0004
arcsec



± 4 mm over
6.5 m



10 nm

Measuring devices and sensors

Vibration measurement

Non-contact vibration measurements with focused measurement beam able to detect vibration on almost every surface rough surfaces as well.

Determination of vibration spectra, vibration modes and resonant frequencies of macro and micro objects.



Laser interferometric vibrometer model LSV 120 NG

- working distance fixed at (customer specific) 30 ... 70 mm / 240 mm / 480 mm
- diameter of laser spot 12 ... 30 μm / 100 μm / 200 μm
- protected interior optics



0–5 MHz



max. 3 m/s



5 μm

Variable measuring distance for an easy and fast beamfocusing on measurement object surfaces. In combination with a tripod, it's an ideal vibration measuring instrument for usage at different locations.



Laser interferometric vibrometer model LSV 2500 NG

- working distance continuously adjustable: 240 mm to 2500 mm
- digital and analogue data outread



0–5 MHz



max. 3 m/s



5 µm

Vibration measurement on micro-objects

Non-contact measurements of the dynamic characteristics of microstructures, MEMS and objects in the micrometer size range. Determination of the vibration modes by surface scanning, calibration of AfM cantilevers



Nano Vibration Analyzer NA

- scan field range: 50 mm x 50 mm (other ranges on request)
- microscope magnification: 10 x, 50 x (100 x optionally)
- laser spot diameter: $\leq 10\mu\text{m}$, $\leq 2\mu\text{m}$ (Lens dependent)
- OEM version in stable portaldesign available



0-5 MHz



max. 3 m/s



5 pm

Tactile thickness measurement and calibration

Interferometric precision gauging probe for tactile thickness measurements and calibration of measuring standards with high linearity over the entire measuring range. Also available as a differential probe for highest demand on accuracy and repeatability. The unique interferometric probe builds the basis for customer-specific measuring stations in the optics and semiconductor industry to measure the thickness of lenses, wafers and foils.

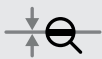


High linearity probe LM

- linearity $\leq \pm 2$ nm
- factory fixed measuring force: 0.5 ... 1.5 N
- motorized measuring shaft
- exchangeable commercial probe tips
- standard clampshaft diameter
- traceable to national standards



20 mm,
50 mm



0.1 nm

Frequency and amplitude stabilized lasers

Highly stable light sources as a measuring standard for laser-optical measuring technology with frequency standards at a wavelength of 632.8 nm.

Coupling to a PM fiber in combination with a Faraday isolator is available.

Traceability of laser frequency by an iodine-stabilized HeNe laser is standard for all SIOS stabilized HeNe lasers.



Frequency stabilized HeNe lasers model SL 02

- compact design with integrated stabilization electronics and small plug-in power supply
- available with one or two polarized longitudinal modes
- fibre coupling on request



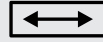
2.5 MHz / 1h



≥ 1.2 mW (1 mode)
≥ 2.4 mW (2 modes)



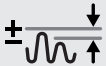
50 mm



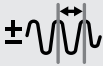
410 mm

Frequency and amplitude stabilized HeNe lasers model SL 04

- amplitude or frequency stabilization as operating modes
- standardized diameter of laser tube for easy replacement
- fibre coupling on request



< 0.3%



1 MHz / 1h



≥ 1.2 mW



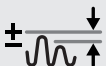
45 mm



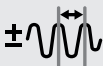
314 mm

Frequency stabilized HeNe lasers model SL 03 mini

- frequency stabilized
- standardized diameter of laser tube
- compact stabilization electronics and power supply
- fibre coupling on request



< 0.2%



1 MHz / 1h



≥ 0.7 mW



32 mm

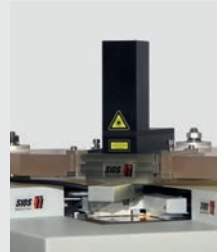
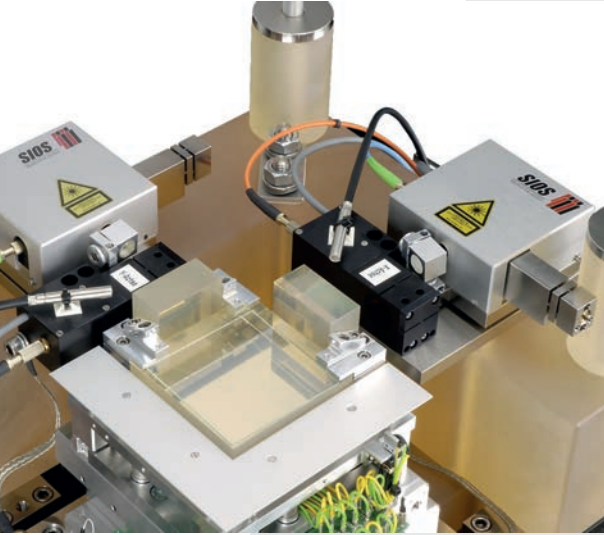


180 mm

Nanopositioning

High-precision coordinate measuring system with nanometer accuracy for positioning, manipulation, processing and measurement of objects and structures in large spatial areas with very high resolution.

Use of 1D-, 2D- and 3D-sensors for various measuring tasks.



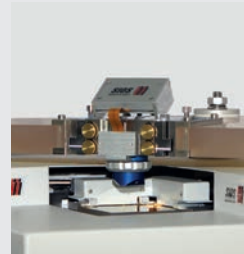
Fixed Focus Sensor



Atomic Force Microscope



White Light Sensor



Tactile 3D Sensor

Nanopositioning and nanomeasuring machine NMM-1

- measuring and positioning range 25 mm x 25 mm x 5 mm
- resolution 0.1 nm
- measurements free of Abbe error at all three coordinate axes
- various probing systems, e.g. laser focus sensor, AFM, white-light sensor, 3D micro probe
- open interface for integration of own sensors

Climate measuring station

High-precision temperature, air pressure and humidity measuring for measurements and calibrations at laboratories.

The measuring device can be combined with the evaluation electronics of SIOS laser interferometers.

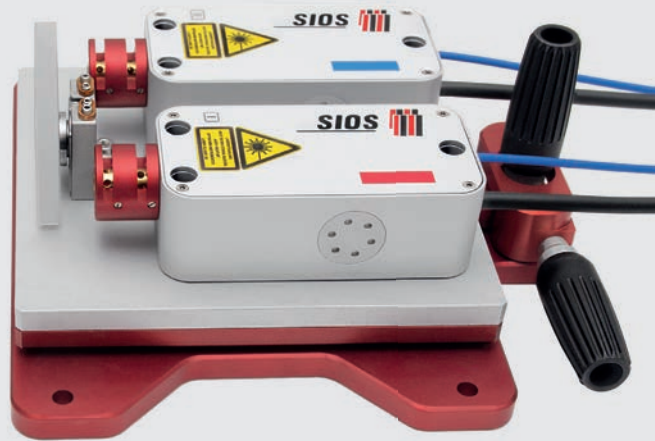
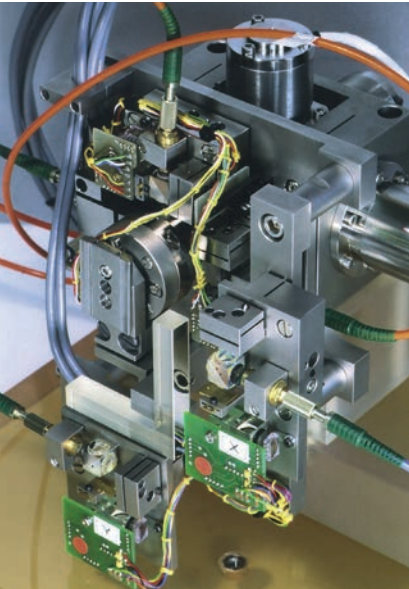


Precision climate measuring station model LCS

- all sensors are digitally calibrated together with the measuring electronics
- standard configuration: connection for max. 5 wired and 15 wireless temperature sensors and two digital interfaces for air pressure and humidity sensors
- expandable to 15 wired temperature sensors

OEM and customized solutions

Since our company was founded, SIOS Meßtechnik GmbH has focused on development of customer-specific high-precision measuring systems. The know-how resulting of our dedication for laser interferometric measurement technology will be an advantage for the solutions of your own measuring tasks. If you are interested please contact us.



OEM and customized solutions

- customized solutions for high accuracy applications and feedback applications
- consulting in measurement techniques and know how
- sensors for ultra-high vacuum and critical environmental conditions
- fully equipped measurement stations

Do you need detailed information about our measuring devices and sensors?

You are welcome to download technical data sheets for our products:



www.sios-precision.com/en/download



Interesting webinars

Measurement technology knowledge directly from our SIOS experts

SIOS experts impart basic interferometric knowledge, inform about the SIOS product range, demonstrate the appropriate software solutions, present achievable measurement results and show various application examples from industry and science.



www.sios-precision.com/en/company/webinars



After a free registration you will receive knowledge on the following topics independent of time and location:

- Calibration of positioning axes, CMMs and machine tools
- High precision length measurement
- Nanometrology
- Optical Vibration Measurement from Nanometer to Picometer
- High precision thickness measurements using tactile probes
- Simultaneous displacement and angle measurement

We would be pleased to assist you in solving your measuring tasks.

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PRECISION & QUALITY
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SIOS Meßtechnik GmbH manufactures and develops in Germany.
With a close-knitted network of partners, we provide solutions for
your measuring tasks – worldwide.

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