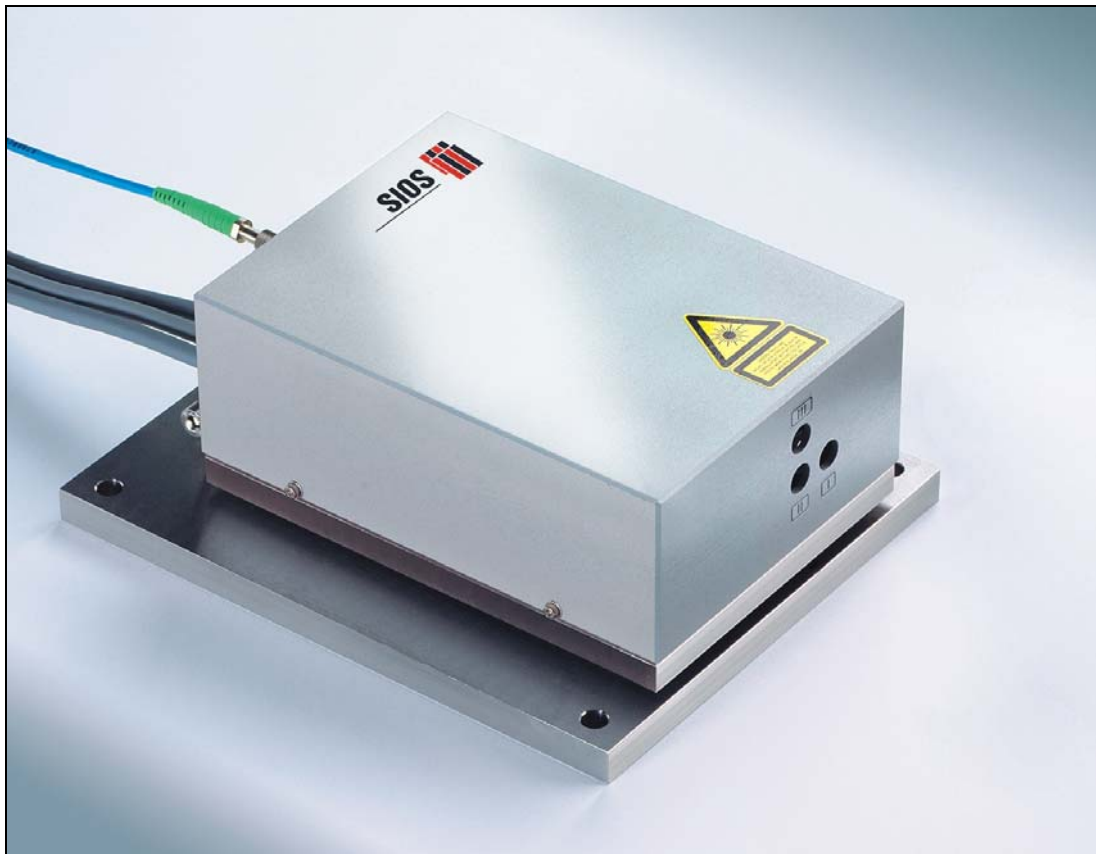


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# Triple-Beam Plane-Mirror Interferometer



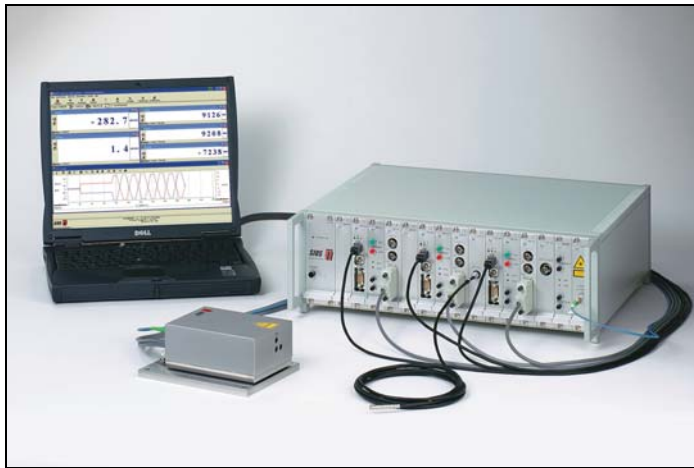
## SP-TR Series

## Design and Operation

Our triple-beam interferometers combine three interferometers into a single unit and thus are capable of making simultaneous, nanometer-precision, triaxial length measurements. They are intended for incorporation into customer supplied systems. Angles may be determined with high precisions from the differences between pairs of length measurements and the respective beam separations involved. The dynamic ranges for pitch and yaw measurements are approximately two minutes of arc.

A HeNe laser emitting an ultrastable wavelength supplies all three interferometers so that all three length measurements will be based on the same reference length. A single fiberoptic lightguide conducts its output beam to the interferometric sensor head. Motions of the moving mirrors are converted into modulated signals that are transmitted to an electronic power supply/signal processing unit.

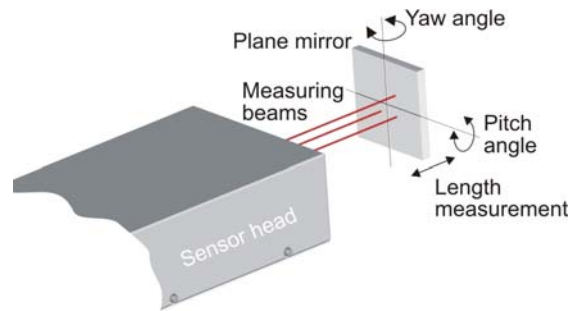
A HeNe laser serves as the light source for the miniature interferometer and is frequency stabilized on models with large dynamic ranges. Compensation of environmental influences form the basis for high metric precisions and are achieved through the correction of laser wavelengths. A PC running a custom software package is employed for operating the electronic modules and displaying measurement results.



## Major Performance Features

- Simultaneous, ultraprecise, triaxial length measurements as well as pitch and yaw angle measurements
- A single laser supplies the beams for all three measuring arms
- Factory made calibration of beam separations

## Operating Principle



## Applications

- Laser-interferometric measurements on guides and translation, microscope, and positioning stages
- High precision pitch and yaw corrections during biaxial or multiaxial length measurements
- Calibrating metrological equipment and machine tools
- Differential measurements (dilatometry, materials testing)
- Angular measurements over extended ranges ( $> \pm 2$  arcmin; available on special order)

Technical Data		Model SP 2000-TR	Model SP 120-TR
Length measuring ranges, each axis	mm	2.000	100
Length resolution	nm	1	1
Optional length resolution	nm	0.1	0.1
Pitch and yaw measuring ranges	arcmin	$\pm 2$	$\pm 2$
Horizontal and vertical beam separations	mm	12	12
Angular resolution at 1 nm length resolution	arcsec	0.02	0.02
Laser wavelength	nm	632.8	632.8
Laser frequency stability (after warm-up period)		$2 \cdot 10^{-8}$	$3 \cdot 10^{-7}$
Laser warm-up period	min	10...20	1
Maximum moving mirror translation rate	mm/s	800	800
Operating temperature range	$^{\circ}\text{C}$	15...30	15...30
Interfaces		RS 232 C USB	RS 232 C USB
Laser safety class per DIN EN 60825-1		2M	2M
Length of cable interconnecting sensor head and signal processing unit	m	3, optionally up to 10	3, optionally up to 10
Electrical supply line voltage/frequency	VAC / Hz	100...240 / 47...60	100...240 / 47...60

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