
Calibration Laser Interferometer

3 DOF / 5 DOF
Simultaneous multi-
axis measurement



SP 15000 C - Series

Design and Operation

The measurement and calibration interferometers SP 15000 C with a measuring range of up to 50 m are designed for high-precision length, angle and straightness measurements on positioning axes. A synchronous, continuous 5 DOF-measurement is possible. The horizontal and vertical components of axis straightness are measured by using the interferometric principle.

The reflector unit is based on a combination of hollow retroreflectors and a rotatable Wollaston prism. Other accessories are the straightness mirror, a 90°-beam deflection mirror unit and various equipment for mounting and alignment.

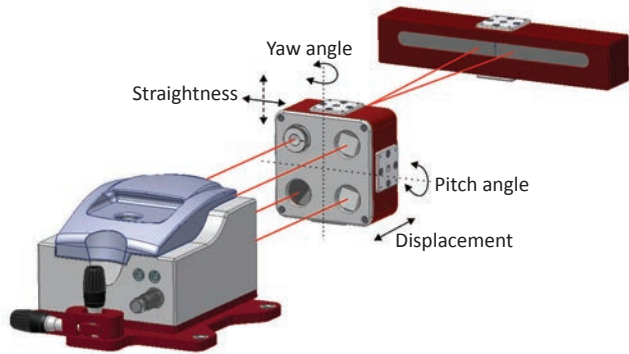
The calibration laser interferometers allow the accurate, dynamic measurement of the properties of linear guides during the assembly and alignment as well as the standardized calibration of machine axes. The measuring and calibration processes can be synchronized with a machine controller. Different triggering options for data acquisition are available. The measured values are transferred to a computer via a fast USB interface. Optional interfaces are available.



Major Performance Features

- Simultaneous, three-channel length, pitch and yaw angle measurement as well as straightness measurement with highest accuracy
- Fast, simple, robust and reliable
- Beam deflection with an adjustable deflection mirror
- Fiber-coupled sensor head and integrated beam direction detection allows easy handling and alignment
- High precision angle measurements
- The same laser frequency is used in all three length measurement channels

Measuring principle for SP 15000 C5



Applications

- Calibration of high-precision axes in measuring and machine tools, as well as coordinate measuring instruments
- Fast and easy alignment of linear guides
- Laserinterferometric measurements on linear guides and translation stages
- Ultraprecise simultaneous length and angle measurement
- Differential measurements

Technical Data	Model SP 15000 C3	Model SP 15000 C5
Length measurement: Measuring range (on request up to 50 m) Resolution	15 m < 20 µm	15 m < 20 µm
Angle measurement: Measuring ranges of pitch + yaw angles Resolution	± 5° < 0.0004 arcsec	± 5° < 0.0004 arcsec
Straightness measurement: Measuring range, lateral Resolution Axial range (freely selectable)	- - -	± 4 mm 10 nm 0.1...6.5 m
Measuring uncertainty under stable conditions: - Length measurement - Angle measurement - Straightness measurement	0.12 ppm ± 0.015% ± 0.0085 arcsec ± 0.1% ± 0.1·M ² ± 0.1µm	
Beam separation (horizontal and vertical)	50 mm	
Maximum velocity of the measuring reflector	500 mm/s	
Wavelength of the HeNe laser	632,8 nm	
Frequency stability of the HeNe laser	2 · 10 ⁻⁸	
HeNe laser warm-up time	< 20 min	
Operating temperature range	15...30°C	
Dimensions (LxWxH) Sensor head with adjustable mount Reflector unit / Straightness mirror Electronic supply and evaluation unit	[192 x 192 x 122] mm [104 x 56 x 104] mm / - [450 x 400 x 150] mm	[192 x 192 x 122] mm [104 x 62 x 104] / [234 x 43 x 49] mm [450 x 400 x 150] mm
Mass Sensor head with adjustable mount Reflector unit / Straightness mirror Electronic supply and evaluation unit	3.4 kg 0.8 kg / - 9.4 kg	3.5 kg 0.93 kg / 0.98 kg 11.7 kg
Cable length between sensor head and electronic module (separable)	6 m, optional up to 10 m	
Line voltage / frequency	100...240 VAC / 47...60 Hz	
Laser safety class according to EN 60825-1/ANSI Z136.1 (CDRH)	2M / II	

SIOS software

Calibration software InfasAXIS

- Manual and automatic measurement for linear axes
- Axis calibration according to VDI/DGQ 3441, DIN ISO 230 or VDI 2617

Calibration software InfasMTCAL

- Volumetric error mapping and control specific correction
- Including CNC Code generator

Alignment software InfasALIGN

- Fast and easy manual measurement for axis adjustment
- Supports 2-, 3- and 4-beam interferometer

SIOS-Calibration software InfasAXIS

The combination of the optionally available software package InfasAXIS with the calibration interferometer SP 15000 C5 allows the calibration of machine tools, positioning tables etc. in 5 degrees of freedom: position, pitch and yaw angle and straightness in horizontal and vertical direction.

- Database for management of customer and measurement data
- Configuration of measurement (sequence control)
- Export and import of calibration data
- Customer projects for the specific measurement tasks
- Selection of the standard: VDI/DGQ 3441, DIN ISO 230 or VDI 2617
- Output of the calibration protocol



InfasAXIS window

SIOS-Calibration software InfasMTCAL

Infas MTCAL



CNC-Control e.g. FANUC 31iA5



Machine Tool



SP15000C5 / SP5000NG



InfasMTCAL window

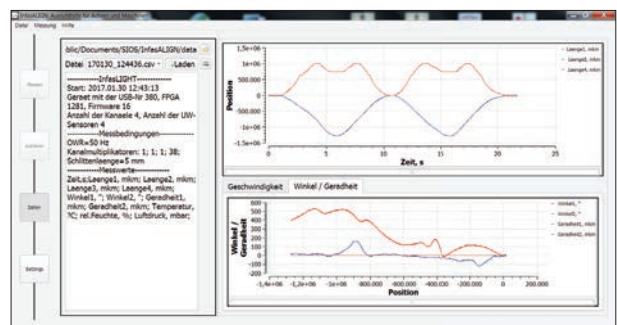
Main features:

- Calibration, error mapping and verification
- Online, dwell time and trigger mode
- CNC control support for Siemens, FANUC, Heidenhain, BoschRexroth, Fagor, Fidia,
- Evaluation according to ISO 230, ISO 10360, DGQ3441, ASME

SIOS-Alignment software InfasALIGN

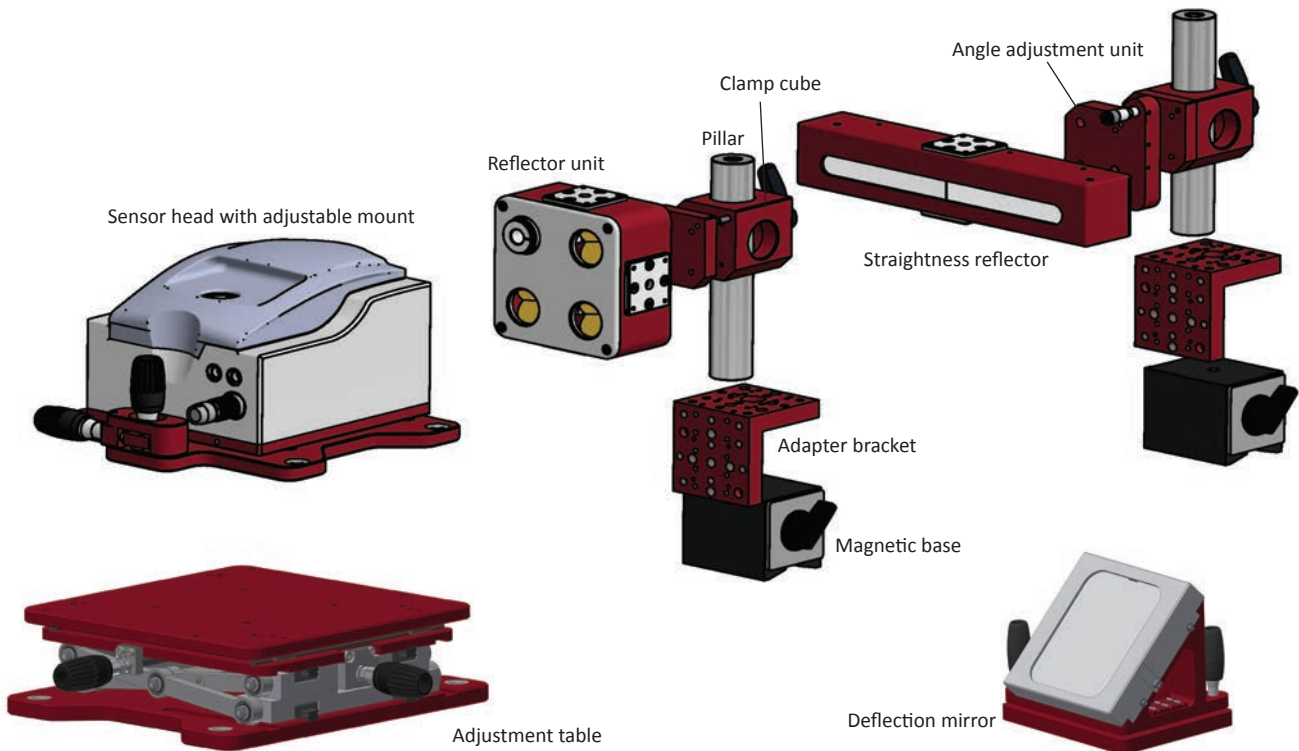
In combination with the optionally available software InfasALIGN the calibration interferometer SP15000 C becomes an essential measuring tool for highly accurate alignment and adjustment of machine components such as linear guides.

No matter, if the measurement is done in automatic mode or by moving the sliding carriage by hand, the software always provides complete information about position, angle and straightness in seconds. The measured data can be saved and logged.



InfasALIGN window

Extensive adjusting and mounting accessories



Accessories

With the available range of accessories, the calibration laser interferometer can be installed very quickly and comfortably on measuring and machine tools as well as coordinate measuring devices. The mounting is universal and very robust, which is particularly important for the high measuring accuracy. The optional deflection mirror provides a 90° deflection of the measuring beams to allow vertical length and angle measurements.

Alignment facilities

Additional sensors allow a monitoring of the alignment state of the interferometer. So the user is able to align the measurement system quick and precise. For measurements with highest accuracy it is possible to align the reflector very precisely to the measuring beams, using the alignment mirror. The alignment mirror can be simply clipped onto the reflector unit.



SP 15000 C5 with compact straightness measurement



- Compact reflector unit
- No space required for straightness mirror
- Easy alignment
- Measurement setup for Z- Straightness possible
- Unchanged technical data, only axial range up to 3.5 m



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Warning:

