

Interferometric measurement system with 6 degrees of freedom (6 DOF)



The **MS-6** interferometer is a multi-axis system for measuring geometric errors of coordinate measuring machines and numerically controlled machine tools. The laser system allows for simultaneous measurement of all **3 translational errors and 3 rotational errors of the axis under examination**, enabling:

1. Linear measurement in the range of 15m with a relative uncertainty of $0.5 \cdot 10^{-6}$ (0.5 $\mu\text{m}/\text{m}$)
2. Straightness measurement in the range of $\pm 0.2 \text{ mm}$ with an uncertainty of $\pm (2 \mu\text{m} + 0.01 \text{ measured deviation})$ or 0.1% of the measured value range
3. Measurement of tilt angles

(pitch) and rotation (yaw) in the range of ± 400 arcseconds with an uncertainty of $\pm (0.6 \text{ arcseconds} + 0.05 \text{ arcseconds}/\text{m})$

4. Measurement of roll angle in the horizontal axis (roll) in the range of ± 400 arcseconds with an uncertainty of ± 1.5 arcseconds
5. Parallelism measurement with an uncertainty of $\pm (1.0 \text{ arcsecond} + 0.2 \text{ arcsecond}/\text{m} + 0.033 \text{ indication})$
6. Perpendicularity measurement with an uncertainty of $\pm (1.0 \text{ arcsecond} + 0.2 \text{ arcsecond}/\text{m} + 0.033 \text{ indication})$

Measurement components of the

system are mounted on the machine's spindle, with a mass not affecting the measurement accuracy (220 g).

The system provides digital compensation/correction of environmental conditions with the following uncertainties for individual sensors (not worse than specified):

- Air temperature $\pm 0.1 \text{ }^{\circ}\text{C}$
- Pressure $\pm 1 \text{ hPa}$
- Relative humidity $\pm 5\%$
- Material temperature $\pm 0.1 \text{ }^{\circ}\text{C}$

The roll error can be measured by the laser system (accuracy of 4 arcseconds) and by a digital level (accuracy of 0.6 arcseconds).

