

Multi Probe Analyzer for SEA

Spindle Error Analyzer extension-kit

An extension-kit for the SEA system designed to achieve ultra-precision in spindle measurements. It provides enhanced analysis and separation of target geometrical errors, to reveal the true spindle performance up to nanometer level.

At a glance

The Multi Probe Analyzer (MPA) system is a valuable addition to the Spindle Error Analyzer (SEA) system. In specific ultra-precision scenarios where the spindle error motion can become in the same order of magnitude as the target form errors, the need to distinguish between individual contributions of spindle motion and target geometry arises. The add-on kit has been developed to separate this target geometrical error from the measurement data revealing the true spindle error motion. The MPA is aimed at spindles with errors of the order of 500 nm and below and measures spindle and target errors to nanometer level.

The multi-probe-ring for on the SEA tool allows for analysis using the 8mm capacitive sensors. The included software provides a detailed analysis with ISO 230-7 parameters of the spindle and the target in a PDF report.

Unique strengths

- Enhanced-accuracy in sub-micron spindle metrology
- Separation of spindle and target error motion to nanometer level
- Simple add-on kit to SEA
- PDF report showing true spindle and target errors
- No extra capacitive sensors needed



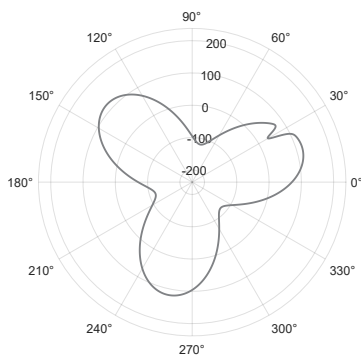
For more information visit www.ibspe.com/machine-qualification/spindle-analyzer-systems/spindle-error-analyzer

Accurate spindle profile characterization

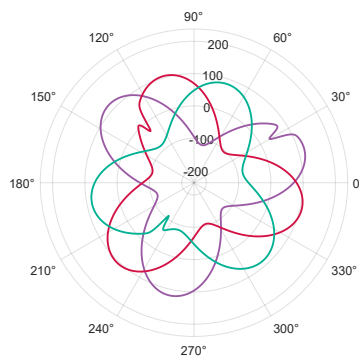
The MPA measurement method reveals the spindle error motion through the application of 3 sensors at optimized sensor angles. The chosen configuration enables reliable separation of errors up to 150 undulations per revolution (UPR), which is well beyond the typical harmonic content encountered in practical applications. The revealed spindle error motion comes with an error result to nanometer level. This new method is for sub-micron accurate spindles, from 500nm and below. The combination of high-resolution measurement and quantified uncertainty ensures reliable characterization, giving you confidence in your measured spindle performance.

Error separation

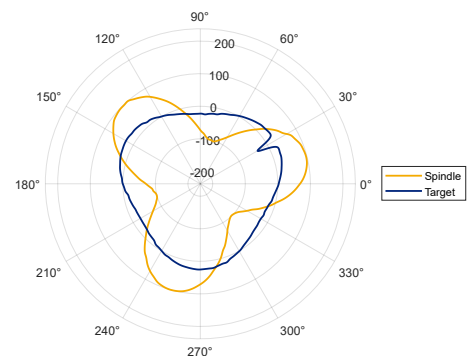
Spindle error measured by SEA



Sensor signals using MPA



Separated spindle & target error measured by MPA



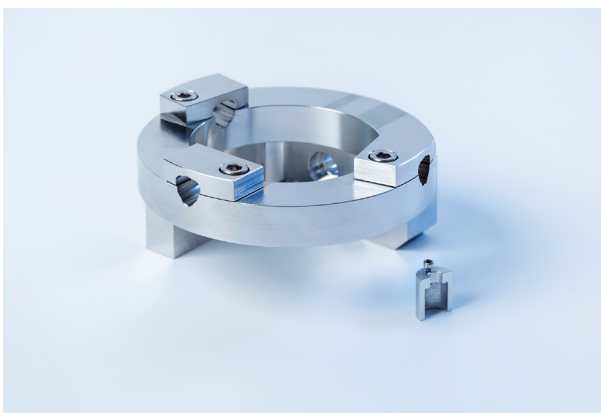
A typical SEA measurement uses two probes in the same plane, positioned 90° around the target. This results in a combined error of spindle and target, meaning the observed behavior does not represent the true spindle behavior.

By placing three probes in the same plane at optimized angles, spindle error motion can be separated from the target error. Harmonic content up to 150 UPR can be extracted.

The separated signal from the spindle and target reveal the significant impact of target errors to the measured error. This means in our example above, SEA measures 238 nm of spindle error, MPA reveals a true spindle error of 202 nm.

The extension-kit includes:

- Multi Probe Analyzer ring - for mounting the 3 capacitive sensors at the optimized angles
- Mounting material - for quick and stable attachment to your SEA system
- Software package - for seamless measurement and automatic data report generation.



Multi Probe Analyzer ring



Multi Probe Analyzer probes