STM Series Spindle Measuring Machines – Precision Without Compromise

In high-end machining, the accuracy of ball screw spindles is a decisive factor for machine performance, productivity and long-term process stability. With its latest generation of spindle testing machines, Kunz precision AG supports spindle manufacturers in verifying and improving spindle accuracy and reliability.

The STM series is designed for dynamic and static pitch measurements of ball screw spindles from 4 to 125 mm in diameter and lengths of up to 8'000 mm, combining a rigid hard-stone base with a vacuum air-bearing measuring slide. This contact-free guidance ensures exceptionally smooth motion, with an air-bearing stability of 0.1 µm, and guarantees long-term reproducibility even under demanding production conditions. The spindle is driven by a precision rotary axis with torque motor and high-resolution angular encoder, offering a rotational accuracy of ±5 arcseconds, independent of spindle diameter.

The system is based on a laser interferometric length measurement with a precision of 1.0 µm per meter. Synchronized with spindle rotation, this architecture enables highly efficient dynamic measurements with hundreds of data points per revolution. The resulting data provides detailed insight into total deviation, pitch variation over defined reference lengths and deviation per revolution in accordance with relevant international standards. The integrated measurement and evaluation software automates data acquisition, filtering and reporting, supporting both standardized tolerance classes and customer-specific specifications.

The performance of the system is validated by an accredited ISO/IEC 17025 calibration. Recent acceptance

tests demonstrate straightness of the measuring axis in the low micrometer range, following a specification of 1.0 µm + 1.0 × 10^{-6} L for the Z-axis. System-level measurement uncertainties reach down to ±(0.4 µm + 2.0 × 10^{-6} L) for static measurements under controlled conditions. These results underline the capability of the STM to serve as a reliable reference in production, quality assurance and calibration environments.

Beyond pure accuracy, the STM concept focuses on usability and robustness. Flexible spindle mounting in prisms or between centers, automated height adjustment, integrated temperature sensing and comprehensive safety systems enable efficient operation with minimized operator influence. Designed for a long service life, the machines reflect Kunz precision AG's philosophy of a sustainable, long-term investment.

For spindle manufacturers focused on efficient, high-precision quality control, Kunz precision AG delivers a powerful and proven measurement solution. The STM series combines automated, dynamic measurements with the acquisition of a very high number of measuring points, ensuring reliable, traceable results in minimal time. STM spindle measuring machines streamline measurement processes and support consistently high production quality.

The promise of Kunz precision AG

With our measurement services and products, we contribute to metrology and find excellent solutions which inspire. Kunz precision AG excels with highest measuring accuracy – worldwide.

ISO/IEC 17025

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