

# API

## Machine Tool Calibration



## MACHINE TOOL ACCURACY AND COMPENSATION

API offers a comprehensive suite of Machine Tool Calibration (MTC) products and has pioneered the development of machine-tool geometry inspection and calibration tools. API's initial MTC products included BALLBAR and SPINDLECHECK and were launched in the early 90's to diagnose axes deviations and servo errors followed by the API XD Laser Interferometer and SWIVELCHECK to address more complex forms of machine inaccuracies and uncertainties.

API's XD Laser was the first axial calibration interferometer capable to measure machine position and machine geometry simultaneously (6DoF) reducing dramatically machine-tool calibration times from days to just a few hours.

API has been at the fore-front of developing award winning true volumetric error-compensation in partnership with Boeing and MAG. The original development work was enhanced allowing use of the API Laser Tracker to directly compensate machine tools geometry errors.

The MTC product range is enhanced with latest generation Vericomp software providing verification and calibration routines and also G Code and compensation table generation for all major machine-tool controllers.

API's MTC products offer fast and comprehensive machine-tool and robot calibration solutions improving process performance.



### XD LASER

The XD Laser is a multi-dimensional interferometer offering a high level of flexibility for machine-tool calibration. XD is wireless and available in 1, 3, 5, and 6 Degree of Freedom (6DoF) configurations. The 6DoF XD laser provides simultaneous measurement for all axis errors in a single setup providing rapid machine-tool error assessment by evaluating velocity, acceleration, parallelism, squareness, flatness, straightness as well as linear, angular, and roll errors with a single set-up.

XD Laser is compact and provides easy setup and operation. The control box is integrated into the laser head for portability; the environmental station compensates in real time with software for control, data acquisition, and reporting all included as standard. Available options include linear and volumetric error compensation.



### BALLBAR

The telescopic Ballbar quickly checks contouring accuracy of a machine axis to diagnose servo errors and path deviations. Measured deviations are displayed in a polar plot format. Simple setup, straightforward operation, automatic error identification, and intuitive analysis make the API Ballbar the perfect solution for machine tool performance monitoring.

Larger machine tools are accommodated with telescopic extensions up to 1.5 meters in radius.

The Ballbar's unique parallel spring suspension provides extremely accurate results between the machine spindle and table. The wireless sensor's Bluetooth connectivity and 8-hour rechargeable battery provide simple operation for quick verification of a machine-tool's performance.

Use Ballbar performance verification to demonstrate compliance, ensure accurate machining quality, and reduce overhead in manufacturing operations.



### SPINDLECHECK

The SPINDLECHECK allows the measurement of integrity and thermal expansion of a machine tool spindle axis. SPINDLECHECK identifies rotational and axial errors, bearing integrity, machine repeatability in addition to thermal drift and error mapping.

Available as a Dynamic Analyzer (rotational error), Thermal Analyzer (stability in x,y,z + pitch/yaw), or as a combination instrument. Measurements are performed in either dynamic or stability modes with the paired software providing live feedback for quick setup and alignment. Analysis reports are simple to interpret and are ASME BB9.3.4 compliant.





## SWIVELCHECK

The SWIVELCHECK instrument measures and calibrates machine tool rotary axes, swivel axes, tilt tables, and pendulum axes. SWIVELCHECK utilizes a servo-driven motor in conjunction with an electronic level and precision rotary encoder to measure multiple parameters in a single setup. Mounting can be off-center of the rotating axis to measure swivel axes and trunnions without disassembling critical machine-tool components.

SWIVELCHECK can operate in automated or manual modes and includes software for control, data acquisition, and reporting. Used in conjunction with the API XD Laser, SWIVELCHECK can also measure table wobble on horizontal rotary tables.



## A VISION FOR INNOVATION

For more than 30 years API have pioneered laser based equipment for measurement and calibration. API founder and CEO, Dr. Kam Lau, invented the laser tracker while working at USA's National Institute of Standards and Technology (NIST) to allow industrial robot accuracies to be determined. API introduced the world first six degrees of freedom (6DoF) Laser Interferometer in 1992.

Today API is a global company with its laser trackers and machine tool calibration products continuing to be the benchmark for metrology Automation, Precision and Innovation. API measurement and calibration products are at the heart of manufacturing organizations world-wide ensuring product quality and performance.

## PRODUCT SUSTAINABILITY

Manufactured in the USA all API MTC products are supported globally through subsidiary offices in Europe, China, India, and master reseller partnerships, API offers the level of support demanded by our sophisticated international customers. We are where you are.

