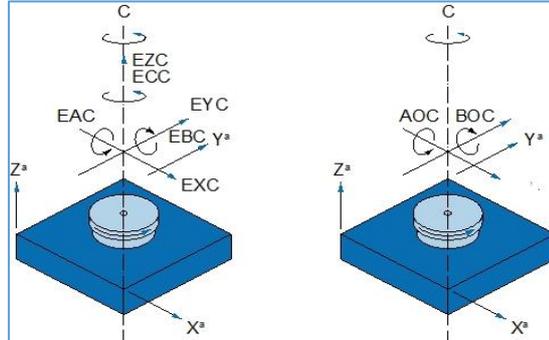


For rotary axes (A, B or C axis) the six component errors consist of the angular positioning deviation, two radial motions, one axial motion and two tilting motions (wobbling).



Error	for a A axis	for a B axis	for a C axis
Angular positioning	EAA	EBB	ECC
Axial motion	EXA	EYB	EZC
Radial motion	EYA, EZA	EXB, EZB	EXC, EYC
Tilt motion	EBA, ECA	EAB, ECB	EAC, EBC
Squareness	BOA, COA	AOB, COB	AOC, BOC



Etalon offers an effective and quick technology to determine all these deviations with highest accuracy and to output correction data for the Sinumerik control at the click of a mouse.

Controller	Compensation table from Etalon
Sinumerik 840D	Volumetric Compensation System (VCS) Cartesian 3D SEC (SEC3D)
Sinumerik	Cross Error Compensation (CEC)

LaserTRACER-NG

The universal LaserTRACER is a self-tracking laser interferometer, which simplifies the detection of geometrical errors of measuring and machine tools with the highest accuracy. Thanks to its patented technology, spatial distance measurements are possible with surpassing accuracy!



The unique basic principle of measurement with the LaserTRACER: As in the case of the Global Positioning System (GPS), spatial information is obtained by pure distance measurements in space. In the working volume of machine tool, spatial accuracies in the sub-micrometer range can be achieved with largely automated measuring routines.

Technical specification	
Measurement range	up to 20 m, more on request
Uncertainty for a spatial measurement	$U_{(k=2)} = 0.2 \mu\text{m} + 0.3 \mu\text{m}/\text{m}$
Resolution	0.001 μm
Suitable for	Linear and rotary axes

LaserTRACER-MT

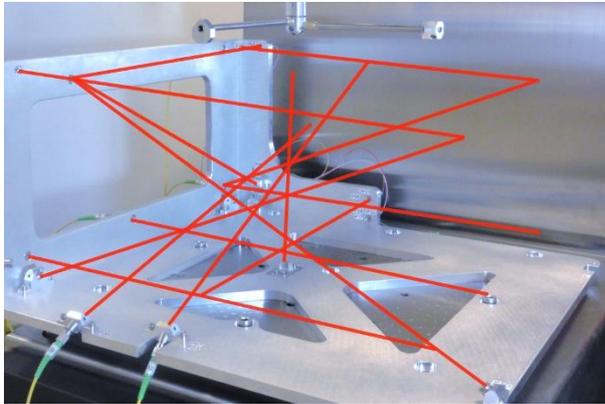
The LaserTRACER-MT has been developed especially for small and medium-sized machine tools and uses the same principles as the LaserTRACER-NG. It is also possible to determine all geometrical deviations of linear and rotary axes. The main difference is that the laser beam is guided by a telescopic linkage from the machine. This makes the LaserTRACER-MT easier to set up, lighter and is besides its 5 axis capability also a financial alternative to conventional 6 DOF systems.



Technical specification	
Measurement range	up to 1 m, more on request
Uncertainty for a spatial measurement	$U_{(k=2)} = 2 \mu\text{m}$
Resolution	0.001 μm
Suitable for	Linear and rotary axes

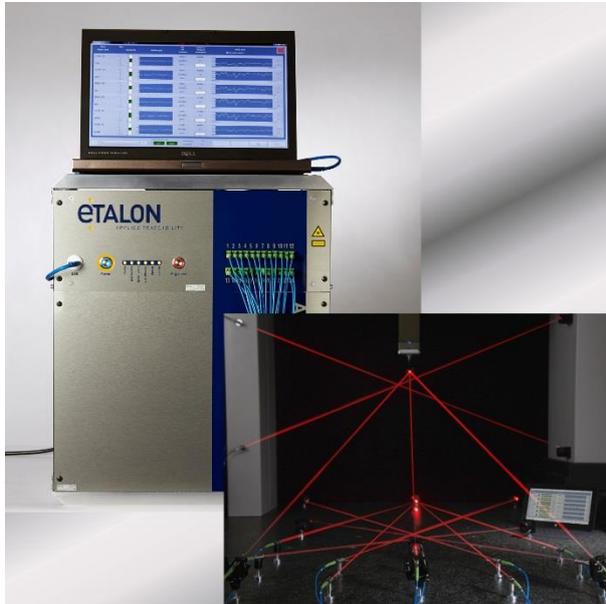
LineCAL

LineCAL allows a fully automatic measurement run to determine the geometrical deviations of the machine. LineCAL can also be used for very small working volumes. The same software core is used but in contrast to the Etalon LaserTRACER, with LineCAL many fix measurement lines replace a beam tracking system. A frame is used for arranging the measurement lines, which is specifically tailored to the type of machine to be tested. Therefore, LineCAL pays off when a particular type of machine has to be calibrated repeatedly.



Technical specification	
Measurement range	up to 3 m, more on request
Uncertainty	$U_{(k=2)} = 0.1 \mu\text{m} + 0.3 \mu\text{m}/\text{m}$
Resolution	0.001 μm
Suitable for	Linear axes

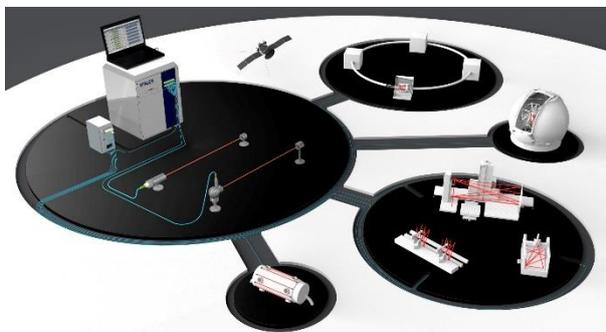
Absolut Multiline Technologie



With the Absolute Multiline Technology, Etalon offers a revolutionary solution for demanding precision measurements in industry and research.

The Absolute Multiline technology is an absolute measuring interferometer that can measure distances with up to 124 channels simultaneously. The unit can be set up centrally and controlled via a network. The laser light is fed via glass fiber, which can be several kilometers long. On fix measurement lines, length up to 30 m can be measured precisely, even after beam interruptions.

In machine tool parks, the Absolute Multiline Technology is used to automatically monitor production machines for your specification and, if necessary, to compensate deviations. For this purpose, a corresponding option from Etalon is available on the Sinumerik controller. Due to the metrological traceability of the measurements, machine tools can also be qualified for measuring tasks. Robots can also be checked by the integration of reference lines.



In research and development, the long-term stability and deformation (through temperature influences, weight of the workpiece or foundation changes) are examined with the Absolute Multiline System from Etalon. In scientific applications, the system serves for deformation monitoring e.g. of mirrors or structures and for reliable position monitoring in 3D.

Technical specification	
Measurement range	up to 30 m
Uncertainty	$U_{(k=2)} = 0.5 \mu\text{m/m}$
Resolution	0.001 μm
Frequency to detect	up to 500 kHz
No. of measurement channels	up to 124, multiplication possible
max. fibre length	several km
Suitable for	Linear and possibly rotary axes, robots and 3D objects