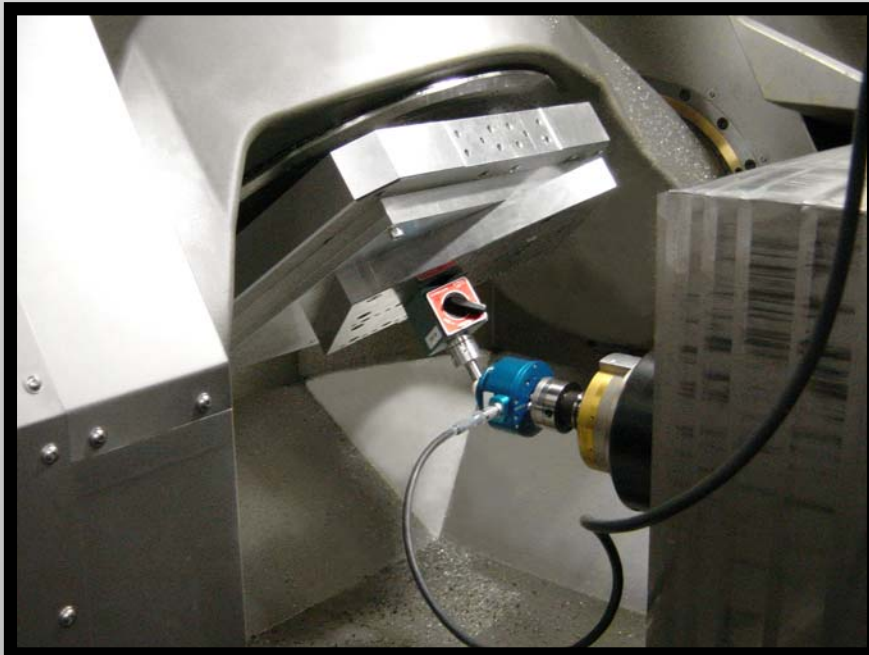


MT Check MT Check



MT Check *Machine Tool* *Calibration*



WHAT IS IT? ... FUNCTIONALITY

The MT Check system is an innovative metrology system used for determining the positioning accuracy of machine tools rapidly. With this system linear and rotary axes can be checked accurately using a single Masterball, a ball beam or even a ball plate. The system can also be used for allocating spindle units in multi-spindle machines.



WHY TO USE IT? ... ADVANTAGES

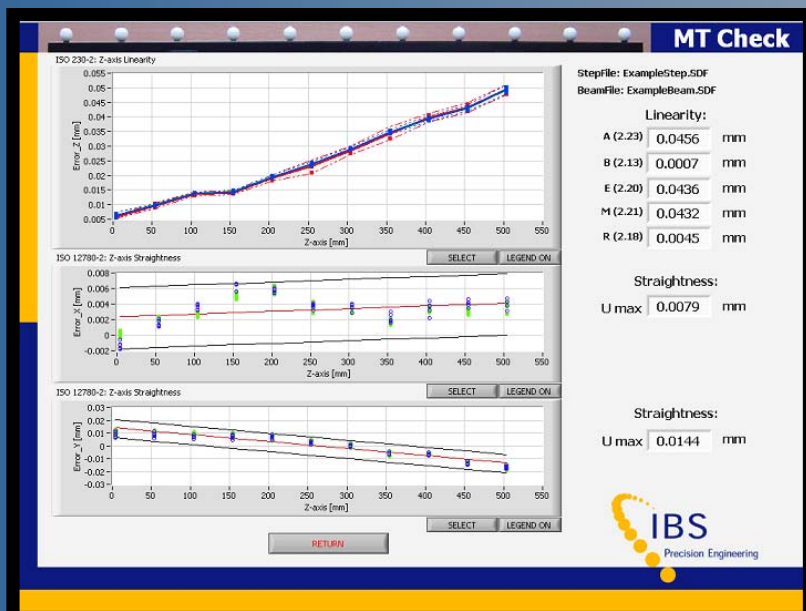
Linear axes are measured with the MT Check system within a few minutes only. It combines a simple measurement setup and automated measurement sequence with a high degree of accuracy. The time required is reduced significantly because the MT Check system is a truly 3D measurement system unlike conventional measurement equipment. In this way, 3 errors of a linear axis are measured simultaneously: positioning and both straightness errors. When a ball plate is used instead of a ball beam even more information about the machine's positioning performance is obtained more rapidly, including the squareness error between both axes.

Rotary axes can be allocated very accurately in a few minutes by performing the R-test, while use of conventional dial gages by a specialist requires one full day.

Multi-spindle machines benefit from this system as the relative location between spindle units can be determined directly. Conventional methods are less accurate and more time consuming. All measurements described can be performed by a machine operator as no specialistic knowledge is required.

HOW DOES IT WORK? ... DESCRIPTION

The MT Check system uses a 3D measuring probe head in combination with an artefact, containing 22 mm diameter precision spheres. Such a calibrated artefact is then mounted on a machine's work piece table. The probe head is put in the spindle unit and the machine is commanded to allocate all artefact spheres automatically. By comparing the calibrated and measured ball positions, the machine's accuracy can be determined directly. Measurement data is presented according to ISO 230.

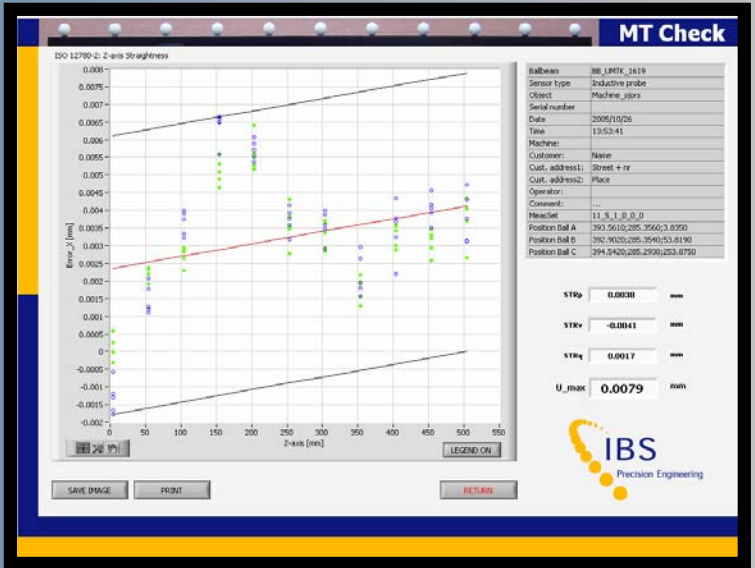


APPLICATIONS

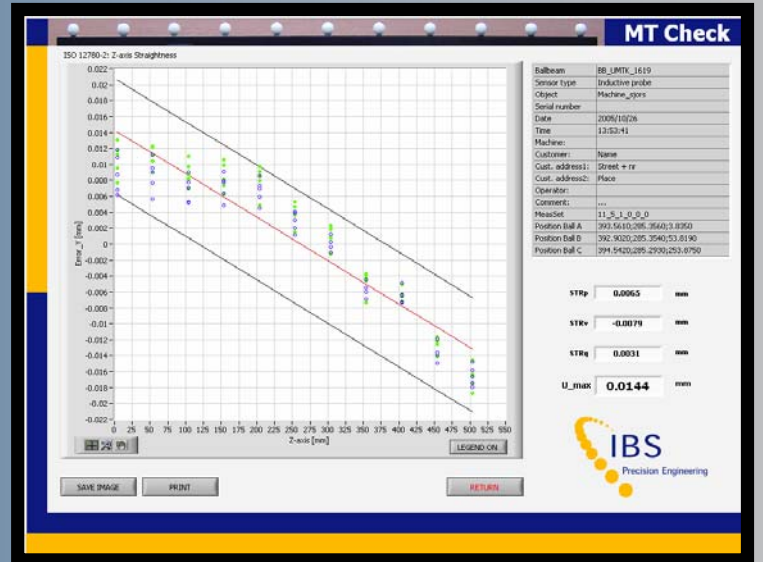
The X-axis of a machine tool has been measured with the MT Check system using a 500 mm length ball beam. The ball beam is mounted approximately axis parallel by eye on the work piece table.



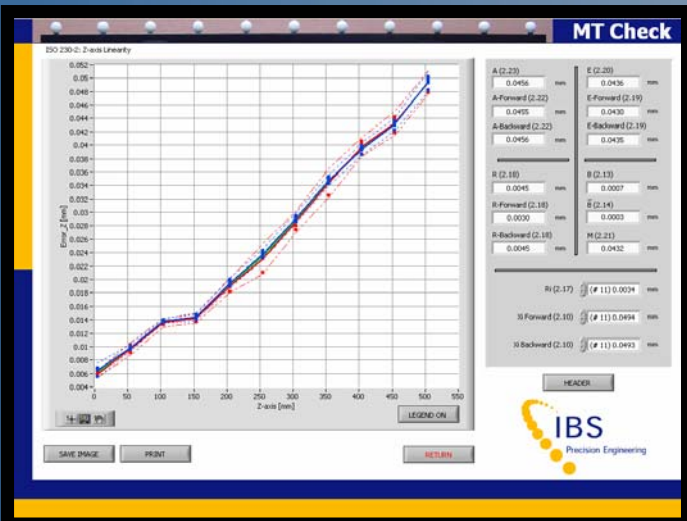
After sensing 3 balls of the beam in a prescribed alignment procedure, the software generates automatically the NC code necessary to command the machine to measure all artefact balls 10 times (ISO 230-2). Below the measurement result showing the positioning errors is depicted. On the right-hand side of this page the straightness errors are shown in detail



Above the straightness error of the machine's X-axis is presented acting in the vertical plane. The straightness errors are smaller than 8 μm in this case. Below the straightness error acting in the horizontal plane is depicted for the same machine axis, measured in the same sequence.



In this picture the straightness error of the machine's X-axis is shown acting in the horizontal plane. This straightness error equals 14.4 μm .



EXAMPLE OF R-TEST APPLICATION

Below a photograph is depicted of a R-test measurement performed on a Hemtech 5 axis machine tool. With this measurement the location of the C-axis is measured (lower left-hand side picture: $dX=105 \mu\text{m}$, $dY=21 \mu\text{m}$) first and improved (lower right-hand side picture: $dX=-4 \mu\text{m}$, $dY=-0.4 \mu\text{m}$) by adjusting the machine's controller parameters, revealing a significant improvement.

