



C. D. Measurements Ltd

SPECIALISTS IN ENGINEERING METROLOGY



Laser Machine Tool Calibration

A Comprehensive Laser Measurement, Assessment and Error Correction Service for CNC Machine Tools

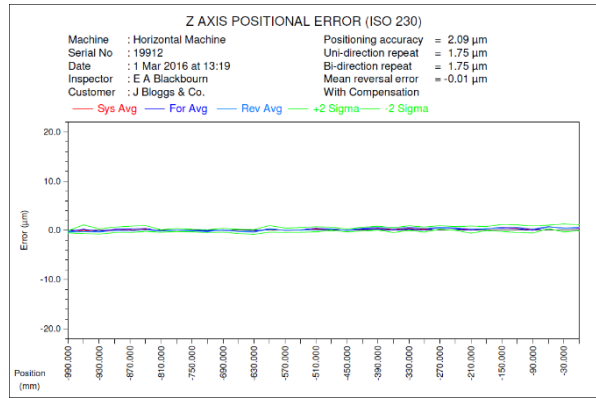
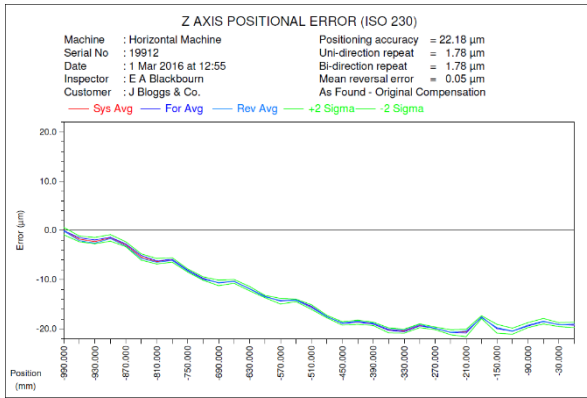


Our specialist engineers, together with advanced equipment and computer aided technology, provide an unrivalled machine tool measurement and error correction service to machine tool users, suppliers and service companies. Our UKAS accreditation, with the lowest commercially available best case measurement uncertainty of $0.15 \mu\text{m} + 0.50 \mu\text{m}/\text{m}$ for lengths up to 4m and $1.9 \mu\text{m}/\text{m}$ for axes up to 30m, gives the peace of mind of an internationally recognised certificate of machine performance.

Linear axes are assessed and pitch error corrected using the Keysight laser interferometer system, which can also be configured to take angular measurements such as pitch and yaw motions. The utilisation of laser autocollimators enables the measurement and error correction of rotary axes, such as those encountered on lathes and machines with 4,5 and 6 axes, with a best case UKAS accredited uncertainty of 0.6 arc seconds (0.00017°).

Pitch error correction is available on most machine tool control systems and is used extensively to fine tune machine performance without the need to undertake time consuming mechanical work. This error correction is effective in compensating for positioning errors within the machine. Our proprietary software logs data from the measurement equipment, analyses it to international standards and then generates pitch error correction data, which in most cases is directly uploaded to the machine tool controller. This software assists in providing a reliable speedy calibration and error correction service. In favourable conditions a 3 axis machining centre can be calibrated and pitch error corrected within seven hours.

We have experience of many CNC controls from manufacturers such as Allen Bradley, Bosch, Fagor, Fanuc, Fidia, Heidenhain, Laserdyne, Mazak, Mitsubishi, NUM, Okuma, Osai, Philips, Seicos, Siemens and Yasnac. If we encounter less familiar systems our engineers will aim to apply our knowledge and experience to achieve the best accuracy from the machine controller.



Results on a typical machine tool axis, before and after error reduction by pitch error correction.

Our customer base spans many industrial sectors aerospace, calibration, composite, heavy engineering, marine, medical, military, motor sport, oil and gas, pattern making, power. This diversity covers EDM machines with a work zone of a few square millimetres, through lathes, VTLs, machining centres, mill turn machines up to floor borers and gantry mills with beds in excess of 80m and jobs of over 300 tonnes.

The results of measurements can be analysed to various international standards such as ISO230, JIS, VDI3441, NMTBA, and to customer specified requirements. Reports of machine performance before and after compensation plus UKAS calibration certificates showing the final result after compensation are provided in PDF format. In the case of an in-depth machine tool assessment, such as volumetric accuracy, the results are supplied in the form of a Windows interactive program so that predicted machine errors can be extracted by the customer at any location within the working volume of his machine.

Customers appreciate our commitment to quality and our continuing endeavour to offer the best service at a competitive cost, together with willingness and flexibility in accommodating their needs, even outside normal working hours thereby alleviating lost production. We cover the whole of the UK, EU and other countries by arrangement, where we work alongside our customers' maintenance staff. Our considerable experience in the calibration and compensation fields enables us to offer, not only the basic requirements for reliable production, but also in-depth investigations of machine tool and CMM performance.

Our experience, combined with our extensive range of equipment and unique software, enable us to carry on where others leave off.

Our Measurement Capability	
Linear Length	Up to 80m (UKAS accredited up to 30m)
Angular / Straightness	Up to 30m
Squareness	Up to 30m total axes travel
Rotary	360° without restriction (UKAS accredited 360°)
Ball Bar Contouring	0.1mm up to 1000mm radius (UKAS accredited 50mm to 250mm)

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