



## Laser Calibrations: Some Facts and Misconceptions

Machine tools need regular calibration to ensure their accuracy. And while there are various methods used to calibrate machines, laser interferometers are the most common these days and are extremely accurate. However, many people in the industry don't know enough about laser calibration to know what the process entails, and sometimes don't get the results they wanted. Herewith are some common misconceptions about laser alignment and some tips to ensure that you get what you pay for!

**Belief:** A laser is used to align the machine tool

**Fact:** The laser itself is actually aligned to the machine, and once set up, measurements can be taken from the axis to which it is aligned. The most common measurements taken are:

- Straightness of axis in the vertical and horizontal plane
- Angular pitch and angular yaw
- Axis perpendicularity
- Linear error of the ball screw, including backlash

**Belief:** All machine tools can be calibrated and adjusted

**Fact:** Only very large machines can be adjusted. The laser can be used to adjust the straightness of the main axis where fine adjustments are possible and required. On smaller machines, the straightness is determined during machining by the factory's mother machines and usually no adjustment is available.

**Belief:** By simply calibrating a machine's ball screw, the job is done.

**Fact:** The actual calibration is only one step. A critical step to ensure a proper job is to make sure the machine tool is correctly aligned, adjusted, and complies with the static accuracy tolerances stated in the test chart for the machine or ISO standards. If the machine is not within these tolerances, then the data collected by the laser will not represent an ISO compliant measurement.

Always make sure your machine complies with its static accuracy tolerances. If this important step is ignored, then calibration has compensated for the machine's misalignment.

**Belief:** One measurement when calibrating the axis is enough.

**Fact:** No! ISO requires a minimum of 7 runs to analyze an axis. Proper warm up procedures must be met to ensure that the thermal expansion of an axis has stabilized before measurements are taken to ensure accuracy.



**Belief:** If a technician has a laser, he can perform the service

**Fact:** Skill levels of technicians vary – especially with laser calibration. Learning to set up a laser and collecting the data is the easy part. What is done with the data and how it is interpreted are the important aspects, as is all the preparatory work detailed above. Make sure your technician explains exactly what he'll be doing, so there will be no surprises once he packs his equipment and leaves!

We highly recommend that you do your homework and ask questions about the level of calibration you are getting for your money. The old adage "you get what you pay for" rings very true in this industry, and if it's ISO compliancy that you're after, you must make sure that the technician you're considering has the skill, know-how and equipment to get the job done right – the first time.

And remember, a proper laser calibration takes time and can be expensive. You're not only paying for a skilled technician and his costly laser equipment, but you're faced with machine downtime as well. So why go to the expense? Because in the long run, you'll ensure your machine's accuracy and reliability, reduce unnecessary downtime and lost revenues, reduce costly scrap and the need to rework parts, and be ISO compliant at all times. All good for your manufacturing and your company.