

## Evaluation Procedure for Alignment and Calibration of Precision CNC Machine Tools

Outlined below you will find the general steps taken by Measurement & Machine for evaluation of Manual and CNC Machine Tools. Please take a moment to look it over and see how thorough we will be with your machine, keeping in mind this is our general outline of step taken in the evaluation. We adapt our process to the individual machine and specific customer requirements. Contact us for an estimate specific to your needs.

1. Retract way covers to expose way surfaces.
  - a. inspect way surfaces for wear, evaluate way oil function, and access to gibs, etc.
2. Check and adjust machine "earth" level on way surfaces.
  - a. Proper leveling is done on the way surface eliminating potential table top inaccuracies
3. Check and adjust gibs all axes. (as required)
  - a. Done before any further measurements to eliminate "False" readings.
4. Check ball screws for backlash and end play.
5. Indicate "Auxiliary Ways" for alignment. (if so equipped)
6. Inspect straightness on each axis.
7. Verify squareness between axes.
8. Examine parallelism between axes.
9. Check spindle head "tram" and spindle run out.
10. Analyze basic spindle function.
  - a. Spindle vibration and RPM
  - b. Draw bar clamping force
11. Laser Calibration X, Y, W, and Z axes.
  - a. compensation performed if requested
12. Rotary Axis Calibration.
  - a. compensation performed if requested
  - b. special adapter may be required; supplied by customer to our specifications.
13. Ballbar Analysis, before and after
  - a. customer supplied programming help may be required.
14. Complete documentation included.

## We do the Measurements and Adjustments!

Our technicians are HANDS-ON experienced and completely capable of performing all the adjustments needed. It is not uncommon for us to perform geometry adjustments during the evaluation. After the evaluation a plan of action can be formulated should any of the measurements be out of acceptable limits, allowing us to accurately estimate the amount of time needed for the complete optimization of your machine tool. Pitch error compensation optimizes the positioning accuracy but will not address the geometric alignment of your machine tool.

## All Manufacturers, All Types of Machine Tools!

We have many years of hands on experience (over 85 combined) with alignment and calibration on an extremely large variety of machine tools, and do not have an affiliation with any manufacturer, or specialize on any certain make or model of machine. Basic principles of machine design cross all lines. Therefore, we can align and calibrate all your machine tools and give you the complete **CERTIFIED** results