

CNC Mill Calibration Procedure

Memorial University Technical Services

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Revision: 2

1.0 Standards and Equipment

The following equipment is required:

Calibrated Dial Indicator
Calibrated Finger Dial Indicator

NOTE: Standards and equipment used must have a valid calibration certificate

2.0 Calibration Procedure

"TS-0079 CNC Mill Calibration Record Sheet.pdf" must be used

Clean the Dial Indicator and Finger Dial Indicator's measuring surfaces and stand, the mill bed, spindle, and all mounting points for the magnetic base

NOTE: Ensure that the dial indicator stylus is perpendicular to the X, Y, and Z axis and the spindle when performing any measurement

Step 1:

Measure the ambient temperature and record it. If the temperature is $<18^{\circ}\text{C}$ or $>24^{\circ}\text{C}$, see the Division Manager for further instructions.

Step 2:

Test Characteristic: Spindle Bore

Test Method: Remove any tool that may be attached to the spindle (This must be done via the digital panel and a machinist should be asked to show/verify the machine is safe to calibrate). Mount the magnetic base securely on the table and place the finger dial indicator against the inner bore of the spindle (Fig 1).

Rotate the spindle 360 degrees and then record the maximum deflection.

Acceptable Limit: ± 0.001 " or 0.025 mm



Figure 1

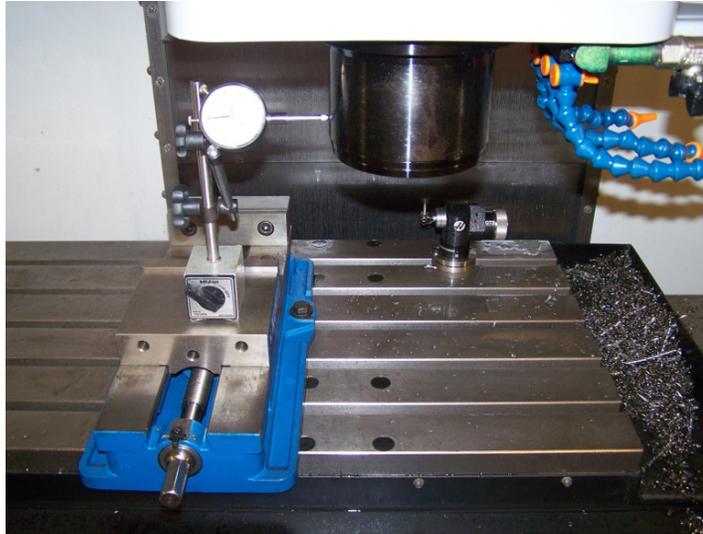
Step 3:

Test Characteristic: X - Axis Scale

Test Method: Securely mount the magnetic base on the table and place the dial indicator stylus against the spindle rim, making sure it is perpendicular to the y and z axis (Fig 2). With the dial touching the outer rim of the chuck, the center point must be found. Move the table left/right in the x direction until the needle starts to deflect. Now move in the y direction, and the point of maximum deflection will be the center point. Now move the table right/left in the x direction until the dial stops moving, and move it back in until it just starts to deflect. DO NOT MOVE THE TABLE BACKWARDS FROM THIS POINT ON. Zero both the dial and the digital readout, then move the table in the x direction until the digital readout displays 1.0000". Record both the digital readout and dial indicator reading.

Acceptable Limit: ± 0.001 " or 0.025 mm

Figure 2

**Step 4:**

Test Characteristic: Y - Axis Scale

Test Method: Securely mount the magnetic base on the table and place the dial indicator stylus against the spindle rim, making sure it is perpendicular to the x and z axis (Fig 3). With the dial touching the outer rim of the spindle, the center point must be found. Move the table in/out in the y direction until the needle starts to deflect. Now move left/right the x direction, and the point of maximum deflection will be the center point. Now move the table out/in in the y direction until the dial stops moving, and move it back in until it just starts to deflect. DO NOT MOVE THE TABLE BACKWARDS FROM THIS POINT ON. Zero both the dial and the digital readout, then move the bed in the y direction until the digital readout displays 1.0000". Record both the digital readout and dial indicator reading.

Acceptable Limit: +/- 0.001" or 0.025 mm



Figure 3

Step 5:

Test Characteristic: Z - Axis Scale

Test Method: Securely mount the magnetic base on the table and place the dial indicator stylus against the bottom of the spindle face or other flat point on the headstock, making sure it is perpendicular to the x and y axis. With the dial touching the surface, move the table upwards in the z direction until the needle starts to deflect. **DO NOT MOVE THE TABLE BACKWARDS FROM THIS POINT ON.** Zero both the dial and the digital readout, then move the table in the z direction until the digital readout displays 1.0000". Record both the digital readout and dial indicator reading.

Acceptable Limit: +/- 0.001" or 0.025 mm



Figure 4