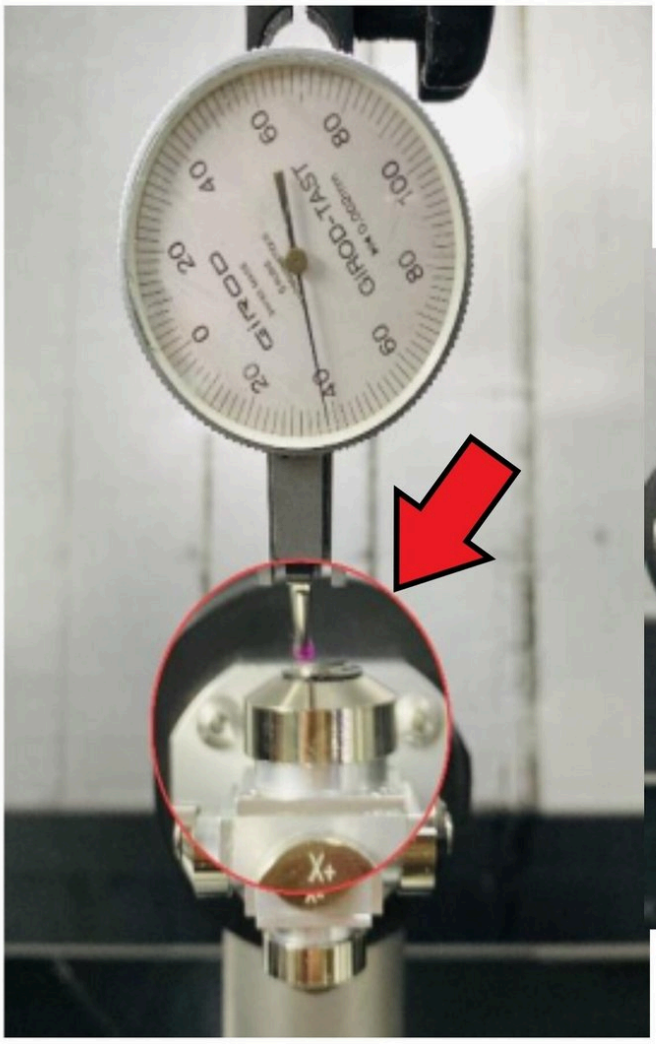
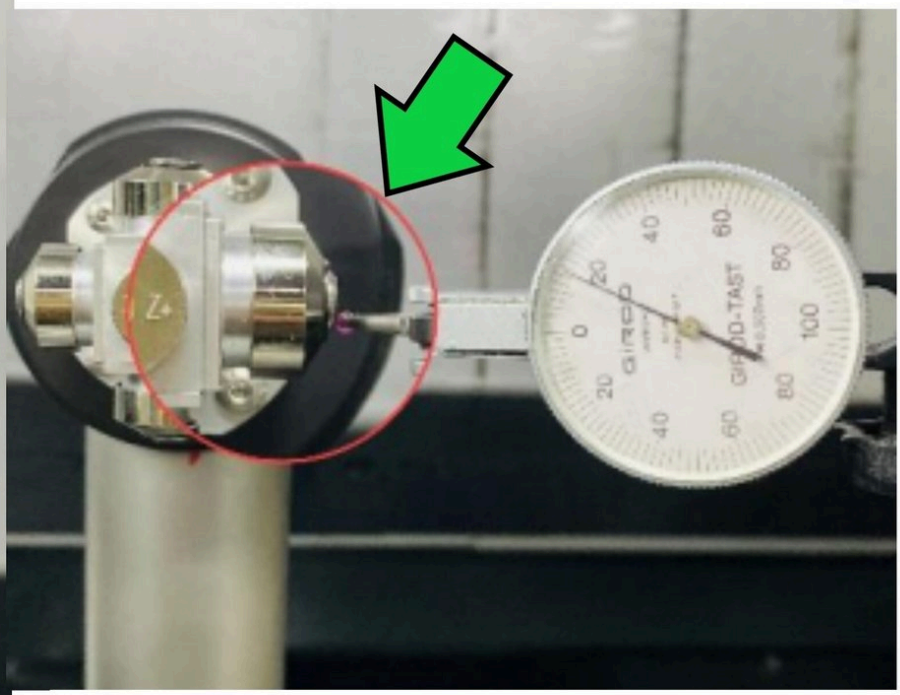
TC820si & TC820LTYsi Lathe: Calibrate Tool Setters

Calibrate the tool setter on a TC820si or TC820LTYsi.

Written By: Trent Plungas





INTRODUCTION

This calibration procedure is essential after a tool crash, software update, or whenever the tool setter is not repeating or reading accurately. It applies to both the TC820si and TC820LTYsi lathe models.

Tool Setter Probe Repeatability:

Across the face: 0.0008" (0.02 mm)

At a fixed point: 0.0004" (0.01 mm)

⚠ Important Note: Images may only show the X and Z axes. However, ensure that the Y-axis is always at machine zero during this process.

To confirm this, navigate to Act. Values > MCS and check that MY1 = 0.000". Do not move the Y-axis afterward.

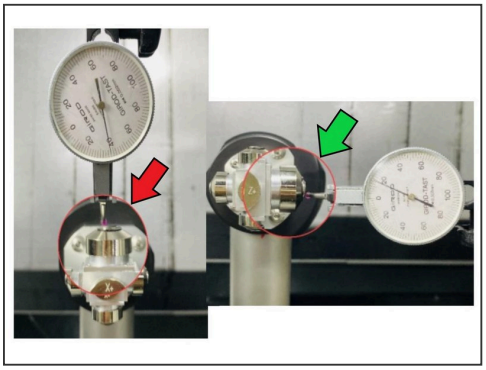
⚠ The clamping mechanism differs slightly between the TC820si and TC820LTYsi, but the alignment procedure is the same.

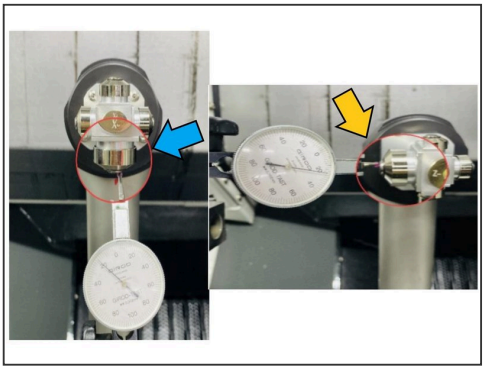
TOOLS:

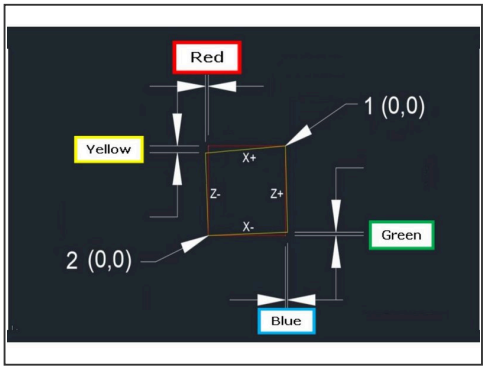
- Dial Indicator (0.0001" resolution) (1)
- Micrometer (1)
- Feeler Gauge Set (1)
- Wedge Clamp (1)
- Boring Bar Tool Holder (1)
- Turning Tool (1)
- Boring Bar (1)
- Cutoff Tool (1)

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Step 1 — Check the Tool Setting Probe Parallelism to the Axis Motion

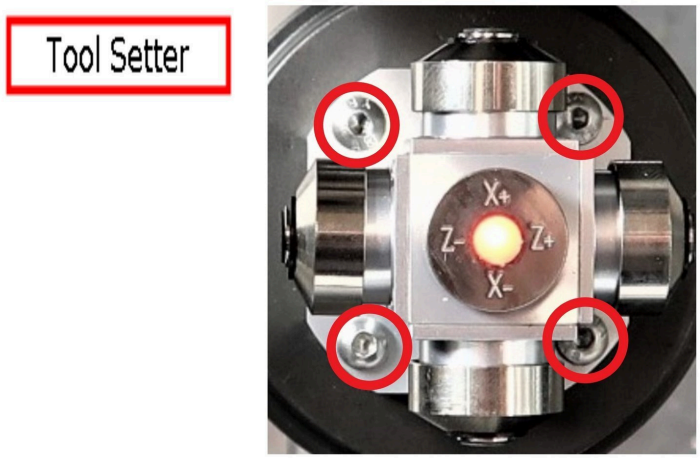






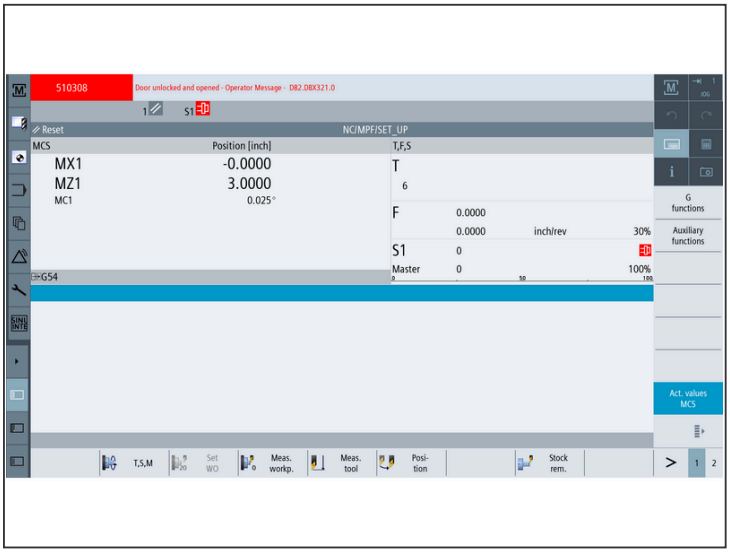
- Mount a dial indicator with 0.0001" resolution to the tool post or a stable holder.
- Move the turret so the indicator can contact the face of the tool setter probe.
- Use the manual jog function to sweep across the X+ side of the probe and note the reading.
- Sweep across the Z+ side, again noting the reading.
- Repeat for the X- side and Z- side.
- Record all four measurements to determine any deviation from axis alignment.
- The goal is for all four sides to be within 0.0008" (0.02 mm) of each other.
- If the probe is out of tolerance, proceed to Step 2 to adjust alignment.

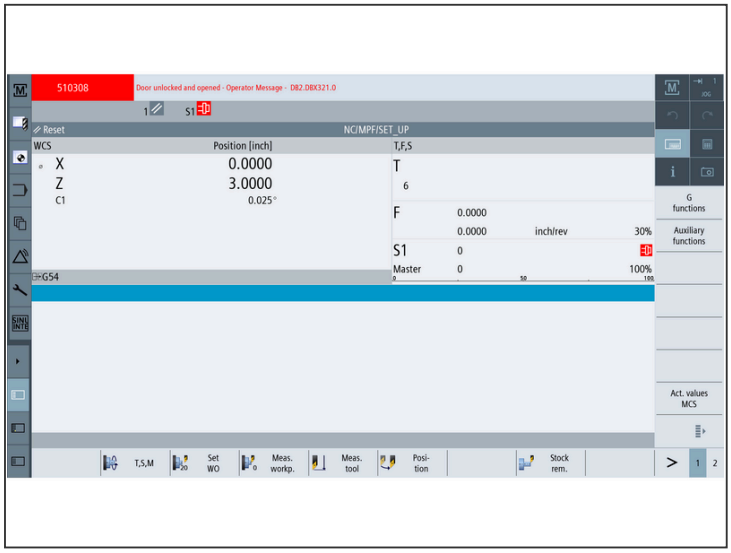
Step 2 — Adjust the Tool Setting Probe Parallelism to the Axis Motion



- Loosen the four mounting screws that hold the tool setter probe in place.
- Lightly snug the screws so the probe can still be rotated or shifted with slight pressure.
- Use the dial indicator readings from Step 1 to determine which sides need adjustment.
- Gently tap or shift the probe until all four sides read within 0.0008" (0.02 mm) of each other.
- Fully tighten all four mounting screws once alignment is within spec.
- Recheck all four sides with the dial indicator to confirm the probe did not shift while tightening.
- If necessary, repeat minor adjustments and recheck until alignment is correct.

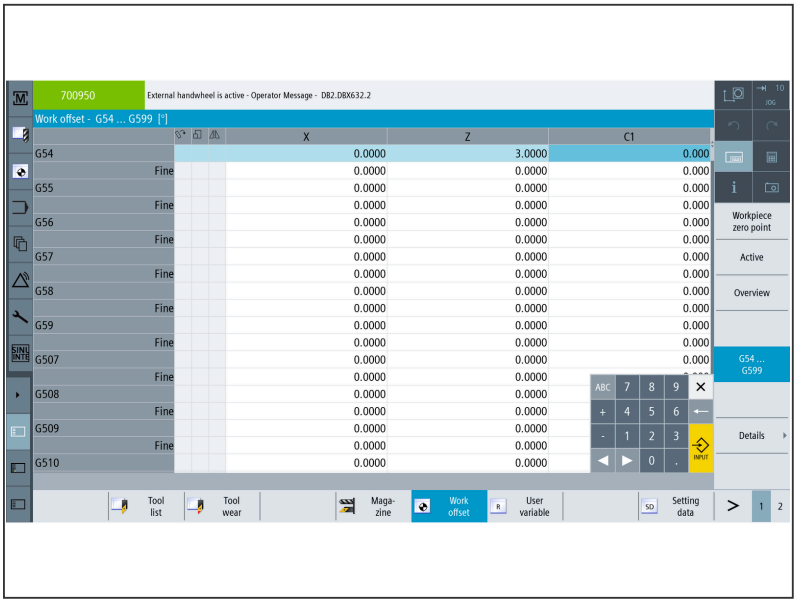
Step 3 — Set G54 Work Offset in TSM





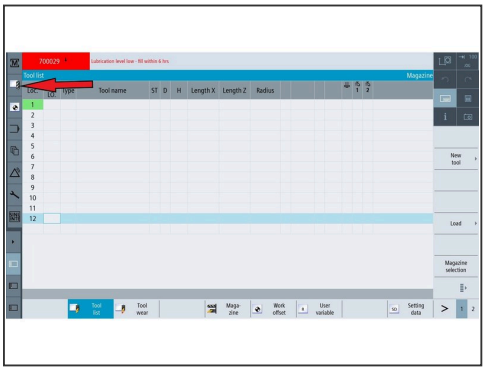
- On the control, go to TSM and set the Work Offset to **G54**.
- Switch to **[Act. Values MCS]** on right
- Jog Axes to **X** = 0.000" **Z** = 3.000" (Also, **Y** = 0.000" if machine has a Y axis)
- Switch back to WorkOffset, turn off actual values.
- Press **[Set Workoffset]**
- Confirm that X and Z (and Y if applicable) values are now matched to the machine coordinate position.

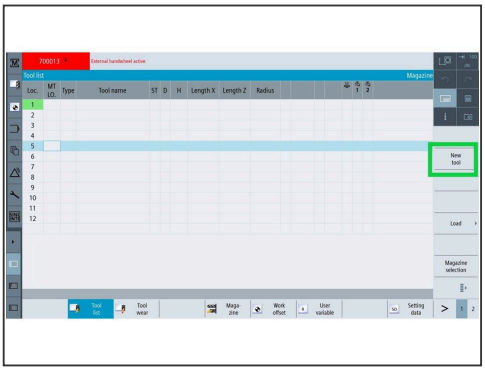
Step 4 — Load Tools

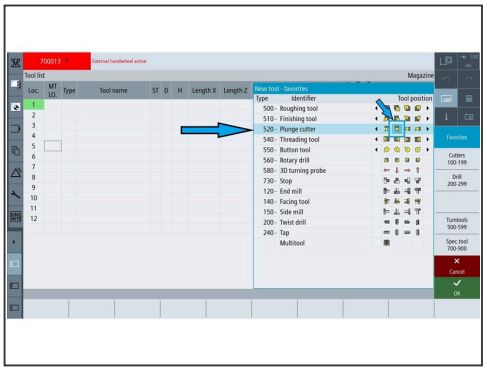


- Insert a ground pin (e.g. 1.000" diameter) into the spindle.
  - ⓘ Or a known diameter part.
- Load three tools into any available turret stations:
  - Tool 1: Cutoff Tool
  - Tool 2: Boring Bar
  - Tool 3: Right Turn/Face Tool

Step 5 — Set Up Cutoff Tool



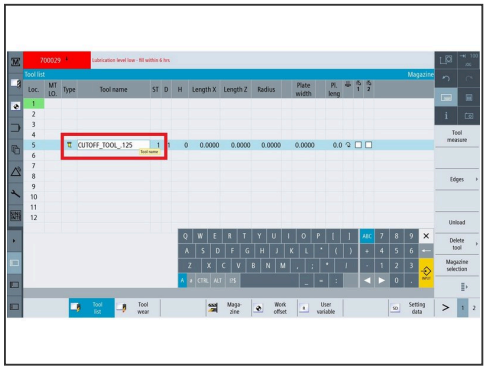
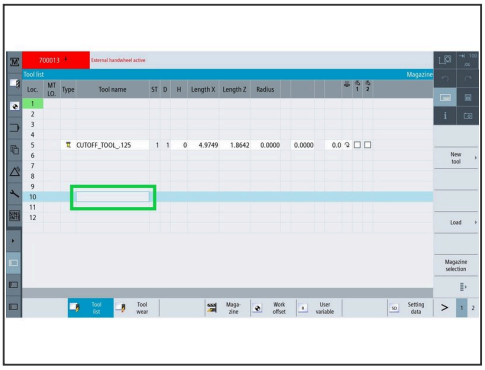
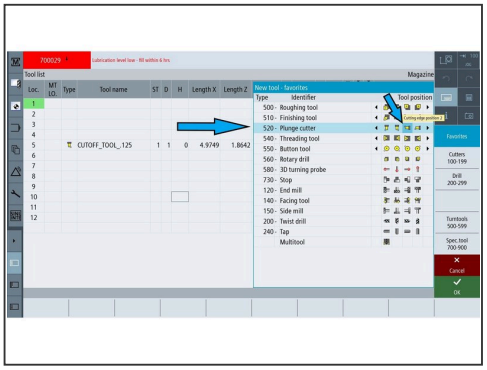




- Open the **[Tool List]** from the left-hand menu.
- Select the turret position where the Cutoff Tool is installed.
- Press **[NEW TOOL]** on the right-side button panel.
- Choose PLUNGE CUTTER as the tool type.
- Click on the 2nd tool tip position (Tip 2).
- Press **[OK]** to save the tool setup.
- Rename the tool to CUTOFF_TOOL_.125 (or adjust the name based on actual tool width).

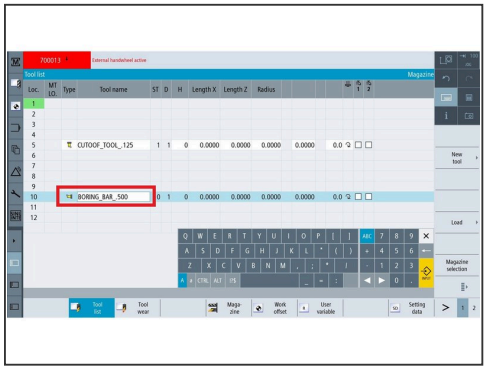
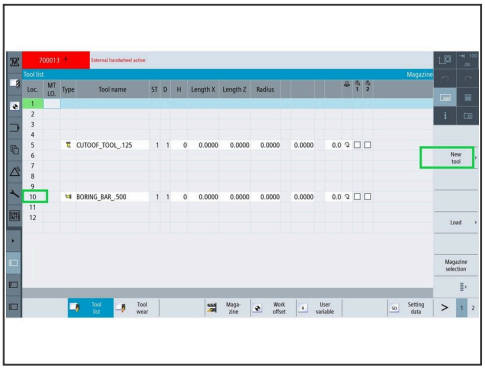
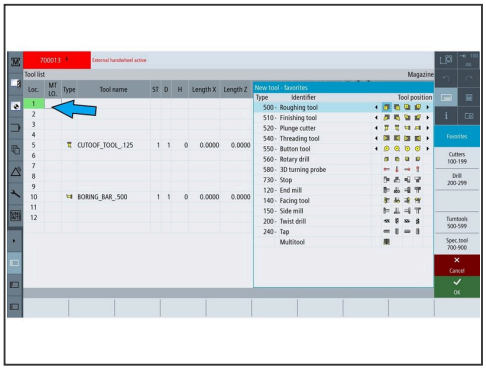
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Step 6 — Set Up Boring Bar Tool

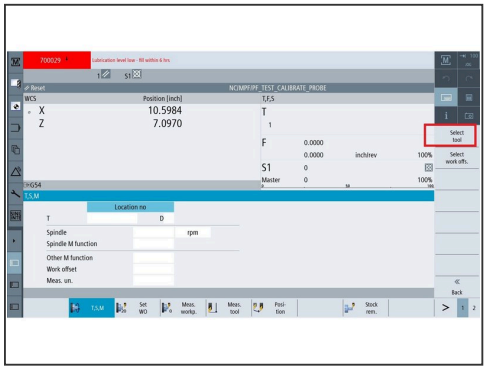
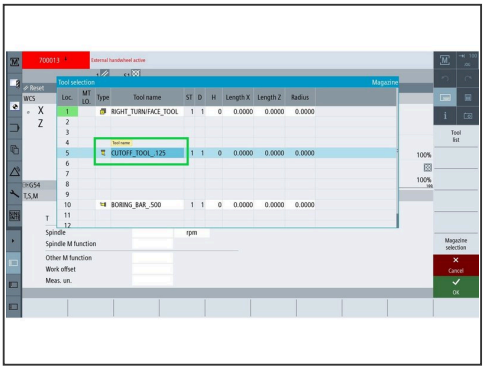
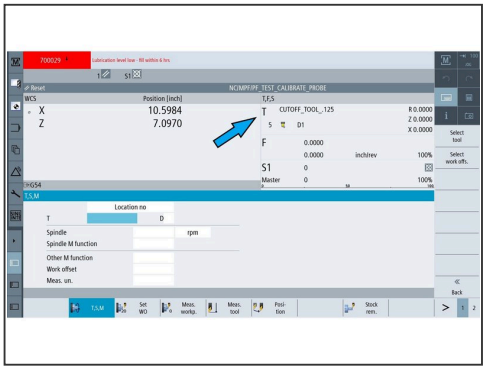
- Select the turret position where the Boring Bar is installed.
- Press **[NEW TOOL]** on the right-side button panel.
- Choose PLUNGE CUTTER as the tool type.
- Click on the 3rd tool tip position (Tip 3).
- Press **[OK]** to save the tool setup.
- Rename the tool to BORING_BAR_.500 (or match your tool diameter if different).

Step 7 — Set Up Right Turn/Face Tool

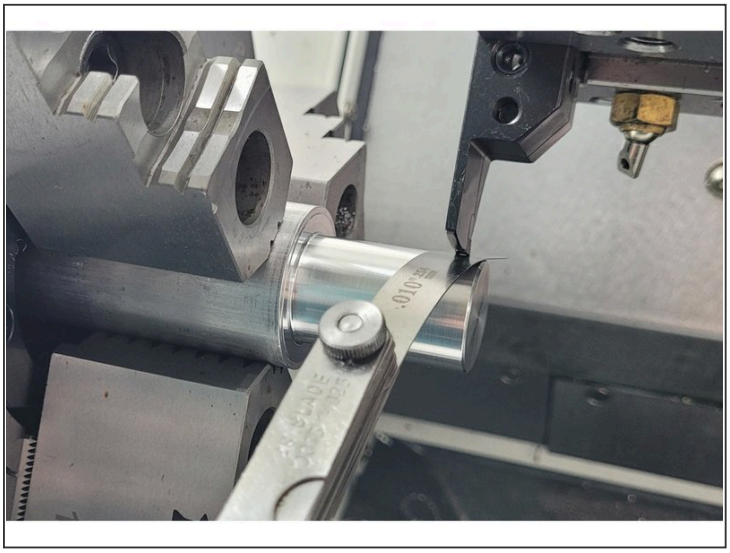
- Select the turret position where the Right Turn/Face Tool is installed.
- Press **[NEW TOOL]** on the right-side button panel.
- Choose ROUGHING TOOL as the tool type.
- Click on the 1st tool tip position (Tip 1).
- Press **[OK]** to save the tool setup.
- Rename the tool to RIGHT_TURN/FACE_TOOL.

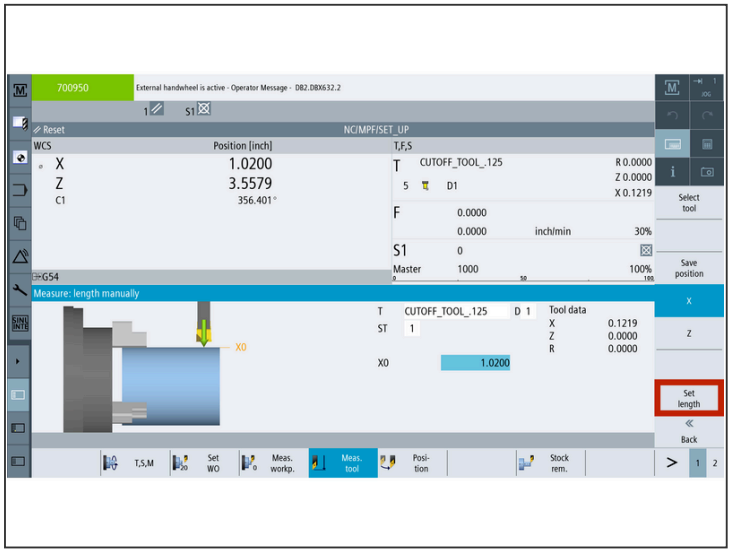
Step 8 — Select Cut Off Tool

- Go back to the TSM screen.
- Ensure the turret has enough clearance to safely rotate.
- Press **[SELECT TOOL]** on the right-side button panel.
- Highlight CUTOFF_TOOL_.125 (or whatever name was assigned in Step 4).
- Press **[OK]** to confirm tool selection.
- Press **[CYCLE START]** on the control panel.
- The turret will rotate and position the selected tool.

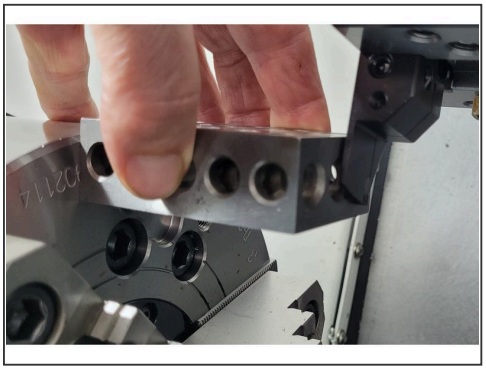
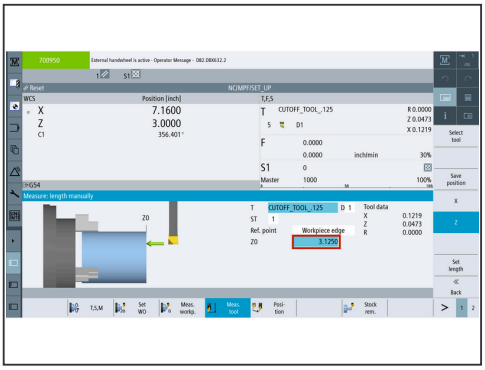
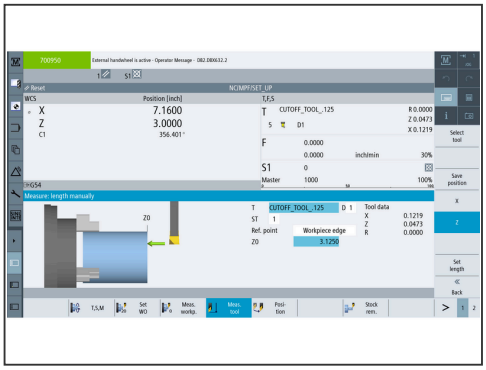
Step 9 — Touch Off X+ for the Cutoff Tool





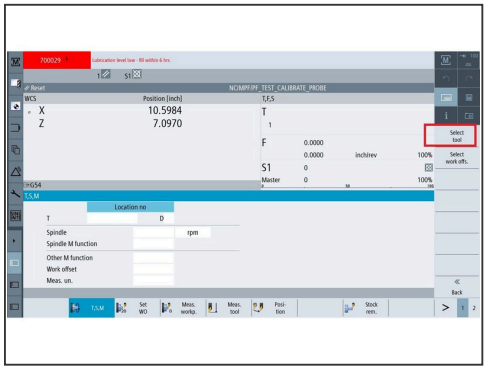
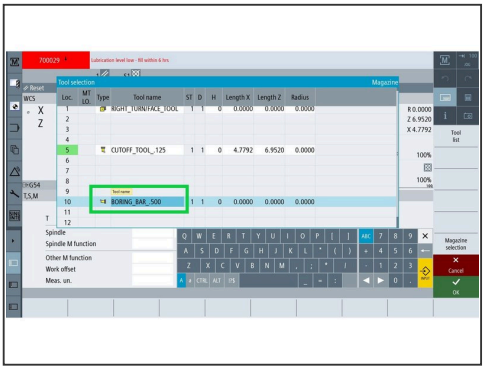
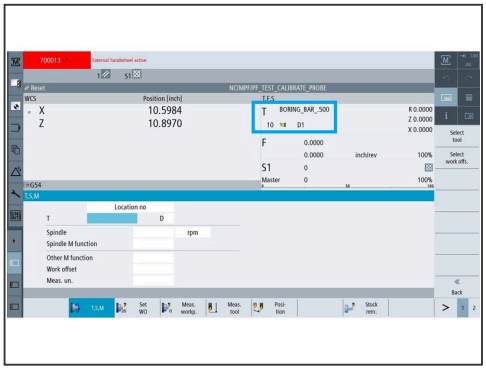
- Press **[MEASURE TOOL]** on the control.
- Use a .010" feeler gauge between the tool and the positive (front) side of the ground pin in the spindle.
- Gently pinch the tool and gauge until you feel light resistance.
- Press **[MANUALLY]**, then press **[X]**.
- In the X0 input field, enter the measured diameter:
  - ⓘ Pin Diameter + (Feeler Gauge × 2)
  - ⓘ Example: 1.000 + (0.010 × 2) = 1.020
- Press **[SET LENGTH]** to save the X value.

Step 10 — Touch Off Z+ for the Cutoff Tool

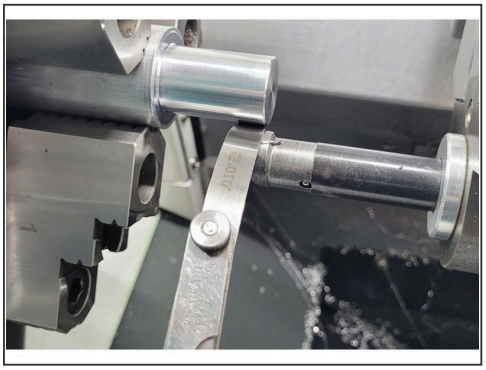
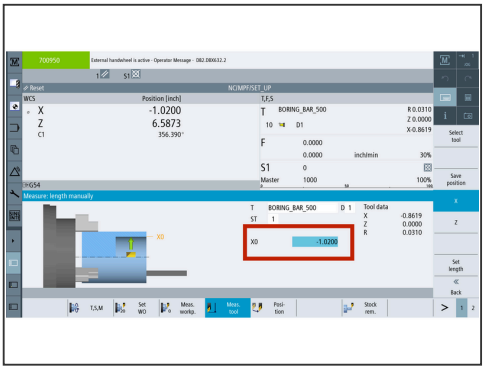
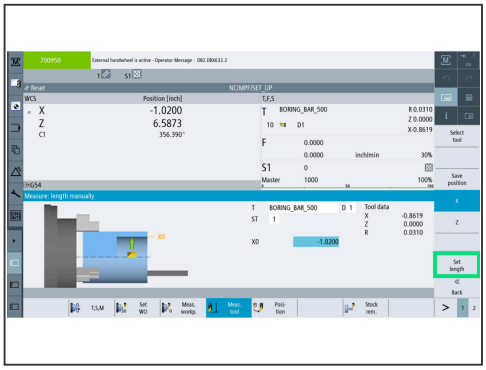
- Press **[Z]** to switch to the Z-axis input.
- Use a 3" Joe Block between the tip of the cutoff tool and the face of the chuck(Or nose of spindle).
- In the Z0 input field, enter the total offset:
  - ⓘ Tool Width + Joe Block
  - ⓘ Example: 0.125 + 3.0 = 3.125
- Press **[SET LENGTH]** to save the Z value.

Step 11 — Select the Boring Bar Tool

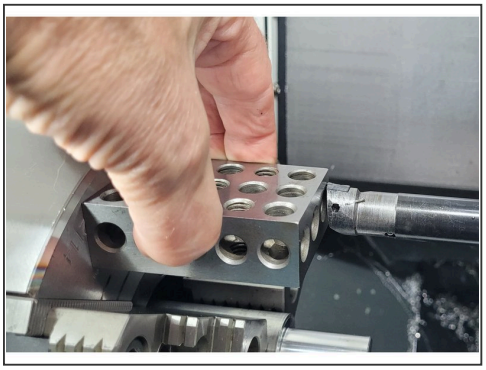
- Move the tool away from the pin to clear space for turret rotation.
- Ensure there is enough clearance around the turret to avoid collisions.
- Open the **[Tool List]**.
- Press **[SELECT TOOL]**.
- Select BORING_BAR_.500 (or your assigned Boring Bar name).
- Press **[OK]** to confirm the tool.
- Press **[CYCLE START]** to rotate the turret and bring the tool into position.

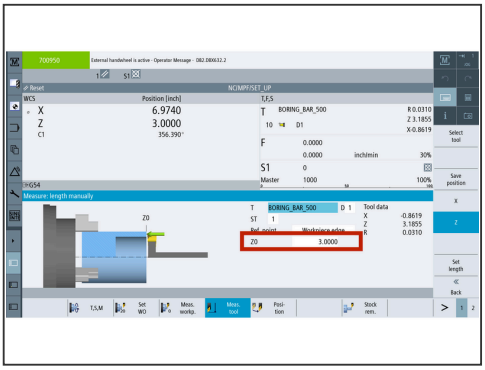
Step 12 — Complete X- Touch Off for Boring Bar

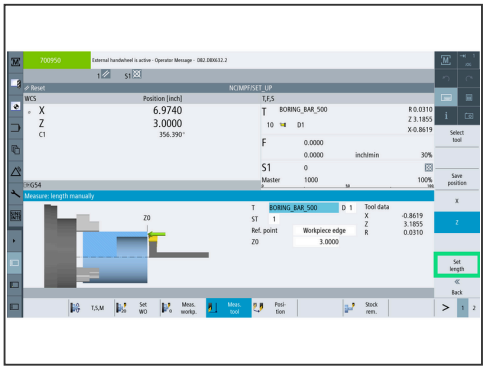




- Press **[MEASURE TOOL]**.
- Use a .010" feeler gauge between the boring bar and the back (negative X) side of the ground pin.
- Gently pinch until you feel light resistance.
- Press **[MANUALLY]**, then press **[X]**.
- In the X0 input field, enter the total value as a **negative diameter**:
  - ⓘ Example: -1.020 (1.000" pin + 0.010" gauge × 2)
- Press **[SET LENGTH]** to save the X value.

Step 13 — Touch Off Z- for the Boring Bar

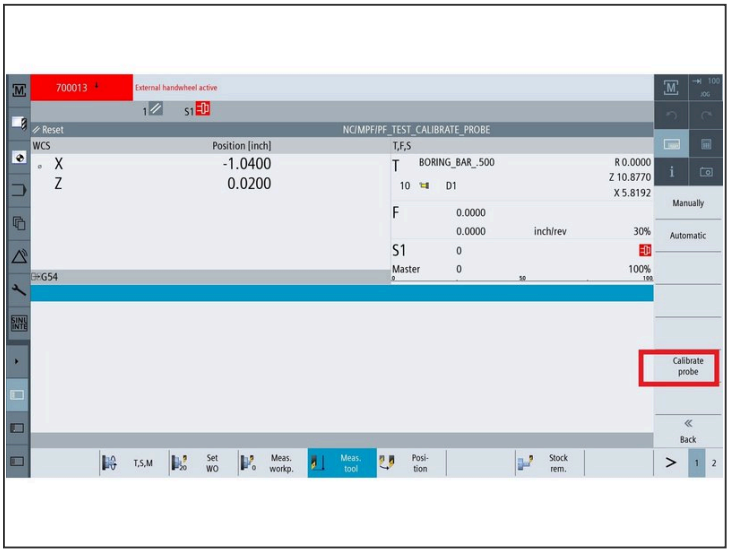


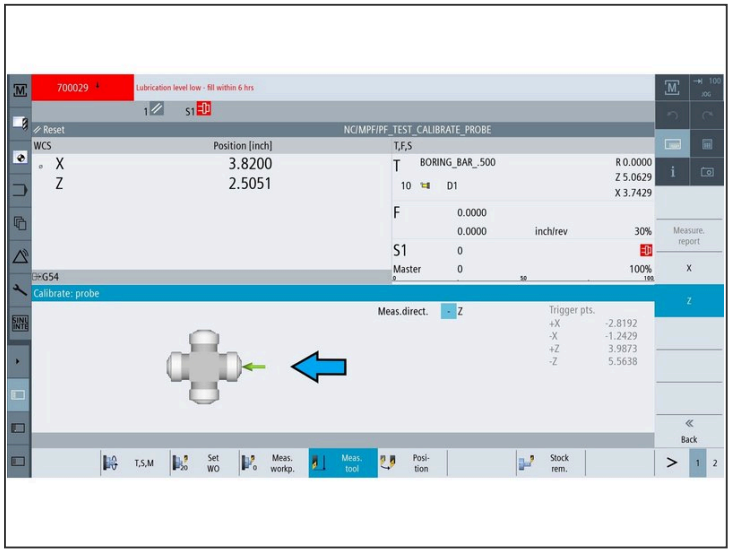




- Press **[Z]** to switch to the Z-axis input.
- Use a 3" Joe Block between the tip of the boring bar and front of the chuck (Or spindle face)
- Gently pinch until you feel light resistance.
- In the Z0 input field, enter the gauge thickness only:
  - ⓘ Example: 3.0"
- Press **[SET LENGTH]** to save the Z value.

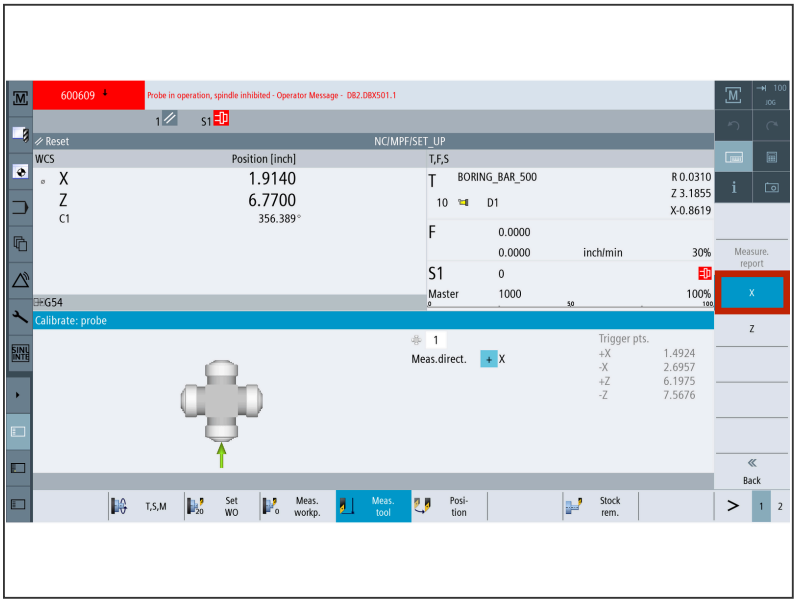
Step 14 — Calibrate Z+ Side of the Probe





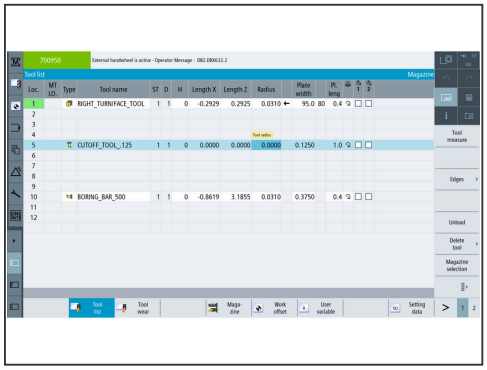
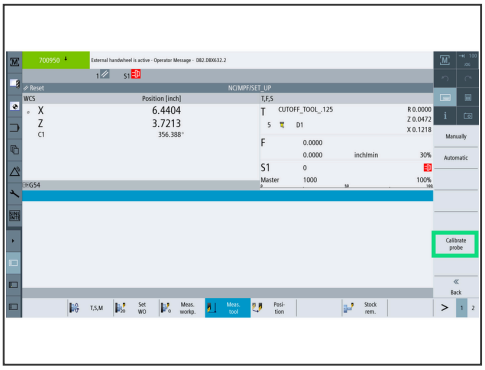
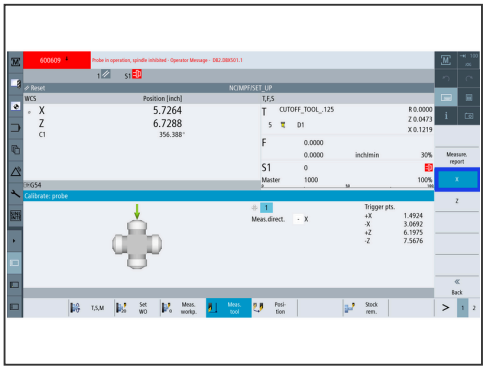
- Move the tool away from the ground pin to clear the area.
- Pull the release pin at the base of the probe arm and swing the probe into position.
- Press **[BACK]** on the control screen.
- Press **[CALIBRATE PROBE]**.
- Press **[Z]** to begin Z+ calibration.
- Jog the tool so the tip is approximately ¼" from the right side of the probe button.
- Confirm the probe is set to move in the correct direction using the on-screen arrows or dropdown.
- Press **[CYCLE START]**. The tool will move forward, trigger the probe, then back away. Z+ is now calibrated.

Step 15 — Manual Calibration of X-



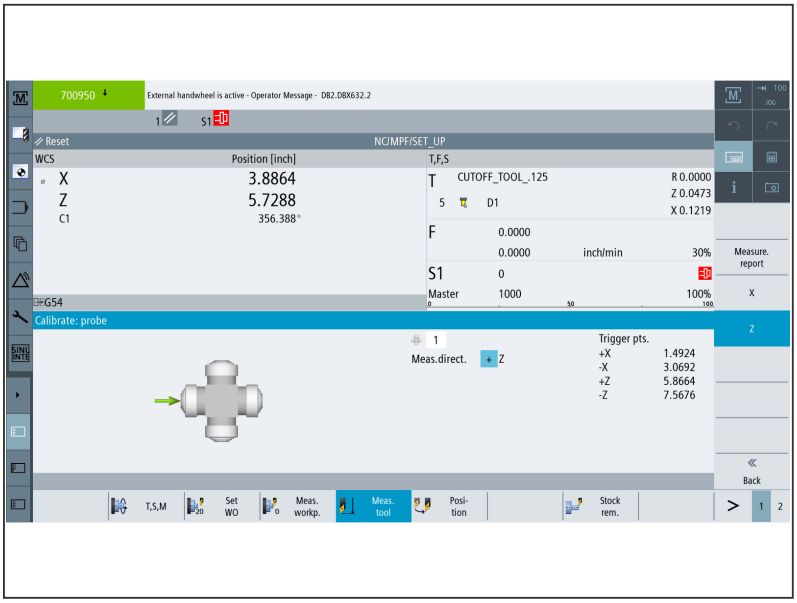
- Press **[X]** to begin X- calibration.
- Jog the tool so the tip is approximately ¼" from the bottom side of the probe button.
- Confirm the probe will move in the correct direction using the on-screen arrows or dropdown.
- Press **[CYCLE START]**. The tool will move forward, trigger the probe, then back away. X- is now calibrated.

Step 16 — Calibrate X+ Side of the Probe

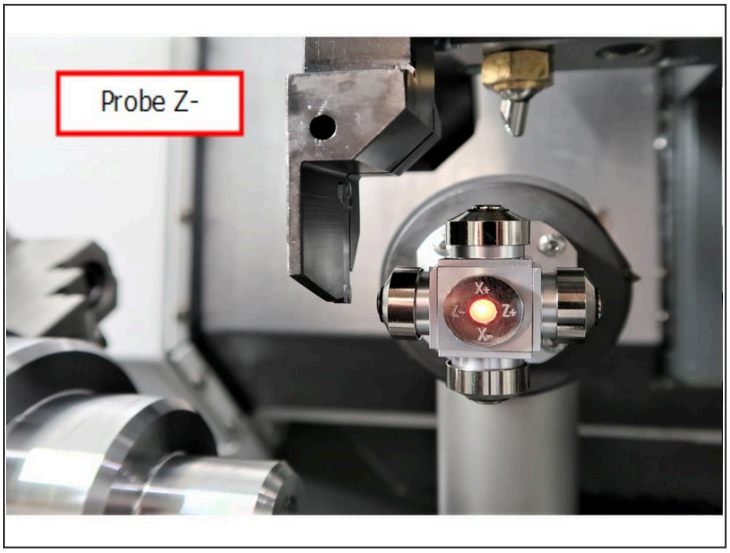
- Move the tool away from the probe to ensure clearance.
- Go to TSM and press **[TOOL LIST]** from the right VSK. Select the CUTOFF_TOOL_.125 (or your assigned cutoff tool).
- Press **[OK]**, then press **[CYCLE START]** to rotate the turret.
- Press **[MEASURE TOOL]** on the control.
- Press **[CALIBRATE PROBE]**.
- Press **[X]** to begin X+ calibration.
- Jog the tool so the tip is approximately ¼" from the top side of the probe button.
- Press **[CYCLE START]**. The tool will move forward, trigger the probe, then back away. X+ is now calibrated.

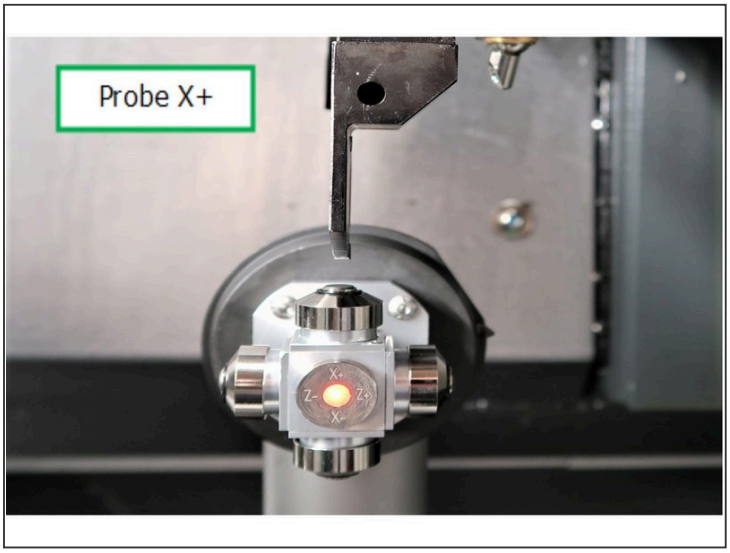
Step 17 — Calibrate Z- Side of the Probe



- Press **[Z]** to begin Z- calibration.
- Jog the tool so the tip is approximately ¼" from the left side of the probe button.
- Confirm the probe direction is correct using the on-screen arrows or dropdown.
- Press **[CYCLE START]**. The tool will move forward, trigger the probe, then back away. Z- is now calibrated.

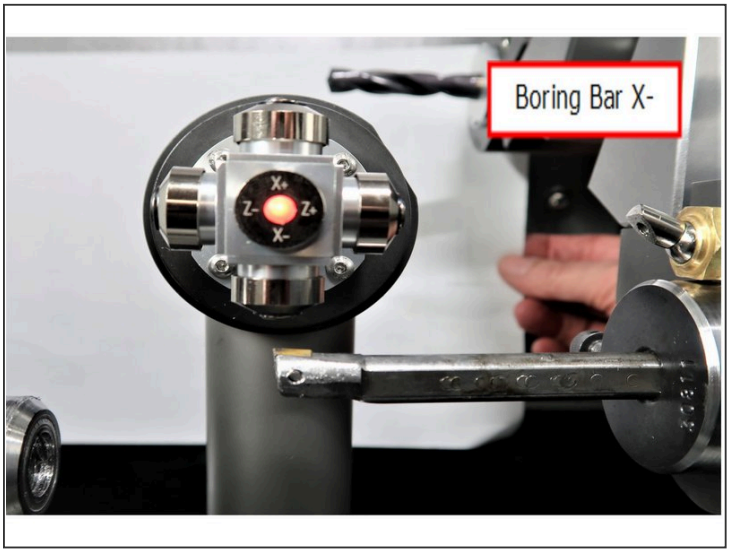
Step 18 — Automatically Calibrate Z- and X+ Offsets

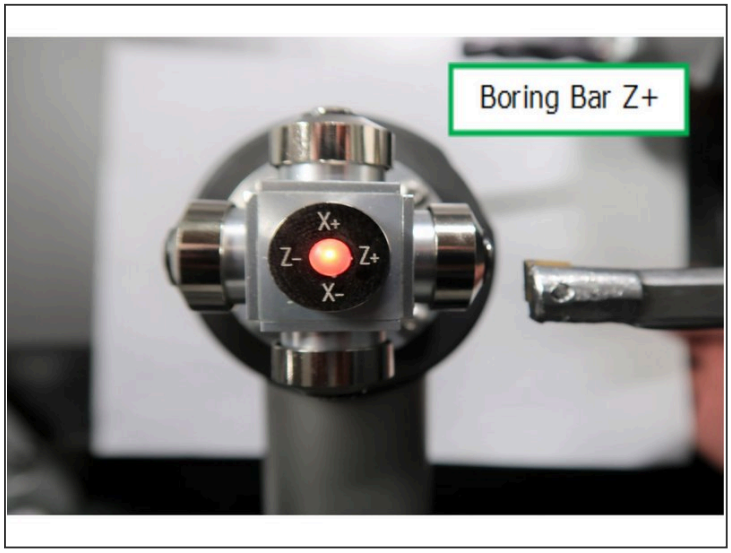




- Press **[BACK]** to exit manual mode.
- Press **[AUTOMATIC]** to enter automatic calibration mode.
- Press **[Z]** to begin. Jog the tool tip to about ¼" from the left side of the probe button.
- Press **[CYCLE START]**. The tool will touch the probe and move away. The Z value will not change. This confirms the tool offset.
- Press **[X]** next. Jog the tool tip to about ¼" from the top side of the probe button.
- Press **[CYCLE START]**. The tool will touch the probe and move away. The X value will not change. This confirms the tool offset.

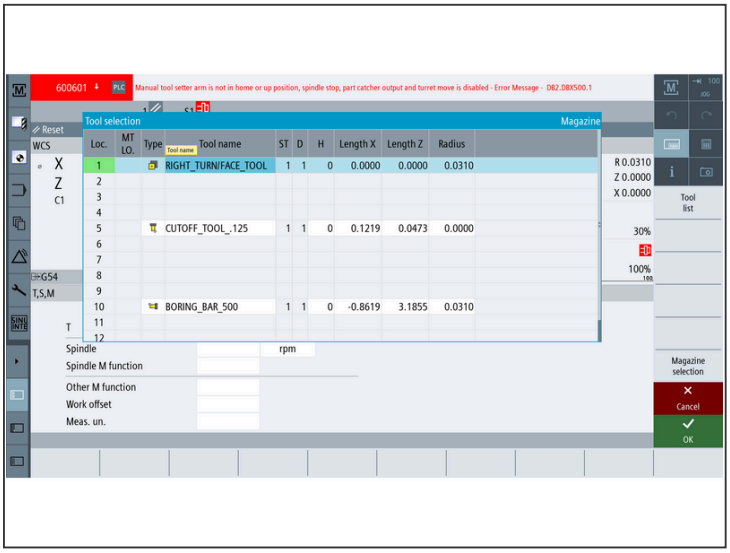
Step 19 — Automatically Calibrate X- and Z+ Offsets

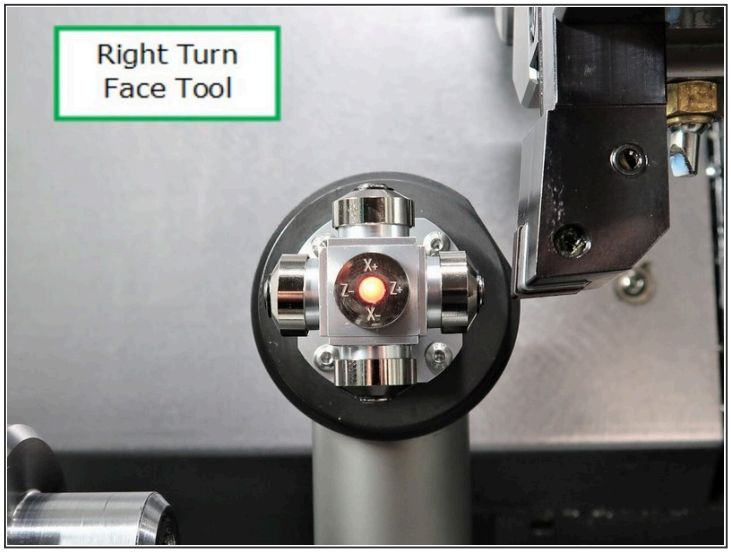




- Move the tool away from the probe to ensure full clearance.
- Open the Tool List and select BORING_BAR_.500 (or your assigned boring bar).
- Press **[OK]**, then press **[CYCLE START]** to rotate the turret.
- Press **[X]** to begin X- calibration. Jog the tool tip to about ¼" from the bottom side of the probe button.
- Press **[CYCLE START]**. The tool will touch the probe and move away. The X value will not change, this sets the machine offset.
- Press **[Z]** to begin Z+ calibration. Jog the tool tip to about ¼" from the right side of the probe button.
- Press **[CYCLE START]**. The tool will touch the probe and move away. The Z value will not change, this sets the machine offset.
- Press **[Back Button]** on VSK highlight back button

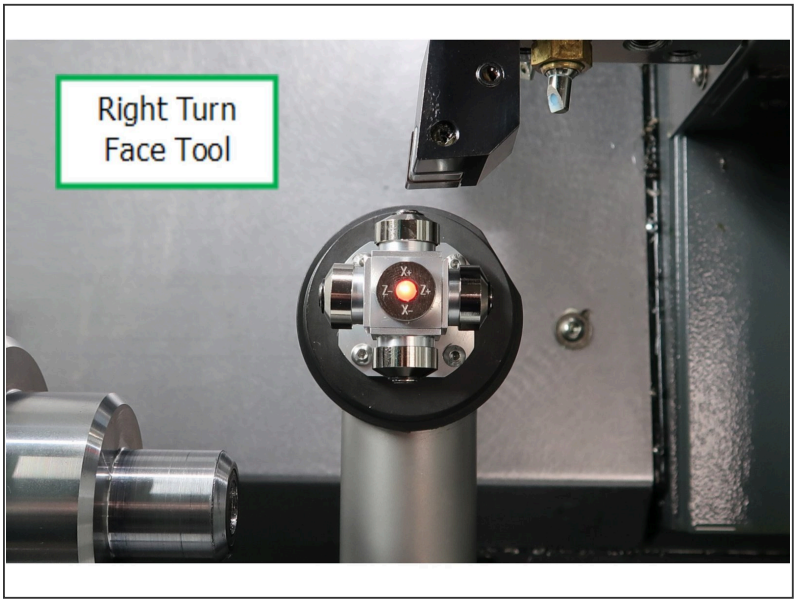
Step 20 — Select and Probe the Right Turn/Face Tool





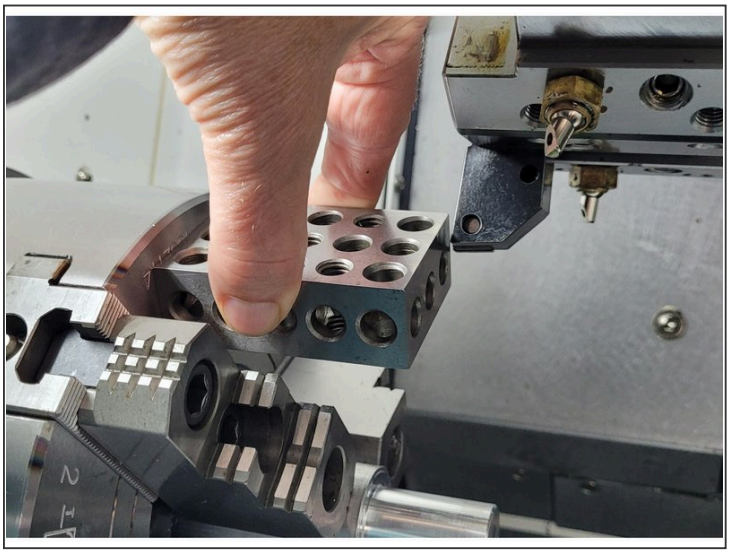
- Move the current tool away from the probe to ensure full clearance.
- Open the **[Tool List]** and select RIGHT_TURN/FACE_TOOL.
- Press **[OK]**, then press **[CYCLE START]** to rotate the turret.
- Go to measure tool and select automatic
- Press **[Z]** to begin Z- calibration. Jog the tool tip to about ¼" from the right side of the probe button.
- Press **[CYCLE START]**. The tool will touch the probe and move away. The Z value will now update to show the offset from machine Z zero.

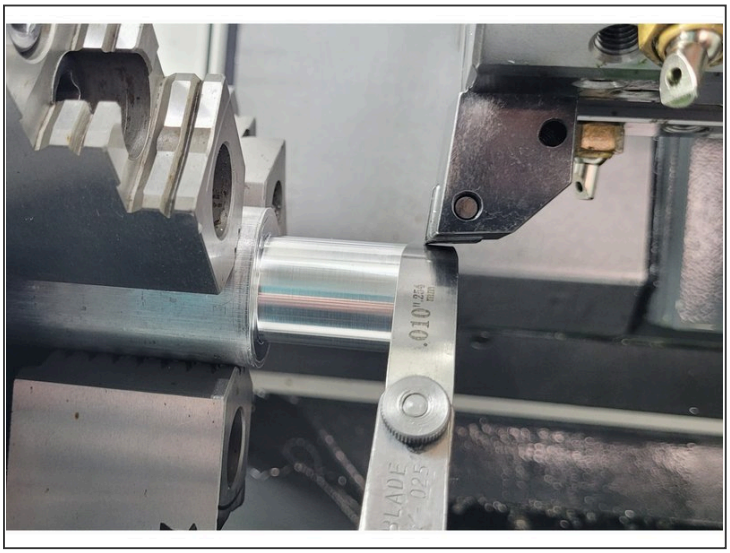
Step 21 — Calibrate X+ for Right Turn/Face Tool



- Press **[X]** to begin X+ calibration.
- Jog the tool tip to about ¼" from the top side of the probe button.
- Press **[CYCLE START]**. The tool will touch the probe and move away. The X value will now update to show the offset from machine X zero.

Step 22 — Verify Tool Offset Calibration





- Move the tool away from the probe so you can return it to its home position.
- Use a 3" Joe block between the tool and the chuck face (or spindle face). The Z value in TSM should read approximately 3.0".
- Use feeler gage to touch the diameter of the ground pin. The X value in the tool display should read approximately 1.020", assuming a 1.000" pin and 0.010" gauge.