OPERATING THE TORMACH PCNC440
V3
JANUARY 6TH - 2025

Langara.
MAKE THINGS BETTER
MAKERSPACE
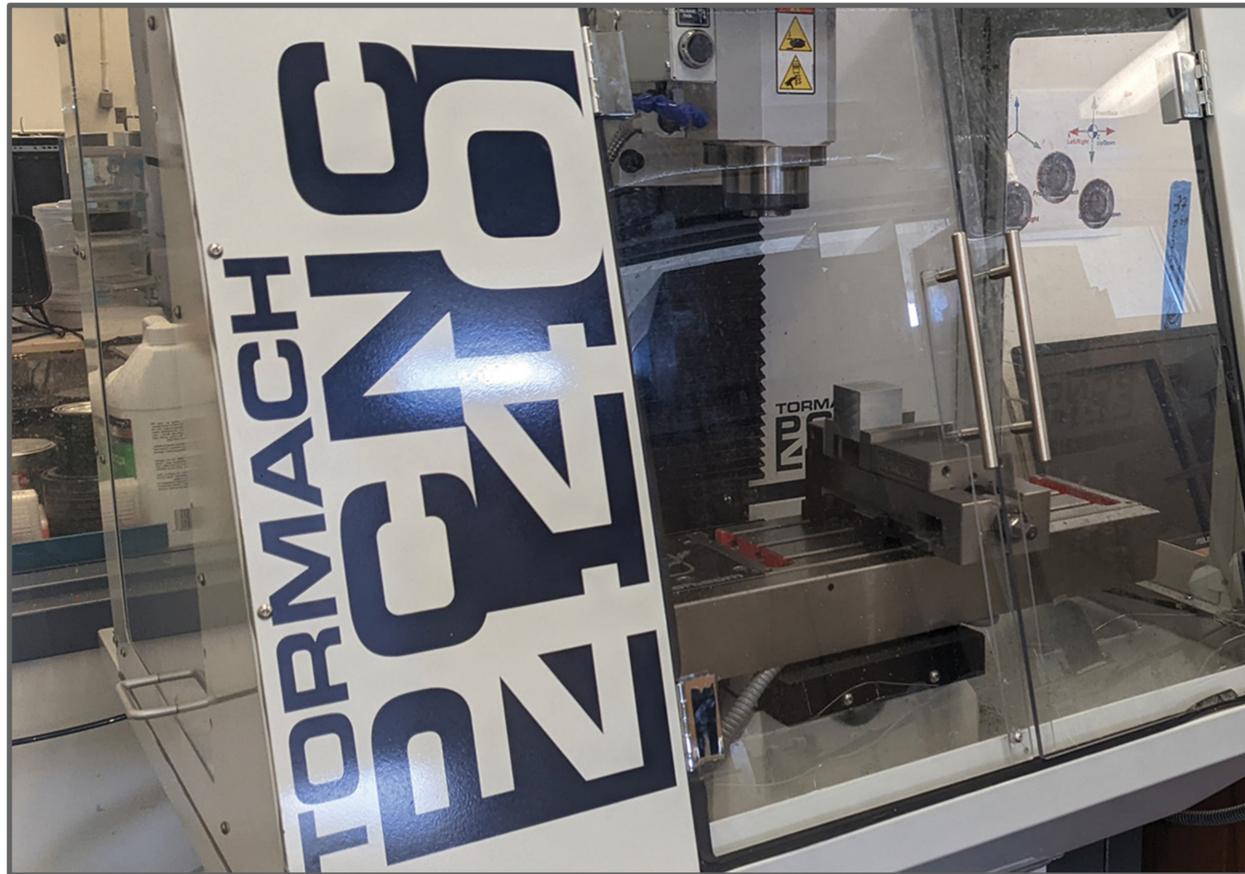
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Mounting Stock To The Tormach Bed

1a - Place a scrap piece of aluminum under the stock for the machine bits to drill into.

1b - Clamp the stock down on top of the scrap piece, but leave the clamps loose. Keep in mind where the clamps are in relation to where the machining head and bits will be traveling. Making sure there is clearance.

1c - Using the machining blocks, line up the back edge of the stock and scrap piece flush to the back edge of the Tormach bed. While holding the stock/scrap and block, tighten up the clamps.
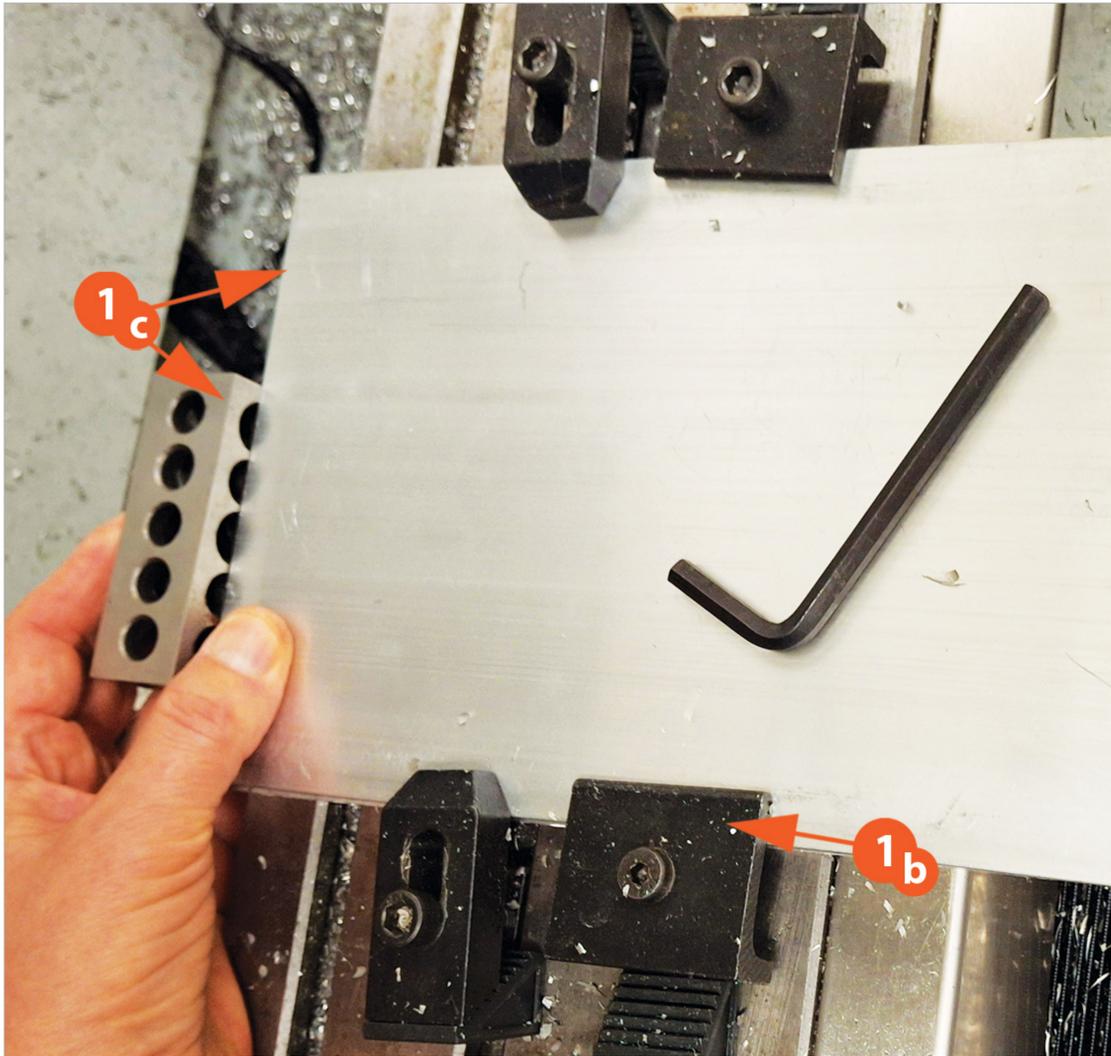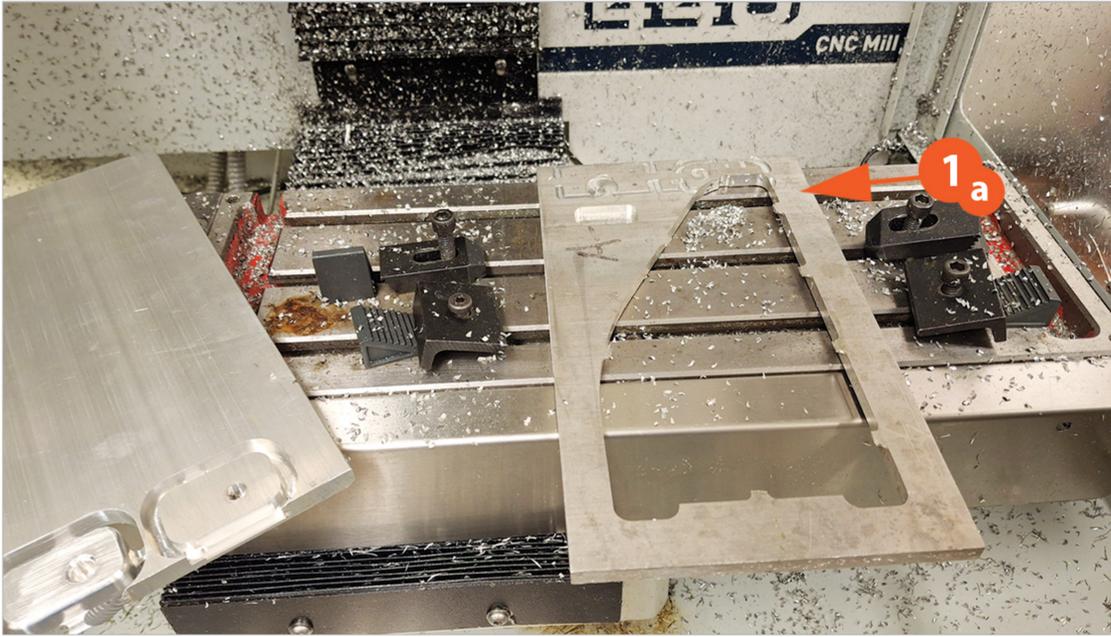
Mounting The Stock To The Tormach Vice

1d - Line up the vice around mid way on the bed. Using the machining block, make the end of the vice flush with the Tormach bed back edge. Then tighten the vice clamp bolts.

The maximum size of stock you can use is 3 7/8" (97mm) deep X 10" (255mm) wide X 5" (130mm) high/thick.

1e - Mount your stock a minimum of 1/2" (12.79mm) below the jaws top, and a minimum of 1/2" (12.79mm) above the jaws top surface.

1f - Use parallels to raise the stock up in the vice.
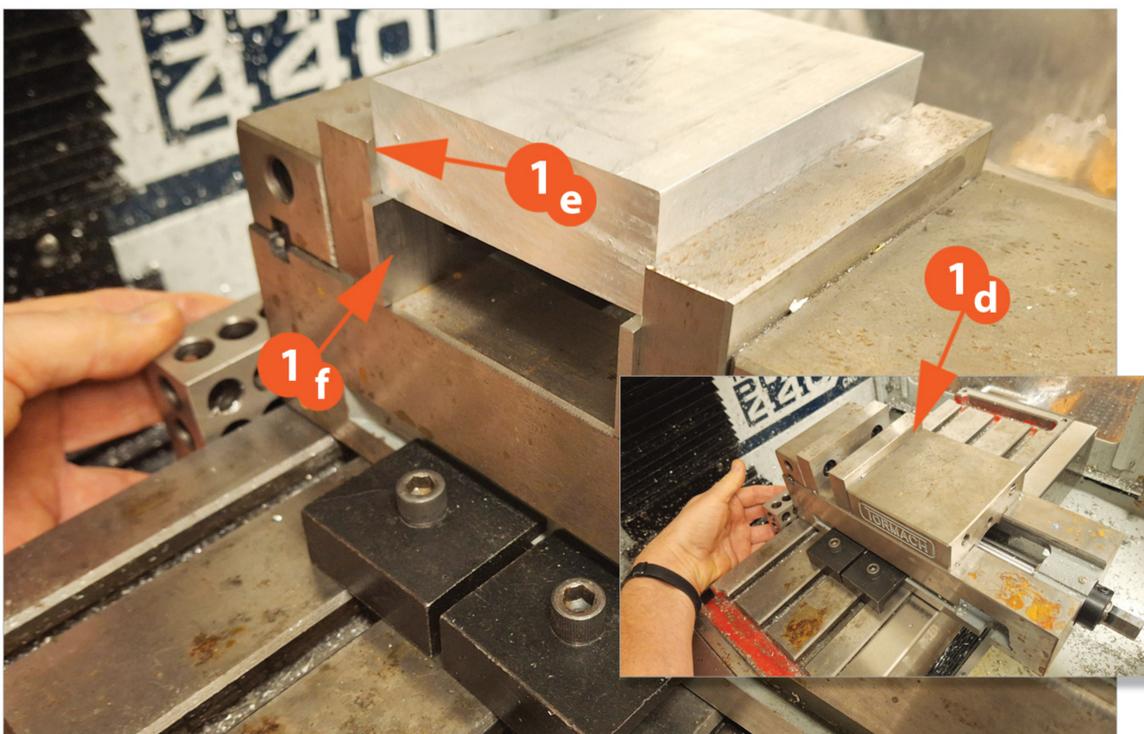
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Starting the Tormach PCNC440

2a - Turn the power bar on that powers the Asus monitor and Path Pilot controller.

Make sure everything is clear on the Tormach CNC, and nothing is obstructing the machining area. Close the doors.

2b - Make sure there is lots of fluid in the cooling container on the side of the Tormach. There is a bucket on the floor to fill from if it is low. The clear part simply unscrews from the blue top.

2c - Turn on the air supply to the Power Draw Bar (on the wall, next to the microwave). The Red Air lever should be pointed up. The air gauge should show 90 to 100lbs.

2d - Turn on the Tormach Main Power Switch located on the right side, near the back of the Tormach. Rotate so the switch is horizontal.

2e - Twist the Red Emergency stop button to the right (it will pop out).

2f - Push in, the now lit up Green Button.
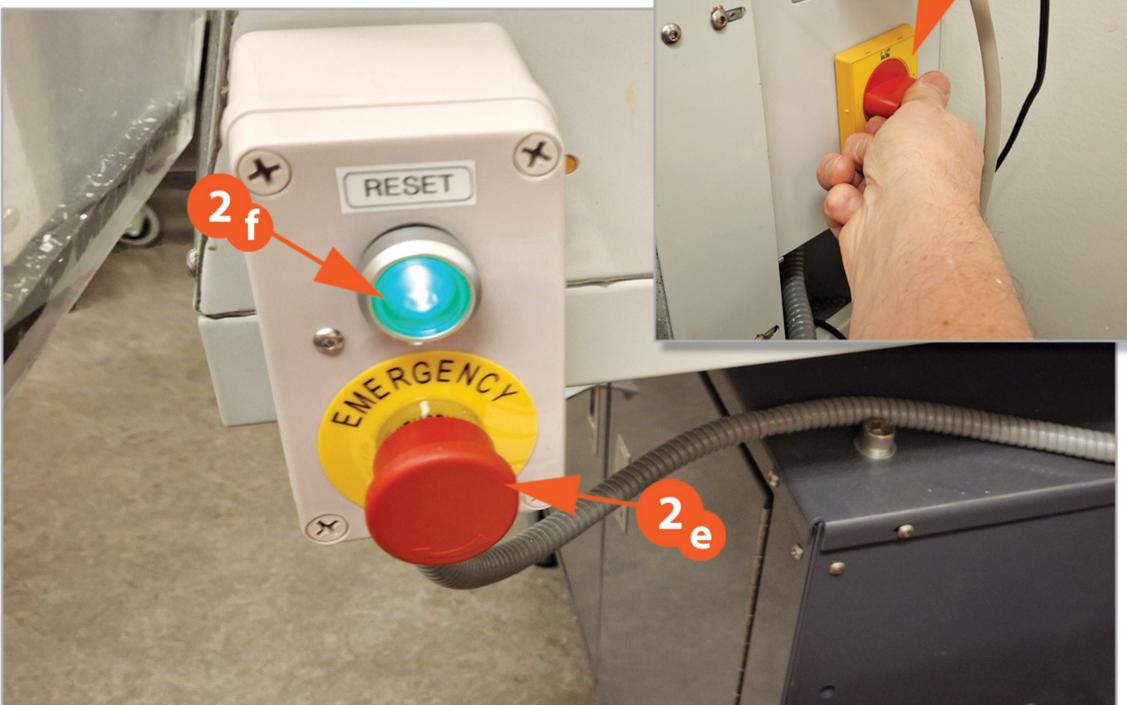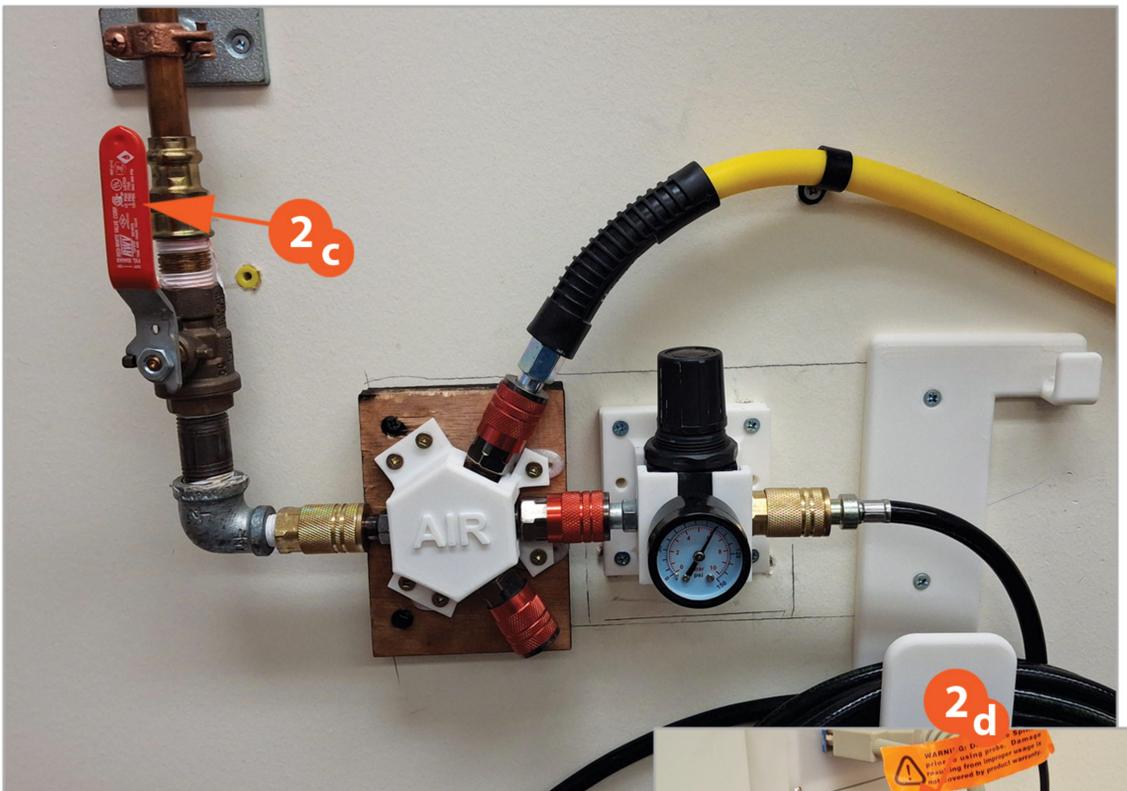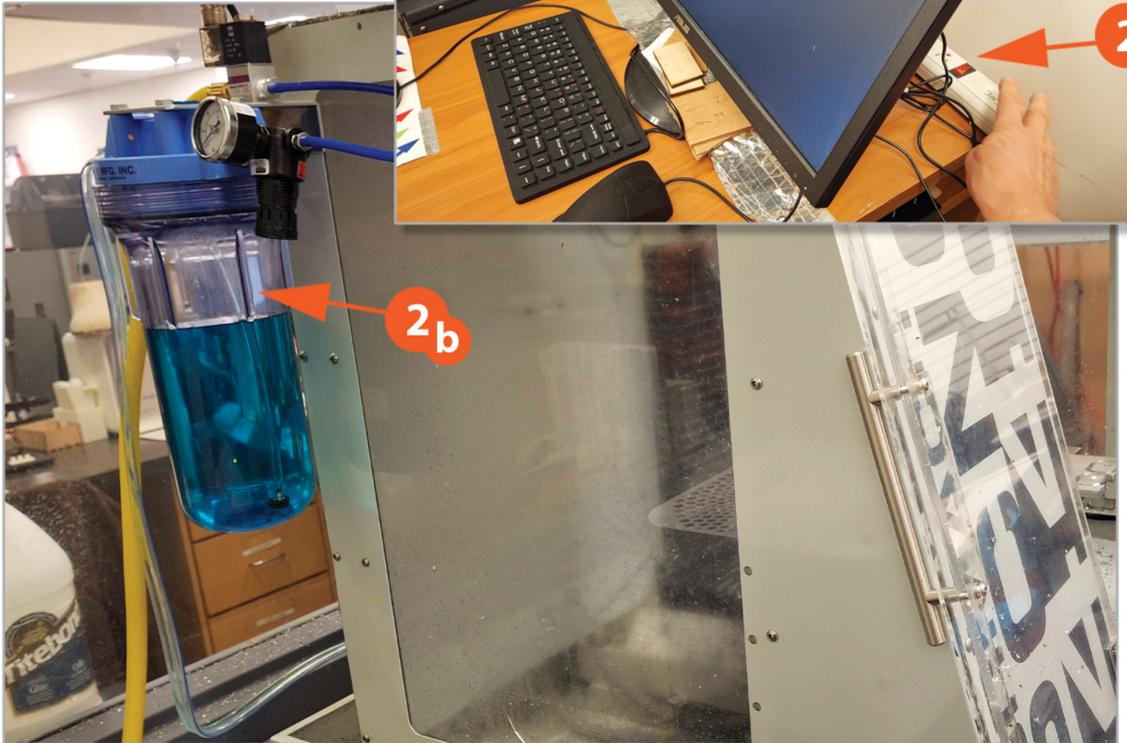
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PathPilot

Everytime you start up the Tormach you must reference the X, Y & Z axis.

3a - In PathPilot, on the Main tab....

3b - Click on RESET.

3c - Now click on REFERENCE Z.

3d - The machine will move to the Z Home position, if not already there. You will now see a 0.0000 and a green light in the DTG slot..

3e - Now click on REFERENCE Y.

3f - Now click on REFERENCE X.

3g - Once the machine has stopped moving, Click on the Probe/ ETS tab.

Installing The Passive Probe

We must now tell the machine where the G54 position is. This should be the same as the location of the X & Z you created using the World Coordinate System in your 3d/Machining software.

3h - Take the Passive Probe out of it's box and screw in the probe's tip.

3i - Push the Power Release button....

3j - While pushing the probe up and into the spindle.

3k - Run the probes wire down and towards the back opening. Grab the cable/plug from the outside rear opening and plug it into to its socket.

WARNING NEVER CLOSE THE DOORS WHEN OPERATING THE PROBE.
THIS TO INSURE THE HEAD DOES NOT START SPINNING THE SPINDLE AND PROBE.
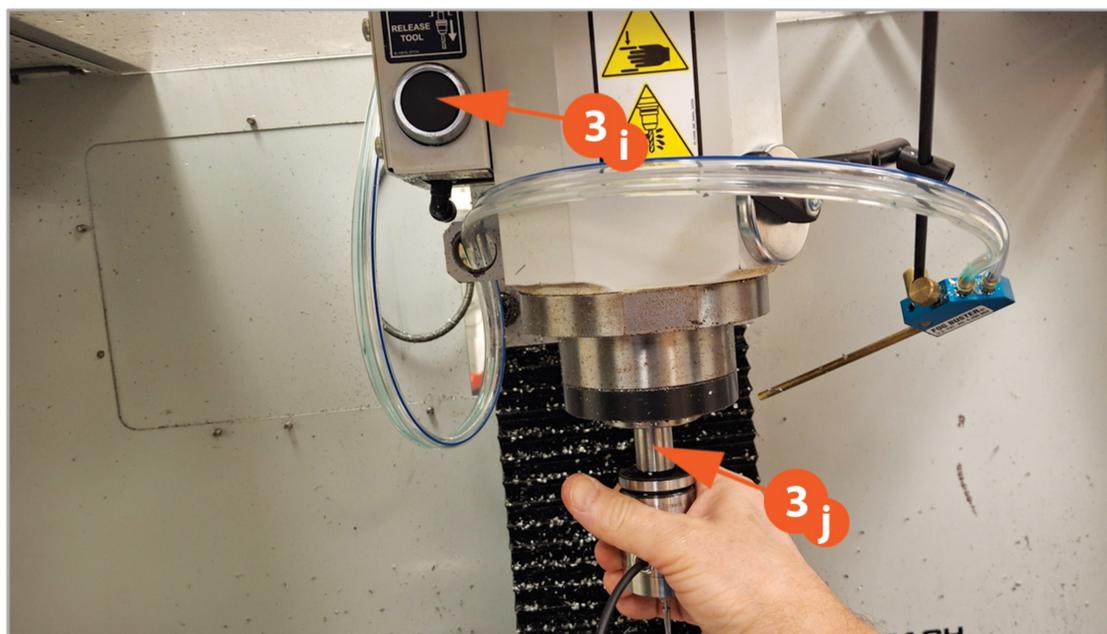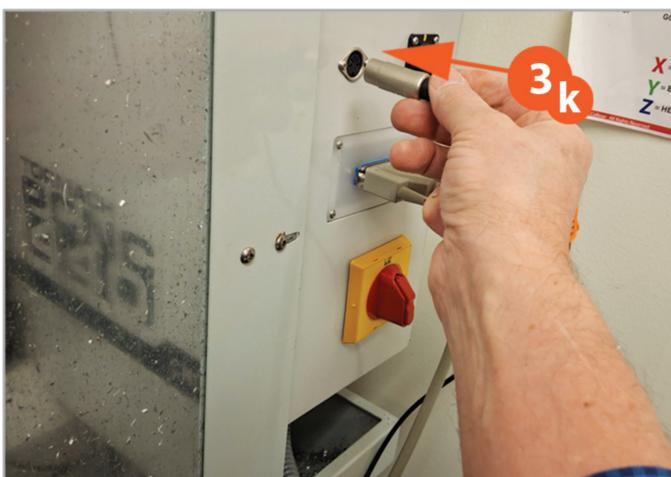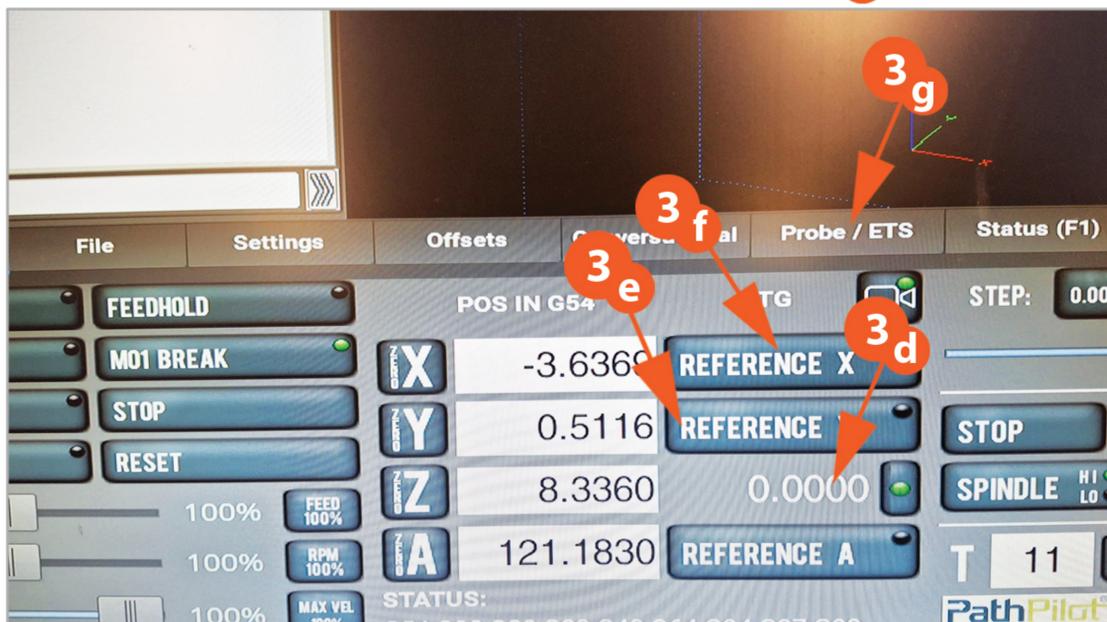
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Setting The G54 With The Passive Probe

4a - Type **99** into the T slot (Tool #) for the Passive Probe.

The G54 for this example is located at the back, top left corner. It is good to located the G54 there so the Passive Probe can reach the area.

4b - Using the Tormach Controller...

4c - Bring the Passive Probe over the stock, and just under 1" (25mm) away from its surface.

4d - Click the PROBE Z - SET WORK ORIGIN button. The probe will move and set the Z/G54.

4e - Using the Tormach Controller, position the probe tip to the left side of your stock, low enough so it can make contact with the edge of your stock. Locate it about 1/2" away from the edge.

4f - Click on the PROBE X+ SET WORK ORIGIN button. The probe will move and set the X/G54.

4g - Using the Tormach Controller again, position the probe tip to the back side of your stock, low enough so it can make contact with the stocks edge. Locate about 1/2" away from the edge.

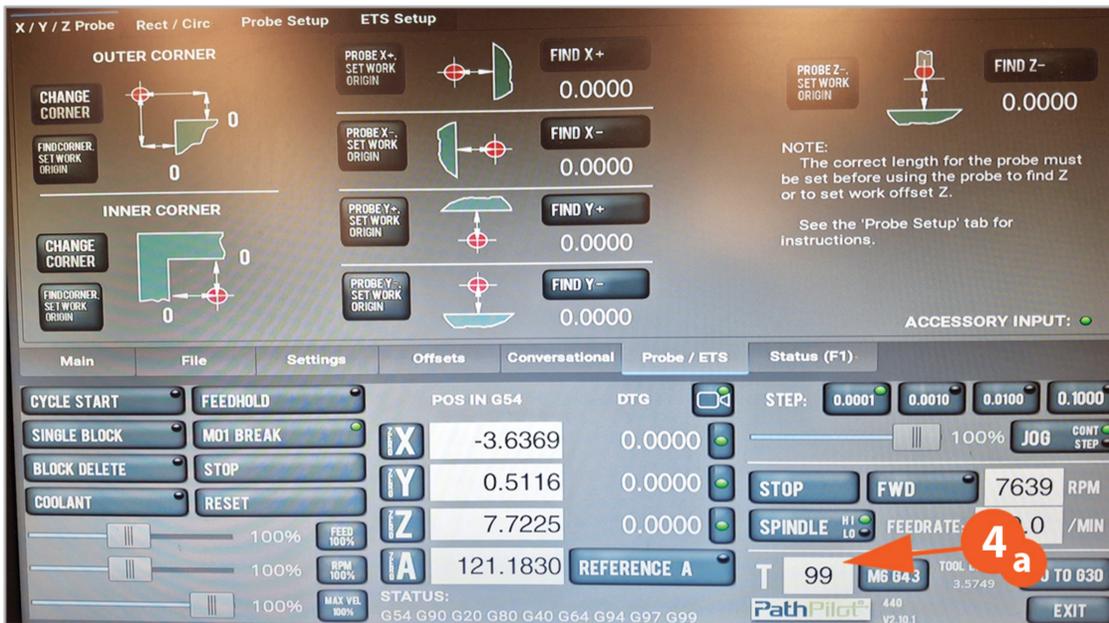4h - Click on the PROBE Y- SET WORK ORIGIN button. The probe will move and set the Y/G54.

Remove the probe's plug, then the probe. Unscrew the tip and put back in its box.
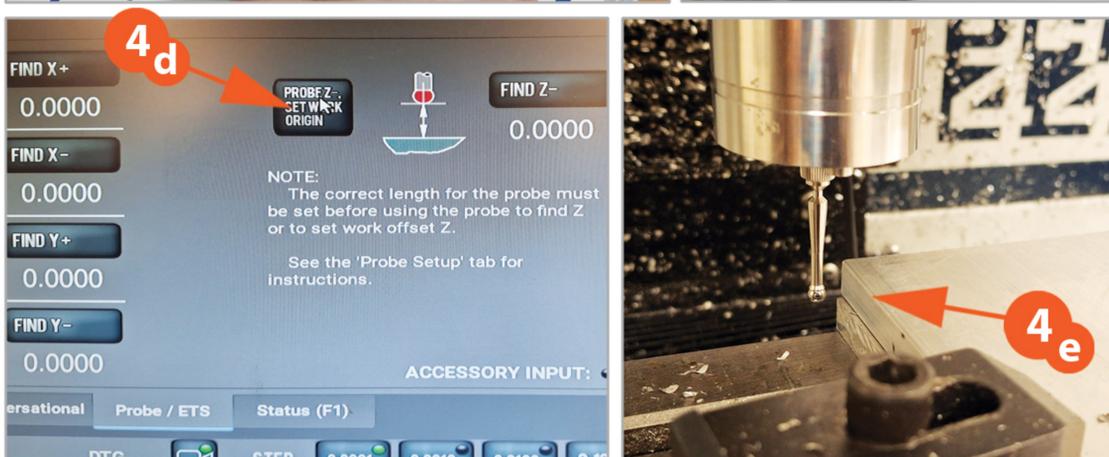
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Tool Offsets

Most tool offsets will already be set, but it is good to check them once in a while. You will also need to create the offset whenever you are using a new tool bit.

5a - Get the Digital Height Gauge controller from the top of the monitor.

5b - Get out the Digital Height Gauge from the purple case, as well as the stone block. Place the controller on top of the block.

5c - Plug the controllers cord into the controllers socket.

5d - Place the tool bit you want to measure into the stone blocks hole.

5e - Position the tip of the gauge down and onto the stones surface.

5f - Turn the gauge on.

5g - Click on the Offsets tab.

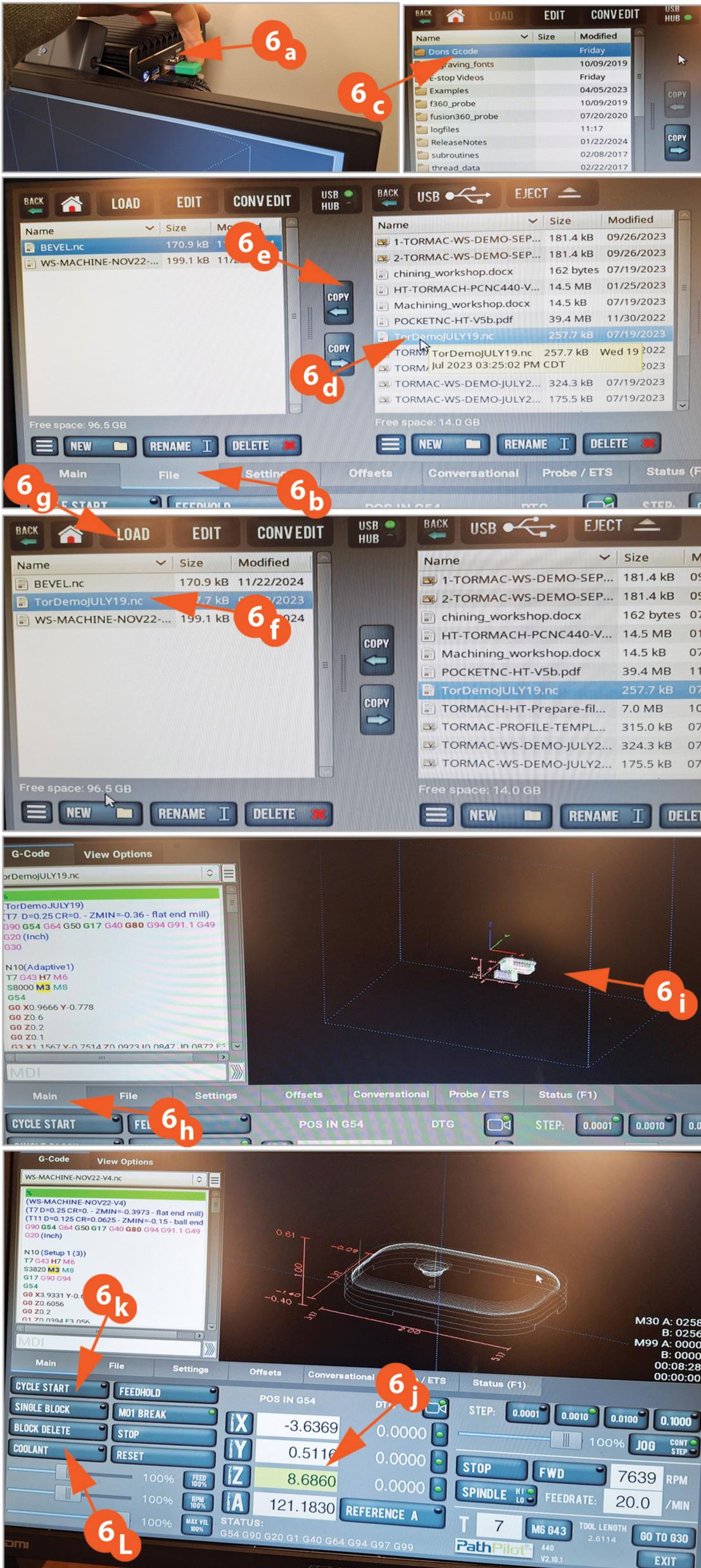5h - Enter the number of the tool in the T (Tool) slot.

5i - On the controller, click the Zero button.

5j - Now raise the gauge's tip up and onto the tool bits surface.

5k - On the controller, click the Data button.

5L - The offset is now set. You can click on the description slot and add a description. Press enter when done.

6

Loading Your File

6a - Insert your USB with your G-Code file into one of the USB slots on the PathPilot Box.

6b - Click on the File tab.

6c - Choose the folder you would like to copy your file to, or create a new folder for it.

6d - Select you file on the right side.

6e - Click on the Copy button.

6f - Now select your file on the left side.

6g - Click on the Load button.

6h - Switch to the Main tab.

6i - Your machining operations should all be inside of the blue line box. If they are not you will need to return to your 3D/Machining program and review the orientation of the operations as well as the G54.

6j - Record all of the numbers in the POS IN G54 slots with the T (Tool#) set to your bit onto the **Tormach Tooling & Setup Sheet**. Change the T# to any other bits you are using and record that Z number onto the **Tormach Tooling & Setup Sheet**. Also set the T# to 99 and record the Z number onto the **Tormach Tooling & Setup Sheet**.

6k - At this point I like to do a dry run. Make sure the Tormach machining area is clear. There should be no tool bits in the spindle. Close the doors.
Click Cycle Start, and then immediately...

6L - Click Coolant (to turn it off).

You should observe the paths, and clearances and make sure all looks correct at this point. There are some reference blocks to check tool bit clearances from the empty spindle head.
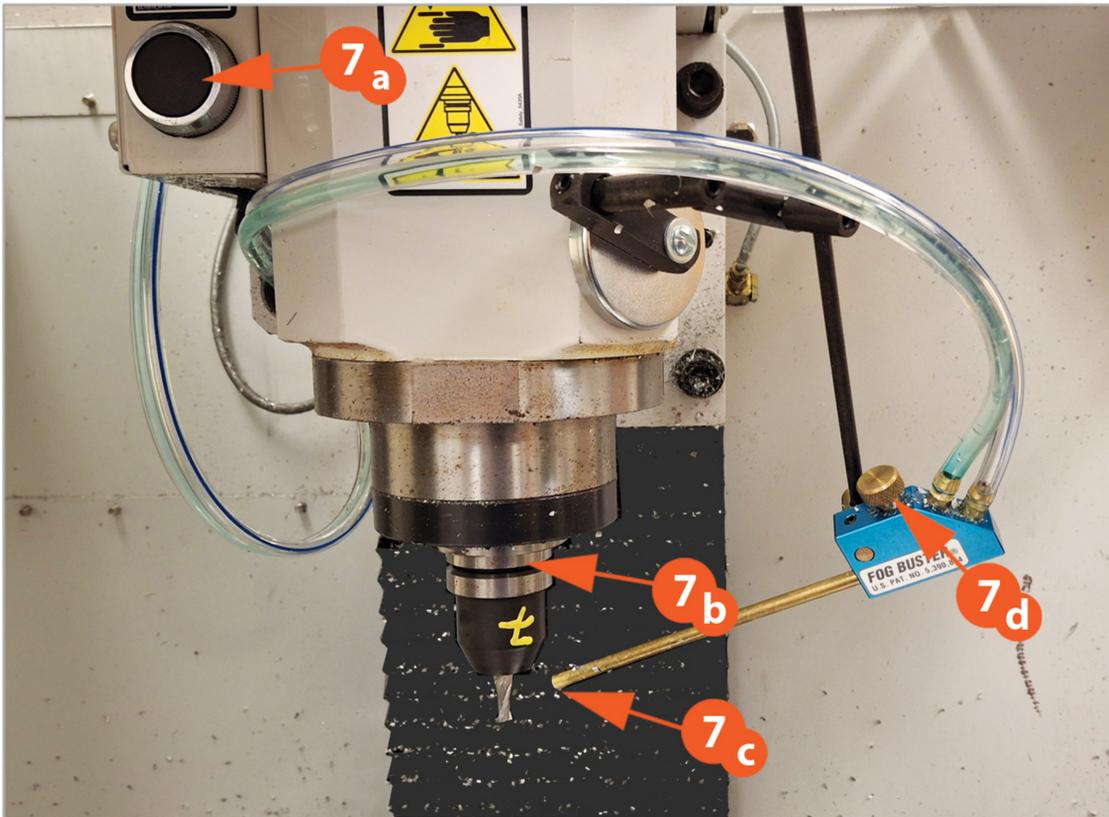
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Running Your File

7a - Push the Power Draw button in, and hold it in while...

7b - Insert the tool and holder, then let go of the Power Draw button.
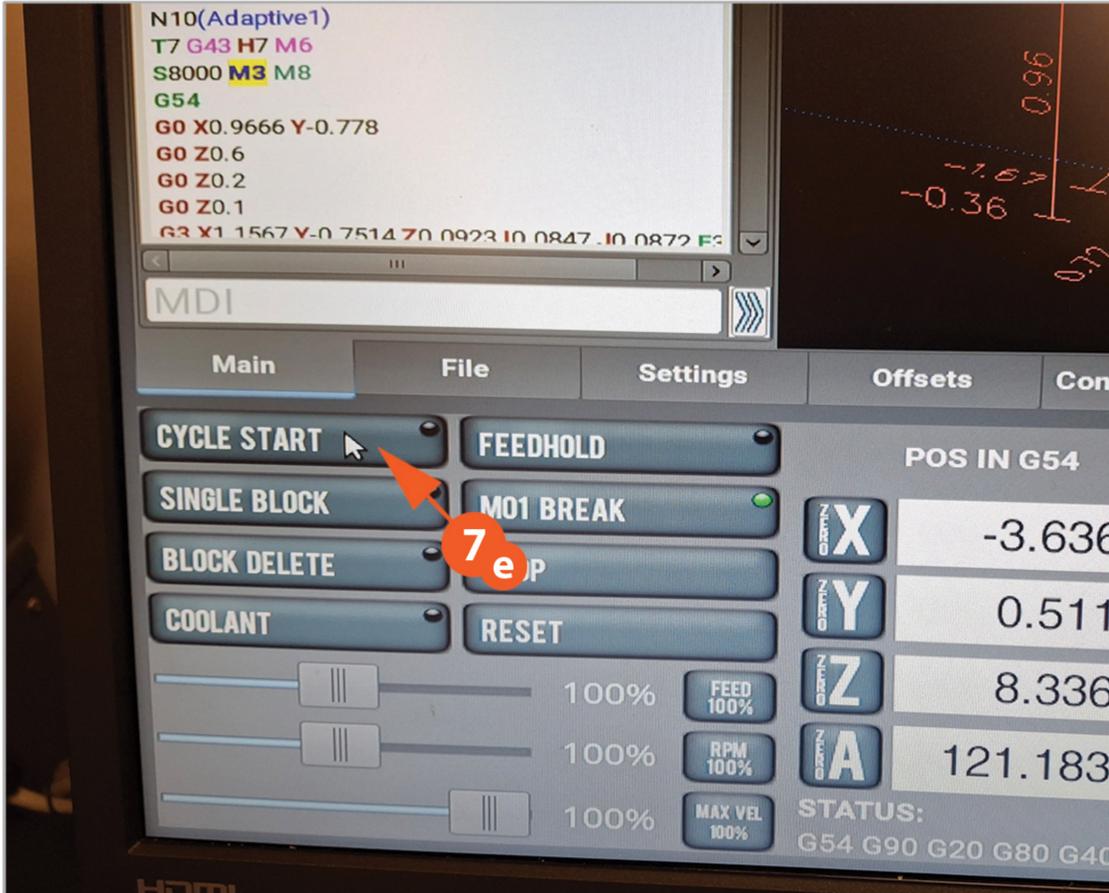
7c - Position the Fog Buster tip so it is lining up with the bit, but not to close that it could hit the stock while machining.

7d - The mist level can be turned up or down with the brass knurl knob.

Close the doors.

7e - Click Cycle Start.

7f - You should always stay and carefully watch the machining operations. Be ready to hit the **Emergency Kill Switch** if anything goes wrong.

IMPORTANT NOTE
You can open one or both of the doors at anytime to immediately pause the operation. Unlike the Emergency Kill Switch, this just pauses the operations and stops the spindle spinning. This works well if you want to do things like adjust the Fog Buster mist amount or change the spray tip direction. Also if you want to pause the machining to take a break.