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READ INSTRUCTIONS BEFORE OPERATING

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Touch Probe for Setting Lathe Tools

Measure Tools with Tool Touch Off Probe

1. For the tool touch off , we are using a 3D Touch Probe Model: TP06, DC: 5-24V, with three wires (see Figure 1).

AliExpress Link: The latest V6 anti-roll 3D Touch Probe edge finder finds the center of the desktop CNC probe compatible with mach3 and grbl (aliexpress.us)

FIGURE 1

2. The touch probe is held in our 6mm end mill holder (P/N 3076) (see Figure 2).

We replaced the probe tip with dial indicator extension and a flat contact point for a dial indicator.

Amazon Link: Flat Contact Points for Dial Digital Indicator Depth Gauge Thickness Gauge 4-48 UNF Thread 15mm Diameter 5mm Length

Amazon Link: Dial Digital Indicator Extension Stem Rod 4.5mm Diameter 4-48 UNF Thread 10mm to 105mm Long by Assembly (4-48 UNF Thread)

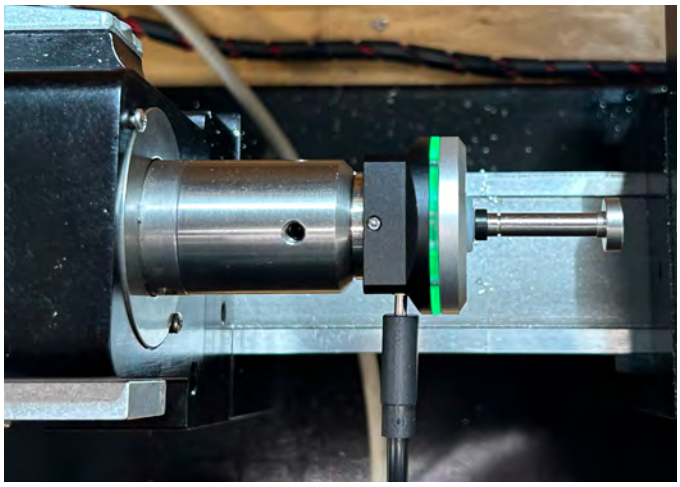

FIGURE 2

3. You connect the three wires from the touch sensor to the 9400 controller box using the DB9 connector that goes into the Aux Tool Setter / Touch Probe DB9 (see Figure 3).

A. Probe Wires to the DB9 connector as follows:
Touch Probe Wires ---To --- DB9 Wires
Red ---To --- White Wire on Pin # 2 (which goes to IN6 on Acorn board)
Yellow ---To --- Yellow Wire on Pin # 3 (which goes to IN7 on Acorn board)
Black ---To --- Black Wire on Pin # 9 (which goes to Common Ground)

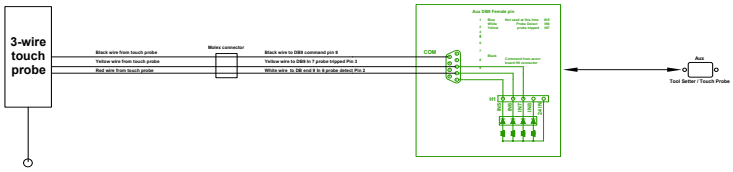

FIGURE 3—The complete schematic file can be found ***here***

B. Plug the touch probe wire into the side of the touch probe. The green light on the touch probe should come on if it is wired correctly (see Figure 4)

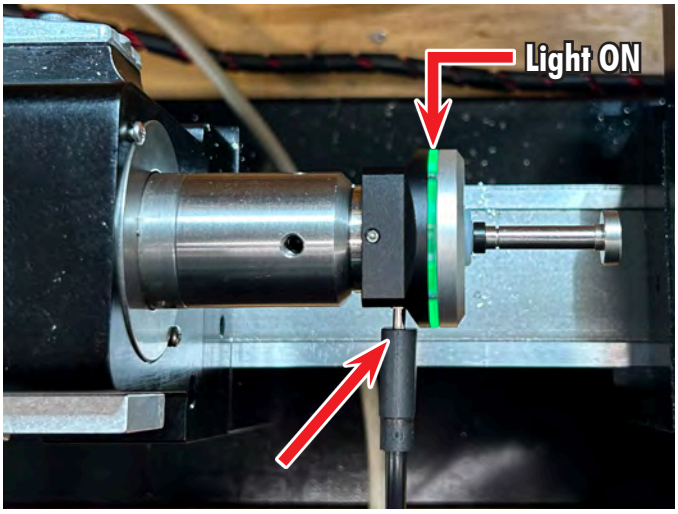

FIGURE 4

4. Once you verify that you have power to the touch probe, you need to check the setting in the Acorn Wizard. Click on Utility F7, Acorn Wizard.

   A. Click on "Input Definitions". Then from the Lathe list drag "Probe Detect" to IN6 and "Probe Tripped" to IN7 (see Figure 5).

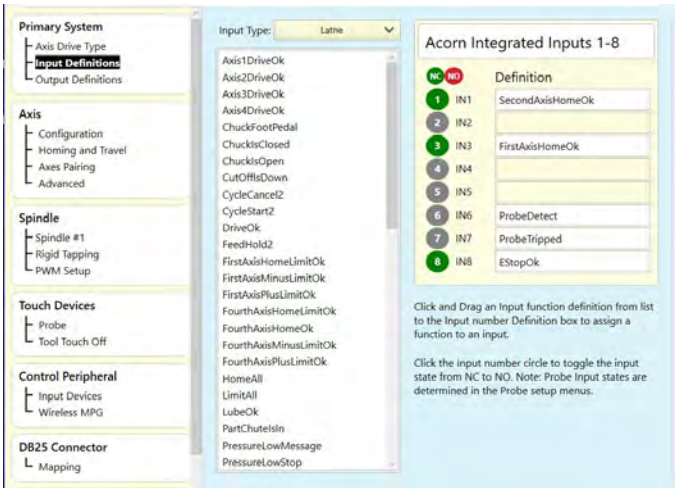

FIGURE 5

B. Click on Probe and input the values shown below (see Figure 6).

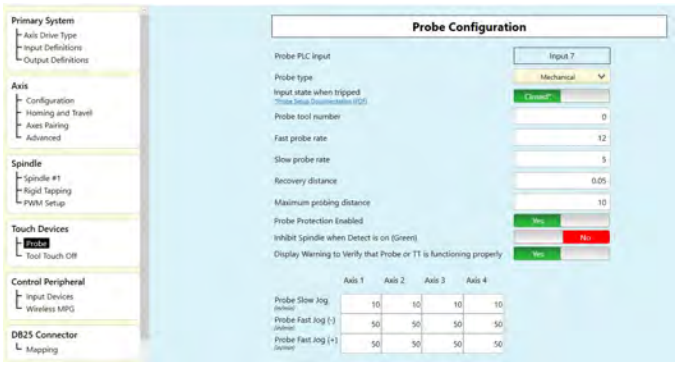

FIGURE 6

C. Click on "Tool Touch Off" and input your probe information. The picture below represents our probe dimensions (see Figure 7).

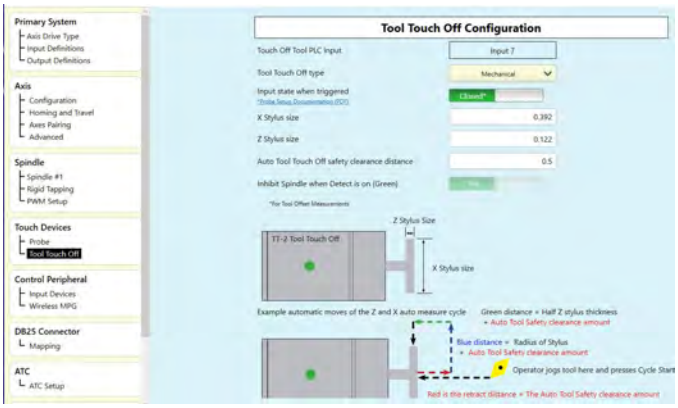

FIGURE 7

NOTE: Our actual X Stylus Size was .392. When we entered the stylus diameter of .392, the tools went past the part centerline (X0.0) when commanded in MDI (see Figure 8)

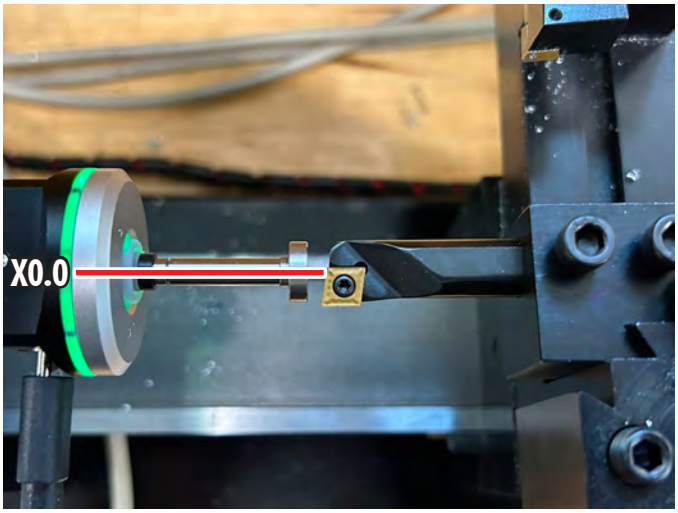

FIGURE 8

To fix this, we entered the stylus Radius instead of the Diameter and that fixed the problem. We also have parameter 55 set to (0) for Diameter (see Figure 9).

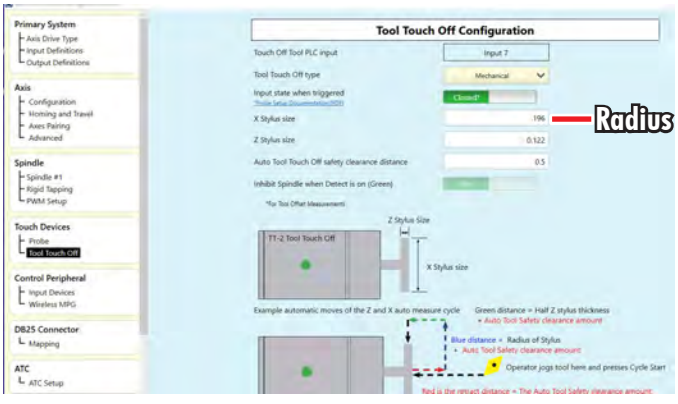

FIGURE 9

5. Now we are going to check to see if the control is receiving a signal from the touch probe. On the key pad, press (Alt I) and the Input screen will show on the control (see Figure 10).

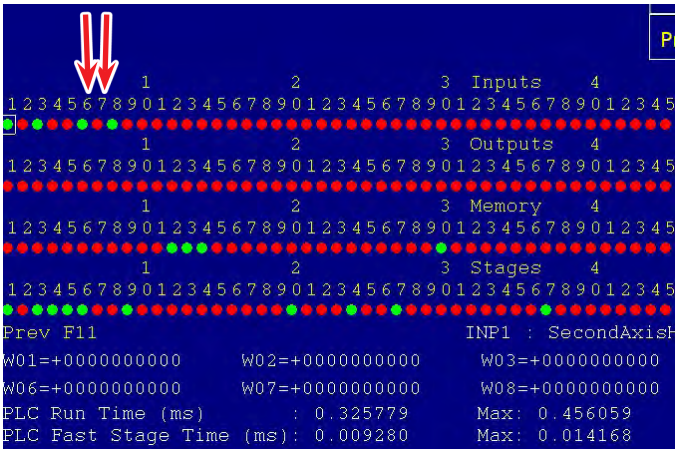

FIGURE 10

A. With the Input screen up, if the touch probe is connected and there is power to the probe, Number 6 should be Green.

B. When you activate the touch probe by pushing on the tip, Number 7 should change from Red to Green.

C. To turn off the Input Screen, type (Alt I) again.

6. As stated earlier in these instructions, I like to tell the control which tool I am currently using. Click on MDI F3. Enter the tool that you are using (in our case "T0202"), Click on Cycle Start. The control screen should show the tool that you entered (see Figure 11).

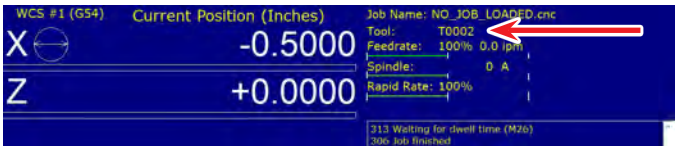

FIGURE 11

7. Now we are ready to touch off the tools.

A. Jog the tool so the cutting tip is approximately at the center of the stylus in the X-axis. Then Jog to a clearance point in the Z-axis (about 1/2" in front of the stylus) (see Figure 12).

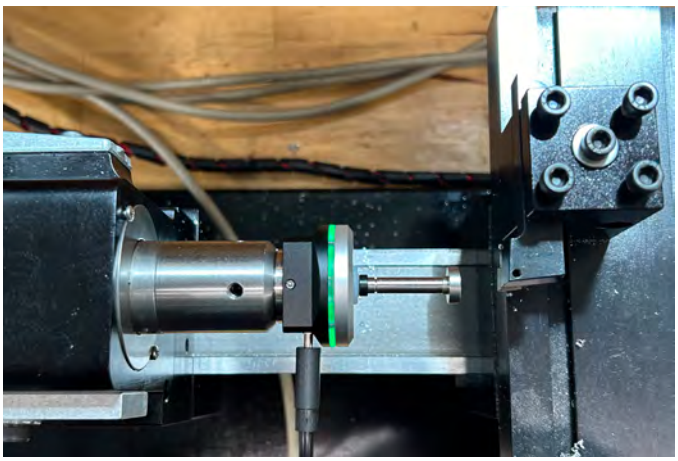

FIGURE 12

B. Click on Setup F1, Tool Offset F2, Highlight the tool / Axis Z, Measure Tool F2, Measure Z & X F7 (see Figure 13).

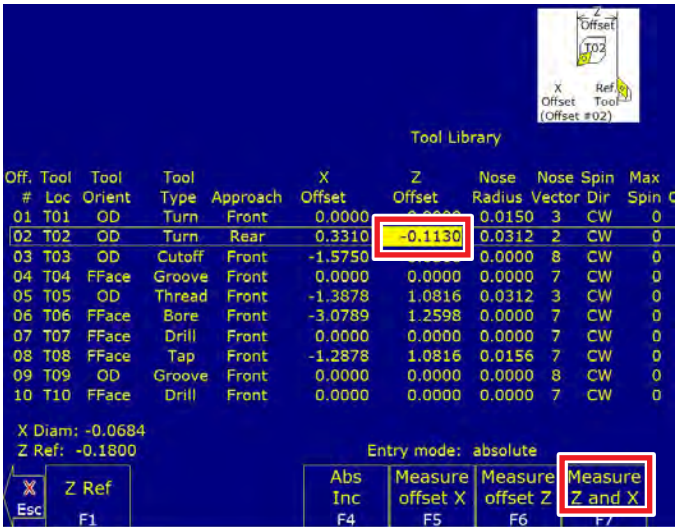

FIGURE 13

C. At this point.a box will come up and ask you if need to "Change the X Direction". This is the direction that the tool is going to move in order to touch the probe. If the direction is correct, you click on Cycle Start to begin the tool touch off program. If you need to change the X direction, click on "Change X Direction F1. This will change the X direction. Then click on Cycle Start (see Figure 14).

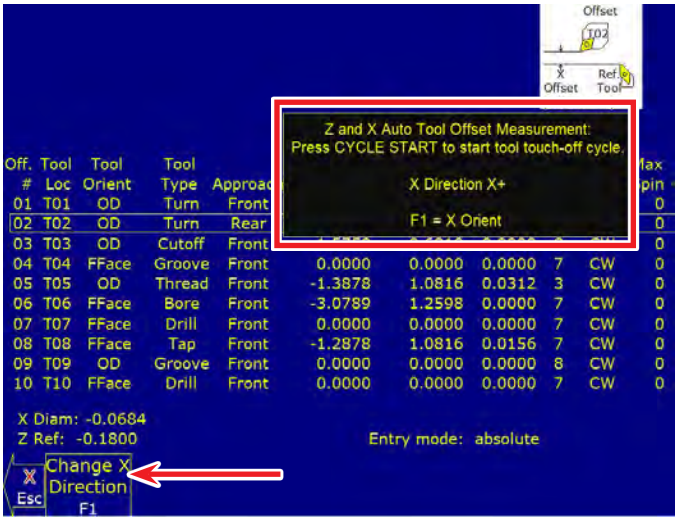

FIGURE 14

D. After you click on Cycle Start, the tool will move toward the probe and touch off in the Z-axis first, and then the X-axis as shown on the probe setting page (see Figure 15).

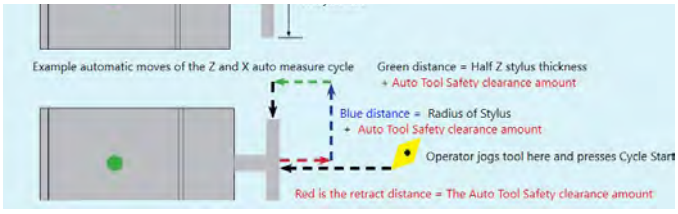

FIGURE 15

E. After the tool has touched off on the probe click on “Save F10” to save the setting to the tool offset page.

If you try to leave the tool offset page the screen will ask you if you would like to save the changes, click F1=Yes (see Figure 16).

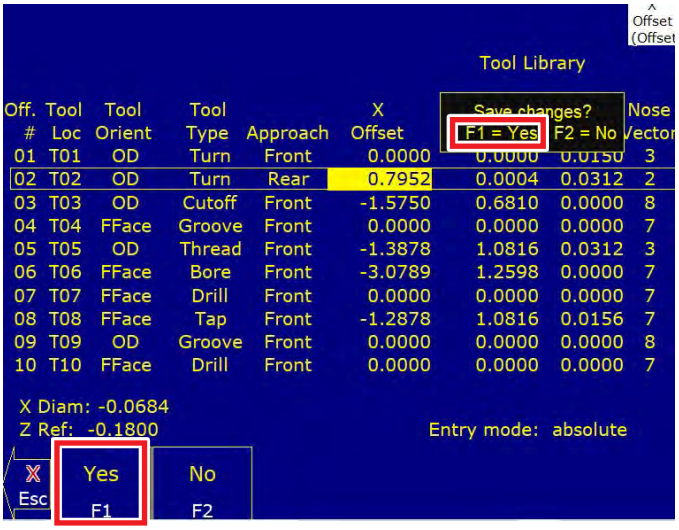

FIGURE 16

8. Now we are going to use our reference tool (tool #2 for these instructions) to set the “Z Ref” on the tool touch probe.

A. Click on Setup F1, Tool Offset F2, then highlight the tool / axis (Z).

B. Click Z Ref F1 (see Figure 17).

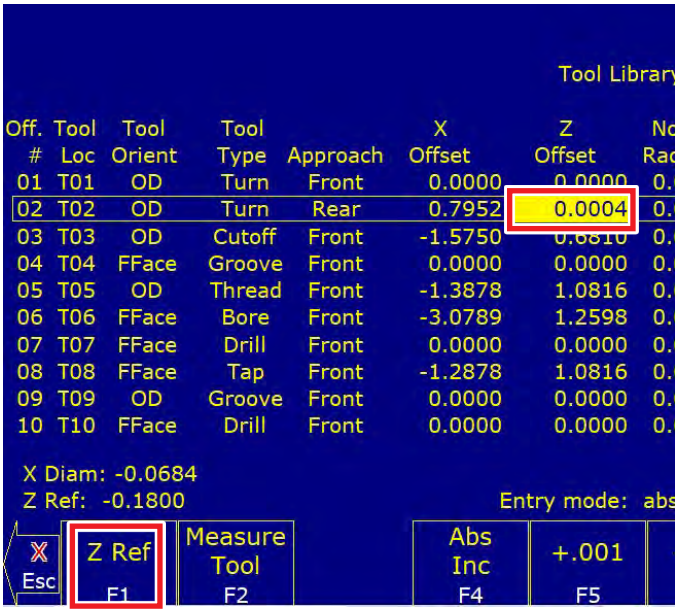

FIGURE 17

C. Click on Z Ref Auto F1. Then click on Cycle Start (see Figure 18).

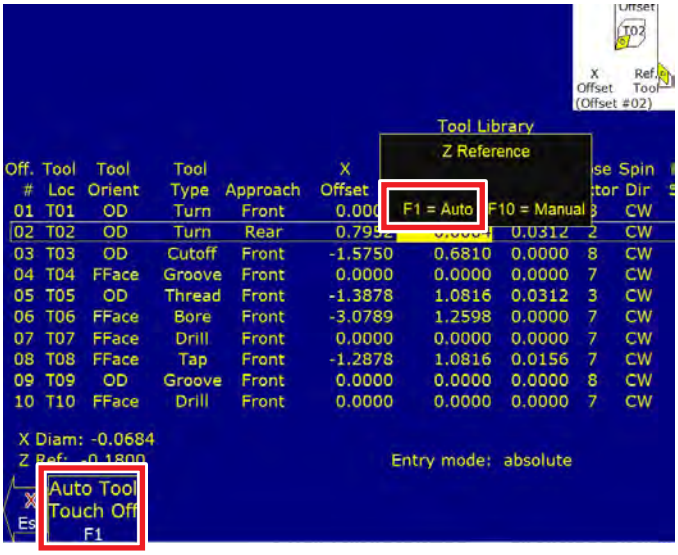

FIGURE 18

9. Now we are going to set the Part Zero in Z and X-axis.

A. Mount your part in the chuck or collet with it extended away from the collet by the correct distance.

B. Again we will be using our Reference Tool to set the part zero (tool #2 for these instructions).

C. Jog the tool up to the front of the part until it touches.

D. Click on Setup F1, Part F1.

E. Set the “Part Position” to (0.0000). Set the tool # to tool 2 (Ref Tool). Then click on Set F10 (see Figure 19).

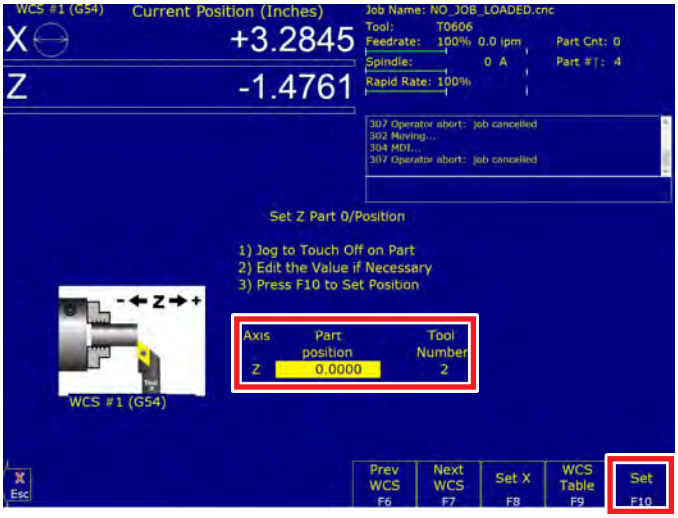

FIGURE 19

F. Once the Z is set we will now set the X Zero. Click on “Set X F8” (see Figure 20).

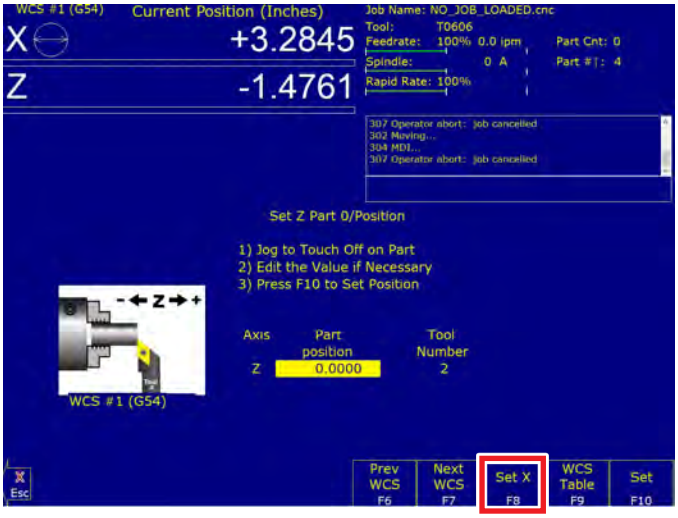

FIGURE 20

G. Jog the tool into position to touch the diameter of the part. Our part is .500” diameter. Our tool is on the backside of the part. For our tool on this part we will be setting the X-axis at (-0.5000) Part Position, Tool Number 2, and “Yes” for Set All WCS. Then click on Set F10 (see Figure 21).

NOTE: If our tool was a front side tool we would have set the Part Position at (0.5000).

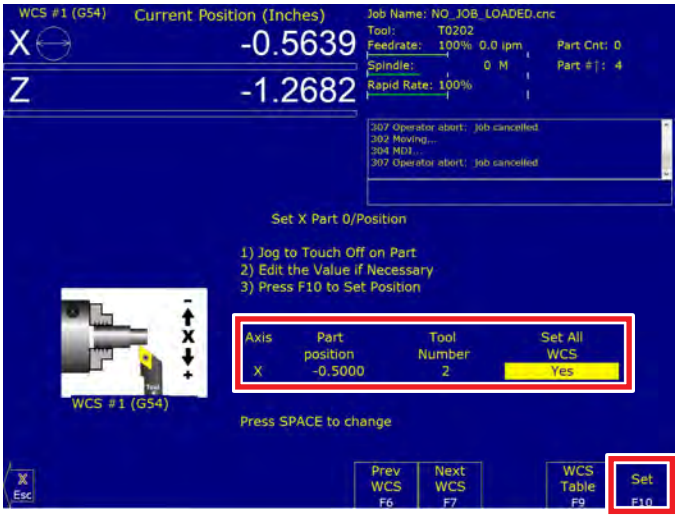

FIGURE 21

10. Now your reference tool is set. Your reference tool is set to the tool touch probe. Your Z and X Reference are set, and your Part Z and X zero are set.

    Follow the instruction in #7 to set the rest of your tools using the tool touch probe.

11. Touching off a boring bar.

    A. The boring bar in the picture below will be described as a “front side” tool on the tool offset page. When it is cutting it will be cutting on the X+ side of the part centerline. However, in order to touch off this tool on the tool touch probe, you will need to touch off on the X- side of the touch probe and tell the control to move this tool in the (X+) direction when it touches off (see Figures 22, 23, and 24).

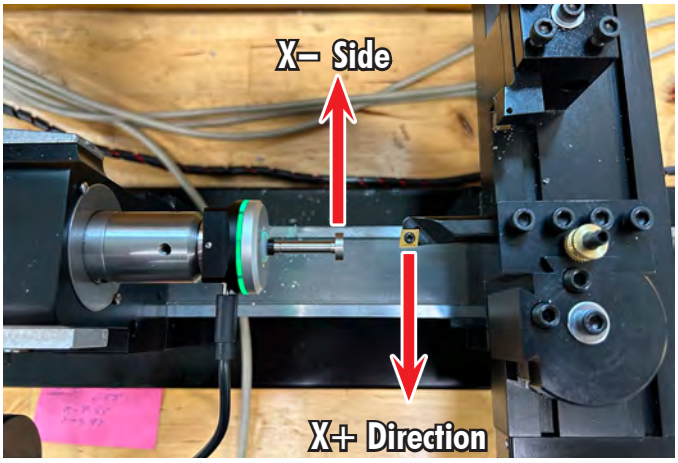

FIGURE 22

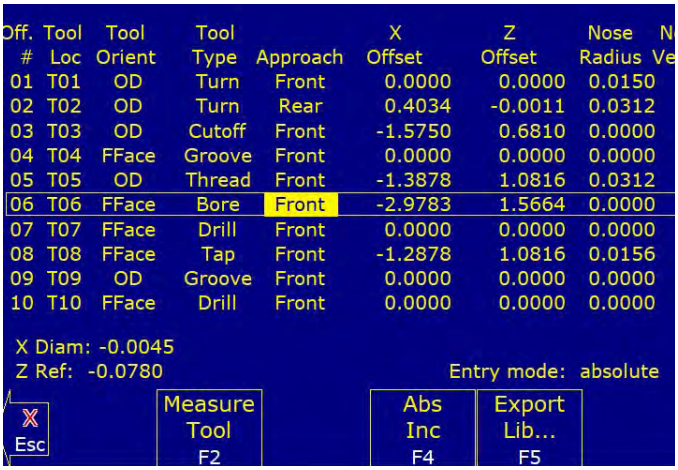

FIGURE 23—Boring tool front.

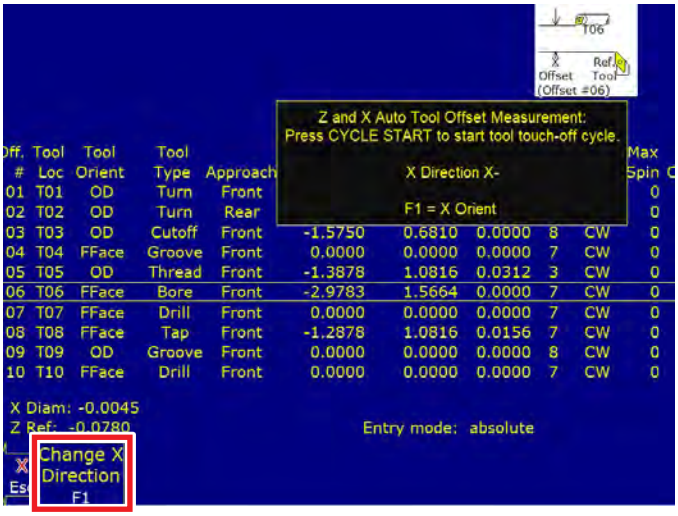

FIGURE 24—Boring Tool, Change Direction to X+.

B. The boring tool will now touch off on the touch probe as shown below (see Figure 25.

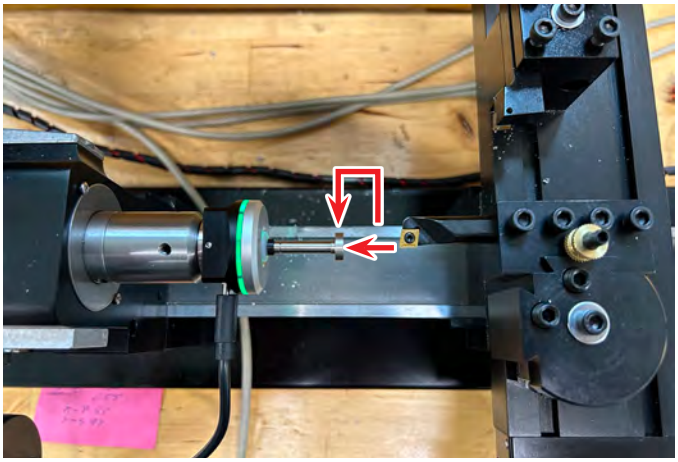

FIGURE 25

Intercon with Gang Tooling

Now, we will make a simple bolt with just two tools: one OD Turn tool, which will approach from the rear, and a cut-off tool, which will approach from the front.

Keep in mind that if the primary orientation is front, a tool with an orientation from the rear has to be programmed with negative X values. So, it is obvious that you cannot use two tools in one cycle with different orientations. The roughing and finishing tools must either be front or rear.

NOTE: You can manually change the X coordinates in the intercom program of a rear side tool to Negative values. Then you can use both front and rear side tools as rough and finish tools.

Here, I used Pre/Post Cycle Pos. for approach and retract (see Figure 26).

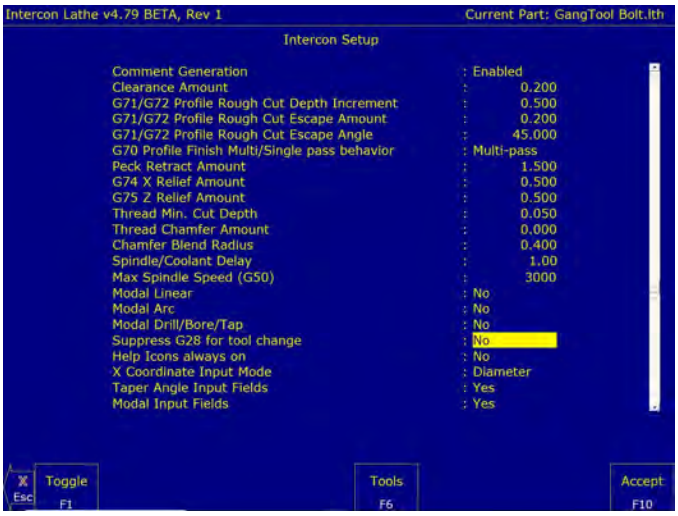

FIGURE 26

You can see in the rapid moves that they are not crossing the part; there should be enough space for the tools while rapidly moving to the part. Make sure that the longer tools do not move into the chuck while turning with other tools (see Figure 27).

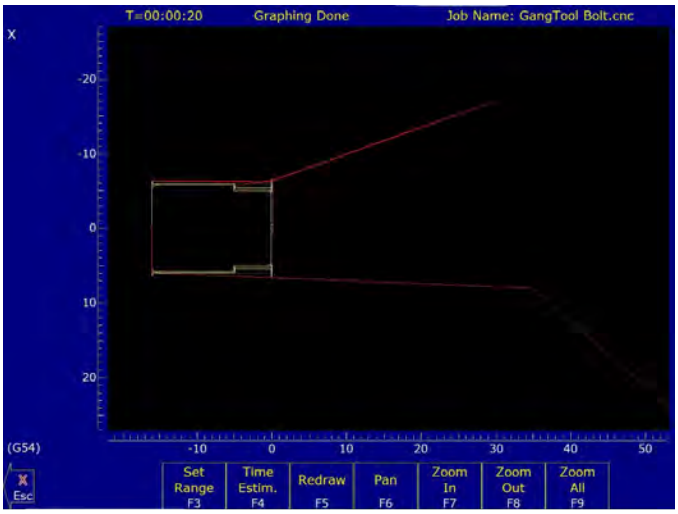

FIGURE 27

Run Program

If the graph looks OK and you are confident, set the feed to 100% and hit Cycle Start.

If you are a careful person, set the feed to 25% / F4 Run / F5 Block. This turns on Single Block Mode, which means you have to press Cycle Start for each line of your g-code for the first part just to make sure everything moves the way it should (see Figure 28).

FIGURE 28

G-code of this Part

; ICN_PATH = C:\icn_lath\GangTool Bolt.lth

; CNC code generated by Intercon v4.79 BETA, Rev 1

; Description: Gang Tool Bolt

; Programmer: Uwe

; Date: 10-Jun-2022

; --- Header ---

N0001 G21 ; millimeter measurements

:::: --- Stock Dimensions ---

:::: X- = -6.0, X+ = 6.0

:::: Z- = -16.0, Z+ = 0.0

:::: ---
G50 S3000 ; max CSS spindle speed G40 ; Cutter Comp Off
M5 M9 G28
; --- Rapid ---
N0002 T0900 ;GangOD CCGT06 M9
G96 S90.0 M3 G4 P1.0
G0 X-13.0 Z0.2 T0909
; --- Facing --- N0003 X-13.0 Z0.2
X-13.0 Z0.2
G94 X1.0 Z0.0 G99 F0.1
; --- Profile --- N0004 G0 X-12.5 Z0.0
G71 U1.0 R0.2
G71 P5 Q9 U0.4 W0.03 F0.2
; --- Linear ---
N0005 G1 X-9.5 Z0.0 G99 F0.1
; --- Linear --- N0006 X-10.0 Z-0.5
; --- Linear --- N0007 X-10.0 Z-5.0
; --- Linear --- N0008 X-11.5 Z-5.0
; --- Linear --- N0009 X-11.5 Z-16.0
; --- Finish Pass --- N0010 G0 X-12.5 Z0.0
G70 P5 Q9 U0.4 W0.03
; --- Profile End --- N0011
G28 T0900
G50 S3000 ; max CSS spindle speed
; --- Cutoff Cycle --- N0012 T0400 ;MGGN200 AL
M9
G96 S60.0 M3 G4 P1.0
G0 X16.0 Z35.0 T0404 X12.0 Z-16.0
G1 X11.6 Z-16.0 G99 F0.05 X10.3915 Z-16.0
G0 X12.0 Z-16.0 X12.0 Z-15.3957
G1 X11.6 Z-15.3957 X11.6 Z-15.4101
G3 X11.3657 Z-15.6929 I-0.4 G1 X10.9859 Z-15.8828
G3 X10.4202 Z-16.0 I-0.2828 K0.2828 G1 X10.3915 Z-16.0
G0 X12.0 Z-16.0 G1 X11.6 Z-16.0 G75 R1.5
G75 X-1.0 Z-16.0 P11.6 Q0.0 R0.0 G0 X12.0 Z-16.0
X16.0 Z35.0
; --- End of Program --- N0013 M5
G28 T0400 M9
G40
; End of Program