

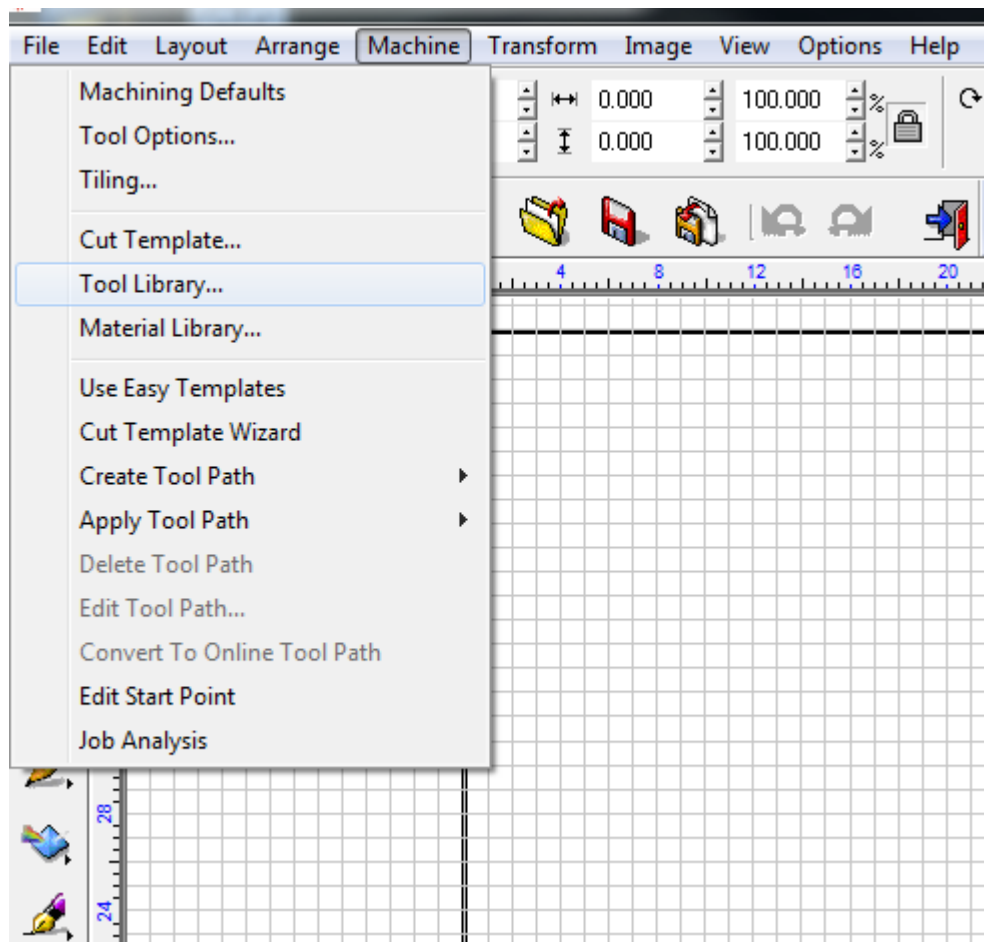


**Cutting
Systems**

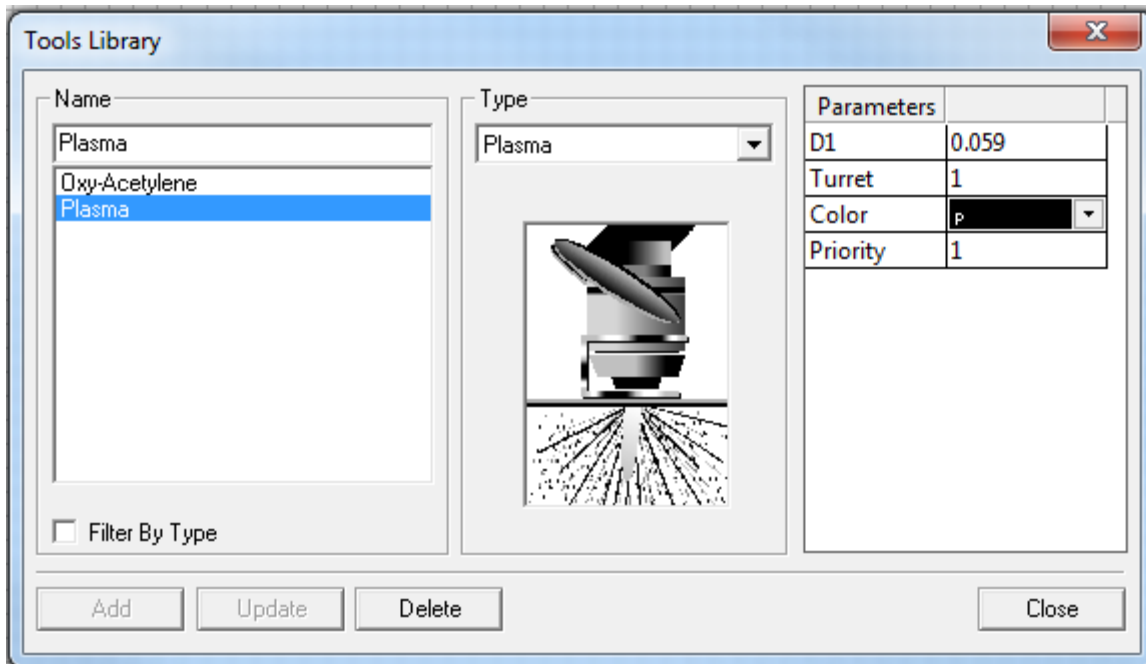
Torchmate Version 4 Multi-Tool Set up Guide

This guide will walk you through how to properly set up your software for multiple tool actions during a single program.

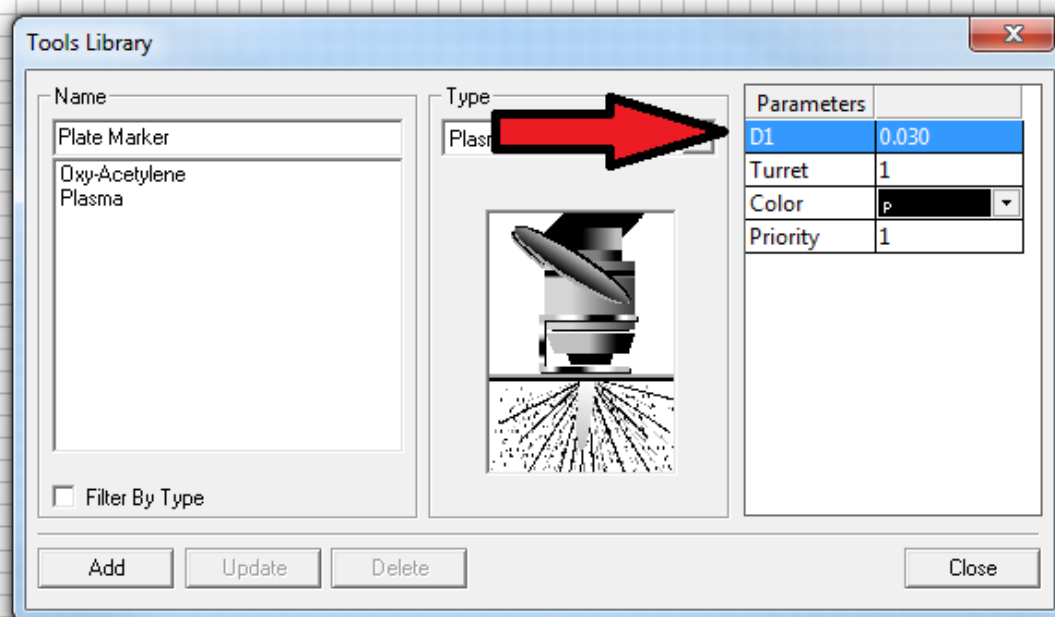
First, you will want to open up Torchmate CAD (Version 7.1.1, 8.1, or EDU is compatible). Go to **[Machine > Tool Library]**



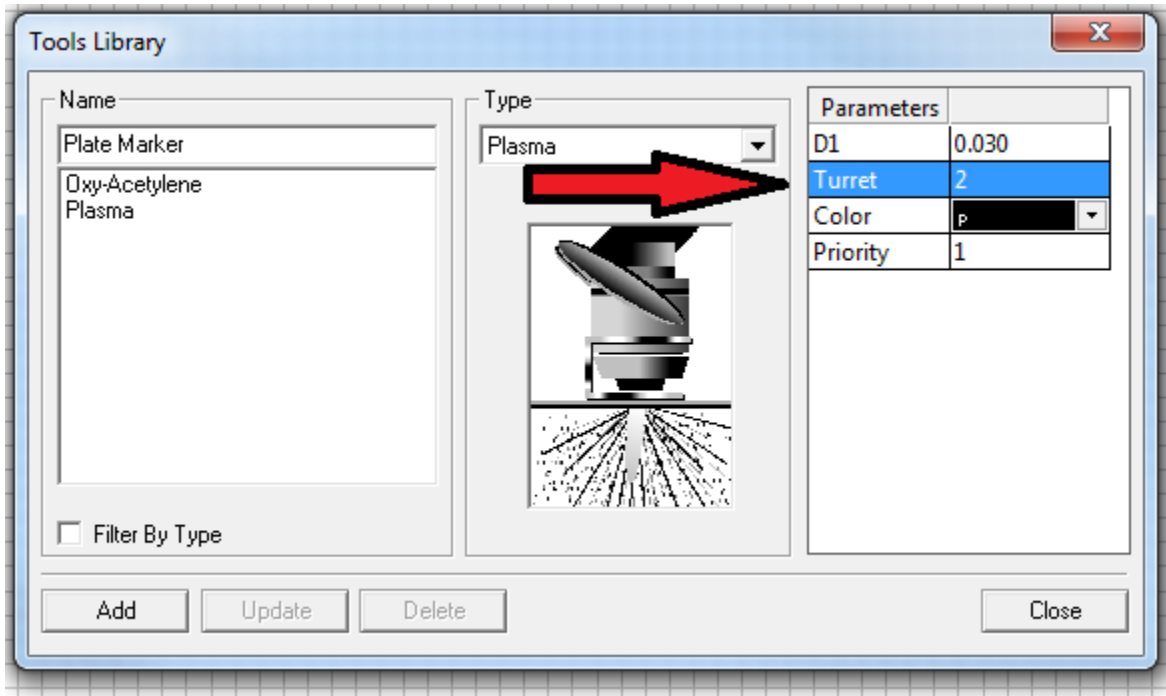
Next you will notice the current tools you have in your library.



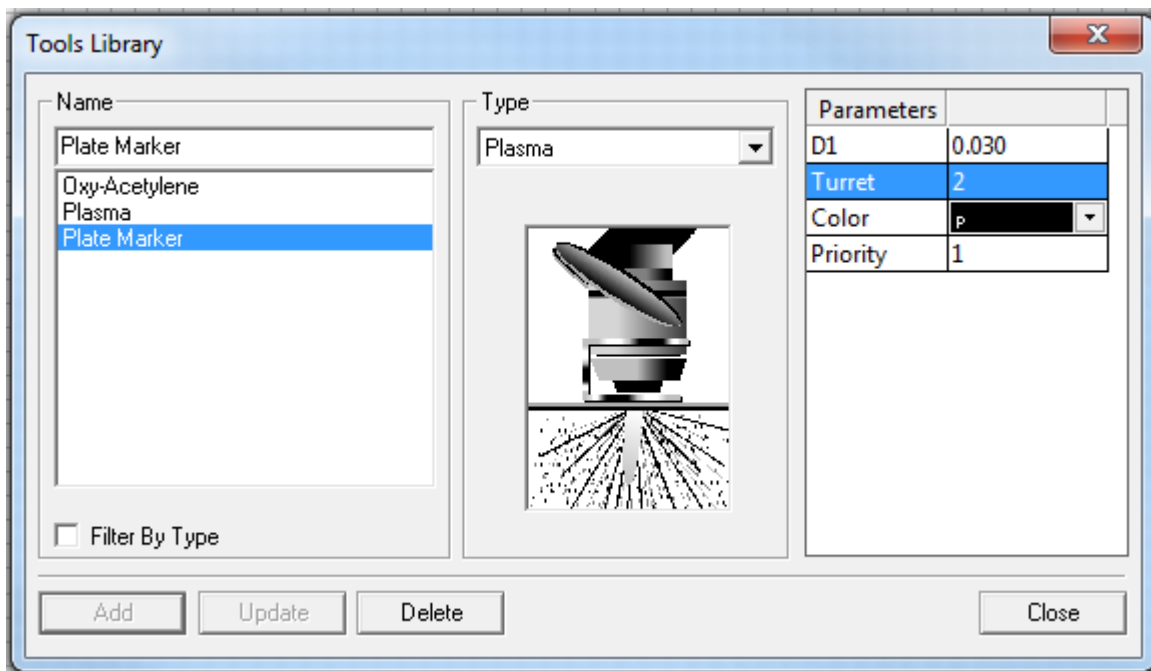
This is where you will add your Plate Marker tool. To create a new tool, simply start typing in the “Name” box. After typing in Plate Marker, click on “D1” which is highlighted below. Change “D1” to “0.030”.



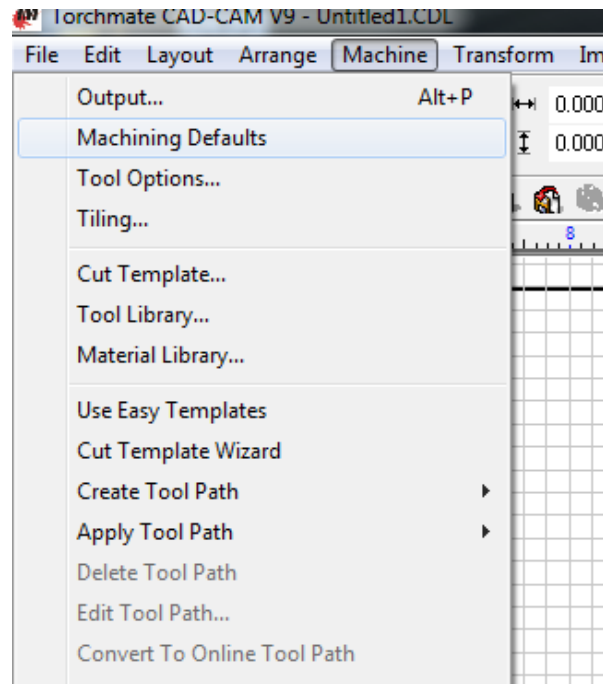
Hit the “Enter” key on the keyboard and it will turn blue. Now click on “Turret” and change it to “2” and hit “Enter” on the keyboard.



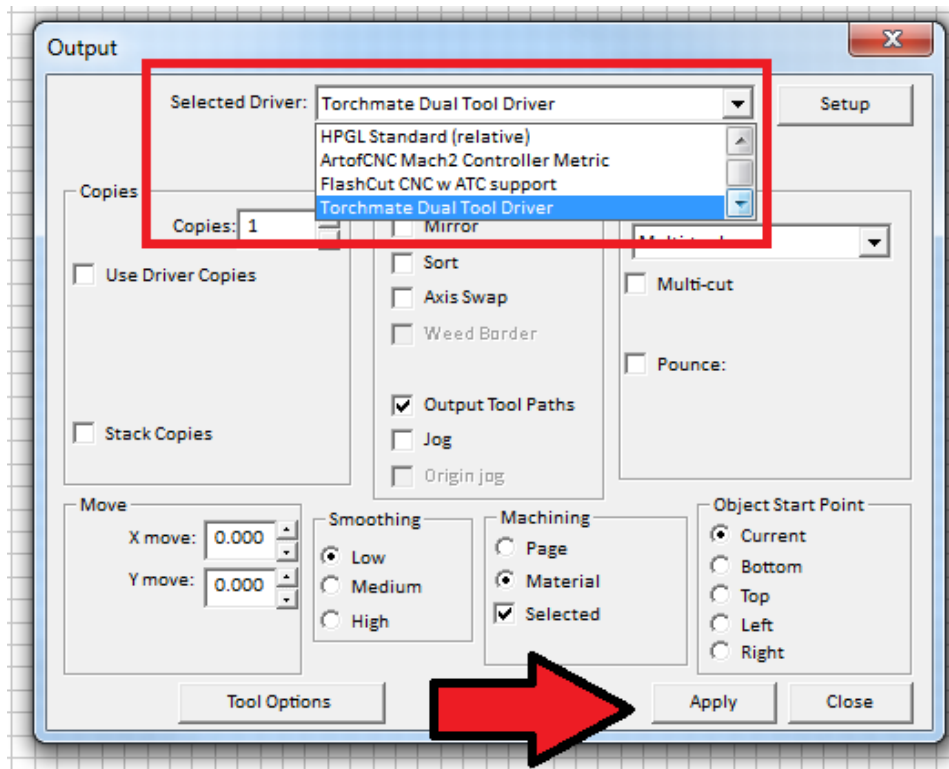
Finally, click on “Add” and you will notice the Plate Marker will be added to the list.



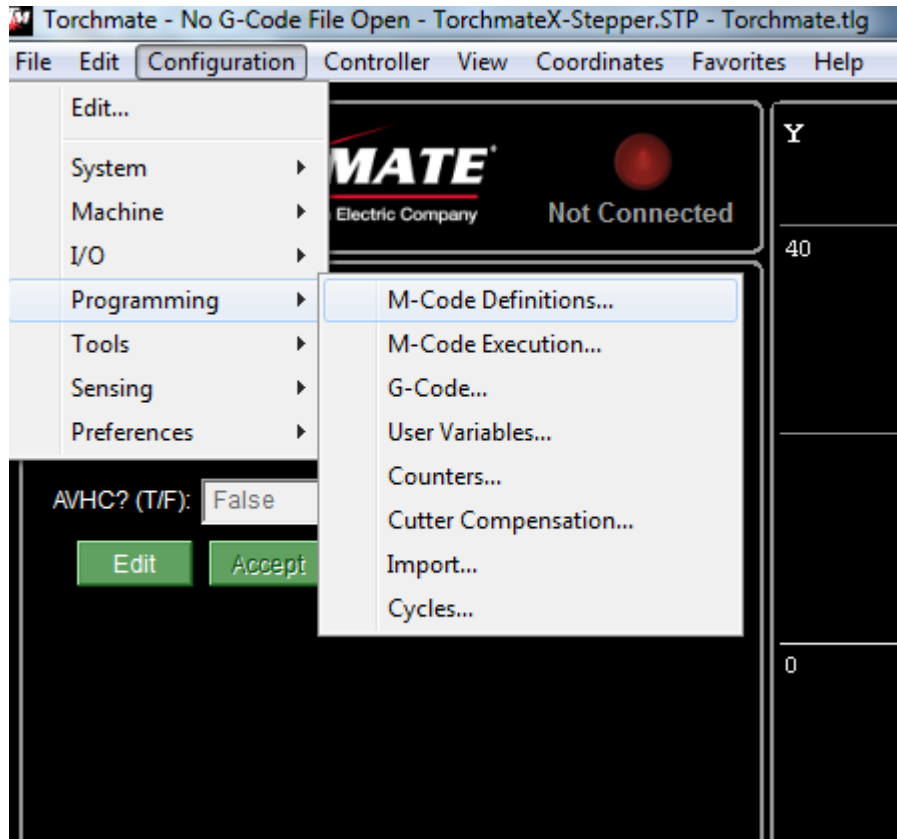
Now go to [Machine > Machining Defaults]



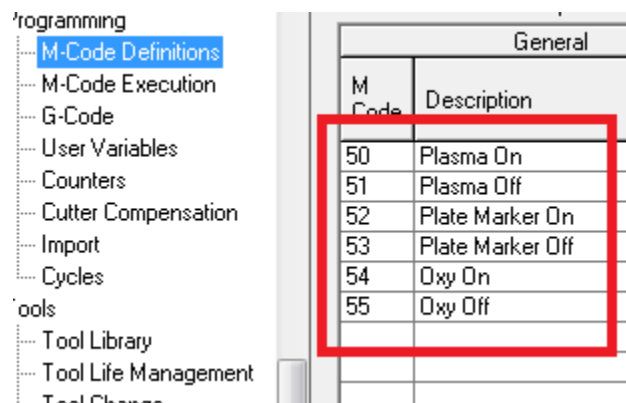
Click the arrow on “Selected Driver” and scroll down to “Torchmate Dual Tool Driver” and select it. Now click “Apply” and you’re done!



For the next phase of the setup, you will work in the **Torchmate 4 Driver Software**. Navigate to **[Configuration > Programming > M-Code Definitions]**.



On the next screen you will notice a list of M-Codes and their descriptions.



You will need to change the “50” to “22” and “51” to “23” so that it looks like the picture below:

Programming

- M-Code Definitions
- M-Code Execution
- G-Code
- User Variables
- Counters
- Cutter Compensation
- Import
- Cycles
- Tools

General	
M Code	Description
22	Plasma On
23	Plasma Off
52	Plate Marker On
53	Plate Marker Off
54	Oxy On
55	Oxy Off

Next you will move down that same screen and change the “22” to “50” and “23” to “51” so that it looks like the picture below:

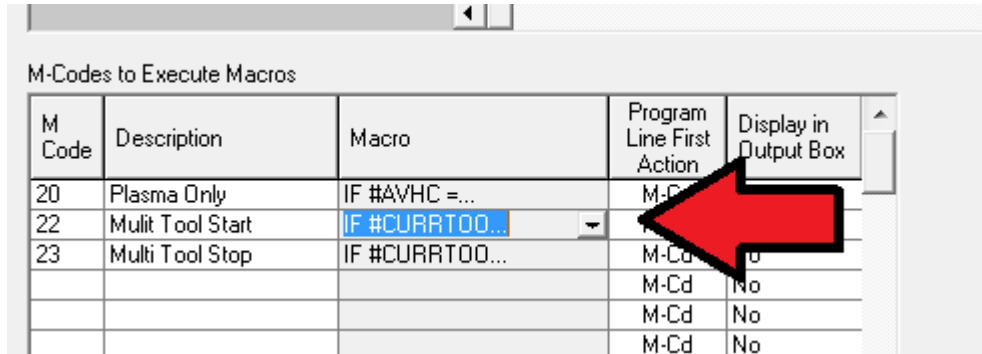
M-Codes to Control Output Lines (For Line Columns: '1' = ...)

General			Ac			
M Code	Description	Program Line First Action	M-Code First Action	Delay (sec)	Ln. 1	Ln. 2
22	Plasma On	M-Cd	Set Ln	0.1	1	-
23	Plasma Off	M-Cd	Set Ln	1.0	0	-
52	Plate Marker On	M-Cd	Set Ln	0.2	-	-
53	Plate Marker Off	M-Cd	Set Ln	1.0	-	-
54	Oxy On	M-Cd	Set Ln	3.0	-	-
55	Oxy Off	M-Cd	Set Ln	1.0	-	-
		M-Cd	Set Ln	0.0	-	-
		M-Cd	Set Ln	0.0	-	-
		M-Cd	Set Ln	0.0	-	-
		M-Cd	Set Ln	0.0	-	-
		M-Cd	Set Ln	0.0	-	-

M-Codes to Execute Macros

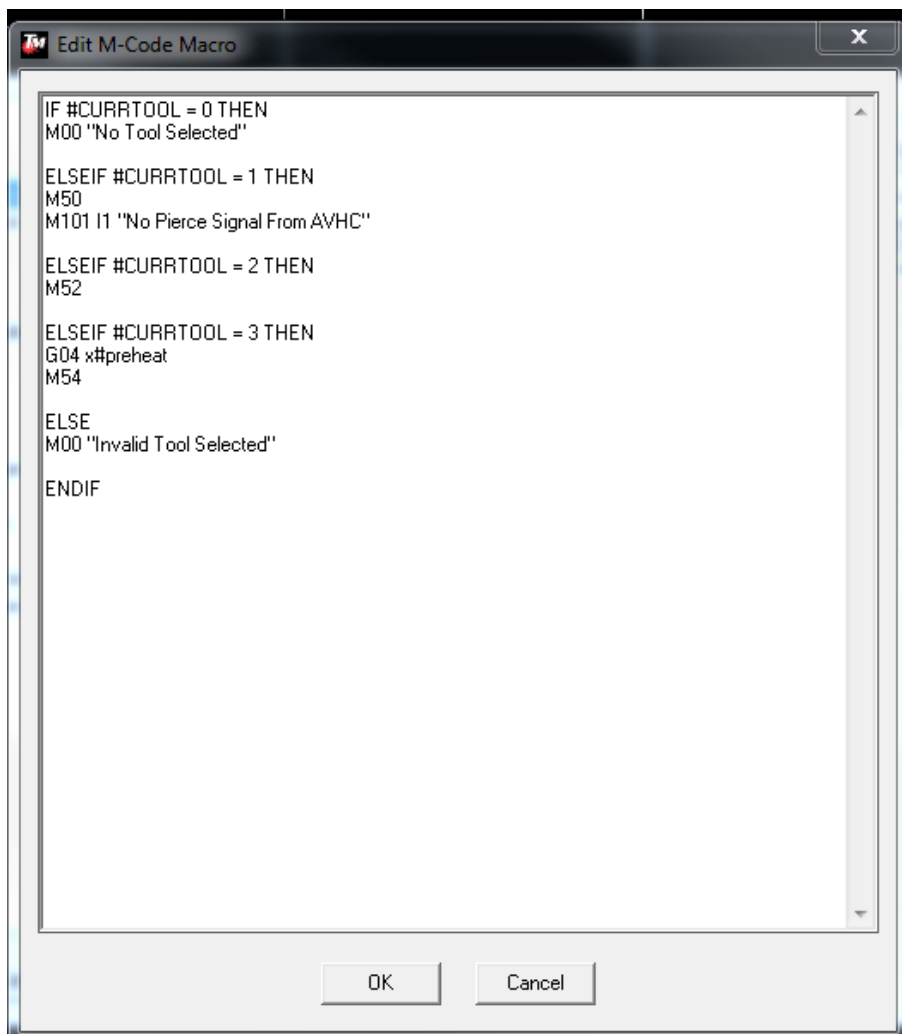
M Code	Description	Macro	Program Line First Action	Displ Outp
20	Plasma Only	IF #AVHC =	M-Cd	No
50	Mult Tool Start	IF #CURRTOO...	M-Cd	No
51	Multi Tool Stop	IF #CURRTOO...	M-Cd	No
			M-Cd	No
			M-Cd	No

Now you will need to edit the macro associated with those M-Codes (50 and 51). If you click on the text that says, “IF #CURRTOO...” then a pop up arrow will appear.



M Code	Description	Macro	Program Line First Action	Display in Output Box
20	Plasma Only	IF #AVHC =...	M-Cd	No
22	Multit Tool Start	IF #CURRTOO...	M-Cd	No
23	Multi Tool Stop	IF #CURRTOO...	M-Cd	No
			M-Cd	No
			M-Cd	No
			M-Cd	No

Click on that arrow and an “Edit M-Code Macro” window will pop up.



```
IF #CURRTOOL = 0 THEN
M00 "No Tool Selected"

ELSEIF #CURRTOOL = 1 THEN
M50
M101 I1 "No Pierce Signal From AVHC"

ELSEIF #CURRTOOL = 2 THEN
M52

ELSEIF #CURRTOOL = 3 THEN
G04 x#preheat
M54

ELSE
M00 "Invalid Tool Selected"

ENDIF
```

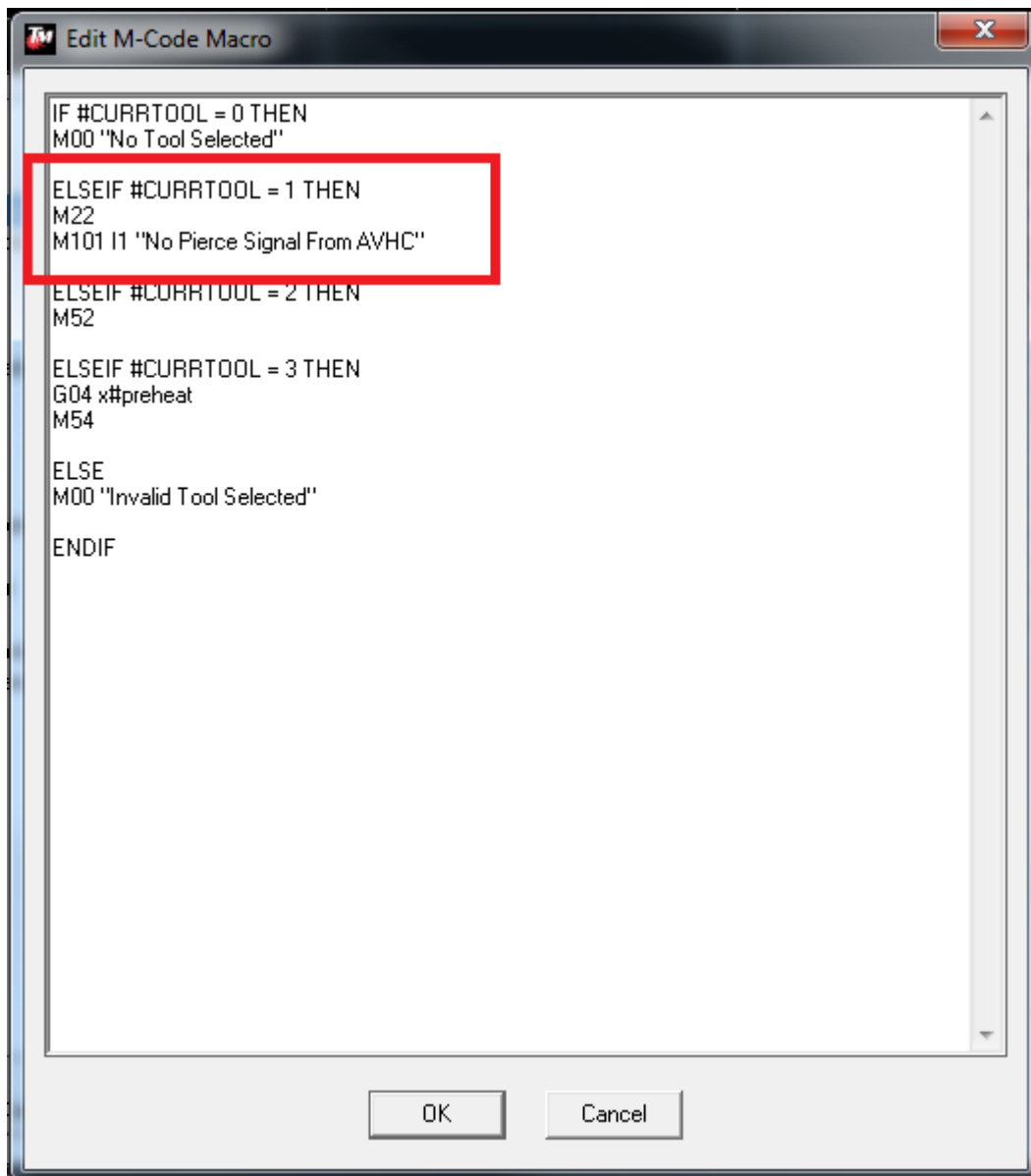
Where it says,

ELSEIF #CURRTOOL = 1 THEN

M50

M101 I1 "No Pierce Signal From AVHC"

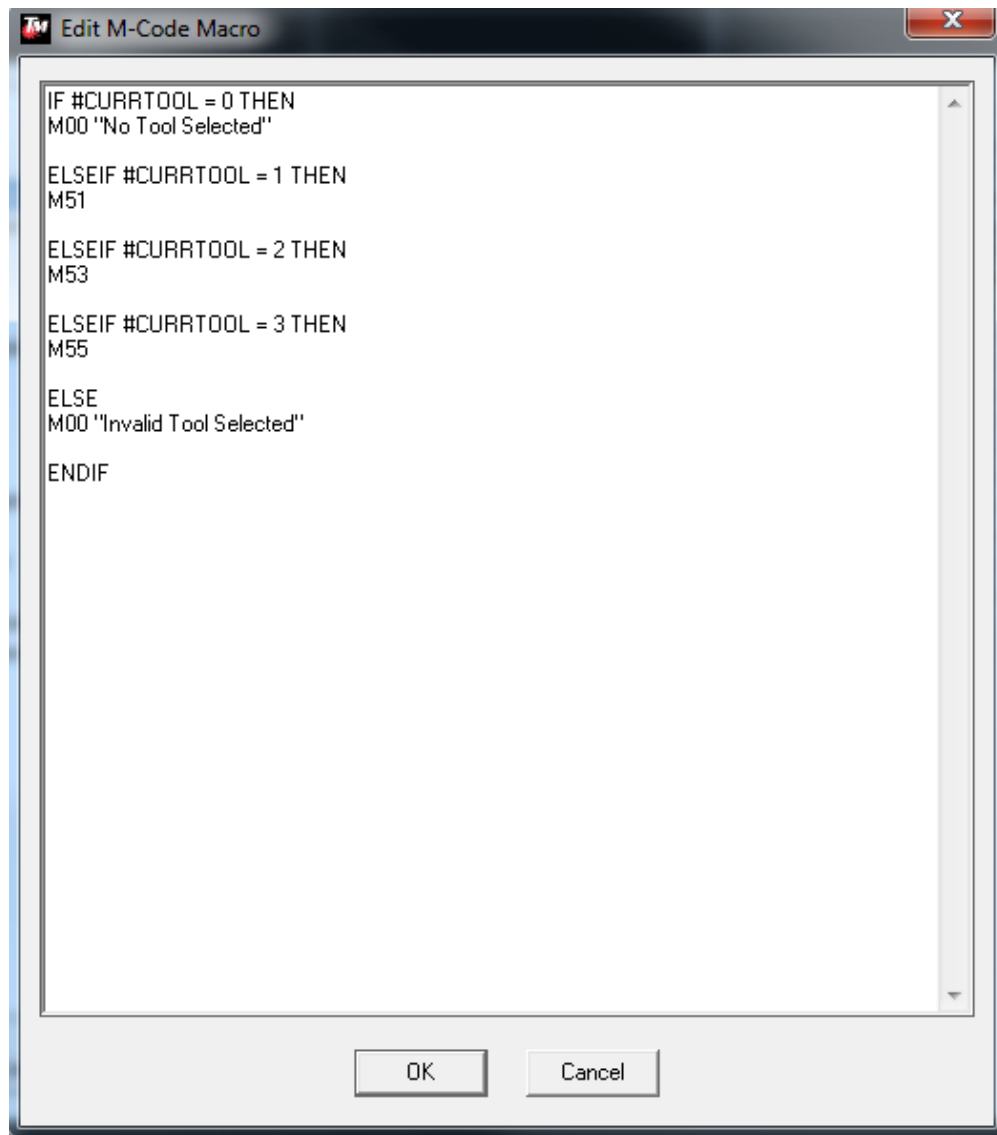
Change the "50" to "22" so it looks like the picture below:



Click "OK" and then open the "Edit M-Code Macro" window for M-Code 23.

M Code	Description	Macro	Program Line First Action	Display in Output Box
20	Plasma Only	IF #AVHC =...	M-Cd	No
22	Multitool Start	IF #CURRTOO...	M-Cd	No
23	Multi Tool Stop	IF #CURRTOO...	M-Cd	No
			M-Cd	No
			M-Cd	No
			M-Cd	No

You should see this:



```
IF #CURRTOOL = 0 THEN
M00 "No Tool Selected"

ELSEIF #CURRTOOL = 1 THEN
M51

ELSEIF #CURRTOOL = 2 THEN
M53

ELSEIF #CURRTOOL = 3 THEN
M55

ELSE
M00 "Invalid Tool Selected"

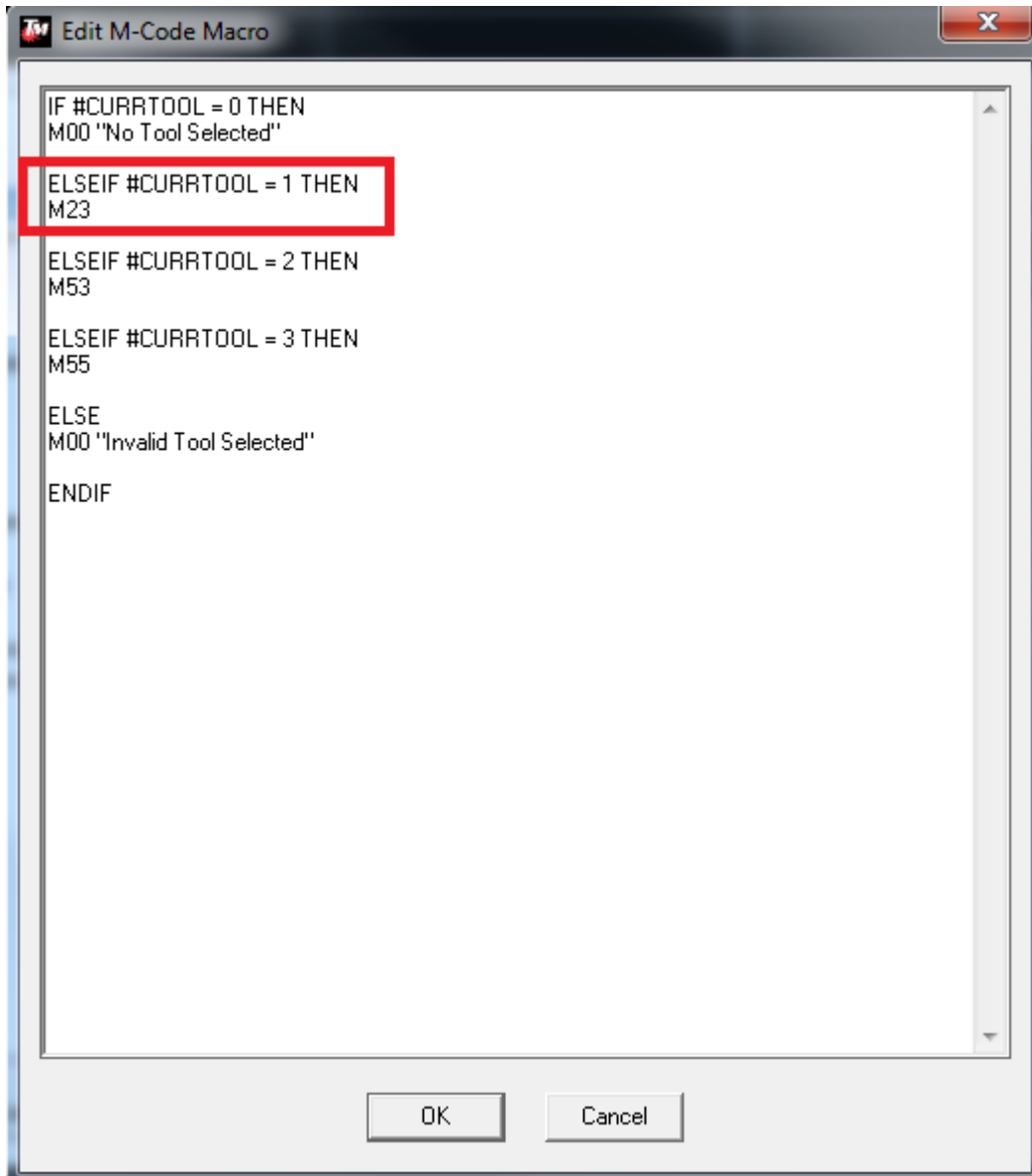
ENDIF
```

Where it says,

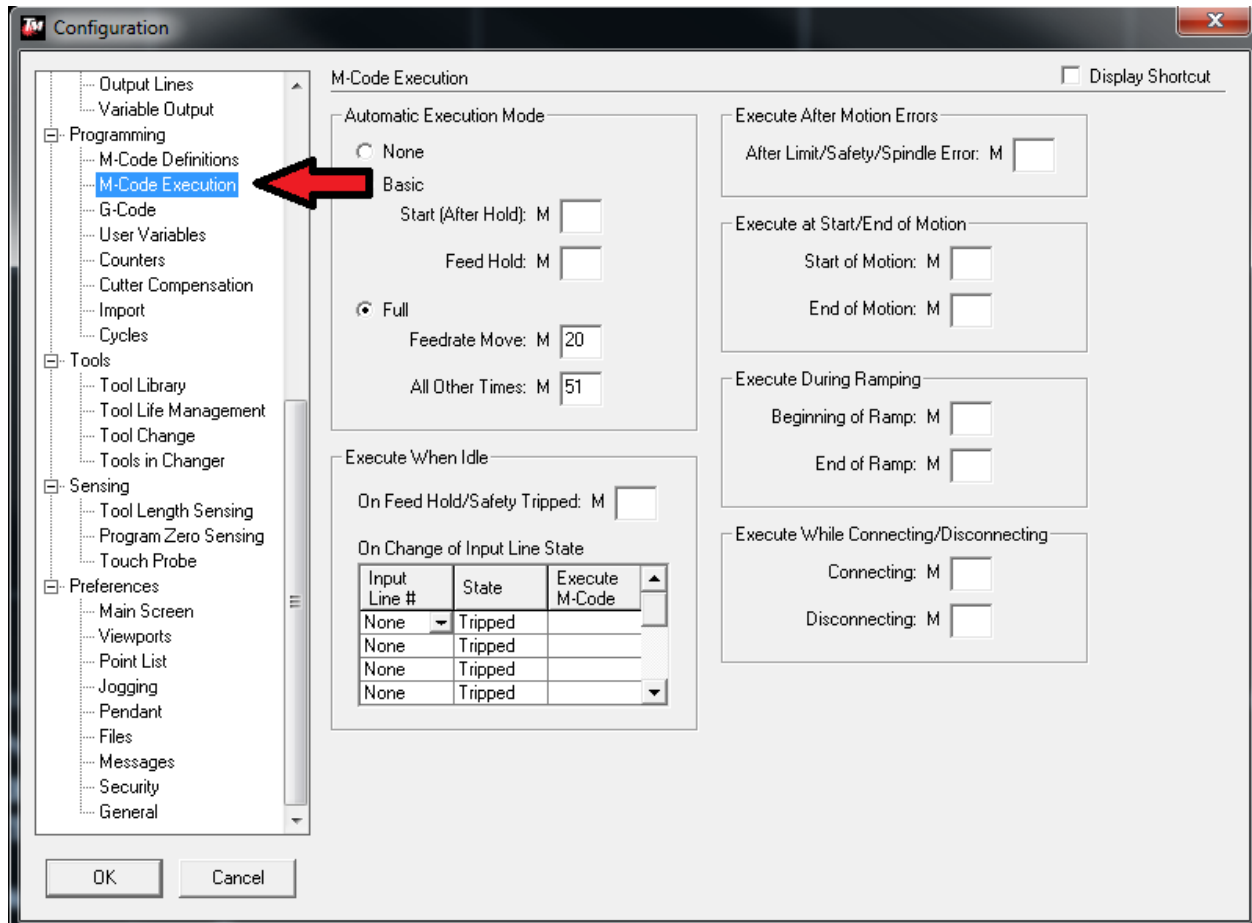
ELSEIF #CURRTOOL = 1 THEN

M51

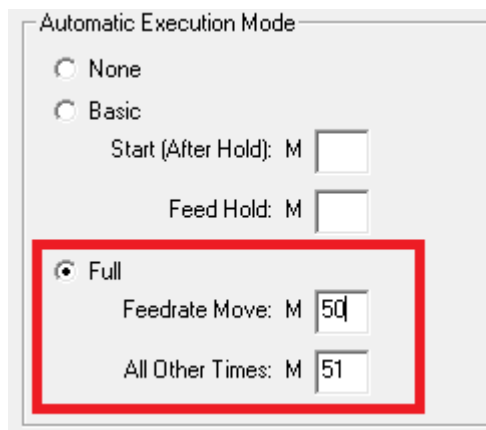
Change the "51" to "23" so it looks like the picture below:



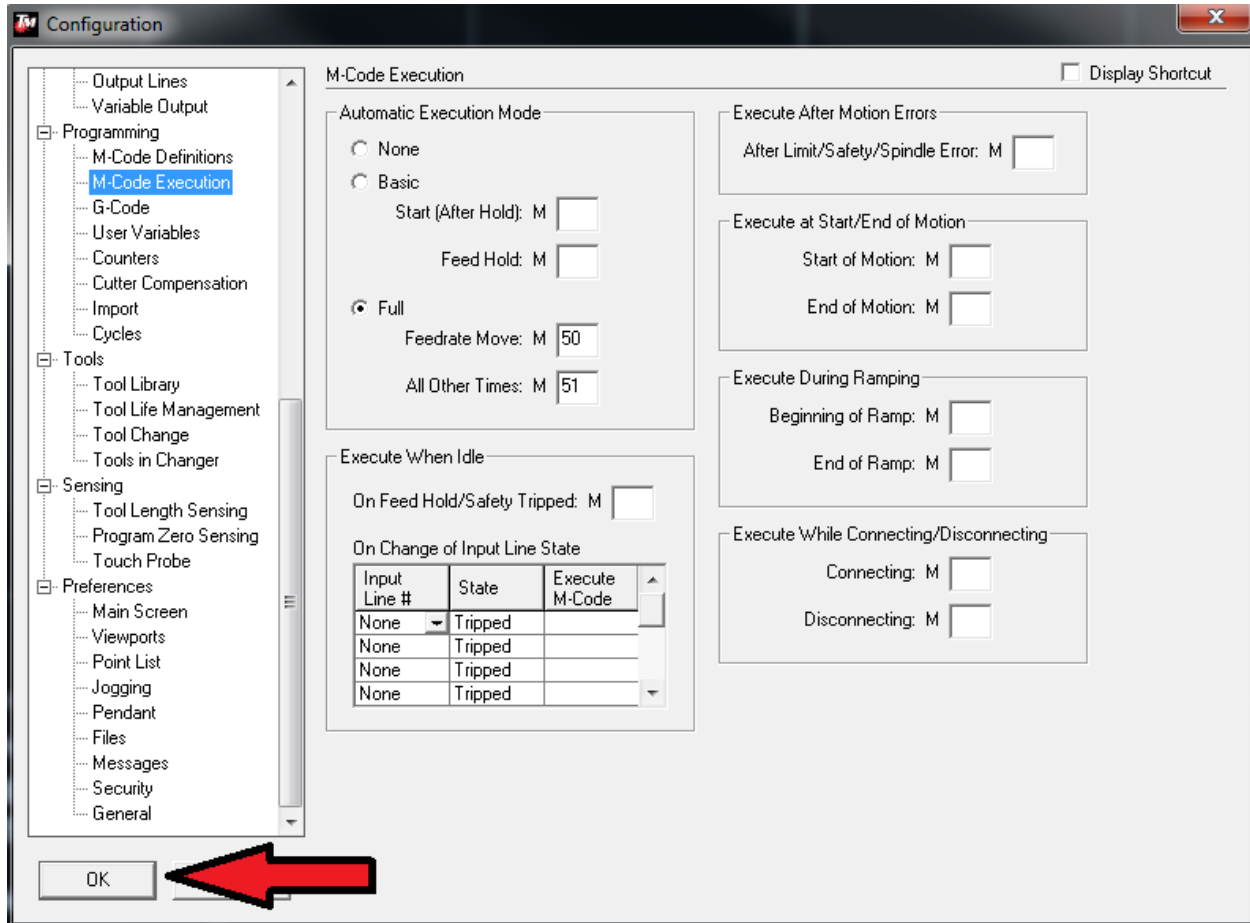
Click “OK” and then navigate to the “M-Code Execution” screen show here:



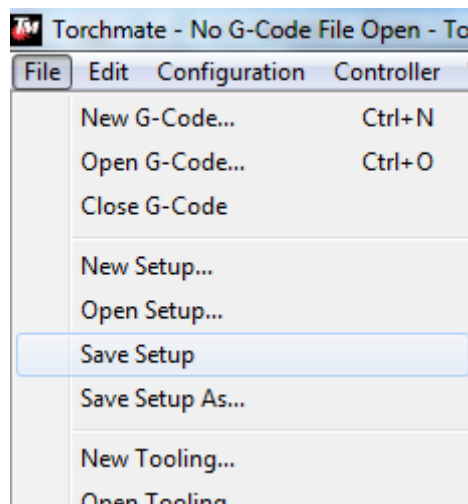
Notice where it says “Full” and change “Feedrate Move” from “20” to “50”.



Click “OK” in the bottom left of the screen

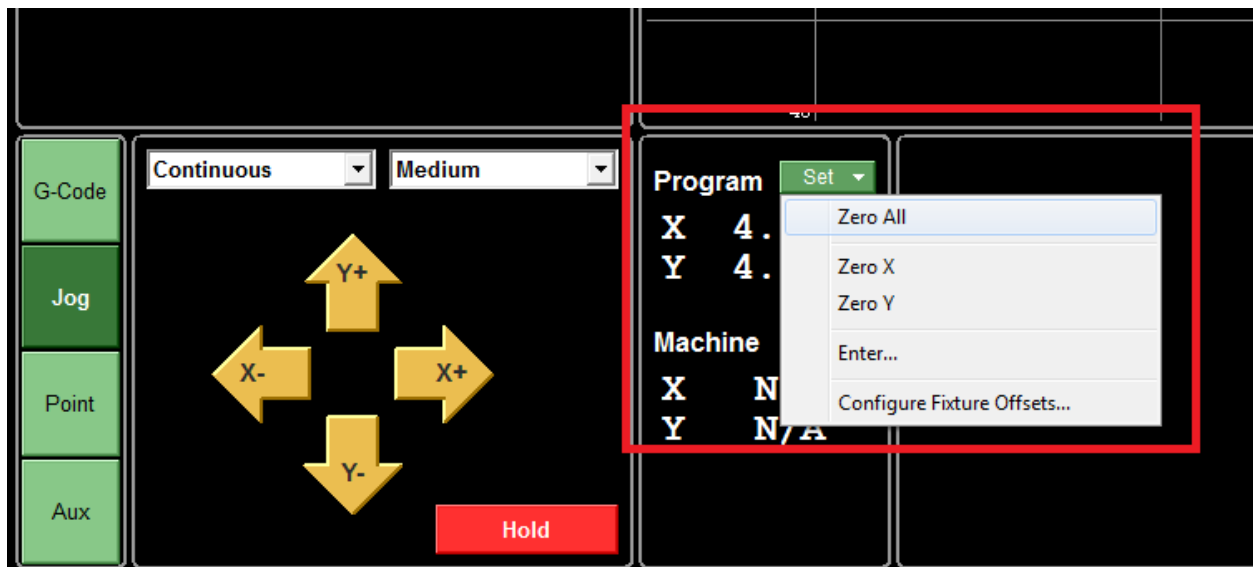


You will want to save your setup at this point so that you won't have to make this change again. To do this, go to **[File > Save Setup]**.

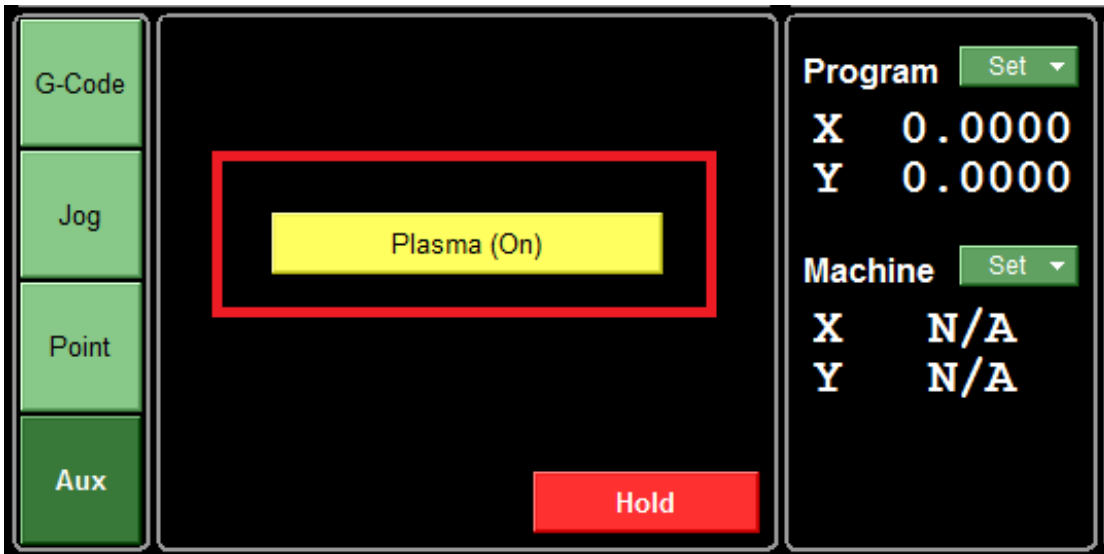
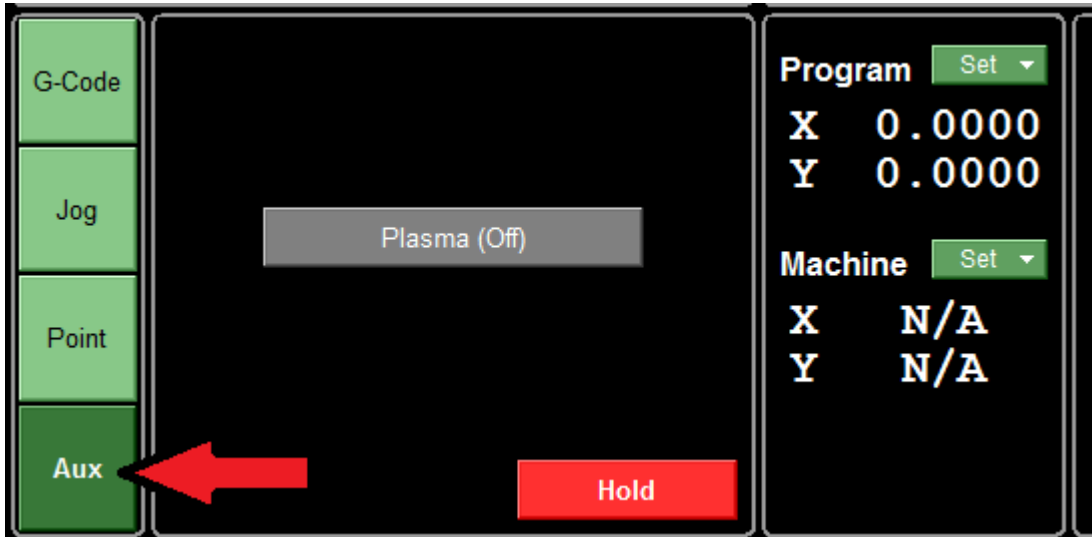


As a precaution, we also recommend making a backup file of this setup. To do this, go to **[File > Save Setup As]**. When naming the file, just add “BACKUP” to the end and save it. Then to go **[File > Open Setup]** and open up your original setup file. Now in case something happens to the original, you can always load the backup and be okay. Additionally, we recommend you save these two setup files to a USB flash drive or external hard drive. This way you will be covered if your computer crashes or is otherwise not operational.

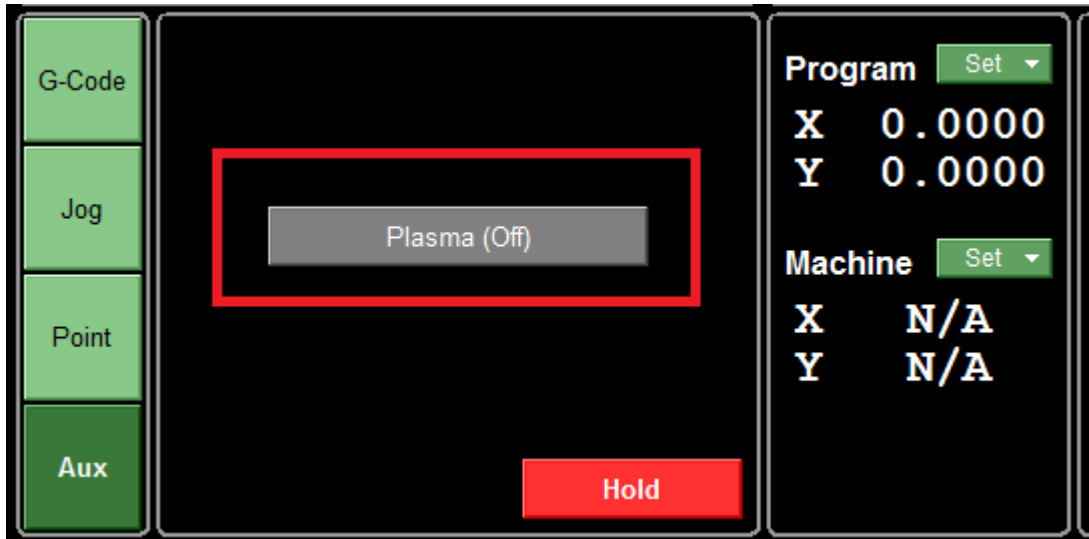
Now, if you haven't setup your tool offset yet, I will explain how to do that now. Jog your torch over a piece of material and zero your program coordinates (Click on “SET” and then click “Zero All”)



Go to the "AUX" menu and turn your plasma from OFF to ON



Once you see sparks, turn the plasma off.



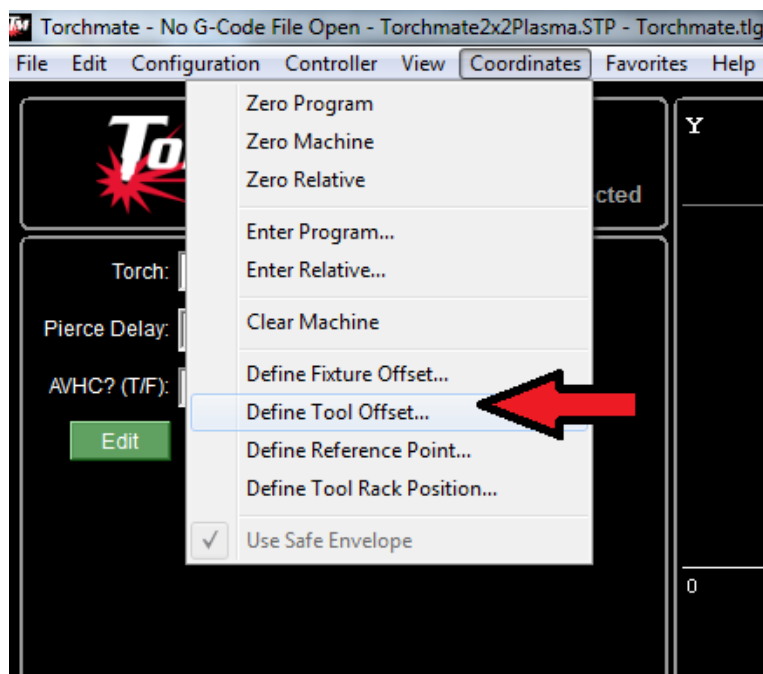
You should now have a pierce mark on the material as shown below:



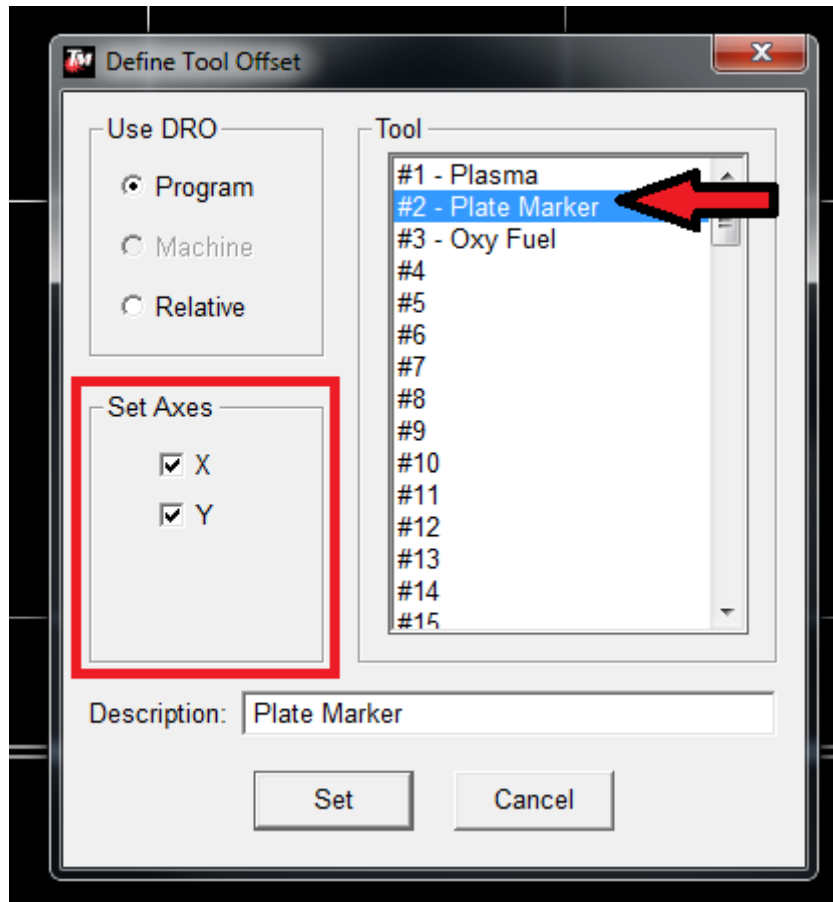
Now jog the machine until your plate marker is exactly over the pierce hole. You may want to bring the plate marker down physically and see if it dives exactly into the middle of that hole as shown below:



Once the plate marker fits in the pierce mark, go to **[Coordinates > Define Tool Offset]**

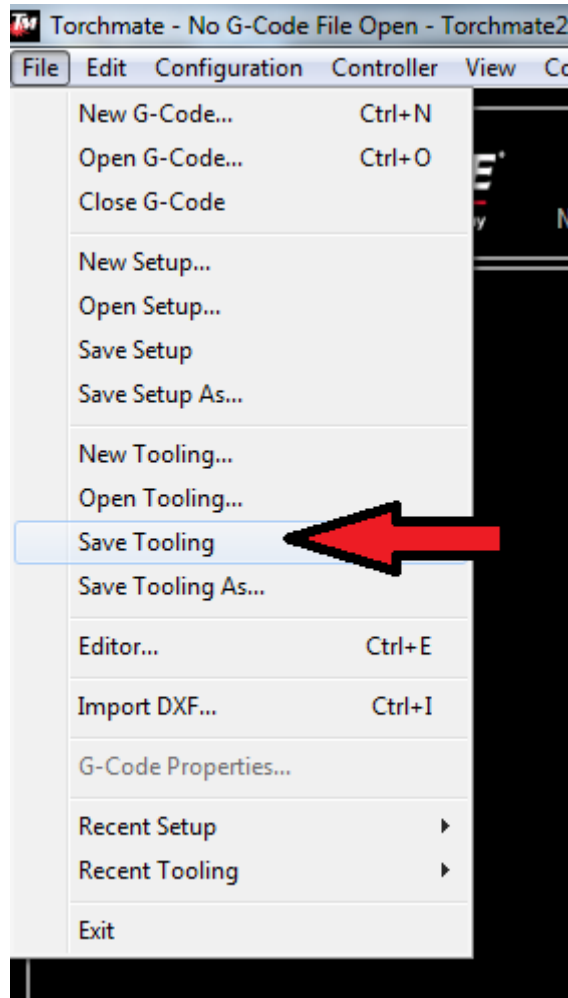


Make sure to click on “Plate Marker” and that X and Y are checked as shown below:



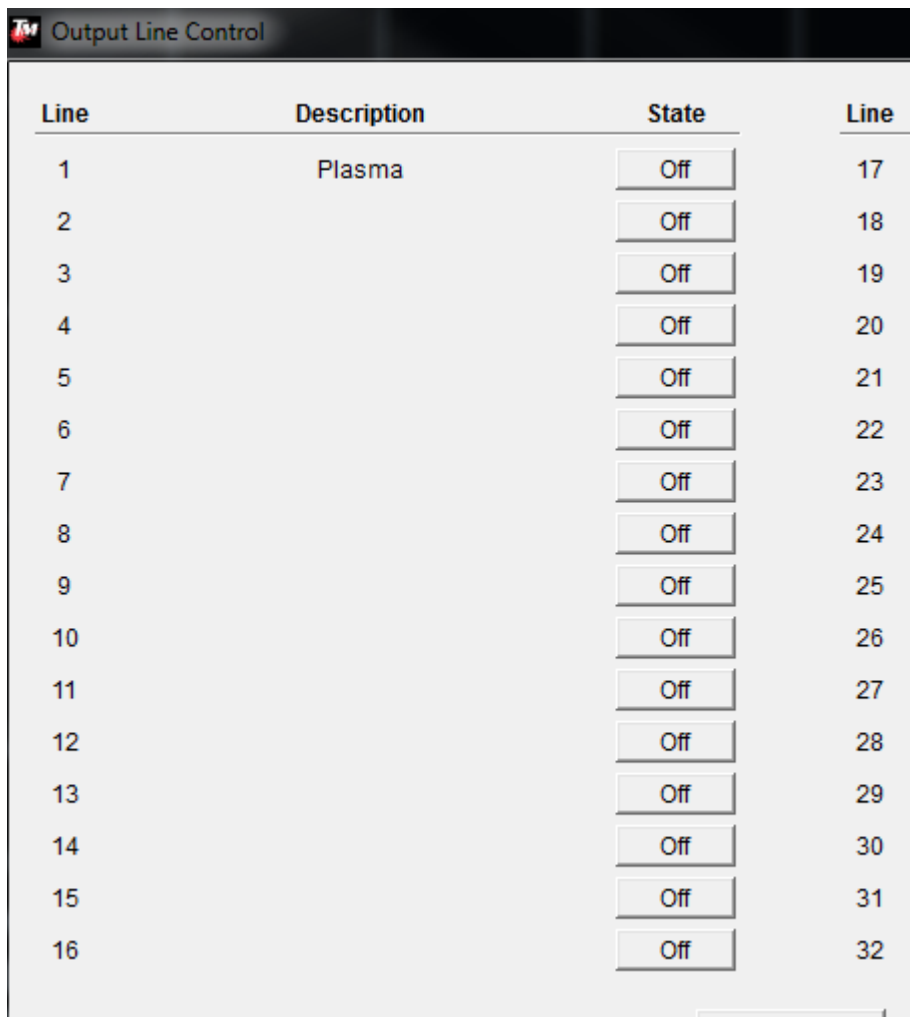
If the “Define Tool Offset” window looks like what is pictured before, click on “Set”.

Finally, go to **[File > Save Tooling]**



It is also important to create a backup of that file as well. You are now ready to create multi-tool files and run them inside Torchmate 4.

Now to actually add the Plate Marker to your tool set. Go to
[Controller > Output Line Control]



The screenshot shows a window titled "Output Line Control" with a table containing 32 rows. The first row has a description of "Plasma". Each row has a button labeled "Off" in the "State" column.

Line	Description	State	Line
1	Plasma	Off	17
2		Off	18
3		Off	19
4		Off	20
5		Off	21
6		Off	22
7		Off	23
8		Off	24
9		Off	25
10		Off	26
11		Off	27
12		Off	28
13		Off	29
14		Off	30
15		Off	31
16		Off	32

From here, start clicking the “Off” buttons starting at “2” one at a time. If you already have your Plate Marker set up with air, it will activate the Plate Marker. If not, then you should hear the click coming from the Torchmate Universal Relay. If you do not hear a click or your Plate Marker does not fire, then just move to the next line and activate it.

Now that we know which line it's on. Go to [Configuration > I/O > Output Lines]. Type in "Plate Marker" on the line it was activated on. For the sake of this guide, I'm going to say it was on line two. It should look like this:

The screenshot shows the 'Output Lines' configuration window. The left sidebar contains a tree view with the following categories: I/O (Input Lines, Output Lines, Variable Output), Programming (M-Code Definitions, M-Code Execution, G-Code, User Variables, Counters, Cutter Compensation, Import, Cycles), Tools (Tool Library, Tool Life Management, Tool Change, Tools in Changer), Sensing (Tool Length Sensing, Program Zero Sensing, Touch Probe), and Preferences (Main Screen, Viewports, Point List, Jogging, Pendant, Files, Messages). The main window displays a table with the following data:

Line #	Description	Button Text (replaces Description)	Display Warning	Display in Aux Panel	Display in Output Box
1	Plasma		Before On	Yes	Yes
2	Plate Marker		Before On	Yes	Yes
3			Before On	Yes	No
4			Before On	Yes	No
5			Before On	Yes	No
6			Before On	Yes	No
7			Before On	Yes	No
8			Before On	Yes	No
9			Before On	Yes	No
10			Before On	Yes	No
11			Before On	Yes	No
12			Before On	Yes	No
13			Before On	Yes	No
14			Before On	Yes	No
15			Before On	Yes	No
16			Before On	Yes	No
17			Before On	Yes	No
18			Before On	Yes	No
19			Before On	Yes	No
20			Before On	Yes	No

Below the main table is a 'Safety Interlocks (Invalid Output Line Combinations)' section with the following table:

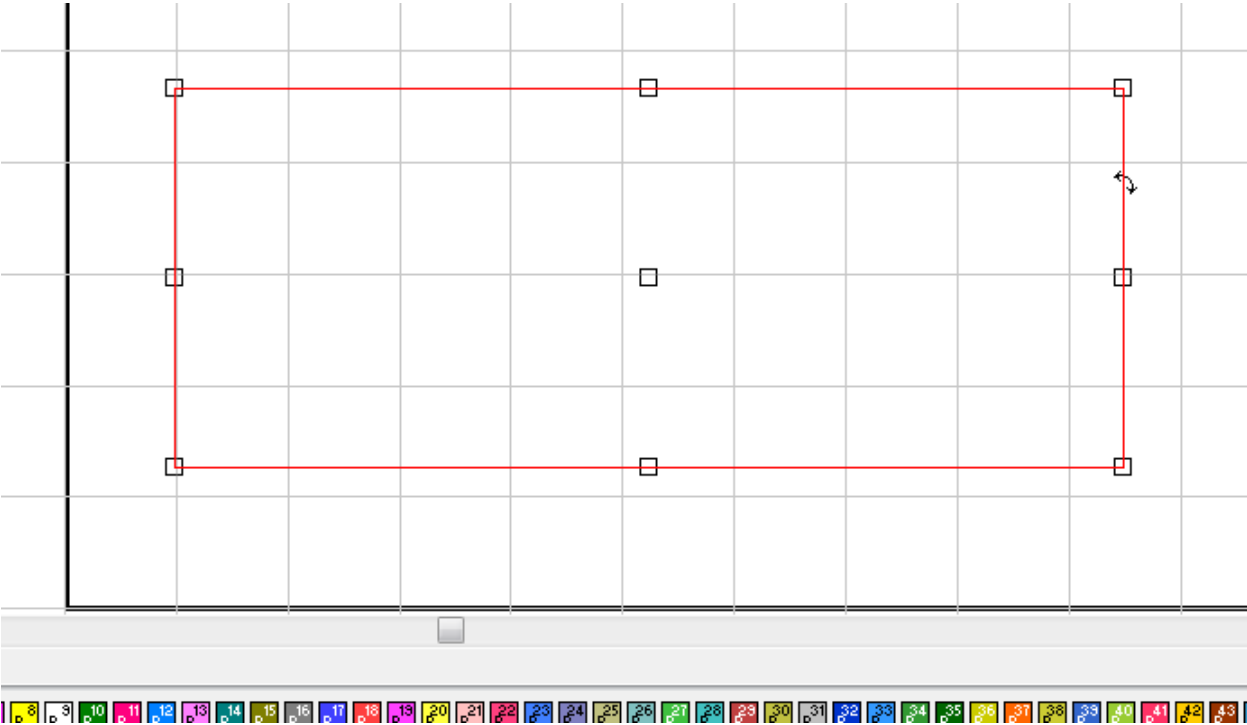
Output Line #	Set To	Output Line #	Set To
None	On	None	On
None	On	None	On
None	On	None	On

Now make your way down to your M-Code Definitions one last time. You'll need to add on/off commands on the appropriate line. If your Plate Marker is on Line 2, then it should look like this:

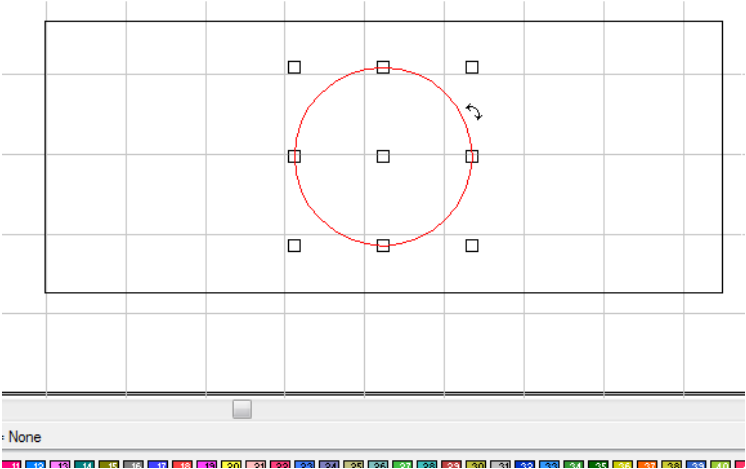
General			Action				
M Code	Description	Program Line First Action	M-Code First Action	Delay (sec)	Ln. 1	Ln. 2	Ln. 3
50	Plasma On	M-Cd	Set Ln	0.1	1	-	-
51	Plasma Off	M-Cd	Set Ln	1.0	0	-	-
52	Plate Marker On	M-Cd	Set Ln	0.2	-	1	-
53	Plate Marker Off	M-Cd	Set Ln	1.0	-	0	-
54	Oxy On	M-Cd	Set Ln	3.0	-	-	-
55	Oxy Off	M-Cd	Set Ln	1.0	-	-	-
		M-Cd	Set Ln	0.0	-	-	-
		M-Cd	Set Ln	0.0	-	-	-
		M-Cd	Set Ln	0.0	-	-	-
		M-Cd	Set Ln	0.0	-	-	-
		M-Cd	Set Ln	0.0	-	-	-

Once that is done, click OK in the bottom left and then go to **[File > Save Setup]**. You should be all done here in the Driver Software for now.

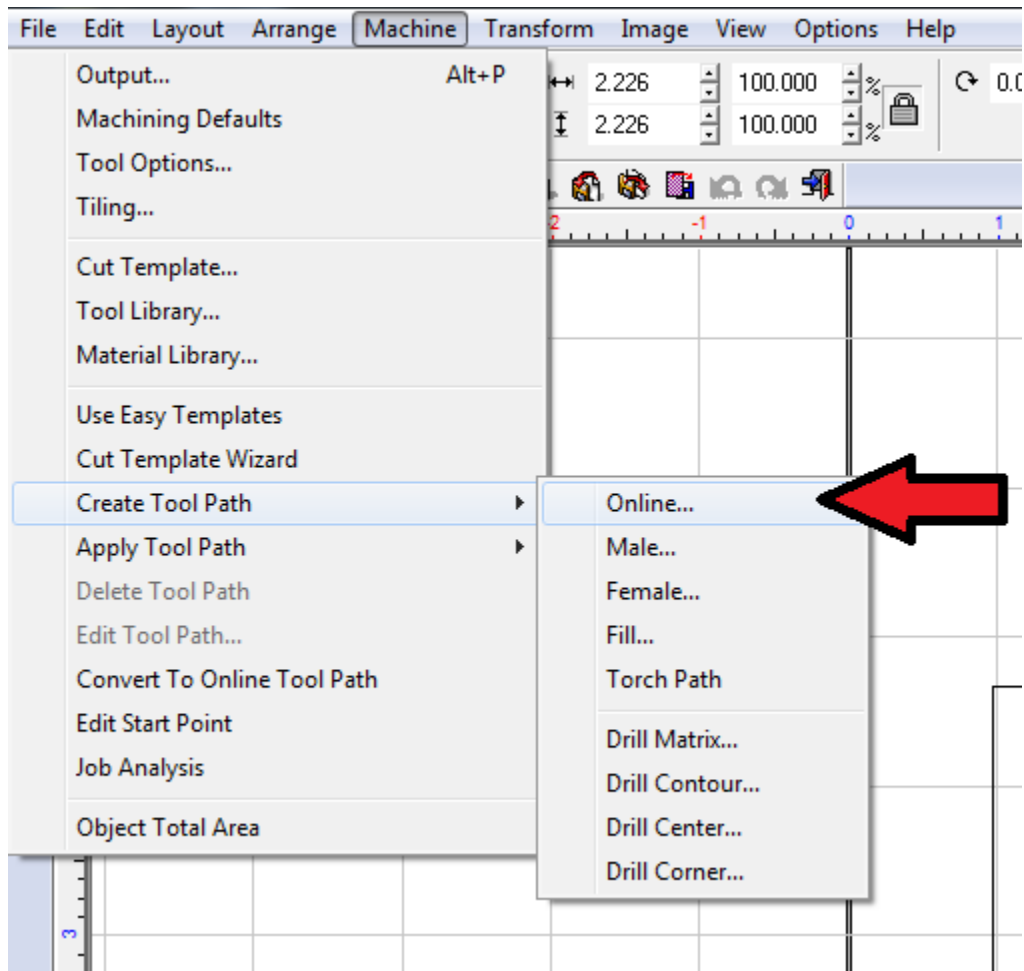
Now we need to create a Multi-Tool file. The part you will be making is going to be very basic, but will help you understand the fundamentals of multi-tool programs. First, start by creating a rectangle. Any size will do.



Now create a circle inside of that rectangle. Again, any size (as long as it fits inside the rectangle) will do.

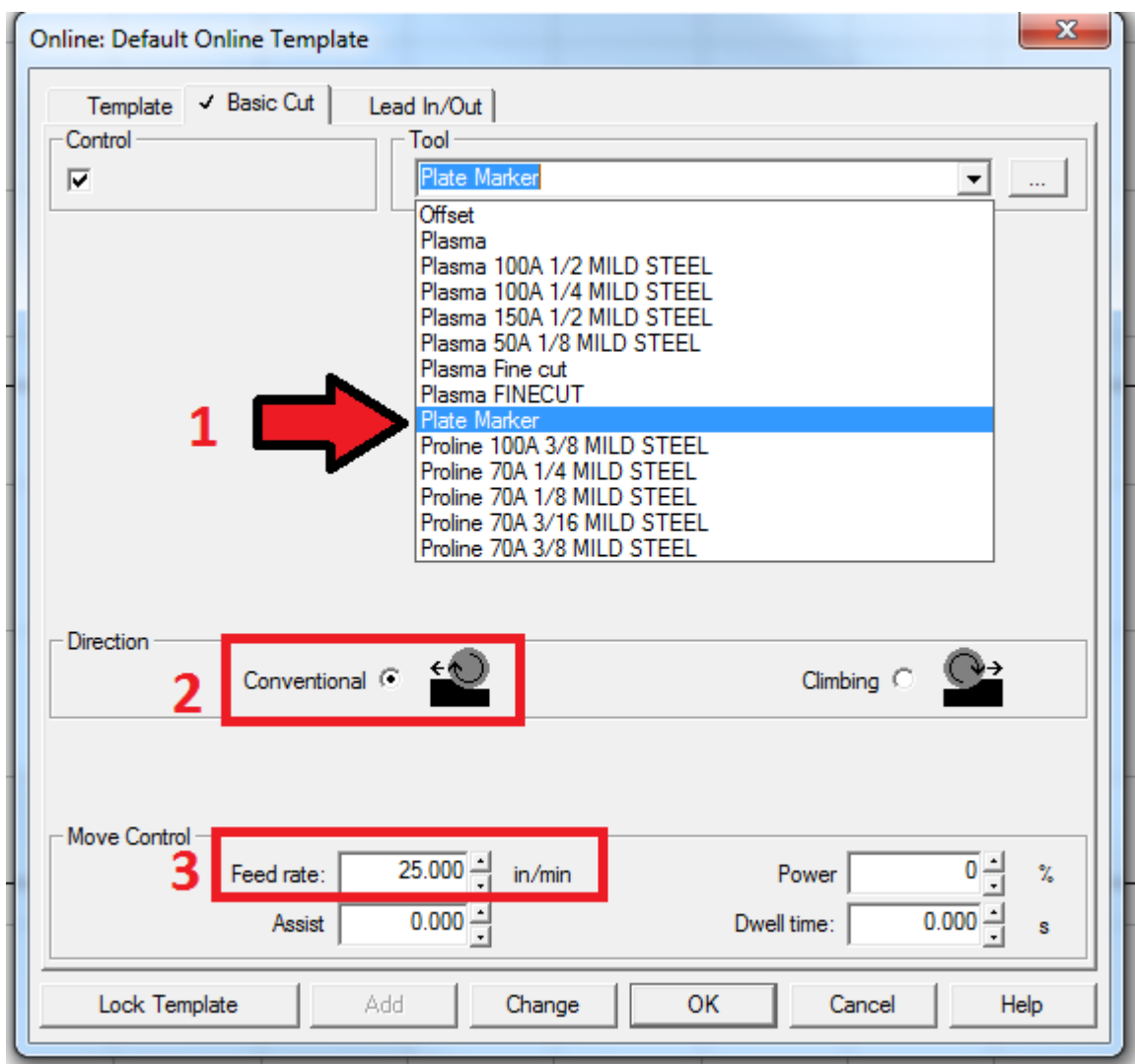


With the circle selected, go to [Machine > Create Tool Path > Online].

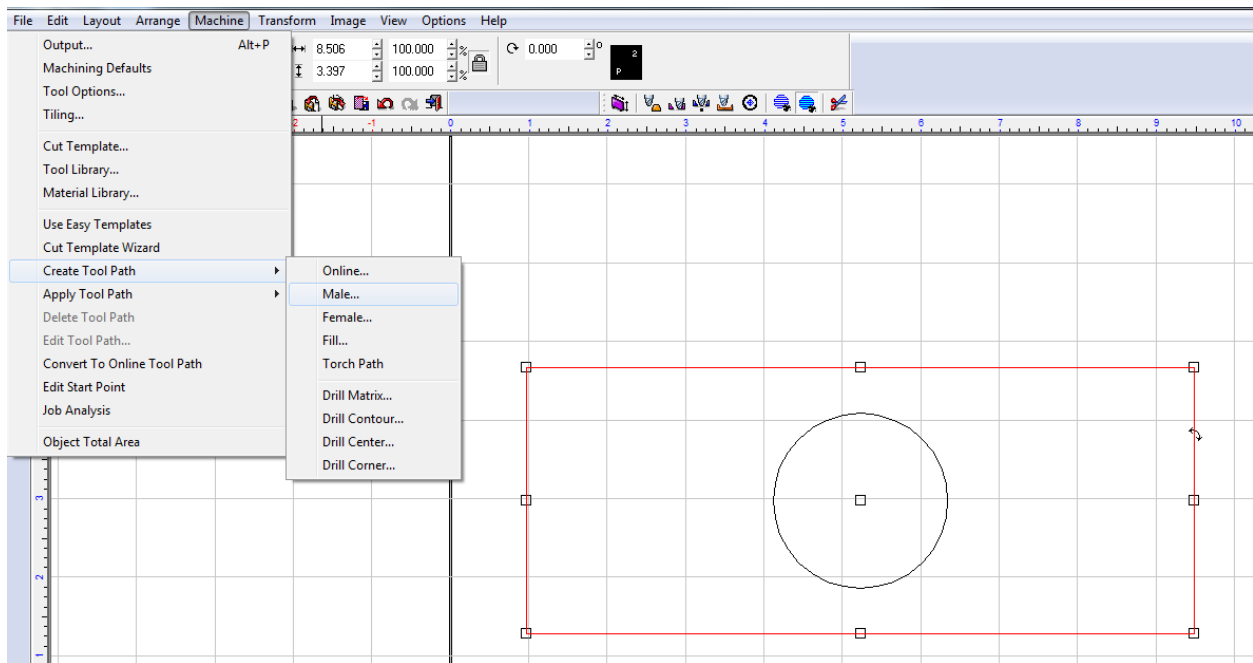


*****Please note, if you do not see "Create Tool Path", uncheck "Use Easy Templates"*****

(1) Select “Plate Marker”. (2) Make sure your direction is set to “Conventional”. (3) Enter in your feed rate. It is important to remember that your feed rate **MUST** be entered in at this screen. Otherwise the program will not work when opened inside the Torchmate software. A feed rate anywhere between 25 and 35 is acceptable. I prefer 25 inches per minute because it helps reduce the dot matrix effect that may happen at higher speeds. Once you’ve entered in your feed rate, click “OK”.

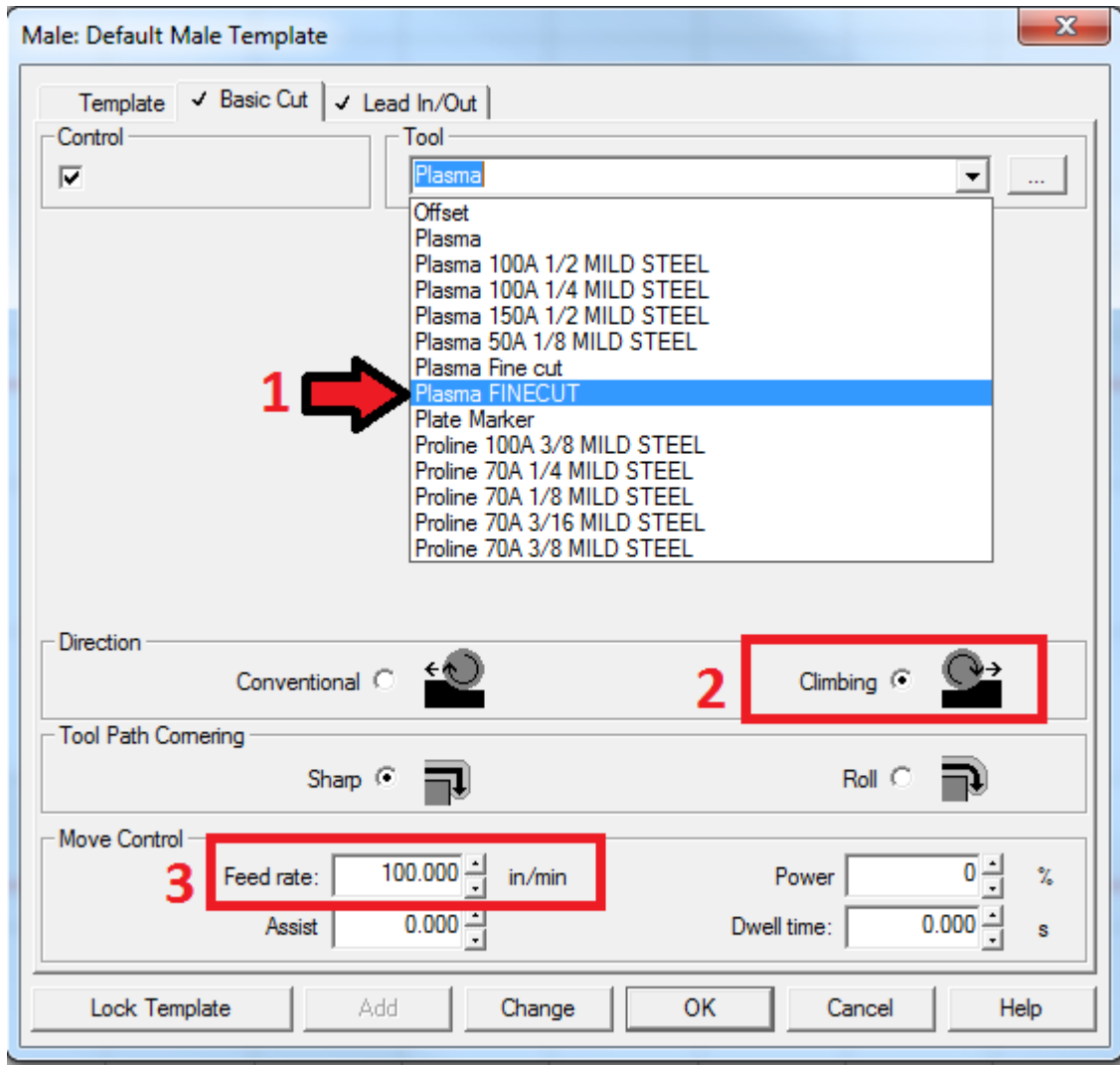


Select the rectangle and go to **[Machine > Create Tool Path > Male]**.



Pretty much the same rules apply in this tool path creation as they did when you created an online path. You'll need to choose your tool, set your direction, and choose your feed rate. All of these things are important to make sure your file works properly when you open it up inside of the Torchmate software.

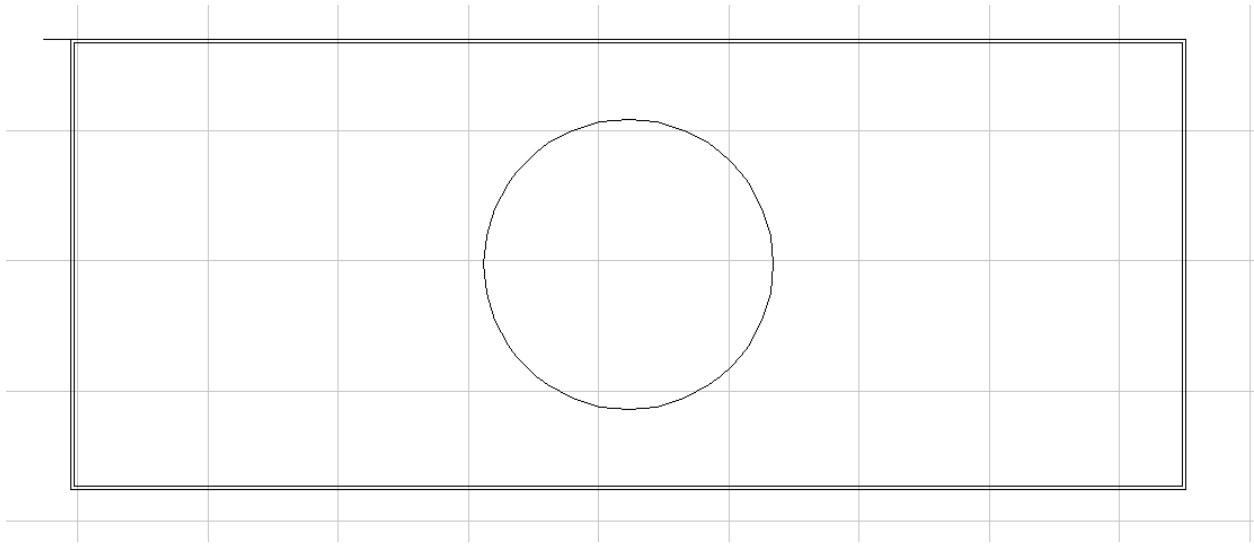
- (1) Select your plasma tool. (2) Select “Climbing” for your direction.
(3) Enter in your feed rate.



Now move on to your “Lead In/Out” tab and adjust your lead ins as you see fit. Afterwards, click “OK”.

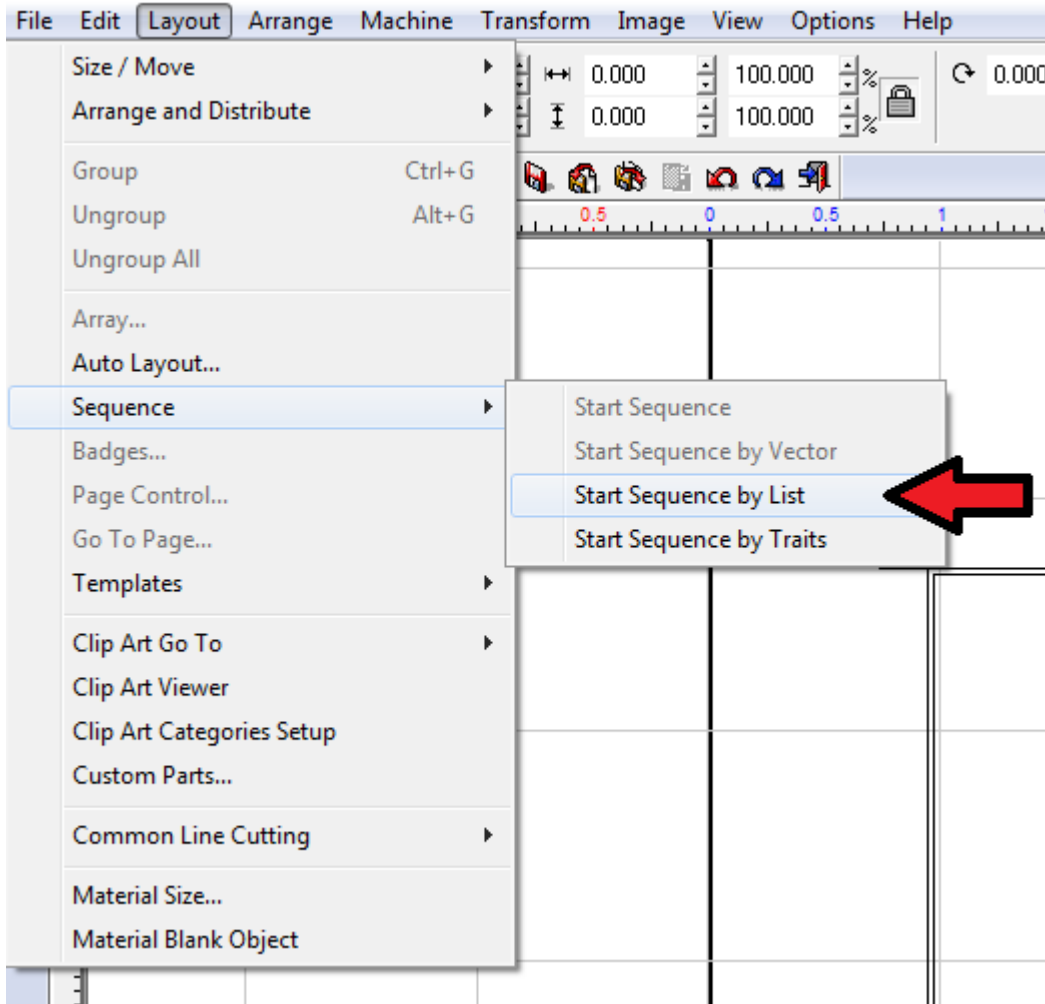
Now would be a good time to save your progress [**File > Save**]. That way if you have any problems, you can always open up your saved file and make adjustments.

By now you should have your original drawing and your tool path on the screen.



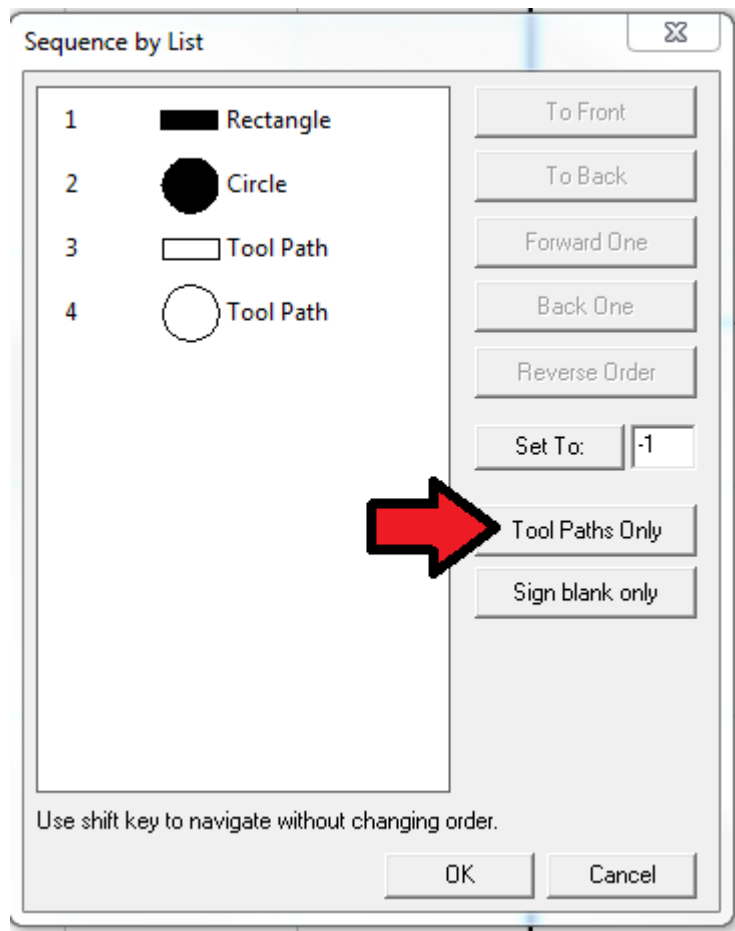
At this point, getting the file in the right order is crucial. Even though we made the tool path on the circle first, that doesn't necessarily mean it will start at the circle.

To check and correct this, we need to go to the sequence manager. To go **[Layout > Sequence > Start Sequence By List]**.

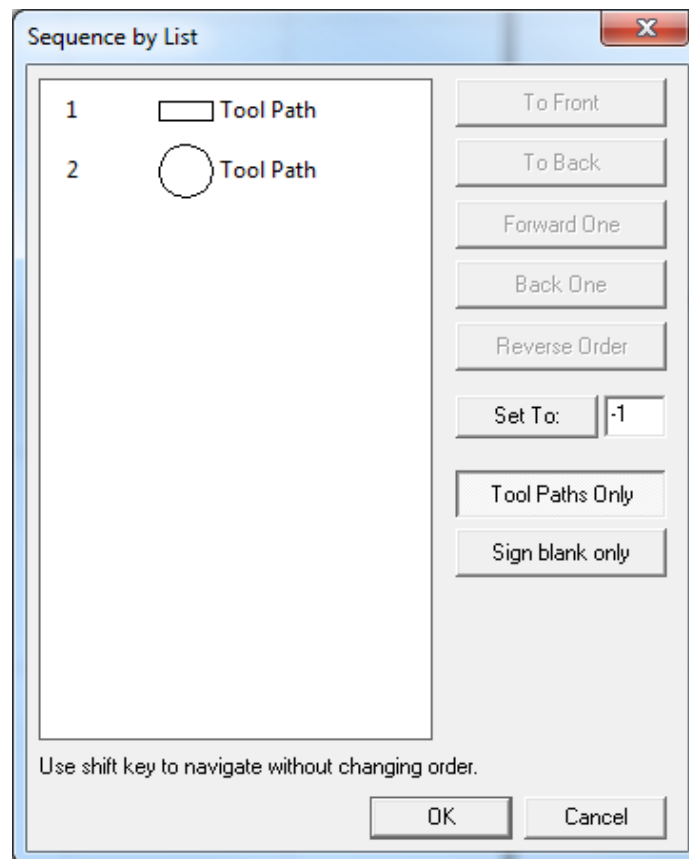


It will show you the objects you currently have in the program and list them in their cut order.

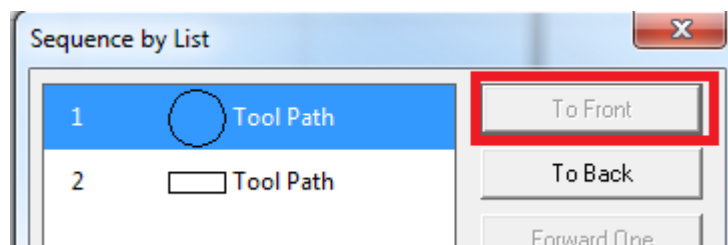
We won't be concerned with regular objects, so click on "Tool Paths Only"



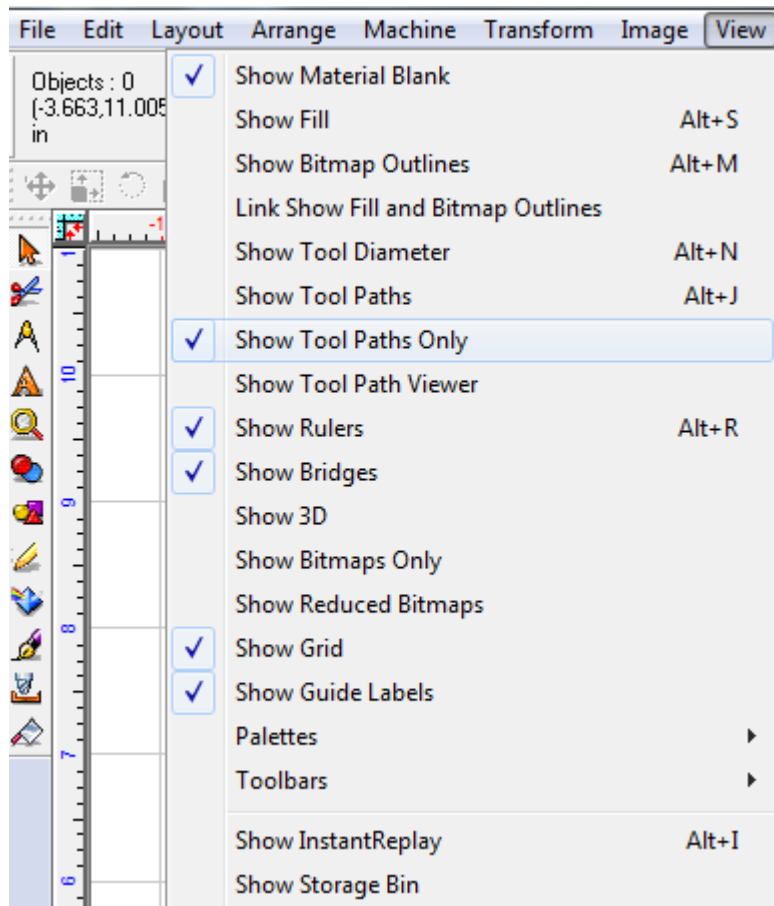
You should see something like this after click that button:



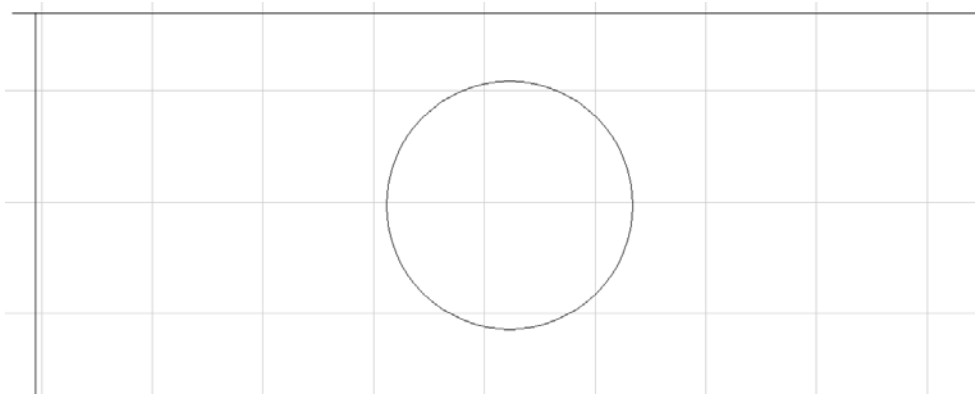
To alter the cut order, click on the object you want to move and then use the buttons to the right to move it in a direction. In this case, we want to take the circle and move it "To Front".



After that, click “OK”. Now we need to export this file to G-Code. Go to **[View > Show Tool Paths Only]**.

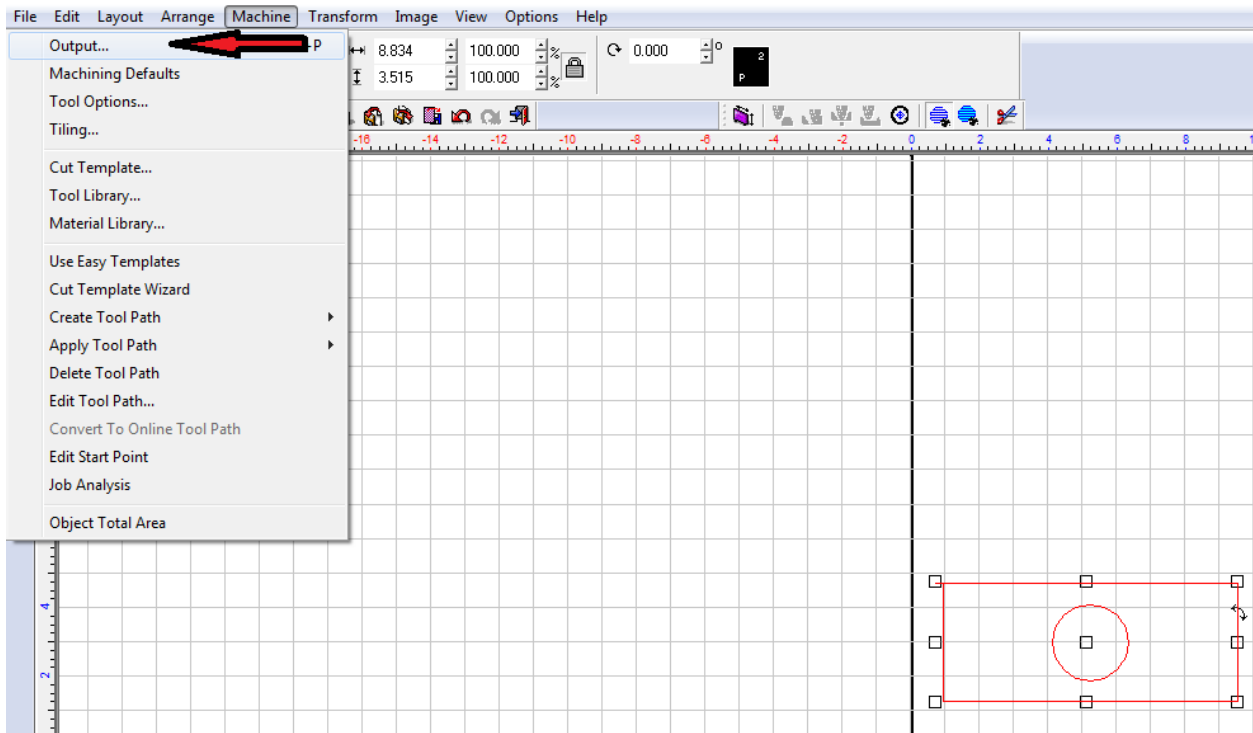


So now all that should be visible is your tool path.

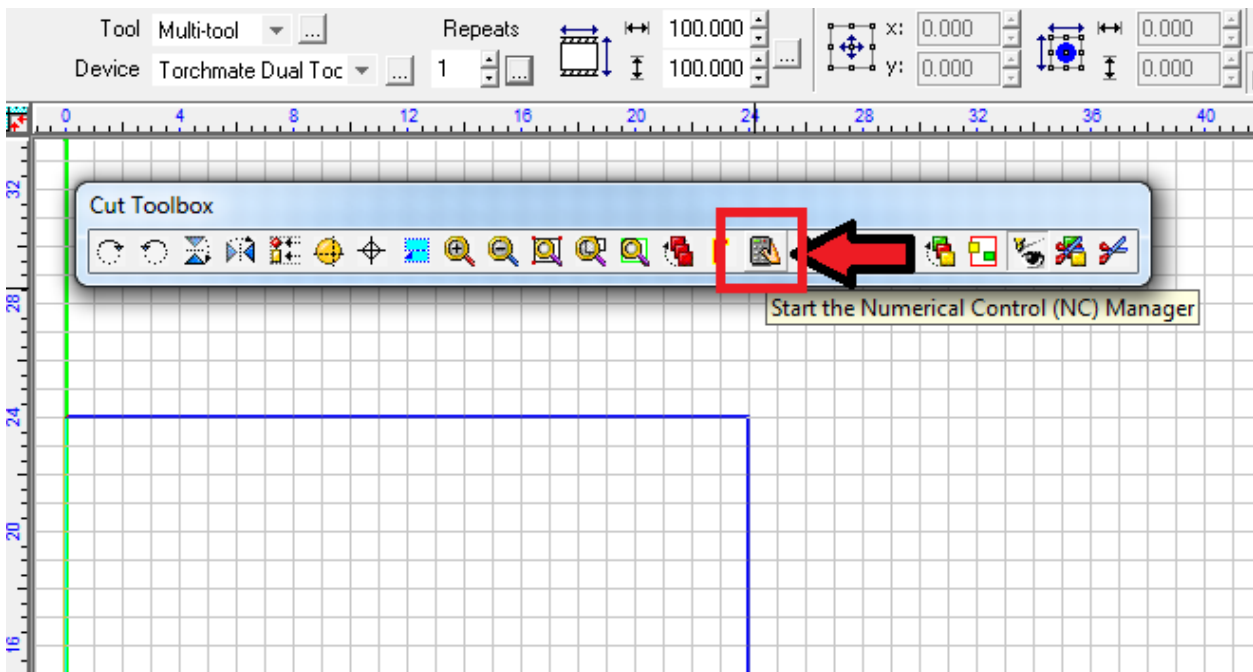


It is important that you now take the tool paths and move them to the zero location on the grid space.

Now select both the circle and rectangle and go to **[Machine > Output]**.



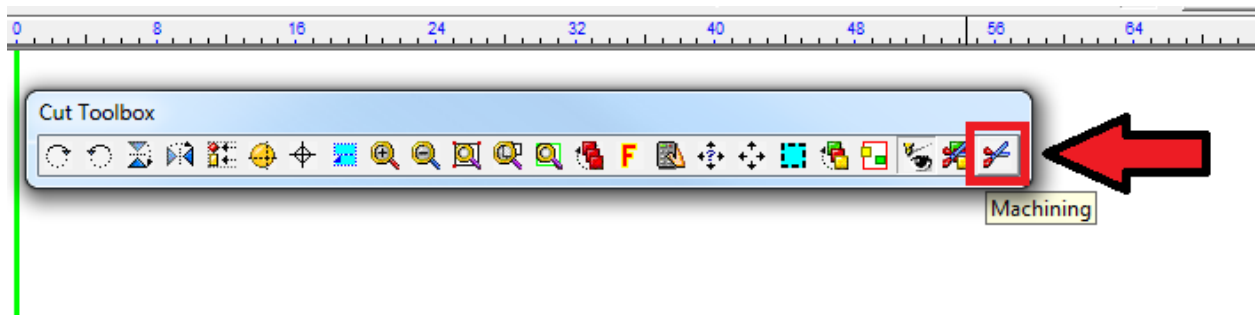
At this point, a bar will pop up with a whole lot of icons on it. For this guide, we will only be concerned with two of them. Click the calculator icon to generate the G-Code.



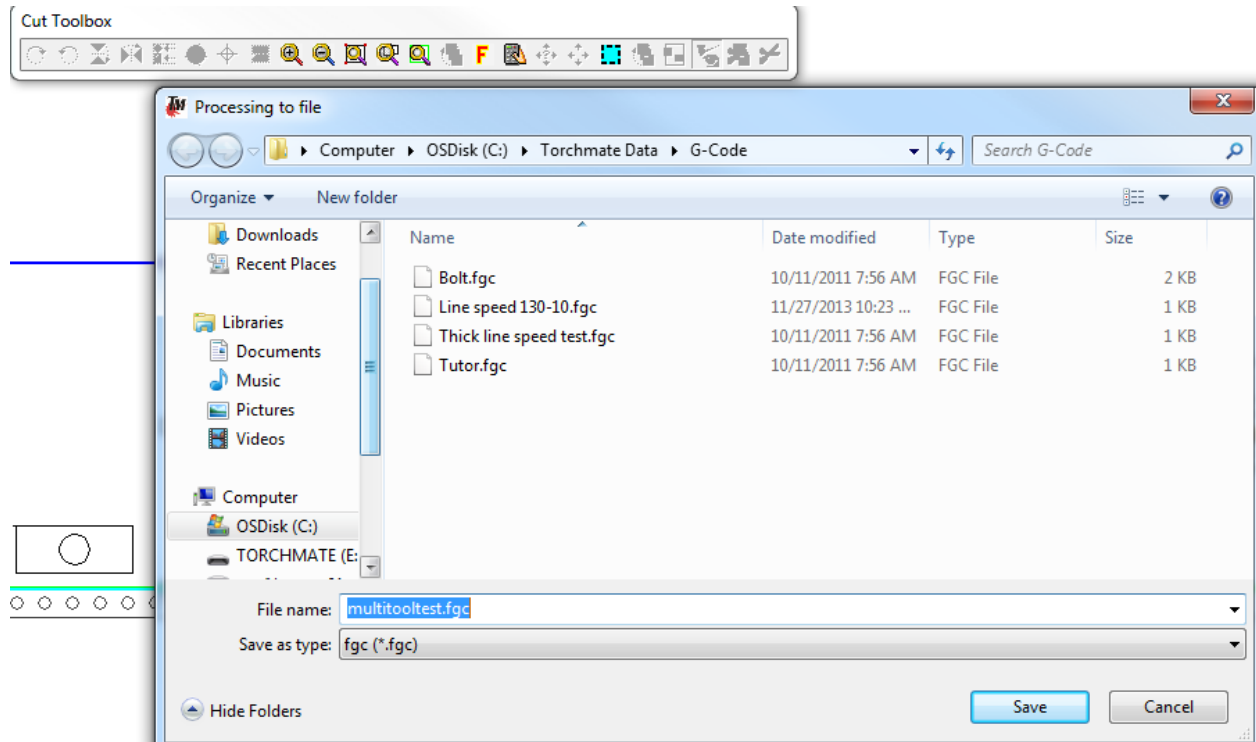
This will generate the G-Code on the right hand of the screen. It should look like this:

```
104 112 120 128
G90
M06 T2
G43 H2
G00 X5.224 Y1.863
M50
G02 X4.111 Y2.976 I0.000 J1.113 F25.000
G02 X5.224 Y4.089 I1.113 J0.000
G02 X6.337 Y2.976 I0.000 J-1.113
G02 X5.224 Y1.862 I-1.113 J0.000
M51
G00 X5.224 Y1.863
M06 T1
G43 H1
G00 X0.733 Y4.704
M50
G01 X0.942 Y4.704 F100.000
G01 X9.507 Y4.704
G01 X9.507 Y1.248
G01 X0.942 Y1.248
G01 X0.942 Y4.704
M51
G00 X0.000 Y0.000
M02
```

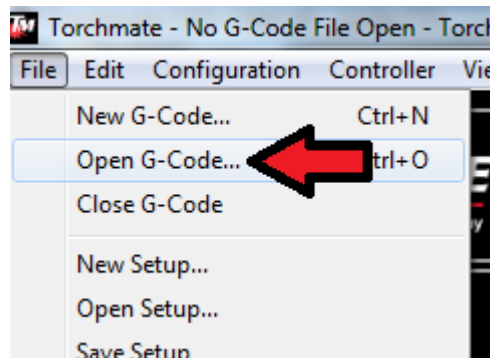
After that, click on the scissor icon on the same bar the calculator icon is on.



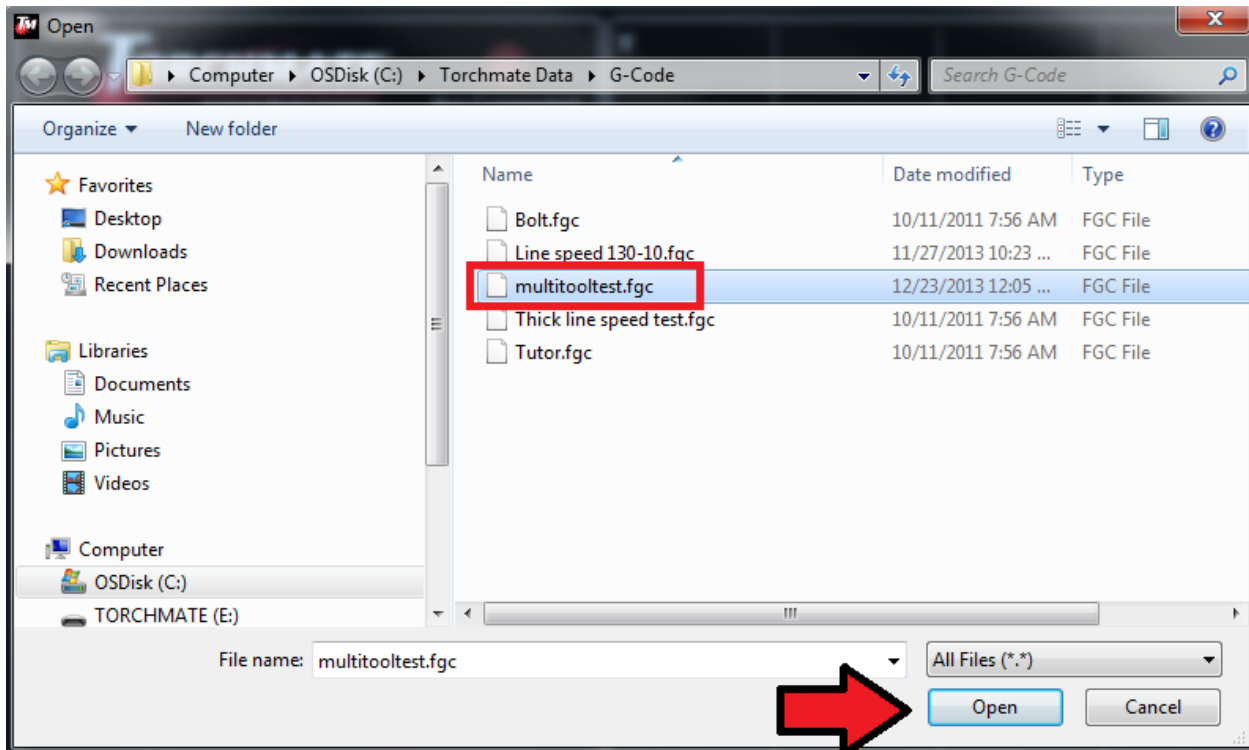
At this point, you will need to name your file and save it. It will automatically select FGC as an extension. This is the native G-Code that opens inside of the Torchmate software.



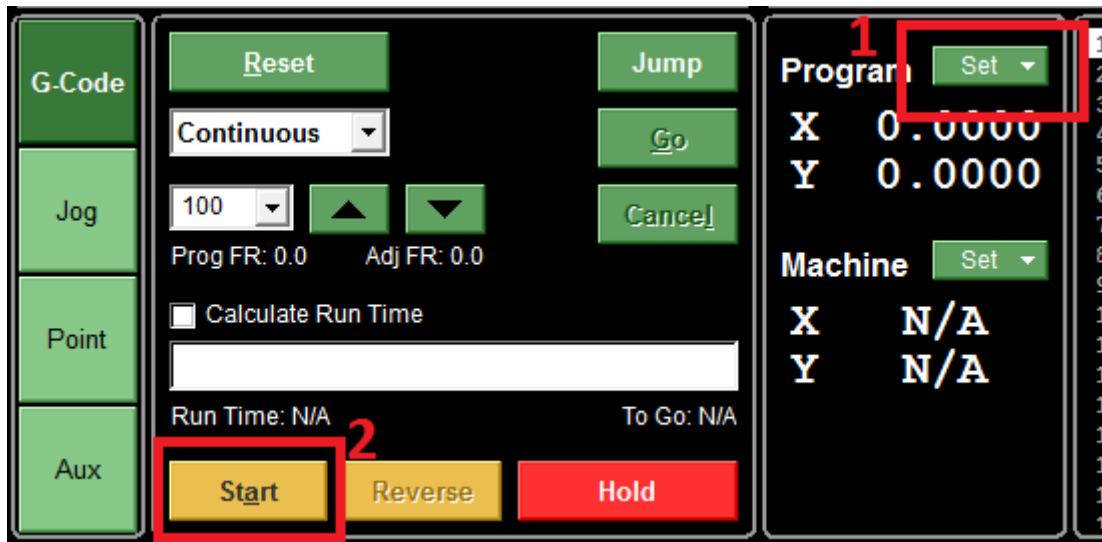
After you save the file, open up your Torchmate software. Go to **[File > Open G-Code]**.



Now just navigate to the file you just saved. Select it and then click “Open”.



This will bring your file into the Torchmate software with all of the tool changes and feed rates already entered in for you. All you need to do is **(1)**zero out your program coordinates and **(2)**hit Start.



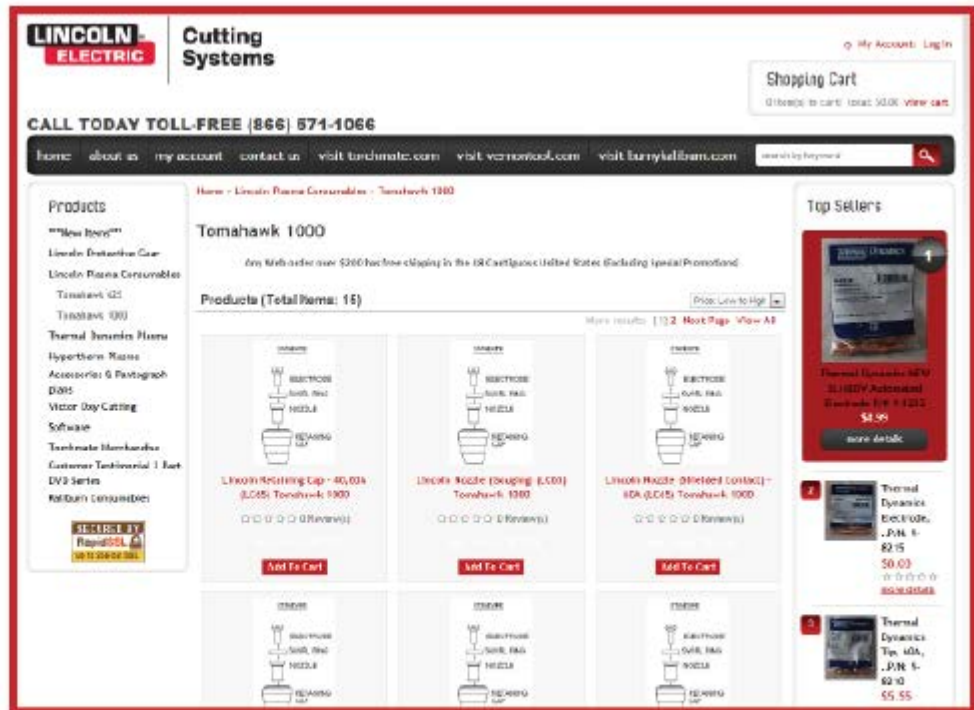
Call, Fax, or Email

- When building the table if a question or concern arises or a part is missing, please contact Torchmate technical support.
- Technical support will also help you with operating the CNC system, and troubleshooting problems.
- Torchmate Technical support is available Monday through Friday from 6 AM to 4 PM (06:00 to 16:00) Pacific Time Zone.



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