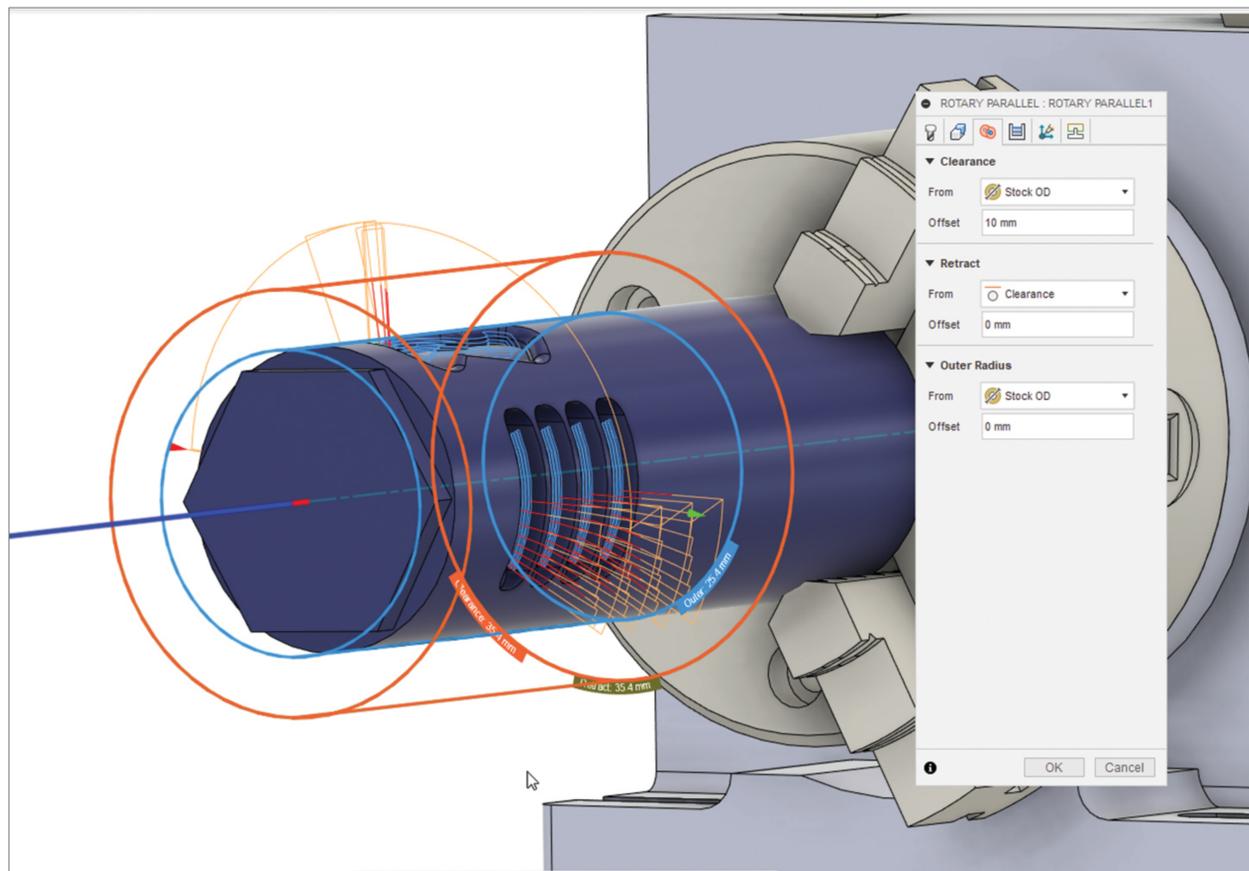


## HOW TO CREATE YOUR FILE & GCODE IN FUSION FOR THE TORMACH PCNC440 & ARC4

### V1

JANUARY 16, 2025



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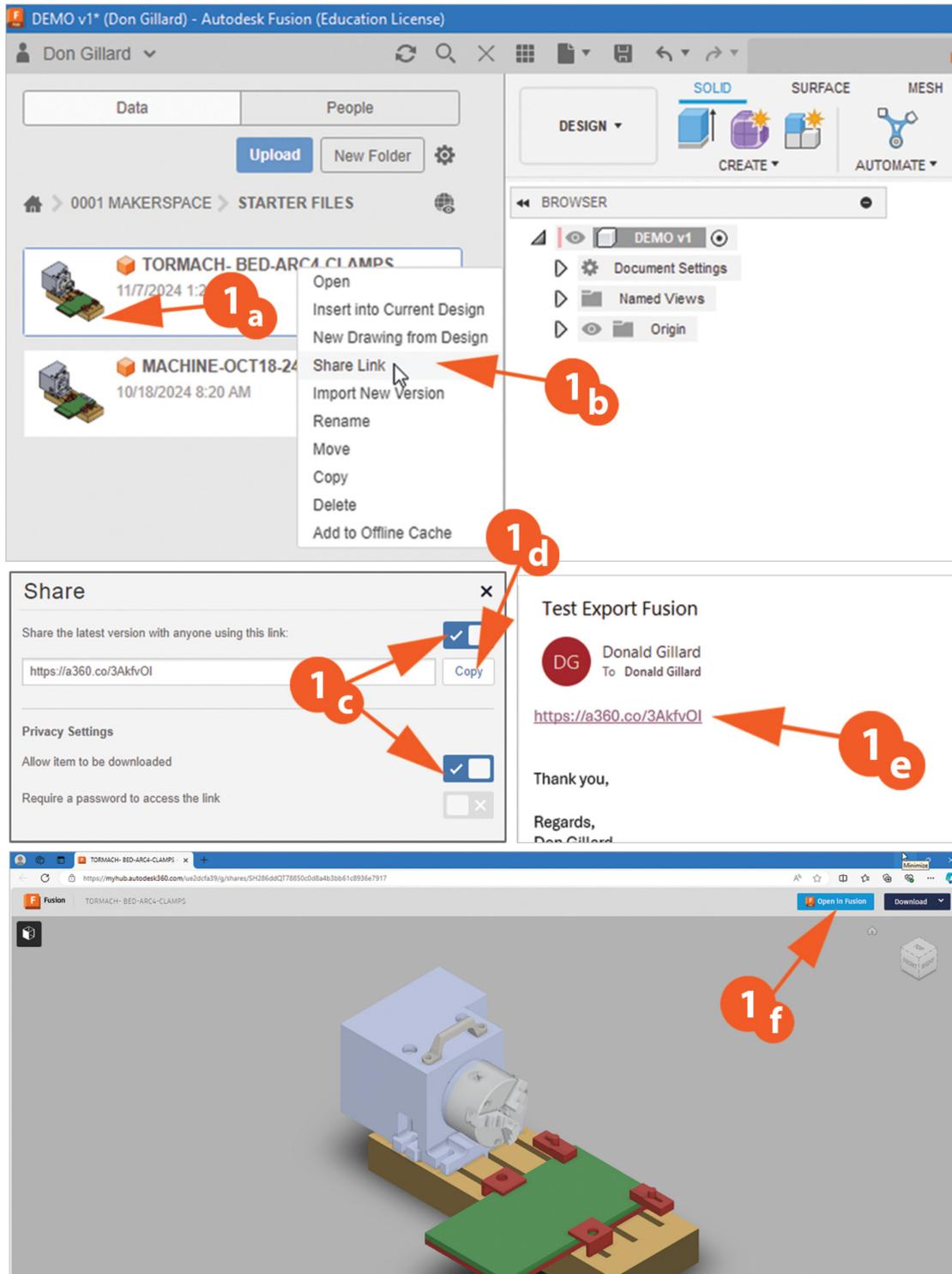
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**1**

**Exporting A Model**

To export a Fusion drawing/model.

1a - Right click on the model for export.

1b - Select Share Link.

1c - Click the boxes as shown.

1d - Copy the link and email to the recipient.

**Importing The ARC4 & 4th Axis Support Models**

1e - Click on the shared **Link** in your email.

1f - From the pop-up viewer, Click on **Open In Fusion**.

Save the file to a folder of your choice.

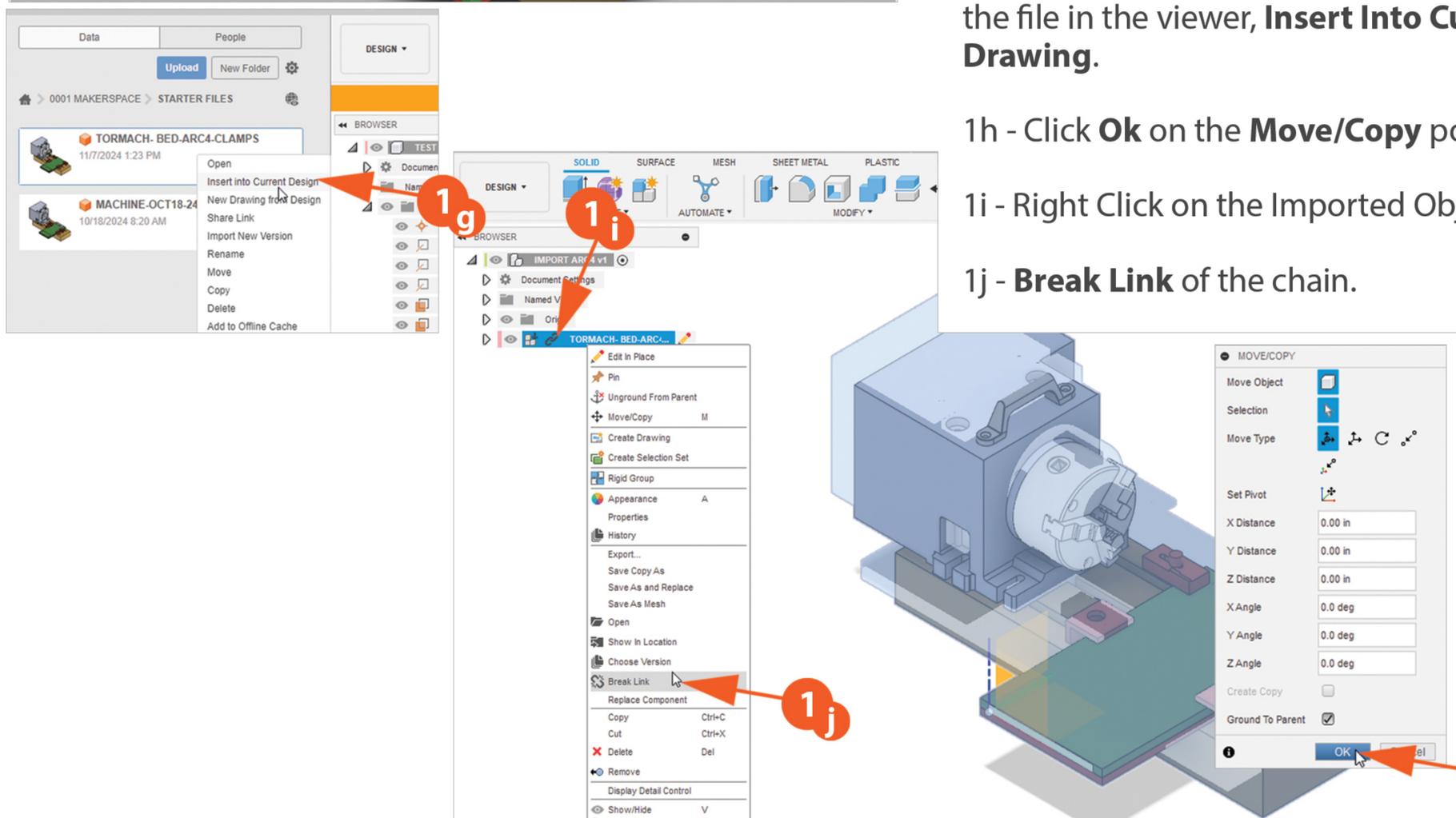
You can now either use this file to start and build your object (just open it)....

1g - Or you can import it into an existing file. Have your existing file open in Fusion, Click on the file in the viewer, **Insert Into Current Drawing**.

1h - Click **Ok** on the **Move/Copy** pop-up.

1i - Right Click on the Imported Object.

1j - **Break Link** of the chain.



**2**

**Setting Up Your Object & Sketches**

Build your round stock & your object to be machined in the Fusion **Design Module**.

2a - Create a Construction line - **Axis Through Cylinder**...

2b - Select the inside cylinder of the ARC4.

2c - Create an Object for your **Round Stock** size and shape. It should start with a sketch located on the jaws of the ARC4 (ie where your stock will sit flush to.)

- 2.5" is the maximum diameter of the stock.
- 6" is the maximum length of the stock.

2d - Create a Construction line for your - **Axis Through Cylinder**.

**NOTE**

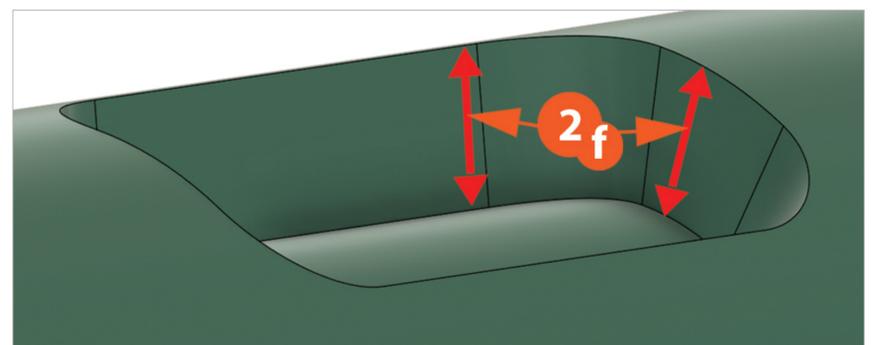
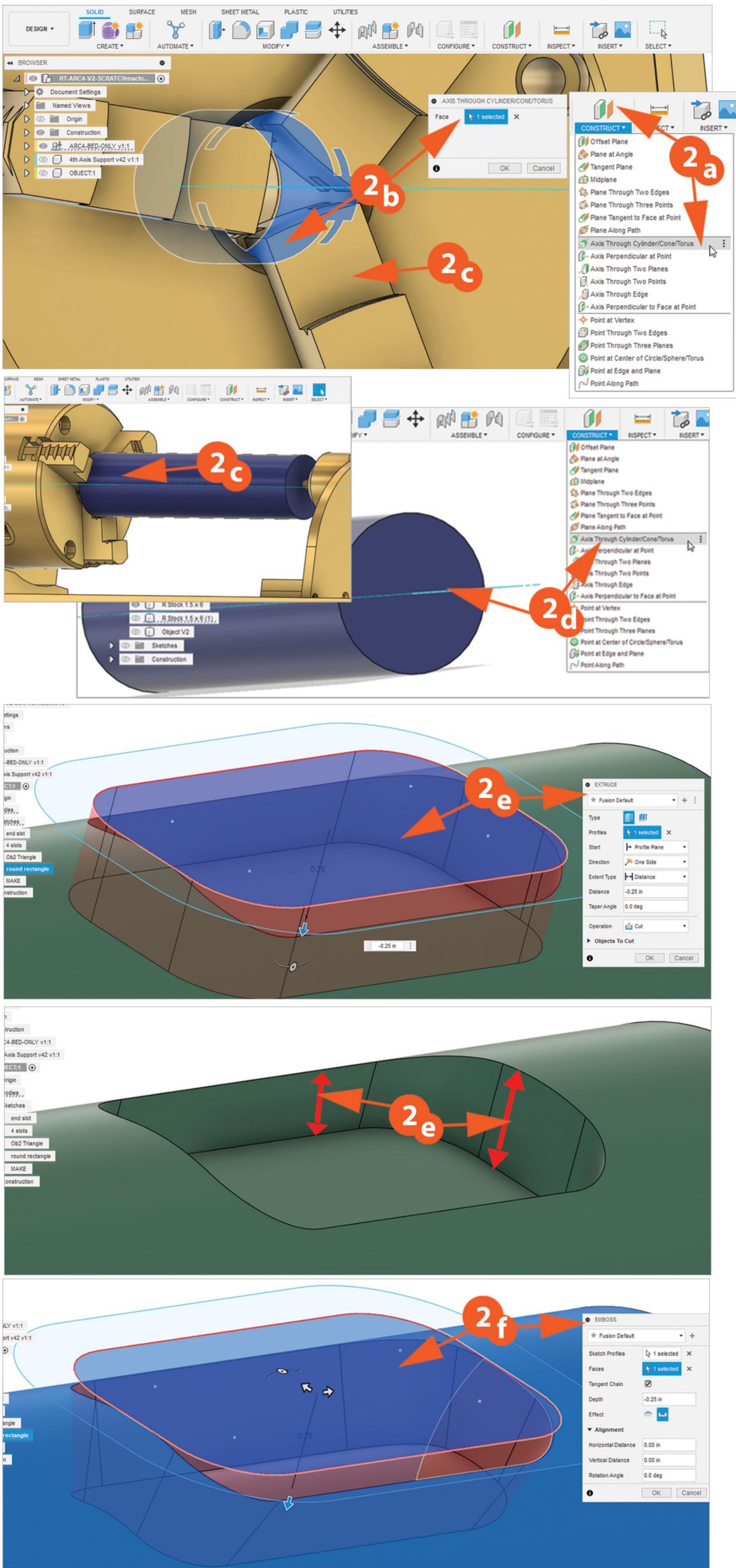
When building your object there are 2 different ways you can create a "cut out" feature:

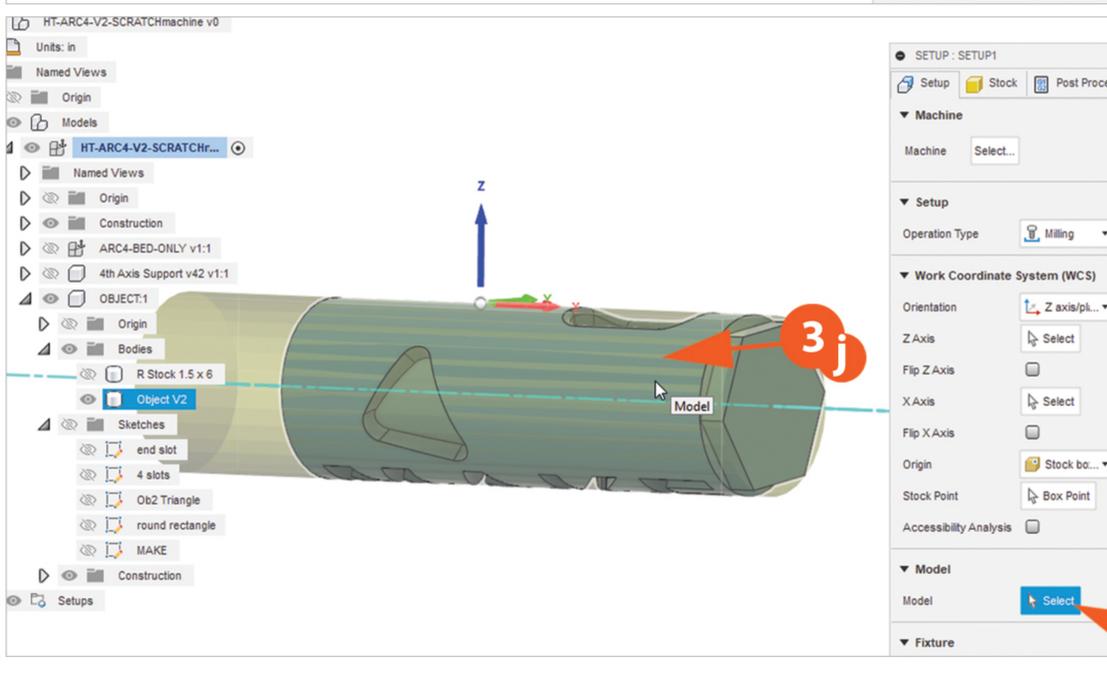
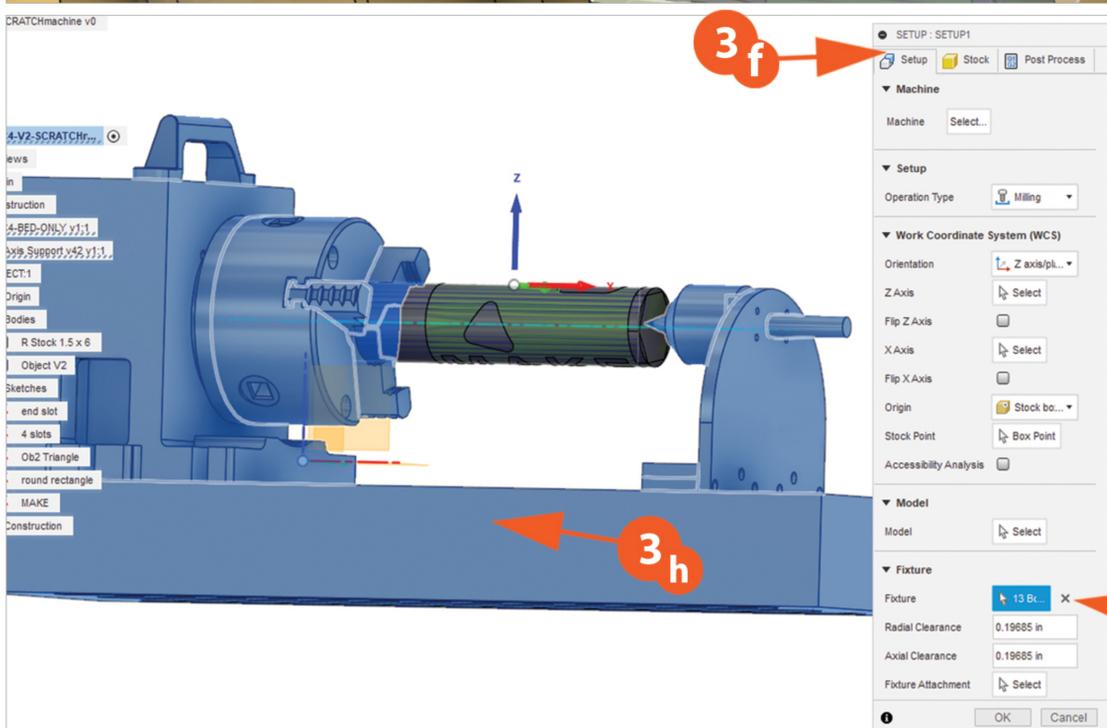
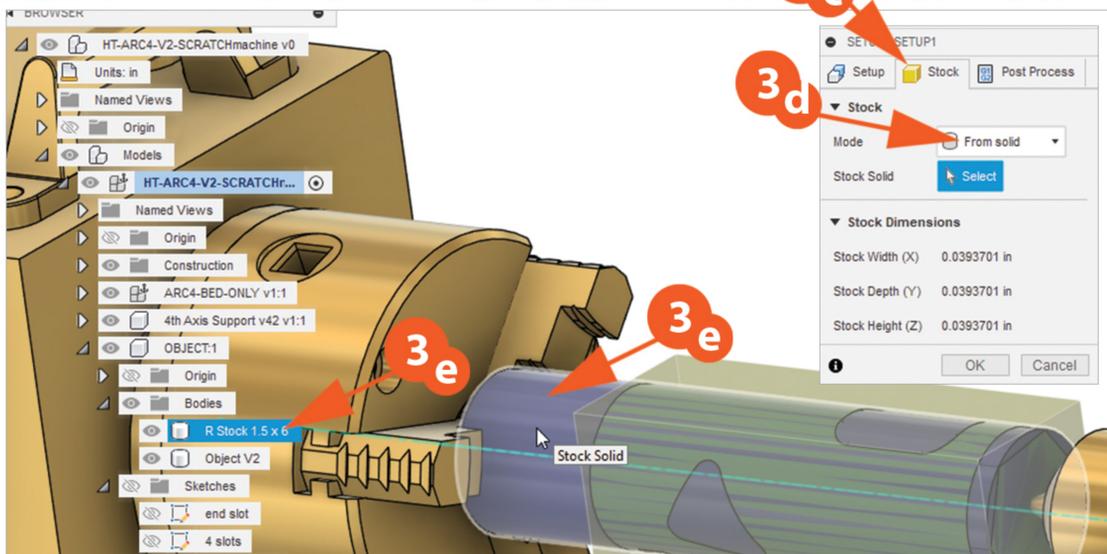
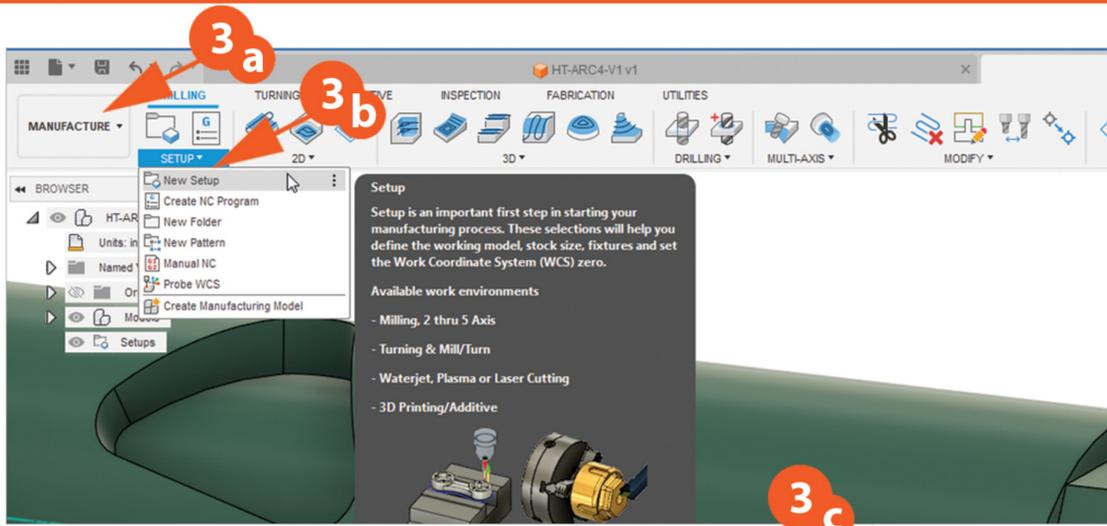
2e - Extruding a Sketch.  
Select **Create/Extrude**.

This will create a floor that has side walls at different heights.

2f - Embossing a Sketch.  
Select **Create/Emboss**.

This will create a floor that follows the curvature (an offset curve) of the round stock. The side walls will all be the same height.





**3**

**MANUFACTURE MODULE**

3a - Change to the MANUFACTURE module.

3b - Click on SETUP/NEW SETUP.

3c - Click on the STOCK tab.

3d - STOCK/MODE /FROM SOLID.

3e - Make sure your stock is visible. Select your Round Stock.

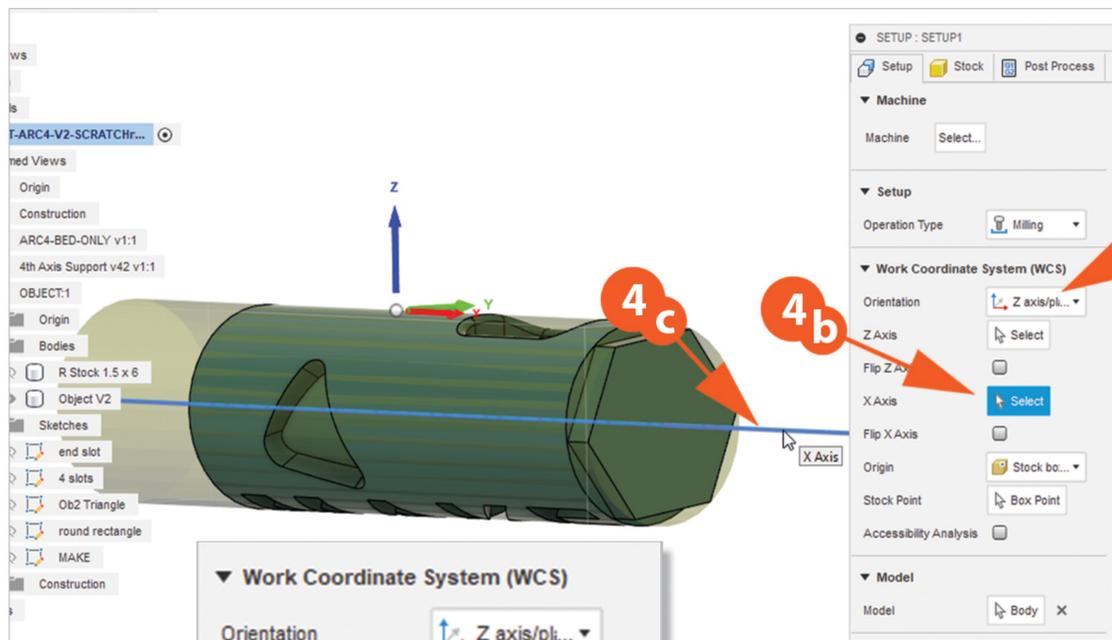
3f - Click on the SETUP tab.

3g - Click on FIXTURE/FIXTURE.

3h - Select all of the ARC4 parts as well as the 4th Axis support parts & the Tormach bed. They should all turn blue.

3i - Click on MODEL.

3j - Click on your MODEL. You may need to hide the Stock to be able to click on the Model.



**4**

**4a**

**SETUP CONTINUED**

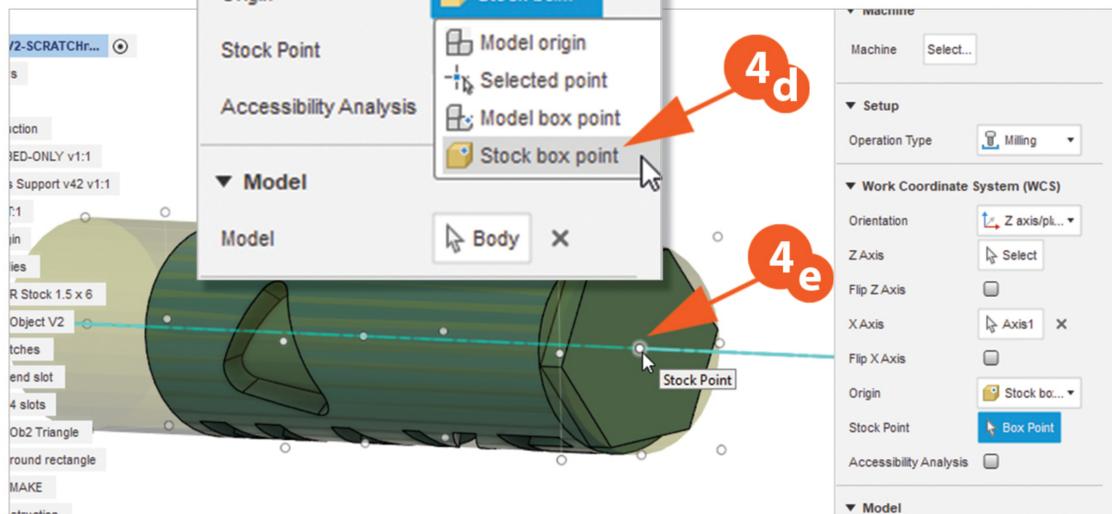
4a - Click on ORIENTATION/Z AXIS PLANE & X AXIS PLANE.

4b - Click on X AXIS/SELECT.

4c - Click on your X Axis Construction line.

4d - Click on ORIGIN/STOCK BOX POINT.

4e - Select the Center End Point of your model.



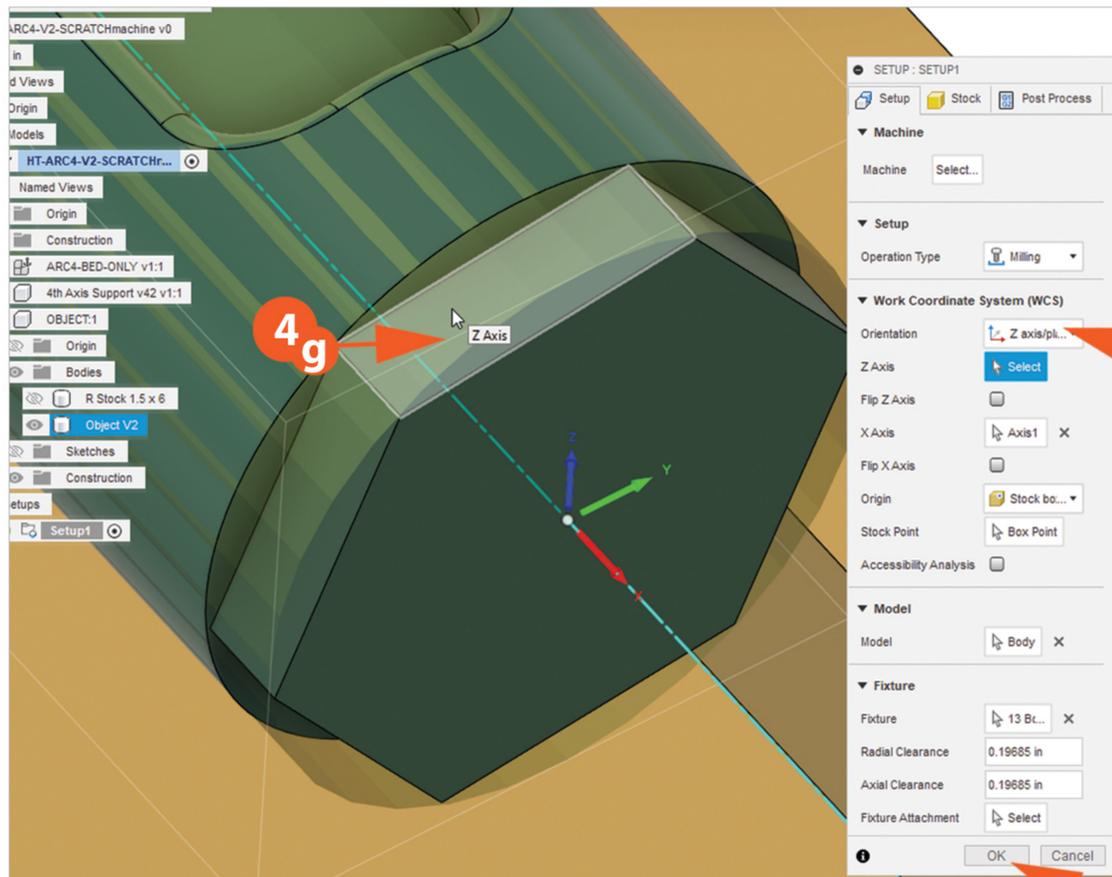
**4d**

**4e**

4f - Select the WCS/Z AXIS.

4g - Select a surface of your model facing up or select the top of the ARC4.

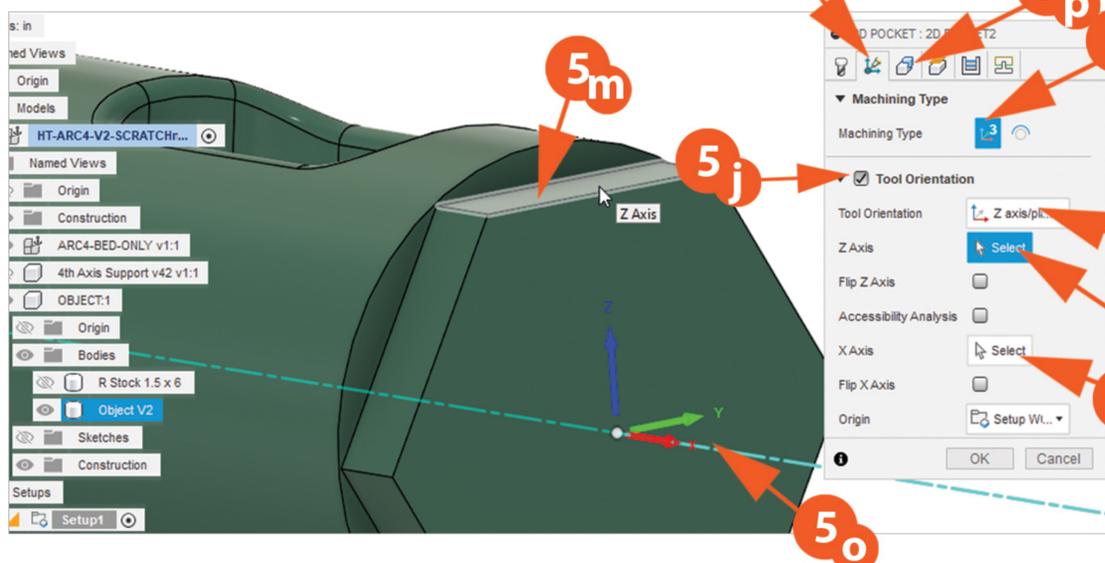
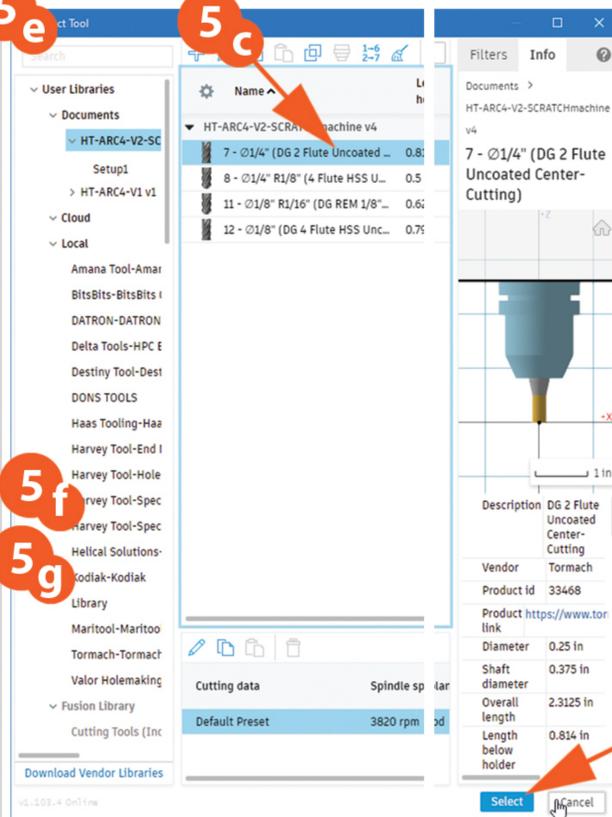
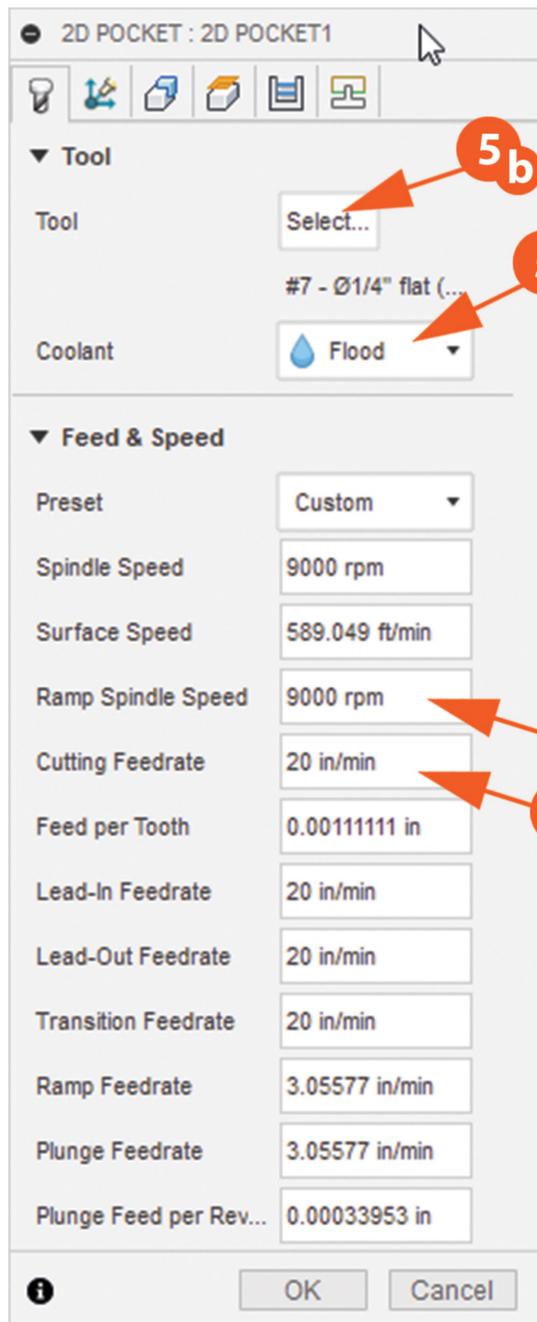
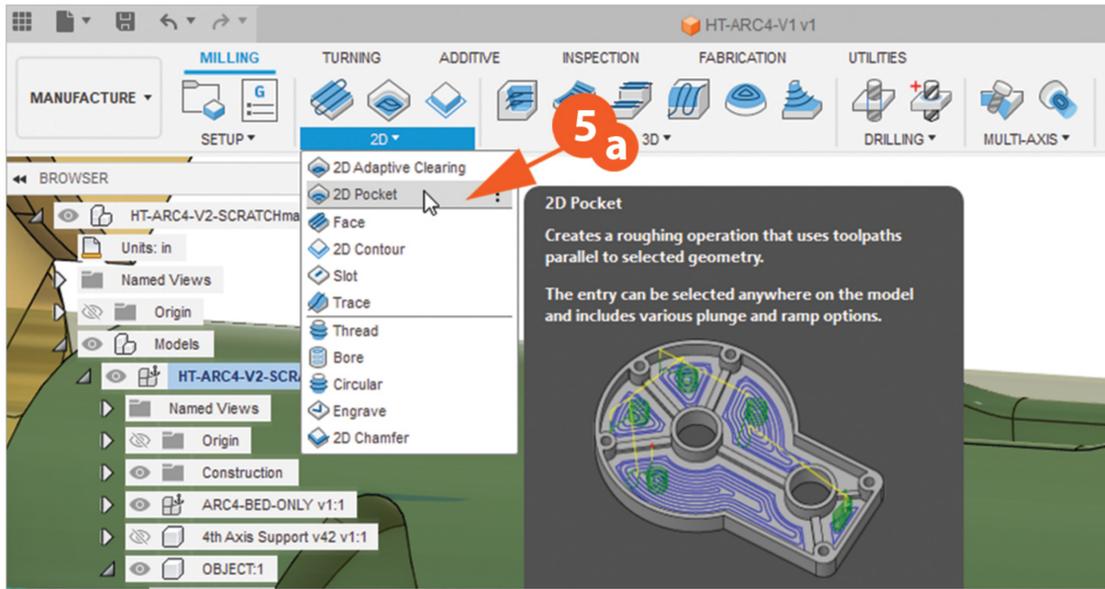
4h - Click OK.



**4g**

**4f**

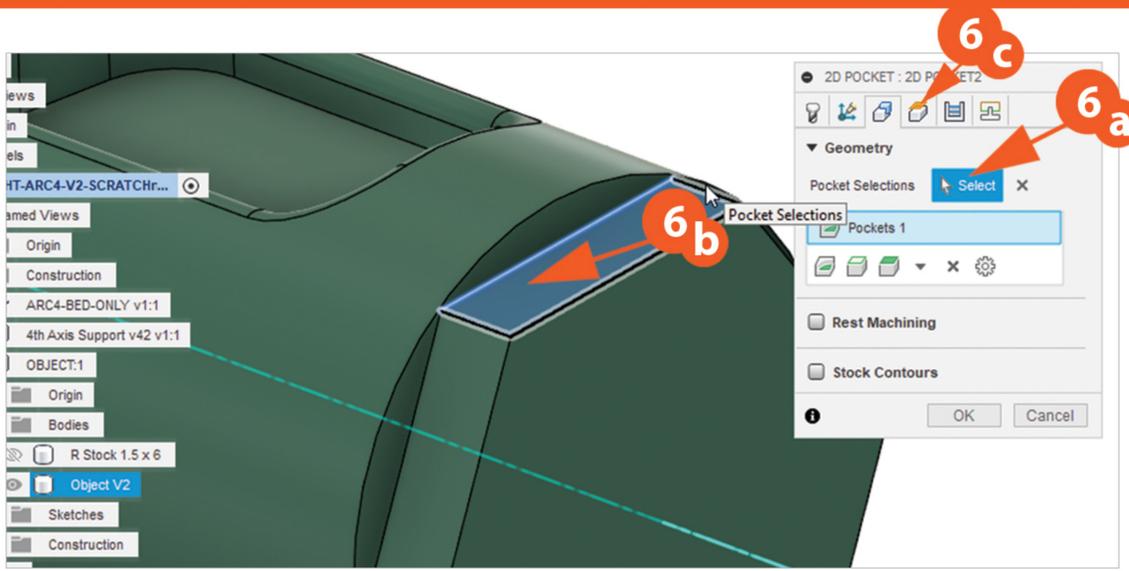
**4h**



**5**

**SAMPLE 1 - HEXAGON END  
2D POCKET OPERATION**

- 5a - Select 2D/2D POCKET.
- 5b - From the pop-up select TOOL/SELECT.
- 5c - Select Tool #T7, .25" FEM.
- 5d - Click SELECT.
- Enter the Following under FEED & SPEED (these settings can be found using GWizard):
- 5e - Coolant = Flood.
- 5f - Spindle Speed = 9000 to 10000.
- 5g - Cutting Feed rate = 20 in/min.
- 5h - Click on the MULTI-AXIS tab.
- 5i - Click on MACHINE TYPE/3 AXIS.
- 5j - Check TOOL ORIENTATION.
- 5k - Select Z AXIS PLANE & X AXIS.
- 5L - Click on Z AXIS/ SELECT.
- 5m - Select the top face of the Hexagon.
- 5n - Click on X AXIS/SELECT.
- 5o - Click on the X Axis Construction line.
- 5p- Click on the GEOMETRY tab.



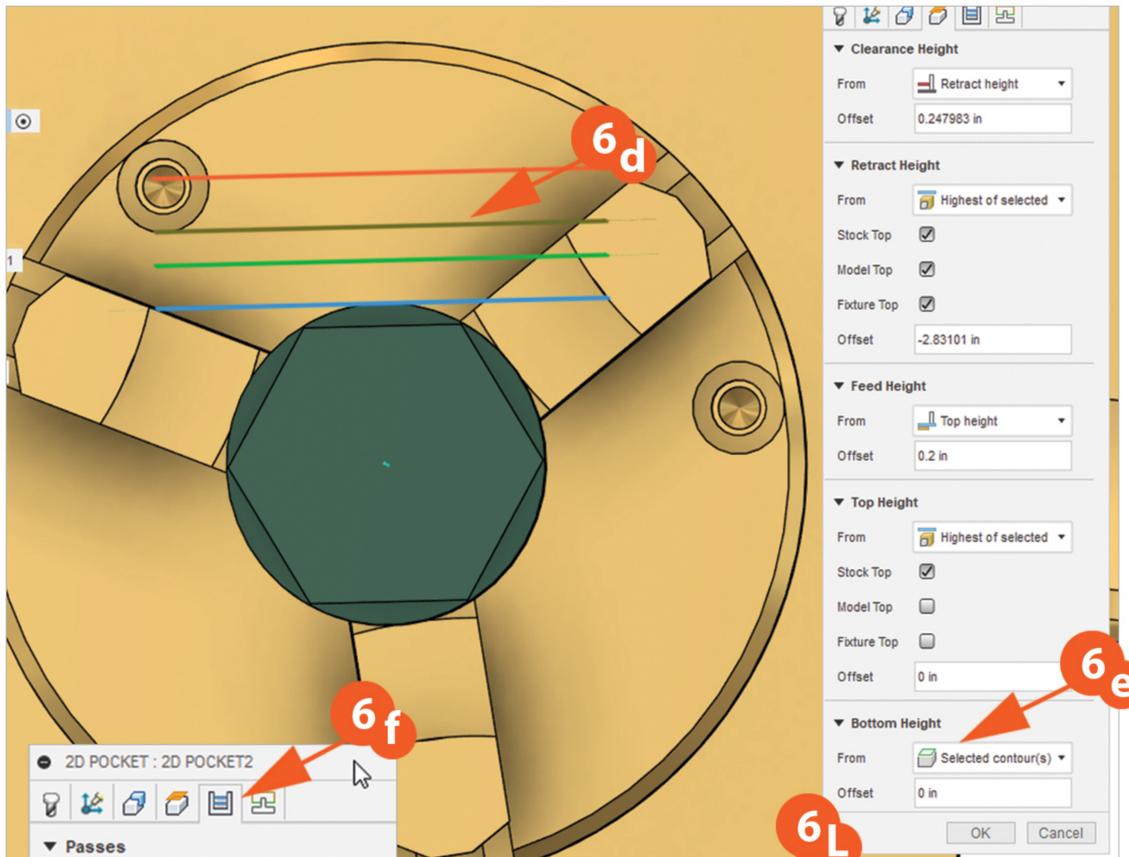
**6**

**SAMPLE 1 - HEXAGON END  
2D POCKET OPERATION CONTINUED**

6a - Click on POCKET SELECTIONS/SELECT.

6b - Click on the top face of the Hexagon.

6c - Click on the HEIGHTS tab.



6d - You can grab each height line with your mouse and move it or enter numbers into the slots for each height. It should look something like this.

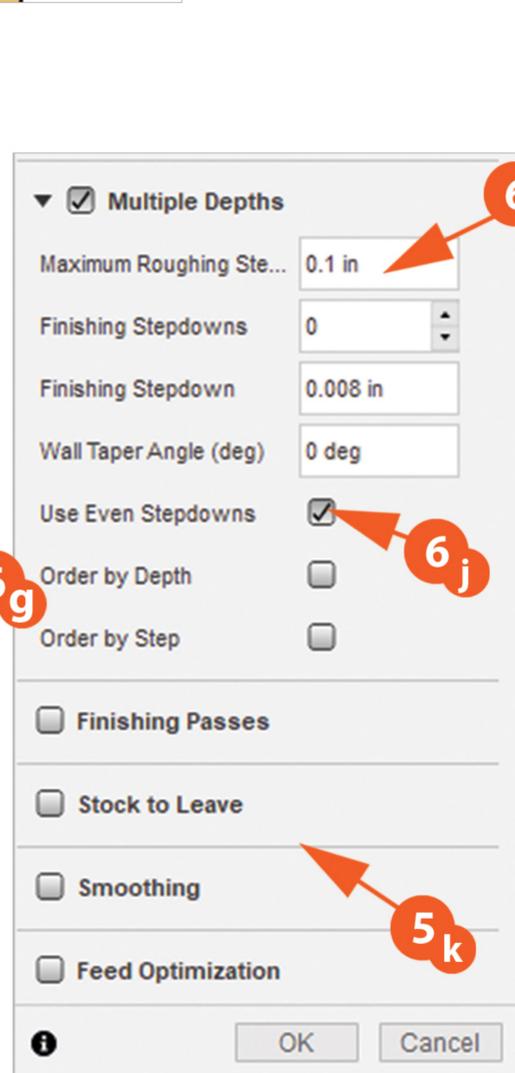
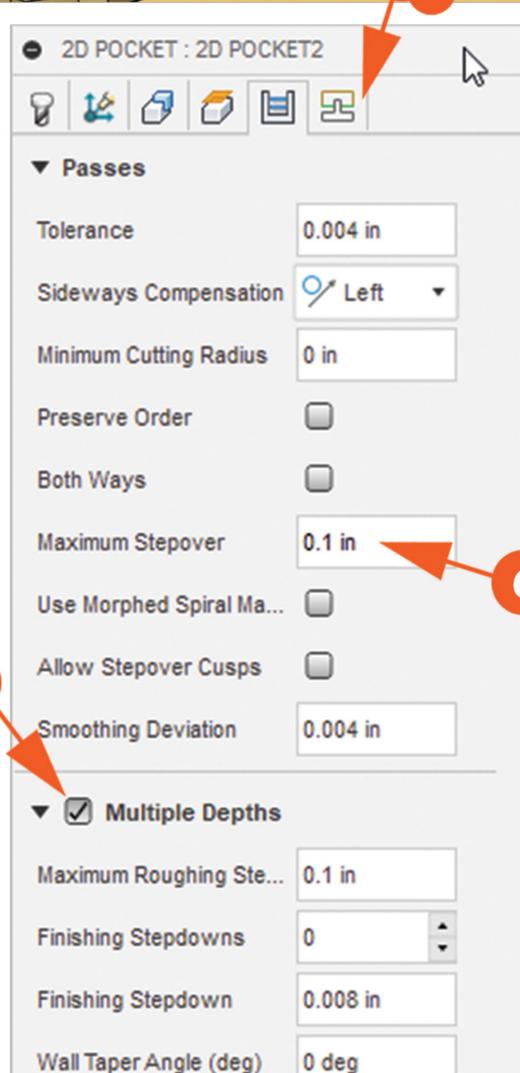
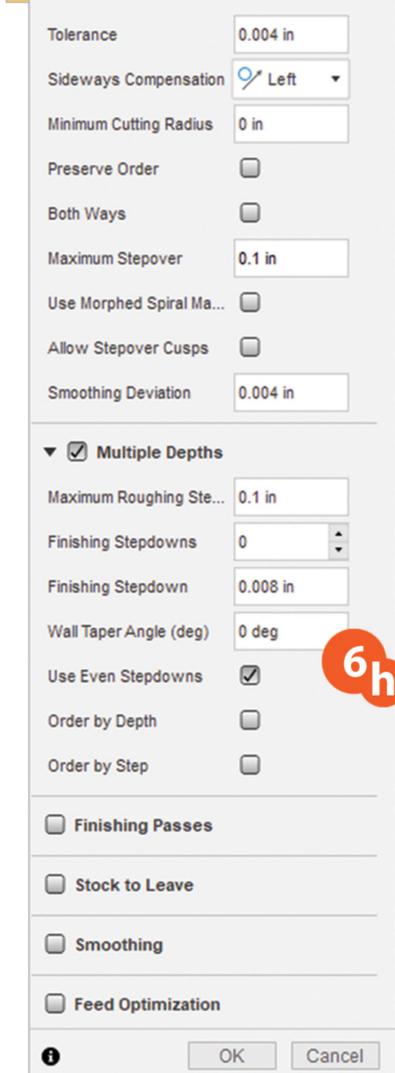
6e - The Bottom Height is using the selected contour (the face we selected earlier) so it is not visible.

6f - Select the PASSES tab.

6g - Enter .1" for the MAXIMUM STEPOVER.

6h - Check MULTIPLE DEPTHS.

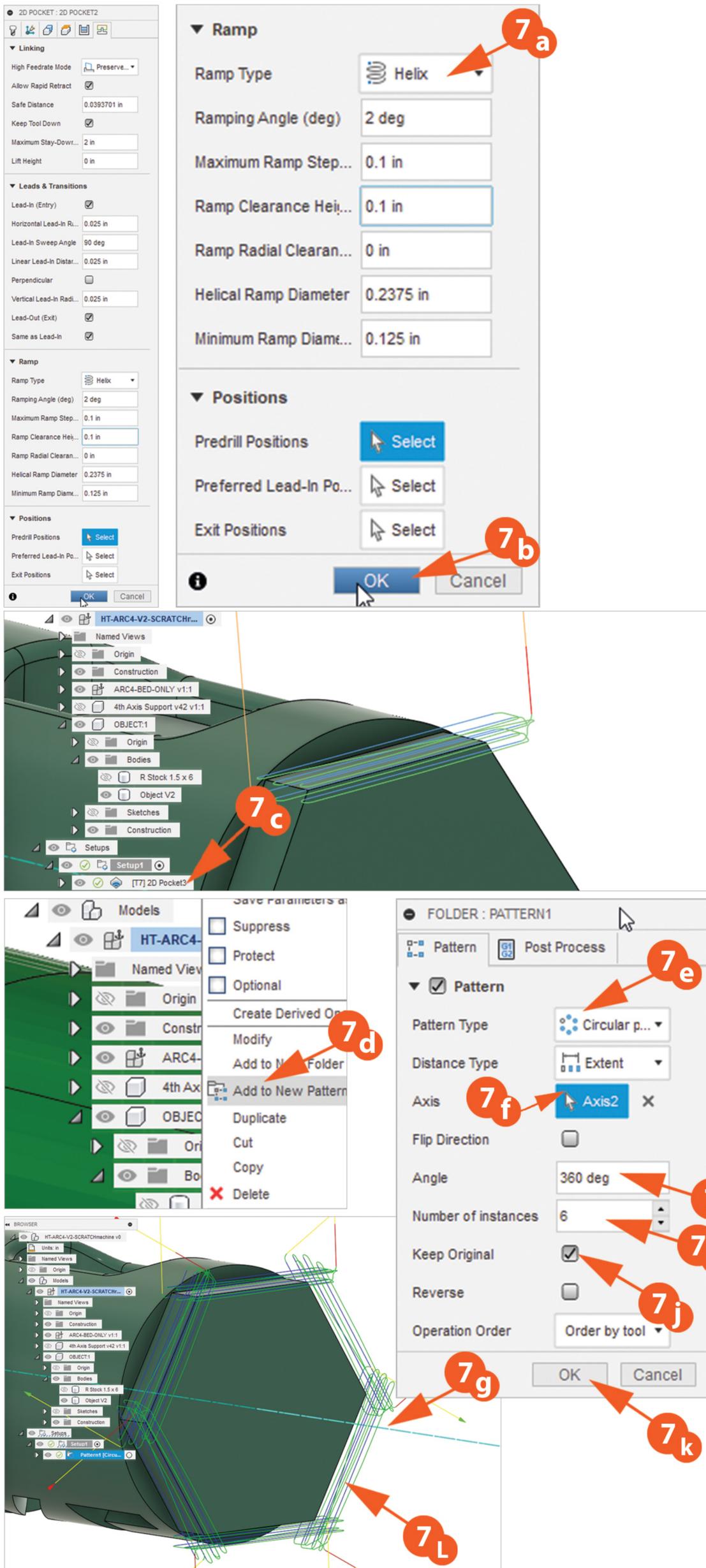
6i - Enter .1" for the MAXIMUM ROUGHNING STEPDOWN.



6j - Check EVEN STEPDOWN.

6k - Leave the lower check boxes unchecked.

6L - Click on the LINKING tab.



# 7

## SAMPLE 1 - HEXAGON END 2D POCKET OPERATION CONTINUED

7a - Select RAMP TYPE/HELIX.

7b - Click OK.

## SAMPLE1 - HEXAGON END CREATE A PATTERN

7c - Right Click on the 2D POCKET.

7d - From the pop-up menu click on ADD TO NEW PATTERN.

7e - From the pop-up menu, select PATTERN TYPE/CIRCULAR PATTERN.

7f - Click on AXIS/SELECT.

7g - Select the Models Axis Construction Line.

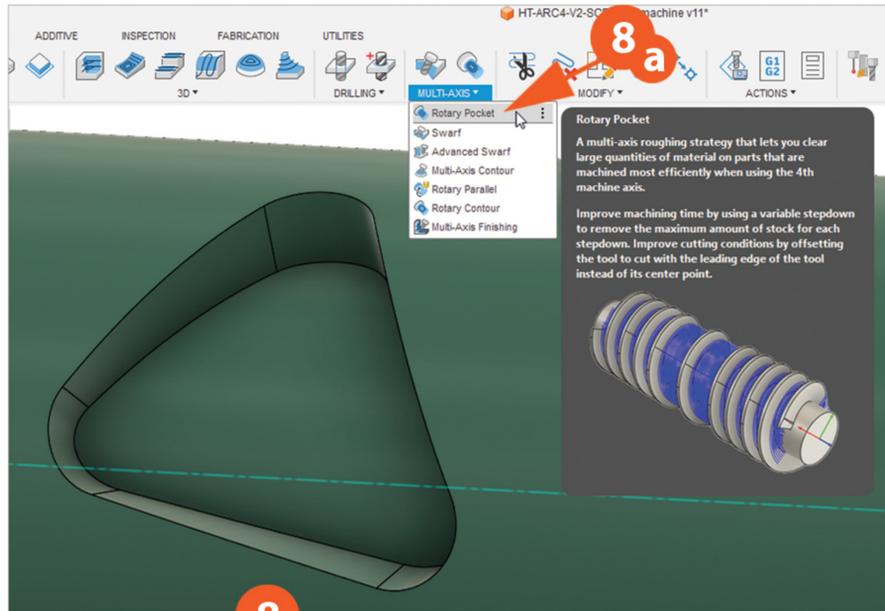
7h - Type in 360 Deg for the ANGLE.

7i - Choose 6 for the NUMBER OF INSTANCES.

7j - Check KEEP ORIGINAL.

7k - Click OK.

7L - You should now see the 6 pocket operations.



**8**

**SAMPLE 2  
TRIANGULAR POCKET  
ROTARY POCKET OPERATION**

8a - Select MULTI-AXIS/ ROTARY POCKET.

8b - Click on TOOL/ SELECT.

8c - On the pop-up menu, select #12 - 1/8" FEM.

Name	Length below holder	Corner radius	Diameter	Flute length	Number
7 - Ø1/4" (DG 2 Flute Uncoated ...	0.814 in	0 in	DG 2 Flute Un...	0.25 in	7
8 - Ø1/4" R1/8" (4 Flute HSS U...	0.5 in	0.125 in	4 Flute HSS ...	0.3 in	8
11 - Ø1/8" R1/16" (DG REM 1/8"...	0.625 in	0 in	DG REM 1/8" ...	0.125 in	11
12 - Ø1/8" (DG 4 Flute HSS Unc...	0.79433 in	0 in	DG 4 Flute H...	0.375 in	12

Cutting data	Spindle speed	Surface speed	Cutting feedrate	Feed per tooth	Lead-in feedrate	Lead-out feedrate	Coolant
Default Preset	3056 rpm	99.99984 ft/...	11.001 in/min	0.0009 in	11.001 in/min	11.001 in/min	Flood

8d - Click on SELECT.

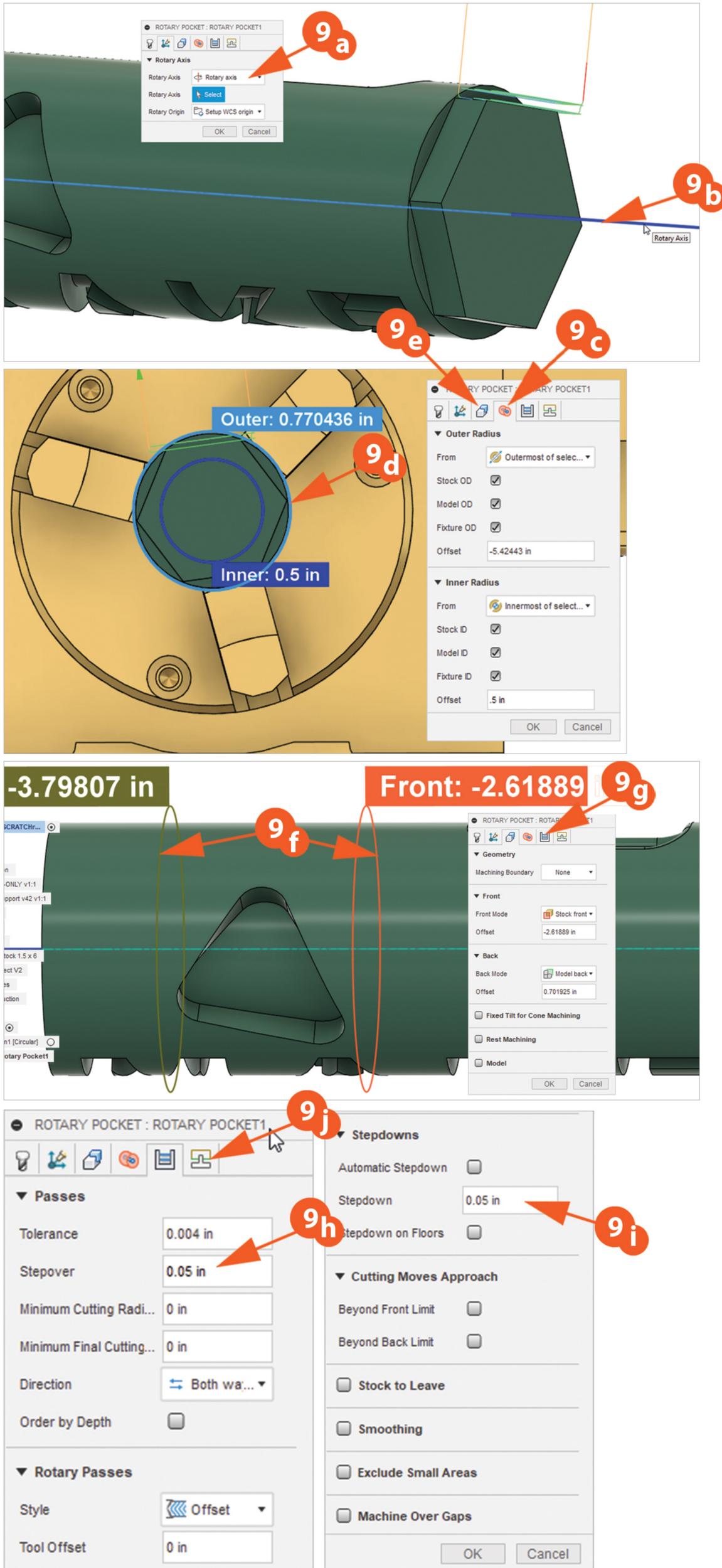
Enter the Following under FEED & SPEED (these settings can be found using GWizard):

8e - Coolant = Flood.

8f - Spindle Speed = 9000 to 10000.

8g - Cutting Feed rate = 12 in/min.

8h - Click on the MULTI-AXIS tab.



**9**

**SAMPLE 2  
TRIANGULAR POCKET  
ROTARY POCKET OPERATION CONTINUED**

9a - Select the ROTARY AXIS/ROTARY AXIS.

9b - Select the Models Construction Axis.

9c - Click on the RADII tab.

9d - Setup the Outer and Inner Radius as shown.

9e - Click on the GEOMETRY tab.

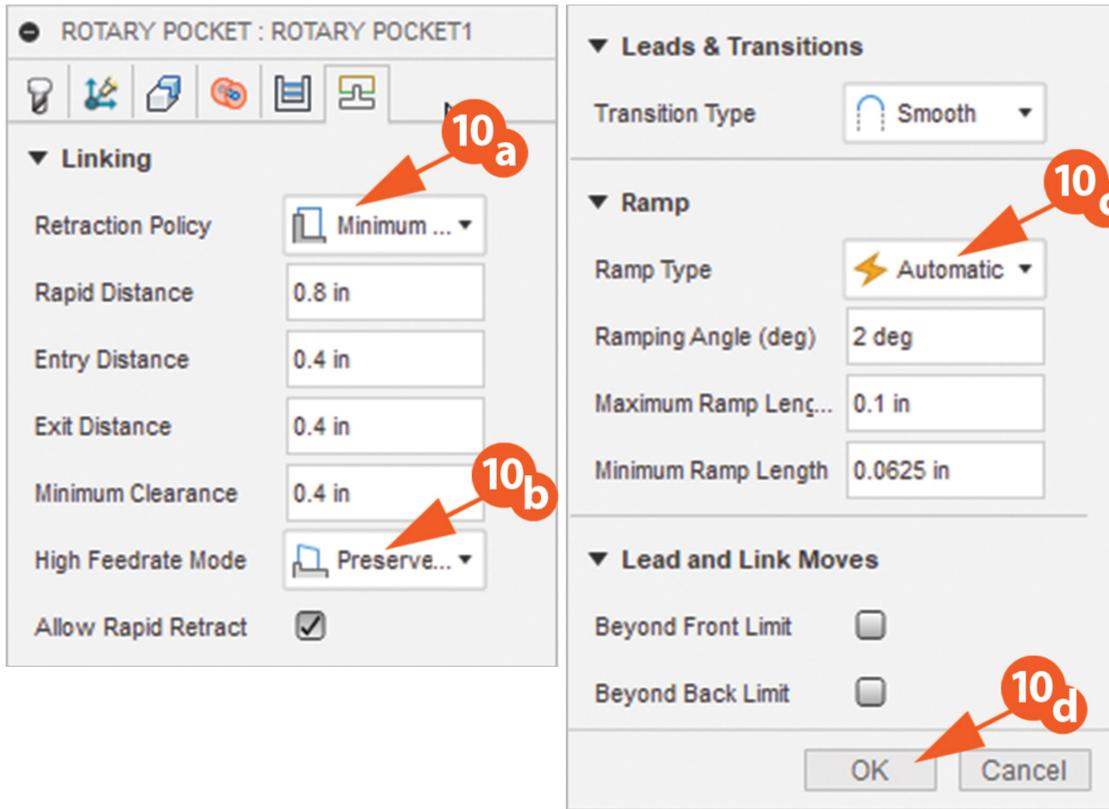
9f - Move the BACK MODE & FRONT MODE closer to the triangle pocket.

9g - Click on the PASSES tab.

9h - Enter .05" for the STEPOVER.

9i - Enter .05" for the STEPDOWN.

9j - Click on the LINKING tab.



**10**

**SAMPLE 2  
TRIANGULAR POCKET  
ROTARY POCKET OPERATION CONTINUED**

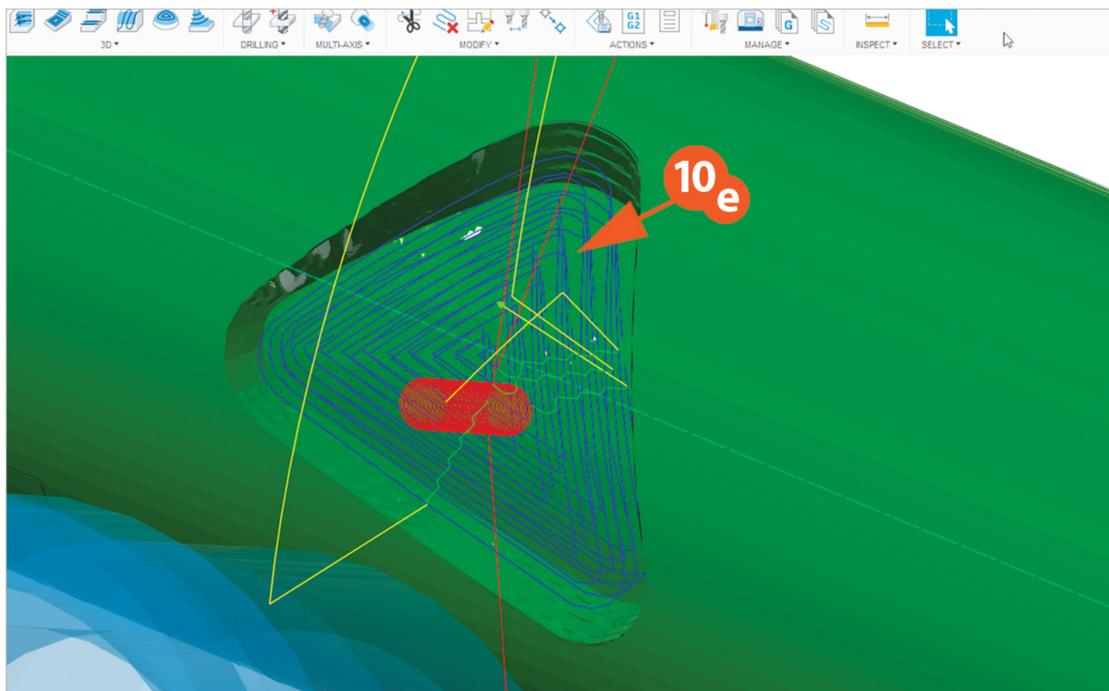
10a - RETRACTION POLICY/MINIMUM.

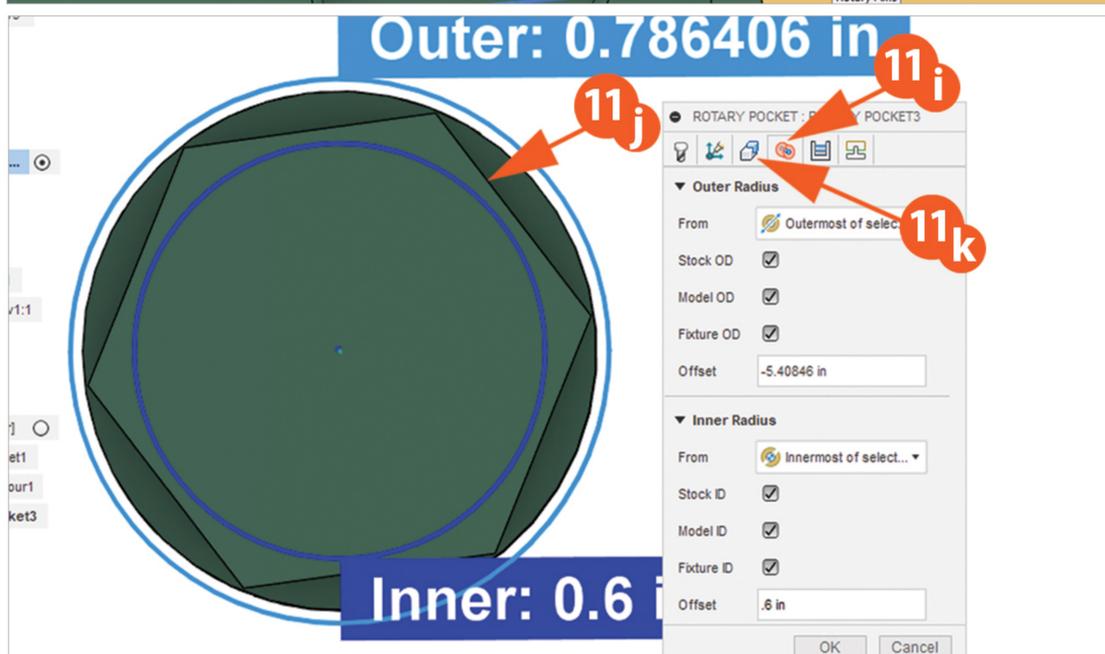
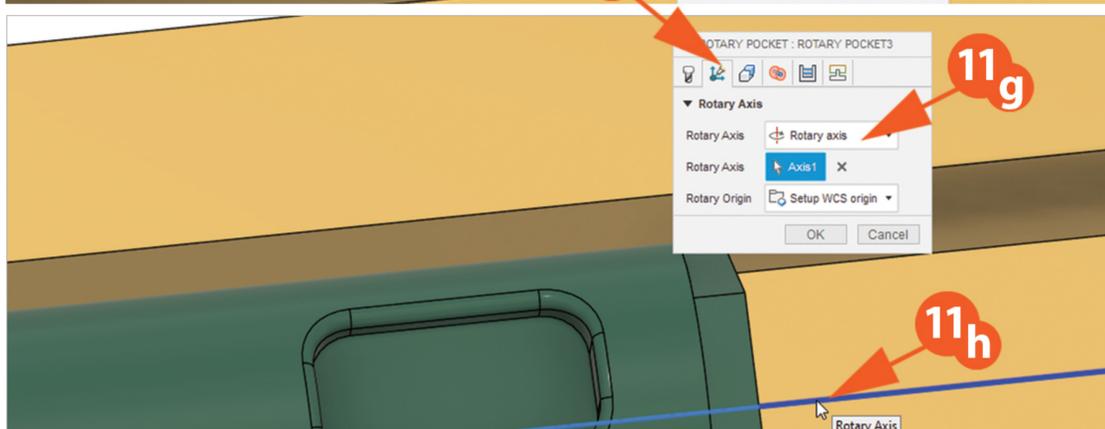
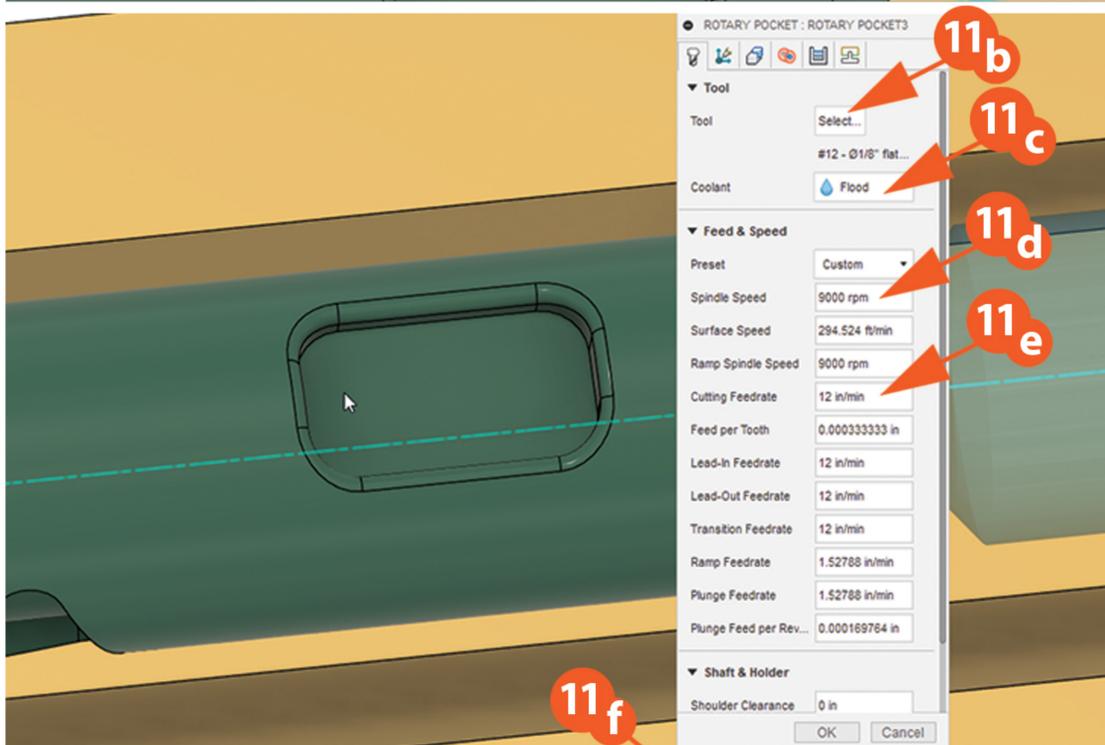
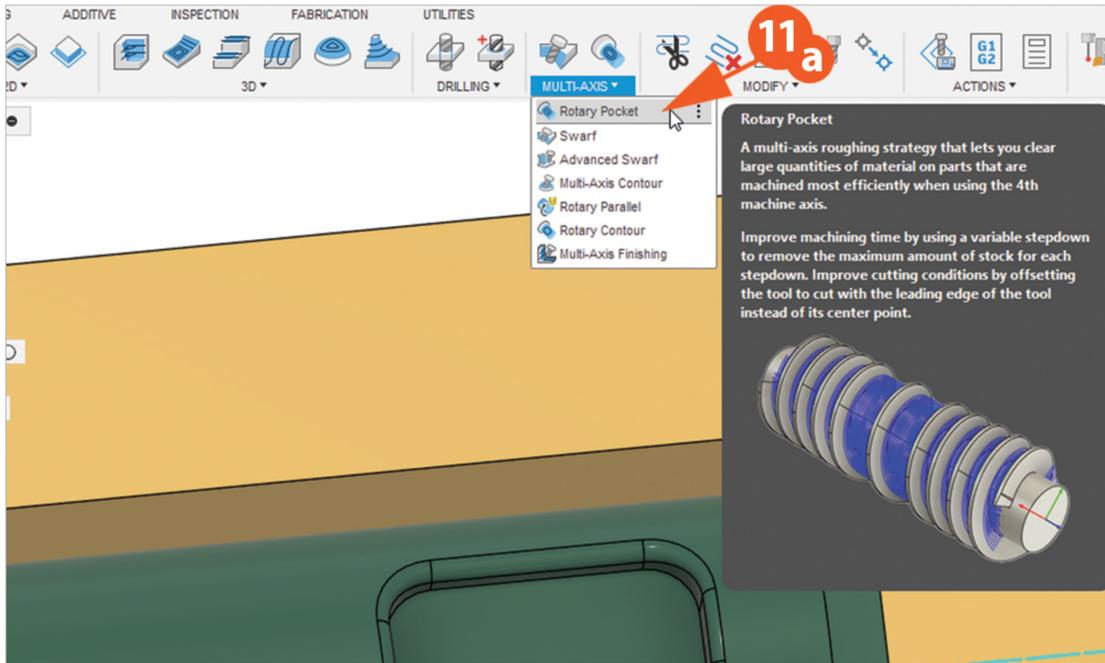
10b - HIGH FEEDRATE MODE/PRESERVE RAPID MOVEMENT.

10c - RAMP TYPE/AUTOMATIC.

10d - Click OK.

10e - The machining paths should look like this.





# 11

## SAMPLE 3 RECTANGULAR POCKET & FILLET EDGES ROTARY POCKET OPERATION

11a - Select MULTI-AXIS/ROTARY POCKET.

11b - Select TOOL/SELECT/#12 (1/8" FEM).

Enter the Following under FEED & SPEED (these settings can be found using GWizard):

11c - Coolant = Flood.

11d - Spindle Speed = 9000 to 10000.

11e - Cutting Feed rate = 12 in/min.

11f - Select the MULTI-AXIS tab.

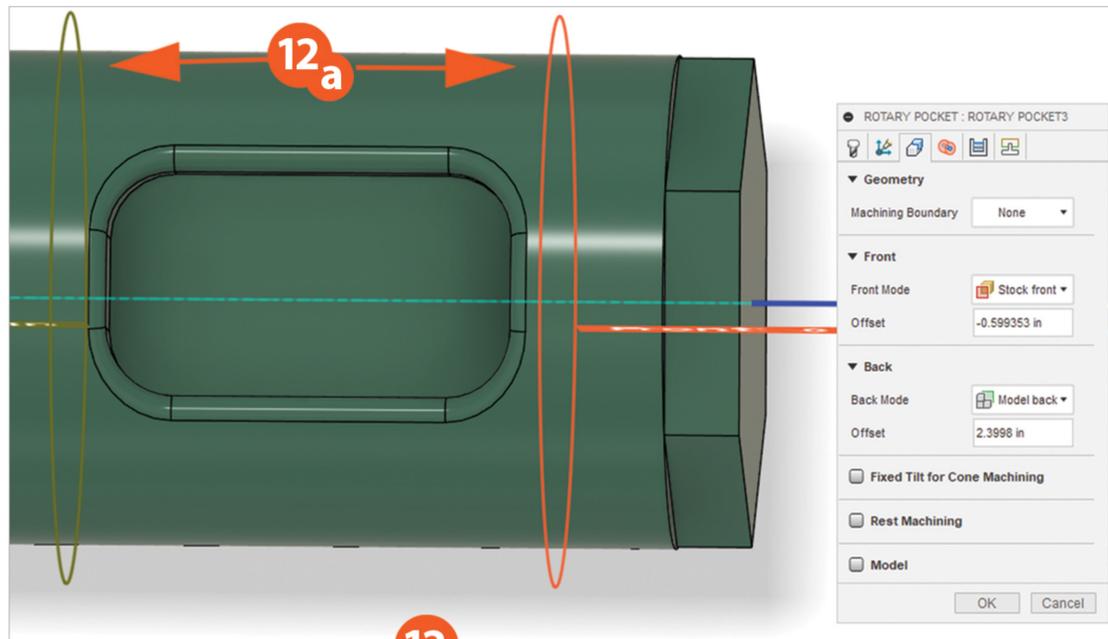
11g - Select ROTARY AXIS/ROTARY AXIS.

11h - Select the Model Construction axis.

11i - Select the RADII tab.

11j - Set the OUTER RADIUS & the INNER RADIUS as shown.

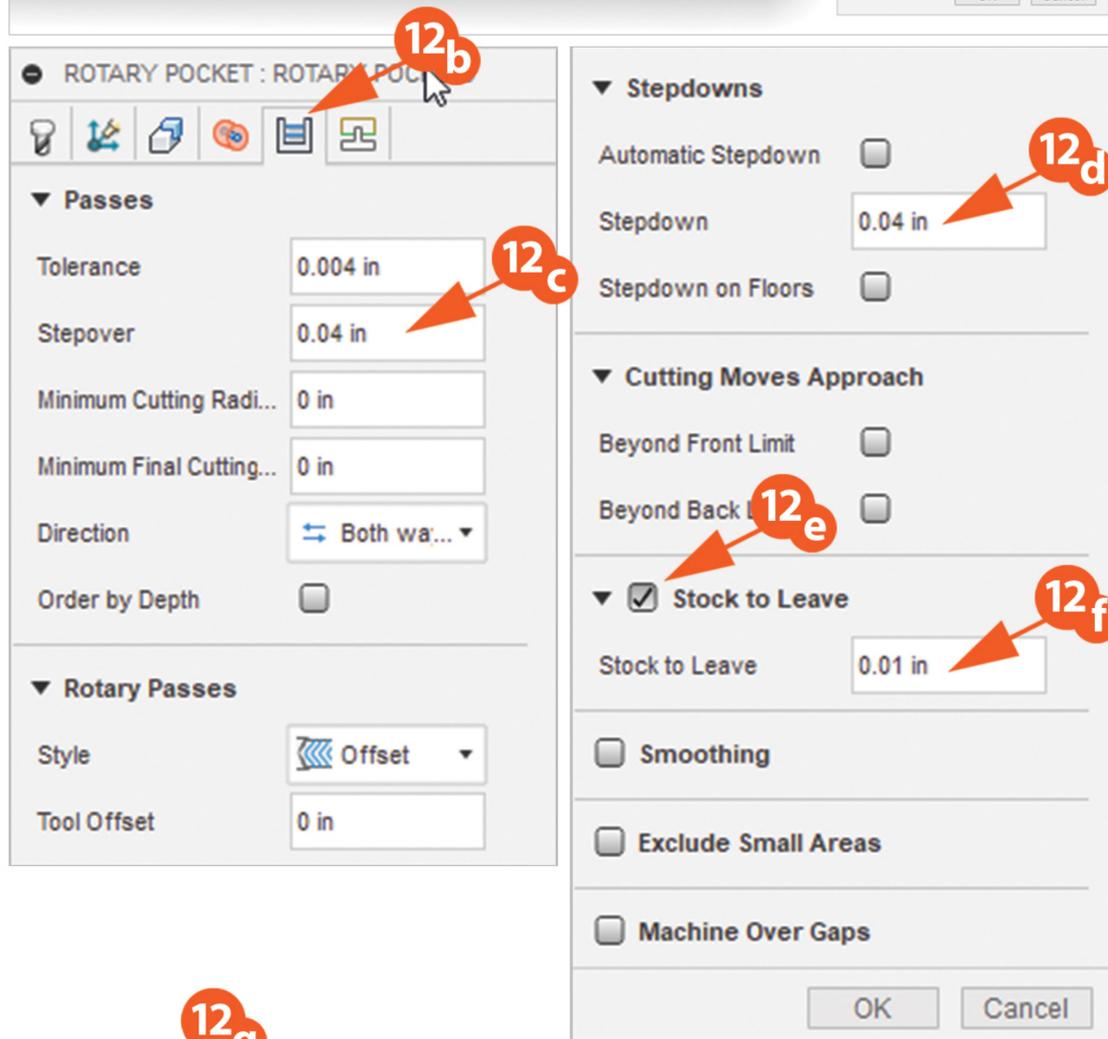
11k - Select the GEOMETRY tab.



**12**

**SAMPLE 3  
RECTANGULAR POCKET & FILLET EDGES  
ROTARY POCKET OPERATION CONTINUED**

12a - Move the FRONT MODE & the BACK MODE in close to the Rectangular Pocket.



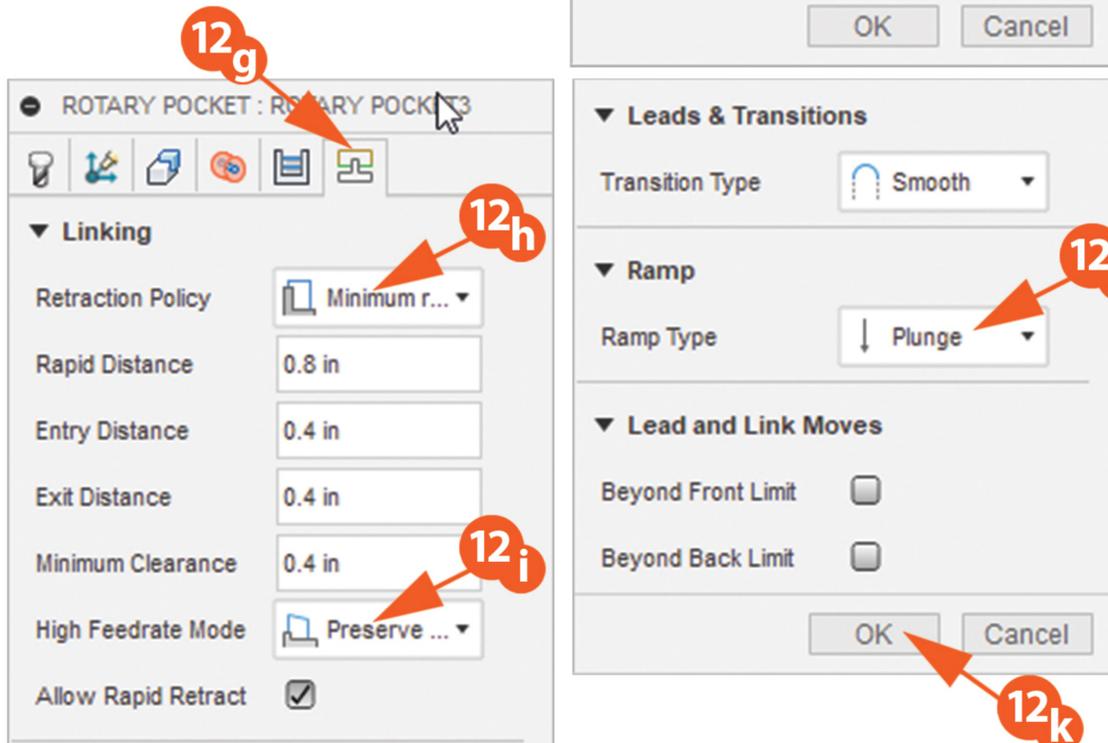
12b - Select the PASSES tab.

12c - Enter .04" for the STEPOVER.

12d - Enter .04" for the STEPDOWN.

12e - Check the STOCK TO LEAVE checkbox.

12f - Enter .01" for the STOCK TO LEAVE.



12g - Select the LINKING tab.

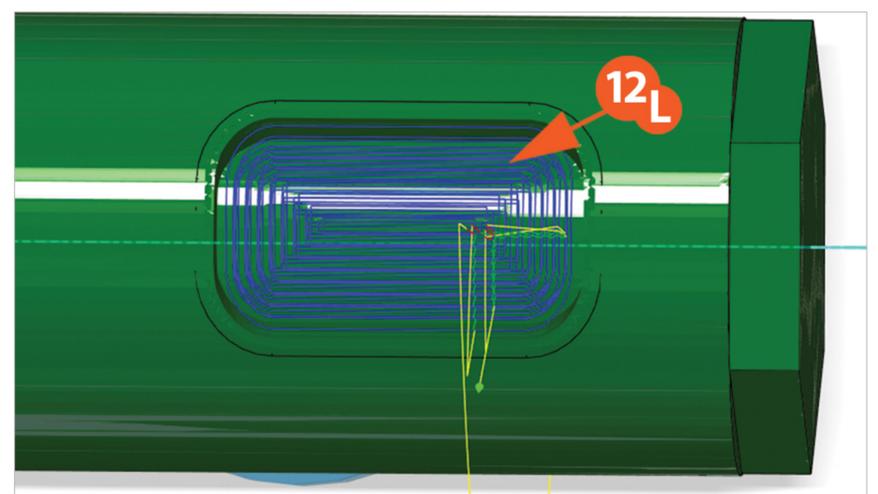
12h - RETRACTION POLICY/MINIMUM.

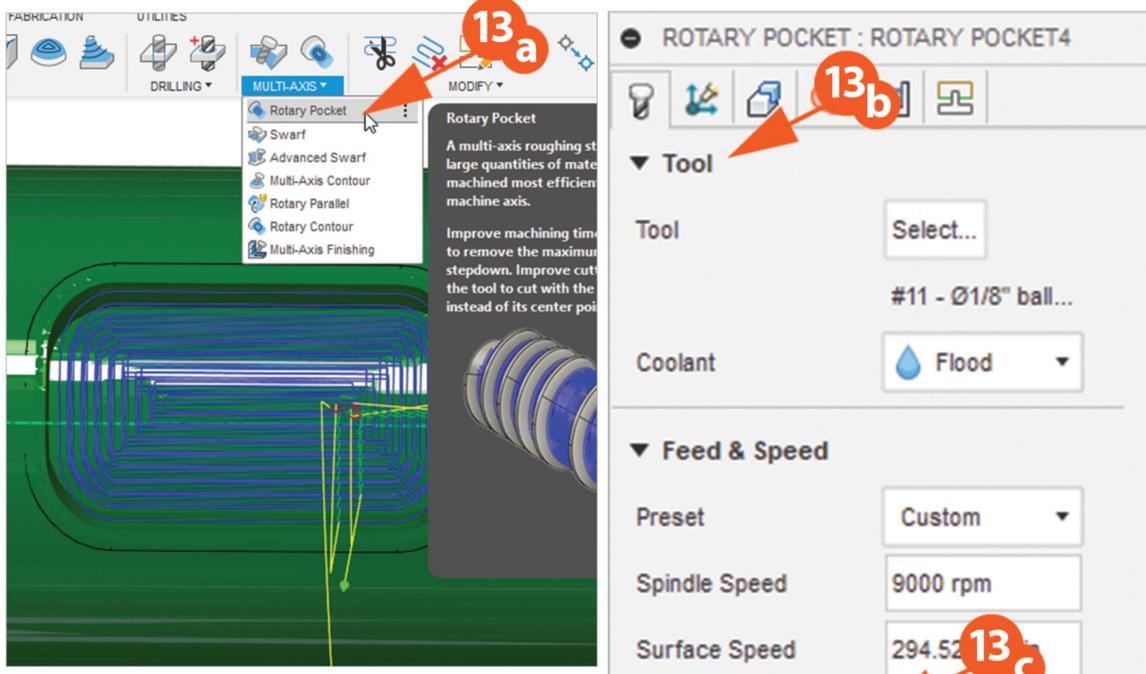
12i - HIGH FEEDRATE MODE/PRESERVE RAPID MOVEMENT.

12j - RAMP TYPE/PLUNGE.

12k - Click OK.

12L - The machining paths should look like this.





13

**SAMPLE 3  
FILLET EDGES  
ROTARY POCKET - OPERATION NO. 2**

This operation is to machine the beveled edge.

13a - Select MULTI-AXIS/ROTARY POCKET.

13b - For the TOOL & FEED & SPEED use the following settings:

Tool = #11 ( 1/8" REM).

Coolant = Flood.

Spindle Speed = 9000 to 10000.

Cutting Feed rate = 12 in/min.

13c - Click on the MULTI-AXIS tab.

13d - Select ROTARY AXIS/ROTARY AXIS.

13e - Select the Model Construction Axis.

13f - Click on the RADII tab.

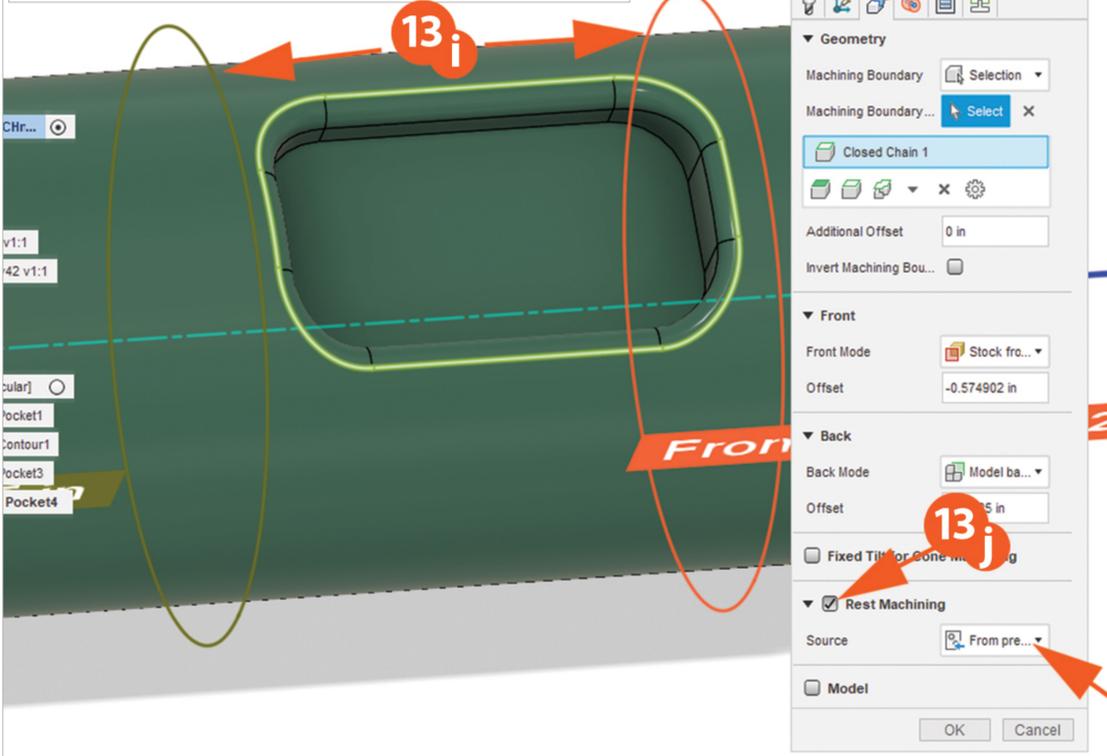
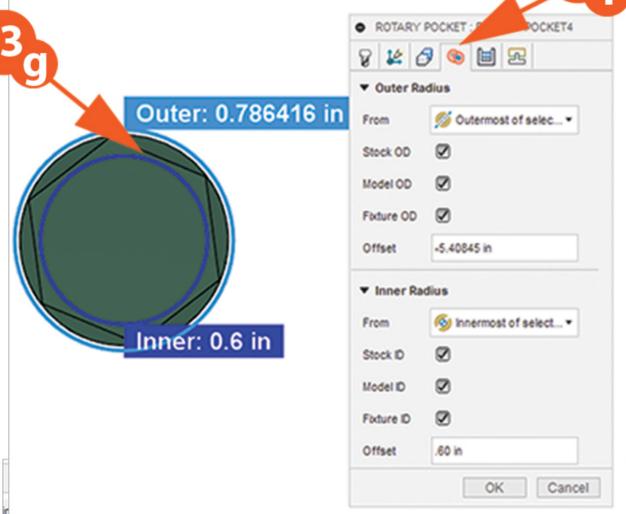
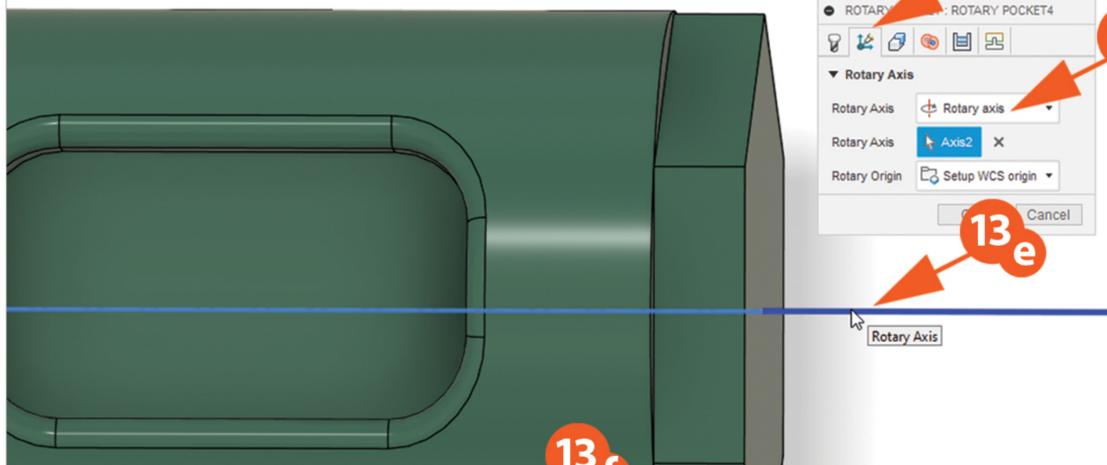
13g - Adjust the OUTER RADIUS and INNER RADIUS as shown.

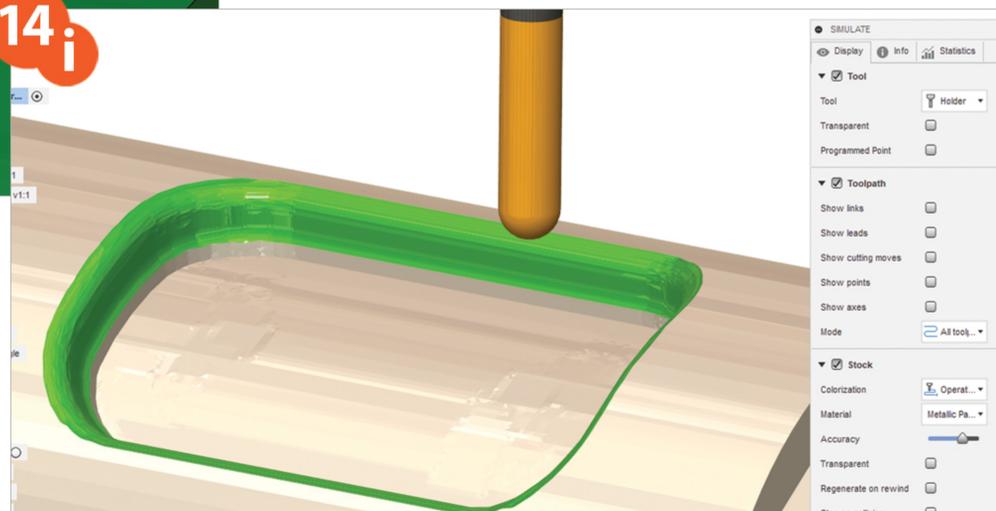
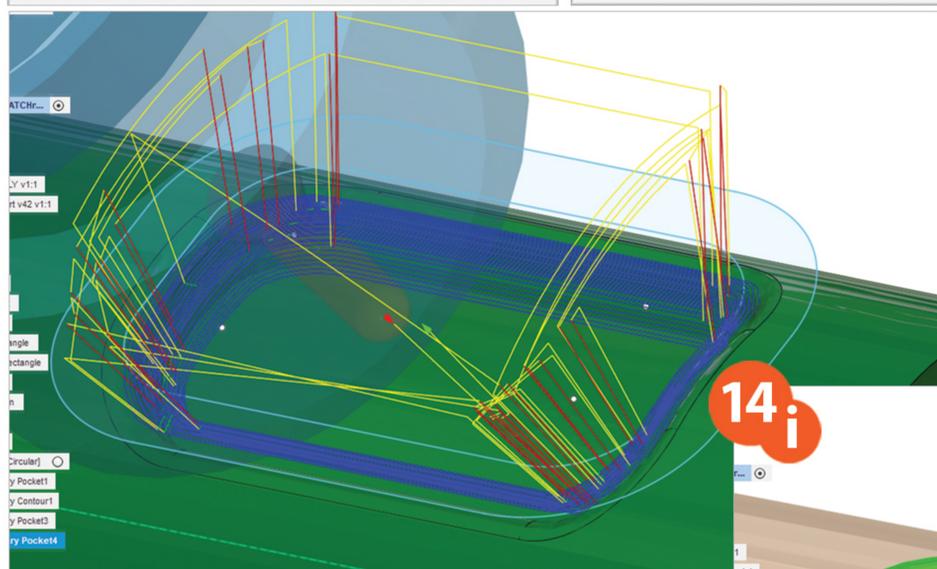
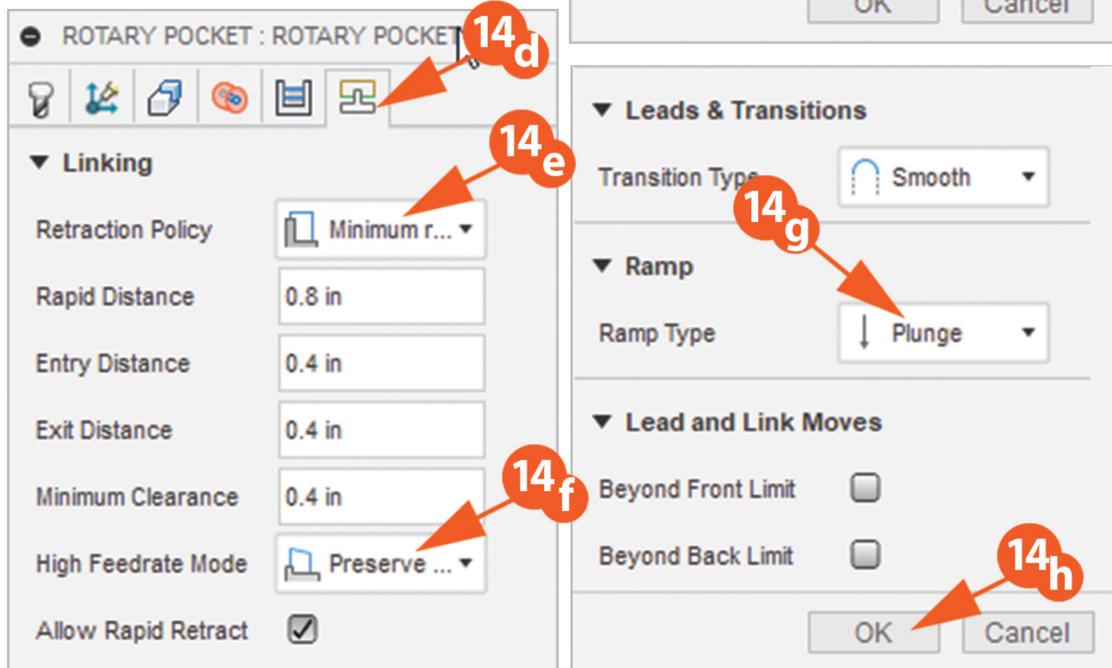
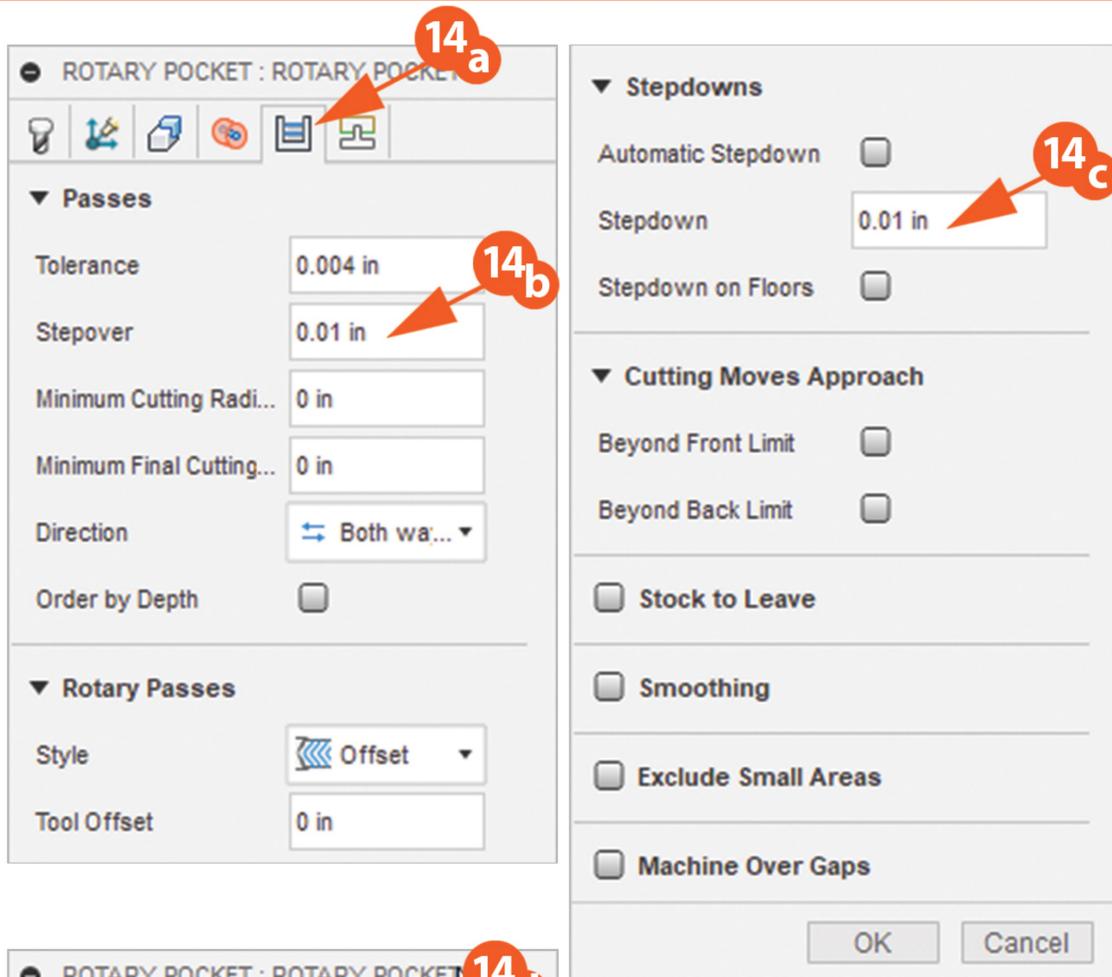
13h - Click on the GEOMETRY tab.

13i - Move the FRONT MODE & BACK MODE close to the Rectangular Pocket.

13j - Check the REST MACHINING checkbox.

13k - Select FROM PREVIOUS OPERATION.





**14**

**SAMPLE 3  
FILLET EDGES - ROTARY POCKET  
OPERATION NO. 2 CONTINUED**

14a - Select the PASSES tab.

14b - STEPOVER = .01"

14c - STEPDOWN = .01"

14d - Select the LINKING tab.

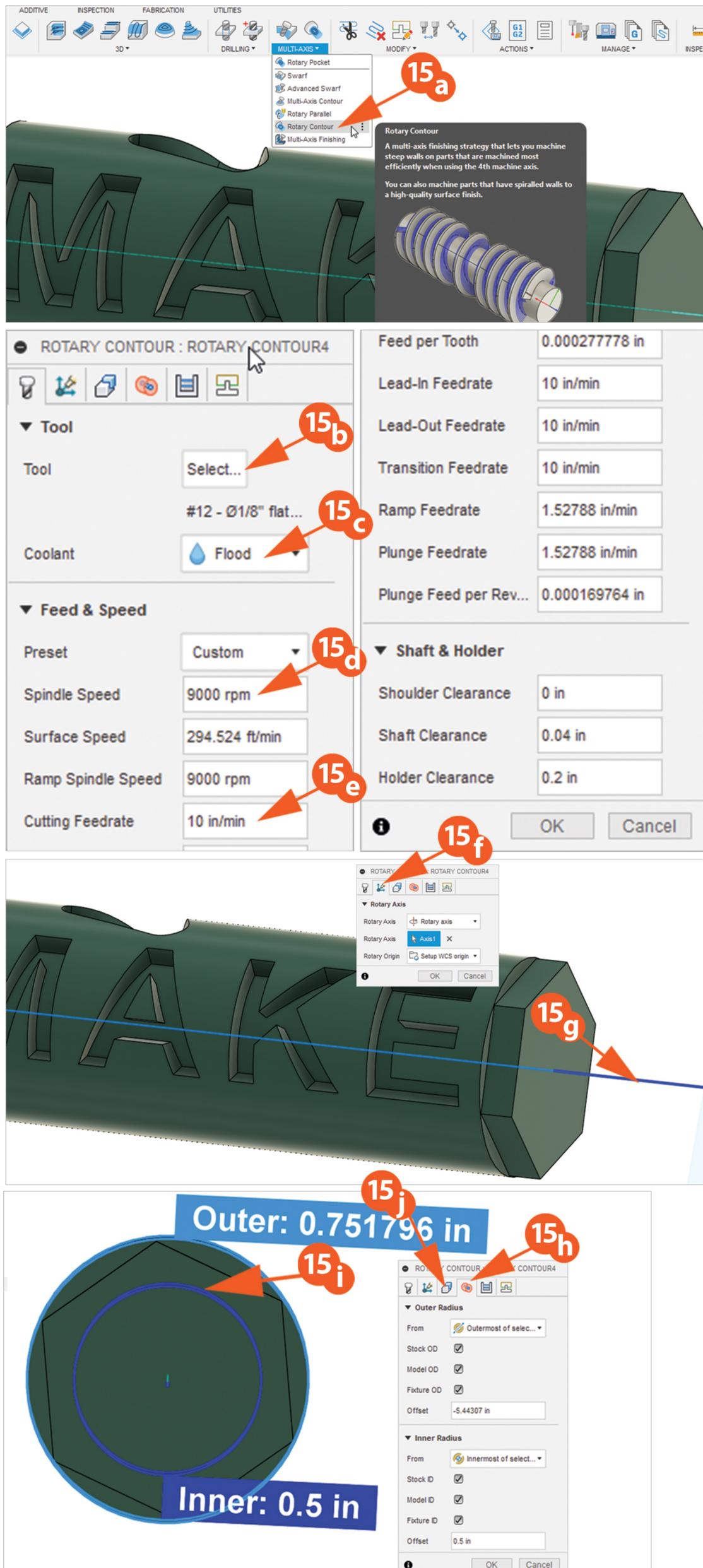
14e - RETRACTION POLICY/MINIMUM.

14f - HIGH FEEDRATE MODE/PRESERVE RAPID MOVEMENT.

14g - RAMP TYPE/PLUNGE.

14h- Click OK.

14i - The machining paths should look like this.



**15**

**SAMPLE 4 - TEXT  
ROTARY CONTOUR OPERATION**

15a - Select MULTI-AXIS/ ROTARY CONTOUR.

15b - Under the TOOL tab, Click on TOOL/ SELECT. On the pop-up menu, select #12 - 1/8" FEM.

Enter the Following under FEED & SPEED (these settings can be found using GWizard):

15c - Coolant = Flood.

15d- Spindle Speed = 9000 to 10000.

15e - Cutting Feed rate = 12 in/min.

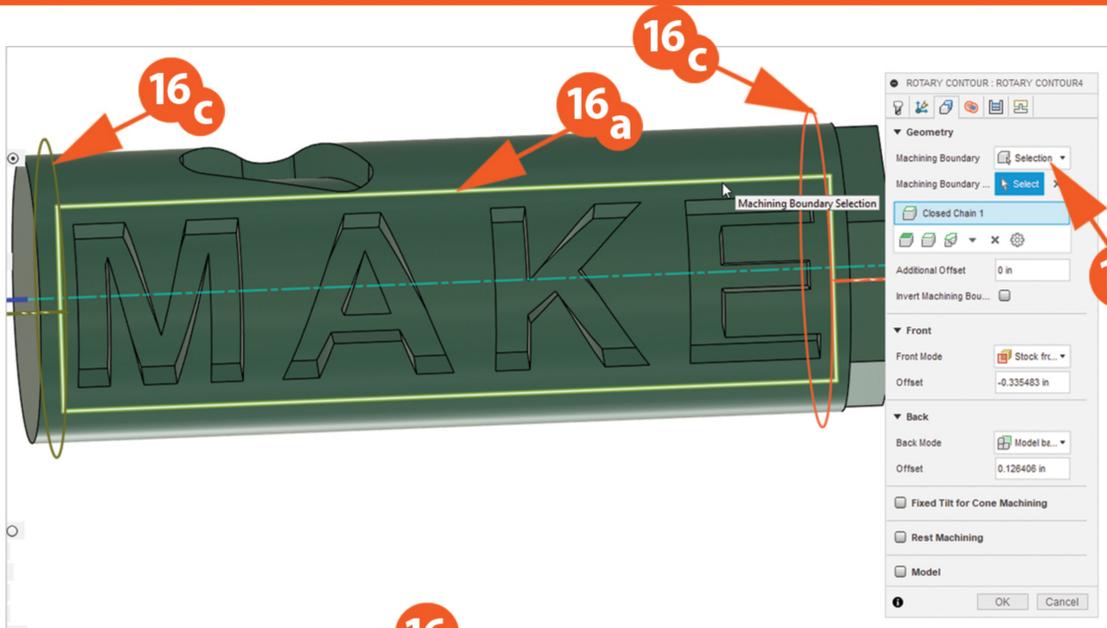
15f - Click on the MULTI-AXIS tab.

15g - Select the Models Construction Axis.

15h - Select the RADII tab.

15i - Set the OUTER RADIUS & INNER RADIUS as shown.

15j - Select the GEOMETRY tab.



**16**

**SAMPLE 4 - TEXT  
ROTARY CONTOUR OPERATION CONTINUED**

16a - Make sure you have a rectangle sketch for the text as shown.

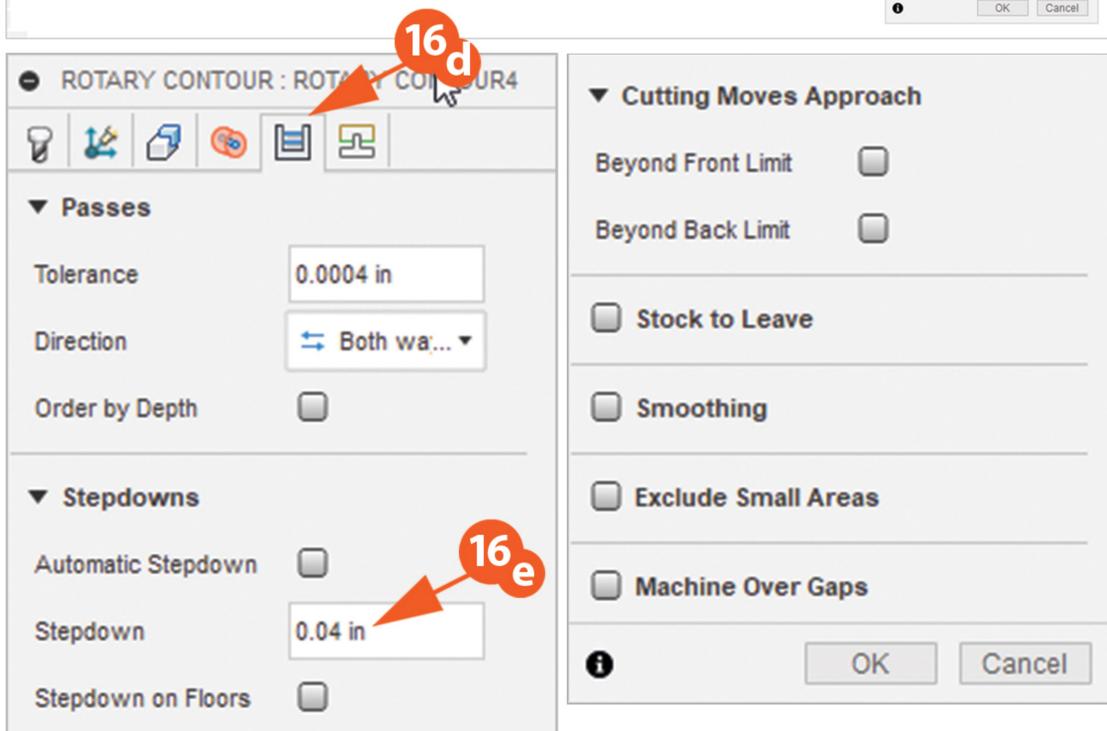
16b - Select MACHINE BOUNDRY/ SELECTION.

16a - Select the Rectangle Sketch.

16c - Move the FRONT MODE & BACK MODE close to the Rectangle Sketch ends.

16d - Select the PASSES TAB.

16e - STEPDOWN = .04"

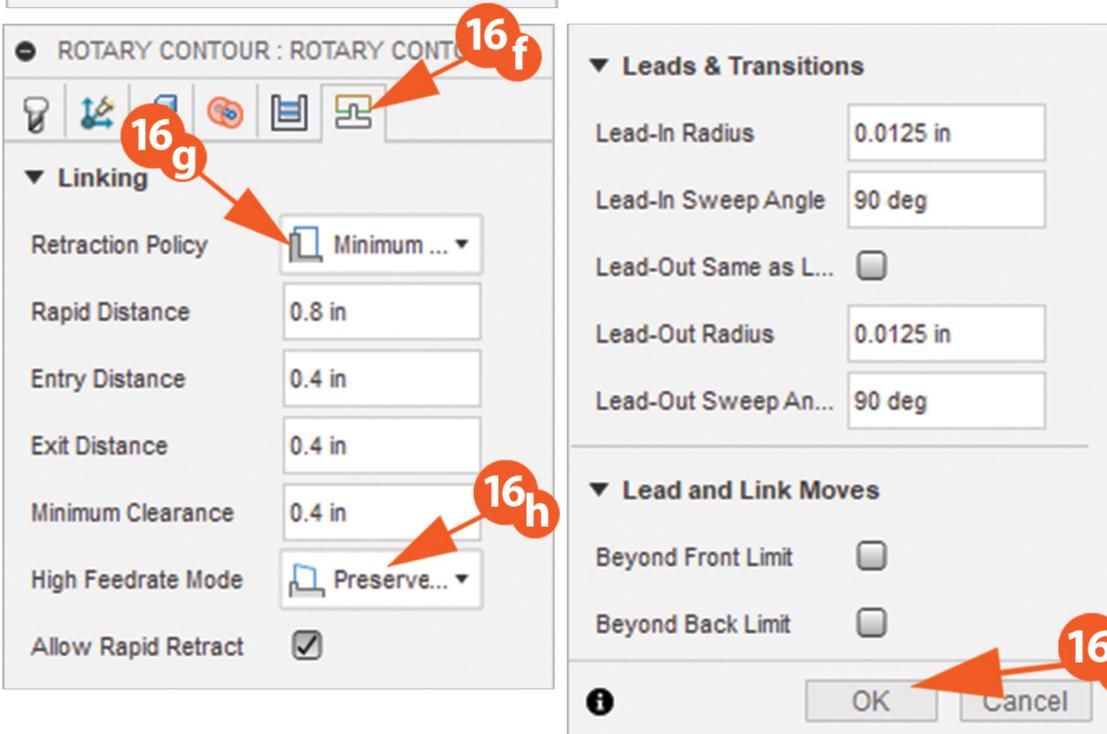


16f - Select the LINKING tab.

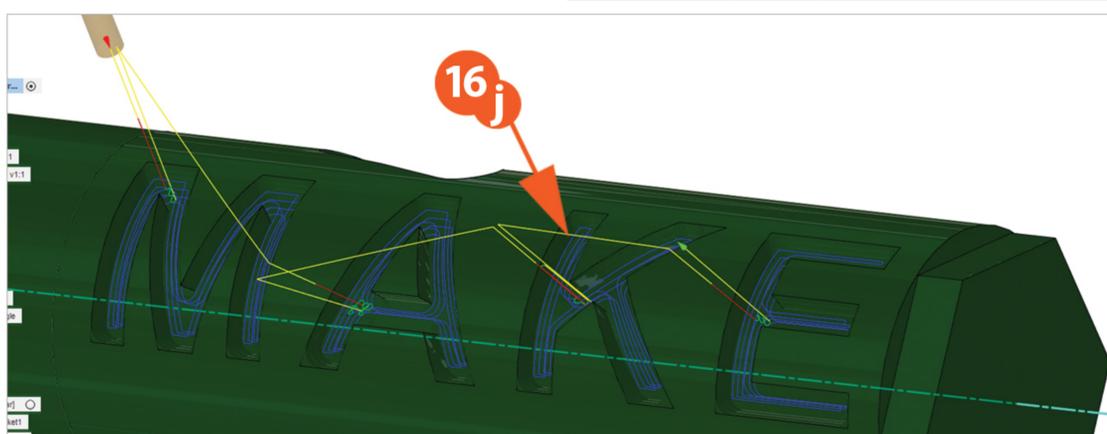
16g - RETRACTION POLICY/MINIMUM.

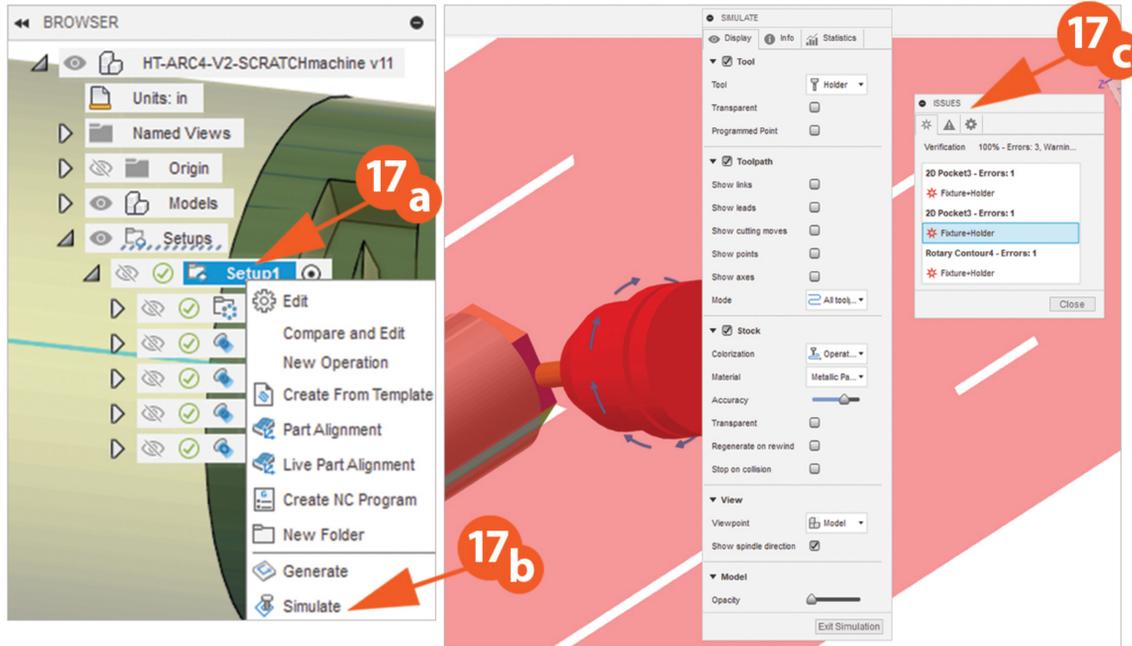
16h - HIGH FEEDRATE MODE/PRESERVE RAPID MOVEMENT.

16i- Click OK.



16j - The machining paths should look like this.





**17**

**PREVIEWING YOUR G-CODE**

17a - Right Click on SETUP1.

17b - Select SIMULATE.

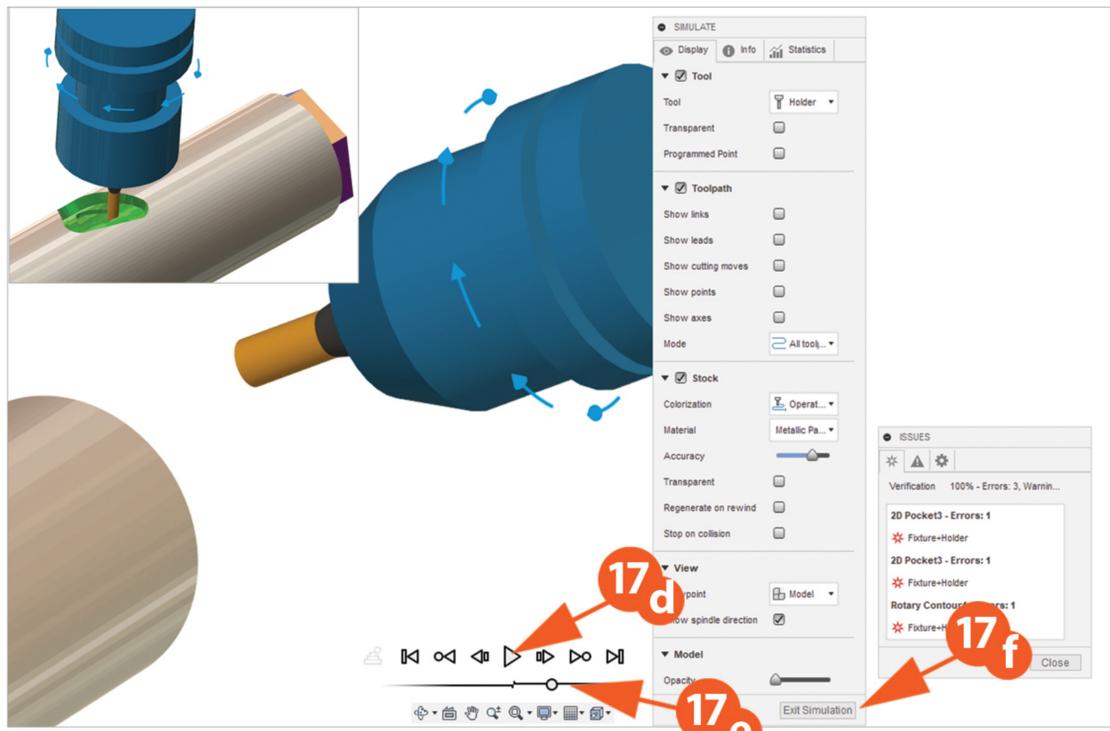
17c - Review any ISSUES. This can be clearance problems resulting in collisions. Correct your machining operations if necessary.

Please note, the preview will show the ARC4 rotation as an issue, you can disregard this.

17d - Click on the ARROW to Start the Simulation.

17e - You can adjust the preview speed with this slider.

17f - Exit the Simulation here.



**CREATING THE G-CODE**

17g - Right click on SETUP1.

17h - Select POST PROCESS.

17i - Enter the file name you would like.

17j - Make sure X is selected for the ROTARY TABLE AXIS.

17k - Click on POST to save the G-Code.

