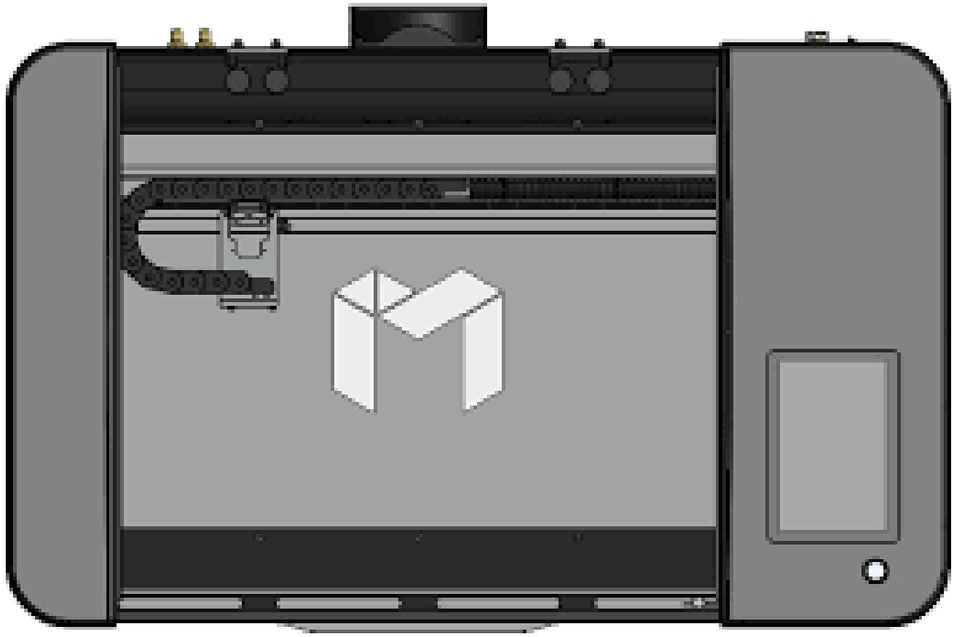
FEBRUARY
2026



MUSE LASER CUTTER – ROTARY ONLY

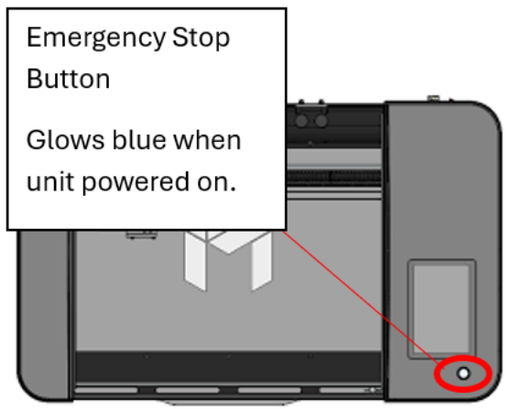
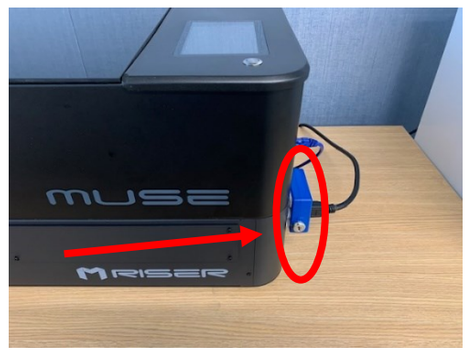
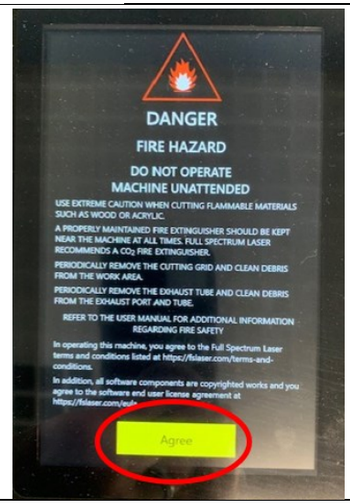
STEP BY STEP GUIDE TO ENGRAVING CYLINDERS

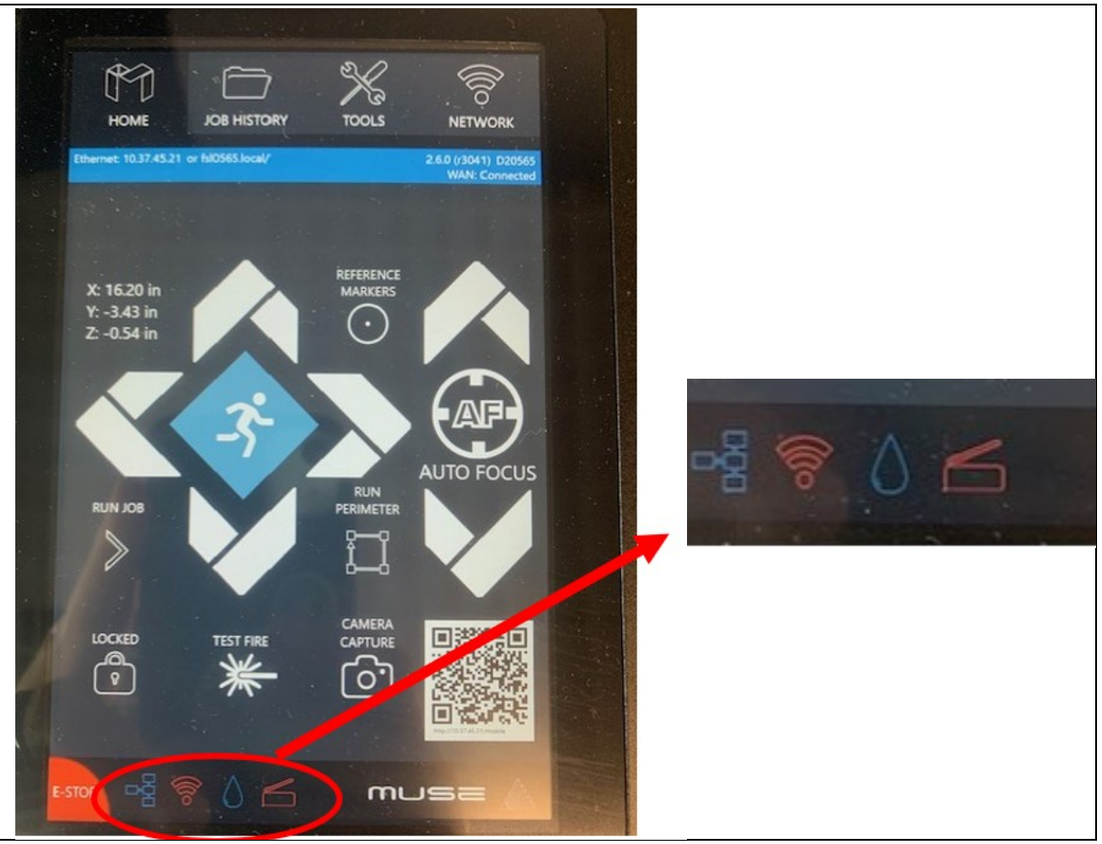
This unit is only for engraving cylinders. Flat materials are not allowed.

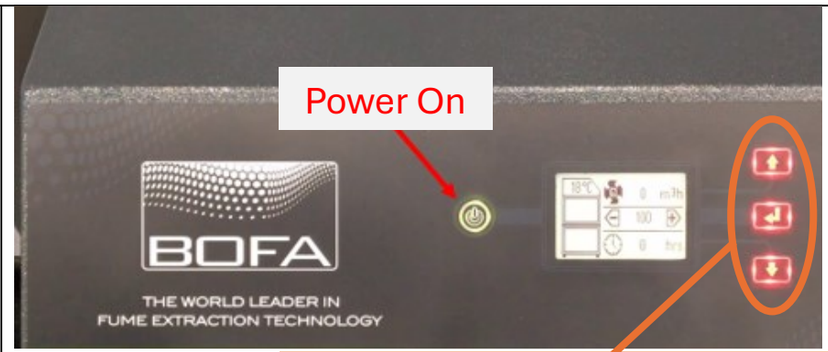
Do **not** use the Muse 3D Vision camera system.

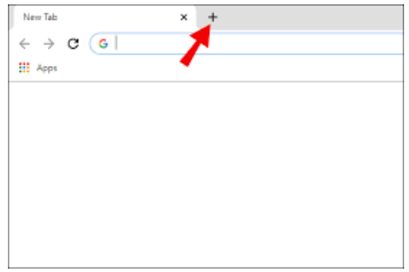
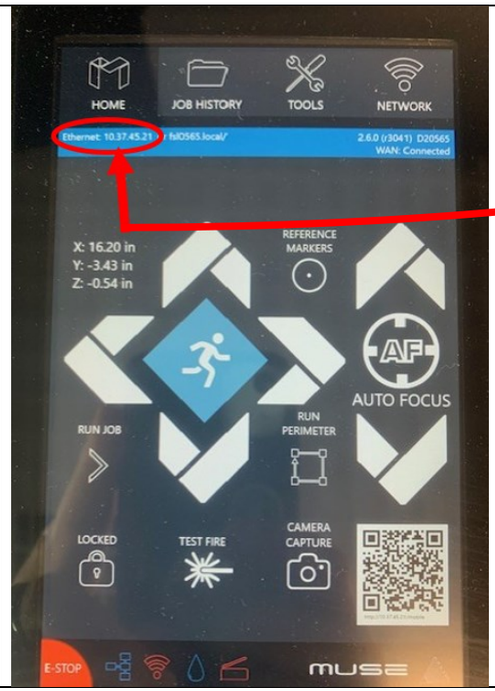
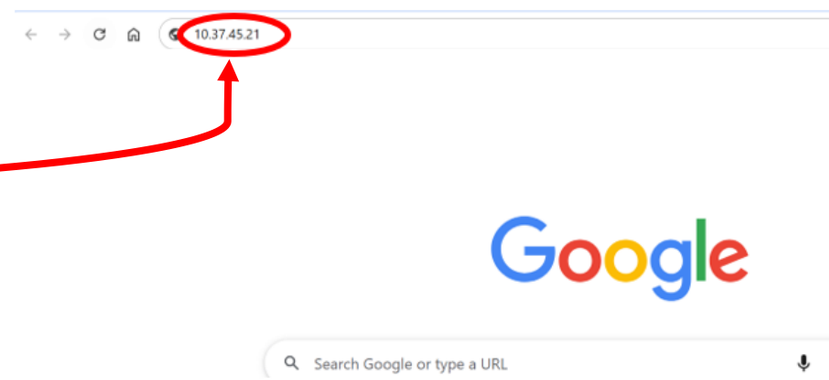
The Muse 3D Vision camera system does not support use with engraving cylinders.

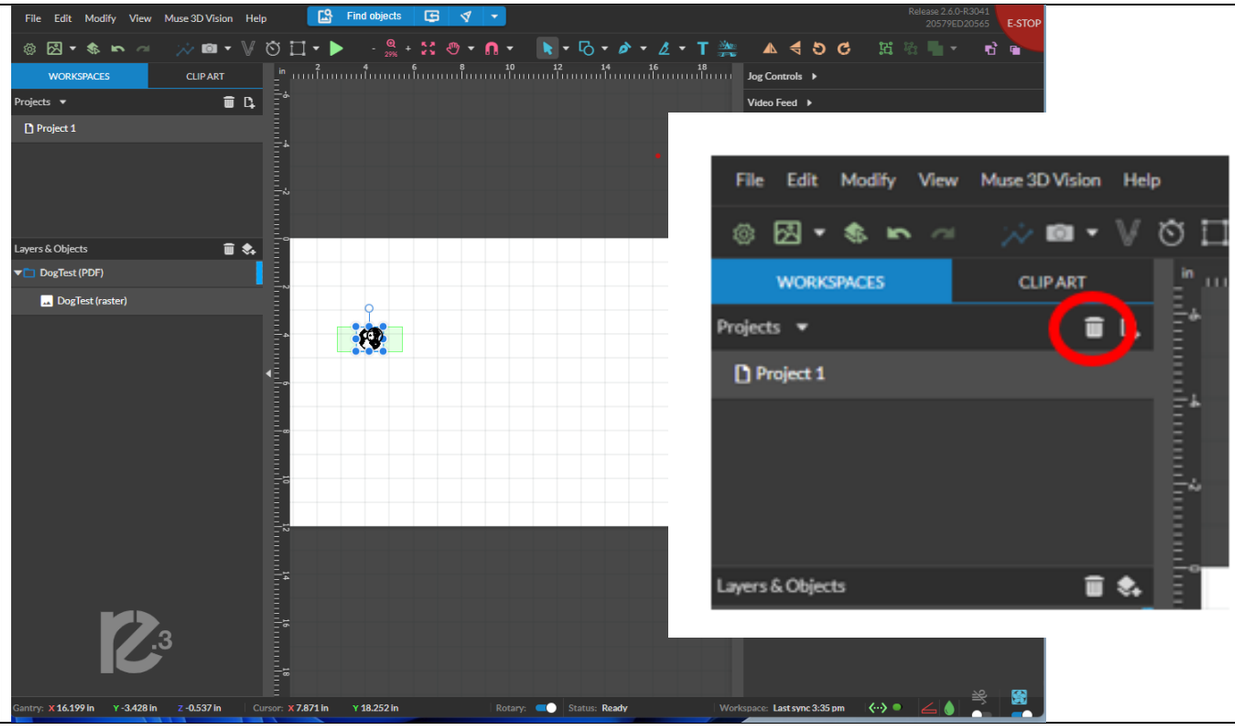
Do not use autofocus. Use the manual focusing method detailed in these instructions.

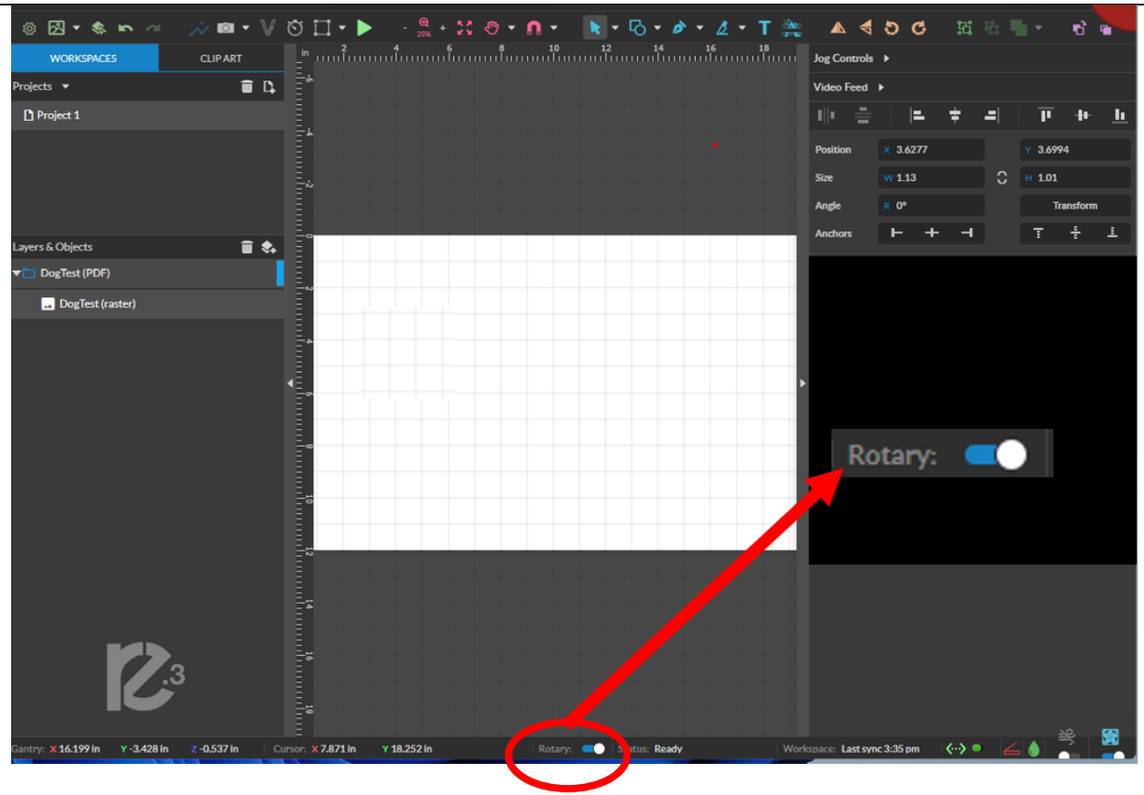
STEP	DETAILS / EXPLANATION	VISUALS
1. Power on with key	Insert key and turn to power on machine. The touch screen on the laser may be blank for up to approximately 2 minutes while the laser boots up. You can tell the laser is powered on by the internal lights and emergency stop button glowing blue.	 
2. Read and agree to safety warnings	Once the laser boots up, the touch screen will display a fire hazard warning. After reading the safety warning, tap the touch screen to agree.	

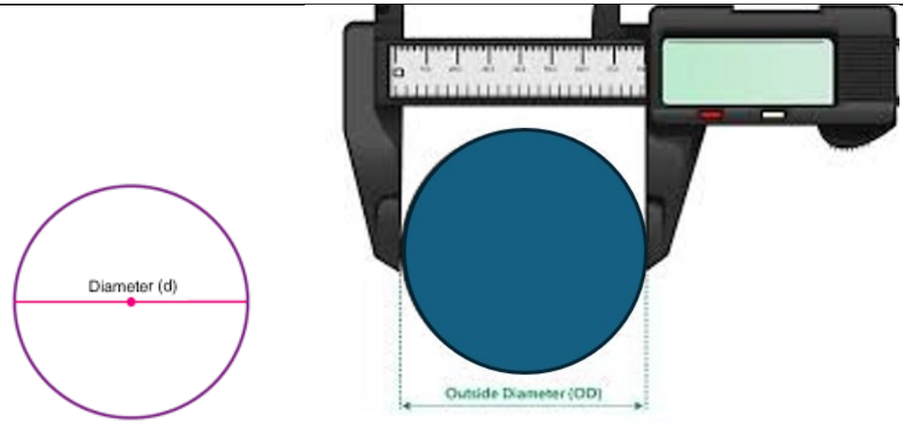
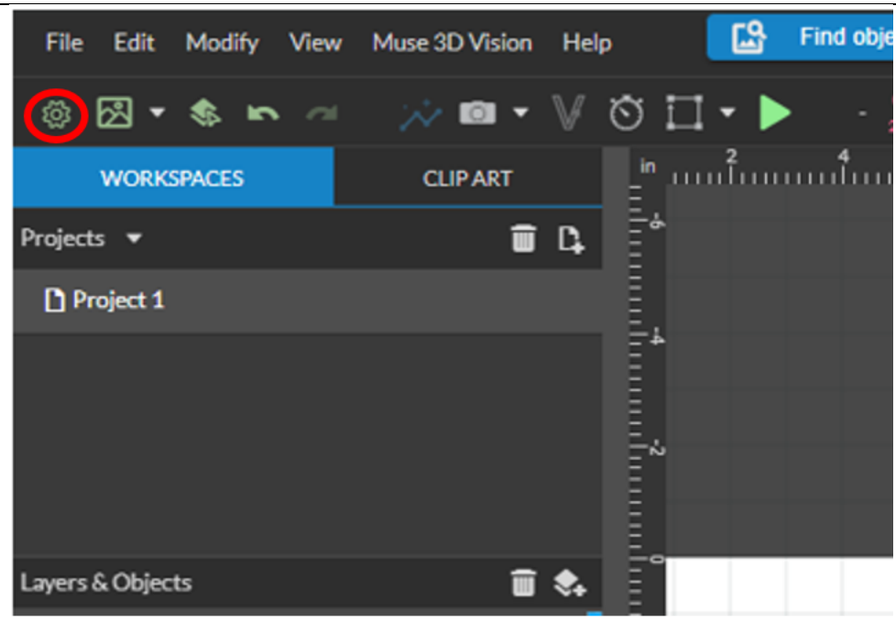
3. Confirm Safety Icons  	The network icon should be **blue**. Water drop icon should be **blue**. If the laser does not connect to the network it will not be able to run any jobs. The water icon lets you know that the water-cooling system is operating. NEVER OPERATE THE LASER WITHOUT COOLING SYSTEM RUNNING. See staff if there are any issues.	

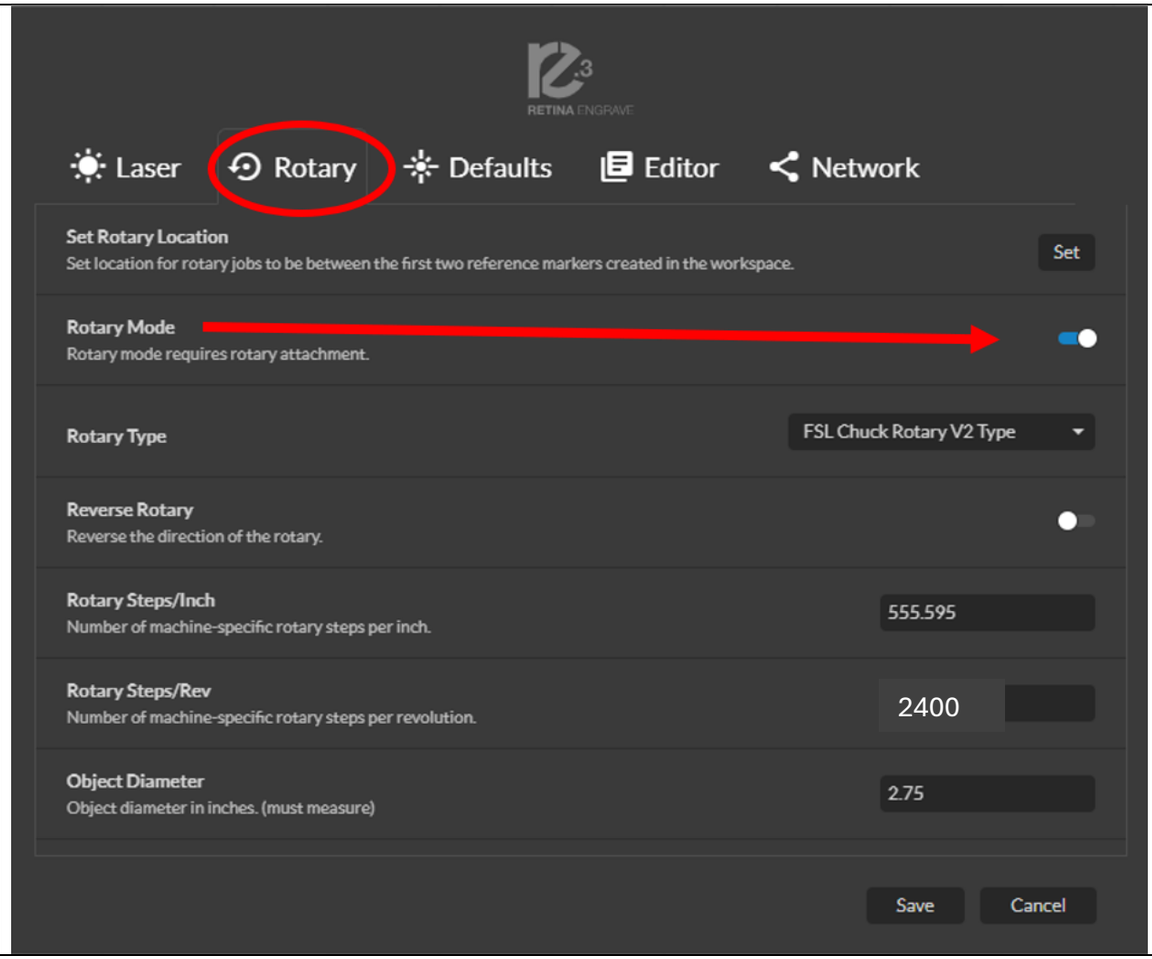
4. Turn On Ventilation Unit	This unit draws air out of the chamber of the laser and passes it through filters to remove fine particulate matter that should not be breathed in. RED BUTTONS: If the arrow buttons remain red that indicates an issue with the ventilation unit. Stop and notify staff so that the unit can be assessed.	 
5. Log into computer	You will log into the computer system with your library card. This will give you access to the desktop and is necessary to operate the laser cutter. NOTE: Session time on computer is a default and **does not** reflect your reservation time for the laser.	
6. Launch Google Chrome	The Google Chrome browser can be found on the desktop. You will connect to the laser cutter using the Google Chrome browser.	

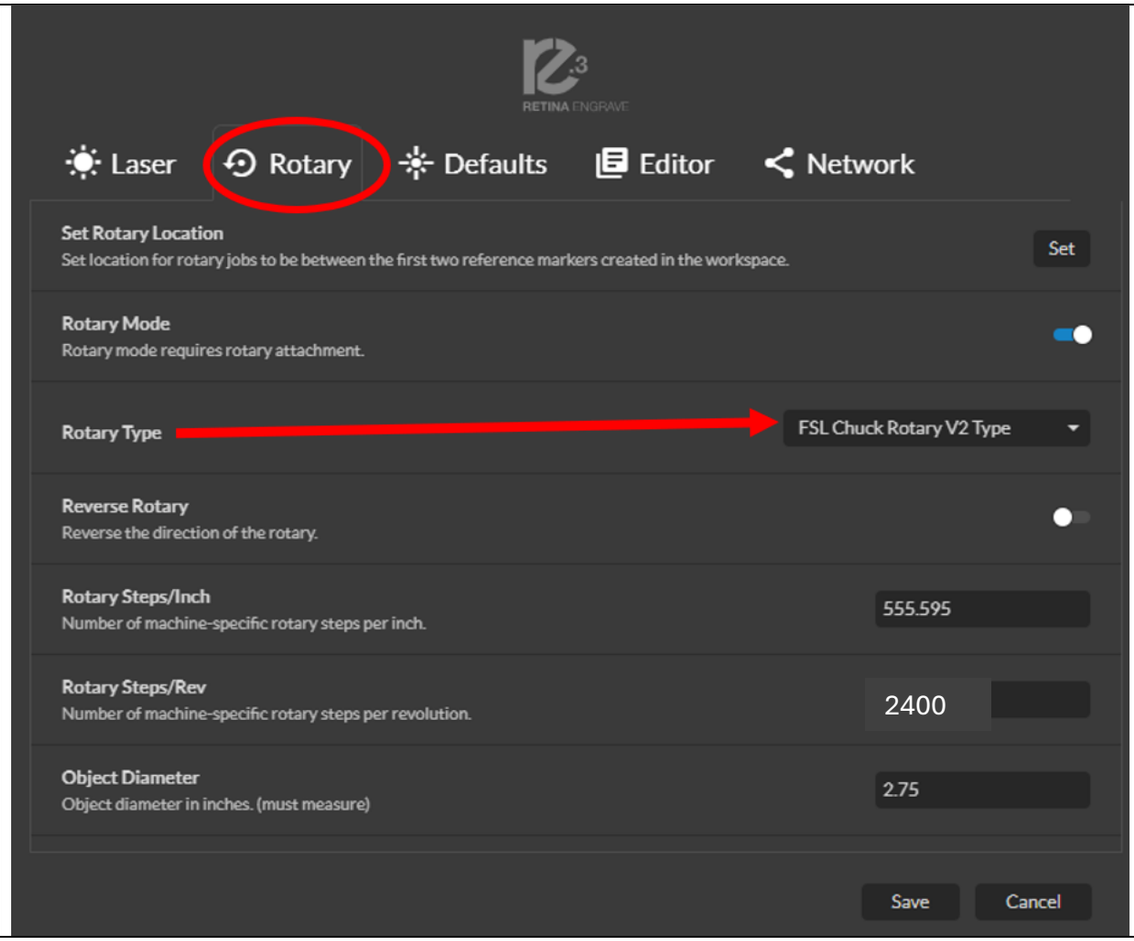
7. Open a new tab in Google Chrome.	You will need a blank tab in order to connect to the laser. Click the + symbol to open a new blank tab.	
8. Enter IP address.	An IP address will appear on the laser touch screen. Enter that set of numbers into the address bar of Google Chrome. This allows the computer to communicate with the laser and load the software running onboard the laser onto the screen of the computer.	 

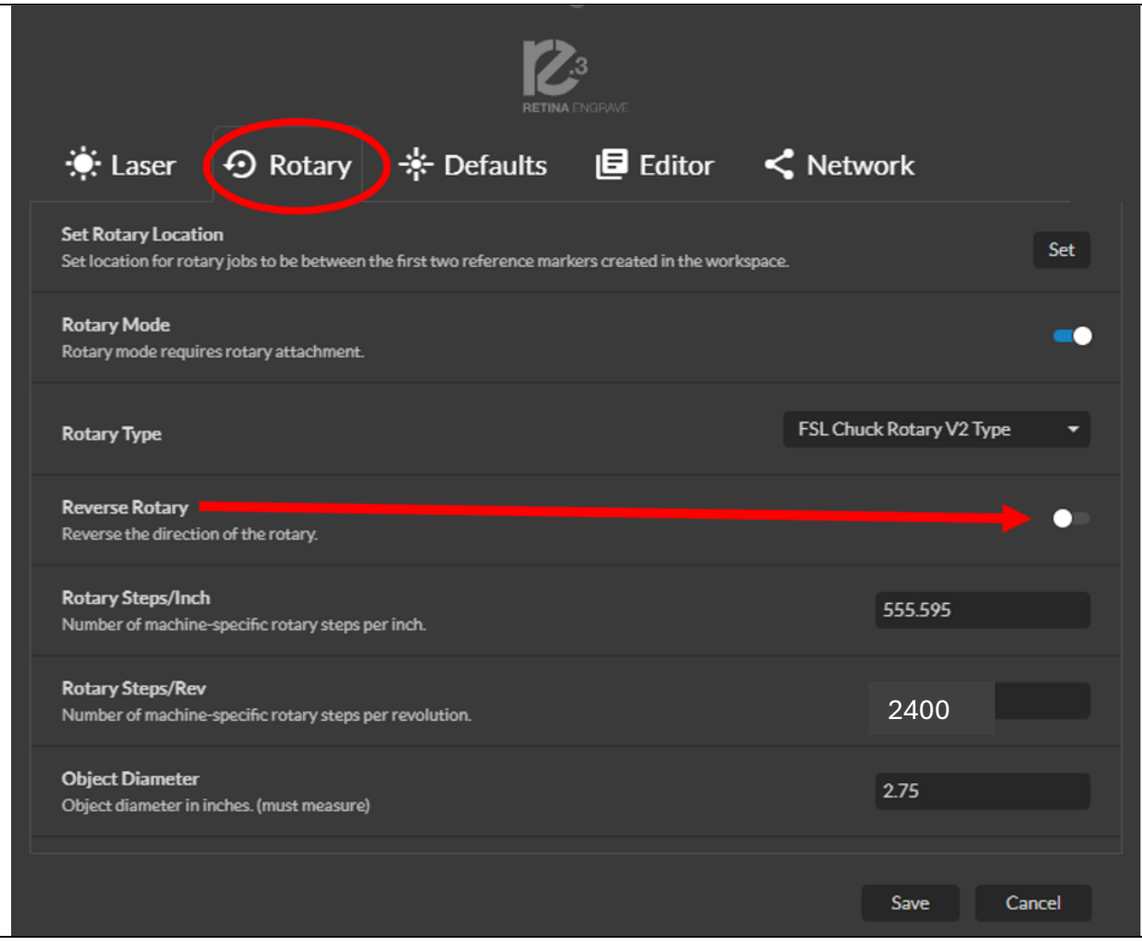
9. Clear any imported artwork	The previous user may have forgotten to erase their work. Click on the artwork on the white grid area. Then press the Delete key on the keyboard. Alternatively, you can select the project name in the left pane and then click the Trash Can icon to delete the project.	

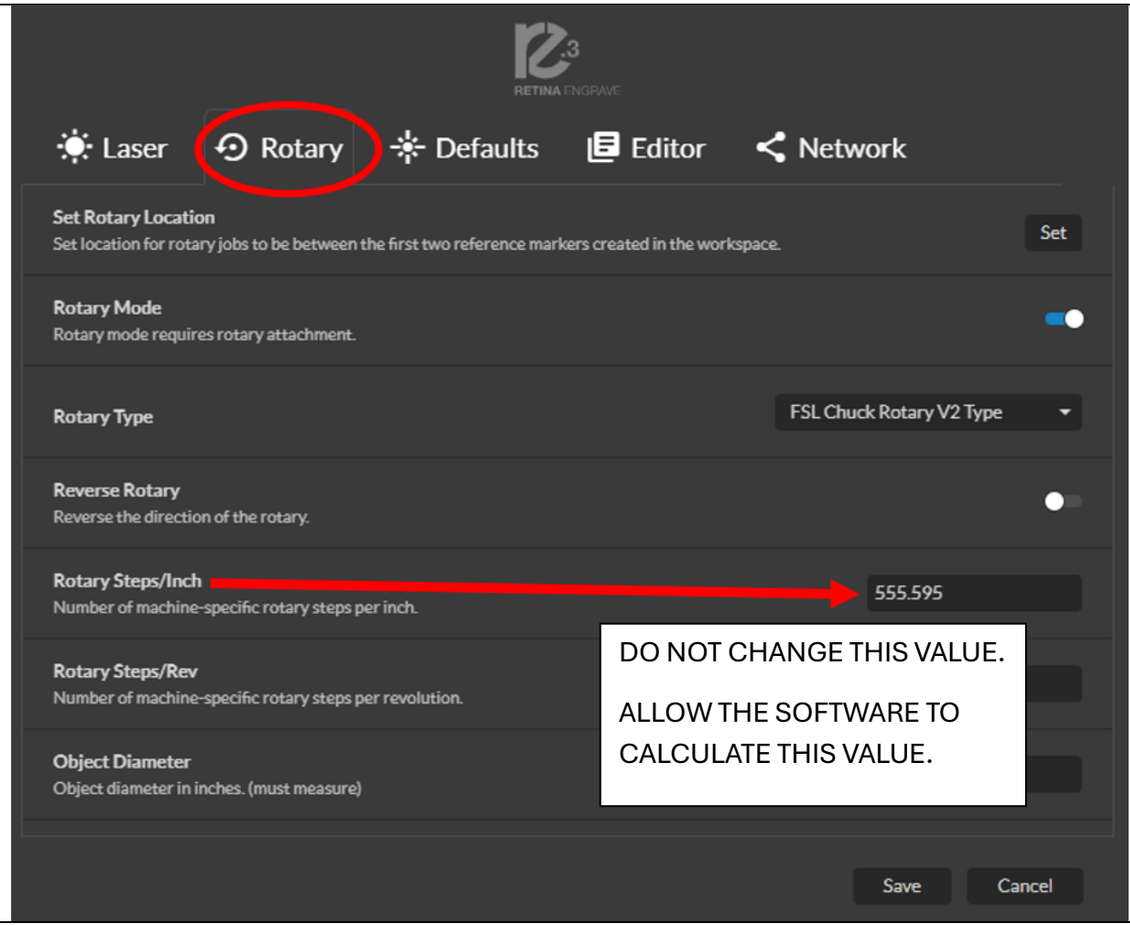
10. Verify set to Rotary	While this machine is only used for engraving cylinders with the rotary tool, a previous user may have inadvertently turned off the rotary setting. The slider switch next to the Rotary label should be blue.	

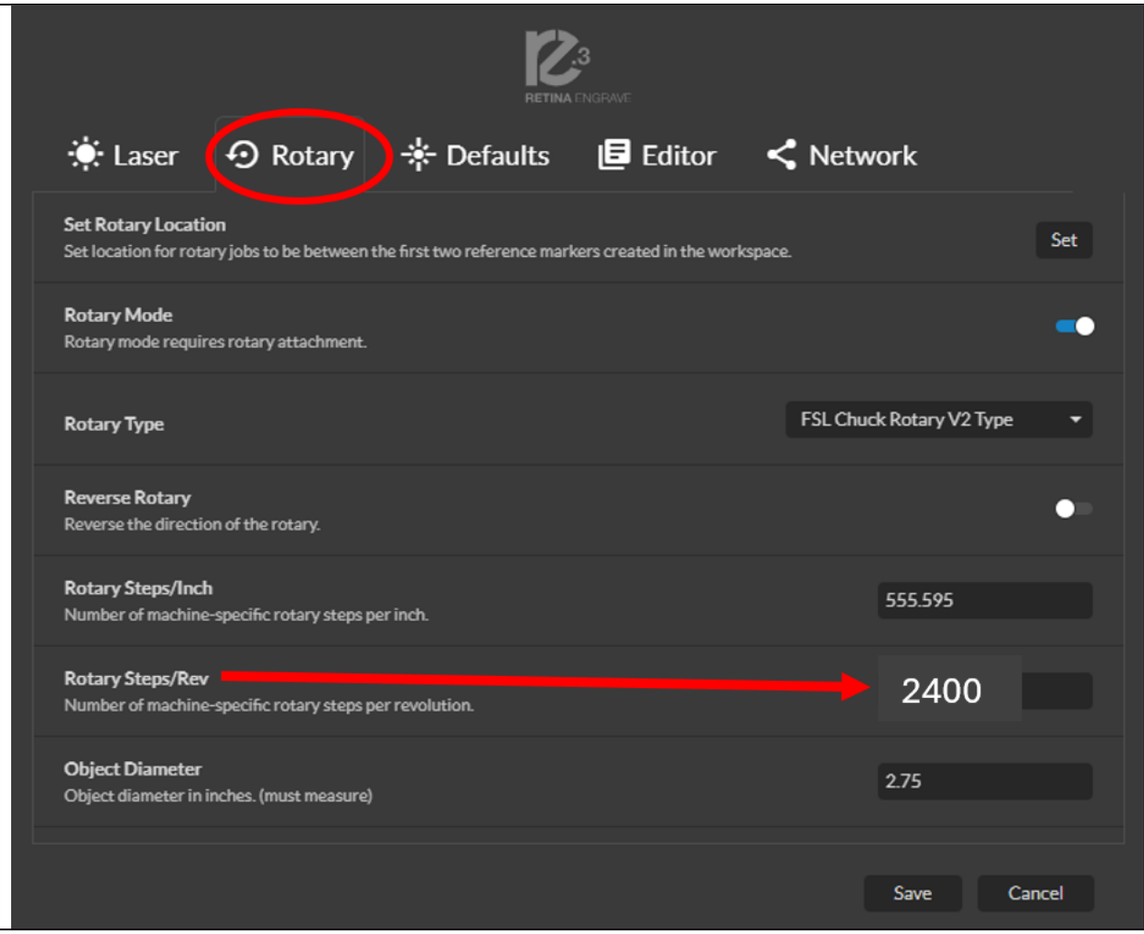
11. Measure diameter or cylinder in **Inches**.	In order for the rotary unit to turn at the correct speed and distance, the software will need to know the outside diameter of your cylinder. A pair of calipers can be found in tool cabinet drawers to help get an accurate measurement. Alternatively, you can use the measuring tape. Make note of this measurement for step 18.	
12. Settings	Navigate to the settings by clicking the gear icon. In the next steps we will be verifying selections and entering values.	

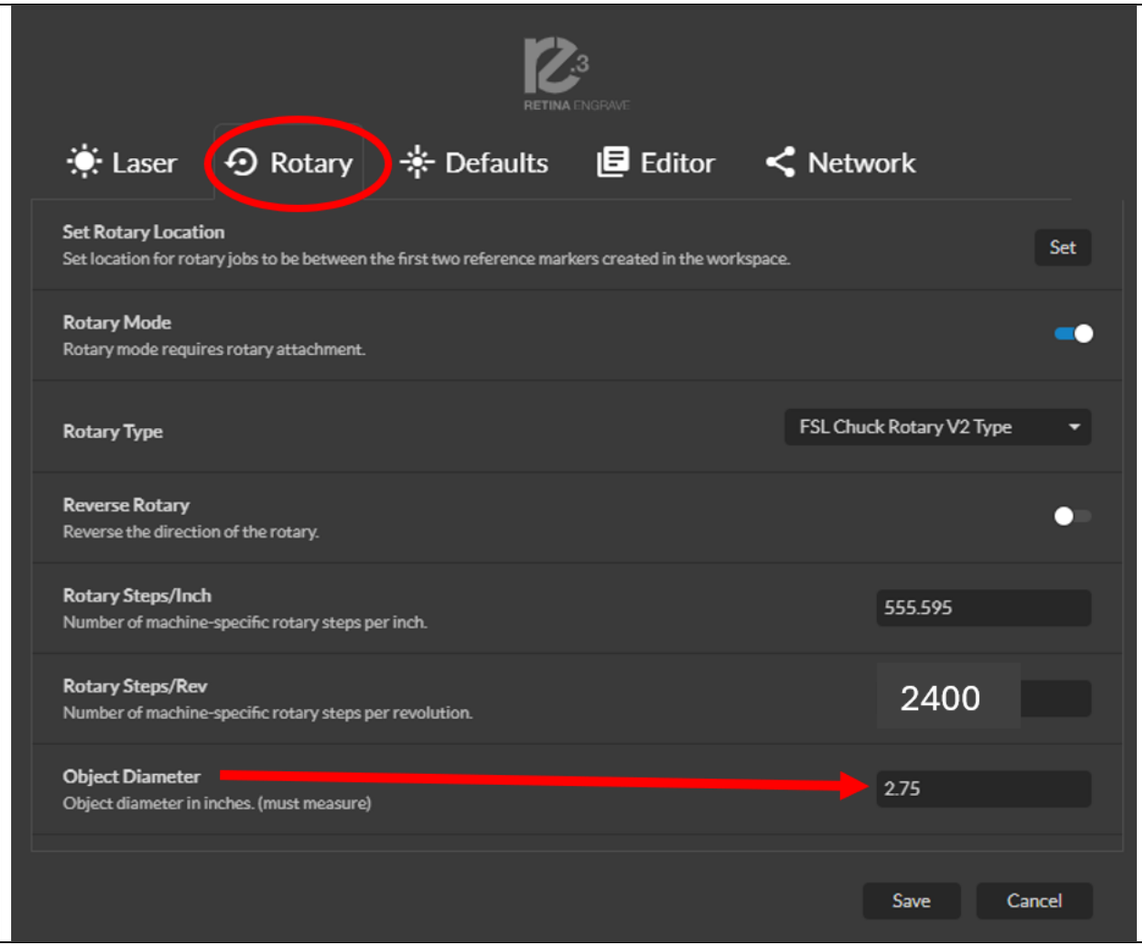
13. Verify Rotary Enabled	Next select the Rotary tab on the settings page. The Rotary Mode slider switch should be turned on and blue.		

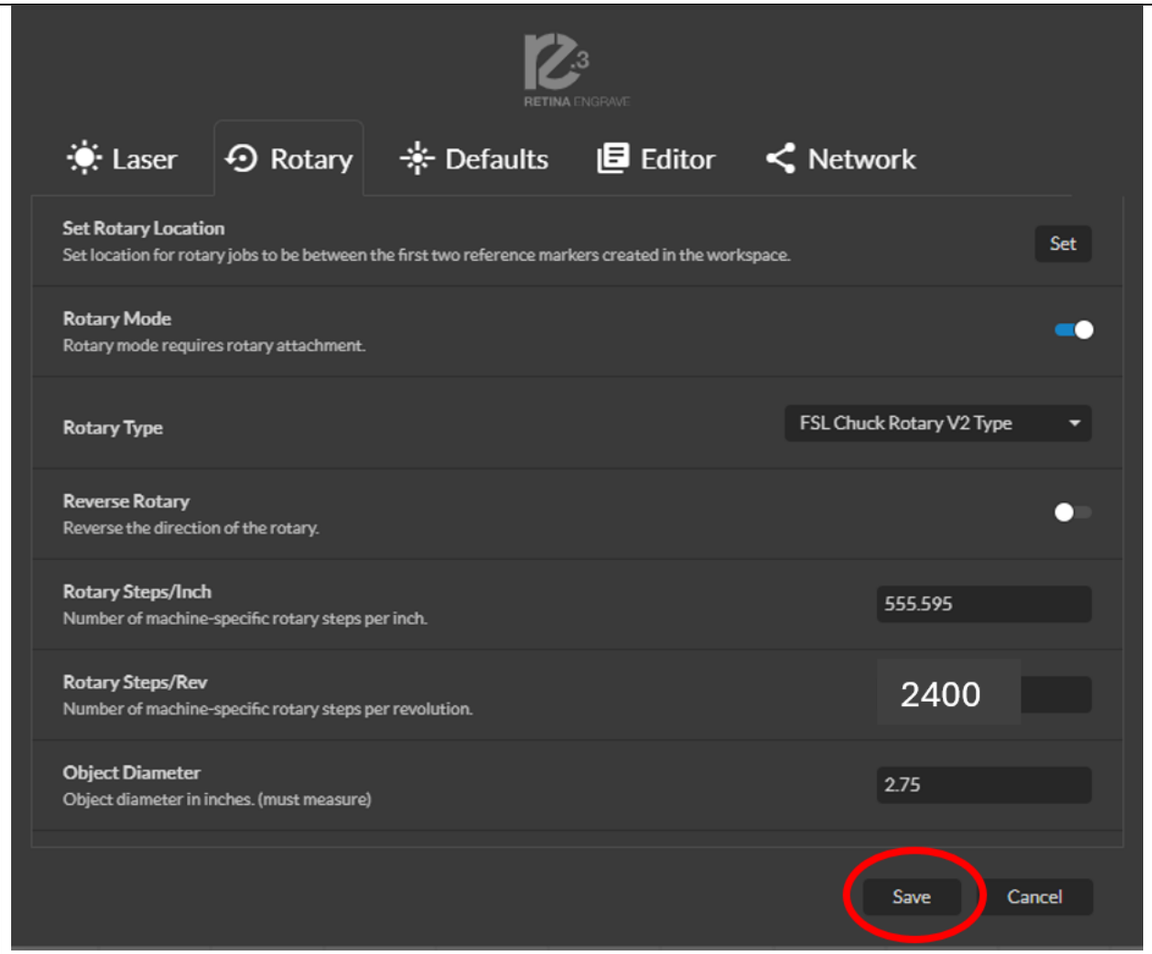
14. Verify chuck rotary v2 Selected	The rotary type you are using is: **FSL Chuck Rotary V2** If this is not the selected rotary type, use the drop-down menu to select the FSL Chuck Rotary V2 option. This is important as the different rotary tools turn cylinders in different increments. Selecting the wrong rotary device can result in the finished engraving image being stretched, squished, or generally out of proportion.		

15. Reverse Rotary Setting	**OFF**: The image will engrave as it appears on the screen. OFF is the most common selection. When off the slider switch is to the left as in the image on the right. **ON**: This image will engrave as a mirror image of what appears on the screen. Turning this setting on will cause the rotary tool to turn in the opposite direction that will create the mirror image transformation. When Reverse Rotary switch is on the slider switch will turn blue.	

16. Rotary Steps/Inch Automatically calculated.	DO NOT CHANGE THIS VALUE. This will be calculated by the software based on the selections you have made. The value displayed likely will be different than that displayed in on the directions. The software will calculate this value based on the type of rotary selected and other values you will enter.		

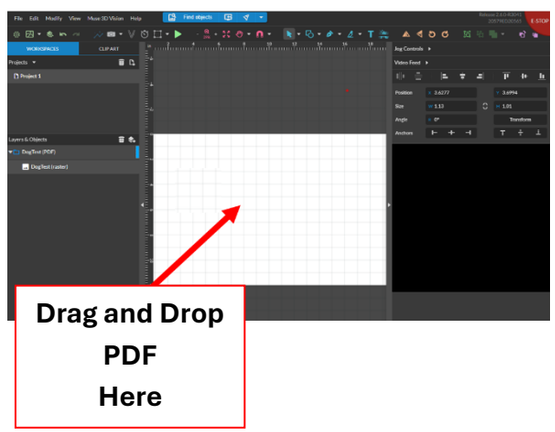
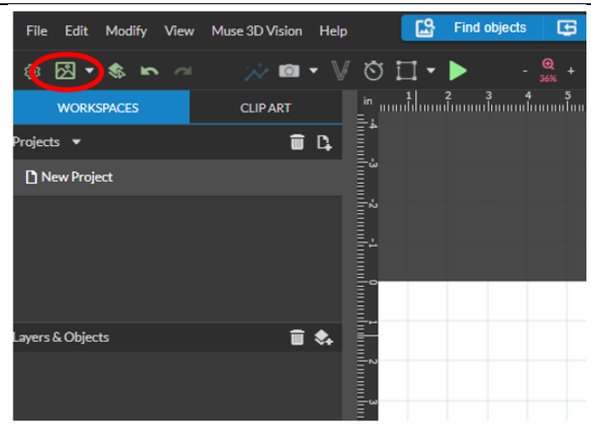
17. Verify Rotary Steps per Revolution: 2400	Rotary Steps/Rev: 2400 The software default value is not correct for the FSL Chuck Rotary V2. You may need to correct the value in this field to 2400. This will allow the motors on the rotary tool to turn in the correct increments. An incorrect value here will result in engraved images that are transformed (stretched or squished) and do not match the artwork because the rotary tool motors will be turning in increments that are either too large or too small.	

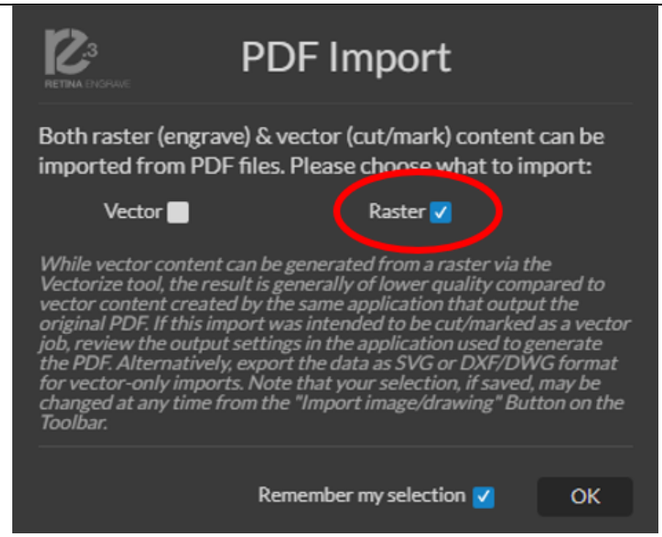
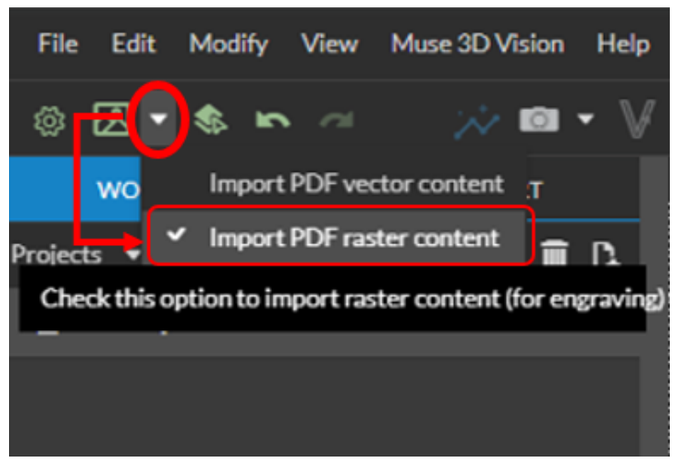
18. Enter Object Diameter	Enter the value you measured in step 11. In the tool drawers you will find calipers and measuring tape to measure the diameter of your cylinder if you need to re-measure. Be sure to measure in INCHES. **Enter the diameter of your cylinder in inches.** This value determines how far and fast the rotary tool should turn based on your artwork. Cylinders of different sizes will need to rotate at different rates.	

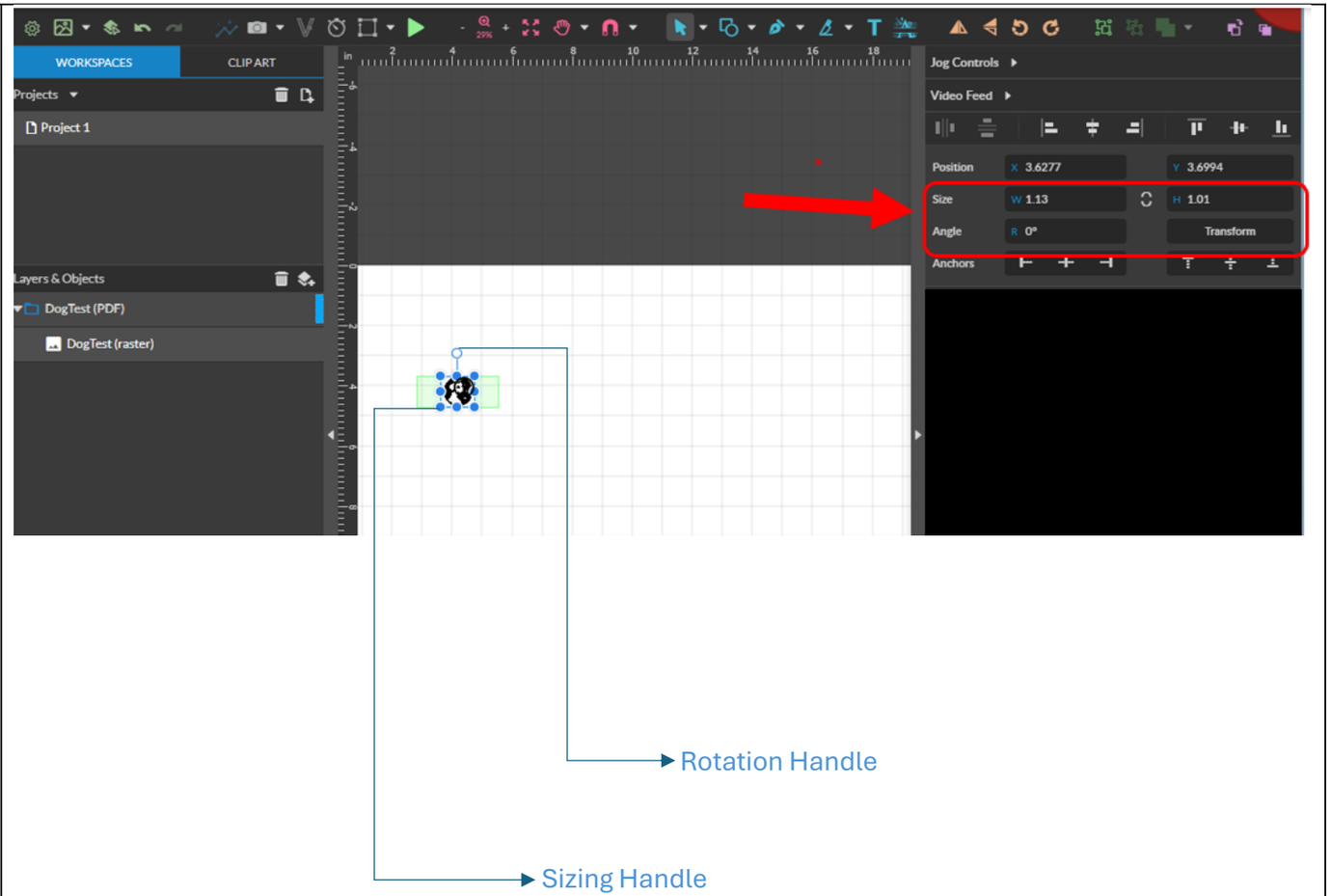
19. Save Rotary Settings	Click the save button to save the rotary setting values and selections you have entered. If you do not save the values, they will revert to the last entered values.	

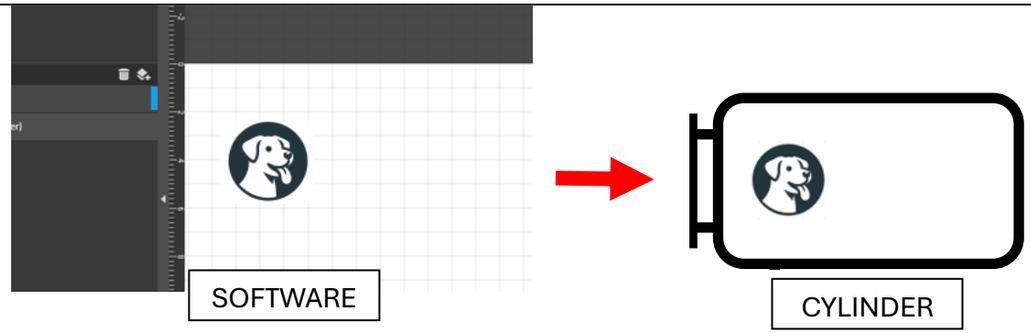
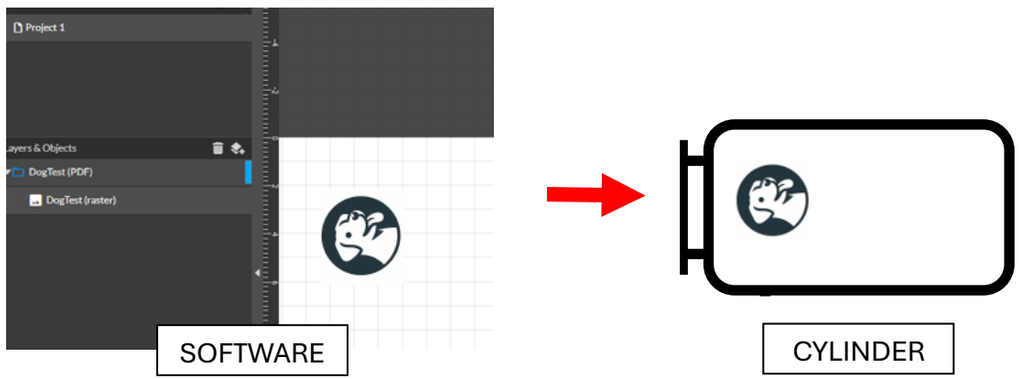
20. Check your cylinder.	You will want to remove: • caps / lids • loose items • handles • other protrusions This will allow the rotary tool to turn the cylinder without obstructions. Any obstructions will prevent the cylinder from rotating properly.	
21. Cylinder Material Check	To engrave onto your cylinder, the surface of the cylinder must be: • Painted or Powder coated • Bare metal prepared with a laser marking spray (such as CeraMark). • Wood (or similar natural material) You will **not** be able to safely mark: • Stainless Steel/Bare Metal • Plastic • Plastic Coating • Resin/Epoxy Coating 	Does your cylinder have a shiny, smooth, high gloss appearance? These coatings are not suitable for laser engraving. These coatings are likely a resin, plastic, epoxy coating that is not suitable for use in the laser. These coatings can be a fire risk or produce toxic gases when used with a laser. 

22. OPTIONAL: Prepare Cylinder for test engraving	Want to run a test without permanently marking your cylinder? Apply painters' tape around your cylinder where you plan to engrave your image. We recommend covering a larger than necessary area in case you have a scaling error or input incorrect values into the rotary setting (which can result in a larger engraving or an engraving the wraps farther around the cylinder than intended).	
23. Access Artwork	Insert your USB drive with your artwork saved as a **PDF**. -OR- Download your artwork saved as a **PDF** from your cloud storage. REMINDER: For best results it is best to have already sized your artwork to the finished engraved size you want applied to your cylinder.	  

NOTE ON ARTWORK FILE TYPES	Can I use other file types? The laser manufacturer specifies that the laser cutter software is optimized for PDFs and does not support the use of other file types. While other file types will open, they can have issues with sizing and quality. Use of other file types is not recommended or supported by the library.	
24. Import Artwork PDF File	Drag and drop your artwork onto the white grid surface of the software. Alternatively, you can import your artwork PDF by clicking on the Image icon and navigating to where you have saved/downloaded your PDF file. IF PROMPTED: Select the **RASTER** option. The raster option is for engraving artwork onto the surface of material. Vector content is for using the artwork pattern to cut the material. You will not be vector cutting.	 

25. Select type of work: RASTER	Select RASTER option when prompted. The raster option is for engraving artwork onto the surface of the material. **Did you mistakenly select vector?** **Was there no prompt?** You can use the dropdown next to the image icon to confirm/change between the raster and vector selection. Delete the artwork, switch to raster from the dropdown, and re-import your artwork.	 

26. Position Artwork	Click on the artwork in the grid. When you have selected the artwork, it will have blue resizing handles and a rotation handle. Use the Transformation menu in upper right to resize, rotate, and apply other transformations. **Size**: width and height are shown in **inches**  Selecting the link icon between the width and height will lock the aspect ratio. So that changing the value of one dimension (width) will automatically result in the other dimension (height) being proportionally changed. **Angle**: use this to rotate your artwork Enter the number of degrees that you would like to rotate your artwork.	

27. Positioning Artwork on computer screen	Keep in mind your cylinder's orientation inside the laser cutter when selecting the orientation of your artwork. In the **Rotated Example** to the right, the image of the dog was rotated in the software so the top of the dog's head will be oriented to the top of the water bottle when the laser engraves the artwork.	 **Rotatated Example:** 

<table>
<tr>
<td>28. Select Power and Speed Settings</td>
<td>Different combinations of material can respond differently. It is always best to have identical sacrificial test material where you can start off with lower power settings and incrementally increase by 10% to find what works best.

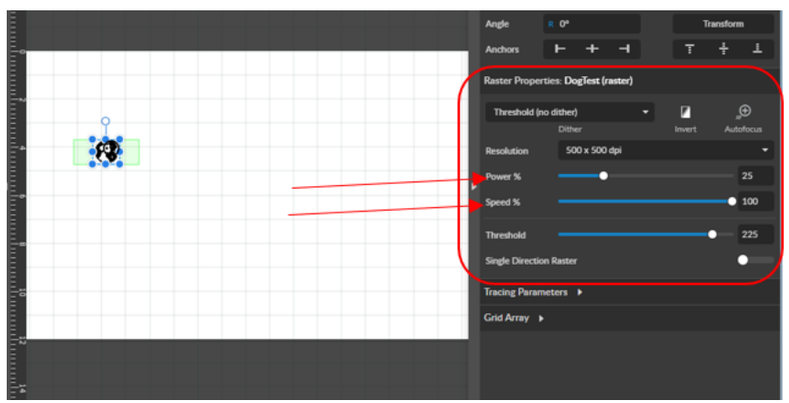
Higher Power: The laser will be a higher intensity and temperature having a greater impact.

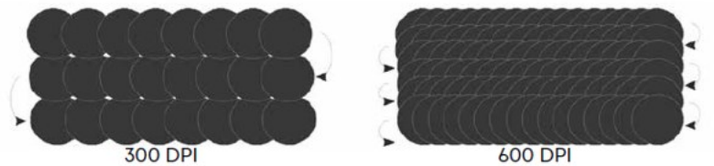
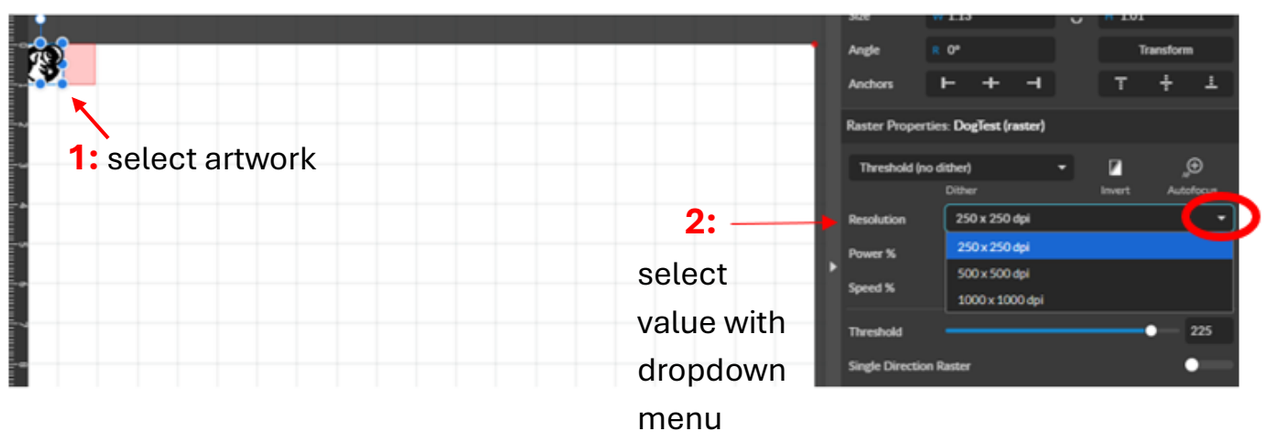
Lower Speed: The laser will move over the surface slower having a more intense effect similar to raising the power.</td>
<td>
Suggested

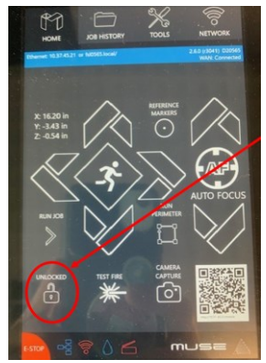
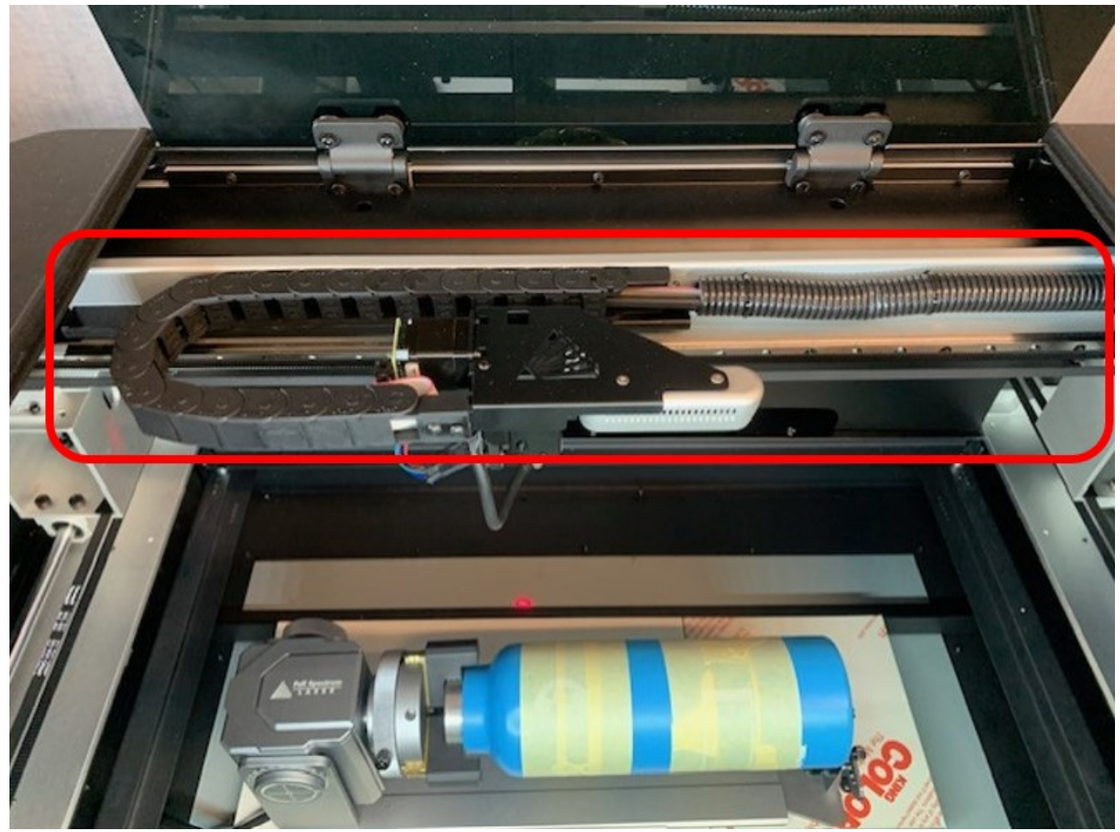
Power and Speed Settings

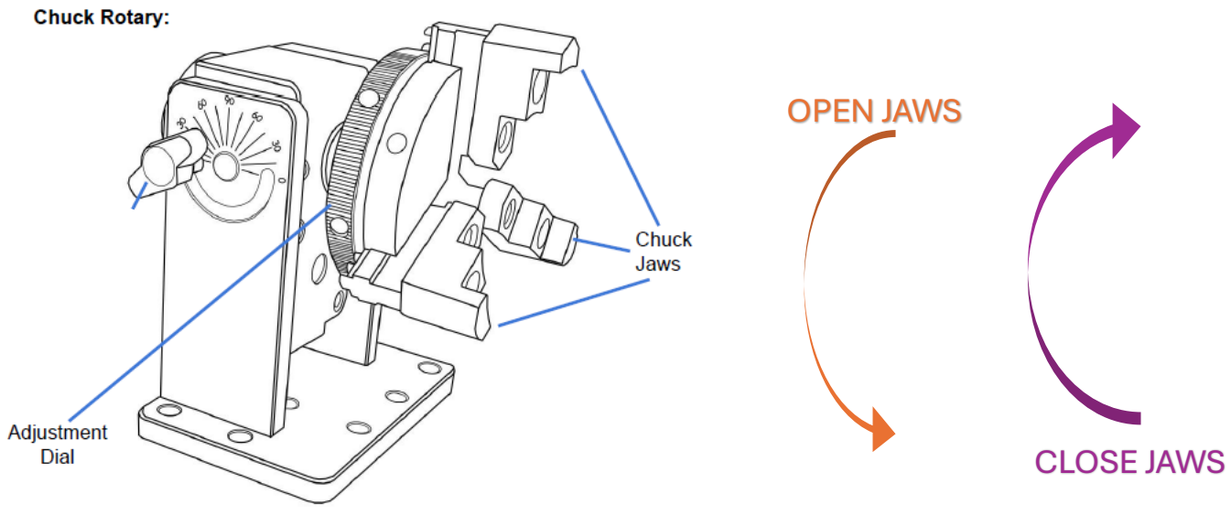
All materials are different and you may need to adjust based upon the results you see.

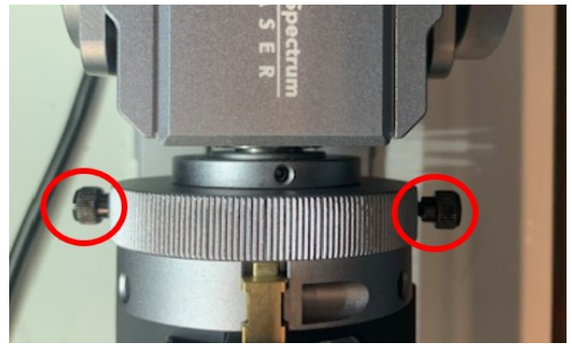
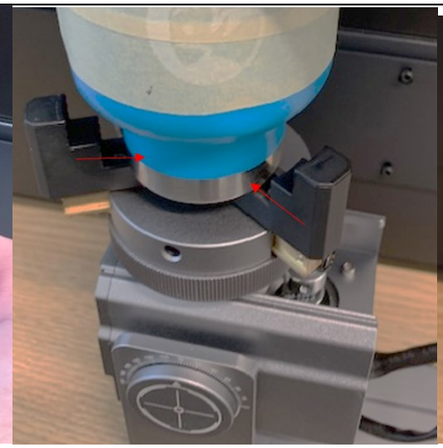
<table>
<tr><th>Material</th><th>Power</th><th>Speed</th></tr>
<tr><td>Painters Tape Test</td><td>15%</td><td>100%</td></tr>
<tr><td>Painted Metal</td><td>40%</td><td>90%</td></tr>
<tr><td>Stainless Steel prepped with laser marking spray</td><td>25%</td><td>90%</td></tr>
<tr><td>Wood</td><td>45%</td><td>100%</td></tr>
</table>
</td>
</tr>
<tr>
<td>Enter selected Power and Speed Settings</td>
<td>1. Make sure your artwork is selected and shows the blue sizing handles.

2. Once the artwork is selected the raster properties will display on the right. Here you can enter your power and speed setting.</td>
<td> 
</td>
</tr>
</table>

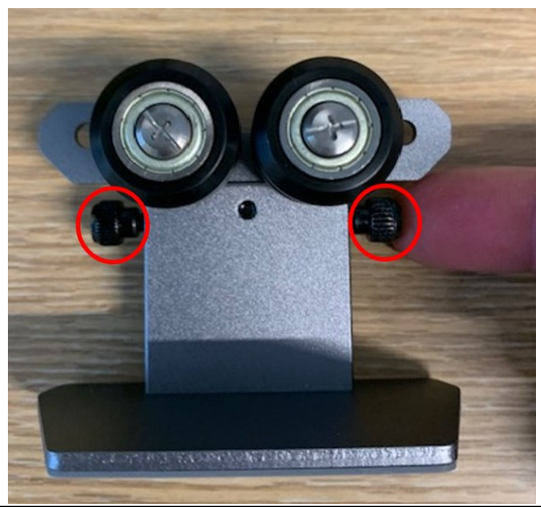
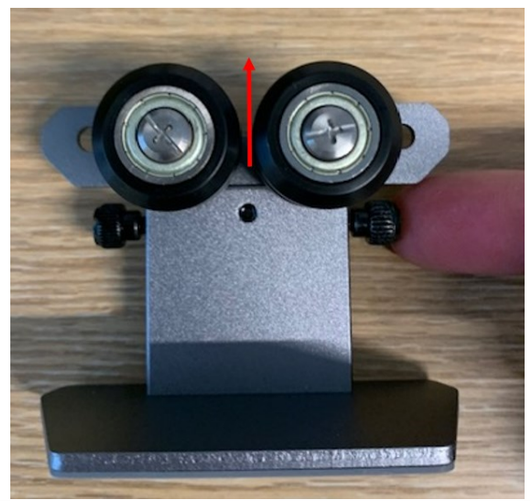
29. Select Setting DPI	As the laser sweeps across the material, it will fire the laser repeatedly to create the artwork. The higher the DPI, each firing of the laser becomes closer together and each marking made by the laser begins to overlap. 250 DPI: Good for fast shallow engravings with simple artwork such as clipart. Fastest engraving. 500 DPI: Good for finer details such as artwork with thin lines. **This is the most common selection.** 1000 DPI: Engraving highly detailed artwork or photographs. This option is rarely used. Slowest speed engraving. Selecting DPI Value in Software: 1. Make sure your artwork is selected and shows the blue sizing handles. 2. Select the DPI value.	 This is a magnified view. You would not see the gaps between the marks on the surface of your material. **How To Select DPI Value:** 

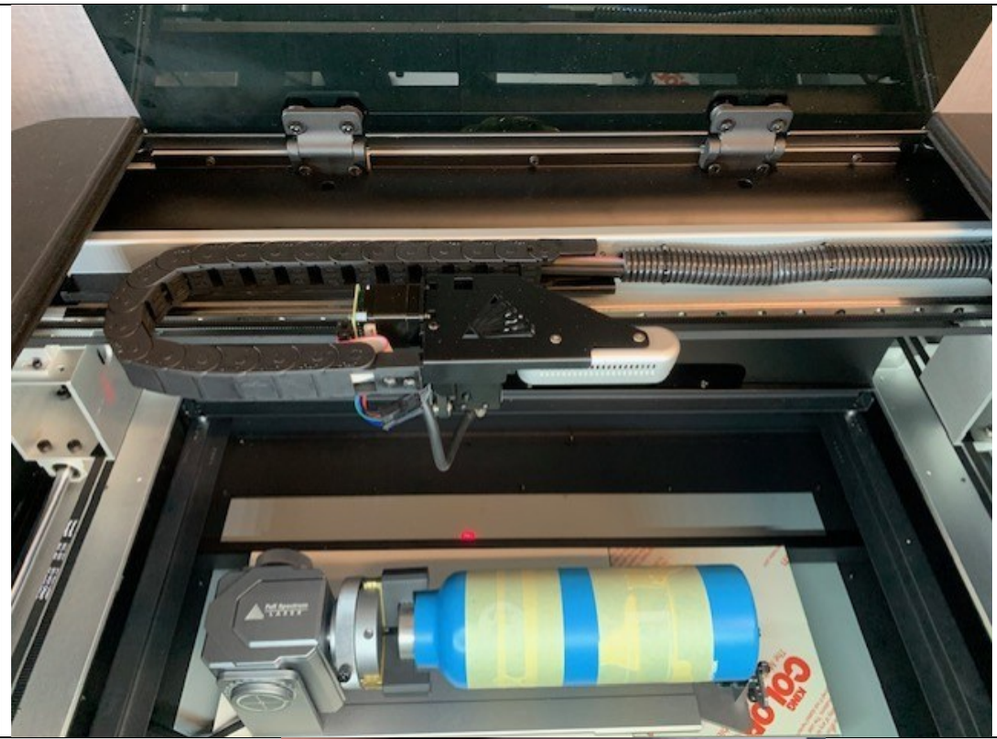
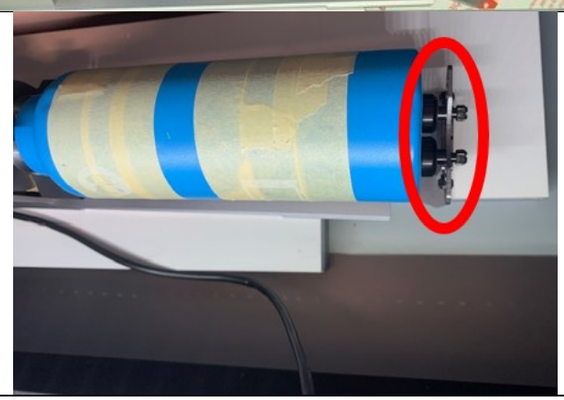
30. Move Gantry to back of machine.	Open laser cutter lid and verify the gantry is moved to the back of the machine (see image). This will allow you to access the rotary tool. **To Move Gantry:** 1. On touch panel of laser cutter touch the lock/unlock icon to that it displays **UNLOCKED**.  2. Gently push the gantry back.	

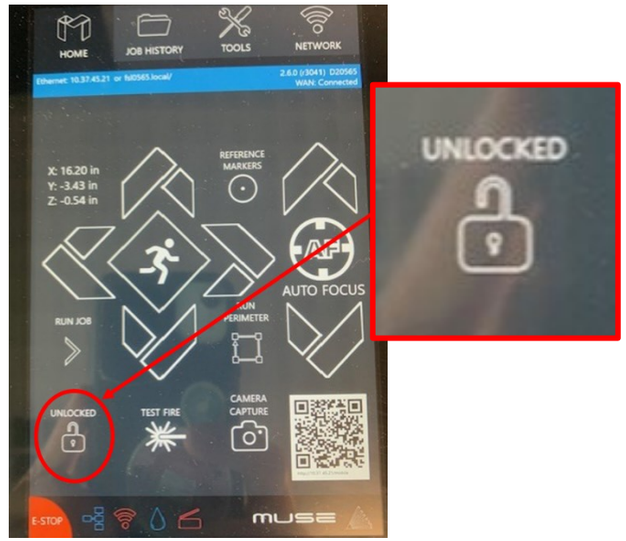
31. Open Chuck Rotary Jaws	Turn the **adjustment dial** to widen the chuck jaws. One direction will open the jaws wider and the other direction will close the jaws. You will want to open the jaws wide enough to accommodate your cylinder.	
32. OPTIONAL: Lift rotary tool out of laser bed.	You may want to lift the rotary tool out of the laser cutter bed and onto the table to make manipulating the chuck and loading your object easier. Move rotary tool with care. Place on the table in front of the laser.	

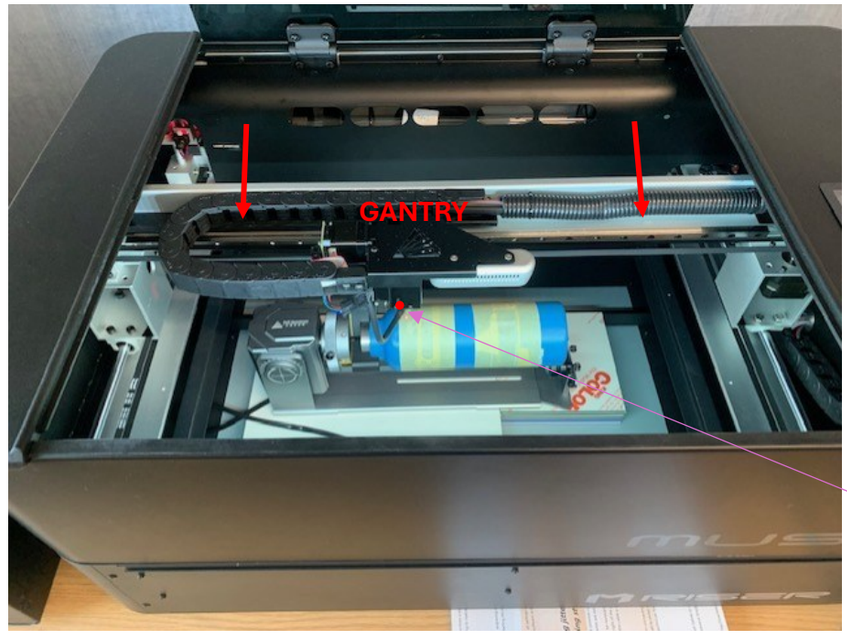
33. Check Thumb Screws on adjustment dial.	If the thumb screws have been tightened the adjustment dial will not turn freely.	
34. Load cylinder into jaws of the chuck rotary.	Load your cylinder into the rubber jaws of the chuck. TIP: Tipping the jaws up may make it easier to load your cylinder and seat it flush against the jaws. Rotate the adjustment dial to initially tighten the jaws onto your cylinder. ⚠ **The jaws <u>will not</u> be tight enough to hold the weight of your cylinder. Keep supporting your cylinder.**	  

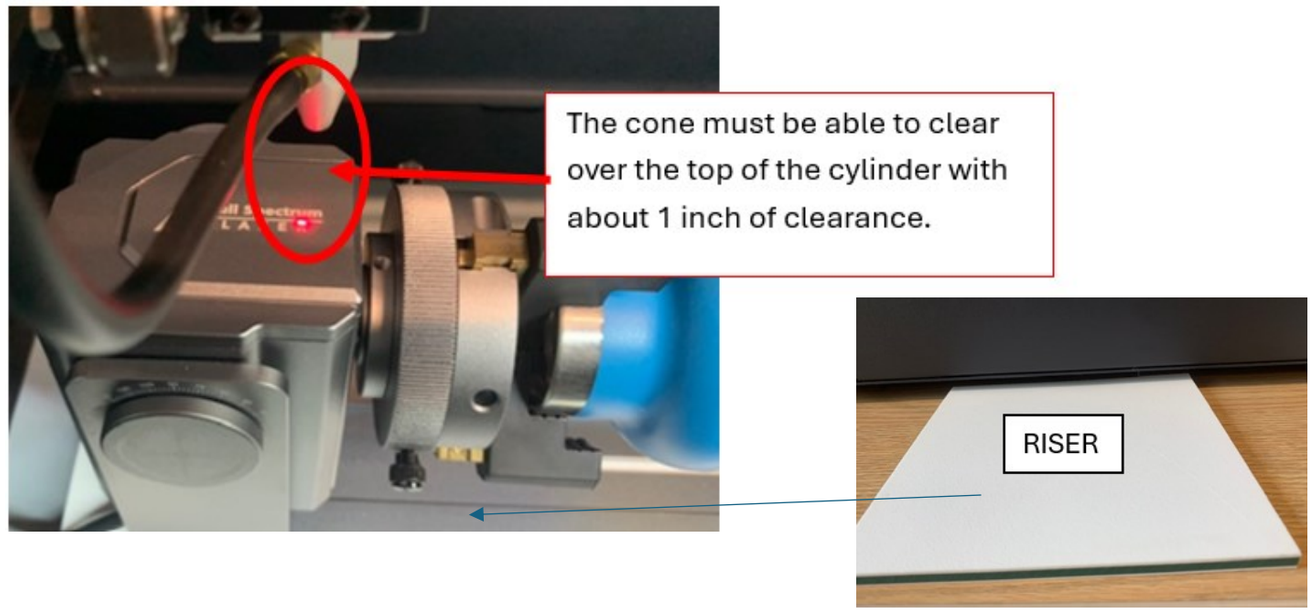
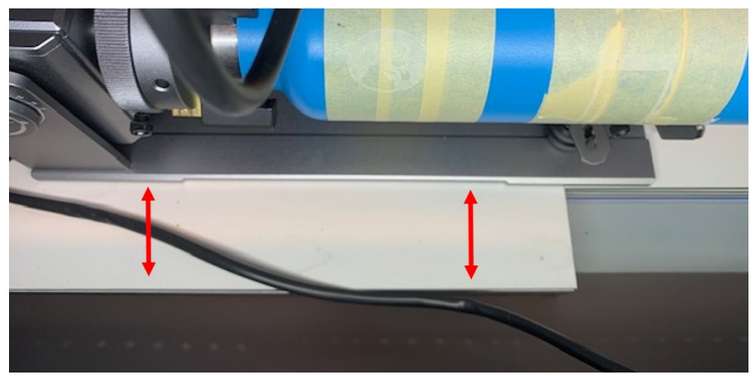
35. Finish Tightening Chuck Jaws	With one hand, hold the chuck jaws. With your other hand hold the **adjustment dial.** Rotate those slowly in opposite directions to finish tightening the jaws onto your cylinder. If you have your cylinder upright, keep it upright. Take care not to overtighten. It is possible to crack or warp fragile material.	
36. Lock Adjustment Dial	Tighten the black thumb screws on the adjustment dial to help prevent the dial from moving.	

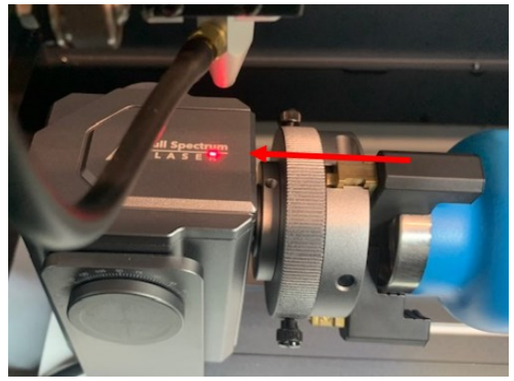
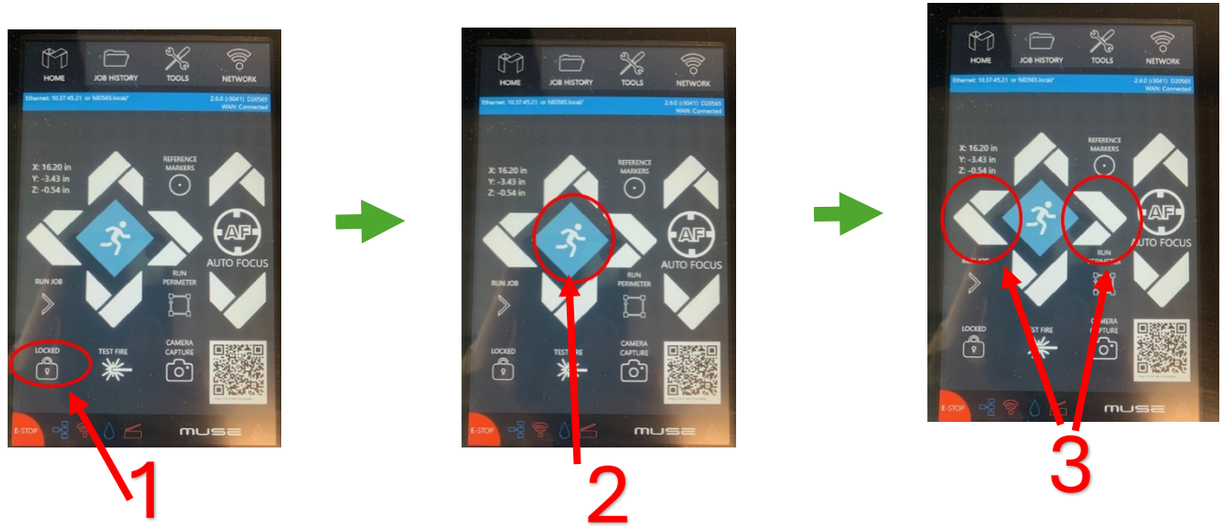
37. Adjust height of floating end wheels.	These wheels are placed under opposite end of your cylinder to help support the weight of the cylinder and prevent it from slipping out of the chuck jaws. Adjust the height of the floating end wheels by: 1. Loosening the thumb screws. 2. Adjusting the height slider. 3. Tightening the thumb screws.	  

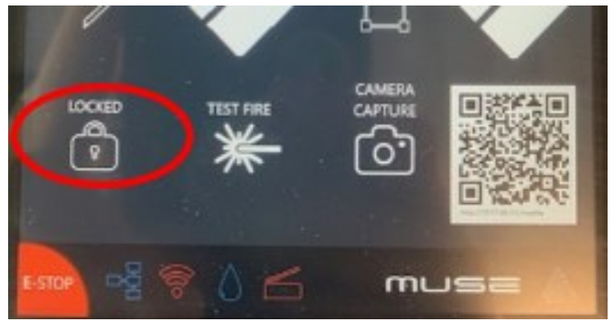
38. Place rotary tool with cylinder into laser	While supporting your cylinder, move the cylinder and rotary tool into the laser bed on top of the risers. **TIP**: You will want to have the floating end wheels strategically placed into the bed of the laser so that they can be quickly and easily positioned to help support the cylinder. 	
39. End wheel support	Place the floating wheels under the end of your cylinder to help support the weight of the cylinder. This will help keep the cylinder from slipping out of the jaws of the chuck. You may need to remove/add risers under the floating wheels to get good support.	

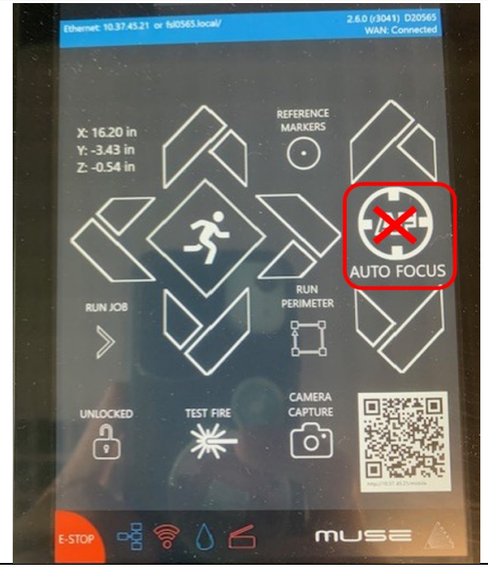
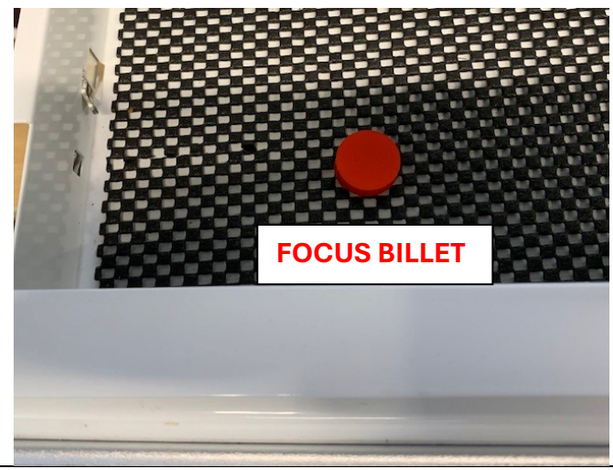
40. Unlock Gantry	Check to make sure the touch panel controls on the laser show the gantry is unlocked. Touch the icon to switch between locked and unlocked. We are preparing to move the gantry over the top of the rotary tool and your cylinder. The gantry **must be unlocked** to move it by hand. When unlocked, the gantry is disconnected from motor control and can be repositioned.	

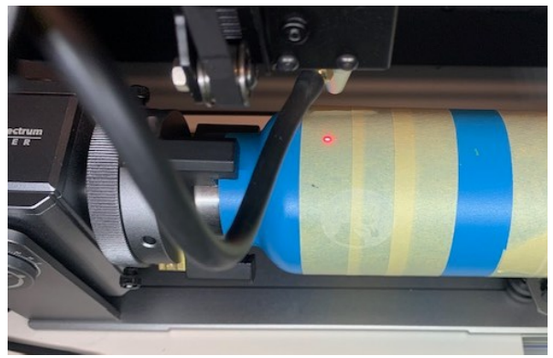
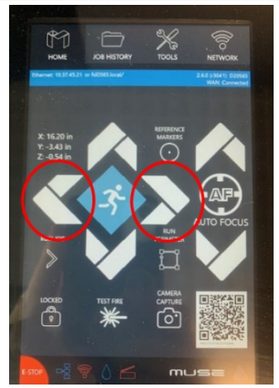
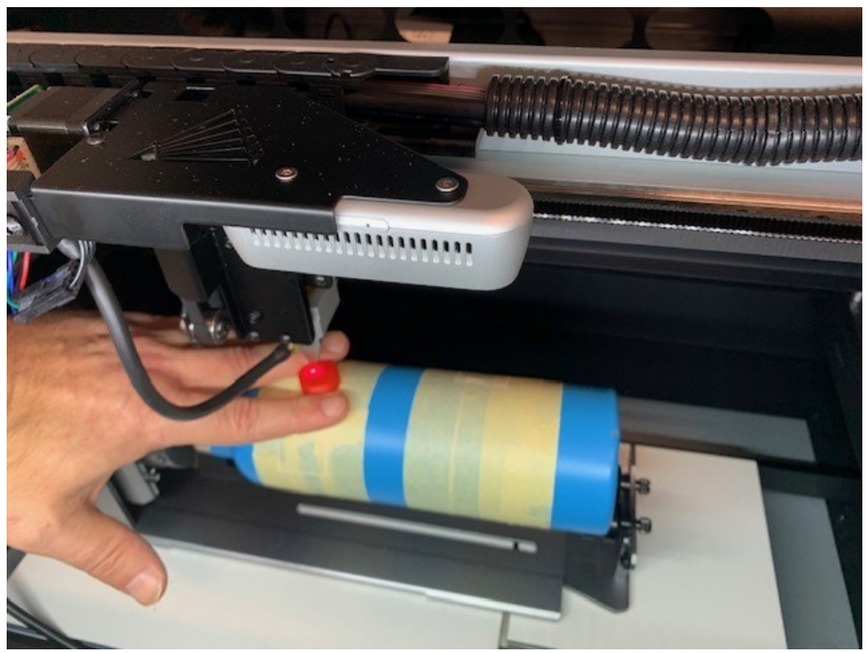
41. Position Gantry Over Cylinder	Gently pull the gantry forward. Position the gantry so that the red dot positioning laser falls on the highest point (middle) of the cylinder. You will want approximately **1 inch of clearance** between the nozzle of the laser and the top of your material. A rough visual estimate of this distance is sufficient. **See step 42 to adjust for this 1-inch clearance**.	 Red dot of positioning laser.

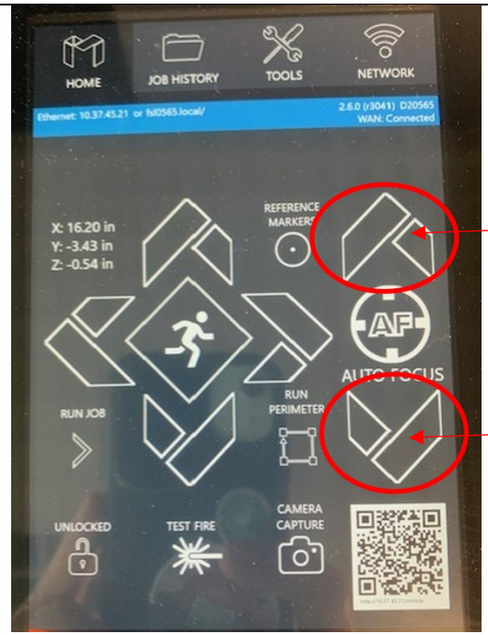
42. Too Tall? Too Short?	The cone of the laser head must have about **1 inch of clearance over your cylinder.** **<u>Not enough clearance?</u>** Try removing some risers under the rotary tool. Store extra risers in the drawer of the tool cabinet labeled risers. **<u>Too much clearance?</u>** You will need to add risers under the rotary tool to achieve about a 1 inch distance from the tip of the cone and the top of your cylinder. If you are unable to achieve the necessary clearance, the diameter of your cylinder may be too wide (or narrow) for the rotary tool and laser work area.	
43. Check Rotary tool is squarely aligned.	Visually check that the rotary tool is squarely aligned in the bed of the laser. One method is to make sure there is a consistent distance between the edge of the risers below the rotary tool and the long edge of the rotary tool. If the rotary is not square, this can result in your artwork being misaligned on your cylinder.	

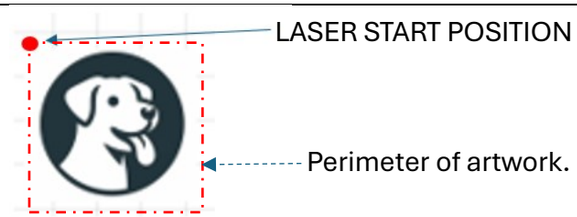
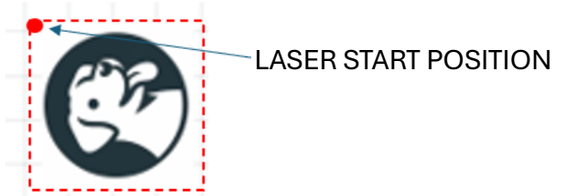
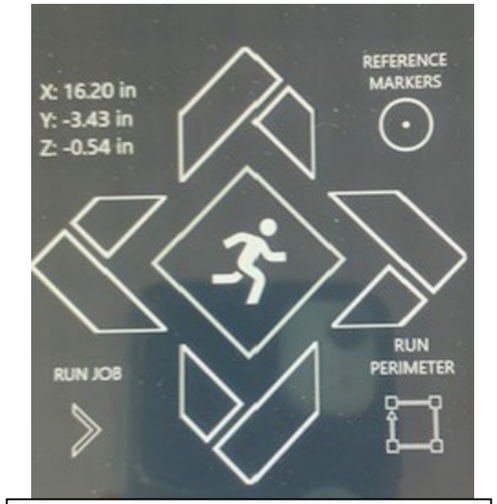
44. Center Laser	Make sure the nose cone is centered above your cylinder. The red positioning dot should be at the highest point on the cylinder. This can be difficult to judge. An alternative method would be to see if the red positioning laser dot falls on the center line of the Full Spectrum Logo on the rotary tool. 1. Lock the gantry on the touch screen panel. 2. Switch speed to slow by touching running/jogging/walking man icon. 3. Use the arrows to jog the laser left and right. **UNLOCK** the gantry before attempting to move it to fine tune its position closer to the front of the laser or back of the laser.	 

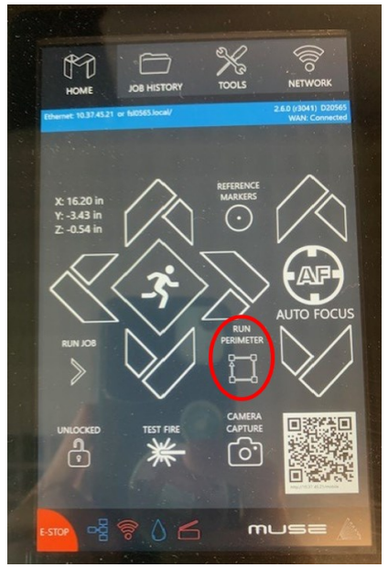
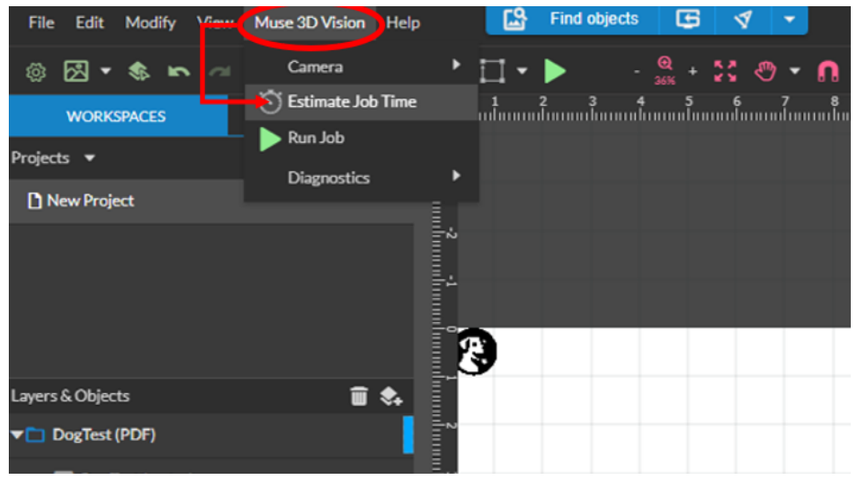
45. Lock Gantry	Once you have the laser centered on your cylinder, be sure to lock the gantry by using the touch screen panel.	

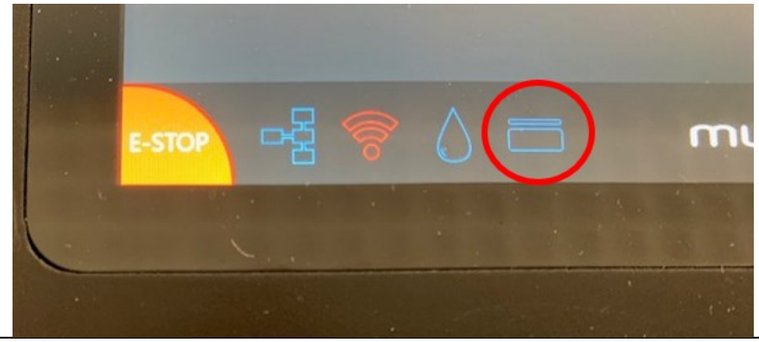
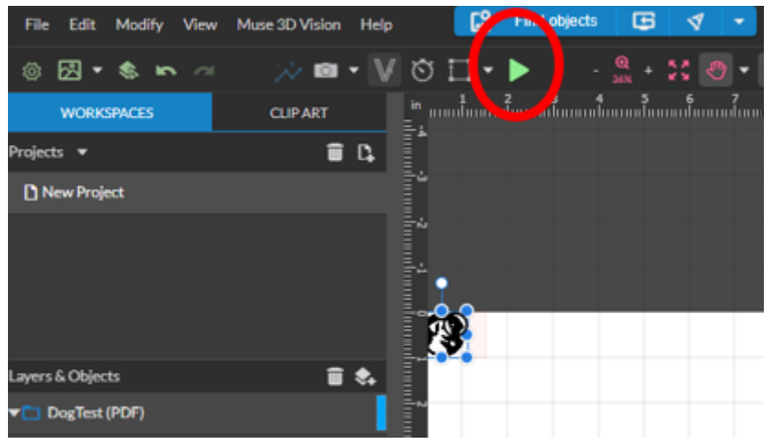
46. Do Not Use Autofocus 	Do Not Use Autofocus The autofocus routine can dislodge your cylinder from the chuck jaws. The autofocus routine will not alert you to your material being positioned too low. This will result in the laser being out of focus and likely ineffective.	
47. Manually Focus Laser	Locate the focus billet located in the tool chest drawer. The focus billet may be a variety of different colors. You will use this as a spacer to gauge the distance to lower the laser nozzle in the next steps.	

48. Position laser over cylinder.	Use the left and right arrows on the touch screen to drive the laser over the point on your cylinder where you will be applying your artwork. Remember you can change the speed in which the laser travels by touching the running/jogging/walking man icon.	 
49. Hold focus billet atop your cylinder.	Hold the focus billet so that it the billet is resting atop the cylinder. Maintain your hold on the billet. Try holding it between two fingers in your left hand so that you will be able to use your right hand to access the touch screen controls in the next step.	

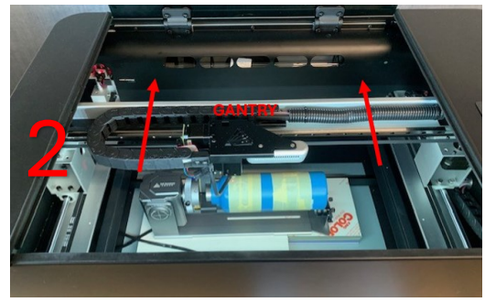
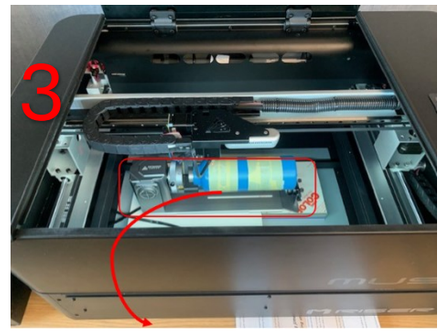
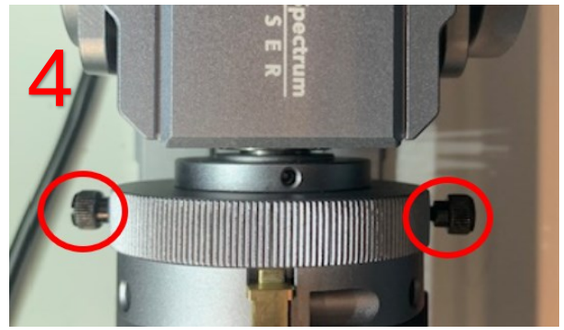
50. Lower/Raise the cone to focus laser.	Use the touch screen controls to lower the cone of the laser until it <u>almost touches</u> the billet. This will have the correct distance from the surface of your material to be in focus. If the laser is too far, it will be too out of focus and may not engrave on the material or have a very weak (faint) engraving. Too close and you will risk damaging both your material and the laser equipment.	 Raises the nose cone. LOWERS the nose cone. 

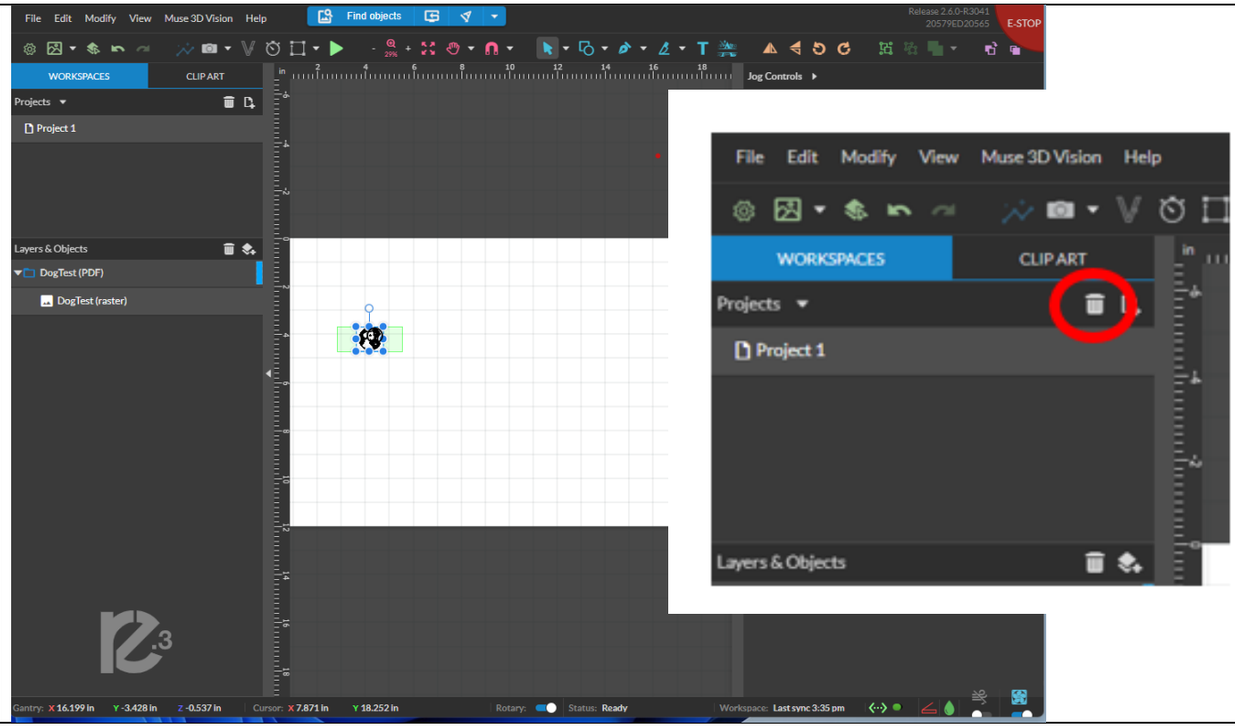
51. Jog laser to start position.	Position the red position dot laser over your material where you would like to start being engraved. The orientation of the artwork does not impact the start position. The laser will start applying the artwork from the upper left corner and move down line by line and end in the lower right. **Up** and **Down** arrows will <u>rotate the cylinder</u>. **Left** and **Right** arrows will move the laser head position left and right.	 	 Use the four arrows to position the red laser dot in the start position on your cylinder.

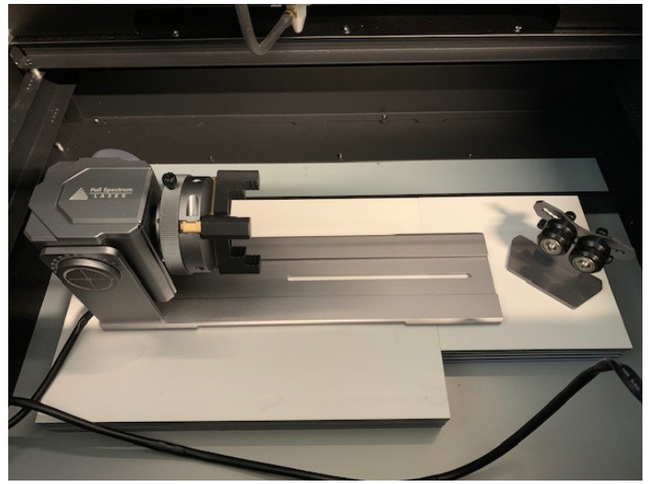
52. Perimeter Check	To visually check the area where your artwork will be placed, use the perimeter check. The red positioning laser will indicate the perimeter of where the artwork will be placed on your cylinder. The laser will move left to right on the gantry, and the rotary tool will rotate the cylinder to outline the perimeter (picture frame) of where your artwork be engraved. Tap the Run Perimeter option on the touch screen panel to see the laser trace the outline of where your artwork will be engraved on the cylinder.	  Perimeter of artwork.
53. Time Check	See the amount of time necessary to engrave your artwork: 1. Click **Muse 3D Vision** menu item 2. Select **Estimate Job Time** Be sure you will have enough time in reservation to not only complete your job but also clean up, pack up, and check out with staff.	

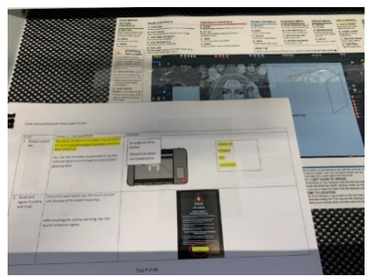
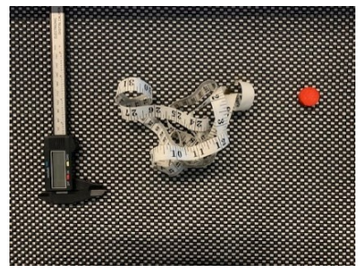
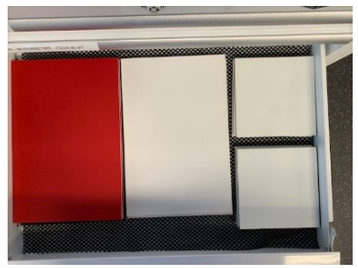
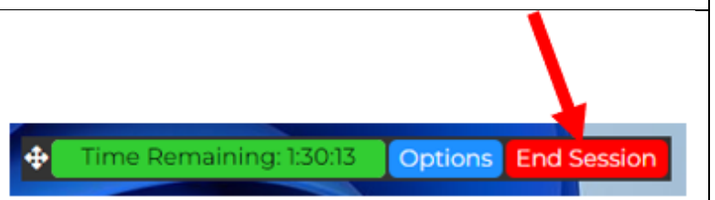
54. Close Lid	Gently lower the lid to the laser cutter. Double check that the *lid closed* icon on the touch screen panel indicates the lid is closed. Icon will turn blue to indicate the laser recognized the lid is closed. An open lid can result in tripping the safety protocol that prevents the laser from firing.	
55. Click Run	Return to your computer screen. Click the Green play/run icon to start the laser engraving.	

56. Leave Cylinder in place	Before removing the cylinder or moving the laser, evaluate the results. **Is the engraving too light?** **Does it appear as if a stronger power or slower speed may have been more effective?** As long as you have not moved the cylinder or the laser position, you can re-run the job with same settings to get a more pronounced effect. Or you can select new power and speed settings and run the job again if nothing has been moved. If you have moved anything, it will be practically impossible to line up the artwork again. You may want to use the cylinder as test material and try different power and speed settings on a new section of the cylinder.	

57. Remove Cylinder	Ready to remove your cylinder? 1. Unlock the gantry 2. Gently push the gantry back 3. Lift the rotary tool out of the laser work area. 4. Loosen thumb bolts on the adjustment dial. 5. Turn the adjustment dial to open the jaws of the rotary chuck.	    

58. Delete artwork in software on computer	Delete any uploaded files. **<u>Files do not automatically erase</u>** and will be visible when the next user powers on the laser. 1. Select the artwork on the screen in the white grid area with mouse. 2. Press the Delete key on the keyboard. Alternatively: 1. Select the project name in the left projects pane. 2. Click the trash can icon to delete the project.	

59. Replace Rotary tool.	Place the chuck rotary into the laser work area on top of the risers. Close the lid of the laser. You may need to wipe off any residue from your project from the interior of the laser or the risers with a damp cloth.	
60. Turn Power Key Off	Use the key to power off the laser.	 
61. Clean Up Area	Make sure you have cleaned up the work area and it is free from debris and surfaces have been wiped down. Wash rags are below sink.	 

62. Lock Tool Cabinet.	Make sure all tools are stowed in their proper drawer. Return these instructions to the tool cabinet. Lock the tool cabinet.	**Drawer 1** • Instruction Booklet • Software Tips Sheet  **Drawer 2** • Calipers • Measuring Tape • Focus Billet  **Drawer 3** • Risers 
63. Remove USB and Log Out of Computer	Remove any USB storage device. End your computer session using the on screen toolbar.	  
64. See staff.	Take the key to staff to check out. Staff will check that the work station is clean and orderly and double check the inventory of the tool cabinet.