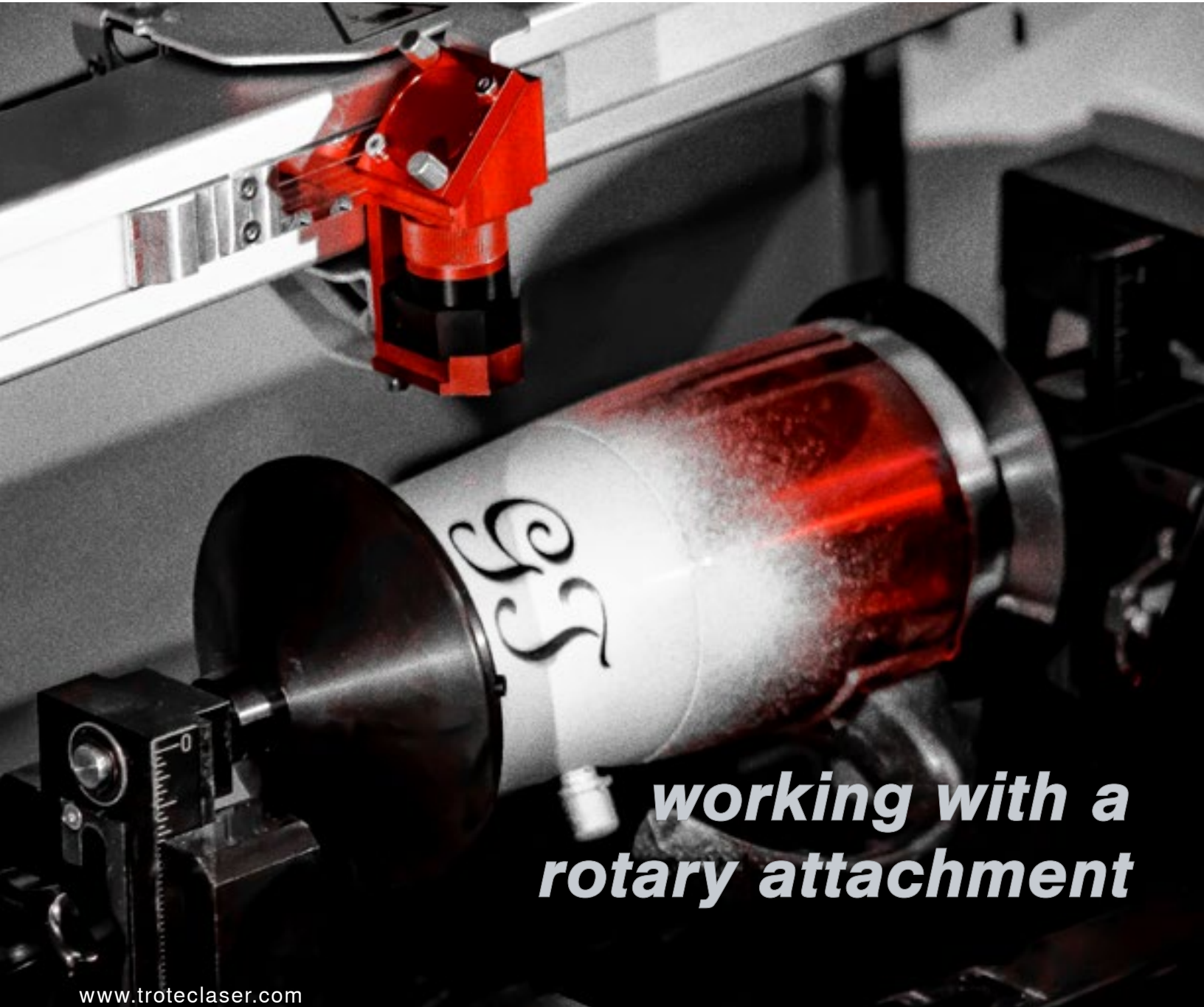


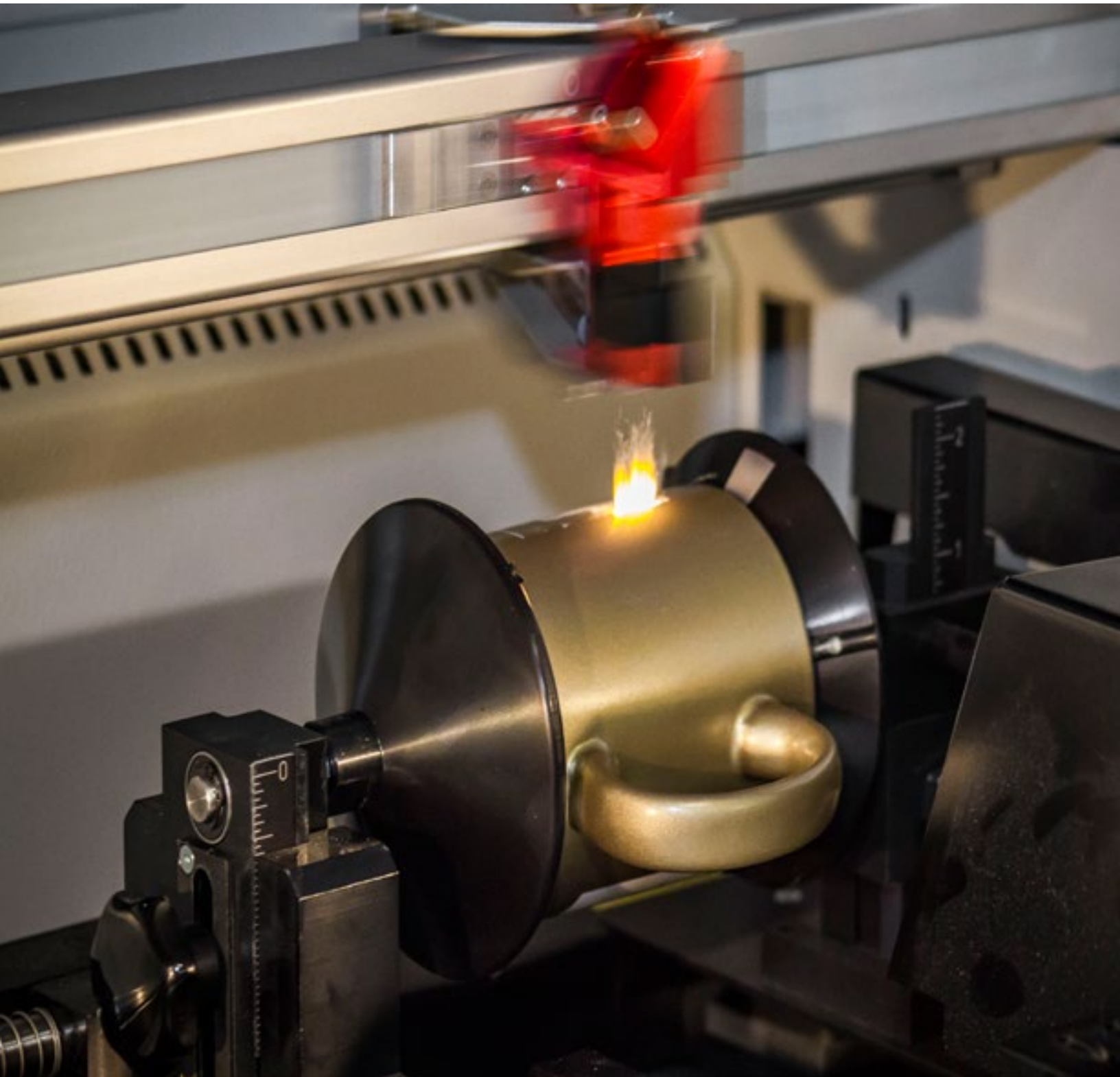
Laser Processing Guide



***working with a
rotary attachment***

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This document was written to address some specific use cases presented by customers and prospects. The specific challenges addressed by this technique include: standard alignment of a single graphic to a preprinted element on an engravable item, exact alignment of two sided engraving on a single item, and re-use of a saved plate template.

These specific challenges have been raised repeatedly with the increasing popularity of engraved stainless steel insulated mugs, such as YETI brand mugs, as well as barware. Barware engraving for items like pint glasses has been increasing with the craft beer industry's growth throughout the United States.



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Align Engraving with a Preprinted or Stamped Element

Many of the items that laser engravers are personalizing already contain some sort of brand mark or graphic element that has been previously applied to the workpiece using a different method. Often the customer would like a name or logo to be exactly aligned with these preprinted or previously applied elements.

If the design you are engraving is very detailed or highly intricate, we recommend still removing the layer prior to processing to avoid having to peel the backing off in many small segments.

As is the case with many of the popular insulated mugs, this item includes a slight taper from bottom to top. It is helpful to consider the location on the item where you intend to center your engraving. This will help reduce distortion of the graphics due to an incorrect radius.

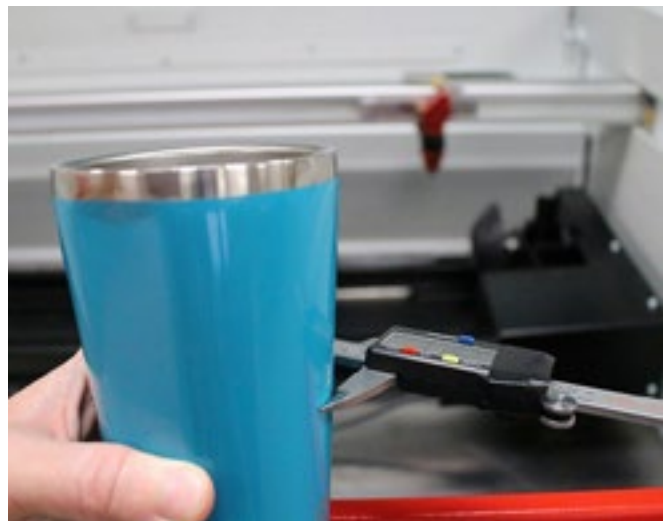


Many items come with pre-printed logos or designs

Step 1: Take a Diameter Reading

For best practices, we will take a diameter reading at the center of the area to be engraved, (as shown to the right). A digital caliper is very useful in taking an accurate diameter reading.

The caliper reading for this mug at the location selected is 3.152". Job Control will automatically make all of the calculations for you; however the diameter of the item to be engraved is very critical to job setup.



A digital caliper taking a diameter reading

Why Diameter is Important

The diameter is used in conjunction with the mathematical constant Pi (3.14159265.....) to calculate the circumference of the item at the location selected. By multiplying the diameter by the mathematical constant Pi, we can arrive at the circumference of 9.981 inches. This value represents the page size of a surface that can be wrapped around the outside of the mug and meet at the start point. (See example shown at right.)



The circumference is the size of a page that can be wrapped all the way around the mug

Step 2: Install and Connect Rotary Fixture

Once the Rotary Fixture has been physically installed against the top, and left rulers of your engraving table you can simply plug the connector into the correct location for your system. The following example was conducted on a Speedy 400 system.

For tapered items, like mugs and glasses, it is useful to have the pointed cone on the right side of the fixture and the rounded cone on the left side of the fixture as pictured below. This positioning will be helpful when using the angle adjustment on the Rotary Fixture to establish a flat engraving surface.



Place the pointed cone on the right for tapered items

Important:

Never connect or disconnect the rotary fixture while your laser system is powered **ON**. **Always** perform this step with the power **OFF**.

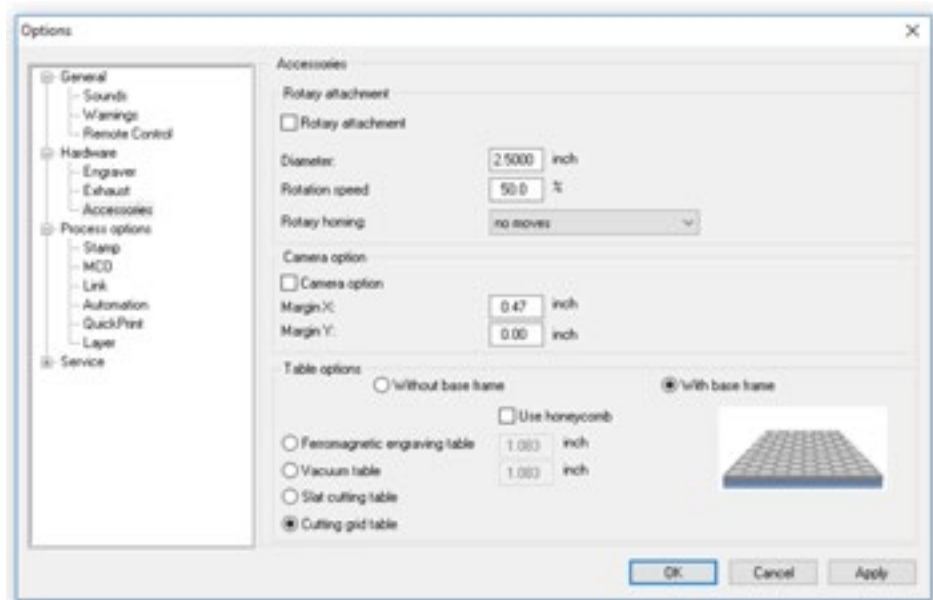
Step 3: Initialize Machine and Set up Job Control

You are now ready to power your machine. You will notice that the X-axis arm automatically centers itself over the Rotary Fixture. This happens because the machine automatically detects that the Rotary Fixture has been connected to the machine. Now you are ready to connect to the engraver from the Job Control window on the computer. We will now setup Job Control to be ready to set our artwork exactly where we want to engrave it.

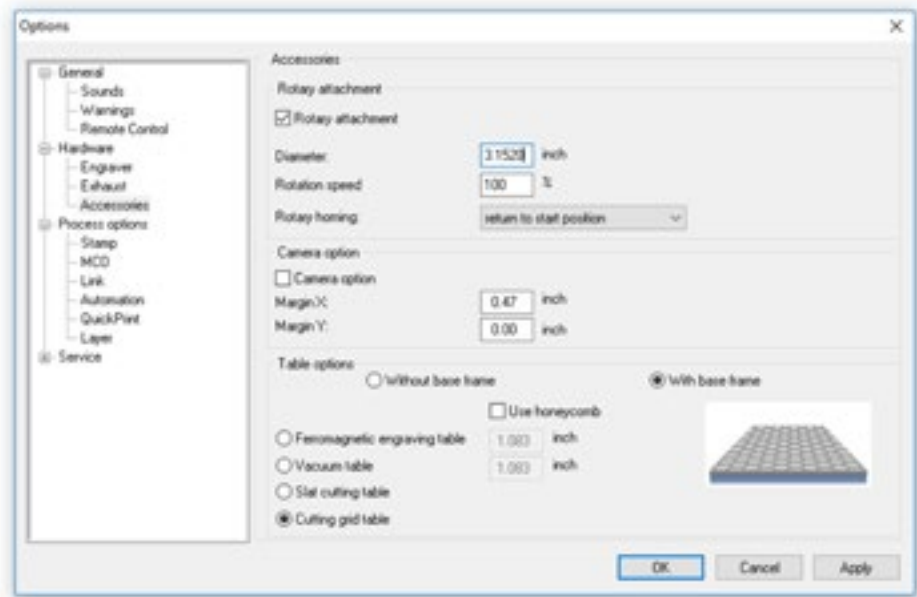
First, we will click the Settings menu and choose Options, or simply type the shortcut key Ctrl+J on the keyboard. This will activate the options panel in Job Control. Click the Accessories option under Hardware.

On this panel, click the checkbox for the Rotary Attachment at the top of the screen. Next, enter the diameter that was observed from the caliper reading in Step 1. For efficiency in trading out the next object for a multiple item order, try using the Rotary Homing option in the dropdown that reads "return to start position." Selecting this setting makes it easier to engrave every single item in exactly the same position. Once all the settings are in place, your options panel should look like the one shown to the right.

Click the Apply and OK buttons to return to Job Control's main window. Notice that the setup of the Job Control window has changed to reflect that the Rotary Fixture option is active. Click the Plate menu and choose Plate Setup, or simply choose the shortcut key Ctrl+H.



Select options and settings



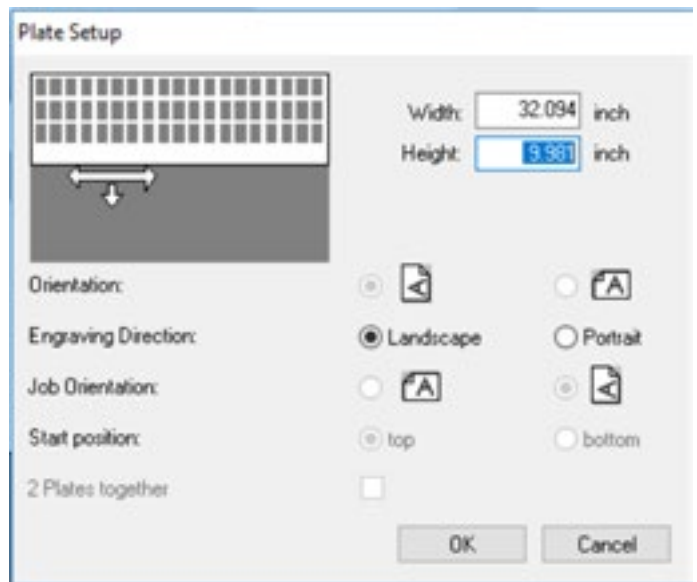
Options panel with settings selected

Important:

All motion commands must be executed with the top door closed; otherwise you will receive an error message and the command will not execute.

The Plate Setup screen will now be active and you will see that Job Control automatically calculated the Page Size relevant to the object you are trying to engrave. The circumference can be seen in the Height textbox. Remember, this value represents the size of a page that can be wrapped around the outside of the object and just meet back at the starting point. On the Plate Setup screen, this value is expressed as the Height of the page since the object sits in the machine sideways for rotary engraving. Write down the Page Height displayed because you will need to refer to this number to complete the setup of your job.

We now want to set up the fixture so that we can engrave multiple mugs to look exactly the same. Click the OK button to return to the job control screen. Remember our paper wrapped around the mug? Now visualize that we want to center a graphic on half of the mug. So, half of the mug equals half of the circumference, or half of the Page Height value we just wrote down (9.981) Visualized in the image below by a line drawn opposite our page seam, and following that same process, the center of half the mug is halfway through that half or one quarter of the Page Height (in our example 9.981).



Circumference expressed as page height in Plate Setup



Center the graphic on half of the mug



The center of half the mug equals one quarter the page height

Step 3 (Continued): Initialize Machine and Set up Job Control

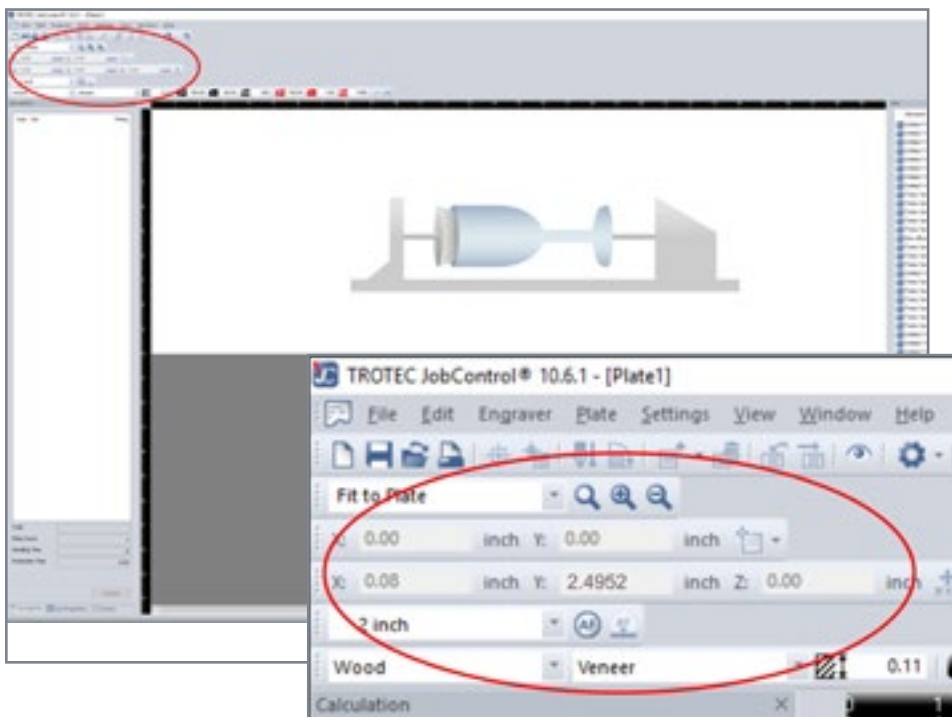
These pictures provide a great visualization for why we conduct the next steps of the process. However, the next two pictures may be the most important. When we first initialize the machine and setup the rotary, the top of our page that would wrap around the circumference would physically stop at the top center of the Rotary Fixture as pictured below. We can also visualize the same concept as if the page were actually the mug. In order to get reliable placement centered on our branding mark, we want to rotate the page around so that the center of the front half of the mug is pointing



Visualize concept as if the page were the mug



Top of the page stops at top center of rotary fixture



straight up. This is accomplished by conducting a motion system movement to the Y coordinate 2.4952 (9.981/4). The easiest method for doing this is to enter the value into the Y coordinate text box at the top of the Job Control screen and then click the XY Coordinate button to the right.

Upon successfully entering this value and clicking the XY coordinate button, the rotary fixture should rotate around a small amount. Now the mug can be loaded into the fixture with the brand mark facing straight up. Use the X motion buttons to move the laser head to the center point upon which you would like the graphics centered. Next, focus the laser head.



Use the X motion buttons to move the laser head to the center point

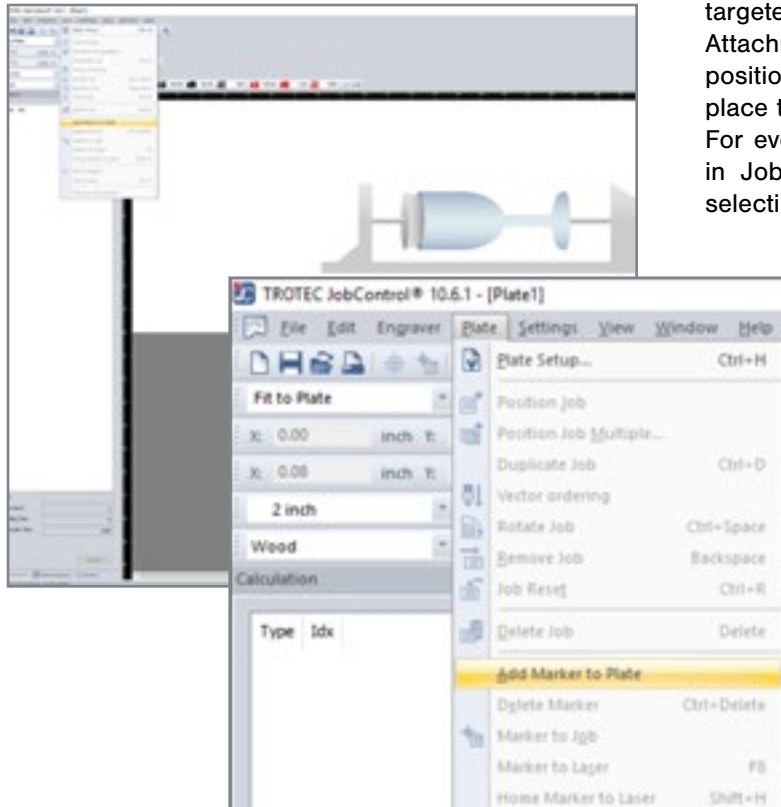
Repetition will be dependent upon being able to set graphics up to the same location every time. This is facilitated by setting a marker in Job Control. To set a marker at this starting location, go to the Plate menu and select Marker to Laser, or simply press the F8 key on the keyboard.

Markers display on the plate as a red box with a crosshair located in the center.

Step 4: Run the Job

Graphics dragged from the Jobs Queue can be automatically snapped to a marker on the plate as shown in the picture.

Running the job should result in the engraved image being centered perfectly on the branding targeted for the center of the work. The Rotary Attachment should return the mug to the same position it started from, making it even easier to place the next mug with the branding straight up. For even more ease of repetition, save the plate in Job Control by clicking the File Menu and selecting Save As.



Give the Plate a name that represents the item you are engraving. The next time you need to run that type of item, simply open the plate in job control and your placement will already be determined. The only steps you should have to complete prior to mounting the first cup is to make an XY move in Job Control to the marker location just like the one at the top of page 11. Then you will be ready to mount the mug and run more jobs.

Extending to Run Both Sides of an Item

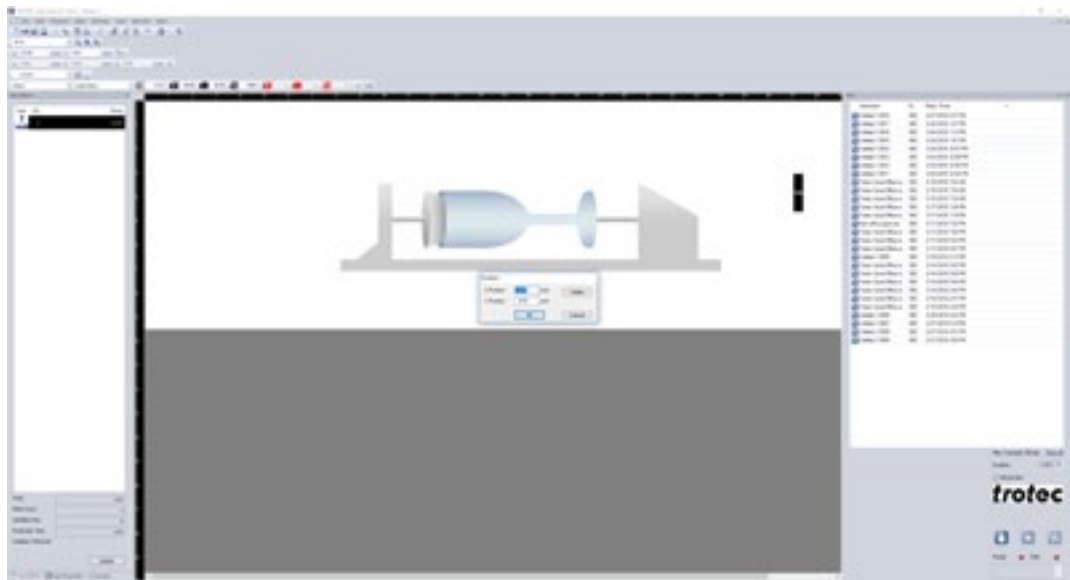
Now that we have explored aligning to a prepositioned item on a cup or mug, let's extend the discussion of markers to illustrate how this same concept can be applied to engraving artwork on both sides of an object, and insuring that the individual engraved areas are EXACTLY opposite one another.

Steps 1-3: Set up Job

First, follow steps 1-3 as described in Section 1 of this guide, through setting the first marker, which represents the center of the front of the item.

Step 4: Mark the Center of the Back of Item

Next, we need to set an additional marker that represents the center of the back of the item. We will do this by manually setting a second marker. To determine the location of the second marker, you need to calculate it off the position you determined for the first marker location. A quick way to accomplish this is to simply double-click the mouse on the first marker and the screen shown to the right will appear:



Set marker for the center of the back of your workpiece

From this marker location coordinate, we can determine the X & Y coordinates of our second marker. This will insure that both markers are lined up with each other. To determine the Y coordinate, we will have to do one more calculation. Take the Y coordinate of our first marker and multiply it by 3. In our example, $2.49 \times 3 = 7.47$. The X coordinate will be the identical for both markers so that the alignment of our graphics from left to right is correct at both locations. Therefore, we will create a second marker at location $32.24x$ & $7.47y$. To do this, click the cancel button on the position window. Next choose Add Marker to Plate

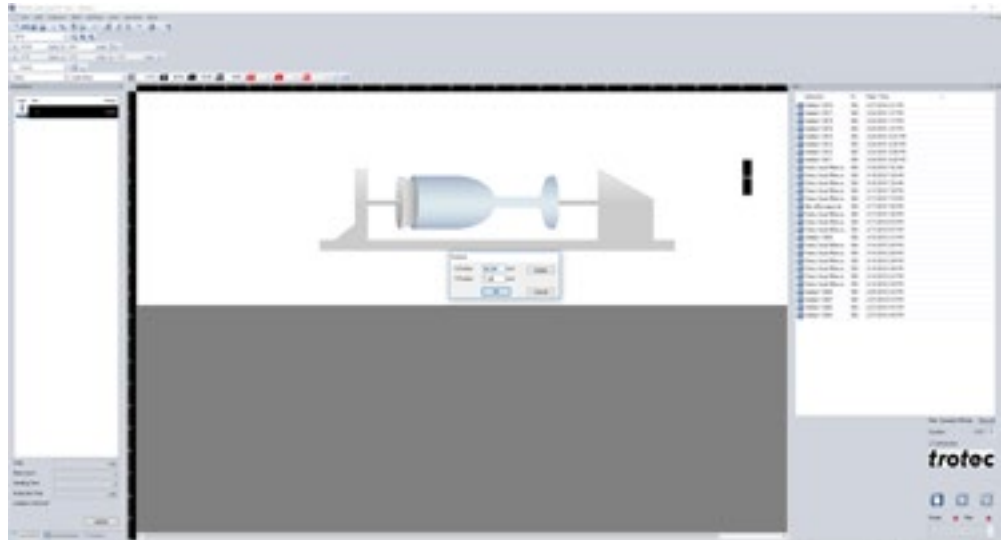
from the Plate Menu.

In the Position window that appears, type in the X coordinate and Y coordinate that were determined based on the first marker.

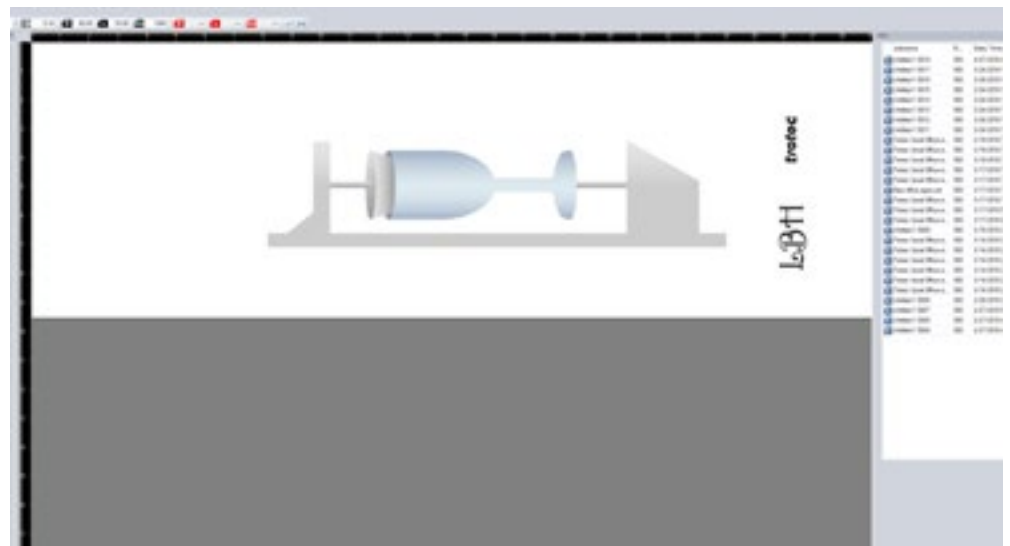
Then click OK to set the second marker location.

It is a good practice to save the plate, at this point, with a name that identifies the template as a two-sided template. Aligning artwork to the two locations on the plate will insure a placement on the item that is exactly opposite. In the example below, we have a corporate logo on one side of a rotary engraved item and a monogram on the opposite side.

For production efficiency, if you are producing multiple mugs for a customer where one element stays the same and the other changes, make sure that each element is sent to JobControl as a separate job. In our example, every mug will have the same company logo, but the monogram will change from piece to piece. We can simply remove the monogram job from the plate each time and replace it with the new monogram.



Determine and enter X and Y coordinates



Align the artwork to the two locations

Important:

When working with rotary-enabled templates and saved plates, never remove ALL of the artwork from the screen. Removing all of the artwork will eliminate the rotary feature and the plate will resize to the full working area of the machine. Always save your templates with a logo or artwork element in place and swap the artwork out in a manner that insures something is always present on the plate.

Reusing a Saved Plate Template

Now that we have explored a couple different scenarios for setting up and saving a rotary plate template, let's explore the best process for re-using a saved template for a repeatedly used item, such as a common size for an insulated mug.

Step 1: Install and Connect the Rotary Fixture

Once the Rotary Fixture has been physically installed against the top, and left rulers of your engraving table you can simply plug the connector into the correct location for your system. The following example was conducted on a Speedy 400 system.

For tapered items, like mugs and glasses, it is useful to have the pointed cone on the right side of the fixture and the rounded cone on the left side of the fixture as pictured below. This positioning will be helpful when using the angle adjustment on the Rotary Fixture to establish a flat engraving surface.

Step 2: Power ON the System and Connect to Job Control

Once the rotary is properly installed, it is safe to turn the system on and connect JobControl by clicking the USB icon in the lower right corner of the main window.

Important:

Never connect or disconnect the rotary fixture while your laser system is powered **ON**. **Always** perform this step with the power **OFF**.



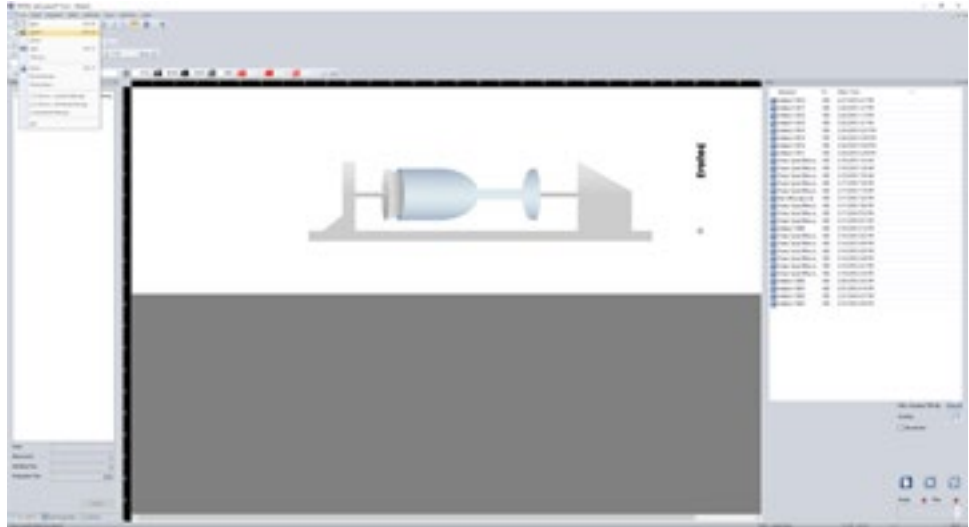
Place pointed cone to the right side of fixture to help with angle adjustment



Connect JobControl and then open your saved plate template

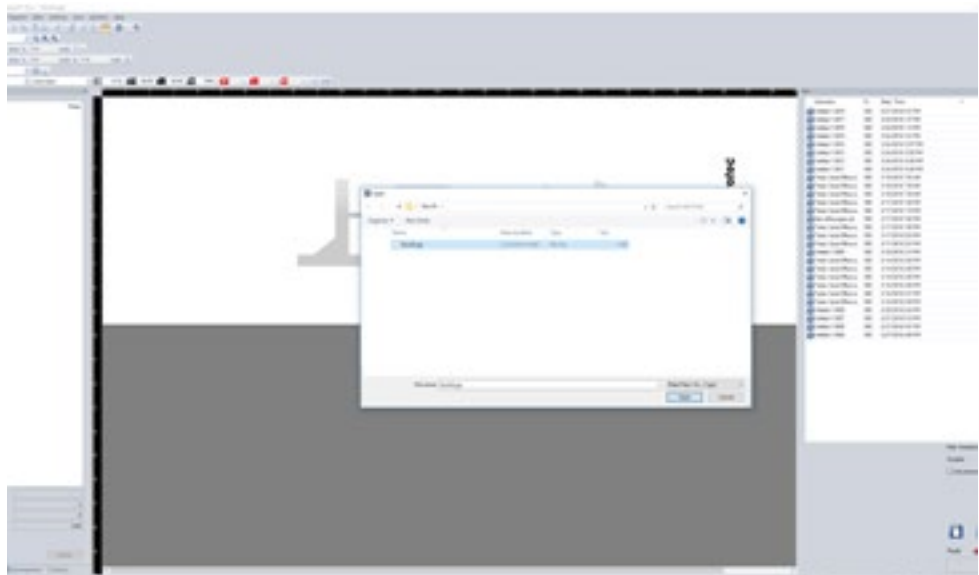
Step 3: Open the Saved Template

With JobControl connected you can now open your saved plate template by navigating to the Open command on the File menu.



Use Open command to open saved template

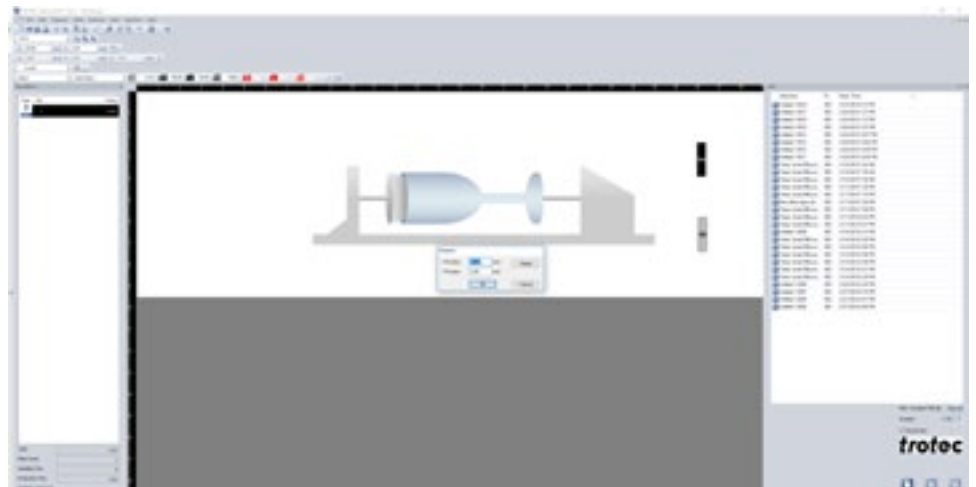
Then select the item template you wish to run.



Select your saved plate template from the dropdown list

Step 4: Make the Rotary Fixture Move to the Start Position and Mount the Mug

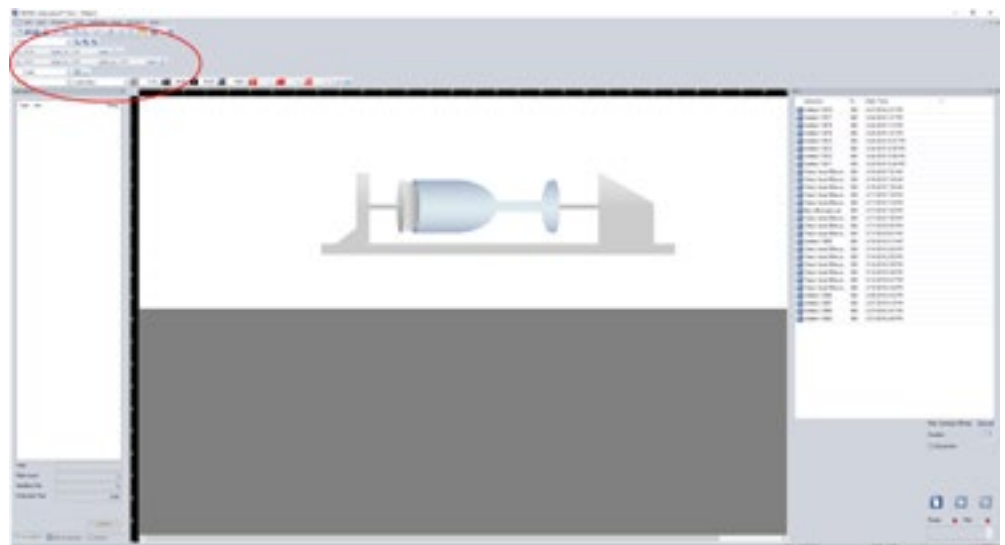
Double click on the first marker position that was saved with the job. Make note of the X & Y coordinates on the Position window as you will re-use those in the next step.



Make a note of the X and Y coordinates from the first marker position

Enter the coordinates of the first marker position into the X & Y position fields at the top of the JobControl window.

Upon successfully entering this value and clicking the XY coordinate button, the rotary fixture should rotate around a small amount. Now the mug can be loaded into the fixture with the brand mark facing straight up.



Enter the coordinates of the first marker position into the X and Y position fields in JobControl

Step 5: Update the Artwork on JobControl

The JobControl Screen can now be updated by placing new job elements onto the plate for engraving.

Step 6: Run the Job



The mug can be loaded into the rotary fixture with the brand mark facing straight up

Important:

When working with rotary-enabled templates and saved plates, never remove ALL of the artwork from the screen. Removing all of the artwork will eliminate the rotary feature and the plate will resize to the full working area of the machine. Always save your templates with a logo or artwork element in place and swap the artwork out in a manner that insures something is always present on the plate.



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