

# Using the Rotary Attachment (Roller or Chuck Style)

Quick start with the Ruida 6442X controller

- 1) Turn laser machine off
- 2) Disconnect the Y-axis step-motor amplifier. This may remove the 2 power and stepper motor wires or it may only remove the stepper motor wires.
- 3) Locate the stepper amplifier for the rotary axis. Plug the power connector into the rotary amplifier. This connector has two wires.
- 4) Plug in the motor connector into the rotary amplifier. If your motor is a bipolar stepper motor, the connector will have 4 wires. If the attached rotary device has a hybrid 3-phase motor, the connector will have 3 wires. You cannot use a bipolar motor with a hybrid amplifier.. Nor a hybrid motor with a bipolar amplifier.
- 5) If you have never set the motor amplifier, the amperage is expected to be at about 1.36 amps.
- 6) A typical stepper motor will have 200 full steps per revolution. Some motor amplifiers (also called a stepper motor driver) will show the micro-steps as a divider of each full step instead of showing the total number of micro-steps per revolution. The micro-steps per revolution setting is often at 6400, but can be 3200 for rotary attachments with high gearing. This can be seen mathematically as: 16 microsteps \* 200 full steps per revolution = 3200 micro-steps per revolution.

$$16 * 200 = 3200$$

- 7) Turn the laser machine power ON.
- 8) Start the laser software RDWorks V8.
- 9) Look at the right side of the software and open the "User" tab.
- 10) Click on the "Read" button to update all parameters from the laser machine.
- 11) Open the last settings section labeled as "Auxiliary" and scroll down to the variables for the Rotary Attachment.
- 12) Notice that the values that are currently found at Rotary Enable, Circle Pulse, and Circle Diameter.

The "Rotary Enable" tells the software that you are currently using the rotary attachment and it will adapt. Not all functions of the laser are perfectly adapted. You may want to adjust the cut acceleration values and top speeds. Acceleration values that are too high will cause the product to bounce out of the two-wheel cradle.

The "circle diameter" tells the software about the cylinder product or the rotary that you are using.

Option A - If the rotary attachment is roller-wheel style, the "circle diameter" indicates the outside diameter of the O-ring driver wheels. The diameter of the product is not important. The circle diameter is always the diameter of the O-ring. The circle diameter for the O-ring driver wheel is approximately 76mm. This may be different based on the usage, stretch, or normal wear and tear on your rotary device.

Option B - If the rotary attachment is the chuck style, then the "circle diameter" indicates the outside diameter of the product at the engraving location. This measurement is made in millimeters.

The "circle pulse" indicates how many micro-steps the controller needs to create in order to rotate the circle at exactly one revolution. If the rotary attachment is roller-wheel style, then the O-ring wheel will turn one full rotation. If the rotary attachment is chuck style, then the cylinder product (chuck) will turn one full rotation.

The "circle pulse" P can be calculated according to the following method. We must consider the motor commanded steps per revolution and reduction gearing.

Stepper motor natural steps = 200

Step division = 16

Micro-step divisions M = 3200

Motor drive gear teeth d = 18

Driven gear teeth D = 70

$P = M * D / d$

$P = 3200 * 70 / 18 = 12,444.44$

With a different rotary attachment design, the calculation changes...

$P = 6400 * 45 / 25 = 11,520$

OR

$P = 1600 * 70 / 18 = 6,222.222$

13) Change the values of the circle pulse, circle diameter, and Rotary Enable to match the physical properties of your rotary device.

14) After the software has read the settings from the laser machine, the software will allow the user to change values to the rotary parameters and then "Write" those values to the laser machine controller. "Write" the values to the controller memory.

The laser should be ready to use the rotary attachment. Remember to design your project such that the Y-axis will be rotating your product.

Things to consider:

**Problem:** My images are being engraved upside-down (or backwards).

Answer-1: You need to rewire the Y-axis motor wires. Swap the A- and the A+ motor wires.

Answer-2: The rotary device is normally inserted into the machine with the motor on the right side of the work table. You can insert the rotary device with the motor on the left side.

**Problem:** The product is moving too fast and skips out of position and sometimes it can even jump around.

Answer-1: Press the "Speed" button on the Operator Panel to reduce the jogging speed.

Answer-2: You will need to adjust the User Configuration variables for the values of "Work Acceleration"

Answer-3: You may need to adjust the Y-axis "Vendor Settings" configuration to smooth the performance. The default "Vendor Settings" password should be "rd8888".

**Problem:** My engrave design comes out with horizontal lines. (Gaps)

Answer-1: The stepper motor amperage is too high or too low. Turn OFF the laser machine. Change the DIP switch settings to the lowest value. Turn laser machine ON. Run a test project. If the project still has lines, change the DIP switch settings to the next amperage value. Run the next engraving test.

Answer-2: Your "Interval" value for the scan mode may be too high or too thick. Change the scan mode "Interval" to 0.7, download the project again, run the laser project to test if the problem is solved.

**Problem:** My projects result as oblong/stretched.

Answer: Need to adjust the "Circle Pulse" or "Circle Diameter". Remember to "Write" the settings to the laser machine controller and then try your project again.

**Problem:** While using the roller-wheel style attachment, the engrave project has gaps or squished in only a small section of the project. Other parts of the project appear to be correct.

Answer: The product may be slipping.

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