PIBURN LITE LASER ROTARY ATTACHMENT

User Manual (first draft)

Updated: September 5, 2025 (get the latest version at: http://piburn.info/manual)

Note: PiBurn Lite Roller-Style is a rotary attachment for laser cutters and engravers that enables the engraving of cylindrical objects.
It's meant to temporarily replace your Y-Axis and will work with most Ruida type controllers.

Note: Due to constant improvements to the design, your PiBurn might look slightly different from the one pictured in this guide.

Table of Contents

Main Diagram

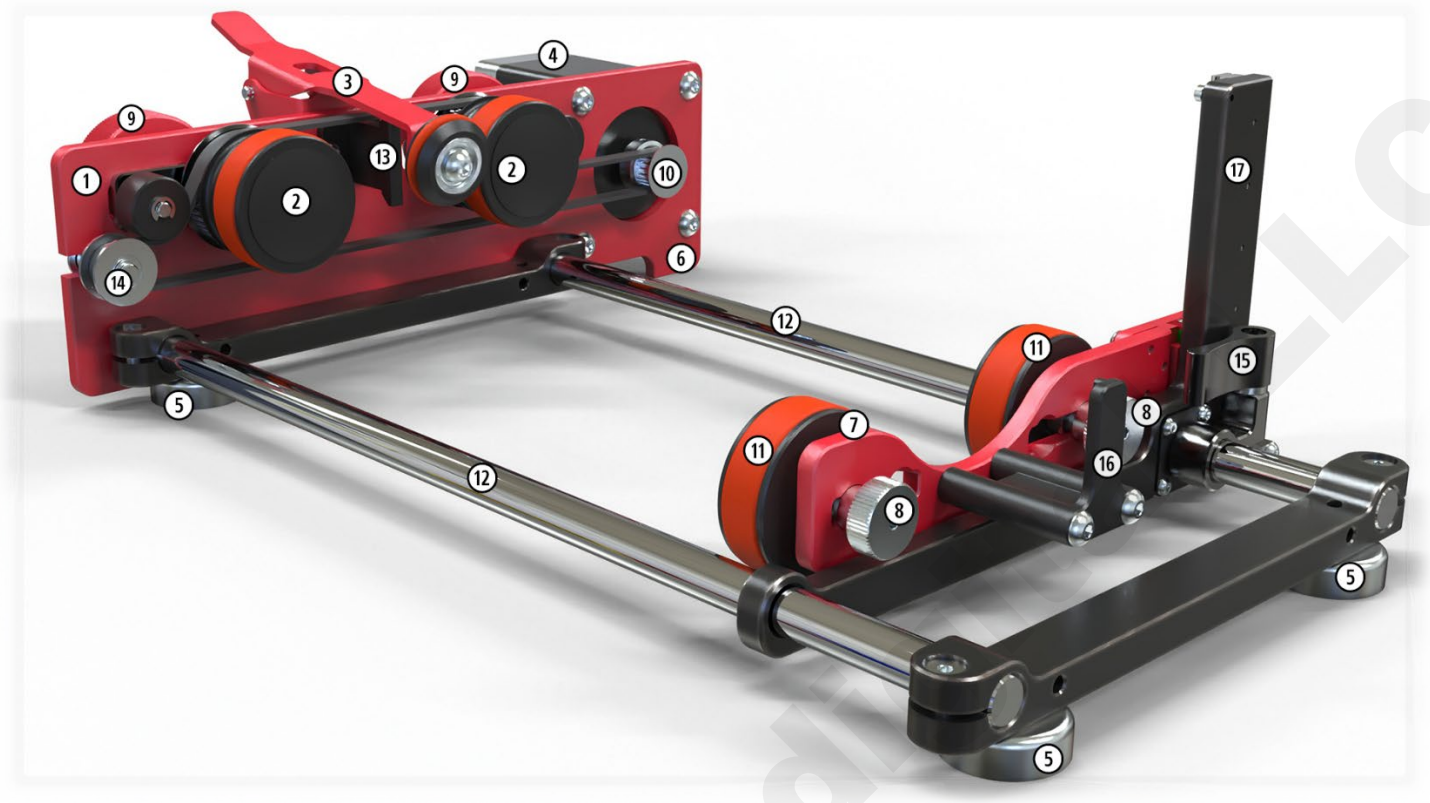


Figure 1. Front View

1. Headboard
2. Front Wheels
3. Clamp
4. Motor (behind headboard)
5. Magnetic Feet (three)
6. Non-Magnetic Foot (part of headboard)
7. Foot-Board
8. Back Wheel Adjustment Knob
9. Front Wheel Adjustment Knob
10. Motor Pulley
11. Back Support Wheels
12. Round Rod Guides
13. Front End Stopper “A”
14. Belt Tensioner Pulley
15. Horizontal Adjustment Lock Flag screw
16. Back End-stop
17. Vertical Post

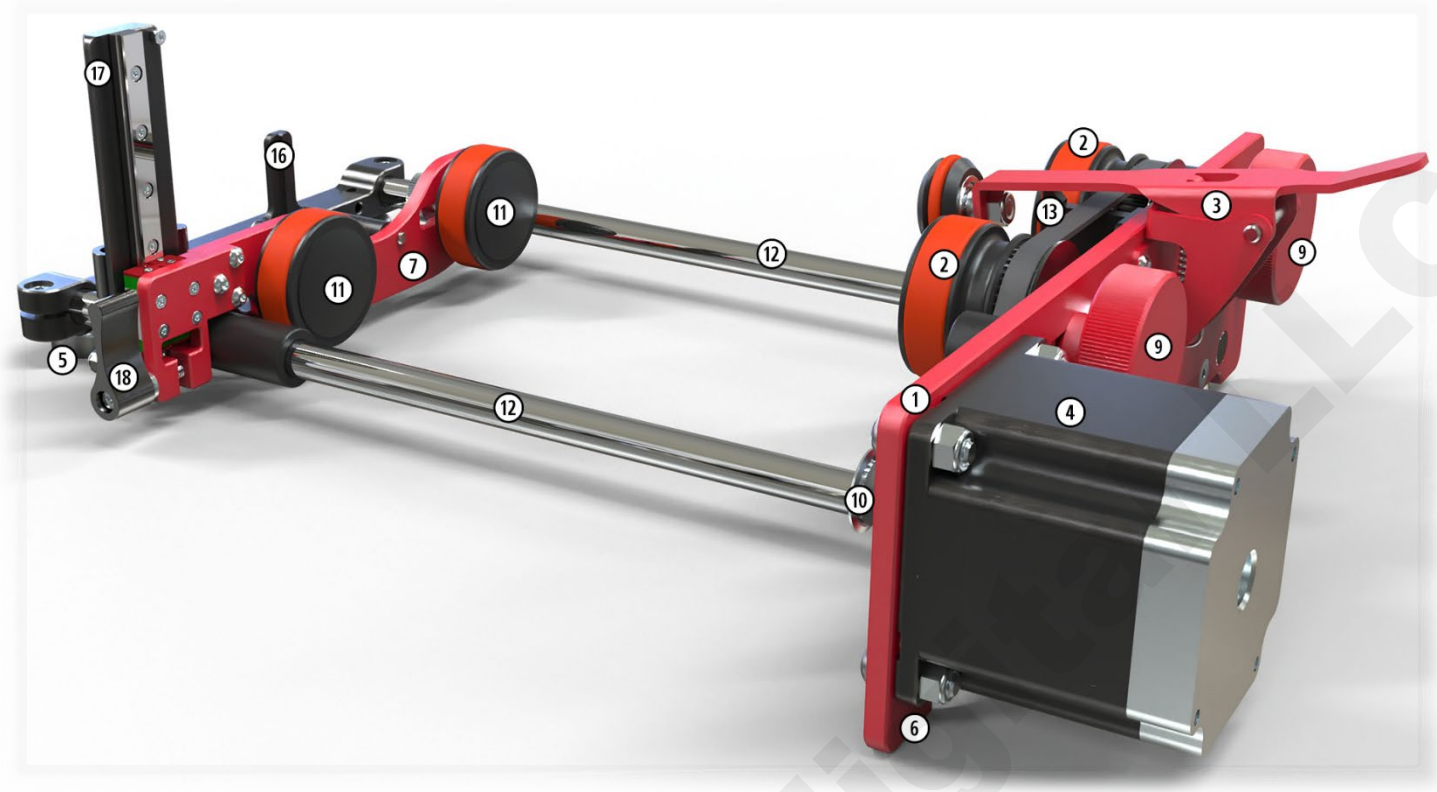
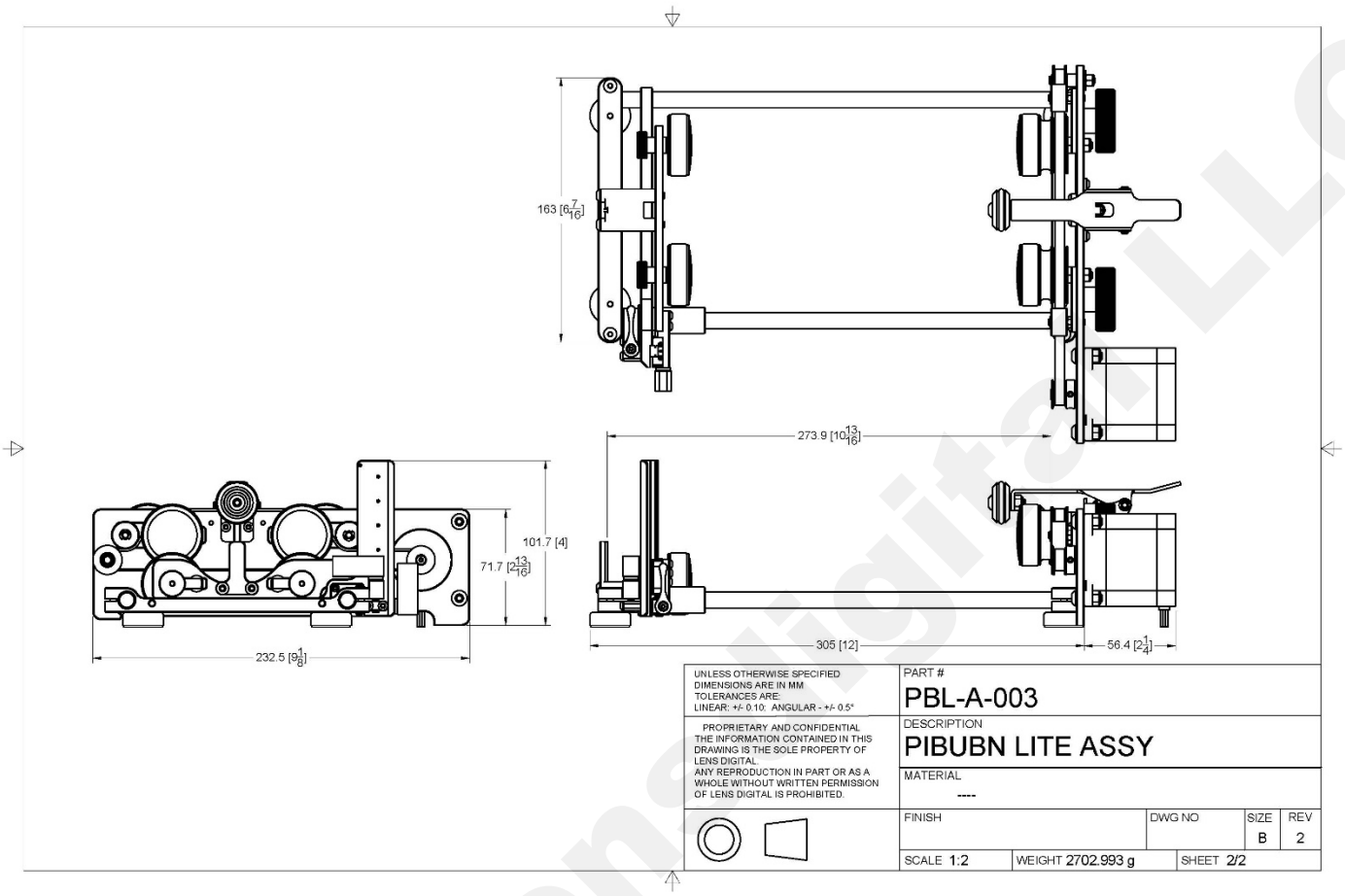


Figure 2. Back View

1. Headboard
2. Front Wheels
3. Clamp
4. Motor
5. Magnetic Feet (three)
6. Non-Magnetic Foot (part of headboard)
7. Foot-Board
9. Front Wheel Adjustment Knob
10. Motor Pulley
11. Back Support Wheels
12. Round Rod Guides
13. Front End Stopper “A”
16. Back End-stop
17. Horizontal Post
18. Vertical Adjustment Lock Flag screw

Technical Data

Dimensions



OTHER DATA

Gear Ratio: 2.5x (50:20).

This information is helpful if your laser machine has an unknown SPR (Steps per rotation) setting for rotary. Find out what your Stepper Driver is set to and multiply it by the gear ratio of PiBurn Lite. For example, if your rotary driver is set to 5,000 SPR, your actual rotary SPR will be 5000*2.5=12,500. Use this setting in the rotary setup in Lightburn.

Wheel Diameter: 40mm (1.5748 inch)

Chapter I: Installation

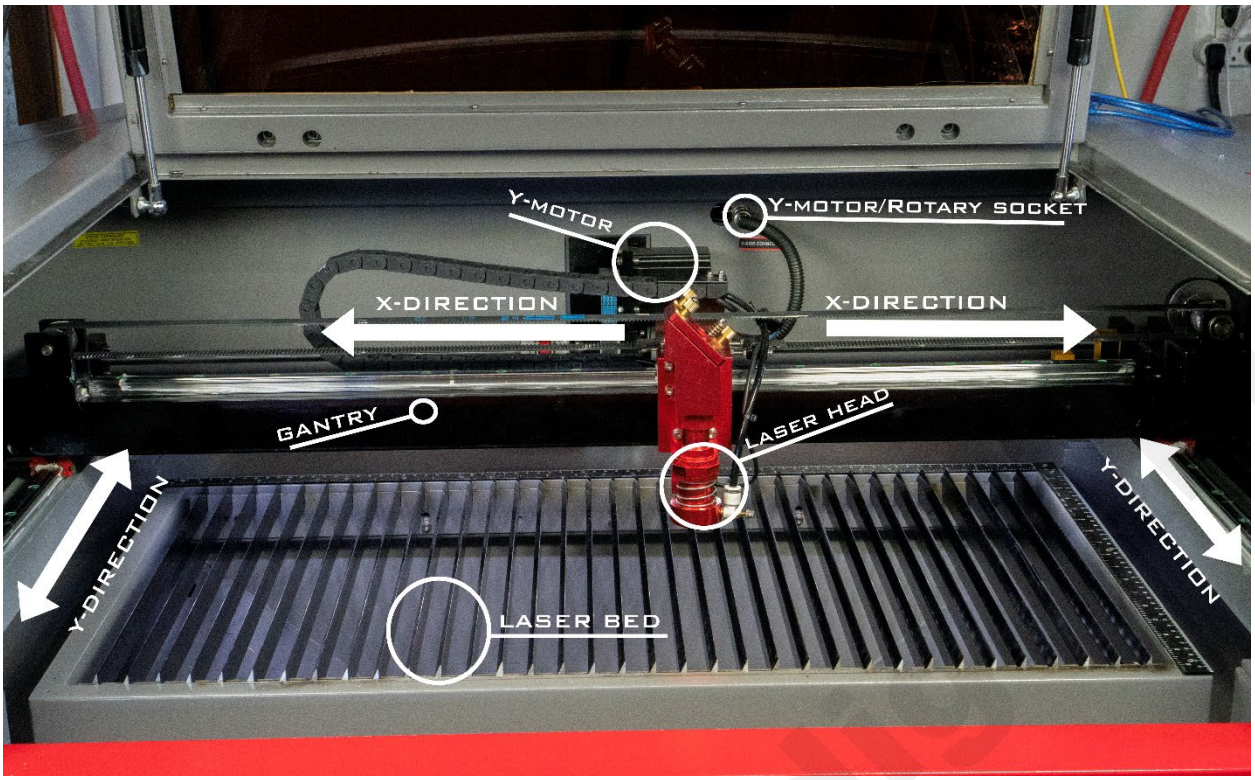


Figure 3. Laser Overview (Boss Laser)

Plug-in PiBurn Lite to your machine

NOTE: Different laser machines have different ways of connecting rotary attachments. Some (i.e., Boss Lasers made after 2020, Aeon Mira/Nova, Thunder laser) have dedicated rotary port and either a manual switch or automatic relay to enable it. In machines that don't have a dedicated rotary port (i.e., Boss Laser made before 2020, OMTech, and other generic), usually, you will unplug your Y-axis motor and plug in the rotary instead.

For Machines without a dedicated Rotary Port:

1. Locate the Y-Axis plug. This is where your Y-motor is plugged in. Usually, it's located in the "work chamber" and easily accessible once you lift the main machine cover. On older Boss Laser machines, the plug is located toward the back

Figure 4. Y-Axis Connector

2. Lower your bed so PiBurn can easily fit under the laser nozzle
3. We also recommend that you move your laser head to the top right corner (or whenever your normal homing position is) via control panel arrows and save position (i.e., the "**Origin**" button on the control panel) before turning the machine off. It's safer this way because the laser head tends to move very fast to the position it was in last before the machine was powered down. It can injure or surprise you when it does that.
4. Finally, power down the machine.

For Machines with Dedicated Rotary Port:

1. Power on your laser and let it auto home.
2. Locate the Rotary port (note on some machines (i.e., Aeon Mira) you might have to lower the z table to gain access to this port and plug in the Rotary). On Boss laser, you might need to open the top right access door to see the rotary port and switch.
3. If your laser machine has a Rotary switch, switch it to the rotary position. Note: This will disable your gantry movement! On some machines, the gantry stays powered on and can't be moved by hand (i.e., Boss Laser). If that's the case, you will need to position your gantry above the middle of the PiBurn first before turning on the Rotary switch.

Install PiBurn Lite

(see note for Thunder Laser)

1. When physically placing the PiBurn insider laser, you have three options:
   a. Place it on top of the Honeycomb Table
   b. Place it on the "knife blades."
   c. Place it directly on the laser floor
   You can place PiBurn Lite directly on the honeycomb table if you have enough headroom space. PiBurn Lite has Magnetic Feet (3 of them), so using a honeycomb made from ferrous metal (i.e., NOT aluminum) is best. If you desire to place PiBurn directly on top of your knife blades, we recommend placing it on something large and flat (like an acrylic or plywood sheet) so feet don't slide off the blades.
2. When engraving larger objects, and if your laser machine allows, you can remove the knife blades and place the rotary directly on the laser bed. This is the recommended setup for Aeon Laser machines.
3. If your laser bed has sloping walls (i.e., Boss Laser or some OMTech machines), you can attach optional magnetic slope adapter brackets (sold separately) to those walls. Then, you can place the rotary on those adapters like on any flat surface.
4. Plug in your rotary as described above.
5. Carefully arrange the wire, PiBurn, and supporting platform so it doesn't interfere with the laser bed going up or down. We don't want the wire to get pinched between moving parts.
6. Turn on your machine (if it wasn't already).

Homing Machine with Rotary Attachment

When you turn on your laser, it must perform a "homing" sequence to know its start position. This usually involves moving the gantry and laser head into the top right (or left on some machines) corner until it reaches the end-stop limit switch. Then, the laser will move a little away from the limit switch and then back. Upon completion of the homing sequence, the laser head and gantry will want to move rapidly to the last known position where it was when you turned off the laser.

In many laser machines, when you plug in the rotary, you are disabling the Y gantry motor, so it won't be able to reach the limit switch on its own. In cases like that, you will need to move the gantry by hand to simulate a normal homing sequence. But sometimes you can't move the gantry because its motor is still under power (i.e., Boss Laser). In that case, you

should only plug in the rotary after the machine has finished homing sequence and you position the gantry over PiBurn's center

To home gantry by hand, push the whole gantry all the way back to trigger the Y-axis limit switch.

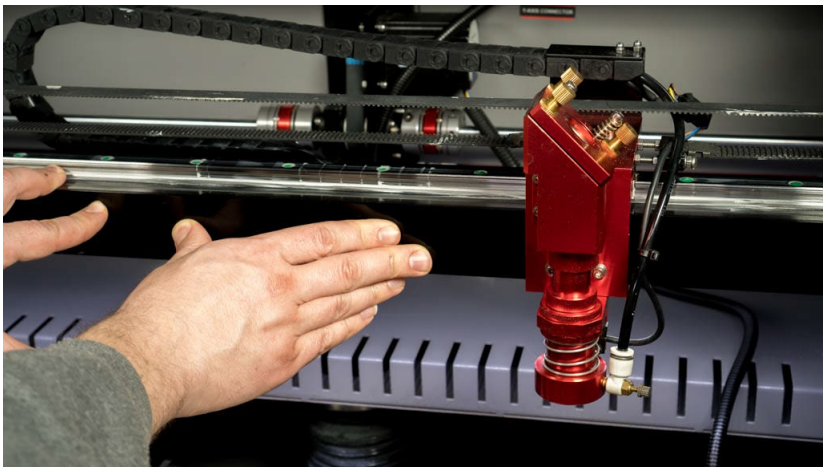


Figure 5. Pushing Gantry

- You'll notice that rollers on the Piburn will start rotating in the opposite direction after you reach the limit switch. That's because the laser wants to move the gantry forward a little.
- Pull the gantry towards yourself just a bit so it disengages the limit switch, and finally push it all the way back again.

At this point, you manually finished performing the initialization process that the machine usually does automatically when the Y-axis is plugged in. It should all be set to continue with the software setup part.

Note for Thunder Laser Owners:

Because the rotary is connected to a separate "U-axis," you don't need to worry about manually homing the machine. Just plug it into a dedicated rotary port. Watch out for laser head clearance to ensure it won't hit any part of your PiBurn when it's homing.

Chapter II: Main Software Settings

To correctly configure your PiBurn with a laser machine, you will need to determine two settings.

The first setting is "**Diameter (mm)**". This one is easy; it's always going to be **40mm (1.5748 in),** no matter what object you engrave. Diameter refers to the diameter of the front rollers of the PiBurn Lite.

The second setting, "**Steps Per Rotation"** (a.k.a. SPR), is slightly trickier. This number tells your laser machine how many pulses/steps it needs to send to the rotary motor for a full 360-degree rotation. Or, in practical terms, it controls how far your engraving object is rotated. If you incorrectly set this number, your engravings will be squished or elongated. This number depends on how your laser engraver was set up at the factory.

Known "Steps Per Rotation" Values:

Laser Machine/Model	Steps per Rotation
Boss Laser LS1420/1416	6,000 or 8,000
Boss Laser LS1630 and above	12,500
AEON Laser (before June 2023) **AEON Laser (after June 2023)**	25,000 32,000
Thunder	25,000
OMTech	5,000 or 12,500
AP Laser	12,500

For all others, it must be determined by looking at Stepper Driver DIP switches, as described below. **DO NOT CHANGE THE DIP SWITCH POSITION**! Only note them.

WARNING!

Your machine must be completely powered off, unplugged, and discharged because you must go inside the electronics compartment to inspect some switch settings visually.

1. Open the door that leads you to the internal electronics compartment. On the Boss 1630 series, it's located in the back of the machine.

Figure 6. Door to electronics

2. Locate the Stepper Motor Driver that controls your Y motor. Stepper Driver looks similar to the one in the picture below.

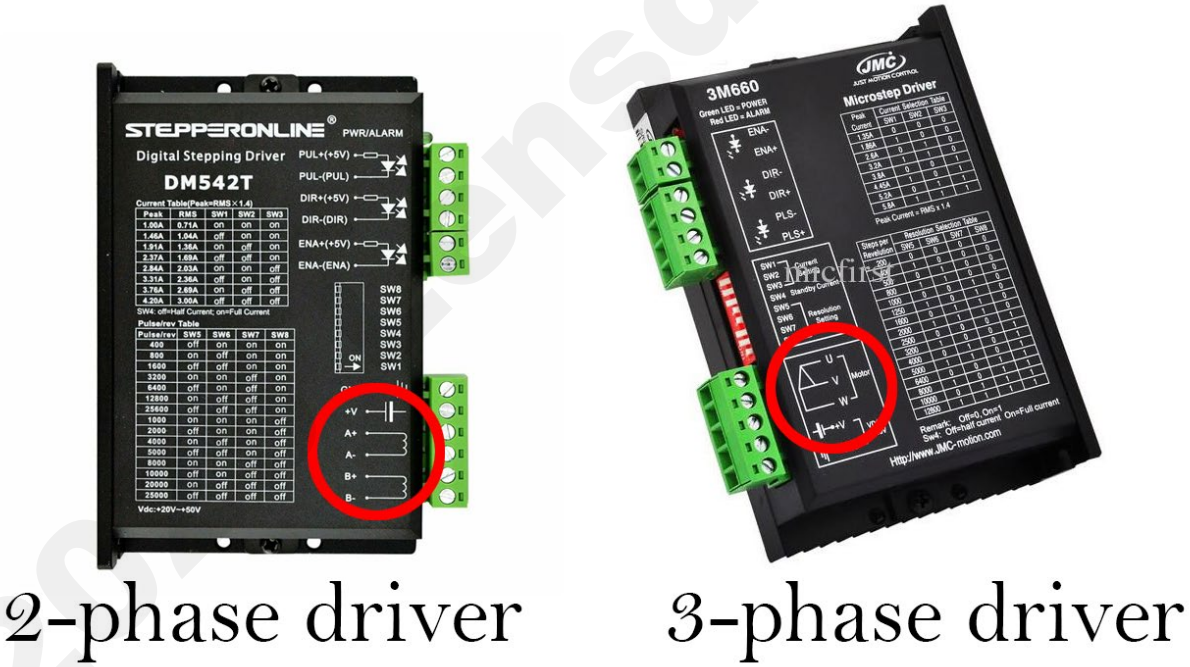


Figure 7

3. There will be 2 or 3 of them inside your machine. One for the X motor, one for the Y motor, and one for the Z axis (if your machine is equipped with a motorized table). Y and X drivers should be identical to each other.

Here's what it looks like inside Boss Laser LS-1630 machine (notice drivers are labeled):

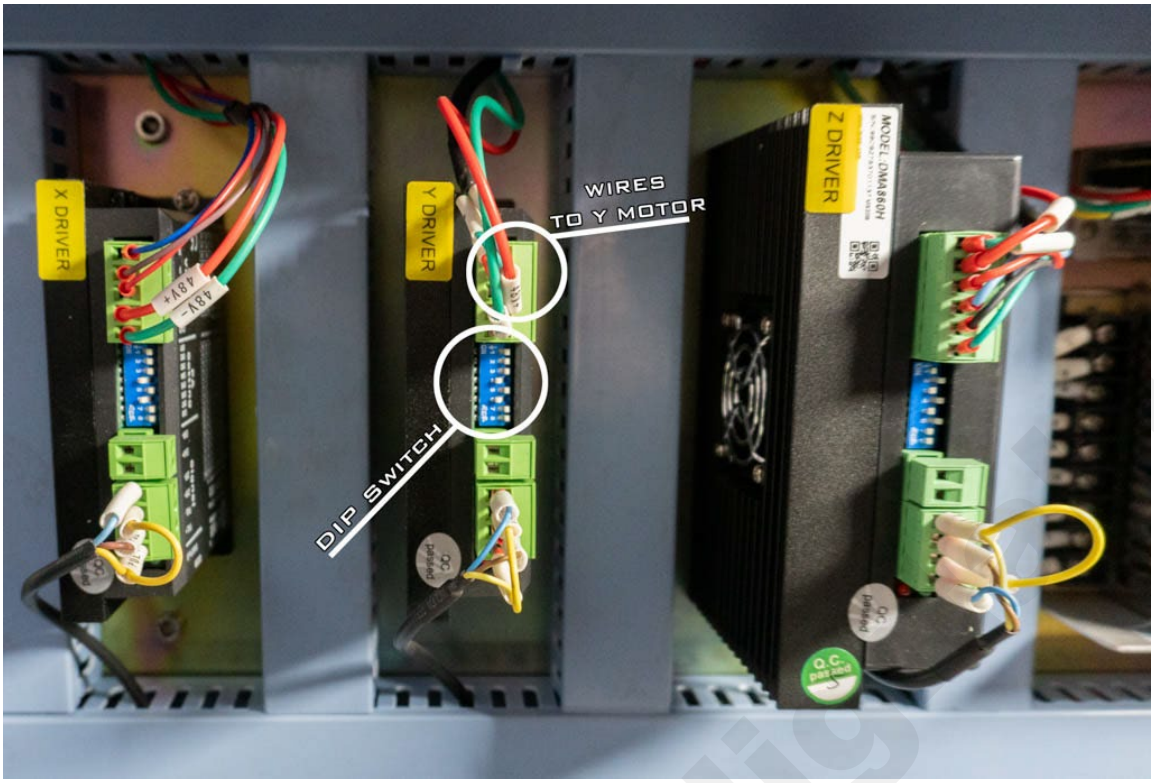


Figure 8. Stepper Drivers inside Boss Laser

4. If yours are not labeled, try tracing wires from the plug where your motor was plugged in (and where we now connected the PiBurn rotary).
5. Write down (or take a photo) of:
    a. **Make** and **Model Number** of the **Stepper Driver**
    b. Position of **"DIP" switches**. These are tiny switches on the back of the motor driver that can be flipped up or down. There's about 6-8 of them. Please refer to *F*igure 8. Stepper Drivers inside Boss Laser
6. Find out how many "**Pulse/Rev**" (Pulses per Revolution) your Y driver is set to.
   The position of **DIP switches** determines the "**Pulse/Rev**" setting.
   Many stepper drivers will have a "**Pulse/Rev**" table printed on them (see *Figure 9. Close* look at stepper driver). If yours doesn't have it, search online and download the manual for your stepper driver model. In the manual, find the "**Pulse/Rev**" table.

Let's look at example below:

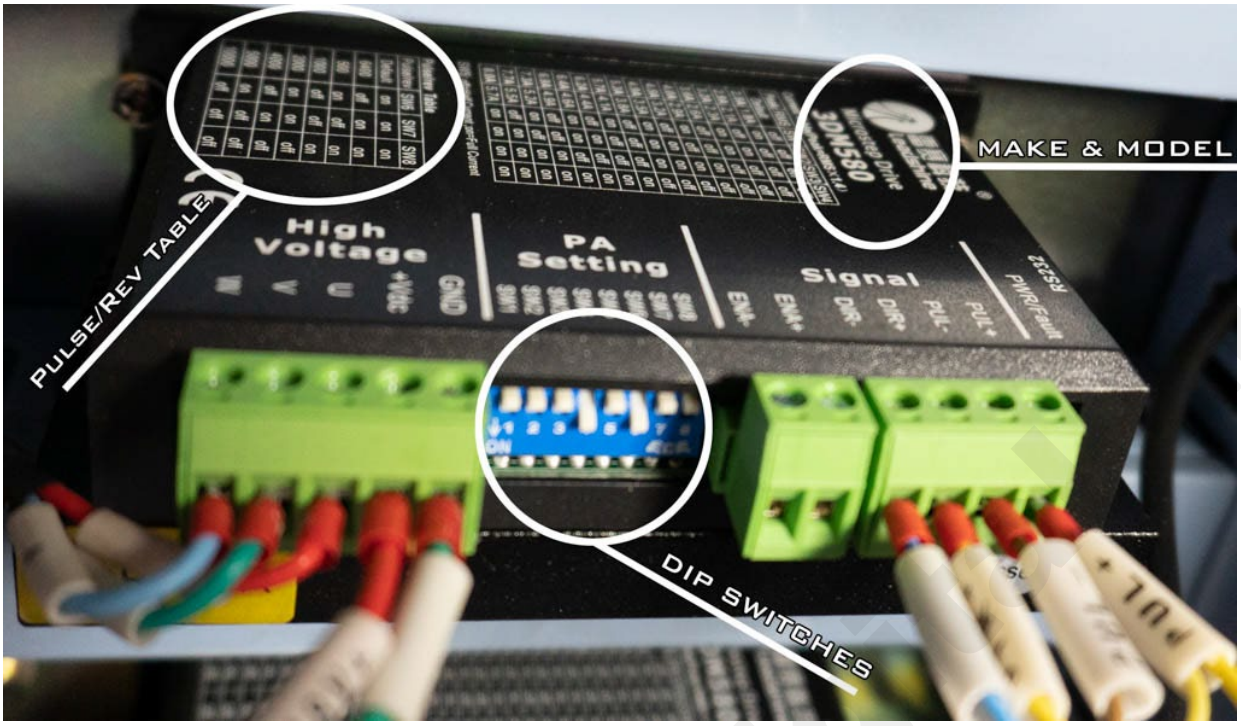


Figure 9. A close look at the stepper driver

There are 8 **DIP switches** on this driver, SW1 - SW8. Switches 4 (SW4) and 6 (SW6) are turned on (flipped down), while the rest are off (flipped up).

This driver has **Pulse/Rev** Table printed on it, so we don't need to know its manufacturer and model (there is no need to look at the manual).

The table refers only to the positions of SW6, SW7, and SW8. In our case, **SW6** is **ON**, and **SW7** and **SW8** are **OFF**.

This combination shows that our **Pulse/rev** value is **5000**. That's the one you need to know for the next step.

7. To find the "**Steps Per Rotation**" setting, take the "**Pulse/Rev**" value (from the previous step) and **multiply by 2.5x** (that's the gear ratio of PiBurn Lite if you are curious).
   For example, if your **Pulse/Rev** = **5000**, your **Steps Per Rotation** will be: 5000*2.5=**12,500**

Chapter III: Configuring Software

Now that we know the Diameter and Steps Per Rotation values, let's use RDWorks or LightBurn to configure your laser to use PiBurn.

1. Ensure your PiBurn is installed and plugged into your laser engraver.
2. Turn on the Laser machine and manually home in Y-axis
3. Connect your machine to the computer running RDWorks or Lightburn. Use either a USB cable or a network connection.
4. If you are using RDWorks (or LaserWorks, which is the same software)
    a. Navigate to the **User** tab and press the "**Read**" button. If you don't see Read/Write buttons, resize the window (drag the border) down until it appears

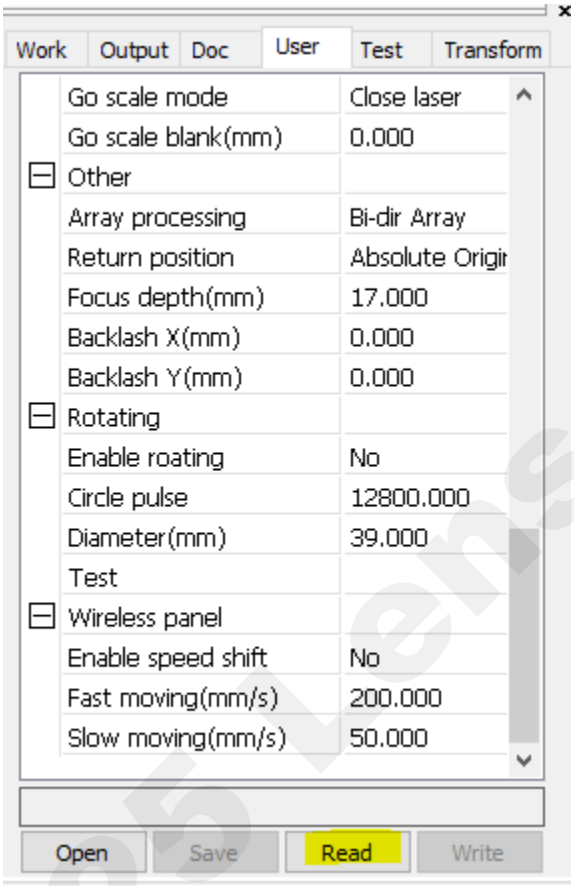


Figure 10

    b. Scroll down until you see the "**Rotating**" section (*note in newer versions of RDWorks, **User** tab is separated into three sections. If you don't see the "**Rotating**" option, click on the "**Other**" radio button on top*).
    c. Change "**Enable Rotating**" to "**Yes.**"
    d. Enter the "**Circle Pulse**" (a.k.a. **Steps Per Rotation**) value you determined from the previous chapter.
    e. Enter "**Diameter(mm)**" to be **63**
    f. Click the "**Write**" button

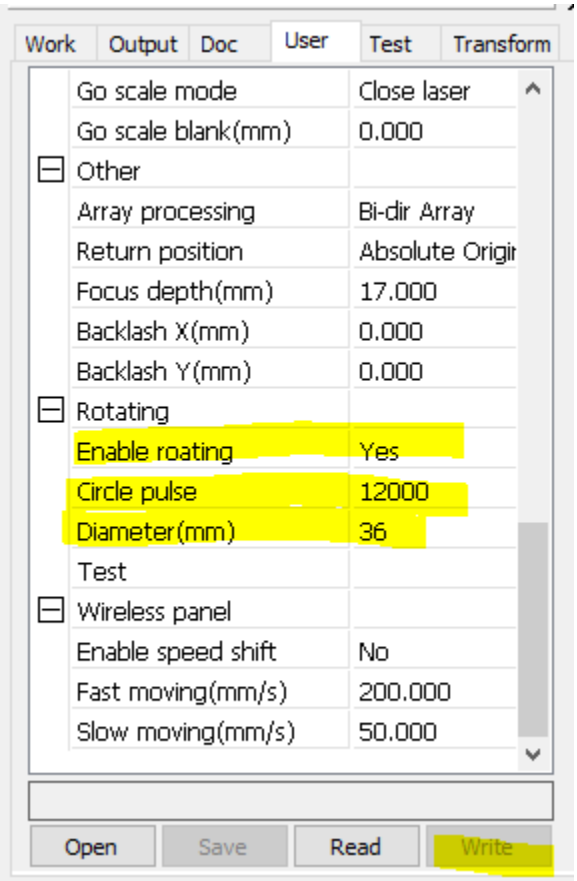


Figure 11

5. If you are using Lightburn, start it go to the “Tools” menu, and select “Rotary Setup.” (or click Rotary Icon on top toolbar)
    a. Change Rotary Type to “Roller”
    b. Click on the “Enable Rotary” switch to make it green.
    c. Rotary Axes should be set to “Y-axis” (for Thunder, it will be “A Axis”)
    d. Change “Steps Per Rotation” to a value you determined from the previous chapter
    e. Set “Roller Diameter” to **38-40 mm** (due to slight variations in rubber tires, this value might be different for your specific rotary by about a millimeter).
    f. Disregard “Object Diameter” and “Circumference” values; they do not affect anything

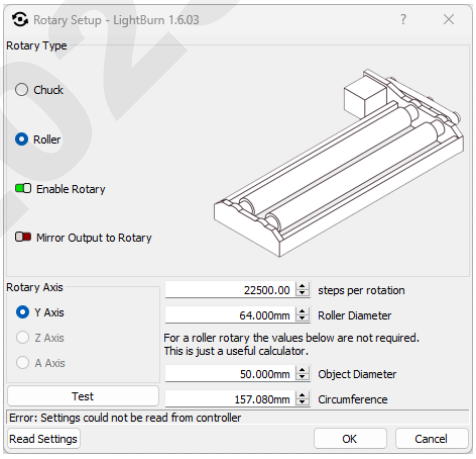


Figure 12 Lightburn Rotary Setup

6. **Lower idle and acceleration speed**.

   While this is not required, we strongly suggest your lower acceleration speeds when using a rotary attachment. That's the speed at which the head moves between cut movements. When cutting or engraving flat materials, you might have noticed that the laser moves at the speed that you entered when it's firing, but when it's done with cutting/engraving, it will move very fast to the starting position. Rotary attachment is not meant to be rotated this fast and might cause the object that you are engraving to fly off it after engraving is done or when doing a "frame" operation.

   To access parameters in Lightroom, Open "Machine Settings "from the "Edit" menu. In RDWorks, these can be found under the "User" Tab.

   That's why it's highly recommended that this value be lowered when using rotary. Please write down default values first so you can change them when you are not using the rotary. You can back up all the default settings by hitting the Read button and then **Save** Button and store this file on your computer. In fact, it's a great idea to save settings for both rotary and "flatwork" and just load each one as needed. Note: Some machines will come with these settings on a USB flash drive; however, they might be outdated.

   Change the following values:

   a. Set "**Idle Speed(mm/s)**" to 30
   b. Set "**Idle Acc(mm/s2)**" to 30
   c. Set "**Min Acc(mm/s2)**" to 20
   d. Set "**Max Acc(mm/s2)**" to 30.

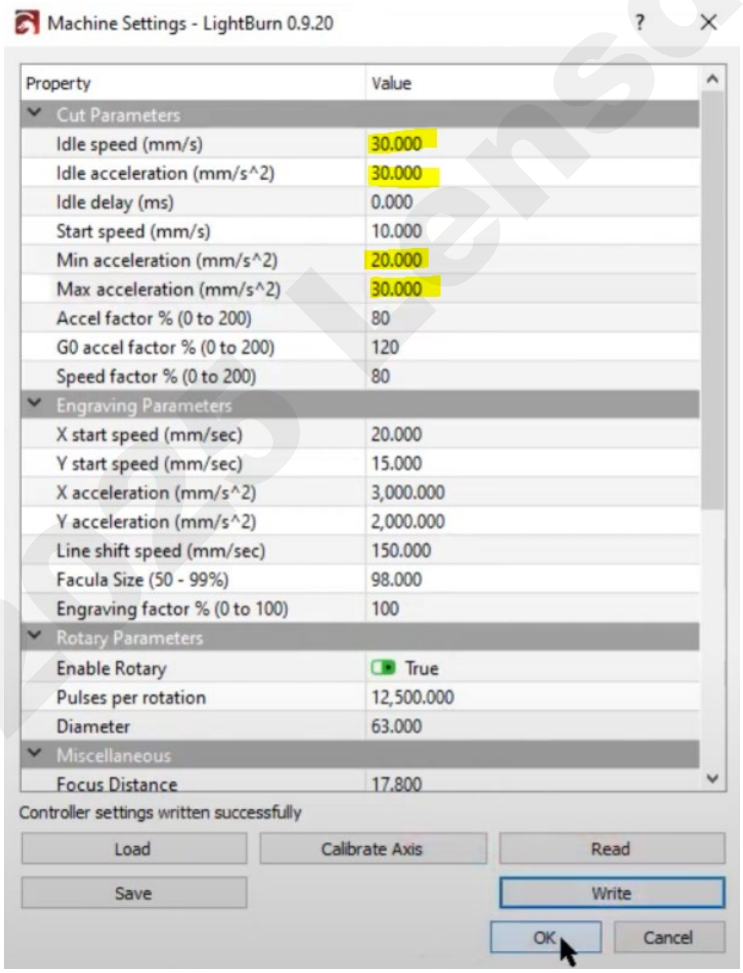
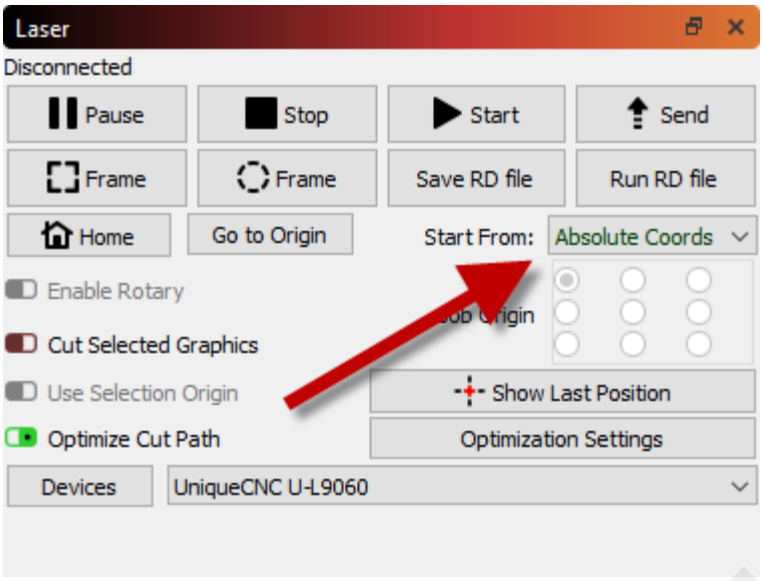


Figure 13. Speed Settings

These are just suggested values, and you might have to adjust them according to your machine.

7. Special Note about Thunder laser. Thunder Lasers uses custom firmware for its controller. For the PiBurn rotary to work with these machines, you must change Origin in Lightburn to anything OTHER THAN "**Absolute Coordinates**." This is very important! With Absolute Coordinates selected, the Y gantry will move instead of turning the rotary.



Boss HP machine setup

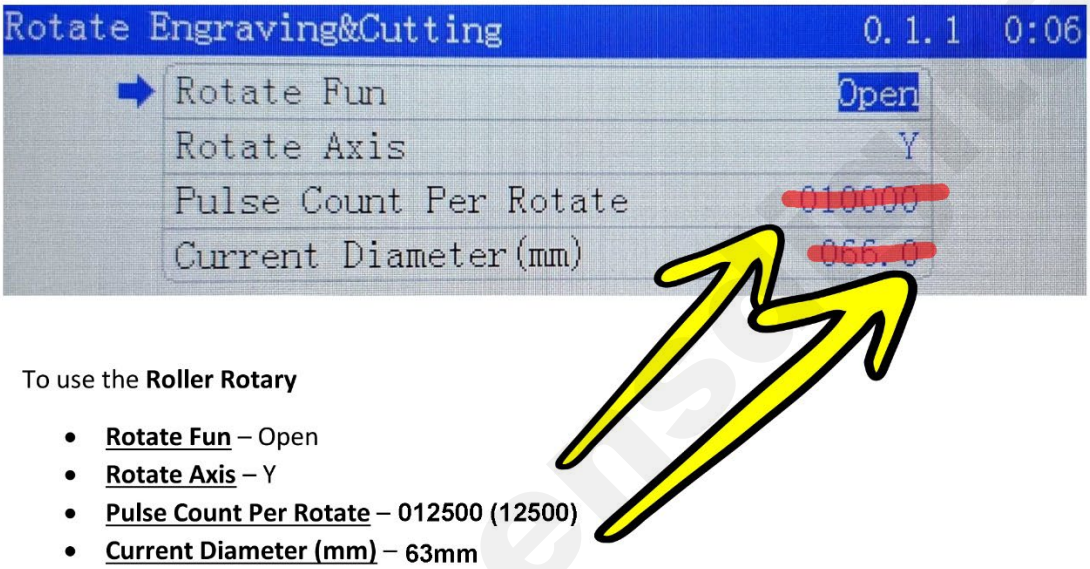
These lasers use a different controller. Lightburn is unable to change rotary settings on it, so it has to be done from the laser's control panel:

Setting up in LaserCAD (HP Machines)

On the AWC Control Panel, press the **Menu button**, then go to:

7. Common Parameter Settings > Press Enter > 4. Rotate Engraving&Cutting > Press Enter

The following picture shows that **four parameters** that need to be adjusted



To use the **Roller Rotary**

- **Rotate Fun** – Open
- **Rotate Axis** – Y
- **Pulse Count Per Rotate** – 012500 (12500)
- **Current Diameter (mm)** – 63mm

✎ **NOTE: You will need to RESET the machine (Turning off/on the machine or pressing the RESET button) after you've made changes!**

To go back to the worktable, change the **Rotate Fun to "Close,"** then press the **Enter button**. Then RESET the machine to save changes to the machine.

Chapter IV: Fine Tuning and Testing

Now, we can finally start some testing! If your laser has a built-in beam combiner (i.e., red pointer laser dot), you don't even need to fire the actual laser until you tune in to the correct setting!

Find a cylindrical object you want to test. We now carry a calibration tumbler in our Shop at lensdigital.com!

We have a video showing this process in detail: https://youtu.be/uY54OtFF6Lk

An actual tumbler (preferably a simple shape without a bottle-like neck) would be a good choice. Cut a piece of masking tape and place it on the table. Using a ruler, draw a 100 mm long line (or if you prefer imperial units, make it 4 inches) with start/end marks as shown on the picture and then wrap it around your tumbler.

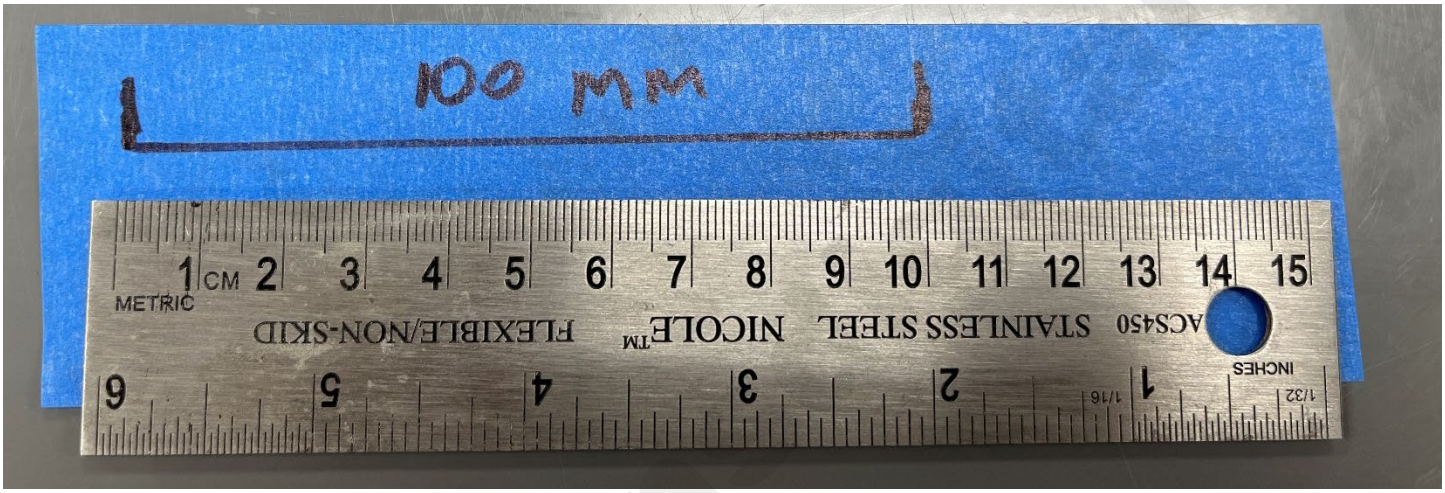


Figure 14. Mark distance on tape

Figure 15: Apply tape to the tumbler

Open **RDWorks** or LightBurn and create a square shape or just a vertical line.

Make sure that the little “padlock” icon is “unlocked”.

Change the square’s width to about 10 mm and length to 100 mm (exactly). Or if using imperial units, make it 4 inches long. It doesn’t matter as long as you use the **SAME** “vertical” length as the line you drew on the masking tape!

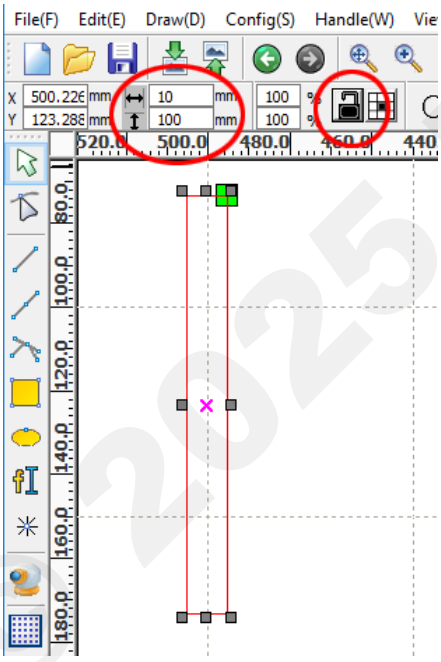


Figure 16. Shape in RDWorks

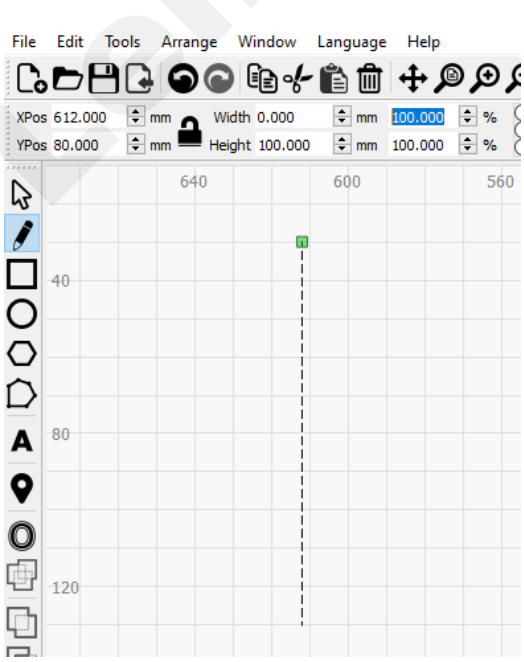


Figure 17. Create shape in Lightburn

In layer settings, change power to 1% (we don’t want the laser to fire), and speed to 20mm/sec. Upload this file to your laser machine; let’s name it “square”.

At the laser machine's control panel, change the default speed to 20mm/sec (press the "Speed" button).

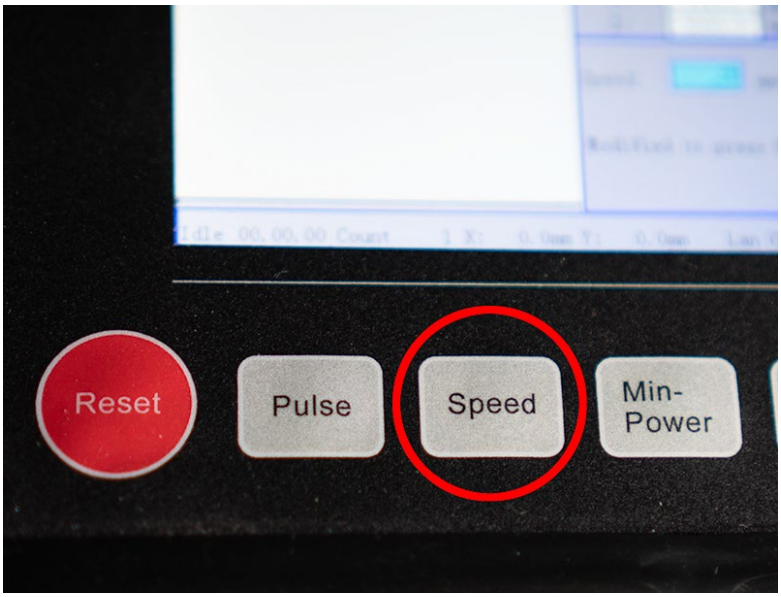


Figure 18. Speed Button

Insert your test object into PiBurn, adjust rollers for the correct length and height, and use the clamp.
See Chapter V: Basic Operation if you are unsure how to do this.

Move Y gantry until it's directly above PiBurn. Move the laser head in the X direction using the left/right arrows on the control panel to position it above the first mark.

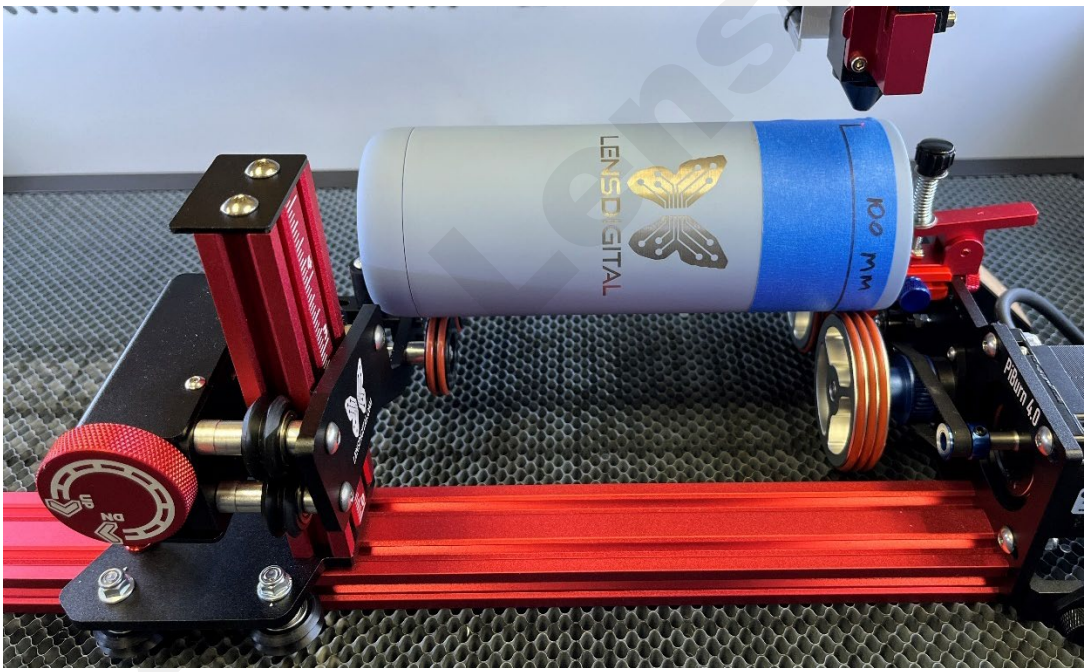


Figure 19: Position laser over start of the line.

You might need to rotate the object using the up/down arrows on the control panel. Hit the "Origin" button.

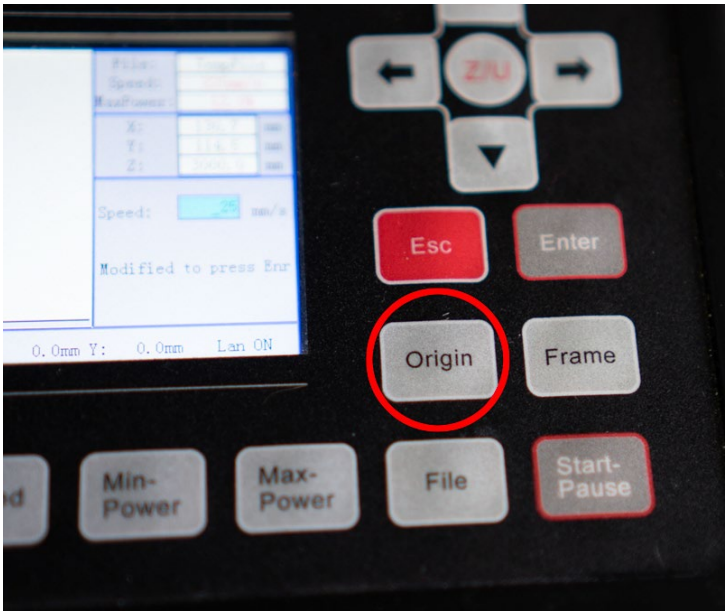


Figure 20. Origin Button

Move the laser bed up or down to approximate focal distance. It doesn't really matter as long as you can see a laser dot on the object clearly.

Load the "**square**" file and press the "**Frame**" button.

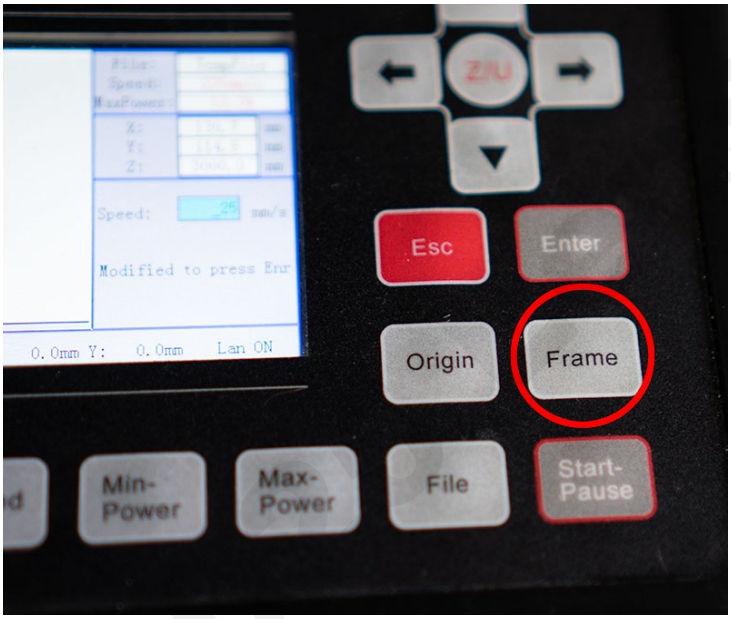


Figure 21. Frame Button

PiBurn will rotate the object in one direction and then back. Note up to which point it stopped before returning to its original position. You are all set if it goes right up to the second mark! Otherwise, follow these steps:

1. If the laser didn't reach the end mark, you will need to decrease the "**diameter (mm)**" number. Increase it depending on how short it stopped to the mark. Follow the guide in "Chapter III: Configuring Software" to adjust this value. Turning off or restart the machine between these changes is unnecessary.
2. If the laser went past the end mark, you'll need to increase the "**diameter (mm)**" number.
3. Finally, save the new setting and try "**Frame**" again.
4. Adjust again as needed until it stops right at the end mark.

*TIP: You can also adjust the "**Steps Per Rotation**" value instead of **diameter**, which might give you finer adjustment*

What if your machine doesn't have a red "pointer" laser (beam combiner)? In this case you will need actually to burn in the line on the object. Adjust the power of the line layer to the minimum at which your laser will fire. You only want to see where it ends up…

Note: If you get a "SLOP Y Over" error, you position too close to the laser's maximum or minimum coordinates on the Y axis. Laser can't move below 0 or above max coordinate. You'll need to rotate rotary wheels (using arrow keys on the control panel) until your Y reads somewhere between your max and min coordinates (for example, 150 mm might be a good number), then reposition the tumbler (with your hands) until the start of the line is under red laser dot and don't forget to press the Origin button too.

See a video about "Y SLOP Error": https://www.youtube.com/watch?v=spi-B7qGKMw

Chapter V: Basic Operations

Assuming you have already set up your machine to work with PiBurn Lite and connected the rotary attachment, here are the basic operation guides.

Note: Due to ongoing design, your PiBurn Lite may appear slightly different from the one pictured below.

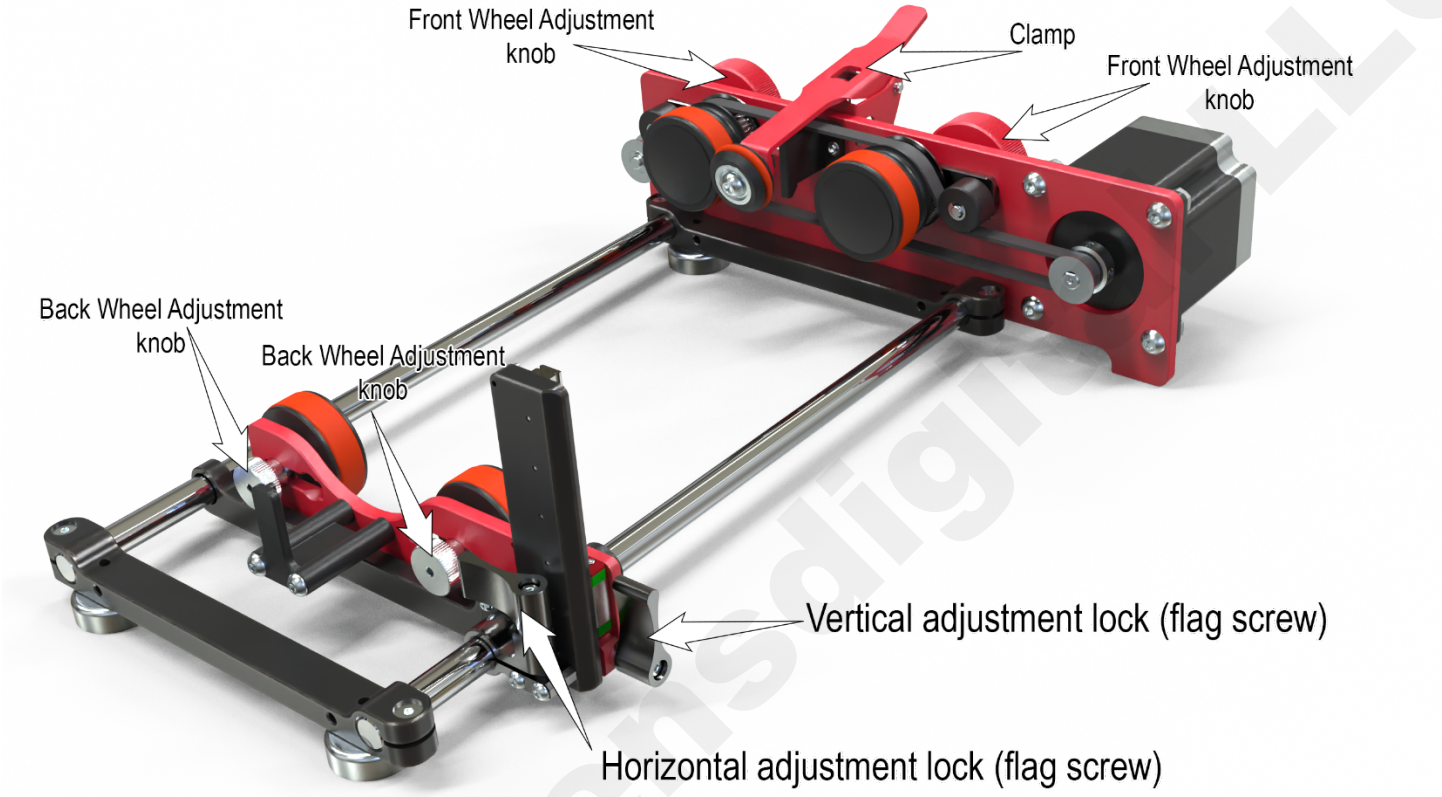


Figure 22. Rotary Overview

Adjusting Wheel Distance

PiBurn Lite is the only rotary with a **patent-pending adjustable wheel system**, designed to allow you to change both the front and rear wheel spacing without affecting belt tension.

There are two wheel positions: **close together and far apart.**

Use the **widest wheel distance** for the best engraving stability on standard cups, tumblers, and even larger items like dog bowls.

Use the **narrower wheel distance** when engraving smaller objects, so they don't slip or fall between the wheels.

No tools are required to make adjustments:

- **Front Wheels**: Loosen the large red knobs located behind the wheels, push them forward, and slide the wheels into the alternate position. Once aligned and straight, tighten the knobs securely by hand.
- **Back Wheels**: Loosen the two smaller knobs behind the wheels, shift them into the new position, and re-tighten.

With these simple adjustments, you can quickly adapt PiBurn Lite to handle a wide range of objects securely and with precision.

Loading/Unloading object

1. Remove the lid from the tumbler (if it has one) to fit the clamp inside it. If it's impossible to use the clamp, remove the clamp and set it aside (*see Clamp Operation*)
2. Loosen up the horizontal lock "flag screw" so the back wheel carriage can slide back and forth freely.
3. Put the largest/heaviest part of the object on the front wheels (clamp it if possible), and hold the back side of it in the air slide carriage until it's positioned correctly (parallel to the laser gantry). The front of the cup/glass should slightly touch the front-end stop.

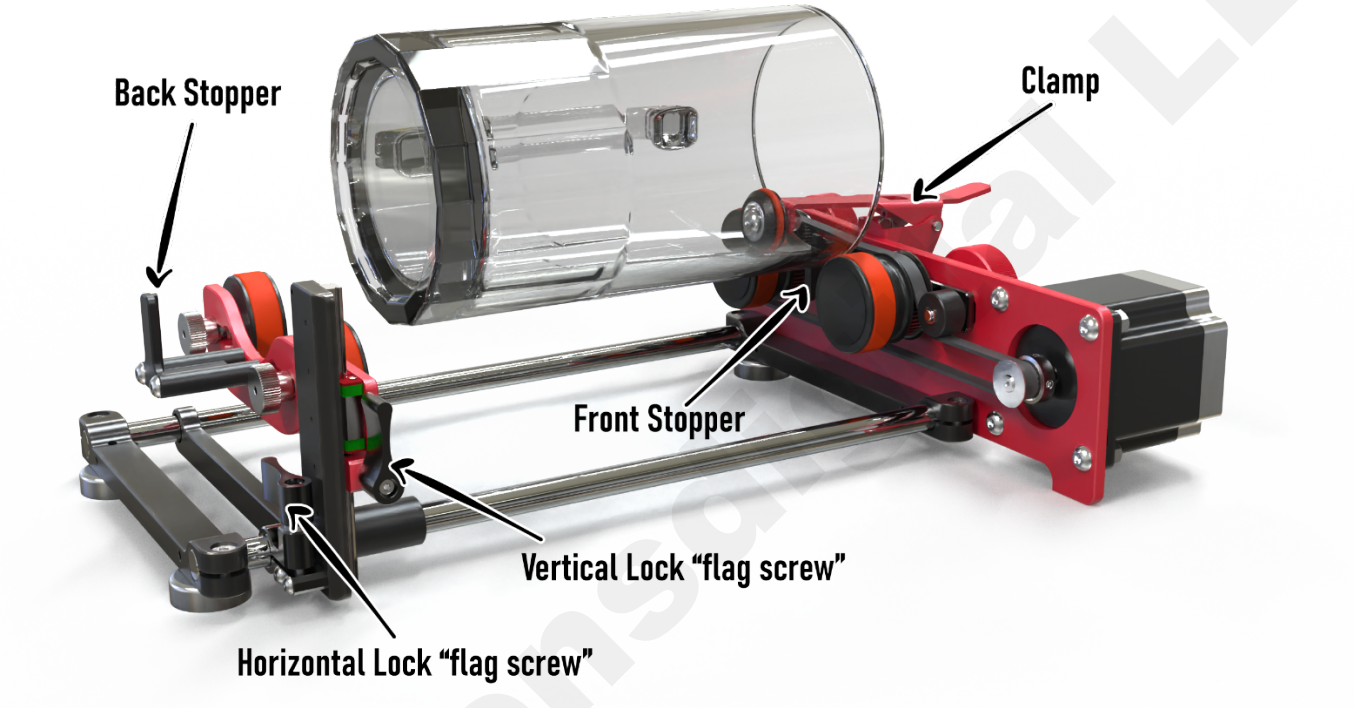


Figure 23. Cup Setup

4. Slide the Back Support Carriage until it's under the back of the tumbler and pace the back side of the tumbler on the back wheels
   Loosen the flag screw (flip it down a little), securing the back wheel assembly, and lift or lower it until most of the object's surface is parallel to the laser gantry, then tighten the flag screw (flip it up). Use a bubble level for this step. Place it on top of the tumbler.

Slide the back wheel assembly towards the front of the rotary until the back stopper touches the bottom of the tumbler.

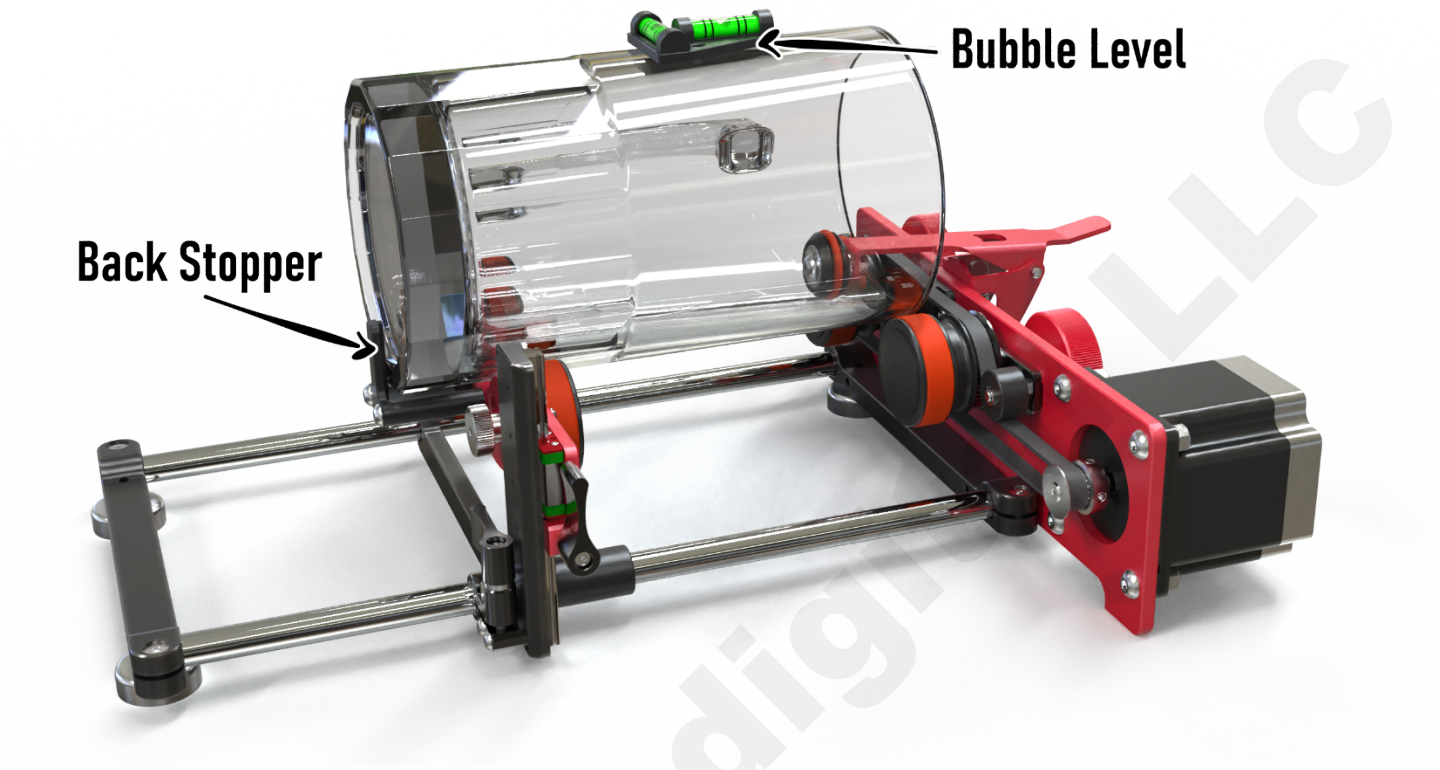


Figure 24. Final Position

5. Turn the Horizontal Lock Flag Screw so the carriage doesn't move.
6. Change the machine's "framing" speed to 10-25mm/s

Figure 25. Speed

7. Using up/down arrows on the control panel, rotate the object slightly to ensure its sitting correctly.
8. Load the graphics file, frame, and start engraving.

Clamp Operation

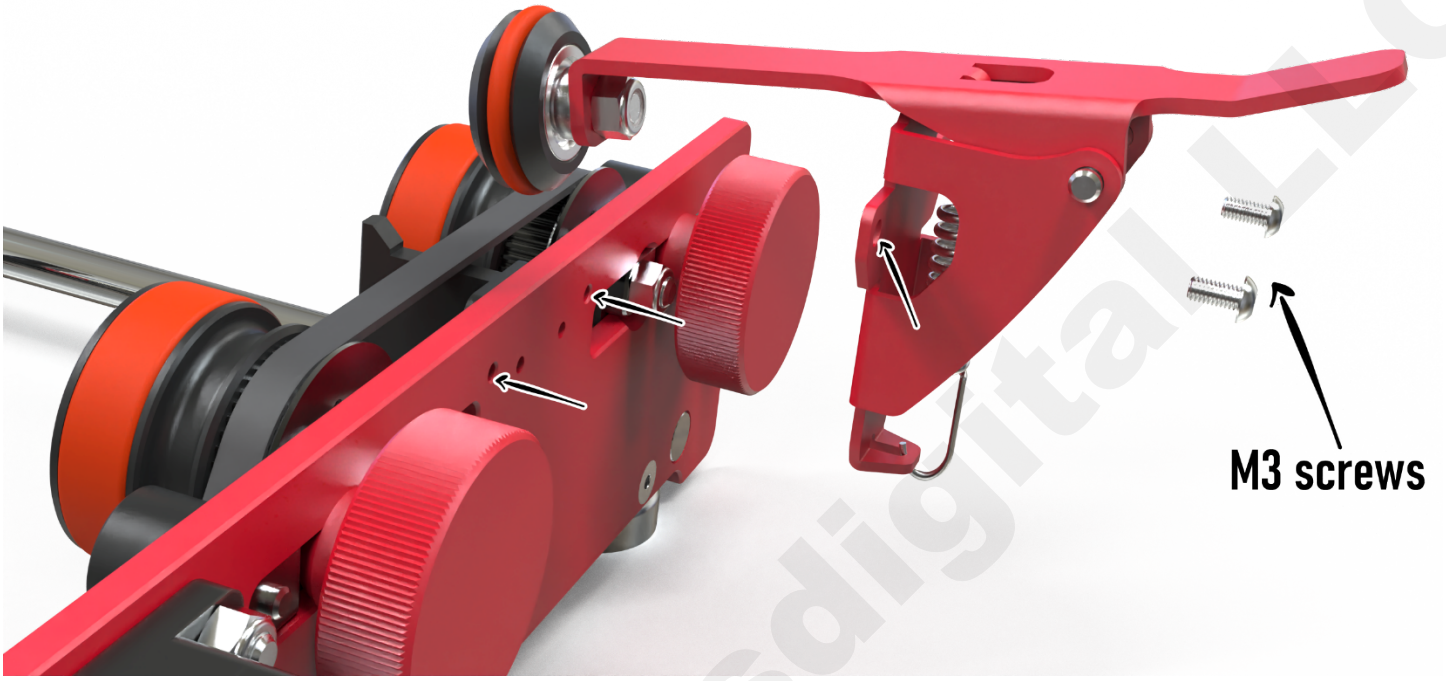


Figure 26. Clamp

The clamp will usually be placed inside an engravable object such as a tumbler or glass. It uses spring to apply pressure on the inner surface of the cup to increase friction with drive wheels and minimize slippage. However, in some cases, like when engraving bottles or small bats, you will want the widest part of the bottle to be on the front rollers, and the clamp won't open wide enough to accommodate these. In this case, you need to remove the whole clamp using two M3 screws as shown above.

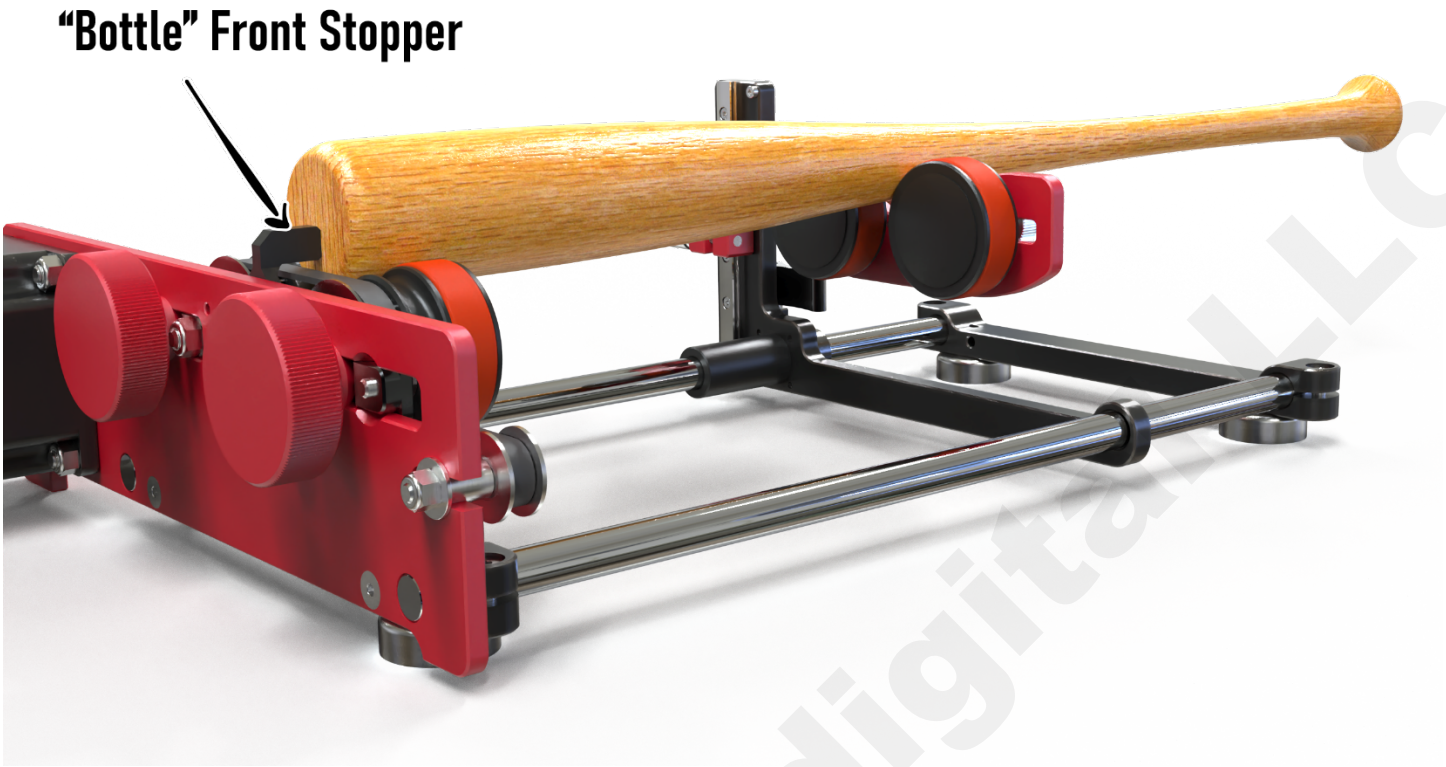
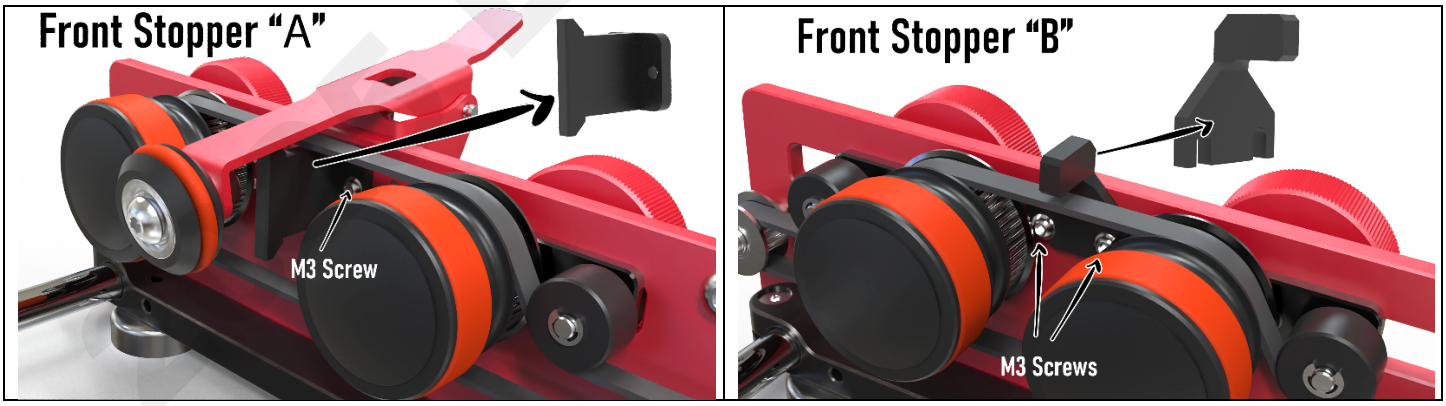


Figure 27. Clamp removed

Choosing Front Stopper

Your PiBurn Lite will come with two plastic front stoppers. Stopper “A” is already attached and can be used for most objects. It’s usually used when the front wheels are installed in a “wide” position.
Front Stopper “B” can replace Stopper “A” when front wheels are installed in “narrow” position and the clamp is removed.



Both Stoppers are held by two M3 screws, which can be removed using the included 2mm hex allen key.

Focusing and Beam Alignment

You'll always want to align your Y axis to be in the middle of the PiBurn. The easiest way to do this is to position Y gantry by hand above PiBurn and move the laser head from the control panel left or right until it's above the middle line of the clamp.

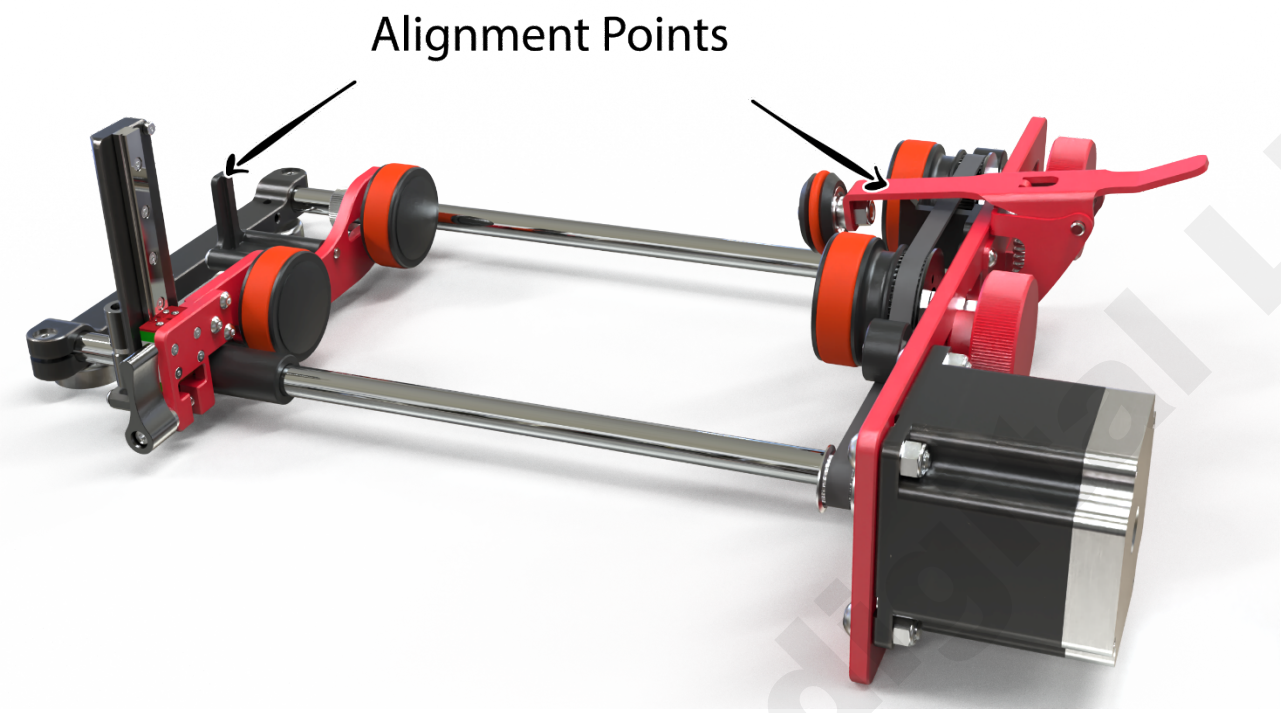


Figure 28. Alignment Points

Then move the laser head until it's directly over the middle of the back stopper

Move/Rotate one of the rotary's ends until your laser's gantry path is parallel to the rotary's rail. In other words, your PiBurn is aligned when your red laser dot hits both alignment points of the rotary (mark on the clamp and center of the thumb screw on the backstopper).

Alternatively, you can purchase a PiBurn Calibration Tumbler from our website: lensdigital.com

Focusing

If your laser has auto-focus, you can use it as normal; just try focusing over the **front** area of the object closest to the motor. Make sure you are ready to hit the emergency stop button, too.
Some users reported malfunctioning autofocus bending stainless steel tumblers, which could break PiBurn. We never had this happen in our tests, but it is better if you are aware.

Chapter VI: Usage Guides and Suggestions

Always remember the #1 Rule: BE SAFE!

Do not operate your laser machine with the cover opened, but if you must, always wear protective goggles and never place your hand in the path of the laser beam. Infrared Laser is invisible, and it hurts a lot when it touches you.

Rule #2 is: Rotate SLOW!

Laser engraver/cutter machines are meant to move fast when not firing to save operator time. This includes movements to the cutting position, framing, or moving back to the start position at the end of engraving.

The rotary attachment is not designed to move this quickly! If it spins rapidly, any object on it will fly off and break (i.e. glass) in the worst case or shift and slip in the best.

So, before you start, set your machine's default movement speed to about **30 mm/s** or lower. This can be done via the control panel's "**Speed**" button. This setting doesn't affect lasering operations, only manual movements and the "**Framing**" function (when you hit the "**Frame**" button).
Lower your idle speed and acceleration as well. This function is performed via machine Settings in Lightburn and is described in detail in Chapter III.

Y coordinates position

The Rotary replaces the Y axis of the laser machine, and it doesn't have a limit as it rotates forever. Unfortunately, the machine doesn't know that. It will not let you rotate past a specific point because it will think you hit the physical limit of your machine's bed. This can cause the machine to refuse to engrave and give a "Slope" Error.

Let's say that your machine's maximum cutting area in the Y direction is 400 mm. You have an engraving that's 100 mm wide. While positioning and rotating your tumbler, you get to the Y=350 mm mark (this can be seen on the control panel's LCD screen). When you try engraving from this point, you will get a "Slope" error because the machine can't engrave at a position above 400 mm (350+100=450).

That's easy to fix.

1. Hold the UP arrow key on the control panel until the machine shows Y close to 0 mm.
2. Disengage the clamp and rotate your tumbler by hand until it's at roughly the starting position that you want
3. You can fine-tune its position now using the UP/Down arrow keys as long as you don't go too far (i.e., above the 300 mm limit as in our example).
4. Hit the "Origin" Button to save this as the start position.

Slipping/Jumping Off

Some very light objects might not have enough weight to stay on rollers despite the front clamp. If you see an object slipping from back rollers, add some weight. Place a small bag of rice or sand inside the object to add weight.

Sizing and Aligning Your Artwork

Aligning

The cool thing about the PiBurn rotary is that its stepper motor is installed on the outside of the headboard. This means you don't have to invert your image or rotate PiBurn in an "unnatural" position.

Your artwork will be engraved just like you see it on the screen. In most cases, you'll just want to rotate it by -90 degrees because your bottle or tumbler is laying on its side inside the rotary. Of course, if you want it to be engraved sideways, you don't need to rotate artwork.

Here's an example:

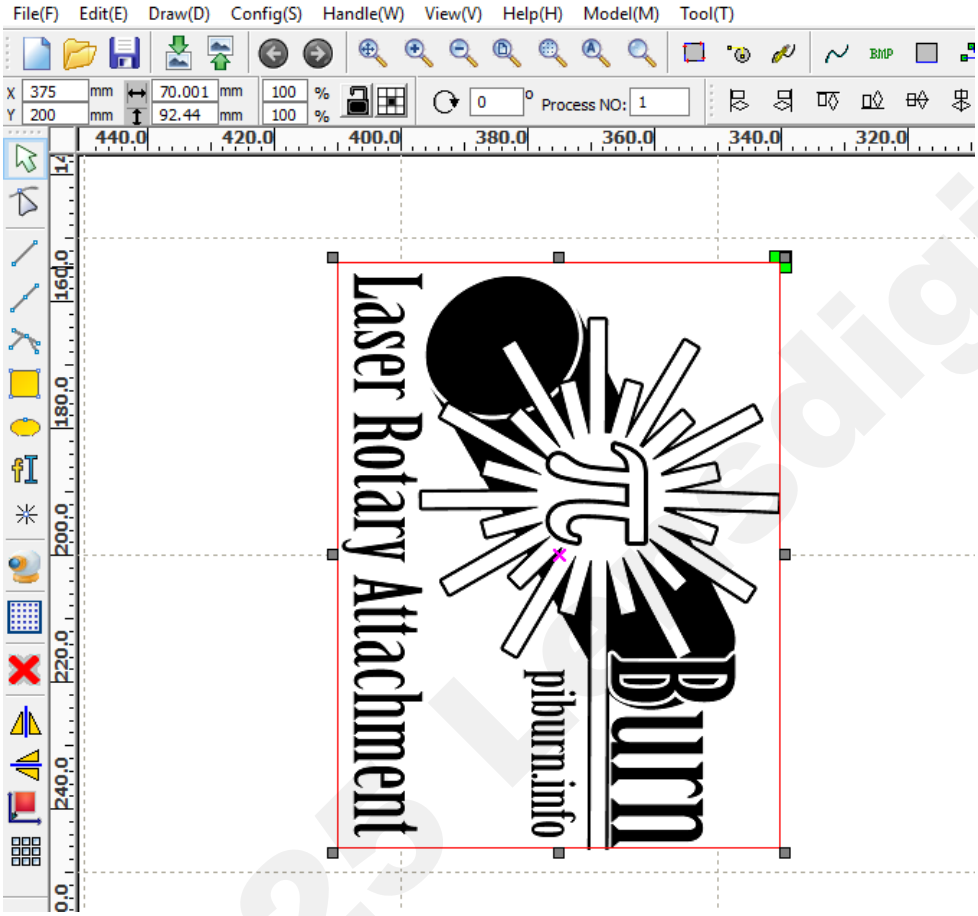


Figure 29. Image Alignment

And Resulting Engraving:

Figure 30. Result of Engraving

Sizing Artwork

Measure the object you are trying to engrave. You'll need to know the length of the area you want to engrave (X direction) and the width (Y direction). Length is easy, but to find out the width you'll need to calculate the circumference of the service. The easiest way is to measure the object's diameter and multiply it by the number Pi (3.14). Do you see why we named our rotary PiBurn? 😊

For example, you have a tumbler that has a diameter of 6 inches (152 mm) at its widest point. And its length is 10 inches (254 mm). The maximum size of the artwork you'll be able to engrave is 152x254mm. But do leave some room for margins.

Uneven Surfaces

For best-quality engraving, the distance from the laser's head to the object must be the same throughout the whole area. This is because the laser beam is the smallest and has the highest power at the lens' focal distance.
Unfortunately, that's not always possible with curved glasses, cups, etc. Try averaging focal distance by focusing on the area between the highest and lower points. Engraving should still come out great!
If the height difference is too much, design your artwork to be engraved in sections if possible, or simply size it so it doesn't cover too large of the area lengthwise.

Bottle Objects or Help, my image is getting stretched!

The most common issue we are seeing people reporting is their engraving is being stretched on the bottle-like objects (i.e. large diameter body and smaller diameter neck). This happens because the smaller-diameter part of the object rotates less compared to the rest of the object. So, if the neck of the bottle turned ½ of the way, the rest of the bottle might have turned ¾ of the way at the same time. When you set your steps per rotation and roller diameter, these settings ONLY affect the part that's directly on the big drive wheels! So, if you want to engrave the neck of the bottle, it will come out correctly. However, now you have to take into account the difference in the diameters. There are three choices you can take to address this problem:

1. Remove the clamp, change the front stopper and simply flip the bottle around! There is no need to mess with settings, and usually, uniform objects like that engrave fine without the clamp.
2. Temporarily adjust steps per rotation or roller diameter settings. You will have to find the correct settings experimentally (we recommend doing a 100mm test as described in this manual). Just don't forget to change settings back when you want to engrave normally shaped object.
3. Finally, you can just resize your artwork, "squishing" its height until it comes out ok in the engraving.

It's important to keep in mind that some bottle tumblers have threads on the neck. These will force the bottle to move back or forward on the rotary, pushing it against the front or back stopper so hard that it will prevent it from rotating correctly and skipping. For this, you can laser cut an adapter that will go on your threaded neck and make it smooth. As a bonus, if you make an adapter the same diameter as the main body of the bottle, then you won't have to worry about diameter differences!

Switching to regular laser operations

After you are done with the PiBurn rotary, don't forget to disable the rotary function, or you will not be able to engrave/cut materials! In LightBurn, you can go to Rotary setup and switch off to enable Rotary. But you'll also want to change the acceleration values. The best way to do this is to have two configuration files saved somewhere—one for Rotary and one for Flat work. Just load the one you want via machine settings and write it to the controller memory.

Chapter VII: Maintenance and Alignment

This maintenance is needed to keep PiBurn in top shape.

Silicone Tires

If you are using metal marking sprays like Laserbond 100 or Cermark, some of the compound will be transferred to the tires. You can wipe off Tires with a paper towel and alcohol to make sure they are providing good traction to the engraving objects.

Appendix A: Note on Thunder Laser Motor (Servo) Switches

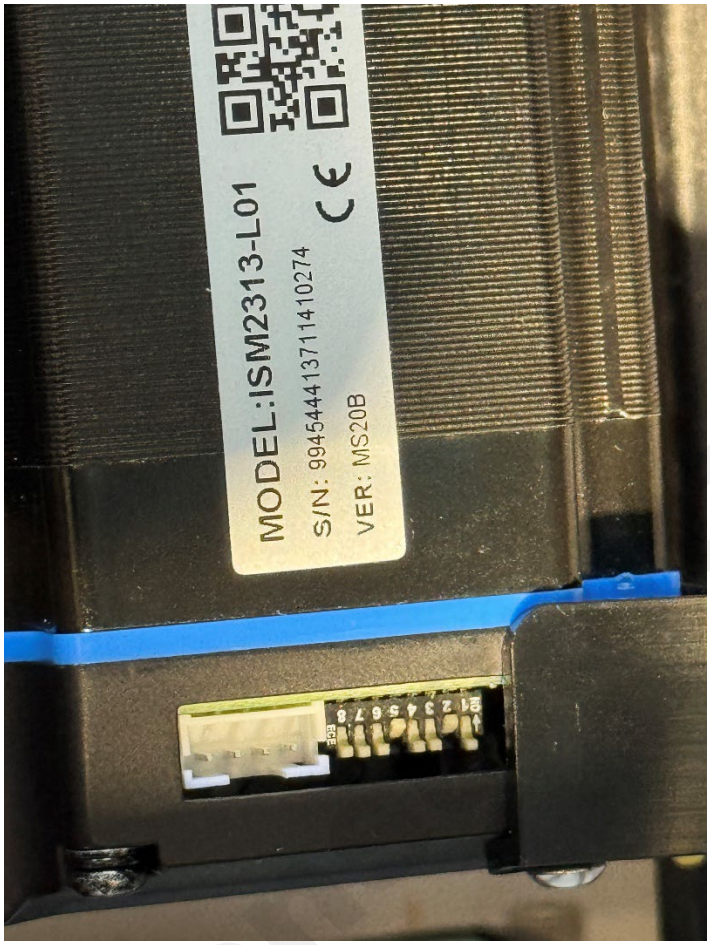


Figure 31. Servo Motor Switches

PiBurn for Thunder Lasers uses a special "closed-loop hybrid stepper motor." We will refer to it as a servo motor (even though it's not a true servo) in the manual. These motors have 6 DIP switches on the back. We shipped these with Switch #2 and #5 in the Up (ON) position. Switches 1-4 control default steps per rotation; please don't change them, or you will have to figure out new settings for your laser controller.

However, Switch #5 controls motor rotation direction. It's up to the end user how he wants to place the rotary inside the laser. Most place it with the motor facing the left side of the laser, and for this placement, we recommend Switch 5 to be ON. However, if you decide to rotate your rotary 180 degrees, you'll want to flip this switch to on, or your engraving might come out "mirrored."

So simply said, if your engraving is mirrored, just flip switch Number 5 (i.e., UP if it's down, or Down if it was UP).

Never turn on switch #6, as it will place the motor into test mode, and it will just spin on its own until the switch is turned off.

Repair and Warranty

Due to its modular design, PiBurn is very easy to repair if any of its parts break. There are no rivets or hidden latches; almost everything can be taken apart in a few minutes with an Allen hex key and pliers. If you need a part replaced, please contact us via **the Contact Us** page on our website.

PiBurn is covered by a 1-year limited warranty. If anything breaks during regular use, we'll fix or replace it.