PS48 VISION

Full Spectrum
LASER

Safety Symbols:

Red Icons indicate dangerous situations that could result in serious injury or death.

DANGER **WARNING** **CAUTION**

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

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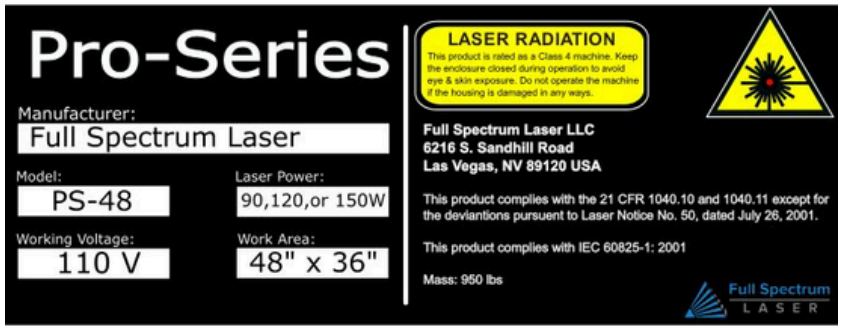
Safety Warnings:

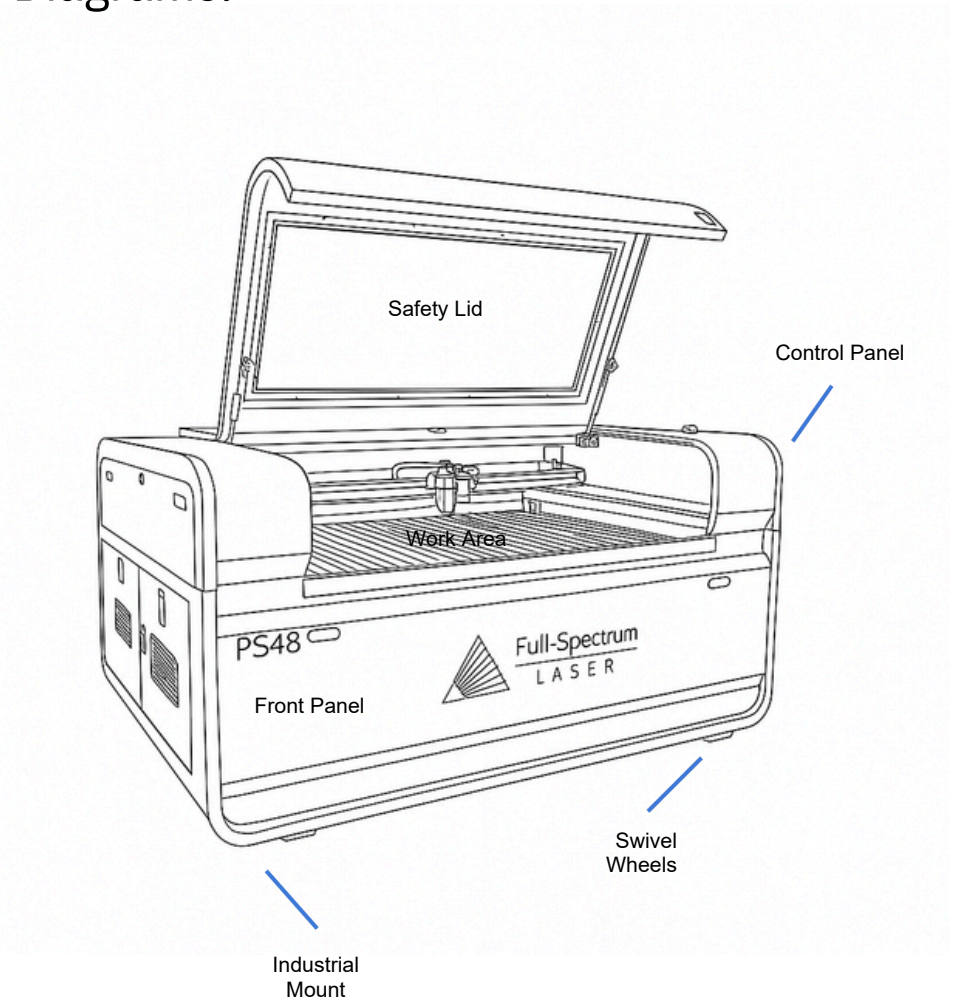
WARNING	• **This product is rated as a Class 4 machine, however the enclosure makes the overall rating of the machine Class 3R.** • **Keep the enclosure closed during operation to avoid eye & skin exposure.**
	• **Never stare directly at the laser when the machine is running.**
	• **Avoid using materials made of carbon or that contain carbon components.** • **Make sure your exhaust in functioning properly before each use.**
	• **Do not leave your machine unattended.** • **Always keep a fire extinguisher and first aid kit nearby.** • **Regularly inspect your fire extinguisher to ensure functionality.**
	• **Do not attempt to access any electrical areas while the machine is on.** • **Unplug the machine and wait for an hour before accessing panels.**
	• **Inspect your machine before each use. Do not use if the machine or its accessories are damaged in any way.** • **Always maintain a clean work area.**

Full Spectrum LASER

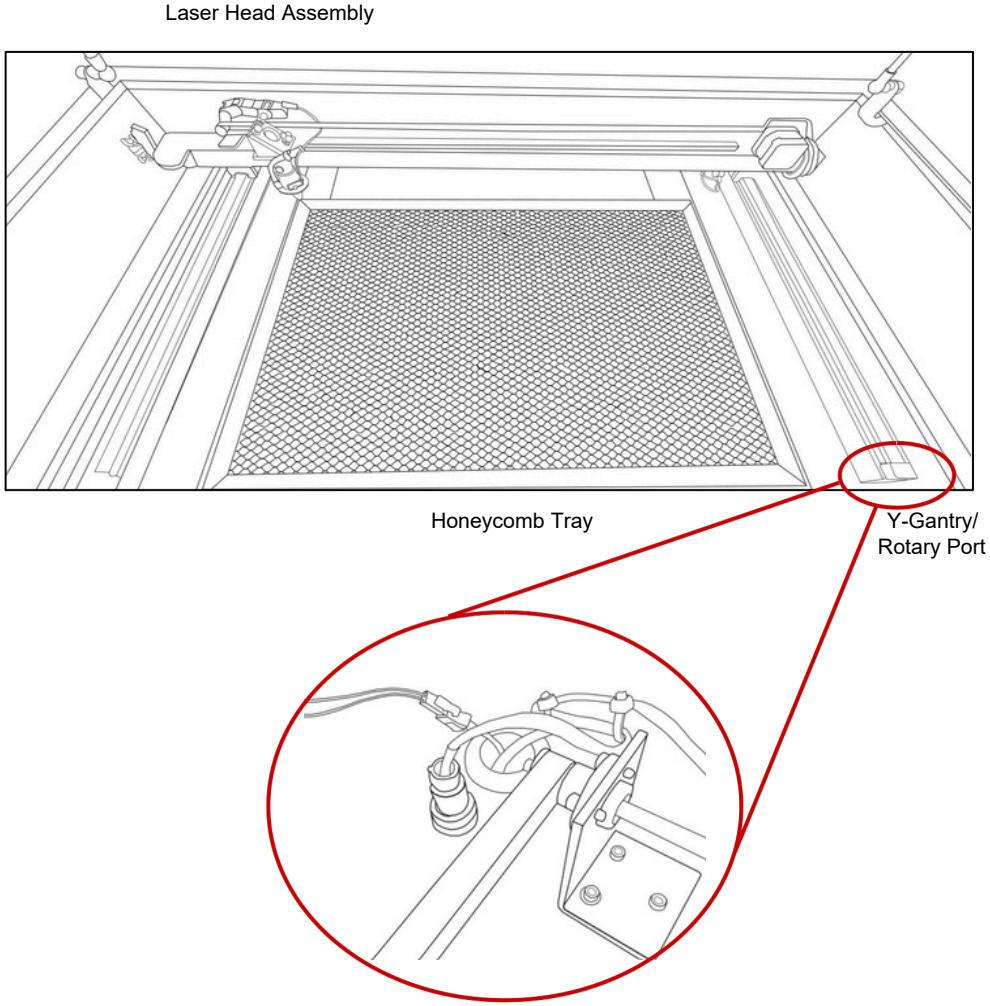
Safety Stickers:



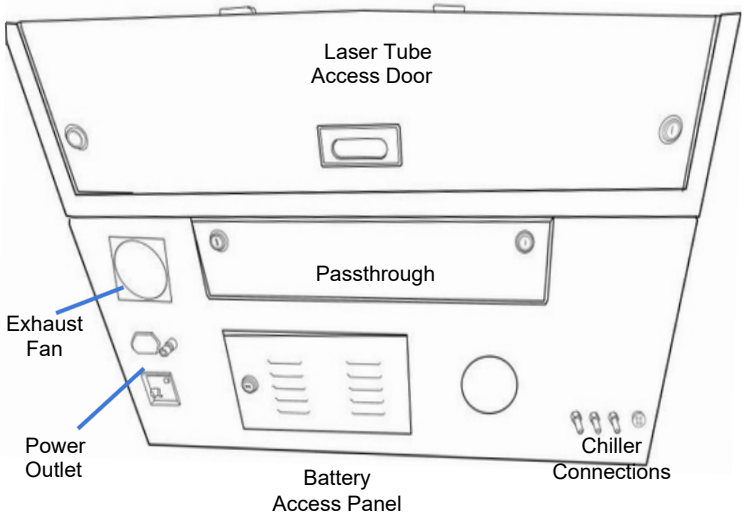
Diagrams:



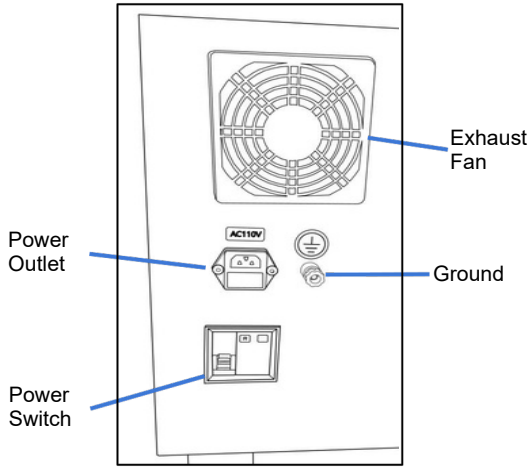
Work Space:



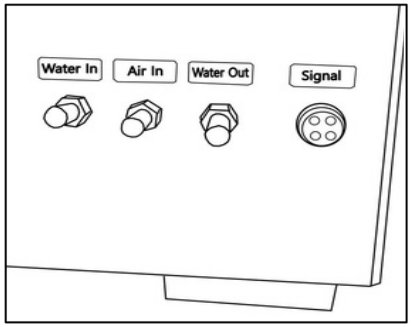
Back View:



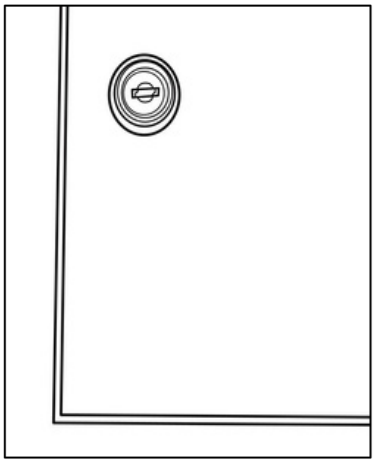
Back Panel (Left):



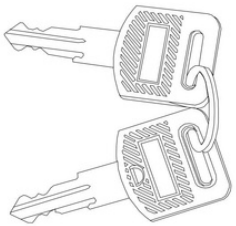
Back Panel (Right):



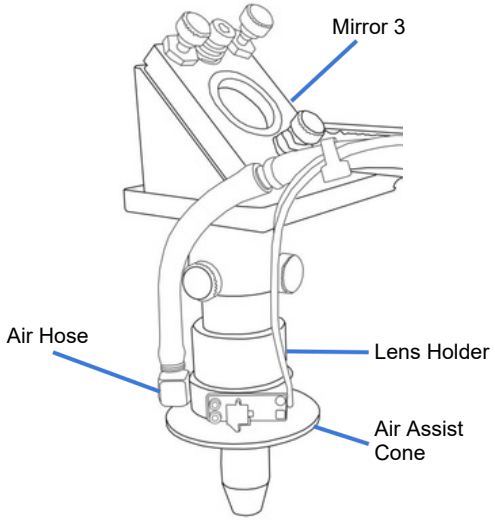
Accessing Panels:



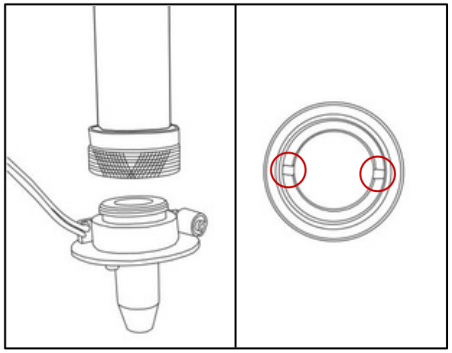
The access panels on the Pro machine can be opened and closed using one of the ignition keys.



Laser Head Assembly:

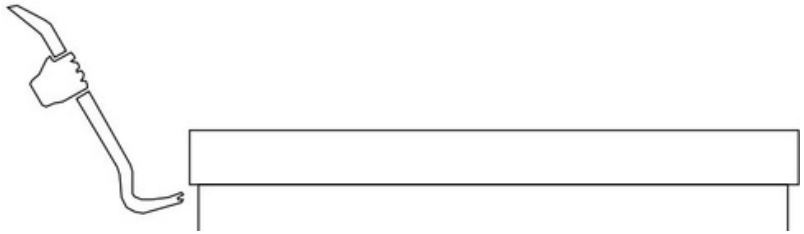


Focus Lens:



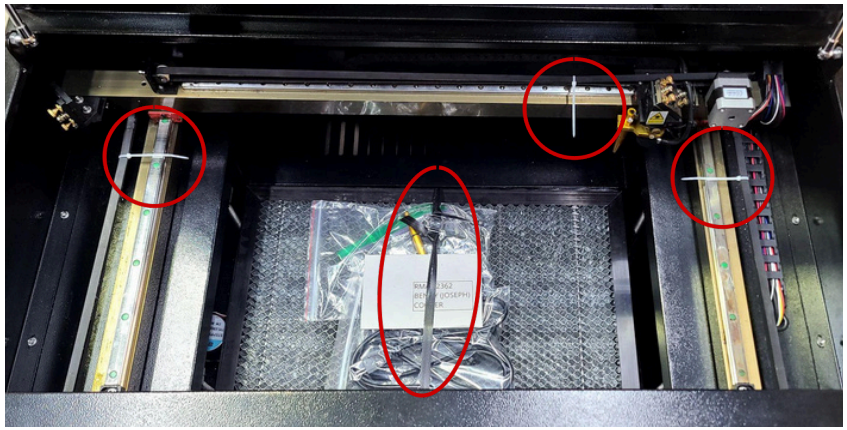
In order to replace the focus lens, twist off the Air Assist Cone and disconnect it from the air hose. Turn the lens holder to its side. Your replacement lens should come with a tool that can be used to remove the lens retaining piece. Once the piece is removed take out the lens and insert the new lens. Reattach the retaining piece and connect the corresponding air assist cone to the air hose and secure in place.

Setting Up Your Pro:

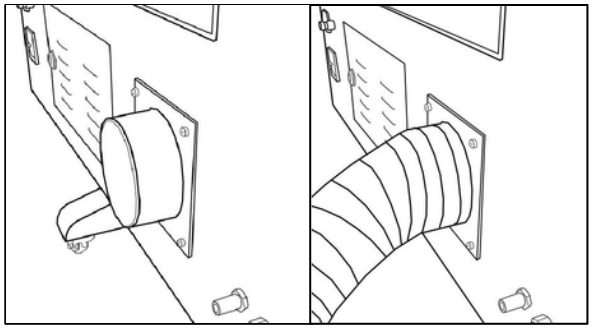


1. Open the Crate. Use a Pry Bar, a hammer, and a Boxcutter (or scissor) to open the crate.

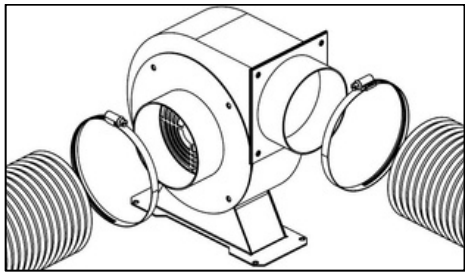
2. Level Machine. Use a forklift to move the Pro-Series into the empty work area. Adjust the machine's legs so that the machine is level in both the front and back sides before removing the forklift.



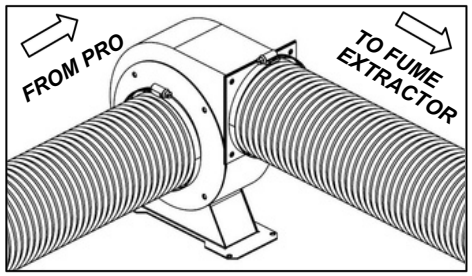
3. Remove the Zip Ties from the machine.



4. Install the exhaust flange. Connect the ducting to the flange.



5. Connect the ducting to the Exhaust Fan.



6. Check the exhaust fans connections.

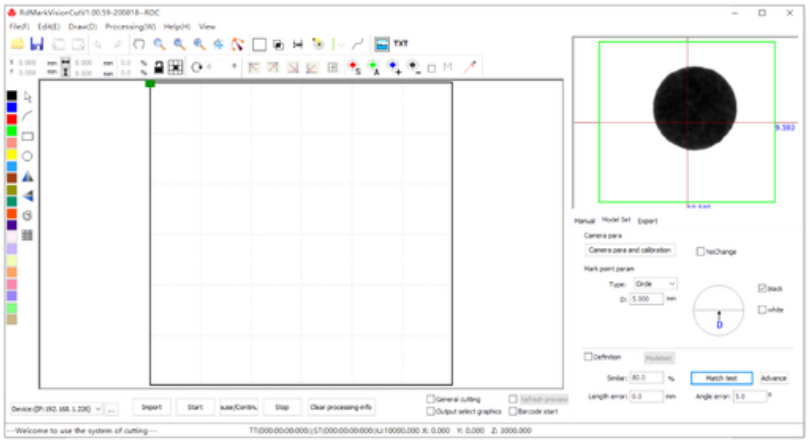
7. Connect the Power cables to the machine.

Software

Full Spectrum LASER

Software:

1. Quick Start



1.1 Set Up Machine Communication

-Establish a connection via the USB port or TCP/IP.
-Ensure successful communication before proceeding.

1.2 Camera Parameters

Hardware-level camera adjustments are made primarily by changing the aperture and focal length to fine-tune image quality. However, these cannot be adjusted freely once the camera is installed. Typically, you will need to adjust the ambient light instead.

Adjust the following camera parameters within the software:

-Contrast: Adjust the background color and the material's color contrast to refine the image quality.

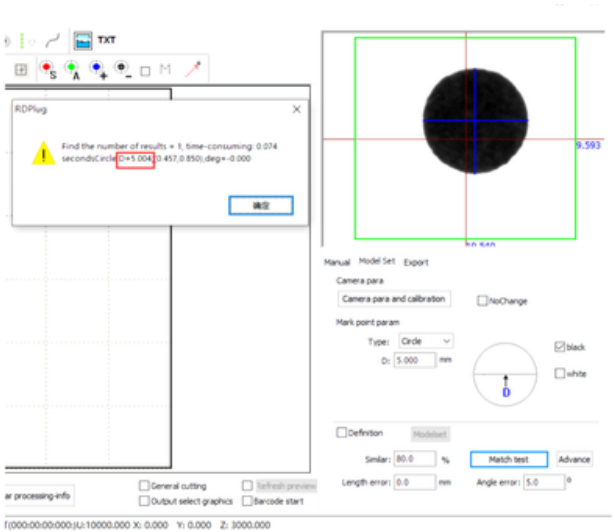
-Gain: Adjusts the overall brightness and magnification of the image.

-Exposure: A longer exposure results in higher image brightness. Click Exposure to perform an automatic exposure adjustment.

-Note: Both "Contrast" and "Gain" manipulate image data. If the image is dim, first adjust the physical light source (the lamp on the camera) and the Exposure. If you still cannot achieve the desired effect, proceed to adjust the brightness, contrast, and gain.

- **1.3 Camera Calibration**

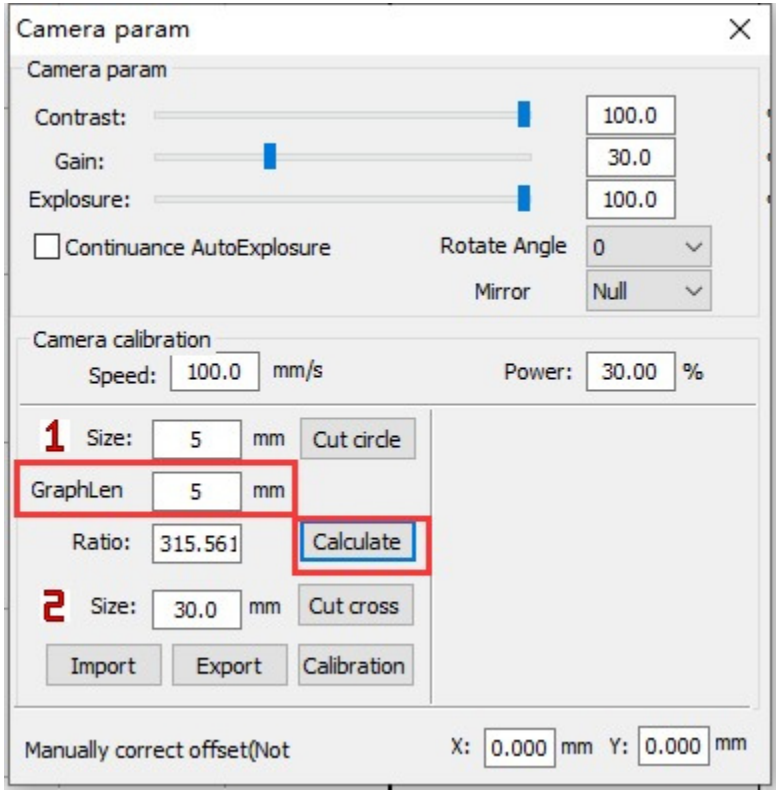
- Speed: Sets the movement speed of the laser head during camera calibration, or when cutting crosses and dots.
- Power: Sets the processing power used during camera calibration.
- Proportionality Coefficient: To cut a designated circle, press "Cut circle". The system will cut a circle on the platform and then run a matching test against the model parameters. To correct the pixel precision, enter the matching test result into the Measuring Length Bar, then click "Calculate". The system will automatically confirm the proportionality coefficient.
- Cut Cross: Click "Cut cross" to have the laser quickly cut a cross shape.
- Camera Distance Calibration: Cut a cross, then move the camera view's cross center to align perfectly with the physical cross center. Click "Camera calibration". The system will calculate the offset between the camera's view center and the laser head's center.



Software:

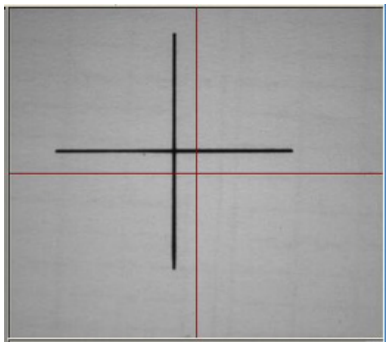
Picture 2-1 matching test to measure diameter

Correct the pixel precision, fill the matching test result into Measuring Length Bar, then click Calculate the system will confirm the proportionality coefficient automatically.



Picture 2-2 pixel precision ratio

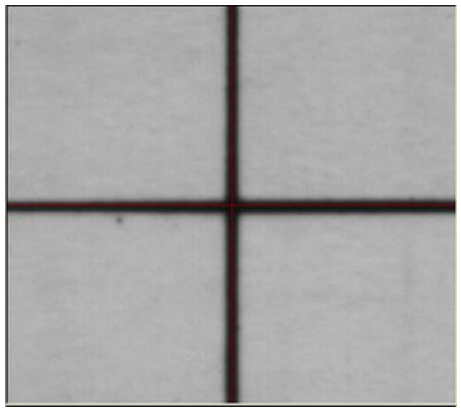
: Click the "Cut cross", the laser will quickly cut a cross.



Picture 2-3 Cut Cross

【Camera Distance Calibration】: Cut a cross, then move the camera view cross center to coincide with the cross center, click "camera calibration". System will calculate the offset from camera view center to the center of the

Software:



Picture 2-4 CameraDistance Calibration

3 Import Graphics

3.1 User clicks the imported icon, the following dialog will be appeared.

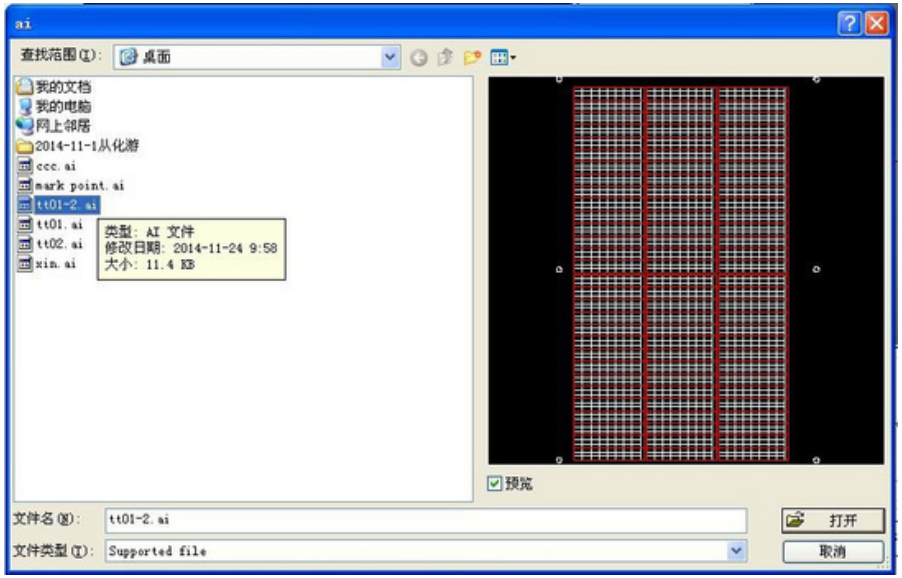


Figure 3-1 import processing file preview

Select the imported graphics, click "open".

The waiting processing graphics will appear in the main view area

Software:

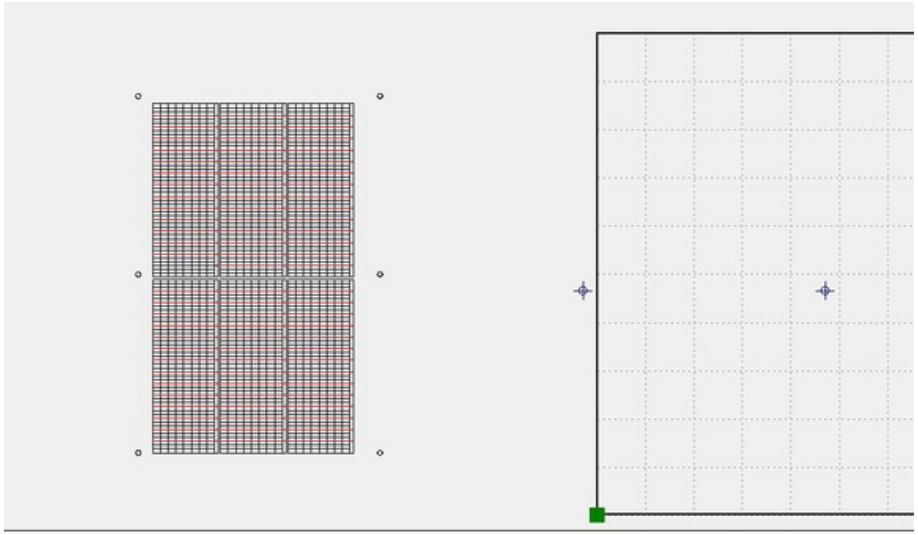


Figure3-2 import processing files

The imported graphics output as the already made layer color, you can define the output cutting contour.

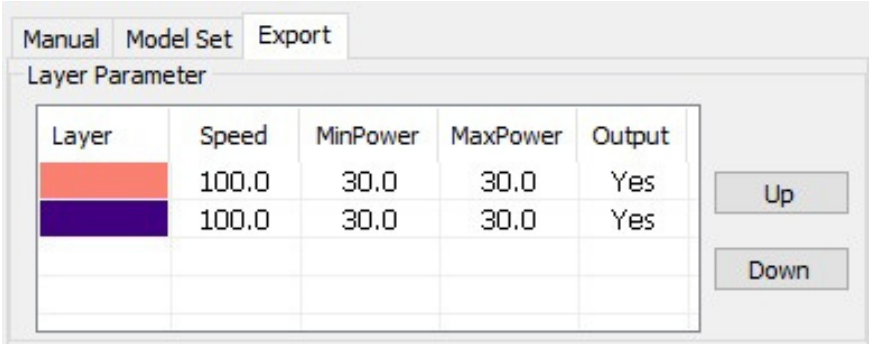


Figure 3-3File processing parameter settings

3. Model Parameter Settings

3. Model Parameter Settings

3.1 Mark Point Parameters

- Choose the required Mark point type to create your Model. The software supports eight styles: circle, cross, rhombus, ellipse, circular ring, rectangle, square, and triangle.
- When creating a Model, specify the different styles according to their corresponding chart parameters (such as diameter or width).

3.2 Model Matching Parameters

- Smoothing coefficient: A higher smoothing coefficient extracts fewer scattered point characteristics.
- Similarity: This is the matching score between the Model and the actual pattern. A higher score indicates a stronger likeness between the graphics. The similarity setting directly affects the match quality.
- Overlapping: This sets the allowable overlapping percentage of two envelope rectangles around target graphics. This parameter controls whether overlapping target graphics are identified.
- Matching angle: This allows the model to revolve and search within a specified angle range. For example, if set to 180 degrees, the search range during matching is 180~180 degrees. Set this angle according to your actual requirements; a wider angle requires more matching time. If you do not need this parameter, you can simply remove the option directly.
- Match overtime: This controls the maximum allowed match time. Adjust this parameter if target graphic matching fails due to a lack of time, or to prevent excessively long search processes. This parameter is largely influenced by the complexity of the model's characteristics.
- Matching test: This tests how well the current model matches the target graphics within the camera's view. The results will be displayed in the results interface, allowing you to review the mark point-related parameters.

not need to set this parameter, can remove the option directly

Match overtime: this parameter controls the match time. To adjust the parameters when the target graphics matching failed due to lacking of time or to avoid waiting too long time in search process. This parameter is mainly affected by the model characteristics of complexity.

Matchingtest: The current model matches with the current target graphics in camera view range, test results will be back inresults interface. You can know the mark point elated parameters from test results.

3.3 Enable Secondary Positioning

- Instead of setting the initially searched location as the final criterion, the camera will automatically move to the target, take another photo, and reposition the exact coordinates.
- Distance offset / Angle offset: This is used during two-point positioning. When searching for the second feature based on its distance from the first feature, the system might find multiple similar features along the circular arc. The angle offset helps distinguish between them.

Note: If the offset is set too small, missing cuts may occur. Generally, the distance offset can be set within 2mm, and the angle offset within 5°. For workpieces requiring higher accuracy, you can set smaller values.

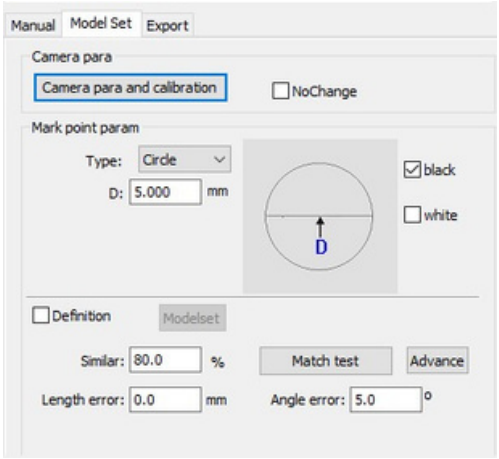


Figure 3-4 Model parameters

Software:

3.3 Enable Secondary Positioning

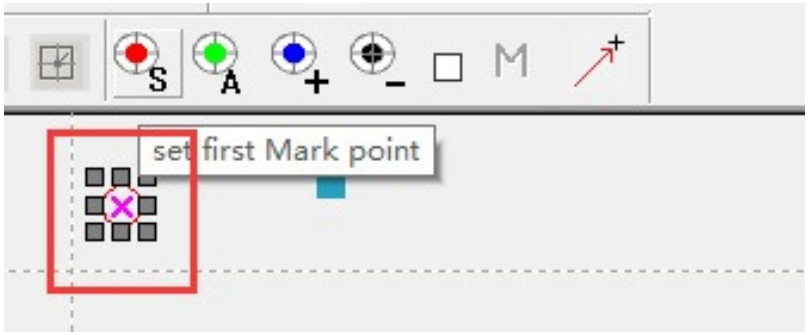


Figure 4-5 Mark point setting

Support any point identification, which is fit for mark point cutting with different quantity. To choose the mark point in the view area, click  to set the starting point, and choose other mark point, click  to set.

You can also click  to search all the mark points automatically.

3.4. Mark point searching path

Click the starting point to confirm the starting point coordinate, also can choose the mark point in the view area to click  to set the starting point.

The system will search the marking points starting from the closest other marking points.

3.5 Processing Settings

Move the axis, the camera will find the first Mark points, then match testing and check the matching result.

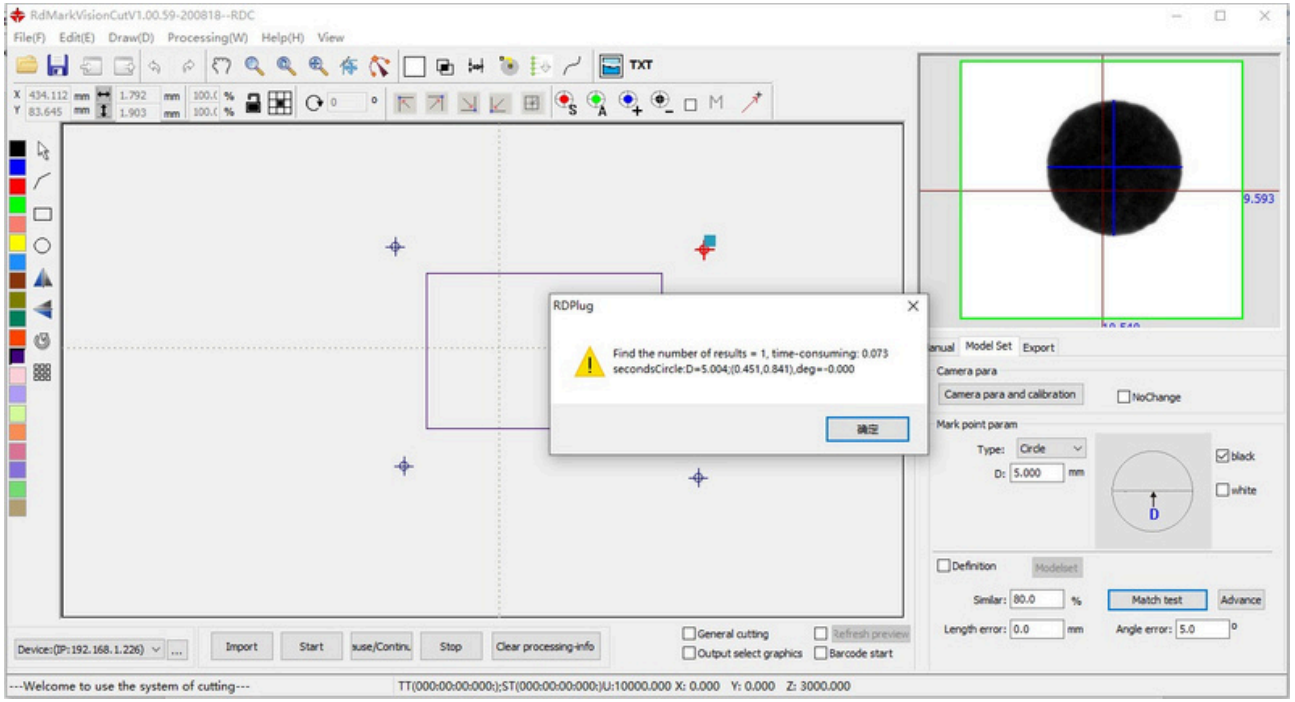
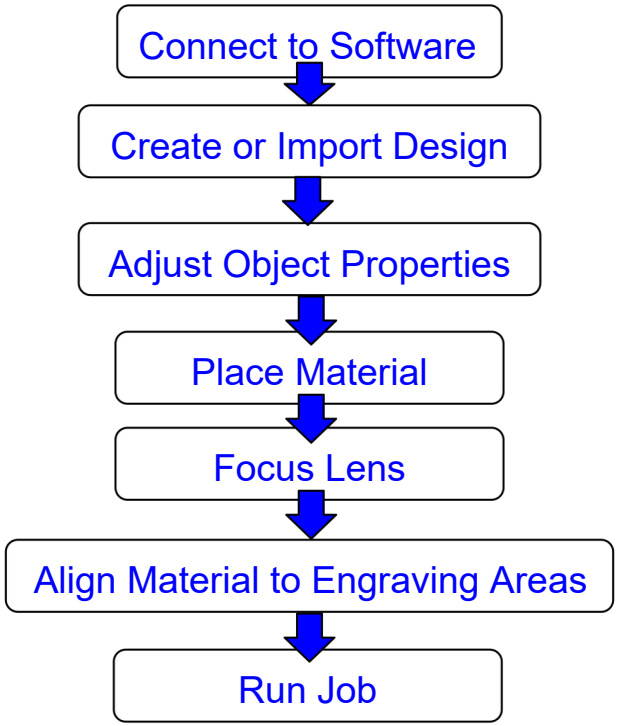


Figure 4-6 Mark point matching test

After the testing, click the "start" button on the control panel to proceed processing.

Project Procedure:



For more information on your machine refer to your user manual. For information on RE3, refer to the RE3 Guide found in our website.

General Maintenance:

By following our maintenance instructions, you can ensure your machine will function at peak performance for a long time. Please keep in mind that the following maintenance schedule can vary depending on machine usage.

Before each daily use:
Clean your lens and Mirrors with optical grade wipes.
Check your water, and air tubes for any potential issues.
Make sure your exhaust system is functioning properly.

After weekly use:
Remove the honeycomb tray and clean the interior of any debris.
Clean laser tube mirrors with optical grade wipes.
If you have issues with smoke in the workspace look into cleaning your exhaust options.

Monthly:
If cleaning is no longer effective, look into replacing your exhaust systems filters (if applicable).
Check X and Y belts, tighten if needed.
Clean your honeycomb trays with oven cleaner.
Bi-Yearly:
Perform an Alignment test to ensure proper engraving.
Check rails and clean if needed using white lithium grease.

Mirror Alignment:

Before running your first job, you should check and make sure the mirrors are properly aligned using the following procedure. The mirror is pre-installed and aligned for before shipment, however if your mirror is out of alignment, or if you have installed a new laser tube, you must align the laser.

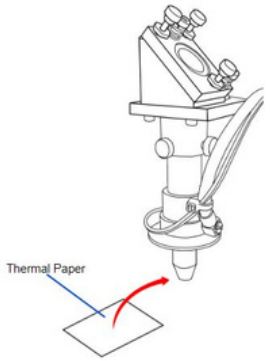
Alignment Test:

Before you start your first job, it is important that your laser is tested in case it needs to be adjusted. Follow the following steps to test your laser:

For this alignment test, we will test-fire the laser both at the closest possible position and at the farthest possible position between Mirror 2 and Mirror 3.

1. **Open the Safety Lid:**
   You will need to accessthe interior of the machine.

2. **Place Thermal Paper**:
   Take a small piece of thermal paper or craft tape and place it on the air assist cone under Mirror#3.



3. Make sure to place the thermal paper firmly on, creating a reference ring on the paper.

4. **Position Laser Headto1st Position:**
   Move the laser head into the left most position.

5. **Close The Safety Lid:**
   Safety measures are in place to ensure laser does no fire with the safety lid open. Regardless, never attempt to fire the laser with the safety lid open.

6. **Fire the Laser:**

   Press the Test Fire Laser Icon on the touch screen until a burn mark becomes visible on the thermal paper.

7. **Repeat Test Fire in Second Position:**
   Move the laser head to the rightmost position. Without removing the thermal tape, fire the laser again.

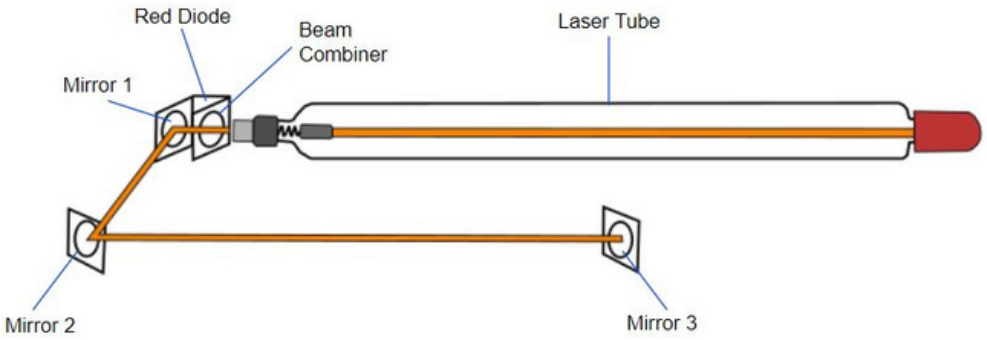
8. **Check Results:**
   With the test fires complete, open the lid and remove the thermal tape. The burn marks should overlap each other. If they do not overlap perfectly, you will need to align the mirrors.

   Please note that the burn mark will most likely resemble the shape of an oval.

Mirror Alignment:

Perform only if the initial test was unsuccessful.

The goal of the mirror alignment is to adjust the invisible Co2 laser beam properly so that in can engrave anywhere on the works space. Once the CO2 beam is consistent along the X-axis, the visible red beam will serve as the primary indicator for mirror alignment.



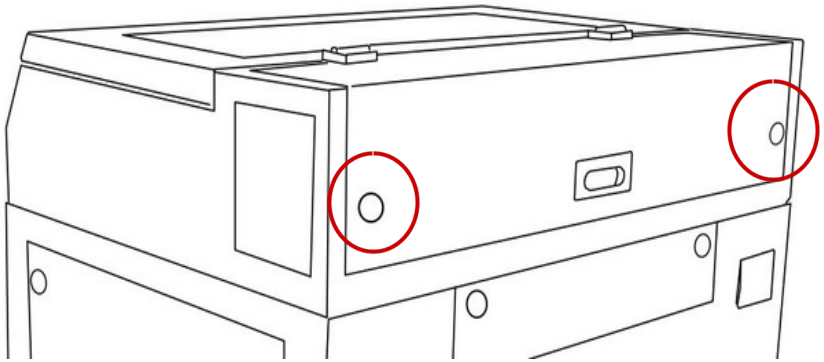
Preparation:

Tools:

Thermal Paper (included with accessories)
2.5mm Hex Wrench (included with accessories)

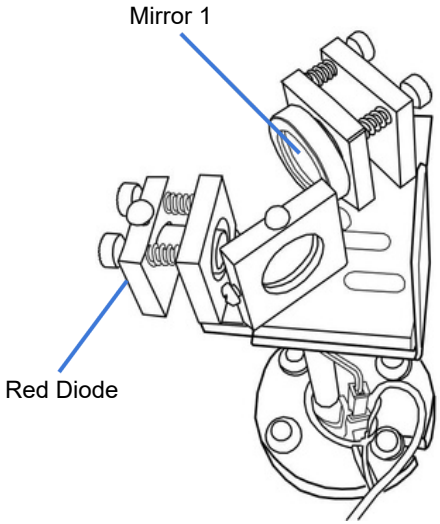
Make sure to prepare your tools and workspace.

1. **Turn on Titan:** Allow the machine time to fully boot up.
2. **Unlock Driver Motor:** On the touch screen, press the “Locked” icon. It will enter the “Unlocked” position signifying the gantry motor is disabled.
3. **Locate the Ignition Key.** The Pro-series comes with two copies of the ignition key. The ignition key can also be used to open the panels on the machine.
4. **UnlocktheLaserTubeBack Panel.** Use one of the ignition keys to unlock the back panel.



5. **Open the Back Panel.**

Diode to Mirror 1:



Mirror 1 Assembly

Align the laser output to Mirror #1 making sure that the beam hits close to the center of the mirror.

1. Open the Safety Lid.

2. Place Thermal Paper On Mirror 1. Make sure to place it firmly over **Mirror #1** to create a reference ring.

3. Close Safety Lid: Machine should be unable to fire the laser with the safety lid open.

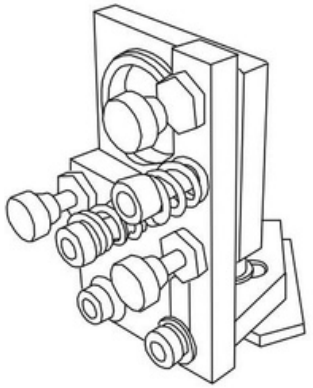
4. Fire the Laser: Press the Test Fire icon on the touch screen. Open the lid and check the thermal paper for a burn mark.

5.AdjustTheMirror 1: Adjust Mirror 1 so that the burn mark will be at the center. Test again and adjust as needed.

6. Adjust Red Diode: Use your hex wrench, make incremental adjustments to the adjustment screws of the red beam diode, and position the red dot exactly over the center of the burn mark.

Mirror 1 to Mirror 2:

Mirror 1 is stationary but Mirrors 2 and 3 are located on the Y and X gantry respectively. Therefore both of those Mirrors need to be aligned in the nearest and farther position from the previous Mirror for proper alignment.



Mirror 2 is located at the left corner of the gantry (see picture above).

1. **Open the Safety Lid.**

2. **Place ThermalPaper:** Take a piece of thermal paper and place it firmly over **Mirror #2** to create a reference ring.

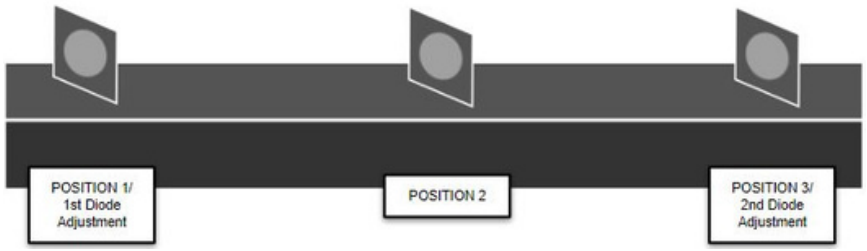
3. **Close Safety Lid.**

4. **TestFirethe Laser:** Press the Test Fire icon to create a burn mark on the thermal paper.

5. **Adjust Mirror #1:** Make incremental adjustments to the adjustment screws of **Mirror #1**.

Mirror 2 to Mirror 3:

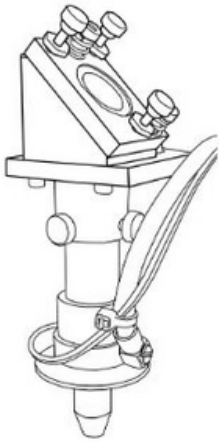
Mirror 3 is located on the laser head assembly, we will have to check the alignment along the X-gantry. We recommend selecting three position to test the alignment and using two of those positions to adjust the red diode.



1. **Open the Safety Lid.**
   Place Thermal Paper.
2. Takeapieceofthermalpaper and place it firmly over **Mirror #2** to create a reference ring.
3. **Move the Laser Head Assembly to Position 1.**
   Close Safety Lid.
4.
5. **Fire the Laser.** PresstheTestFireicontocreatea burn mark on the thermal paper.
6. **Check Results.** AdjusttheMirrorifneeded.Replace Thermal Paper as needed.
7. **Adjust Red Diode.** Makesurethediodeisatthecenter of the burn mark.
8. **Move the Laser Head Assembly to Position 2.**
9. **Close Safety Lid.**
10. **Fire the Laser.** PresstheTestFireicontocreatea burn mark on the thermal paper.
11. **Check Results.** Adjustthe Mirror if needed. Replace Thermal Paper as needed.
12. **Repeat For Positions 3.**

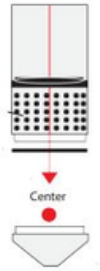
Mirror 3 to Focus Lens:

The focus lens converges the laser beam to a single point. The focus lens does not require manual focusing, however it is important to ensure that the path from mirror #3 to the focal lens is straight throughout the Z-axis.

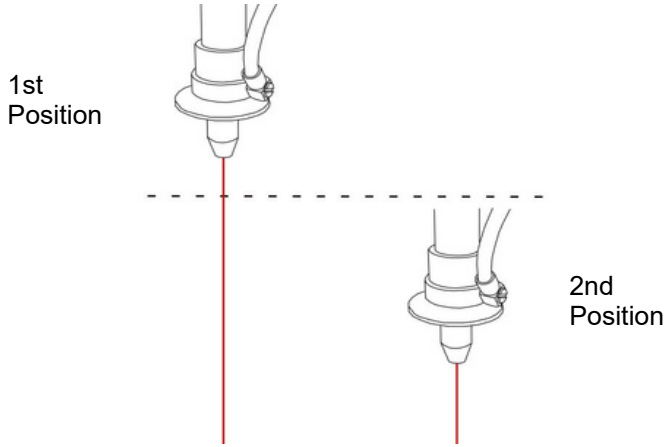


Please Note: The Focus Lens is taken off for this part as the coating can be damaged by the thermal paper.

1. **Open the Safety Lid.**
2. **Remove Focus Lens.** The Focus Lens is removed

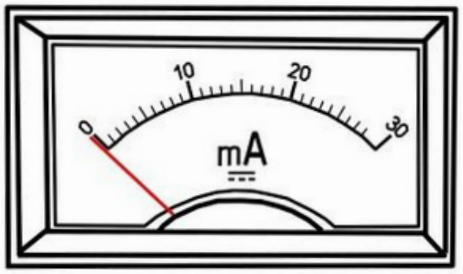


3. **Place Thermal Paper.** Take a piece of thermal paper and place it firmly over the **Focus Len Mount** tocreateareference ring.
4. **Close Safety Lid.**



5. **Position Laser Head to 1st Position.** Manually adjust the laser head assembly so that the z- belt is as high as it goes.
.
6. **Close Safety Lid.**
7. **Fire the Laser.** PresstheFireLasericon to see a burn mark on the thermal paper.
8. **Adjust Mirror #3:** Makeincrementaladjustments to the adjustment screws of **Mirror #3** tomovetheburnmarkoverthecenter of the **Focus Len Mount.**
9. **Open the Safety Lid.**
10. **Position Laser Head to 2nd Position.** Manually adjust the laser head assembly so that the z- belt is as low as it goes.
.
11. **Close Safety Lid.**
12. **Fire the Laser.** Press the Fire Laser icon to see a burn mark on the thermal paper.
13. **Adjust Mirror #3:** Make incremental adjustments to the adjustment screws of **Mirror #3** tomovetheburn mark over the center of the **Focus Len Mount.**

Adjusting the Beam Attenuation:



When a laser tube is installed the amps released by the machine needs to be adjusted. The laser machines comes with attenuator gauges for adjusting the amount of Amps released. A large number of Pro machines come with this beam attenuator dial and milliamp gauge to make the adjust easier. If your machine does not have the beam attenuator dial then the power supply needs to be replaced with one set to the appropriate voltage.

1. Turn on the machine. In order to adjust the milliAmps of the machine the machine must be on.

2. Check the milliamps. The Amps displayed will depend on the laser tube installed on the machine.

3. Adjust the Amps. The Amps your machine is set to correspond to the Laser Tube installed. The following chart list the Amps needed for each laser tube.

Amp Settings For Laser Tubes	
45 W	18 mA
90 W	24 mA
120 W	26 mA
150 W	28 mA

Troubleshooting:

Q: What should I do if my laser isn't marking?

A: Adjust the laser is in its focal height. If the machine is off by even a few millimeters, it won't engrave. The laser head should be refocused after changing materials.

Still having difficulties? Make sure that your material is compatible with your laser engraver. Material containing carbon components should not be cut in this machine. For a list of material compatible with our laser machine, click on the link ~~here~~.

Q: Why are my marks turning out incorrect?

A: Experiment with different settings to find the ones that work best for you. Here are some initial guidelines to get started:

- To get darker/lighter engravings, adjust the power or speed.
- To get deeper engravings, decrease the speed or increase passes.
- For clearer engravings, use a picture with a high resolution.

Q: What should I do if my engravings are too shallow?

A: You may need to increase the power and/or decrease the speed. Multiple passes can also add more depth. For precise engravings, ensure that the laser is fully focused. You can also use a smaller lens to engrave in more detail.

For a more detailed explanation on how to adjust the settings on your CO2 laser, please refer to the material settings article linked ~~here~~.

Q: What should I do if my engravings look wobbly and uneven?

A: Ensure your material is flat while engraving, it may need to be flatten and/or weigh down your material before engraving.

If the problem persists, it may be a belt or gantry issue.

Q: How can I solve issues with focusing my laser?

A: The Pro will automatically focus to your material by touching the material and moving to the programmed focus height. If your machine does not move to the height try autofocusing manually using the autofocus button.

Is it still not focusing correctly, then the machine can still be focused manually using the provided focusing billet.

If your machine's laser head assembly moves irregularly, check belts. The belt may need to be replaced.

Q: I changed my focus lens and now it's not engraving like I want.

A: When changing your focus lens you also have to change your air assist cone. Since different focus lenses have different focal heights, an air assist cone is made to work only with one lens.

Is your issue not listed here? Visit our Help Center and look at our comprehensive guides, videos, and other helpful resources.

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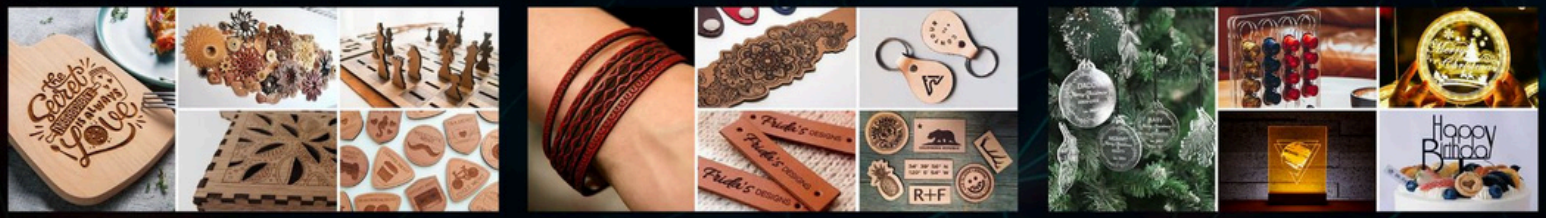

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