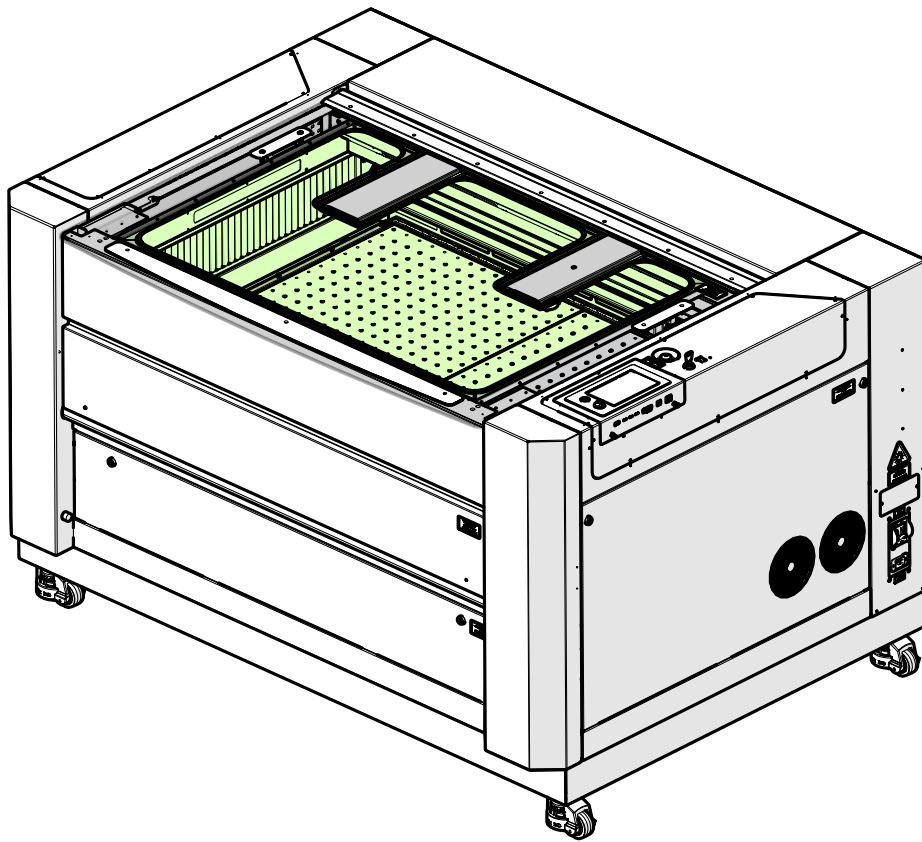


CO2 Laser Alignment Fusion Pro 32 & 48



Parts Required

- CS0935 - Holder, Target, Alignment

Tools/Materials Required

- 5/32" Allen Wrench
- 3/32" Allen Wrench
- Masking Tape
- Eyeglasses or protective eyewear

CO2 Laser Alignment

CO2 laser alignment should be checked periodically to ensure that the engraver is operating at optimum performance.

Complete this procedure if any of the following behaviors are observed:

- Laser power appears weak in certain areas of the table, especially when moving from left to right in the engraver
- The engraver is unable to effectively cut through materials at or around the recommended settings.
- Optics in the lens assembly fail prematurely.
- If the engraver has been moved to a new location.

Or if any of these components have been replaced:

- Laser tube
- Mirror #1, #2, or #3
- X-axis assembly
- Red dot diode

CO2 Laser Safety



The laser assembly used in the Fusion Pro CO2 engraver can cause serious and or permanent injury if safety procedures are not observed.

Do not fire the CO2 laser with any of the engraver panels removed.

Do not place any part of your body in the beam path while the laser is in operation.

Do not defeat the safety interlock system in the engraver.

It is recommended that eye protection such prescription eyeglasses, Lexan, or other polycarbonate safety glasses be worn by all those present for the duration of the laser alignment procedure.



16000 - CO2 Laser Alignment

The CO2 laser alignment consists of three (3) parts:

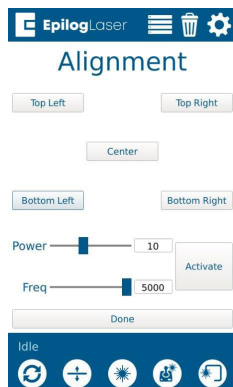
- Pre-alignment to ensure that the CO2 laser and red dot diode are coaxial.
- Cutting laser alignment.
- Perpendicular alignment

Pre-Alignment

1. Turn on the engraver, and let it complete the startup process.
2. Install the laser alignment target over the window optic on the left side of the lens carriage and place a piece of masking tape over the target:
3. Press the Gear icon on the display to enter the Settings menu:



4. Press the Alignment button to enter the Alignment Mode menu:



The Alignment Mode menu allows you to move the lens carriage to specific table position and fire the laser without the need to send a job to the engraver.

- For <120- watt lasers, press Bottom Right to move the carriage to the bottom right corner (position 4) of the engraver.
 - For 120-watt lasers, press Center to move the carriage to the center of the engraver.
5. Ensure that the laser power is set to 10% and press the Activate button once to fire the laser.
 6. Look through the top door, or open the top door if needed, and observe if the laser marked the masking tape.
 7. If the laser did not mark the tape, close the top door and press and hold the Activate button while observing the masking tape on the alignment target. As soon as you observe the laser marking the tape, let go of the Activate button.

In certain situations the CO2 laser alignment may be very poor, preventing you from getting a burn mark in position 4. If this is the case, attempt to get a burn mark in position 1.

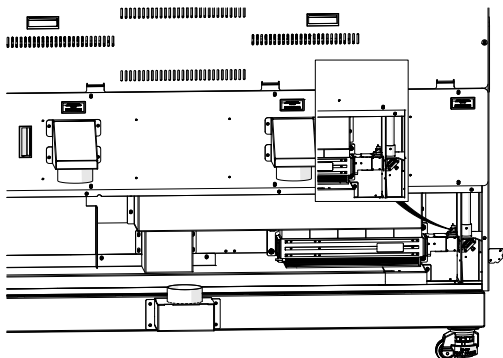
- Once a burn mark is observed on masking tape, press the Red Dot Pointer button to turn on the red dot:



- Inspect the location of the red dot in relation to the burn mark left by the laser.
- For an accurate alignment, both the red dot and burn mark should appear in the same exact location on the tape.
- If both the red dot and burn mark appear in the same exact location on the tape, move to the next section of the alignment procedure.

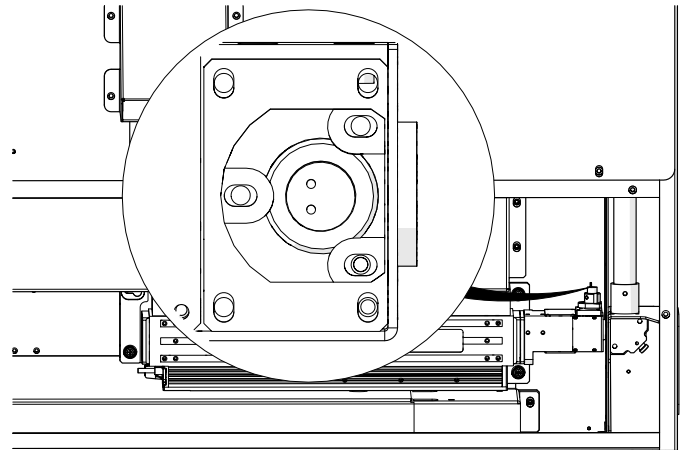
At this point in the alignment procedure, the position of the red dot and burn mark in relation to the center of the alignment target is not important.

- If both the red dot and burn mark do not appear in the same exact location on the tape, remove the lower rear panel of the engraver and locate the red dot diode to the right side of the laser tube:



Adjusting the Red Dot

- Adjust the red dot so that it is centered over the burn mark on the masking tape made by the laser using the three (3) Allen adjustment screws:



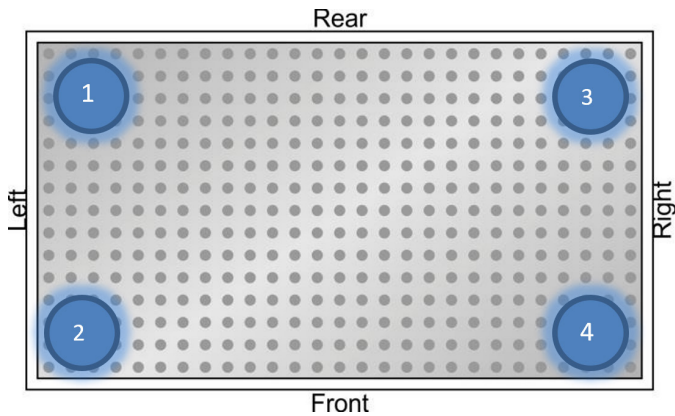
- Once the red dot and burn mark appear in the same exact spot, install the lower rear panel of the engraver and move to the Cutting Laser Alignment procedure

Cutting Laser Alignment

It is very important that the laser and the red dot are coaxial prior to beginning this process. You will not be able to properly align the laser if the red dot and the cutting laser are not coaxial.

For alignment purposes, the table of the engraver is separated into four (4) quadrants or table positions. The location of each quadrant or position is determined by the relative distance from the laser.

Table Positions

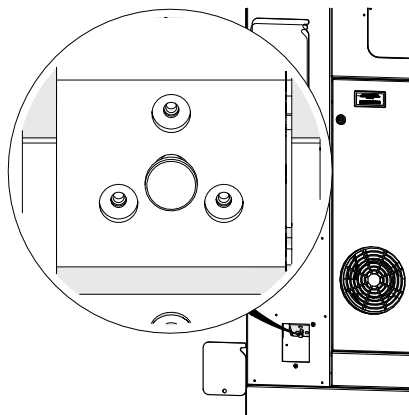


There are four (4) mirrors in the Fusion Pro CO2-only engraver, all of which may need to be adjusted while aligning the cutting laser.

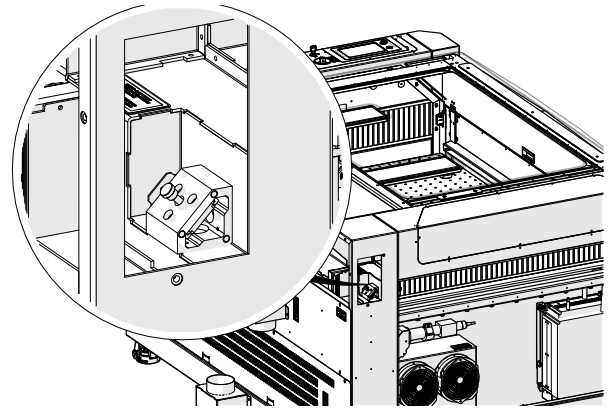
Each of the mirrors in the Fusion Pro engraver are referenced by number in this procedure and correspond to a specific table location. When adjusting a mirror, ensure that the correct one is being adjusted for that specific table location.

Mirror Locations, Numbers, and Corresponding Table Position

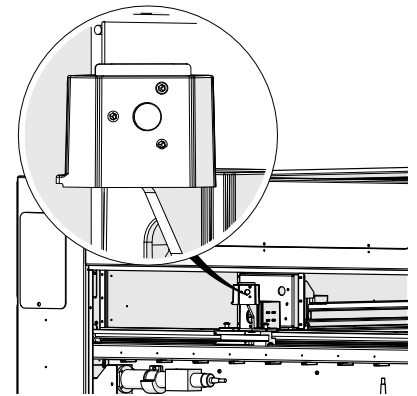
Mirror 1 / Position 1



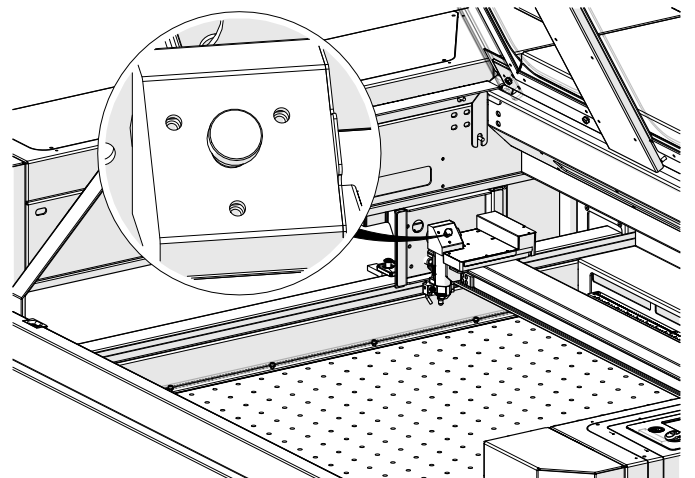
Mirror 2 / Position 4



Mirror 3 / Positions 3 & 4

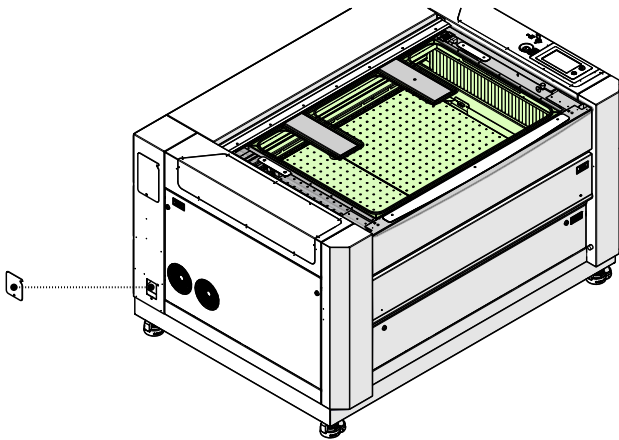


Mirror 4/Perpendicular Alignment

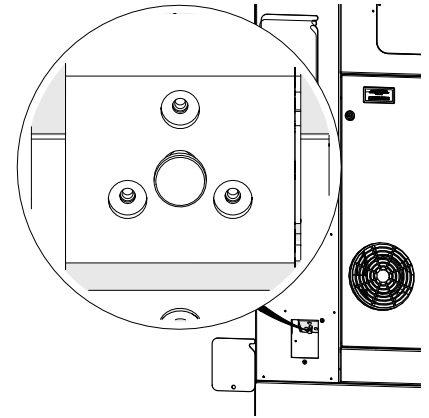


Adjusting Mirror/Position 1

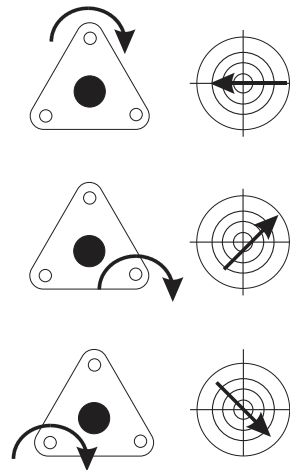
1. Place a new piece of masking tape on the alignment target.
2. Ensure that the red dot pointer is activated.
3. In Alignment Mode, press Top Left to move the lens carriage to the top left corner (position 1) of the engraver.
4. Inspect the location of the red dot in relation to the center of the alignment target. If the red dot pointer is not in the center of the alignment target, adjustments will need to be made to mirror 1.
5. Remove the lower mirror cover at the back left corner of the engraver:



6. Adjust the red dot position so it is centered on the alignment target using the three (3) Allen adjustment screws located on the back of mirror 1:



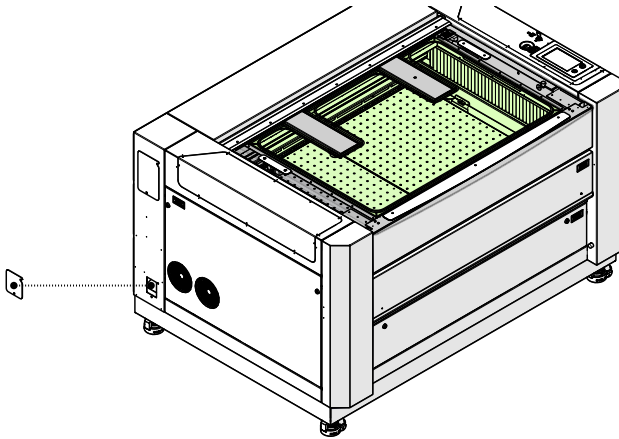
Mirror 1 Adjustment Screw Guide



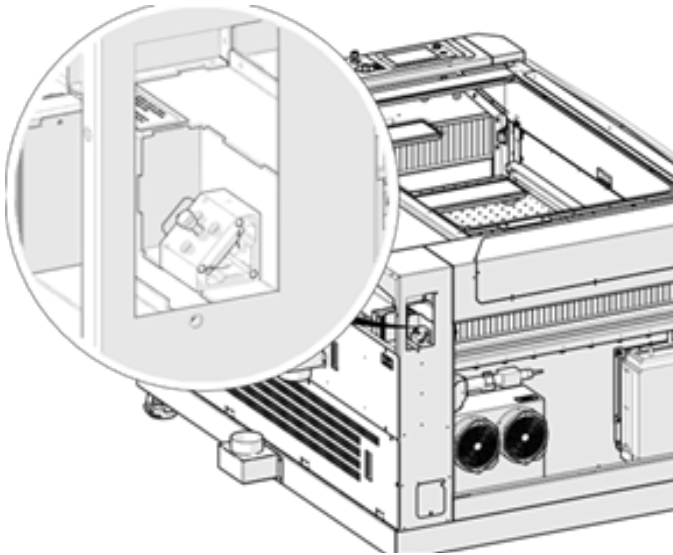
Adjusting Mirror/Position 2

1. Ensure that the red dot pointer is activated.
2. In Alignment Mode, press Bottom Left to move the lens carriage to the bottom left corner (position 2) of the engraver.
3. Inspect the location of the red dot in relation to the center of the alignment target. If the red dot pointer is not in the center of the alignment target, adjustments will need to be made to mirror 2.

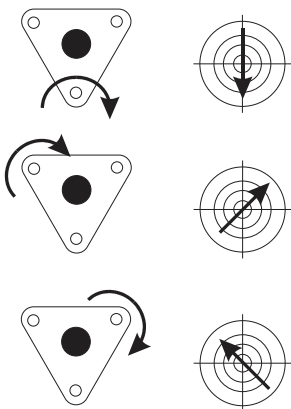
4. Remove the upper mirror cover at the back left corner of the engraver:



5. Adjust the red dot position so it is centered on the alignment target using the three (3) Allen adjustment screws located on the back of mirror 2:



Mirror 2 Adjustment Screw Guide



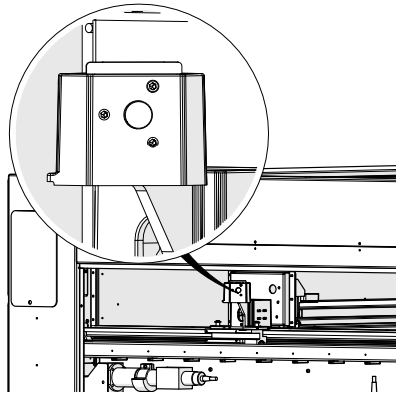
6. Once the red dot position is centered on the alignment target, move the carriage back to position 1.
7. If the red dot position is still centered on the alignment target while the lens carriage is in position 1, move to Adjusting Mirror/Position 3.
8. If the red dot position is no longer centered on the alignment target while the lens carriage is in position 1 after adjusting position 2, adjustments to mirror/position 1 will need to be made again.
9. Move between positions 1 and 2, adjusting the respective mirror for each position until the red dot is centered on the alignment target at both positions.

In some cases, this process can take several back and forth movements between positions 1 and 2. Ensure that the correct mirror is being adjusted for each position.

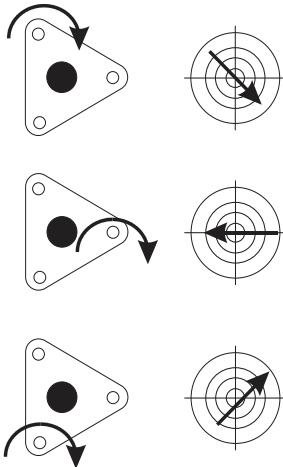
Adjusting Mirror 3/Positions 3&4

1. Ensure that the red dot pointer is activated.
2. In Alignment Mode, press Top Right to move the lens carriage to the top right corner (position 3) of the engraver.
3. Inspect the location of the red dot in relation to the center of the alignment target. If the red dot pointer is not in the center of the alignment target, adjustments will need to be made to mirror 3.

4. Remove the left panel of the engraver.
5. Adjust the red dot position so it is centered on the alignment target using the three (3) Allen adjustment screws located on the back of mirror 3:



Mirror 3 Adjustment Screw Guide



6. Once the red dot position is centered on the alignment target, move the carriage back to positions 1 and 2.
7. If the red dot position is still centered on the alignment target while the lens carriage is in positions 1 and 2, move to the Perpendicular Alignment.
8. If the red dot position is no longer centered on the alignment target while the lens carriage is in positions 1 and or 2 after making adjustments to mirror/position 3, adjustments to mirror/positions 1 or 2 will need to be made again.

9. Move between positions 1, 2, and 3, adjusting the respective mirror for each position until the red dot is centered on the alignment target at all three positions.

In some cases, this process can take several back and forth movements between positions 1, 2, and 3. Ensure that the correct mirror is being adjusted for each position.

Perpendicular Alignment

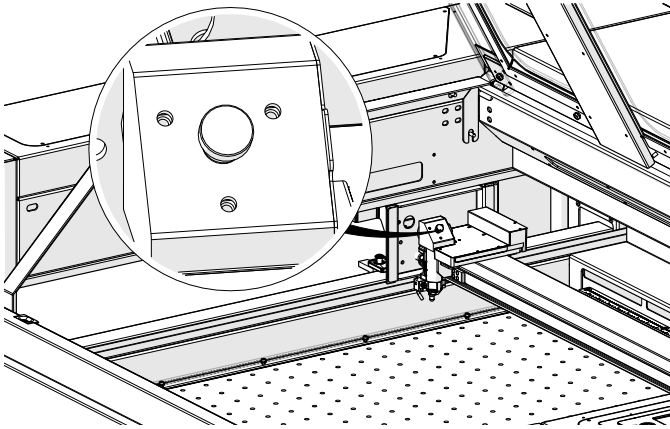
Once the mirrors have been aligned, we need to adjust for the perpendicularity of the cut. By making these adjustments, we can ensure that the vector cut is as close to 90 degrees as possible.

This is a very important step for customers who do a lot of cutting with the machines.

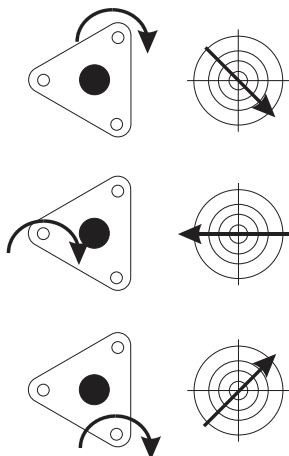
Failure to verify the perpendicular alignment can result in poor vector performance and premature failure of the optics in the lens carriage.

1. Ensure that the red dot pointer is activated.
2. Use the Focus menu to raise the table up, stopping short of depressing the autofocus plunger.
3. Remove the alignment target from the lens carriage and place it on the table, directly under the lens tube. Move the target so the red dot is centered on the alignment target. Once here, place a piece of masking tape over the target to ensure that it does not move.
4. Using the Focus menu, lower the table 3-4" (75mm - 100mm).

5. Inspect the location of the red dot in relation to the center of the alignment target. If the red dot pointer is not in the center of the alignment target, adjustments will need to be made to mirror 4:



Mirror 4 Adjustment Guide



6. Adjust the red dot location so that it is centered on the alignment target.
7. Raise the table while watching the location of the red dot. If the red dot moves off of the center of the alignment target, repeat this process, until there red dot does not change position when raising or lowering the table.

If further assistance is required, contact Epilog Laser Technical Support by phone at 303-215-9171, or by email at tech@epiloglaser.com