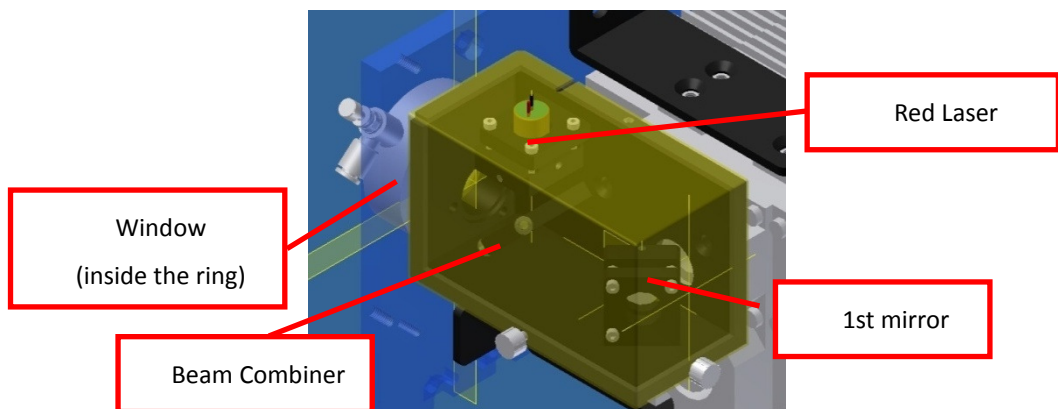
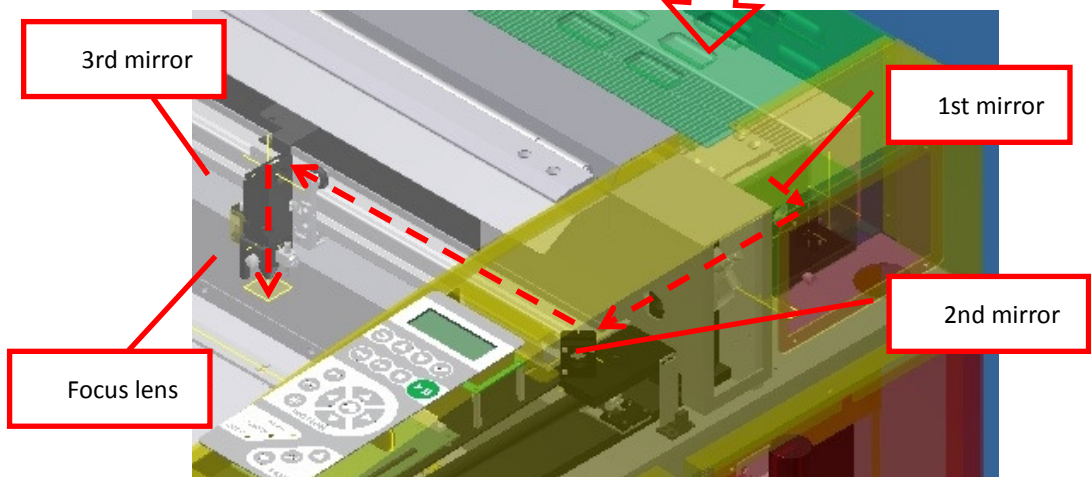
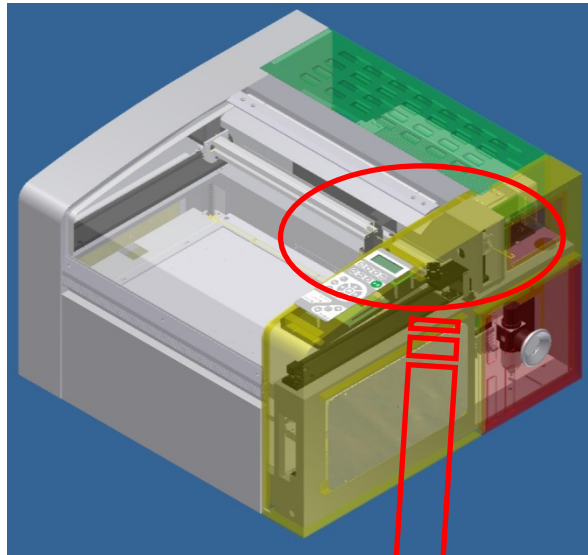




V2000 LaserAlignment

1. V2000 laser beam path and optics layout description





2. Preparation before alignment

2.1 CAUTION

This procedure requires overrule of the safety interlock system. The laser emits dangerous invisible radiation. Be extremely careful to avoid eye or skin exposure to direct or scattered radiation.

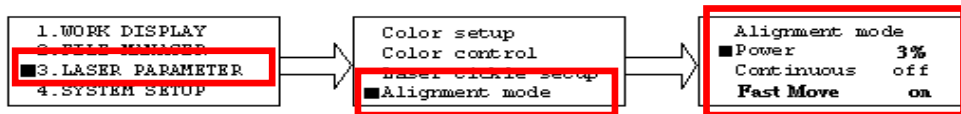
Please follow all instructions exactly. Observe all relevant safety regulations at all times.

YOU MUST WEAR APPROPRIATE LASER SAFETY GOGGLES FOR THIS PROCEDURE.

2.2 Tools required

- Laser safety goggles(The material of goggles can be glass or acrylic)
- Thermal print fax paper (the greasy kind that turns gray if you scratch it)
- Double sided tape (low tack, i.e. can be easily removed)
- Allen wrenches

2.3 Panel operation description






■ Alignment Mode

This function is used for alignment of laser. It is recommended **NOT** use this function unless instructed to by a LTT technician.

- **Power**

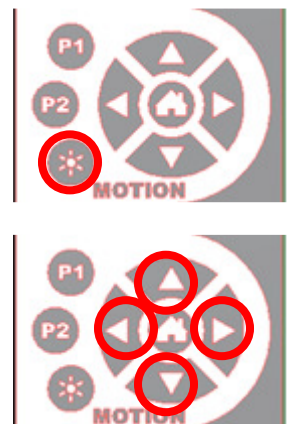
Indicates the power for laser tickle. Its range is between 0~100%.

- **Continuous**

If this function is on and press  the laser will emit continuously until pressing  again. If this function is off, the laser emits only when you keep pressing .

- **Fast move**

If this function is on, you can move the carriage faster to nine position of working table by using motion control keys.



2.4 Interlock Bypass

The laser beam will not emit if the top lid is opened.

To do the alignment, you can bypass the interlock by two pieces of magnets.

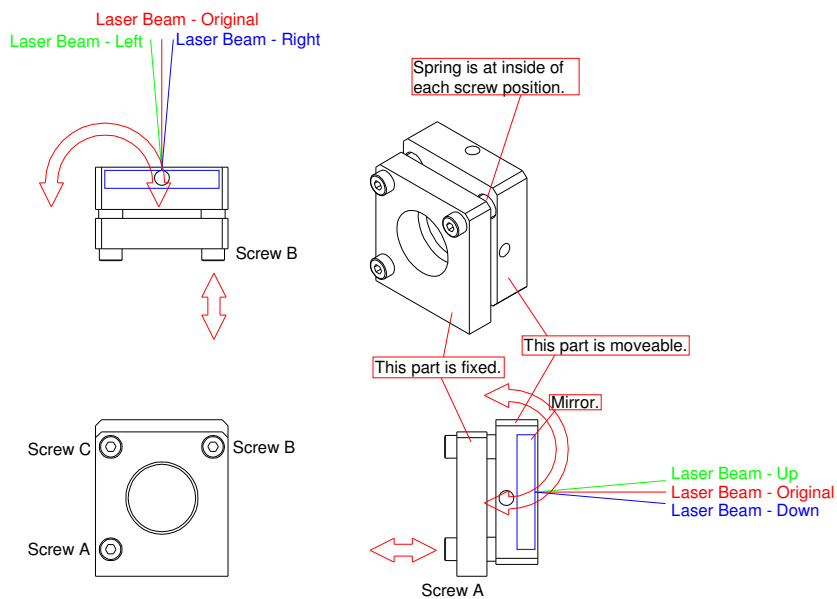
The machine will become a class 4 laser device. For your safe, please wear protective goggles all the time.



3. Alignment Key Skills

Due to the CO2 laser is invisible light, so we have to use tools to check the position of laser beam. We use the thermal print fax paper and double sided tape to stick the paper on the mirror holders around the reflection mirrors. And let the machine give a lower power ratio laser beam, the paper will turns into black after receives heat energy, so we will get a little black spot which tells the position of laser beam. So we can confirm the position of laser beam and adjust it.

3.1 The relations of mirror adjustment and beam direction





The mirror module consists of two aluminum blocks, one is a fixed part and the other one is a moveable part. And they are mounted together by three hex screws and three springs.

When you adjust a mirror, you just turn screw A or screw B each time. Generally we leave screw C still. It will be easy to change the laser beam position.

When you only turn screw A clockwise, the screw will shorten the distance between the fixed part and the moveable part. It will let the reflective laser beam go down. You can take a reference of the down-right part of the above picture.

You can imagine there is a virtual axis through screw B and screw C. When you turn screw A, the moveable part will rotate around this virtual axis or down.

So the same thinking on turning screw B.

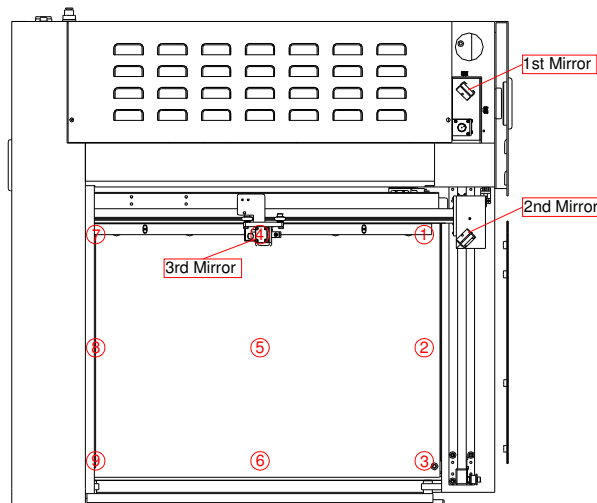
Turn clockwise screw A will get a laser beam down.

Turn counterclockwise screw A will get a laser beam up.

Turn clockwise screw B will get a laser beam right.

Turn counterclockwise screw B will get a laser beam left.

3.2 Alignment Operation



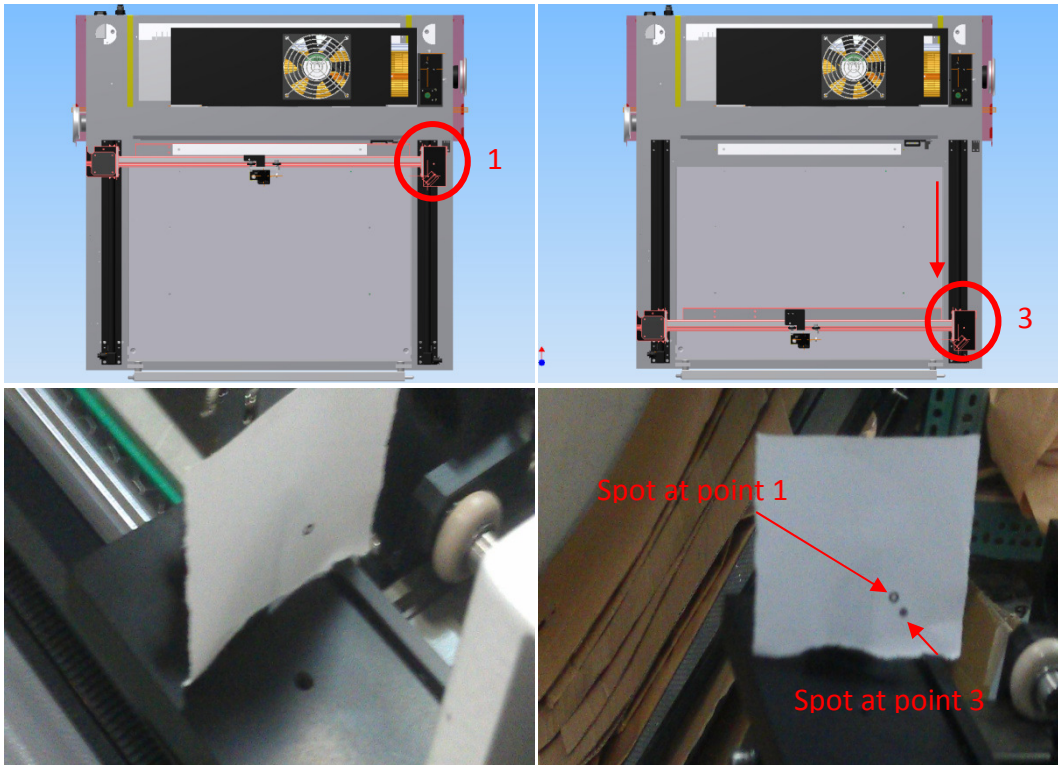
To do the alignment, we move the next mirror closer and trigger the laser to get a spot on thermal paper, then move the mirror to a farther position and trigger again to get the second spot. Then adjust the mirror and trigger again, until the spot is as close as possible to the first spot.



4. Alignment Process

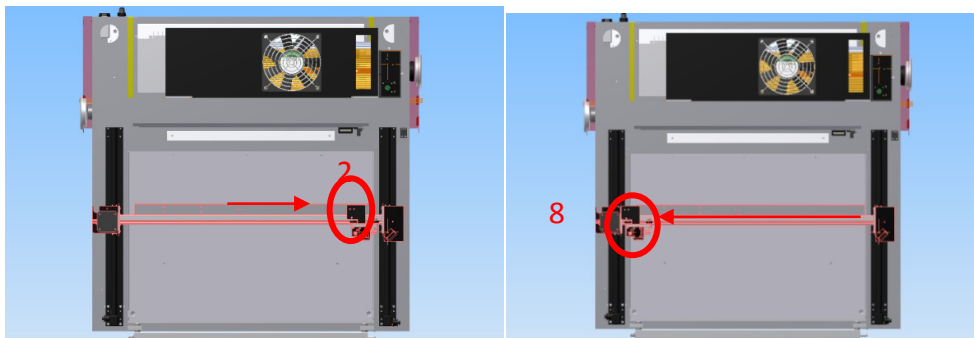
4.1 First Mirror Alignment

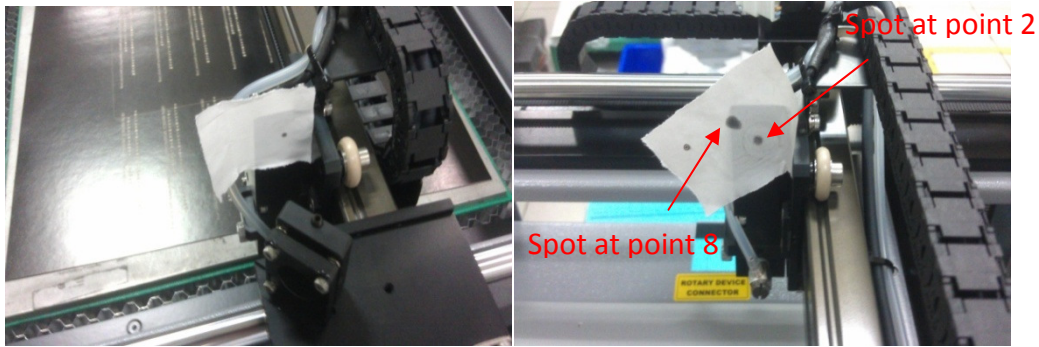
To do alignment from 1st mirror to 2nd mirror. Trig a small power of laser on the 2nd mirror at position ①. And then move carriage to position③ and trig laser again. To align these two position of laser spots at the same position of mirror. Your goat is to adjust 1st mirror and let the laser spot at position ③ as close as possible to position ①.



4.2 Second Mirror Alignment

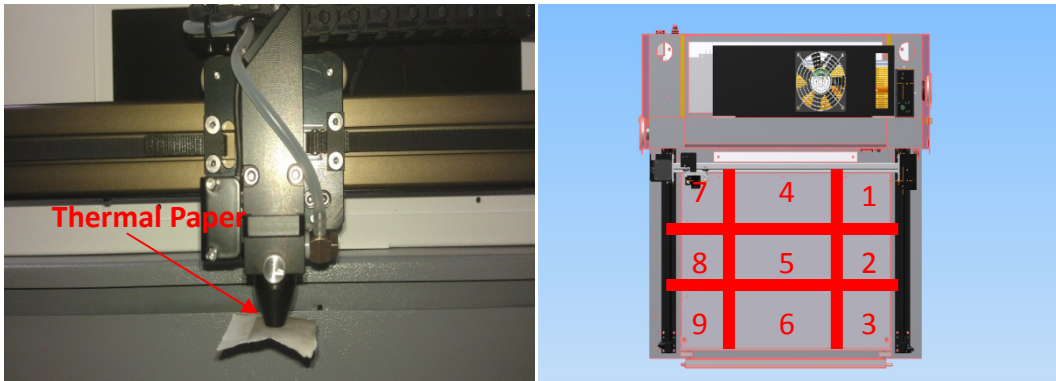
To do alignment from 2nd mirror to 3rd mirror. Trig a small power of laser on the 3rd mirror at position ②. And then move carriage to position⑧ and trig laser again. To align these two position of laser spots at the same position of mirror. Your goat is to adjust 2ndmirror and let the laser spot at position ⑧ as close as possible to position ②.





4.3 Final Mirror Confirm

The final mirror is not adjustable part, to confirm the alignment, please stick the thermal paper under the nozzle as following picture and trig laser in nine points. The spot should be as close as possible the central on the nozzle, if not, please go to 1st mirror and do the alignment again till the spot is near the central.



4.4 Red Laser Adjustment

The red laser is a visual aids part. After laser beam alignment, you can adjust the red laser. Don't adjust any mirror again during adjust the red laser. You can adjust the screws on the red laser holder and let the red light spot match the thermal black spot on 3rd mirror.