

# **MGentleLASE** *Laser Rail Alignment Procedure*



**LASER RAIL ALIGNMENT Procedure****CAUTION !!**

During this procedure it is possible that the laser may fire, emitting laser radiation. Therefore **SAFETY EYEWEAR** must be worn. The eyewear must have an optical density of at least 5.8 at 745 - 765 nm.

The high voltages present in this system are **LETHAL**. This procedure must be performed only by those technicians who are familiar with the precautions required when working with high voltage systems, and those who have been trained on the MGL system and its particular hazards.

**WARNING!!!!**

**BEFORE WORKING NEAR THE HEAD, ALWAYS DUMP THE VOLTAGE BY SELECTING CHRG DISABLE FROM THE TOGGLE SCREEN, PULSING ONCE, THEN ENTERING STANDBY. THERE WILL STILL BE ABOUT 150 V ON THE FLASHLAMP CATHODE, SO THIS SHOULD BE DISCHARGED WITH THE DISCHARGE STICK. ALWAYS MEASURE THE VOLTAGE AT THE FLASHLAMP CATHODE BEFORE WORKING ON THE LASER RAIL.**

**NOTE: If the OPHIR NOVA display is used, be sure the wavelength is set to YAG or <800, depending on the meter head being used.**

1. Remove fiber/delivery system if installed.
2. Install the energy meter bracket, P/N 7122-00-3370, under the front bezel and install the energy meter onto the bracket.
3. Put on eyewear, go to maintenance mode and on the HV control screen enter READY.
4. Adjust the voltage for 6.5 – 7.1 J on head detector. Attach black electrical tape to the alignment plug tool, P/N 7712-00-3363, and imprint the plug's cross hair onto the tape with a fine ball point pen. Install the plug into the receptacle facing the shutter so the cross hair is oriented vertically and horizontally. Put a bag in front of the plug and pulse the laser in order to make a burn on the tape. If the cross hair mark gets burned off, re-mark it with a fine pencil or pen.
5. Measure the centering of the burn with respect to the cross hair. Record it below. It must be 0.5 mm or less vertically and horizontally. Be sure to divide by 2 if you measure the beam centering by measuring the difference between the distance from each beam edge to the cross hair. For example, if the top edge of the beam is 2.0 mm from the cross hair and the bottom edge of the beam is 2.5 mm from the cross hair, then the difference is 0.5 mm and the beam is off center vertically by half this, or 0.25 mm.

Vertical de-centering = \_\_\_\_\_ mm ( $\leq 0.5$  mm)

Horizontal de-centering = \_\_\_\_\_ mm ( $\leq 0.5$  mm)

6. Adjust the voltage until energy is just measured with the energy meter set at its lowest range (about 1-2 Joules). Record this voltage. Go into STANDBY and remove the energy meter.
7. Use the following procedure to verify the alignment of the receptacle using the alignment tool P/N 7122-00-3362 and to perform an alignment if necessary. Most alignment tools are slightly decentered, so this procedure also reduces the error caused by this decenter to a negligible value.
  - 7.1 Put a distinguishable mark onto the back of the alignment tool: Apply red or black “Sharpie” to the proximal end of the fiber on the alignment tool. Insert the tool into the receptacle with the mark facing up and pulse **ONCE**.
  - 7.2 Remove the tool and inspect the tool with an eye loupe or a magnifier, keeping the mark on the tool in the up position. The ink from the “Sharpie” will be gone where the beam hit.
  - 7.3 Draw a sketch of the beam location.
  - 7.3 Rotate the connector so the mark is facing down and repeat Steps 6.1 to 6.3. Be sure to look at the end of the fiber with the mark **down** this time. Sketch this beam location.
  - 7.4 If the location of the burn has changed from the previous step, then the tool has a decenter error. The actual beam location is the middle of the two beam locations. At the actual beam location, if the thickest “Sharpie” band is more than twice the thinnest band, then the receptacle must be aligned or replaced. To align:
    - Loosen the two inner (in the slotted holes) 4-40 socket head screws securing the lens housing assembly to the fiber receptacle block  $\frac{3}{4}$  turn each. Slightly adjust one of the two set screws, located on the top (vertical axis) and left (horizontal axis) side of the fiber receptacle block (do not touch the ball plunger screw on the right side of the block). Adjust the set screw in the desired direction (ex: if burn spot is off to the left on the tool, adjust the lens housing towards the right (looking at the beam input side of the fiber receptacle)).
    - Perform the “Sharpie” burn and re-adjust until alignment is acceptable.
    - Tighten the two 4-40 screws evenly and repeat the two “Sharpie” burns to make sure nothing has shifted.
8. Clean the fiber alignment tool’s tip with a cotton applicator and solvent when finished and replace caps to both ends of the tool.
9. Press Charge enabled so it is not highlighted on the HV Ctrl screen and pulse once to discharge the caps. Go to STANDBY.
10. Install the laser rail dust cover.