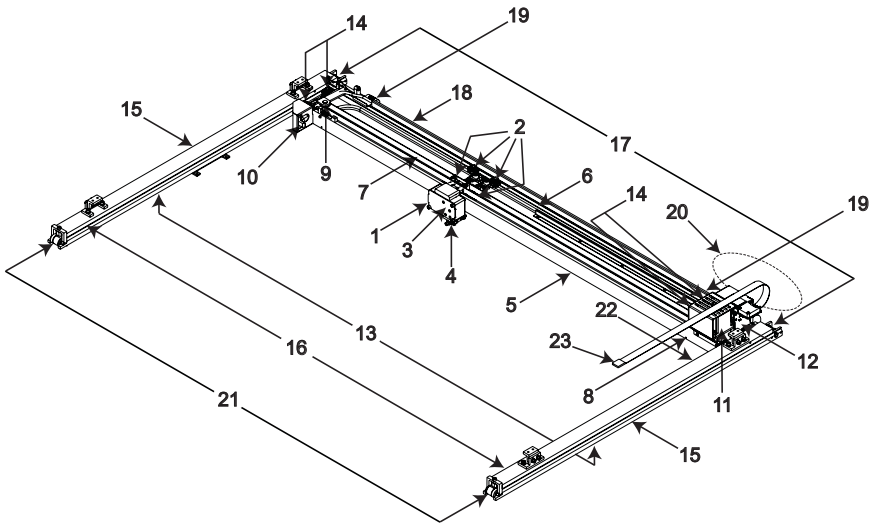
Industrial Laser System ILS9.150D and ILS12.150D

Keeping the laser system clean will ensure the highest quality engraving. A clean laser system is the best performing laser system. The frequency of cleaning will depend on the type of material being engraved, your exhaust system, the operating environment and the amount of laser system usage over a given period of time.

Dirt or debris build-up on the motion system components will cause uneven or rough engraving, or loss of engraving position, as well as component failure. Smoke or dirt build-up can cause damage to the optics, result in loss of laser power or result in premature failure of these components. Always turn the laser engraving system OFF and unplug it before performing any cleaning procedures.

Motion System Components Diagram



Note: X-Axis Rail Cover has been removed for visibility.

1. Focus carriage
2. X-Axis bearing (4)
3. #3 mirror (inside cover plate)
4. Focus lens (inside cover plate)
5. X-Axis rail (arm)
6. X-Axis bearing track (2)
7. X-Axis belt
8. X-Axis sensor magnet
9. X-Axis idler pulley
10. #2 mirror and holder
11. X-Axis motor and drive gear
12. Y home sensor board
13. Y-Axis belt (2)
14. Y-Axis bearing (4) (2 on right side Y-Axis rail, 2 on left side Y-Axis rail)
15. Y-Axis rail (2)(one right side and one left side)
16. Y-Axis rail bearing track (2) (one on right side, one on left side)
17. Y-Axis drive gear (2) (one on right side, one on left side)
18. Y-Axis shaft (2) (one on right side, one on left side)
19. Y-Axis shaft flex coupler (one on right side, one on left side)
20. Y-Axis motor (not shown)
21. Y-Axis idler pulley (2) (one on right side, one on left side)
22. Y-Axis sensor magnet
23. Flex cable

Cleaning and Maintenance Supplies

- Mild soap solution mixture of 1 tablespoon (14.78 ml) liquid soap and 1 quart (liter) of water in a spray bottle
- Window cleaner
- Paper towels
- Cotton cloth
- Denatured alcohol (do not use on any painted surface, plastic or the Top Window)
- Acetone (can be used on the engraving table, but nowhere else)

> ***CAUTION:*** When using acetone or denatured alcohol, please follow the instructions on the printed label of these materials for safe handling procedures.

- Cotton swabs (supplied)
- Lens cleaner (supplied)
- Vacuum cleaner
- Set of Allen wrenches sized from 0.050 to 3/16 inch

System Cleaning and Maintenance

Motion System

- Turn off and unplug the laser system.
- Open the top door and thoroughly remove all loose dirt and debris from inside the laser system with a vacuum cleaner.
- Clean the engraving table surface with either a soap solution, or alcohol or acetone, and paper towels. Never pour or spray any solution directly into the laser system. Always dampen your paper towel or cloth outside of the laser system with the cleaning solution and then wipe down the parts you are cleaning with the dampened cloth.
- Clean both X-rails and both Y-rails by using either the cotton swabs or paper towels and soap solution. Pay close attention to the bearing tracks since any debris left to build up in these bearing tracks will cause the bearings to wear and the engraving quality to become rough.

- After the rails and tracks are cleaned, use a clean swab or paper towel and soap solution to clean all of the bearings on the laser system by holding the swab against each bearing and moving the motion system by hand to roll the bearings against the swab. There are eight bearings in the system: four on the focus carriage, two on the left side of the X-rail and two on the right side of the X-rail.

The Main Enclosure

- Clean the top window with a cotton cloth or paper towel and window cleaner. The top window is made out of glass; therefore, **do not** use abrasive cleaning cloths because they will scratch the glass. Also, **do not** use abrasive chemicals as these chemicals will damage the glass. Only use cleaners compatible with glass.
- Use a soft cloth or paper towels and the soap solution to clean the enclosure. **Do not** use alcohol, acetone or any other harsh chemical, these will damage the paint.

Optics

A visual inspection of the #2 and #3 mirrors, beam window and focus lens should be performed at least once a day.

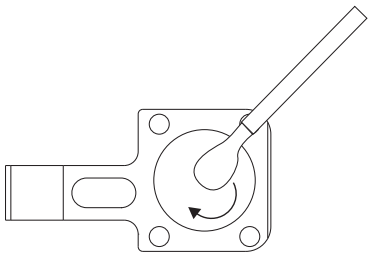
CAUTION: Do not clean an optic that is visually clean. Excessive cleaning can damage the optic. To prevent contamination, wash your hands thoroughly before cleaning any optic. Never touch any optic with your fingers.

Never clean any optic right after engraving or cutting because the optic may be hot and the cool lens cleaning solution may thermally shock the optic and crack it.

#2 Mirror

1. Locate the #2 Mirror holder (red). Grasp its protruding handle with your thumb and forefinger and slide it out. It is held in place by magnets, so you may feel a slight resistance when you begin to slide it out.

2. Inspect the #2 mirror (yellow in tint) and clean it with a cotton swab, only if there is debris present.
   a. To clean the #2 mirror, moisten a cotton swab with the lens cleaning solution supplied with the laser system.
   b. Gently roll the cotton swab across the mirror once. Do not drag the swab or roll it back and forth as this can scratch the mirror.



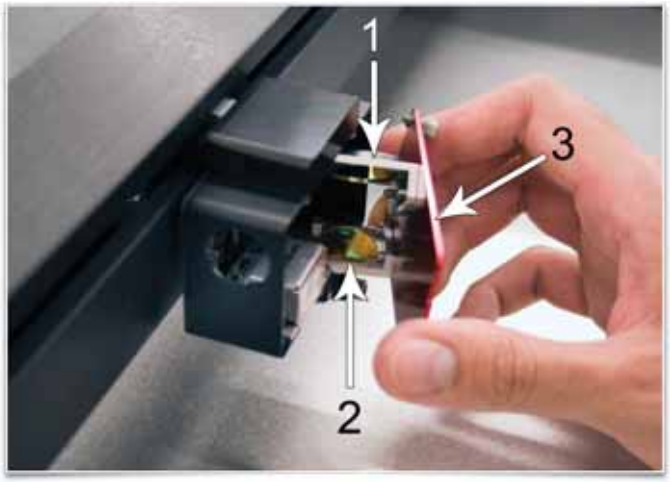
   c. If the mirror did not come clean, use a fresh cotton swab and repeat the procedure.

3. Re-insert the #2 Mirror holder by sliding it into the mounting slot until it stops.

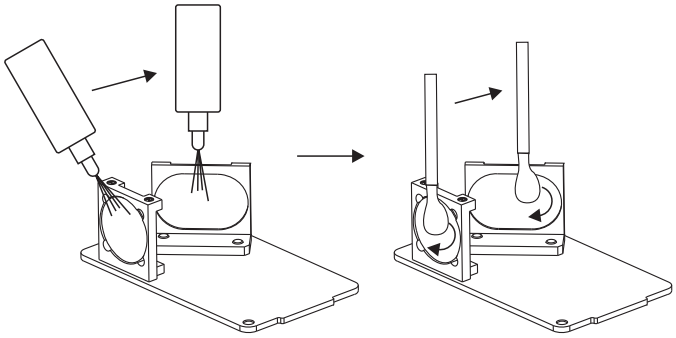
CAUTION: Installing the mirror backwards will destroy the mirror once the laser beam penetrates the backside of the mirror so be sure that you re-install the mirror correctly. Do not be concerned about small pieces of lint that come off of the cotton swab. They will be vaporized as soon as the laser hits the mirror. You can cause more damage to the mirror by trying to remove the lint than by leaving it alone.

#3 Mirror and Focus Lens

To gain access to the #3 mirror (1) and the focus lens (2), hold the front cover (3) with one hand and remove the two thumbscrews with the other hand. Pull the front cover straight out. The #3 mirror and the focus lens are both mounted to the front cover.

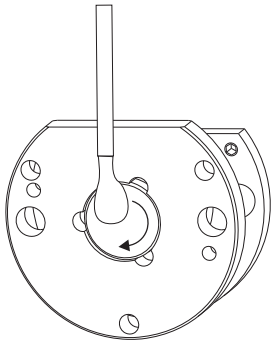


Tilt the front cover enough to enable you to apply the lens cleaning solution directly to the #3 mirror and to the focus lens. Flood the reflective surface of the #3 mirror with the solution. If heavy debris is present, let the solution soak in for a minute. Roll a fresh cotton swab across the mirror in one direction. Use a fresh swab for each pass. Be gentle when cleaning the optic to avoid scratching the surface. Repeat this procedure for the focus lens, but make sure you clean both sides of the lens.



Beam Window

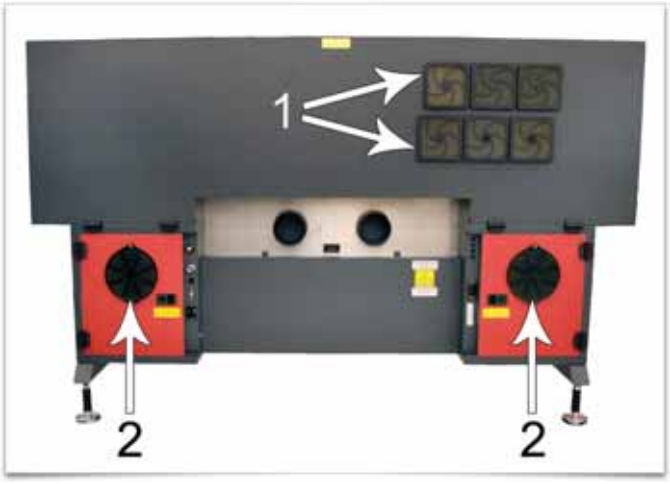
The beam window is where the laser beam enters into the engraving area. It is located in the upper left hand corner of the engraving area against the back wall and is yellow in color. It is only necessary to clean the front side of the beam window. Do not remove the optic to clean it; simply clean it in the same manner as the #2 mirror.



Cooling Fan Filters

This air-cooled laser system will require periodic cleaning of the cooling fan filters. Since ambient air is used to cool the laser cartridge, the air must be filtered before it enters the inside of the laser system. Dirt or dust contamination may reduce the cooling fan's ability to keep the laser cartridge, as well as the CPU and power supply, from overheating. An overheated laser cartridge will lose laser power during engraving and will eventually shut down completely.

The cooling fan filters are located on the back of the laser system. To service the filters, first turn OFF and unplug the laser system. There are 6 large square filters (1) and two large circular filters (2). To remove the filter(s), simply snap off the black cover and remove the foam element. Wash the element in a soap and water solution, dry and re-install.



CAUTION: Never operate the laser system with the cooling fan filters removed. This can permanently damage the laser system. Damage to the laser system due to inadequate or improper operating environment is not covered under the ULS Warranty.

Adjustments and Lubrication

There are no periodic adjustments normally required. The bearings in the motion system will self-adjust to take up any clearances as they begin to wear. The belts are fiber reinforced and will not stretch under normal use so that periodic tension adjustment is not necessary. Optical alignment is not necessary because the laser and the #2 mirror are fixed.

All bearings in the system are sealed and do not require lubrication. Do not lubricate the tracks that the bearings ride in. The only lubrication that may be required is the screw threads for the table lifting mechanism. After some time, contaminants can adhere to the lubricant, which can cause the engraving table to bind up or sound squeaky. If this is the case, wipe off the contaminated grease with a soft cloth dampened with alcohol and apply fresh white lithium grease to the screw threads. **Never** spray any degreasing solutions directly onto the threads. Run the table up and down to work in the fresh grease. Repeat if necessary.

Maintenance Schedule

Since the maintenance requirements of the laser system are dependent on the type of material being run, the quantity of material being removed, the hours of operation and the quality of the exhaust blower, you should define your own schedule.

As a starting point, we recommend the following schedule:

As necessary
- Clean engraving table
- Clean main enclosure
- Clean top door window

Every 8 hours of engraving
- Clean X-Axis and Y-Axis bearings
- Clean X-Axis and Y-Axis rails and bearing tracks
- Clean X-Axis belt
- Check beam window, #2 mirror, #3 mirror and focus lens for debris. Clean ONLY if dirty.

Every month
- Clean cooling fan filters
- Clean and re-lubricate Z-Axis lead screws
- Check for X-Axis and Y-Axis belt wear. Replace as necessary.
- Check and/or clean X-Axis and Y-Axis drive gears
- Check for X-Axis and Y-Axis bearing wear. Replace as necessary.
- Inspect system for loose screws and mechanical parts. Tighten if necessary.

Note: If you are noticing a considerable build-up of debris on the optics and the motion system, clean the system at more frequent intervals. If your system has remained relatively clean, you can extend your cleaning intervals. Keep in mind that a clean laser system is a better performing laser system and can extend the life of the parts as well as reduce down time. If you have any questions about maintaining the laser system, please contact our Customer Service Team.