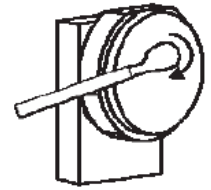


## Optics

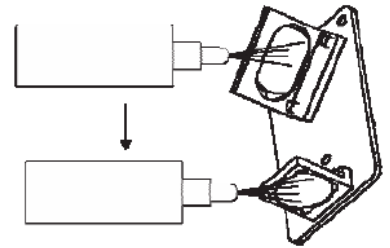
A visual inspection of the #2 and #3 mirrors, beam window and focus lens should be performed at least once a day.

**CAUTION:** Do not clean an optic that is visually clean. Excessive cleaning can damage the optical coatings. To prevent contamination, wash your hands thoroughly before handling and cleaning any optic. Try not to touch the optical surfaces with your fingers, handle optics only by the edge or optical housing. Fingerprints can damage the optical coatings. 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.



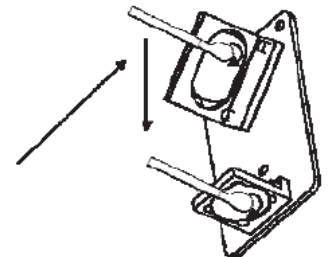
### #2 Mirror

To gain access to the #2 mirror, the mirror cover must be removed. Remove the thumbscrew and slide the cover to the right and then lift the cover straight up. Inspect the #2 mirror and clean it only if there is debris present. To clean the #2 mirror with a cotton swab, moisten the cotton swab with the lens cleaning solution supplied with the laser system. Do not use other types of cleaners or solutions. 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. If the mirror did not come clean, use a fresh cotton swab and repeat the procedure.



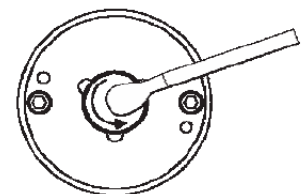
### #3 Mirror and Focus Lens

1. The #3 mirror and the focus lens are both mounted to the front cover.
2. To gain access to the #3 mirror (3) and the focus lens (4), hold the front cover (2) with one hand and remove the three thumbscrews with the other hand. Pull the front cover straight out.
3. Tilt the front cover enough to enable you to apply the lens cleaning solution directly to the #3 mirror and to the focus lens.
4. Flood the reflective surface of the #3 mirror with the solution. If heavy debris is present, let the solution soak in for a minute.
5. 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.



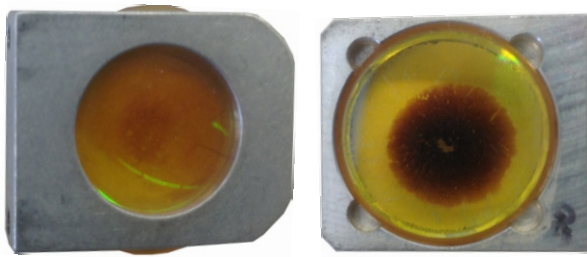
### Beam Window or Collimator

The beam window or collimator is where the laser beam enters into the processing 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.

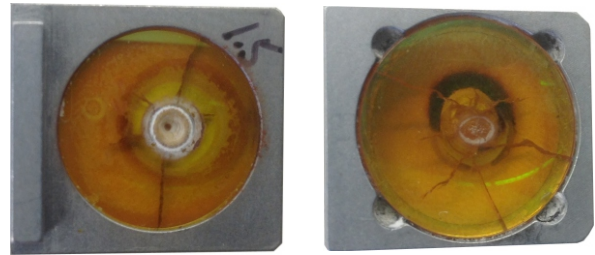


**Note:** If your system is equipped with Air Assist, you must remove the optics protection housing to gain access to the optic to clean it. Rotate the beam window cover counter-clockwise (2) and then off at a 45-degree angle (3). If the beam window cover is stuck, use a 1/16 Allen wrench to slightly loosen the screw (1) and try again. Set the cover off to the side and clean the optic, if necessary. Reinstall the beam window cover being careful not to scratch the optic.

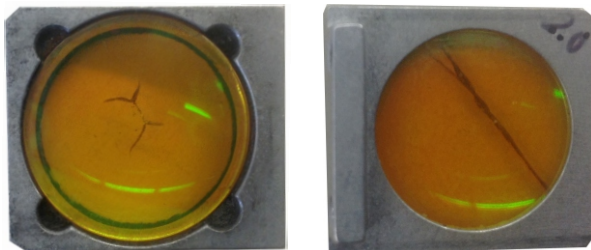
1. Damage caused by no maintenance using a material requiring Air Assist.



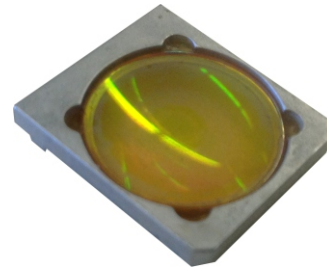
2. Damage caused by having a cone attached without a compressor or insufficient air flow. This can also be caused as #1 but with continues usage.



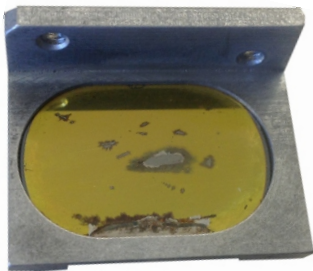
3. Damage caused by either cleaning the lens immediately after usage or use of lens immediately after cleaning.



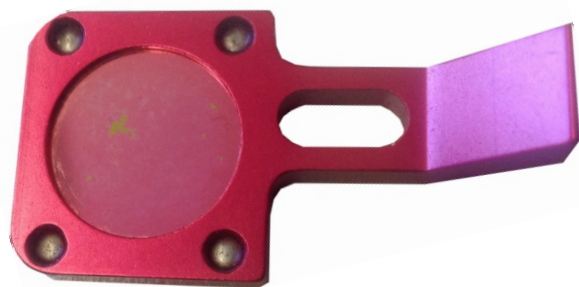
4. Slight damage as in # 1 caused by ,rubbing' off the dirt which can also cause scratches as in # 7.



5. Damage caused by ,rubbing' off dirt which can also cause scratches as in # 7.



6. Damage caused by ,rubbing' off dirt which can also cause scratches as in # 7.



7. Damage caused by ,rubbing' in dirt and not rolling the cotton tip which causes scratches.



Optics are not covered under warranty as they are classified as consumables and good maintained optics can last for many years. Proper maintenance of optics will significantly extend the life time, see Universal Laser System manual.