

# PERFECT LASER

## DREAM IT • DESIGN IT • DO IT

### Suggested Maintenance Schedule

When to clean, when to oil, how to keep your laser cutter in perfect working order.

For help, call 011 036 6062 or 021 839 5594,  
or send an email to [techsupport@perfectlaser.co.za](mailto:techsupport@perfectlaser.co.za)

**Focal lens :** This is the lens that is used to focus the laser beam on to the work area. This lens should be cleaned at least once a month - more if your laser is heavily used. (If there has been an incident of fire or large amount of smoke/fumes, then it is advised to check the lens and clean it immediately). It is not possible to clean this lens while it is mounted in the focal tube. Ensure that the lens is replaced correctly (convex side up, concave side down) in the focal tube. It will be necessary to remove the air-assist pipe before removing the focal tube. Don't forget to replace it or you will get fire!

Only use denatured alcohol or methylated spirits as the cleaning solvent. Use a lens tissue or cotton tipped swabs (earbud) to apply the solvent. Do not scrape the lens. Use a soft swirling motion when applying the solvent. Use as many swabs as needed to result in a clean lens surface. Make sure to clean the lens thoroughly, and allow to dry completely before use.

The focal lens should be replaced if it is cracked, if the coating is scratched or pitted, if the core material is darkened, if the coating is delaminating, or any other significant damage is found. Some minor blemishes are acceptable, but these marks waste power and will result in reduced laser power at the target material. Be aware that dirt, contaminate, or damage to the lens will cause the lens to become damaged faster.

**Mirror # 3 :** This mirror is located directly above the focal lens. This mirror should be cleaned at least once a month. (If there has been an incident of fire or large amount of smoke/fumes, then it is advised to check the lens and clean it immediately). It is possible to clean the mirror in the mounting bracket. Removing the mirror from its position to clean it may result in laser beam alignment being required.

Only use denatured alcohol or methylated spirits as the cleaning solvent. Use a lens tissue or cotton tipped swabs (earbud) to apply the solvent. Do not scrape the mirror. Use a soft swirling motion when applying the solvent. Use as many swabs as needed to result in a clean mirror surface. Make sure to clean the mirror thoroughly, and allow to dry completely before use.

The mirror should be replaced if it is pitted, scratched, rusted, discolored from heat damage, or any other significant damage is found. Some minor blemishes are acceptable, but these marks waste power and will result in reduced laser power at the target material. Be aware that dirt, contaminate, or damage to the mirror will cause the mirror to become damaged faster.

**Mirror # 2 :** This mirror is located directly at the end of the gantry rail, on the left of the case. Use the same directions as for mirror # 3, above.

**Mirror # 1 :** This mirror is located directly in front of the laser tube, at the left back of the case. This mirror should be cleaned at least every two months. Use the same directions as for mirror # 3, above.

**Laser lens :** This lens is located inside the output end of the laser tube. This lens should be cleaned at least every three months. Use extreme care when cleaning this lens. This lens cannot be removed from the laser tube, and if damaged, the entire tube will need replacement. Be careful - you only need to remove dust, contaminate from humidity, or smoke fumes. Do not scratch this lens.

**Linear rails :** The linear rails are the guiding rails along the left and right sides, and (supporting the laser head), across the gantry. These rails should be clean, without rust, and have a slight oily coating.

The linear rails should be given some attention about once a month. The surfaces of the metal should always have some oil on it such that it is not dry to the touch. The best way to see that you need to do some cleaning is to check the end of the rail near where the home switch is located (top left). If you see a dirt line, clean the rails with a soft cloth and denatured alcohol or methylated spirits, and apply fresh oil. Only use a light machine oil or a light spray of Q20 for the rails.

**Work Base :** If your laser machine has a Honeycomb or Blade removable work base, it should be removed and cleaned daily. Cleaning it will prevent transfer of burn residue to your material. Removing it will enable you to remove debris from material that could block fans and pipes, and could cause your work base to not be level, creating places where you get unexpected results when cutting.

**Bearings :** The bearings are under the gantry (to mount the gantry to the side rails) and under the focal head (to mount the focal head to the gantry). These bearings do not normally require maintenance, but if they do, call our tech support.

**Belts :** The rubber belts should be checked for appropriate tension at least every six months. As a rough guide, there should not be any slack, sagging, or flapping. If the belt appears to be worn on one side, check the bearing alignment or damage to the matching bearings. The method of changing the belt tension is normally a matter of tightening a screw and then applying a lock nut.

**Fans :** The fans are used to extract smoke and gasses from the cutting or engraving process. If a fan's blades get dirty, then that fan cannot move the air as quickly or efficiently. If the fan blades are dirty, clean the blades with denatured alcohol or methylated spirits, and some paper towels. Ensure that all power is off before attempting to check or clean fan blades.

**Exhaust :** The exhaust system may get contaminated by small bits of scrap material coming from the operation of the laser. These bits and pieces can cause damage to the pipes and fans, and greatly reduce the air flow. Reduced air flow means that the smell of burnt material stays in the laser machine. If you notice that the exhaust system isn't working as well as it used to, check the pipes and fan housing for bits of debris clogging the system.

**Z-Axis rods :** The Z-Axis rods are the four threaded rods that are used to move the work surface up or down on most laser machines. The Z-Axis rods are greased when assembled at the factory. Additional grease can be applied, but is not likely to be needed more than every few years.

**Z-Axis belt :** This is a larger, toothed belt used to synchronize the turning of the Z-Axis rods. The belt will be threaded around the Z-axis motor shaft and the sprockets at each of the Z-Axis rods. This belt should be checked for appropriate tension once a year.

**Z-Axis touch sensor:** If your laser machine has one, the Z-axis touch sensor is used during the auto-focus routine. There will be a probe to touch the top of the engrave/cut surface. This allows the sensor to react to the target material and then apply the right distance between the focal lens and the target material. To accurately position your focus distance, check that there is no slack/play in the mechanism.

**Coolant :** The coolant should always be clean and clear. The best coolant is de-ionized water, but distilled water can be used. Tap water should be a last resort - and then only as a temporary measure. If the coolant has developed a green tinge with slime building up on the inner walls of the laser tube and pipes, you will need to clean out the system to restore full laser power. Flush out the old water, then use fresh water with 20% bleach. Cycle the water for 30 minutes and then flush with clean pure water for 5 minutes. Replace this water with de-ionized water or distilled water. A thermometer will come in handy to monitor the temperature of the water which should not drop below 12°C or rise above 24°C.

**Humidity :** Humidity can cause the metal parts of the laser machine, as well as the laser mirrors to rust. Control the humidity level in the laser work area.

**Maintenance schedule :** The easiest way to follow a regular cleaning schedule is to use a calendar to remind you to do scheduled maintenance. Neglecting the maintenance of your laser could result in the laser not working properly - or not at all.