



Fiber Laser Most asked questions about
FAQ Fiber Laser Cutting Systems
answered

About Lasers

What is a Laser?

"LASER" is actually an acronym for light amplification by stimulated emission of radiation.

How does a Laser-cutter work?

Industrial laser cutting concentrates high amounts of energy into a small, well-defined spot. The resulting heat energy created by the laser vaporizes materials in this small-defined area and a gas such as oxygen, nitrogen, or compressed air is used to blow the vaporized material out of the kerf (the width of a groove made by the laser beam). The beam's energy is applied directly where it is needed minimizing the Heat Affected Zone (HAZ) surrounding the area being cut.

What are the benefits of using Laser-cutting?

There are many reasons to choose a laser cutting machine. There is almost no limit to the cutting path of a laser—the point can move in any direction. This means that very complex designs can easily be performed without expensive tooling costs or long lead times. Small diameter holes that cannot be made with other machining processes can easily and quickly be produced with a laser. The process is non-contact allowing very fragile parts to be cut with little or no support and the part keeps its original shape from start to finish. Lasers can cut at very high speeds. Lasers do not have parts that will dull and need to be replaced or that can break easily. Lasers allow you to cut a wide range of materials and produce a high quality cut without requiring secondary processes. Fiber laser cutting is a very cost effective process with low operating and maintenance costs and maximum flexibility.

How is Fiber Laser different from CO2 Laser?

A CO2 laser needs many components to generate a beam. These include a special gas mixture (helium, carbon dioxide, and nitrogen), vacuum pump, turbine to circulate the gas, mirrors for delivery, a lot of electricity, and a cooling system to protect all these components. A typical 4kW CO2 resonator will need about 120KVA of power to operate.



A Fiber laser uses a solid state resonator (no moving parts) to generate the beam using diodes as the light source. The light energy is delivered to the head via a Fiber-optic cable eliminating the need for mirrors. Very little cooling is required and there is no maintenance required. A 4kW Fiber resonator may consume 35KVA in power at peak usage. The lower power requirements coupled with the lack of moving parts and mirrors result in substantially lower operating costs than with a CO2 laser.

How does a Fiber Laser compare to Waterjet?

Waterjet is an abrasive cutting process. Fine garnet (sand) is delivered to the head via a high-pressure water stream. The head “focuses” the stream to about 0.10” in diameter for maximum cutting effect. The garnet erodes the material being cut. The water is simply the delivery medium for the abrasive garnet. The advantage of waterjet technology is that it can cut virtually anything from food products to stone and metal. Very thick slabs of material can be cut as well (i.e. 10” aluminum or thick blocks of tool steel). Waterjet cutting speeds in sheet metal, however, do not compare to that of Fiber lasers. A waterjet operating at 90,000 PSI will cut 1/4” steel at a rate of 10 to 15 IPM. A 6KW Fiber laser using nitrogen for assist gas will cut the same material at about 200 IPM.

Cutting

What materials can Fiber Laser Cut?

Fiber lasers are particularly well-suited to cutting metals. Steel, stainless steel, aluminum, copper, and brass can all be easily cut with this technology. A 12KW fiber can now cut almost 60mm of mild steel.

How do I determine the Fiber Laser power for my needs?

Fiber power determines cut speed and maximum thickness. Although a 2KW fiber will cut 1/4” steel it will do so at about 80 IPM. A 6KW fiber resonator will cut the same material at 200 IPM. As with any laser purchase the buyer must reconcile projected material types and thicknesses being processed with budget limitations while considering the cost advantages of higher cutting speeds.

Maintenance

How much maintenance does a Fiber Laser need?

As with any machine tool all drive components need lubrication except for linear drives. Only the guide rails need maintenance in this situation and higher end machines will have automated lubrication systems. There are no mirrors or blowers to maintain and clean. The only consumables are the nozzle and lens protector.

Do I need certified technician to perform maintenance on a Fiber Laser?

Regular maintenance can be performed by the operator. Many machines are now being designed to require little or no maintenance. Some will even contact the factory via an internet connection when a problem is detected well before the operator is aware of it.

Return on Investment (ROI)

What cost savings can I expect when I switch to Fiber Laser?

1. Reducing Energy Costs (60 to 70% less Power Consumption than CO2)
2. Reducing Maintenance Cost (i.e. the cost of replacing the blower works out to \$2000 per year when considering a typical Fanuc 12K hour blower amortized over 6 years)
3. Eliminating optics will further reduce costs by \$2000 to \$3000 a year when factoring the cost of mirrors, replacement by a technician, and the regular cleaning intervals.
4. No LASER gas required
5. Systems Take Up Less Valuable Floor Space (More Compact)
6. Reduce Production Downtime (Quick Installation and Start Up)
7. Increases Production Speed and Output (Fastest Cutting Speeds)



Contact us for a no-obligation consultation



PARAMOUNT
MACHINERY INC.

Paramount Machinery Inc.
3535 Laird Road, Unit 3
Mississauga Ontario L5L 5Y7
<http://www.paramountmachinery.ca/>

Toll Free (866) 644-2525
Telephone (905) 569-1229
Fax: (905) 569-1962

