Link

PRECISION FIBER LASER CUTTING SYSTEM

FIRST HIGH POWER FIBER LASER PRECISION TOOL
Fiber Laser Cutting & Marking Applications

Fine cutting in many industries, especially the medical manufacturing industry, requires precision and control. Laser Photonics laser systems meet the most stringent medical device requirements.

- **Intricate cutting**
  - Medical stents
  - Microtubes, tubular material processing
  - Surgical instruments
  - High quality thin stainless steel for commercial kitchen equipment
  - Stencils & masks
  - Anodized aluminum
  - Aluminum
  - TFT screens
  - Opaque plastics
  - Different alloys
  - Coated and plated metals
  - Thick coating removal
  - Deep engraving
  - Vector and bitmap
  - Control panels
  - and much more

Detailed and complex patterns can be created easily and quickly with our fiber laser systems. Vector and bitmap images can also be imported into the software for processing.
Advantages of Fiber Laser Cutting

- Materials do not require post processing of edges
- Identical cut quality in any area of the cutting table without using sophisticated CNC controlled beam collimators
- Easy replaceable fiber cable in emergency situations utilizing the integrated fiber coupler
- The cutting of aluminum, copper, brass, and high reflective alloys is natural for fiber lasers and impossible for CO₂ lasers of comparable power
- Due to very low heat levels, industrial cutting of the intricate shapes and patterns is an every day regular job for the fiber laser
- Full control of the laser power from 1-100% makes it a true universal tool for cutting of any material thickness limited only by the maximum power
- Superior edge quality for multiple material selection, cutting accuracy and intricacy makes fiber laser cutting technology the most universal for industrial cutting applications
This system will achieve a level of quality and detail that is unprecedented in the industry for laser cutting and engraving. It can cut microtubes, surgical instruments, stencils and much more. It has a granite base and can perform effective N₂, Ar or O₂ gas-assisted cutting under pressures of up to 250 psi. Ease of installation gives the system “plug-and-play” characteristics and a quick startup time.

The Link will help quicken production time and lower manufacturing costs. Fiber laser systems reduce the cost of ownership, maintenance and dramatically improve overall production quality. A high output laser power with low energy consumption, resulting in operating cost savings and a quick return on investment. Due to its direct drive motor with integrated software control, the Link preserves a large amount of detail when cutting and engraving. The software allows Laser Photonics to import any image into the software as a prepared solution for engraving/cutting.

**Standard Features**
- High pressure gas assist N₂, Ar or O₂ gas-assisted cutting under pressures of up to 250 psi
- Latest generation Ytterbium 100 to 1,000 watt CW upgradable fiber laser (500 watt increments)
- Software controlled X-Y orthogonality
- Class 1 laser safety enclosure

**System Capabilities**
- Save valuable work & floor space, the unit has a relatively small footprint, is Ethernet ready and Plug & Play capable
- Fully software-controlled mechanical geometry alignment eliminating special requirements for installation
- No reeducation required for experienced CNC operators (G-code programming)
- Fastest cutting speed on the market for comparable systems
- Low power consumption
- No optical system alignment, no laser service necessary
- No laser service knowledge required from the operator
- Highest cutting quality available from 1064 nm lasers
- Lowest operating cost among all laser types
- Ease of installation allows for quick start-up
- No replacement parts on laser necessary
- No beam delivery system maintenance
- No alignment after optics replacement
- Software alignment on orthogonality

**Applications & Materials**
- Stents
- Surgical Instruments
- Microtubes
- Stencils
- Coated & Plated Metals
- Thick Coating Removal
- Aluminum
- Anodized Aluminum
- Deep Engraving
- Opaque Plastics
- Stainless Steel
- Alloy Metals
- Mild Steel
- Copper
- and More
The **Link** fiber laser cutting system is a completely new state of the art design combining the latest developments in motion engineering, PC based CNC control and fiber laser technologies.

It is the most advanced, compact, industrial grade, mid size, fiber laser cutting and engraving system available on the market.

Provides low maintenance system with no laser service required.

Unique ability to cut highly reflective materials such as stainless steel, aluminum, brass and copper.

Proven multi-purpose laser material processing machine with a natural ability to cut and engrave the intricate jobs with 5 – 10 watts as well as cut 1/4” steel.

Standard nozzle: 1.2mm/dia. (consumption of assist gas is 30% of standard 2mm nozzle)

### Easy to Operate

- Fiber optic beam delivery system
- Access from the front and back
- Simple operation panel
- Auto focus cutting head
- Replaceable nesting basket
- Native G-code CNC programming
- Standard CNC control

### State of the Art Product

- 100 to 1000 watt upgradeable fiber laser
- Software controlled X Y orthogonality
- High pressure gas assist N$_2$, Argon or O$_2$ gas-assisted
- Cutting under pressures of up to 250 psi.
- Class 1 laser safety enclosure
- Processes most commonly used materials for 1064 nm laser wavelength
Link PLCS Fiber Laser Cutting System

Benefits

• Highest cutting quality available from 1064 nm lasers
• Latest generation ytterbium fiber laser with up to 1000 watt CW
• Fastest cutting speed on the market for comparable systems
• No optical system alignment, no laser service necessary
• Low power consumption, no need for high power outlet
• Software alignment on orthagonality
• No laser service knowledge required from the operator
• No alignment after optics replacement
• No beam delivery system maintenance
• Lowest operating cost among all laser types
• No replacement parts on laser necessary
• Save valuable work and floor space, the unit has a small footprint, is Ethernet ready and plug-&-play capable.
• Ease of installation allows for quick start-up
• Fully software controlled mechanical geometry alignment eliminating special requirements for installation
• No re-education required for experienced CNC operators
State of the Art Fiber Lasers

- Leading the way in "green" manufacturing
- No consumables ensures less waste and eco-friendly operation
- The most advanced high power fiber laser used in Laser Photonics cutting systems
- Lowest beam divergence of any one micron laser for all power levels (large dynamic range)
- A 5x smaller output beam spot size diameter than a CO2 laser
- Lowest maintenance and operational costs among all industrial lasers
- High electro optical efficiency: only 10% power consumption compared to other laser systems
- Low cooling requirements
- Cost savings in ownership and eco-friendly
- 100 to 1,000 watt upgradeable fiber laser
- Ultra low power consumption in comparison with any other commercial lasers makes fiber lasers the laser of choice for 21st century “green” manufacturing.

Superiority of Fiber Lasers

- Identical cut quality in any area of the cutting table without using sophisticated CNC beam collimators
- Easy replaceable fiber cable in emergency situations utilizing the integrated fiber coupler
- No maintenance or service is required on the fiber laser making it ideal for 24/7/365 days a year of heavy duty industrial operation
- No laser gas, gas delivery and control equipment, gas pumps and leakage detection
- No mechanical moving parts and sophisticated optical components at all
- No resonators to maintain, check, or align
- No optical components to clean or replace
- No system realignment
- No beam delivery system purging and protection from contamination and industrial dust
- Simple operation, like changing a light bulb, affordable by any level of CNC laser machining
- Negligible cost of ownership in comparison with other laser types, where the main factor is depreciation. The laser system will last for 20 years.
- Full power control range from 1 watt to 1000 watt opens the way to cut stents and thicker materials on the same laser system, while on the other laser systems, minimal power is limited to the lasing threshold and is typical from 20% to 50% depending on laser type.
Link Features & Specifications

The *Link* fiber laser material processing system is a completely new state of the art design combining the latest developments in motion engineering, PC based CNC control and fiber laser technologies.

The *Link* employs a new generation of diode pumped single mode CW ytterbium fiber laser systems of near infrared spectral range (1060-1080nm) with a unique combination of high power, ideal beam quality, fiber delivery and high wall-plug efficiency.

These laser systems possess a reliability that is unmatched by any other kind of solid state or gas laser system. Wide selectivity of operating wavelengths, ultra-low amplitude noise, high stability and ultra-long pump diode lifetime complete an impressive list of advantages of this modern fiber laser system.

- Most compact design on the market for its application
- Low maintenance system
- No laser service required
- Small spot size, 50% smaller than conventional laser systems.
- Small kerf widths
- 5x less power consumption than the competition.
- Unique ability to cut highly reflective materials such as aluminum, brass, copper.
- A proven multi-purpose laser material processing machine with a natural ability to cut and engrave the intricate jobs with 5 – 10 watts as well as cut 1/4” steel.
- Lowest running and maintenance costs on the market.

**Electric power consumption 8.8 kW**
- Laser 3.5 kW
- Chiller 3.4 kW
- *Link PLCS* 1.9 kW

**Easy to operate:**
- Fiber optic beam delivery system
- Access from front and back
- Simple operation panel

- Native G-code programming
- High performance / cost ratio.
- Processes most commonly used materials for 1064 nm laser wavelength.
Comparable Advantages of Fiber Lasers

- Identical cut quality in any area of the cutting table without using sophisticated CNC beam collimators
- Easy replaceable fiber cable in emergency situations utilizing the integrated fiber coupler
- No maintenance or service is required on the fiber laser making it ideal for 24/7/365 days a year of heavy duty industrial operation
- No laser gas, gas delivery and control equipment, gas pumps and leakage detection
- No mechanical moving parts and sophisticated optical components at all
- No resonators to maintain, check, or align
- No optical components to clean or replace
- No system realignment
- No beam delivery system purging and protection from contamination and industrial dust
- Simple operation, like changing a light bulb, affordable by any level of CNC laser machining
- Negligible cost of ownership in comparison with other laser types, where the main factor is depreciation. The laser system will last for 20 years.
- Full power control range from 1 watt to 1000 watt opens the way to cut stents and thicker materials on the same laser system, while on the other laser systems, minimal power is limited to the lasing threshold and is typical from 20% to 50% depending on laser type.

Fiber Laser Technical Specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>Ytterbium Fiber Laser</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation Mode</td>
<td>CW or Modulated</td>
</tr>
<tr>
<td>Wave Length</td>
<td>1075 nm +/- 5</td>
</tr>
<tr>
<td>Output Power</td>
<td>100W standard, up to 1,000W optional</td>
</tr>
<tr>
<td>Beam Quality M2</td>
<td>&lt;1.15</td>
</tr>
<tr>
<td>Polarization</td>
<td>Random</td>
</tr>
<tr>
<td>Maximum Modulation Frequency kHz</td>
<td>10</td>
</tr>
<tr>
<td>Electrical requirements V</td>
<td>Dependent upon laser power</td>
</tr>
<tr>
<td>Power consumption</td>
<td>Total (kW)</td>
</tr>
<tr>
<td>Fiber Laser (kW)</td>
<td>Laser-specific</td>
</tr>
<tr>
<td>Water Chiller (kW)</td>
<td></td>
</tr>
<tr>
<td>Cutting System (kW)</td>
<td></td>
</tr>
<tr>
<td>Estimated diode life time (Hours)</td>
<td>100,000</td>
</tr>
<tr>
<td>Cooling method</td>
<td>Water (over 100 W), Air-cooled (under 100W)</td>
</tr>
<tr>
<td>Maintenance required</td>
<td>(None) Maintenance-free operation</td>
</tr>
</tbody>
</table>
Cutting Head

<table>
<thead>
<tr>
<th></th>
<th>Standard</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z-axis travel</td>
<td>2”</td>
<td></td>
</tr>
<tr>
<td>Lens selection</td>
<td>100 mm</td>
<td>73 mm, 100 mm</td>
</tr>
<tr>
<td>Auto focus</td>
<td>Ultrasonic for all materials</td>
<td>Capacitor for metals</td>
</tr>
<tr>
<td>Nozzle selection</td>
<td>1.2 mm</td>
<td>1.5 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.0 mm</td>
</tr>
<tr>
<td>Crash protection</td>
<td></td>
<td>Optional</td>
</tr>
<tr>
<td>Red aiming beam</td>
<td></td>
<td>Optional</td>
</tr>
</tbody>
</table>

Motion Systems

| Travel Method               | X/Y/Z/Θ - 4 axis direct drive servo platform on granite base with advanced velocity control and low vibration |
|                           | 4-axis CNC controlled simultaneously. Linear optical encoder with amplified sine read-head provides feedback for positioning and laser firing. |
| Control Method             | 4-axis CNC controlled simultaneously. Linear optical encoder with amplified sine read-head provides feedback for positioning and laser firing. |
| Speed to Laser Power Interpolation | X, Y, (Speed), P(Laser Power) interpolation |
| Travel Distances           | Maximum stroke (X Y) 700 x 700 mm travel stage with linear motor and limits |
| Maximum Loading Capacity   | XY payload 5 lb. XY accuracy |
| Repeatable Positioning Accuracy | ± 5 um. Linear Straightness ± 20 microns over full travel (per axis) |
| Minimal Addressable Resolution | Linear accuracy ± 1 micron per axis |
| Drive Feed Method          | Direct drive linear motor includes brushless linear motor with high performance air cooled forcer |
| Assist Gas Type Selector   | Programmable selection |
| Power Supply (only for machine) | AC, 1 phase, 120 V, 3.0 kW Max. |
| Gas Supply                 | 360 psi Max |

System Dimensions

<table>
<thead>
<tr>
<th>Dimensions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>42 in. [1067 mm.]</td>
</tr>
<tr>
<td>Width</td>
<td>65.75 in. [1670 mm.]</td>
</tr>
<tr>
<td>Height</td>
<td>69 in. [1753 mm.]</td>
</tr>
</tbody>
</table>

Additional System Options

- Autofocus System for general materials
- Special Autofocus System for metals
- DI Water Filter
- Vacuum Table
- Vision System
- Cutting Table
- Fiber Coupler
- Water Chiller
- Assist Gas
- Exhaust
Advanced Control Software

Motion generation and synchronization are centralized at the PC. Motion execution is decentralized at the drives. A3200 operates on any standard desktop or industrial PC. Servo loops are closed on the drive.

The Link utilizes the A3200 software for coupling the vision module with the motion system that coordinates the laser.

Advanced Control Software Benefits

- Higher quality output (accuracy and precision) due to fully digital drive and advanced servo algorithms
- Simplified integration as all major automation components are bundled into one platform
- Lower startup and lifecycle cost due to lower component count and reduced engineering time
- Faster startup and changeover results from fully integrated motion platform, easy to use setup tools and extensive diagnostics
- Laser Photonics uses BobCAD/CAM for writing G-code however, any software will work
- Higher throughput due to high performance control, network and high-power drives
- User interface flexibility due to local or remote processing
- Higher reliability due to fewer components
Options

<table>
<thead>
<tr>
<th><strong>Automatic Focus</strong></th>
<th>Automatic focus: capacitor or ultrasonic sensor versions available</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Remote CNC Pendant</strong></td>
<td>Remote joystick operation for manual X-Y axis adjustments</td>
</tr>
<tr>
<td><strong>Remote Terminal</strong></td>
<td>Remote control tower with touch screen monitor</td>
</tr>
<tr>
<td><strong>Diode Pointer</strong></td>
<td>Red beam for visual alignment</td>
</tr>
<tr>
<td><strong>Auxiliary Touch Screen Interface</strong></td>
<td>Extra interface for graphical CNC controls</td>
</tr>
<tr>
<td><strong>Laser Chiller</strong></td>
<td>Model dependent upon laser output power</td>
</tr>
<tr>
<td><strong>Training</strong></td>
<td>One day of training is included at the Laser Photonics facility. Additional training available at standard rate as per Terms &amp; Conditions of Sale.</td>
</tr>
<tr>
<td><strong>Commissioning</strong></td>
<td>On site commissioning and setup</td>
</tr>
<tr>
<td><strong>Lens Options</strong></td>
<td>Lenses: 2.5&quot;, 3.75&quot;, or 5&quot; available</td>
</tr>
<tr>
<td><strong>Fiber Cable</strong></td>
<td>100µM, 10M</td>
</tr>
<tr>
<td><strong>Fiber Coupler</strong></td>
<td>Enclosed fiber coupler</td>
</tr>
<tr>
<td><strong>Fiber Laser Upgrade</strong></td>
<td>Laser upgrade is available in 500 watt increments up to 1000 watts. Laser must be sent to Laser Photonics for upgrade.</td>
</tr>
<tr>
<td><strong>Shuttle Table</strong></td>
<td>Single and dual pallet shuttle tables are available for specialized material processing</td>
</tr>
</tbody>
</table>
| **Warranty** | **Standard**: One year parts and labor  
**Extended**: 10% per year of coverage of total price |
| **Delivery** | Standard delivery time is 12 - 14 weeks. All prices are FOB factory bases. Handling and transportation costs are quoted separately. |
Link Features & Specifications

Main Features

• Same quality cutting in every spot of the cutting table
• Direct drive ultra smooth motion with non contact linear motors – virtually no wear
• Standard G-code operation with standard postprocessor AutoCAD files loader
• High pressure cutting head with programmable choice of assist gas
• Autofocus for any material or capacitor sensor for metals
• Ethernet ready and plug- & play capable
• Pass through for integration into a production line
• Modular design for instant replacement of any functional part helping to minimize down time
• Down draft exhaust for environmentally safe operation
• Automatic software assist gas selection
• Cutting area equipped with a nesting table
• Slotted mild steel strip table

Cutting Head

• Water cooled focusing optics
• 70mm, 100mm, 120mm lenses.
• High pressure assists gas connection up to 250 psi.
• Lens protection cover window

Beam Delivery System

• Same quality cutting in every spot of a cutting table
• Easy replaceable fiber cable in emergency situations with integrated fiber coupler
• Modular design for instant replacement of any functional part helping to minimize down time
• No optical components to clean and replace
Link Laser Safety System

Class I Enclosure

21 CFR 1040 CDRH compliant fully enclosed system with protective viewing windows

Safety Considerations During Operation

1064 nm wavelength laser light emitted from this laser system is invisible and may be harmful to the human eye. Proper laser safety eyewear must be worn during operation.

21 CFR 1040.10 Compliance

This product is a Class 1 laser as designated by the CDRH and MEETS the full requirements for a stand-alone laser system as defined by 21 CFR 1040.10 under the Radiation Control for Health and Safety Act of 1968. As an added level of security, a redundantly switched safety interlock system helps prevent accidental exposure to excess laser radiation. Plus, the system is equipped with an electrical power manual reset, a key-locked laser power switch and a remote interlock connector. Finally, the system has audible and visible emission indicators with five (5) second emission delay settings. All these features, in combination, constitute the laser radiation safety system, which allows the equipment to be used in a safe and secure manner.
Link Options

**Automatic Focus**

Capacitor or ultrasonic sensors are available depending on material requirements

**Remote CNC Pendant**

Remote joystick operation for minor axial adjustments

**Fiber Laser Upgrade**

Laser upgrade is available in 500 watt increments up to 1000 watts. Laser must be sent to Laser Photonics for upgrade.

**Diode Pointer**

Red aiming beam for visual alignment

**Fiber Cable**

100 μM, 10M length
Link PLCS Options

**Standard Control Terminal**
Terminal with touch screen monitor

**Auxillary Touch Screen Interface**
Extra interface for other functions such as graphical CNC controls

**Laser Chiller**
Model dependent upon laser output power

**Rotary Stages & Lathes**
Lathe needed for tubular material cutting

**Shuttle Tables**
Single and dual pallet shuttle tables are available for specialized material processing
Link PLCS Options

Fiber Coupler

Enclosed fiber coupler

Training

One day of training is included at the Laser Photonics facility.

Additional training is available at standard rate as per Terms & Conditions of Sale.

Delivery & Commissioning

Standard delivery time is 12 - 14 weeks. All Prices are FOB factory bases. Handling and transportation costs are quoted separately.

Warranty

Standard: One year parts and labor
Extended: 10% per year of coverage of total price
**Motion Control & Software**

![Image](14x767 to 1238x806)

**Motion Controller**

Motion generation and synchronization are centralized at the PC. Motion execution is decentralized at the drives. It operates on any standard desktop or industrial PC. Servo loops are closed on the drive.

The software is good for coupling the vision module with the motion system that coordinates the laser.

The combination of a strong, high performance motion system with integrated vision, PLC and I/O in one unified architecture allows the development and maintenance of the system to happen faster at less cost, guaranteeing long term reliability and value.

**Advanced Software**

- Higher throughput due to high performance control, network, and high-power drives
- Higher quality output (accuracy and precision) due to fully digital drive and advanced servo algorithms
- Faster startup and changeover results from fully integrated motion platform, easy to use setup tools, and extensive diagnostics
- Lower startup and lifecycle cost due to lower component count and reduced engineering time
- Higher reliability due to fewer components
- Simplified integration as all major automation components are bundled into one platform
- User interface flexibility due to local or remote processing of cutting process
- Laser Photonics uses BobCAD/CAM for writing G-code however, any software will work
**Advanced Support**

- Worldwide support
- Remote diagnostics and upgrades
- Multilingual software
- Built-in help index
- 50,000 hours MTBF on high power laser
- Remote training
- Remote System Restore
- Remote laser diagnostics through TCP/IP protocol

**LaserNet**

- TCP/IP laser control protocol
- LaserNet interface provides fiber laser module operational control, diagnostics, and support
- Remote laser diagnostics through TCP/IP LaserNet protocol

**International Support**

Multilingual software with worldwide support

- Australia
- Brazil
- China/Hong Kong
- Mexico
- India
- Taiwan
- Singapore
- Malaysia
- Thailand
- Turkey
- Philippines
- Qatar
- Russia
- and more
Application Research Center
Laser Photonics maintains an applications lab for processing customer samples and assisting with process development. Our applications lab has the latest testing equipment to analyze all of your application needs.

For marking applications, we provide the highest quality analysis of each and every mark using our Mark Quality Assessment™ (MQA™) software. With our MQA™ software, we have the ability to guarantee and verify the accuracy and quality of our marks.

The screen shot below demonstrates how the MQA™ software reads the level of pixels in the material marked. The section in red has been analyzed with the MQA™ software. The high and low pixel values demonstrate the overall contrast of the mark.

This procedure can be applied to various marking processes and types generated by our Fiber Laser marking systems. We will prepare and research all applications within a matter of two to three weeks and provide a detailed report free of charge.
Safety Considerations During Operation
1064 nm wavelength laser light emitted from this laser system is invisible and may be harmful to the human eye. Proper laser safety eyewear must be worn during operation.

21 CFR 1040.10 Compliance
This product is a Class 1 laser as designated by the CDRH and MEETS the full requirements for a stand-alone laser system as defined by 21 CFR 1040.10 under the Radiation Control for Health and Safety Act of 1968. As an added level of security, a redundantly switched safety interlock system helps prevent accidental exposure to excess laser radiation. Plus, the system is equipped with an electrical power manual reset, a key-locked laser power switch and a remote interlock connector. Finally, the system has audible and visible emission indicators with five (5) second emission delay settings. All these features, in combination, constitute the laser radiation safety system, which allows the equipment to be used in a safe and secure manner.

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Laser Photonics, LLC is the industry leader in developing high-tech Fiber and CO₂ laser systems. Laser Photonics exclusively specializes in advanced, innovative, latest generation laser systems, processes and technologies. We focus on cutting edge fiber laser technology for material processing. We have delivered hundreds of fiber laser cutting and engraving machines to countries worldwide. Contact us to learn more about our marking, cutting and engraving systems.

400 Rinehart Road • Lake Mary, FL 32746 USA
Tel: 407.829.2613 • Toll Free: 1.888.418.2613 • Fax: 407.804.1002
www.laserphotonics.com • info@laserphotonics.com