Low Energy Consumption, High-Speed Productivity

LCG 3015 AJ

Fiber Laser Cutting System
Development Concept

The LCG 3015 AJ is the latest addition to Amada’s line of fiber laser cutting systems. The 2kW LCG AJ was developed with Amada’s proven fiber laser technology. This technology helps achieve Process Range Expansion (P.R.E.) by having the ability to process brass, copper and titanium — materials that can be difficult to process with a CO₂ laser.

The LCG AJ is a true flying optic laser system — the material remains stationary as the cutting head moves on all three axes (X, Y & Z) to process the sheet. This translates into increased productivity and accurate parts at higher cutting speeds.

The LCG AJ is built to adapt to the evolving production environment of manufacturers. The cutting head is propelled by a high-dynamic motion system that achieves the accelerations and rapid traverse speeds of more expensive linear drive motion systems.

Additionally, the LCG AJ can be fully automated with a variety of material handling options designed and manufactured by Amada.

With an innovative motion system and advanced structural design, the LCG AJ represents an optimal balance of cut speed, positioning acceleration, and overall accuracy.

Cost-Efficient Fiber Laser Technology

The LCG AJ uses approximately a third of the electricity required by the same wattage CO₂ laser system. It is also three times more efficient with the electricity it does utilize, reducing costs and providing a more environmentally-friendly laser system.

The LCG AJ does not require laser gas, mirrors, or any other items typically associated with generating a CO₂ laser beam. A single fiber optic delivery cable eliminates the need for additional external mirrors. The result is significantly less operating costs and maintenance.

Amada is the world’s first manufacturer to design its own fiber laser source. This proven system is capable of cutting materials such as copper, brass, and titanium with ease, while processing more common materials with speeds up to 4 times faster than a comparable CO₂ laser machine.

The AJ2000 on the LCG AJ is the second generation fiber engine produced by Amada. Individual laser diode banks are combined to send the laser through a single fiber directly to the cutting head. This fiber engine utilizes less modules to achieve the desired wattage, thereby increasing its efficiency and simplifying its overall design.
Enclosure & Drive System

The LCG AJ includes a full enclosure that surrounds the entire cutting area with access for part removal. This design protects the operator from gantry movement and the shorter wavelengths associated with fiber lasers. Also, the enclosure helps contain fumes for efficient dust collection and ensures a clean shop environment.

The LCG AJ utilizes a helical rack and pinion drive system for both the X and Y axes, while the Z-axis is equipped with a high-precision ball screw. This innovative drive system allows for higher acceleration and rapid traverse speeds compared to traditional rack and pinion systems. The helical design also ensures smooth and quiet motion.

Dust Collection

Sectionalized Dust Collection System

Specifically designed to handle high-speed operation, the LCG AJ is also engineered to maximize safety. The area beneath the cutting table is divided into four sections. During the cutting process, only the ducts directly beneath the cutting head are open for fume extraction. The ducts in the other sections remain closed to improve dust collection.

AMNC/PC

AMNC/PC Control – Features and Benefits

- Swivels for operator viewing
- 50% faster than previous controls
- Network-ready
- Touchscreen with intuitive graphic display
- Cutting data library
- Maintenance scheduler with email notification of alerts and jobs in progress
- Quick and easy control of feed, power, duty cycle, frequency, gas selection, and pressure control
- Compact flash drive, instead of a hard drive, improves hardware reliability in a shop environment
Beam Delivery System

The beam delivery system is a simplified design which takes the laser beam from the oscillator to the cutting head via a single fiber cable called the Process Fiber. From there Amada incorporates a simple, but effective optic system that allows for maximum beam control to the cutting lens. The result is the ability to cut materials up to 5/8" mild steel with edge quality that rivals most high-powered CO₂ lasers.

Features and Benefits of The High-Speed Cutting Head

• Increased sensing speed for faster cutting and plasma resistance in thin materials
• Lens burn detection stops the machine and alerts the operator of possible damage to the cutting lens
• Auto focus control (B-axis)
• Auto nozzle cleaning and head calibration

Quick Setup

Engineered for simplified setup, the lens and nozzle can be easily removed and installed without tools, wires or air lines. Costly downtime and extended setups are eliminated.

Turn-Key Solution

The LCG 3015 AJ is a complete, turn-key solution. All of the items necessary for installation, training, and production are included with the purchase of the machine. All components are serviced and supported by Amada’s highly-trained service personnel.

Items Included

• AMNC/PC control
• Interlocked enclosure
• NC assist gas
• B-axis NC focus
• Integrated beam purge
• 150 mm lens, 190 mm lens
• High-speed cutting head
• Active Cut
• Clean Cut™
• Dust collector
• Chiller
• Hoses
• Duct kit
• Gas lines and regulator

Advantages of Fiber Laser Technology

• Lower Operating Costs
  – No spatial cavity in oscillator
  – More efficient processing
• ExpandedCapabilities
  – 1.08 μm wavelength: Better beam absorption
  – Cuts copper, brass and titanium
• Lower Maintenance
  – No mirrors in the laser source
  – Simplified laser generation

Advantages of Amada’s Fiber Laser

• Proven Performance
  – Since 2006, the development and real-world application of Amada’s fiber lasers has resulted in proven performance and reliability
• System Integration
  – State-of-the-art AMNC/PC control with user-friendly graphical interface
  – Helical rack & pinion drive system provides higher acceleration and rapid traverse speeds

Environmental Advantages

• Energy Efficient
  – 3-4 times more energy efficient than typical CO₂ lasers
  – A smaller, more efficient chiller reduces environmental impact
• Elimination of Harmful Emissions
  – Solid-state technology does not require gas to generate the laser beam
With the dramatic increase in productivity of the LCG AJ, material handling is more important than ever to realize full machine potential. Amada offers a variety of modular automation options that let you configure your system according to your specific operational needs. All are designed to help improve productivity and increase profits by reducing lead-time and cutting costs.

**Modular Automation for an Ever-Changing Market**

**MP-F/MP-L**
- Automated load/unload for a single laser
- Utilizes area above the laser shuttle table
- Expandable to Amada’s MARS storage system for additional capacity
  • Provides fast, efficient loading/unloading in a small footprint at an economical cost
  • Single shelf, compact system

**ASLUL/ASFH**
- Automated load/unload for a single laser
- Utilizes area above the laser shuttle table
- Expandable to Amada’s MARS storage systems for additional capacity
  • Compact loading/unloading system
  • Single tower or twin towers
  • Multiple shelves support a variety of material types and thicknesses

**AMS**
- Provides maximum flexibility for multiple lasers
- Best expandability options
  • Allows modules to be configured to meet each customer’s individual layout, expansion plans and changing needs
  • Engineered to accommodate multiple towers and lasers
  • Equipped with multiple methods of ensuring precise sheet separation

In order to provide the optimal automated solution, Amada engineers and consultants are ready to evaluate your entire manufacturing process. Our experienced professionals will examine your shop’s operational space potential — giving careful consideration to any structural obstructions. Based on your shop’s layout, systems can be lengthened or expanded by adding standard modules. Overtcarts, undercarts, extensions and towers are all modular and can easily be added at any time to meet your specific needs. Amada will also prepare digital layouts that will provide an accurate representation of how the system will fit in your shop environment.
Dimensions

<table>
<thead>
<tr>
<th>Motion Package</th>
<th>Fiber Laser Resonator</th>
</tr>
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<tbody>
<tr>
<td>Travel Method</td>
<td>Model AJ2000</td>
</tr>
<tr>
<td>Control Method</td>
<td>Resonator Style LD excited Yb fiber</td>
</tr>
<tr>
<td>Drive Motors</td>
<td>CW Output Power 2kW</td>
</tr>
<tr>
<td>Max. Sheet Size (X, Y)</td>
<td>Peak Pulse Output Power 2kW</td>
</tr>
<tr>
<td>Max. Axis Travel (X, Y, Z)</td>
<td>Power Stability ± 2%</td>
</tr>
<tr>
<td>Max. Axis Positioning Speed (X, Y)</td>
<td>Laser Wave Length 1.08 µm</td>
</tr>
<tr>
<td>Max. Speed Z-Axis</td>
<td>Laser Power Mode Selection CW, gated pulse (CNC controlled)</td>
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<tr>
<td>Repeatability</td>
<td>Laser Beam Mode Output Multi-mode mode</td>
</tr>
<tr>
<td>Max. Material Weight</td>
<td>Beam Divergence &lt; 3mm-mrad</td>
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<tr>
<td>Assist Gas</td>
<td>Pulse Frequency 1 – 10000Hz</td>
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<tr>
<td>Electrical Requirements</td>
<td>Pulse Duty 0 – 100%</td>
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<tr>
<td></td>
<td>Chiller Water Requirement ≥ 41 L/min</td>
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<td>Interlocks Electrical, mechanical, and chiller</td>
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<tr>
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<td>Electrical Requirements 200V, 3-Phase, 60Hz 12kVA max.</td>
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<tr>
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<td>Electrical Power Consumption 9kW</td>
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In the interest of technological progress, we reserve the right to make any changes to technical dimensions, construction and equipment as well as illustrations. Workpiece precision and material thickness to be processed are also dependent on production conditions, material, type of workpiece and its pretreatment.