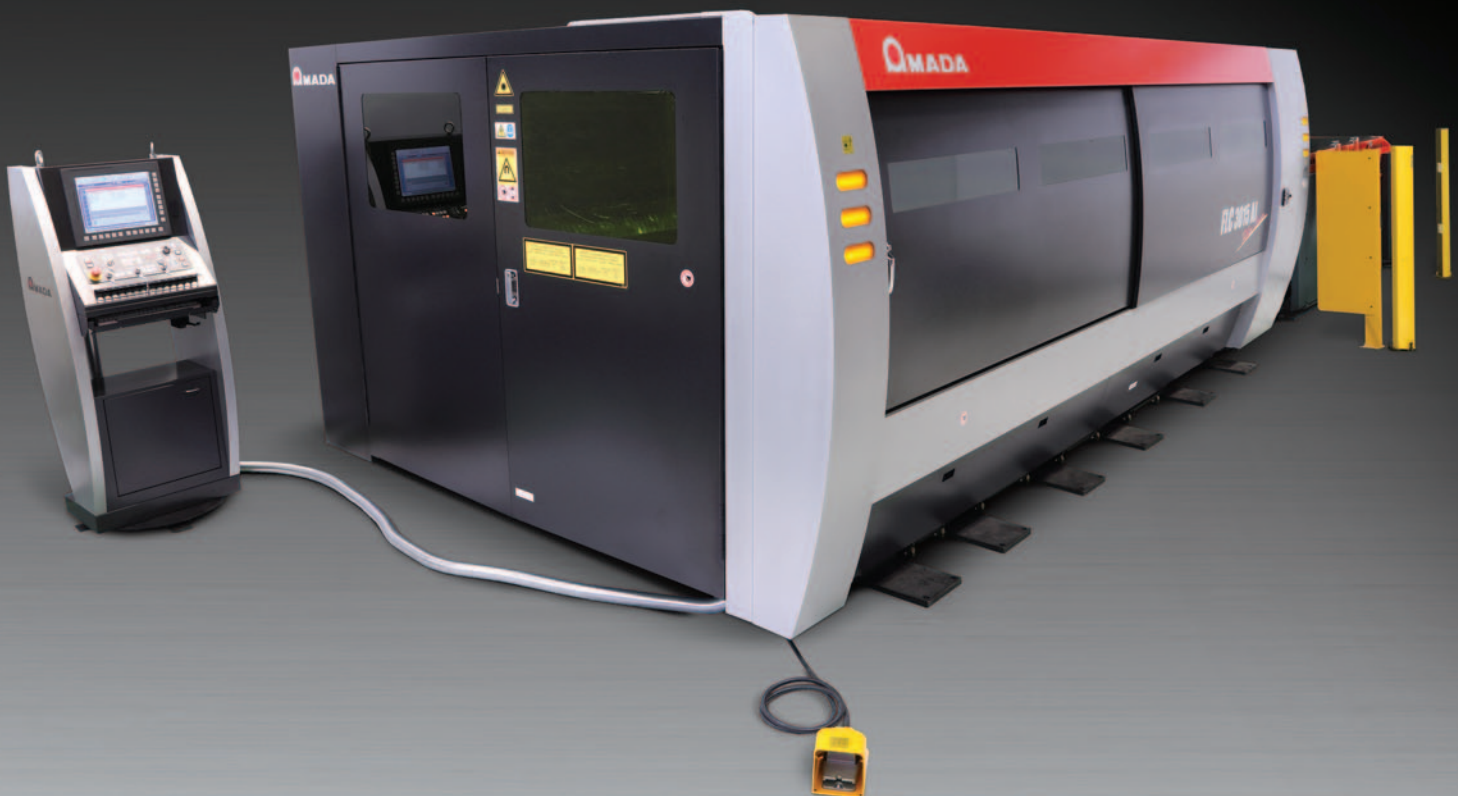


HIGH-SPEED, HIGH-PRECISION FIBER LASER CUTTING SYSTEMS

# FLCAJ Fiber Laser Series

FLCAJ 3015 and FLCAJ 4020





Amada's 3-axis linear motor drive system sets the global standard for speed and precision — enabled by true closed-loop feedback of the head position directly to the AMNC/PC control.



The FLCAJ 3015 is equipped with high-speed shuttle tables and a full enclosure.

## FIBER LASER PROCESSING IS MORE ECONOMICAL THAN EVER BEFORE

The FLCAJ's fiber engine, combined with the fiber optic delivery cable, has greatly reduced machine operating costs and required maintenance. With no laser gas, mirrors, or moving parts in the laser source, and by consuming a fraction of the energy required by a comparable CO<sub>2</sub> laser, the FLCAJ series makes laser processing more economical than ever before.

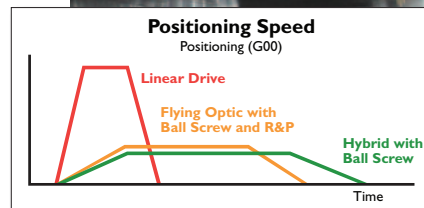
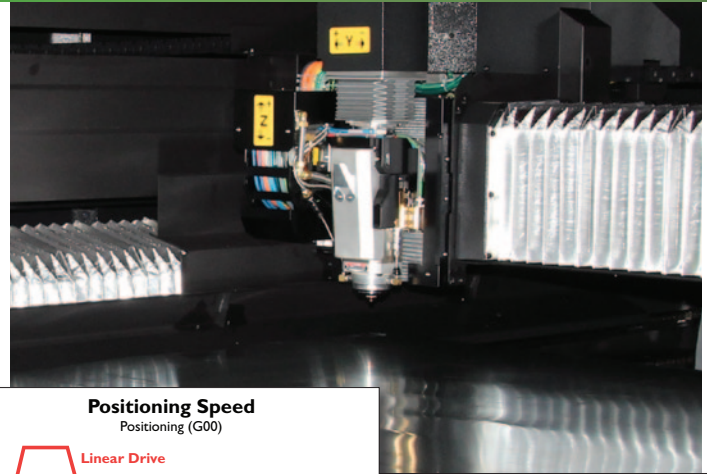
Amada's extremely productive fiber laser boasts a maximum light conversion efficiency of 75% and a maximum "wall plug" efficiency of 30%. The FLCAJ provides unmatched beam stability and quality while

requiring no warm-up time. The AJ engine produces a laser beam with a wavelength that is approximately one tenth of that emitted by a conventional CO<sub>2</sub> laser — resulting in Process Range Expansion (P.R.E.) by ensuring that unique materials such as copper (and other previously difficult to cut materials) can now be cut quickly and precisely.

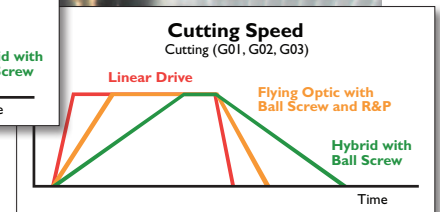
In addition, the extremely small spot density of the focused fiber laser beam results in unparalleled cutting speeds in thin materials — in some cases, up to 5 times faster than the comparable CO<sub>2</sub> laser.

## 3-AXIS LINEAR DRIVE SYSTEM PROVIDES UNCOMPROMISING SPEED AND ACCURACY

The FLCAJ's motion system is built on the foundation of Amada's FI series of CO<sub>2</sub> laser cutting systems. This proven design leverages linear drive technology in all three (X, Y, & Z) axes, which enables the FLCAJ to take full advantage of the high cutting speeds achieved by the fiber laser source. Amada's 3-axis linear motor drive system sets the global standard for speed and precision — enabled by true closed-loop feedback of the head position directly to the AMNC/PC control. Amada manufactures a full range of laser cutting systems from 1kW to 6kW that feature the latest advances in both CO<sub>2</sub> and fiber laser technology. Consequently, Amada is uniquely positioned to match the motion system (ball-screw, rack and pinion or linear drive) that is ideally suited for each series of laser cutting systems. While more conventional motion systems remain popular and cost less to manufacture, Amada's innovative, linear-drive system delivers uncompromising speed. Providing 6,680 ipm in traverse speeds and 2.4 G acceleration over the entire work envelope allows the FLCAJ to keep pace with the inherent high-speed of fiber laser technology.



The FLCAJ's unmatched acceleration rates dramatically reduce processing time resulting in unprecedented productivity.



## NON-STOP PRODUCTIVITY

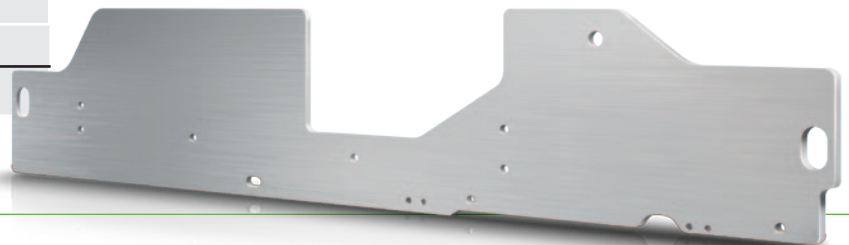
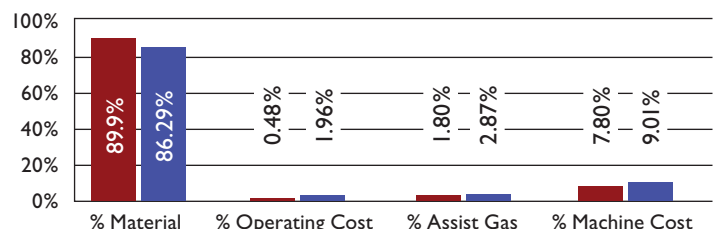


The FLCAJ's high-speed shuttle tables and automatic nozzle changer maximize productivity. The shuttle tables externalize the material setup eliminating interference with the cutting process. The 8-station changer automatically changes, cleans and calibrates the nozzle based on material processing requirements (ensuring that the laser does not sit idle while waiting for an operator to set-up for the next job).

With the dramatic increase in productivity of the FLCAJ series, automation is essential to reach full machine potential and achieve lights-out production. Over 80% of all Amada fiber lasers have been incorporated into an automated load/unload cell. Amada offers a diverse assortment of modular automation options that allow fabricators to configure their system according to specific operational requirements. All automated solutions are designed to improve productivity and increase profits by reducing lead-time and cutting costs.

## PRODUCTIVITY VS. COST

| 14 ga. CRS             | Fiber          | CO <sub>2</sub> |
|------------------------|----------------|-----------------|
| Gas Type               | N <sub>2</sub> | N <sub>2</sub>  |
| Process Time (sec.)    | 24             | 44              |
| Parts/Hr.              | 150            | 82              |
| Material Cost/Part     | \$2.30         | \$2.30          |
| Machine Cost/Part      | \$0.20         | \$0.24          |
| Total Oper. Cost/Hr.   | \$8.71         | \$10.53         |
| Total Oper. Cost/Part  | \$0.06         | \$0.13          |
| <b>Total Cost/Part</b> | <b>\$2.56</b>  | <b>\$2.67</b>   |



## AMNC/PC CONTROL

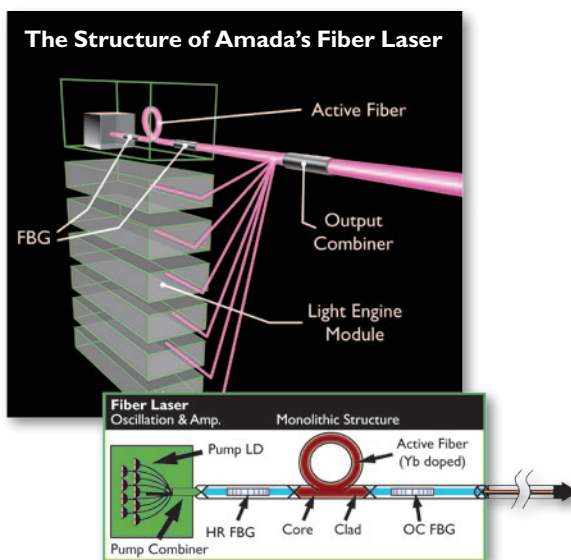


The AMNC/PC control responds quickly and adjusts to requirements for high-mix/low-volume production, shorter lead times and lower cost.

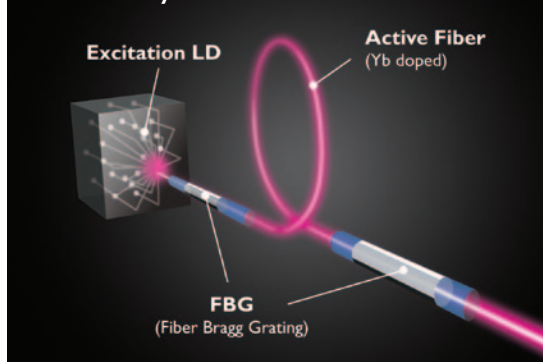
- Graphical touch-screen interface greatly simplifies operation
- Consolidate frequently used functions such as Origin Return, JOG Cut, Positioning and Nozzle/Head Replacement Position
- Set optimum conditions for piercing, corner treatment, etc. with one-touch operation
- Set up to 10 conditions for each material thickness with a maximum of 1,000 types available
- Automatically notifies an operator of an upcoming part inspection based on the inspection period you set for each item
- Allows you to set a daily schedule for stand-alone machines as well as manufacturing lines and check the overall progress

## THE OPTIMUM FIBER LASER SOURCE

Over 6 years of development and refinement have produced the optimum high-powered fiber laser source designed specifically for cutting. The laser source is comprised of multiple power stacks. By combining these stacks, Amada's Fiber laser uniquely provides maximum power for laser processing along with maximum efficiency. The FLCAJ is engineered to send 2,000 or 4,000 watts (based on model) of power through a single fiber optic directly to the cutting head. Amada's extremely productive Fiber Laser boasts a maximum light conversion efficiency of 75% and a maximum "wall plug" efficiency of 30%. The FLCAJ provides unmatched beam stability and quality while requiring no warm-up time.



### Amada's Fiber Laser Maximizes Power and Efficiency



## CONTROLLING THE LASER BEAM

It would have been simpler and less costly for Amada to engineer the FLCAJ's beam delivery system similar to other manufacturers — using only two optics in the cutting head. Instead, Amada has taken a more comprehensive approach by adding 4 additional mirrors in the Z-axis, directly above the cutting head. This innovative design is similar to the beam delivery system featured in Amada's CO<sub>2</sub> laser cutting systems. And, it has given the FLCAJ the ability to precisely control the laser beam properties based on the material type and thickness to be cut. The result is unmatched edge quality especially in thick, mild steels.

## ADVANTAGES OF FIBER LASER TECHNOLOGY

- **Lower Operating Costs**
  - No spatial cavity in oscillator
  - More efficient processing
- **Expanded Capabilities**
  - 1.08μm wavelength: Better 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**
  - Development began in 2006 by the global leader in fabrication equipment and has now been field tested and proven
- **System Integration**
  - State-of-the-art AMNC/PC control with user-friendly graphical interface
  - 3-axis linear drive system provides unmatched speed and accuracy

## ENVIRONMENTAL ADVANTAGES

- **Energy Efficient**
  - 3-4 times more energy efficient than typical CO<sub>2</sub> 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

# Flexible Automation for an Ever-Changing Market

With the dramatic increase in productivity of the FLCAJ, material handling is more important than ever to realize full machine potential. Amada offers a diverse assortment of modular automation options that let you configure your system according to your specific operational requirements. All are designed to help you improve productivity and increase profits by reducing lead-time and cutting costs.

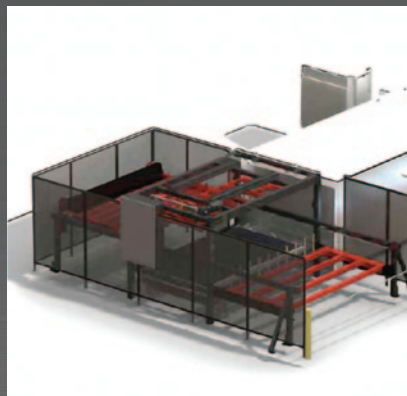
## ASLUL/ASFH

- Automated load/unload for a single laser
- Smallest footprint
- Expandable to Amada's CS and MARS storage systems for additional capacity
- Compact loading/unloading utilizing the area above the shuttle table
- Single tower or twin towers



## MP-F/MP-L

- Automated load/unload for a single laser
- Offers small footprint at low cost
- Expandable to Amada's CS and MARS storage systems for additional capacity
- Provides fast, efficient loading/unloading in a small footprint and low cost
- Approximately 70 seconds for load/unload



## 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

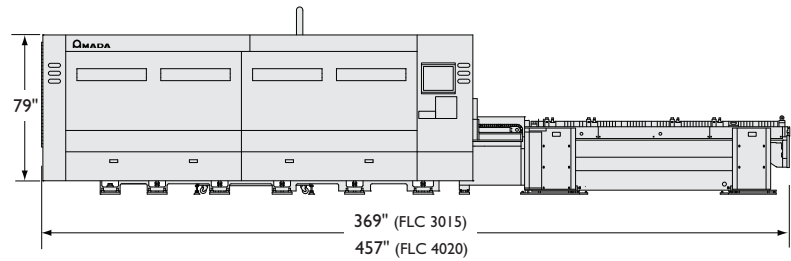
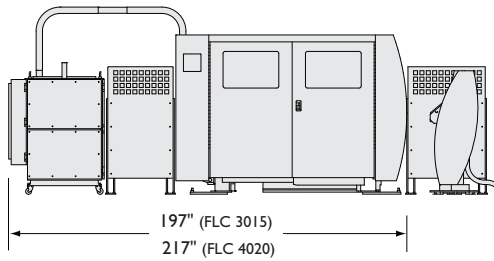


In addition to automated load/unload systems, Amada also offers the CS and MARS storage systems. Offering single or dual row configurations with unlimited expansion capabilities, Amada's storage systems ensure the most flexible and comprehensive automated environment. The CS and MARS storage systems organize the manufacturing process so that machine up-time and machine efficiency are tremendously increased — providing for continuous, on-demand production with minimal supervision.

In order to provide the optimal automated solution, Amada engineers and consultants are ready to evaluate your entire manufacturing process. Our experienced professionals will also examine your shop's growth potential — giving careful consideration to potential structural obstructions. Based on the obstruction, systems can be lengthened or expanded by adding standard modules.

Amada will also prepare digital layouts that will provide an accurate representation of how the system will fit into your shop environment. Overcarts, undercarts, extensions and towers are all modular and can easily be added at any time to meet your specific needs.

## DIMENSIONS (INCHES)



## SPECIFICATIONS

| Technical Data             | FLCAJ 3015                  | FLCAJ 4020           |
|----------------------------|-----------------------------|----------------------|
| Maximum Cutting Area       | 120.86" x 61.02"            | 157.84" x 78.7"      |
| Axis Travel Cutting Head   | 128.74" x 61.02" x 3.93"    | 186" x 80.7" x 3.93" |
| Maximum Material Thickness | 0.625" (2kW)                | 0.875" (4kW)         |
| Table Loading Weight       | 2,000 lbs.                  | 3,483 lbs.           |
| Positioning Speed (X/Y/Z)  | 4,724"/min.                 |                      |
| X, Y Traverse Speed        | 6,680"/min.                 |                      |
| Drive Feed Method (X/Y/Z)  | Linear Drive                |                      |
| Maximum Acceleration       | 2.4 G                       |                      |
| Maximum Cutting Speed      | 4,724"/min.                 |                      |
| Table Height               | 37"                         |                      |
| LST (Shuttle Table)        | Standard                    |                      |
| Position Accuracy          | ± 0.0004"                   |                      |
| Power Supply               | 200/60 V/Hz (±10%), 3 Phase |                      |
| Machine Weight             | 24,251 lbs.                 | 31,300 lbs.          |

| Laser              |                             |
|--------------------|-----------------------------|
| Oscillator         | AJ2000/AJ4000               |
| Oscillation Method | LD to Yb Fiber (monolithic) |
| Power Output (CW)  | 2000 W or 4000 W            |
| Principle          | Fiber-Laser                 |
| Wave Length        | 1.08μm                      |

| Controller                |                               |
|---------------------------|-------------------------------|
| Model                     | AMNC-F                        |
| Screen                    | Touch-screen                  |
| Number of Controlled Axis | 5 (X/Y/Z/B) and Laser Control |
| Memory Capacity           | 10 MB                         |

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, its pretreatment, size of the table as well as the location in the work area.

## OSCILLATOR

Amada's AJ oscillator (fiber engine) was developed specifically for cutting and drastically reduces electrical consumption (1/3 the amount of energy consumed by the typical CO<sub>2</sub> oscillators). The oscillator requires a minimal amount of valuable floor space.

### Material Thickness Specifications

| Material        | AJ2000 | AJ4000 |
|-----------------|--------|--------|
| Mild Steel      | 0.625" | 0.866" |
| Stainless Steel | 0.394" | 0.709" |
| Aluminum        | 0.315" | 0.630" |
| Copper          | 0.157" | 0.315" |
| Brass           | 0.197" | 0.315" |



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