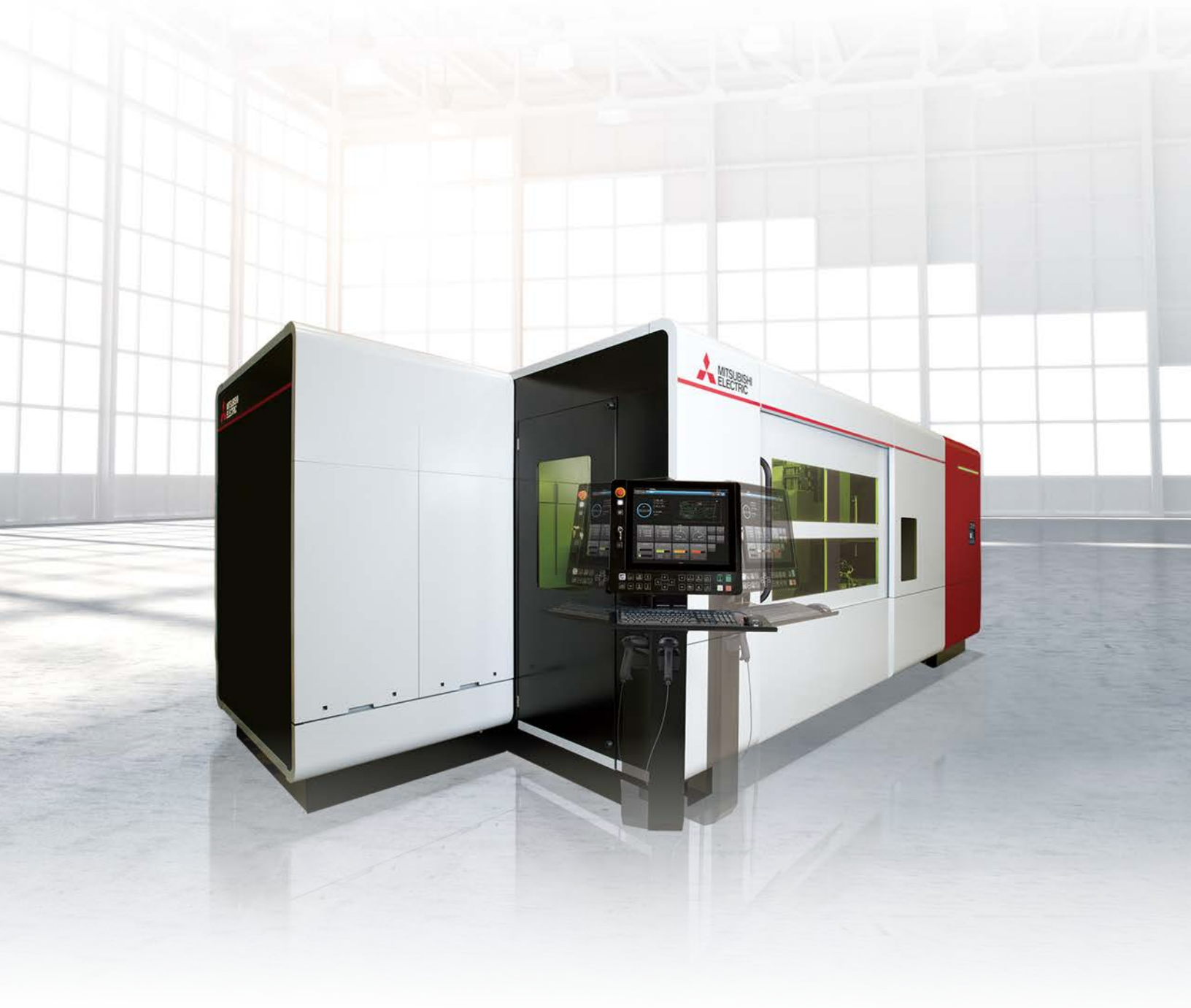
MITSUBISHI LASER

GX-F ADVANCED Series



MC MACHINERY SYSTEMS, INC.

a subsidiary of Mitsubishi Corporation

LESS INPUT. MORE OUTPUT.

Power lies in what a fiber laser can do, not in the kilowatts it has.

With the latest in artificial intelligence (AI) and gas reduction technology, the GX-F ADVANCED Series of two-dimensional fiber lasers delivers more power while using less nitrogen.

Artificial intelligence is a branch of computer science that automates intelligent behavior and machine learning. This means the machine itself can learn from data and adjust performance without human intervention.

One source. Endless expertise.

With the manufacturing industry suffering from a shortage of experienced workers, Mitsubishi designed this new generation of fiber lasers to minimize the need for operator input while maximizing quality and productivity.

Designed by Mitsubishi engineers and built entirely with Mitsubishi components, the GX-F ADVANCED Series is the only laser system in the industry with a single source for service and support.

Features

- Advanced artificial intelligence technology
- Mitsubishi-designed automated zoom head
- 21 position nozzle changer
- AI-assisted cutting
- Augmented reality with drop and cut, part rotation, and rectangular nesting
- Visible Processing Status (VPS)
- Advanced Gas Reduction (AGR)
  - AGR-AIR
  - AGR-N2
  - AGR-MIX
  - AGR-O2
- Dynamic Drive Control (DDC)
- Dross Reduction Control (DRC)
- Plasma Guard Control (PGC)
- High Peak Piercing (HPP)
- Mel's Eye (Plasma, Burn and Burst Detection)
- Protective Process Window Monitoring

Benefits

- Centering Assist Function speeds up setup and ensures accurate nozzle alignment
- 21 Position Automatic Nozzle Changer reduces downtime and supports continuous production
- Advanced Gas Reduction (AGR) technology significantly cuts nitrogen usage and lowers operating costs while improving productivity
- AI process monitoring optimizes cutting conditions in real time for stable, high-quality results
- Augmented Reality enables quick, visual nesting on remnant sheets to reduce scrap and speed up setup
- Magnetic crash protection allows quick recovery and reduces repair costs
- User-friendly M800 control with intuitive touchscreen interface for operators of any skill level
- Remote360™ machine monitoring provides real-time performance data, alerts, and remote diagnostics
- All-Mitsubishi design for seamless integration, high reliability, and long-term support with a 5-year oscillator parts warranty and 2-year machine warranty
- Automation ready, integrate easily with material handling and sorting systems for increased throughput and productivity

MC Machinery Systems, a subsidiary of Mitsubishi, is the U.S.-based supplier and servicer of Mitsubishi Electric laser and automation systems, drawing from an extensive global source of support and innovation.

Our expertise spans virtually every aspect of metalworking—from simple fabrication to CNC-driven, automated manufacturing cells. Serving industries including aerospace, mold and die, job shops, medical, and energy, MC Machinery is headquartered in the Chicago area, with technology centers in Concord, N.C.; Cypress, Calif.; Pine Brook, N.J.; Dallas, Tex.; Querétaro, Mexico; and Richmond Hill in Ontario, Canada.

AGR TECHNOLOGY

AGR or **A**dvanced **G**as **R**eduction is a family of cutting methods and advanced nozzle technologies aimed at reducing the consumption of nitrogen assist gas, improving productivity, process reliability, and ultimately reducing operating costs. Central to all AGR technologies is a low pressure air compressor system which provides the air necessary to enable AGR technology. AGR technologies provide a solution to meet any manufacturers needs in today's diverse manufacturing landscape

1. AGR-N2

AGR-N2 is a Nitrogen cutting process which utilizes Mitsubishi nozzle technology to **reduce running costs by reducing nitrogen assist gas consumption by up to 75%** while producing oxide free parts. for Mild Steel and Stainless Steel applications.

2. AGR-MIX

AGR-MIX utilizes patented MC Machinery nozzle technology which combines low pressure air with nitrogen within the nozzle to mix and create a blended or mix gas of about 95% N2 and 5% O2 – without an external blender. Achieve **extreme nitrogen assist gas reduction of up to an additional 50% over AGR-N2, enhanced part quality, productivity, and stability** with AGR-MIX. For Mild Steel applications.

3. AGR-O2

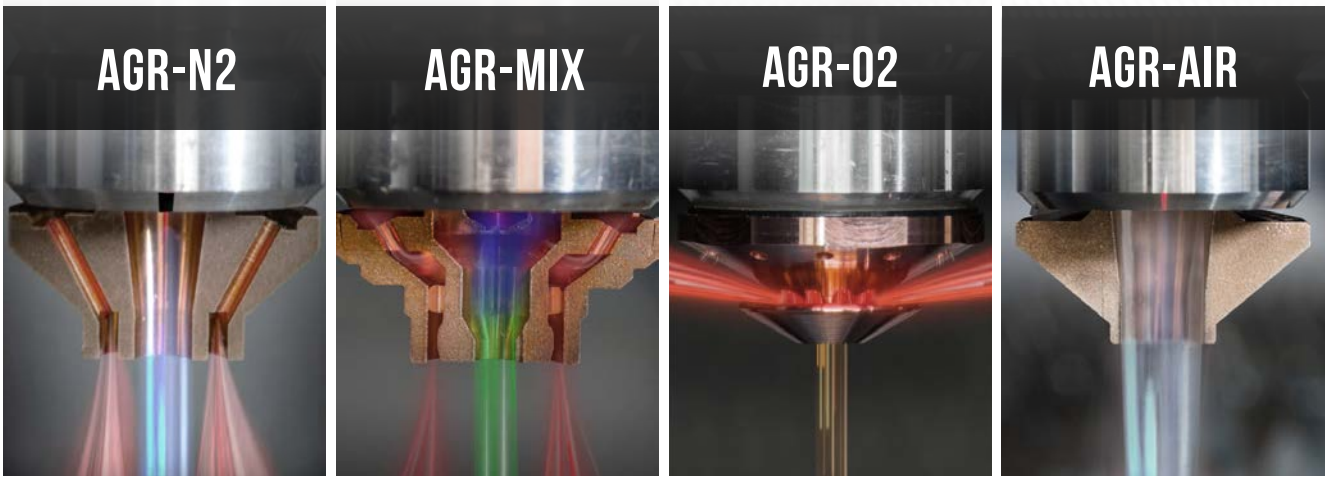
AGR-O2 Boost Is an innovative oxygen cutting process that can perform at double the speed of standard O2, and can **rival the productivity of nitrogen cutting while reducing operational costs significantly.** Central to this technology is an MC Machinery patented nozzle cooled by compressed low-pressure air. Experience efficiency and cost-effectiveness like never before with AGR-O2 Boost. For Mild Steel applications.

AGR-O2 Shiny utilizes the same MC Machinery patented cooled nozzles but applies unique cutting techniques to achieve **ultra high cutting quality and ultra stable cutting performance across almost any material grade and surface quality.** For Mild Steel applications.

4. AGR-AIR

For extreme low cost - full production, low pressure AIR cutting of select materials and thicknesses by wattage. **Obtain the cheapest cost per part possible with AGR-AIR.**

ALL-IN-ONE CUTTING SOLUTION WITH AGR TECHNOLOGIES



ADVANCED ZOOM HEAD ADDS MORE VROOM

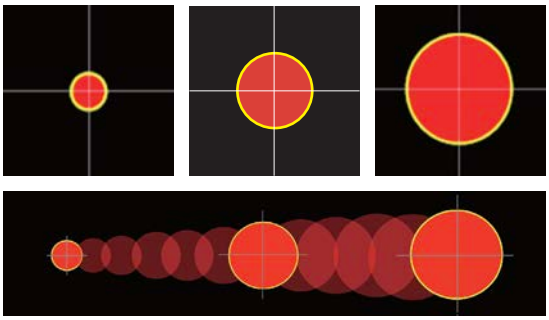
The Mitsubishi Zoom Head Delivers Speed and Flexibility.

Mitsubishi Electric's proprietary optical system offers optimal control of the beam according to the material and plate thickness. The zoom head delivers speed and flexibility by automatically changing the beam size, shape, and focal point for each material. It also processes plates with a wide range of thicknesses.

Because it's not necessary to exchange the processing lens according to plate thickness and material, setup time is significantly reduced.

- Operators can switch between sheet material of different thicknesses quickly and without compromising cutting quality.
- Piercing time is reduced by as much as 60 percent, making it possible to pierce 25mm-thick mild steel within 0.8 seconds.
- Multi-level window monitoring features help prevent processing with a defective window.
- Magnetic Damage Reduction head means faster recovery time, restart cutting in less than one minute without the need for sacrificial hardware.

Conventional head requires step switching



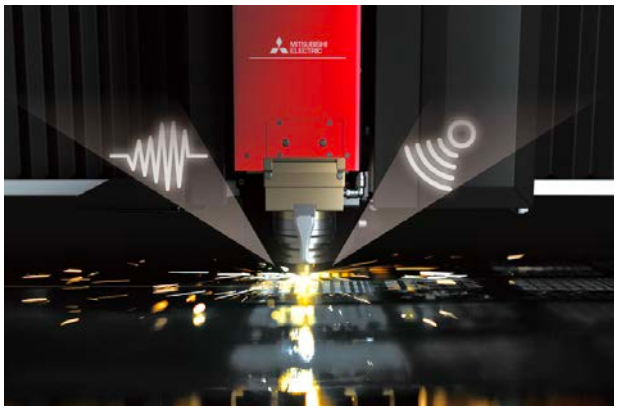
Stepless switching of zoom head mechanism reduces setup time and optimizes cutting speed, cut quality and stability

Magnetic Damage Reduction

AI-ASSIST MAKES IT SMART

The “brains” behind the GX-F ADVANCED Series is the proprietary Mitsubishi Electric artificial neural network technology Maisart®, which imitates neurons in the human brain. It uses audio and light sensors to monitor the cutting process in real time, automatically adjusting parameters to optimize cutting performance and increase process reliability.

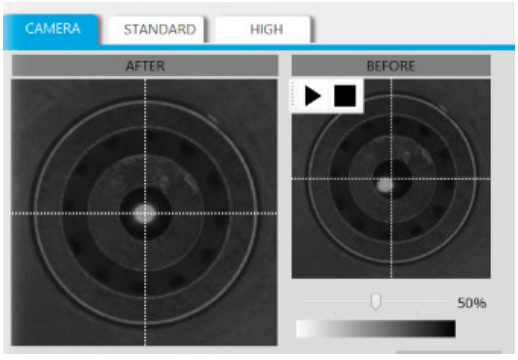
Also used in automobiles to help prevent accidents, Maisart is the foundation of the GX-F ADVANCED Series, creating a nonstop processing system for maximum productivity.



AI Diagnosis
When suboptimal processing is detected, the machine can automatically adjust cutting parameters to restore or enhance cutting performance. Under optimal conditions, AI diagnostics further increase processing speed to boost overall productivity.

Dynamic Focus Control
Automatically adjusts focus position via artifical intelligence to maintain stable processing.

AI Nozzle Monitor
AI nozzle monitor uses a camera system to monitor nozzle lifetime and condition. When nozzles are replaced with the nozzle changer, the nozzle condition is automatically determined from images using AI. If the nozzle processing duration is too long, or the nozzle condition is determined to be poor by the AI assistance, the nozzle is automatically replaced with the nozzle changer if necessary.



21 Position Nozzle Changer
Nozzles that are determined to be defective by the nozzle monitor are automatically replaced with new ones to support continuous processing for a long period of time.

Centering Assist
Centering assist utilizes the AI Nozzle Monitor camera to assist the operator with beam and nozzle centering. The operator simply needs to adjust the centering screws until the RDL sits in the center of the nozzle.

M800 Series CNC Control

Monitor your daily operations and projects effortlessly with one smart, easy-to-use system

SMART AND SIMPLE CONTROL EXPERIENCE

The intelligent M800 control offers a generous 19-inch user interface. The status of the machine and work can be displayed simply on one screen or as a detailed analysis, whichever the operator desires.

Key features include:

- Intuitive, user-friendly operation similar to a smartphone
- Customizable home screen
- Real-time condition adjustment and correction
- Intelligent cutting assist
- Online job scheduling and runtime estimator
- Automatic sheet detection
- Scrap cutting
- Real-time tracking of electrical and assist gas consumption
- Micro-tabbing on the fly
- Advanced help and maintenance screens
- The operator can monitor the cutting process from the machine or remotely
- Operator Lockout can restrict parameters on the machine to prevent any unwanted changes

User-Friendly Controls

Scheduling

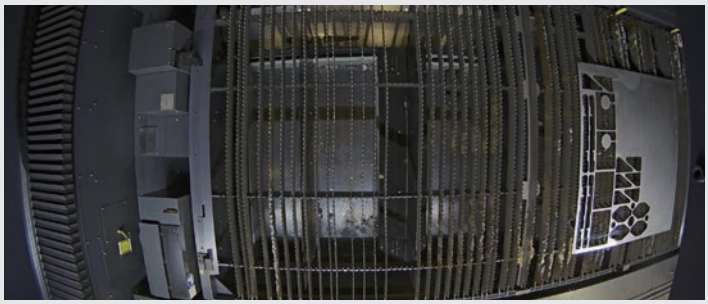
Time Estimation

AI-Assist

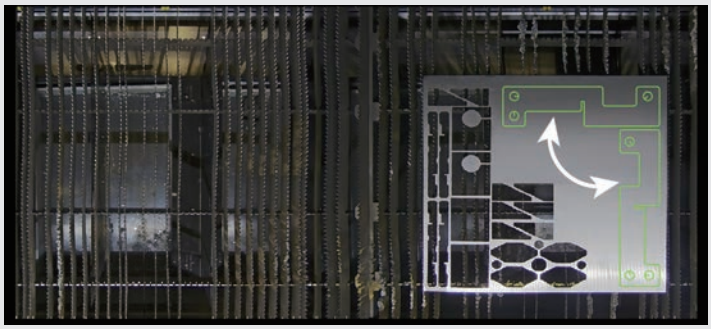
ELIMINATE THE GUESSWORK

Mitsubishi Electric's augmented reality (AR) technology displays overhead 2D images of the system at all positions without distortion, intuitively recognizing the positional relationship between materials and the processing head. The program shape can be easily placed with a drag operation, significantly reducing the setup time for off-cut materials.

Virtual top-view picture



Pre-conversion photo from one camera in the processing system



Virtual top-view picture generated from two camera photos

Easy placing and nesting

Parts can be incrementally moved to and rotated in the desired location while parts from existing programs can be recut and renested. AR also allows the operator to cut remnant shapes from finished stock.

- **Augmented Reality**
- **Renesting**
- **Drop Cut**
- Move and Rotate
- Simple Multi-Part Nesting

ADVANCED FIBER LASER OSCILLATOR

Advanced Fiber Laser Oscillator
Fiber laser oscillators are solid-state, use no optical components, and are sealed from outside air. Because of the reliable design, there is little need for regular maintenance.

The Mitsubishi oscillator delivers the latest advances in clean beam and anti-reflection technologies.

These advances not only improve reliability but also enhance performance and processing capabilities.

Oscillator features:

- Dynamic power reserve: Ensures rated power output over the life of the oscillator
- Extended lifetime structure: Increases module lifetime and prevents immediate power loss in the event of a diode failure
- Maximum processing capabilities
- Compatible with Mitsubishi CNC for high-speed response control
- Automated beam selection for improved processing stability
- Enables N_2 cutting of pure copper
- Integrated with remote diagnostics for preventive maintenance
- Total service and support by MC Machinery
- Five-year parts warranty

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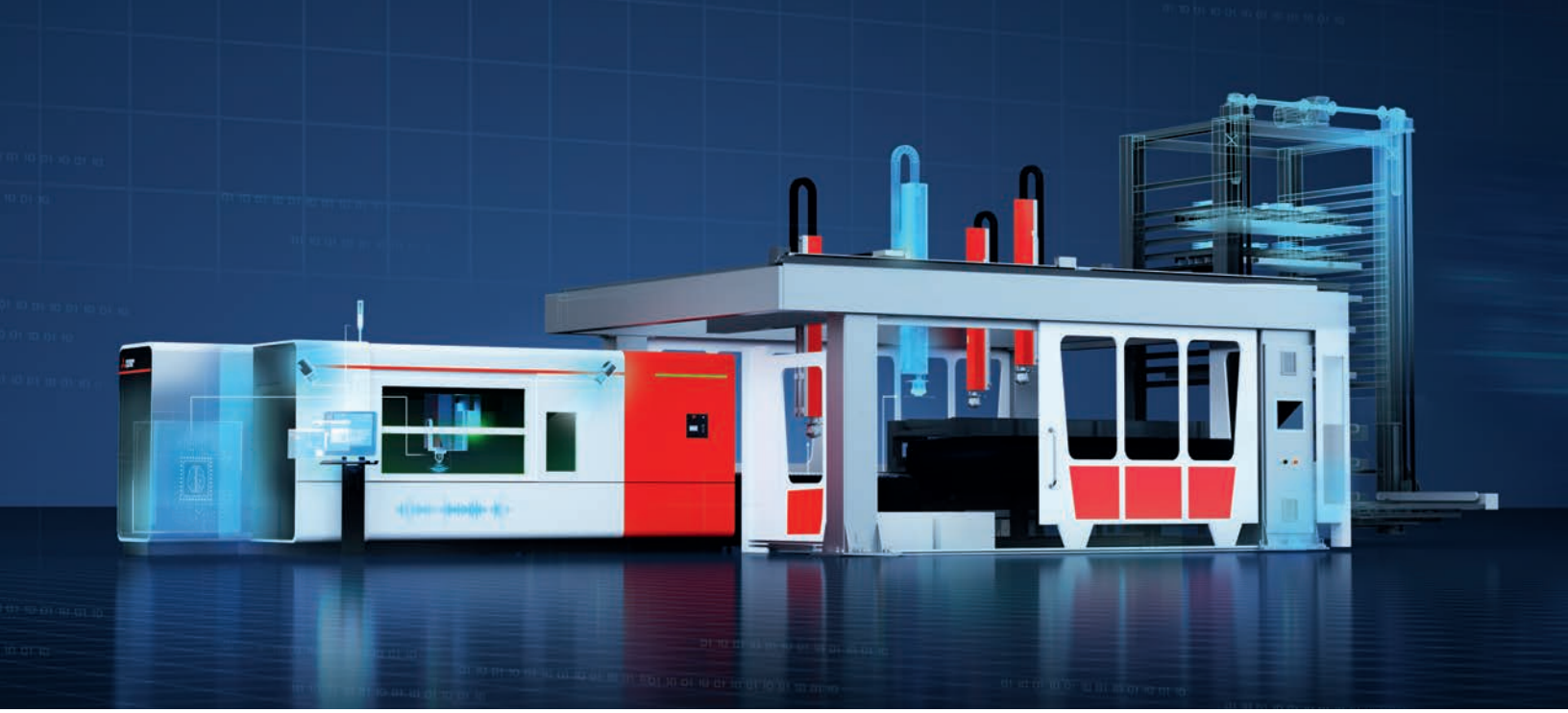


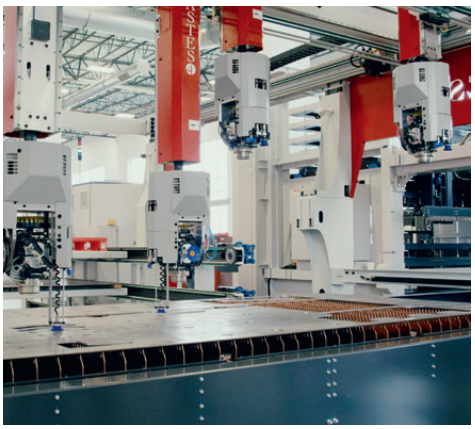
BUILT FOR AUTOMATION

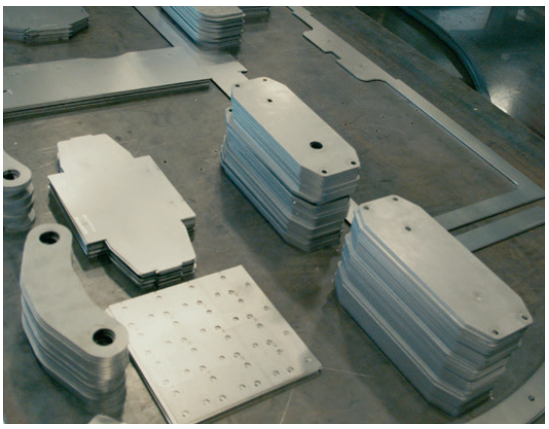
The GX-F ADVANCED Series was built to seamlessly integrate with automation systems that increase productivity and reliability by automating production processes, including material loading, laser processing, laser sorting (lasorting) and material unloading.

A fully automated system means less downtime for unloading, parts removal, sorting and machine adjustments. It also means you'll need fewer skilled operators—a significant advantage as the manufacturing industry faces a continued shortage of an experienced workforce.

And because our automation is modular and flexible, it can grow with you. With our wide range of options—including configurations that require 30 percent less floor space than typical laser automation setups—we have a solution for virtually any application.

To maximize your shop's productivity, our laser automation experts can work with you to determine the right combination of laser, material storage, material delivery/removal and part sorting.





Watch a video of the ASTES4 in action

PREMIER TRAINING, SERVICE AND SUPPORT

Regionalized Service Network

With our industry-leading regionalized service network, we have the most experienced, knowledgeable and responsive employees in the industry. We're here for you with phone support, operation training, on-site service, parts inventory, and a robust, interactive website.

- With regionalized locations throughout North America, we can respond promptly to your service needs.
- We have the largest fleet of service vehicles in the field—three times more than any other company in the industry.
- From installation and on-site training to support and service throughout the life of your system, our national service network is just a phone call away.
- You'll have access to 24/7 support, a detailed interactive parts catalog, printable machine manuals, and software.

Application Support

The value of our support stretches well beyond service, parts and training. Our experienced and creative team members put their knowledge and problem-solving skills to work for you—offering application and engineering support that includes creating specialized shop-floor setups that work harder and get better results. Whether developing integrated manufacturing cells from the ground up or adding specific solutions to complement existing operations, our pre-sales, sales, installation and application support staff can help you eliminate bottlenecks, improve accuracy, and drive throughput.

remote360

Remote Diagnostics

Predictive Maintenance

Two Years of remote360 Support

Consumption Monitoring

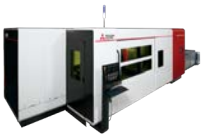
remote360™ Machine Monitoring

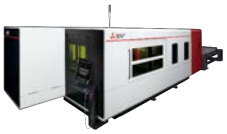
The GF-X ADVANCED Series has a two-year machine tool warranty for parts and labor and a five-year oscillator parts warranty. Also included is two years of the remote360™ machine monitoring software system.

remote360™ is a robust production monitoring and support solution offering real-time data to help increase productivity, improve efficiency, and reduce downtime. It provides:

- Email and mobile notifications of stoppages, completions, and maintenance warnings
- Dashboard display of runtime performance by shift, day, week, and month
- Proactive support with real-time monitoring and remotely connected service technicians

SPECIFICATIONS





MACHINE SPECIFICATIONS		
Available Platform	**ML 3015 GX-F ADVANCED**	**ML 4020 GX-F ADVANCED**
X – Axis Stroke	122” (3100 mm)	161.41” (4100 mm)
Y – Axis Stroke	61.61” (1565 mm)	82.67” (2100 mm)
Z – Axis Stroke	4.72” (120 mm)	4.72” (120 mm)
Maximum Processing Feed Rate	3937 in/min (100 m/min)	3937 in/min (100 m/min)
Maximum Work Piece Weight	2094 lbs. (950 kg)	3637 lbs. (1650 kg)
Table Pass Height	35” (890 mm)	35” (890 mm)
Rapid Travel Speed	6700” in/min (170 m/min) simultaneous	6700” in/min (170 m/min) simultaneous
Repeatability	±0.00039” (0.0099 mm)	±0.00039” (0.0099 mm)
Machine Weight	20,723 lbs. (9400 kg)	29,843 lbs. (13,537 kg)
OSCILLATOR SPECIFICATIONS		
Manufacturer	**Mitsubishi Electric**	**Mitsubishi Electric**
Excitation Method	Ytterbium Doped Fiber	Ytterbium Doped Fiber
Wavelength	1.07µm	1.07µm
Available Output Power (CW)	4 kW, 6 kW, 8 kW, 10 kW, 12 kW, 16 kW, 20 kW	4 kW, 6 kW, 8 kW, 12 kW, 16 kW, 20 kW
Processing Head	Zoom	Zoom

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