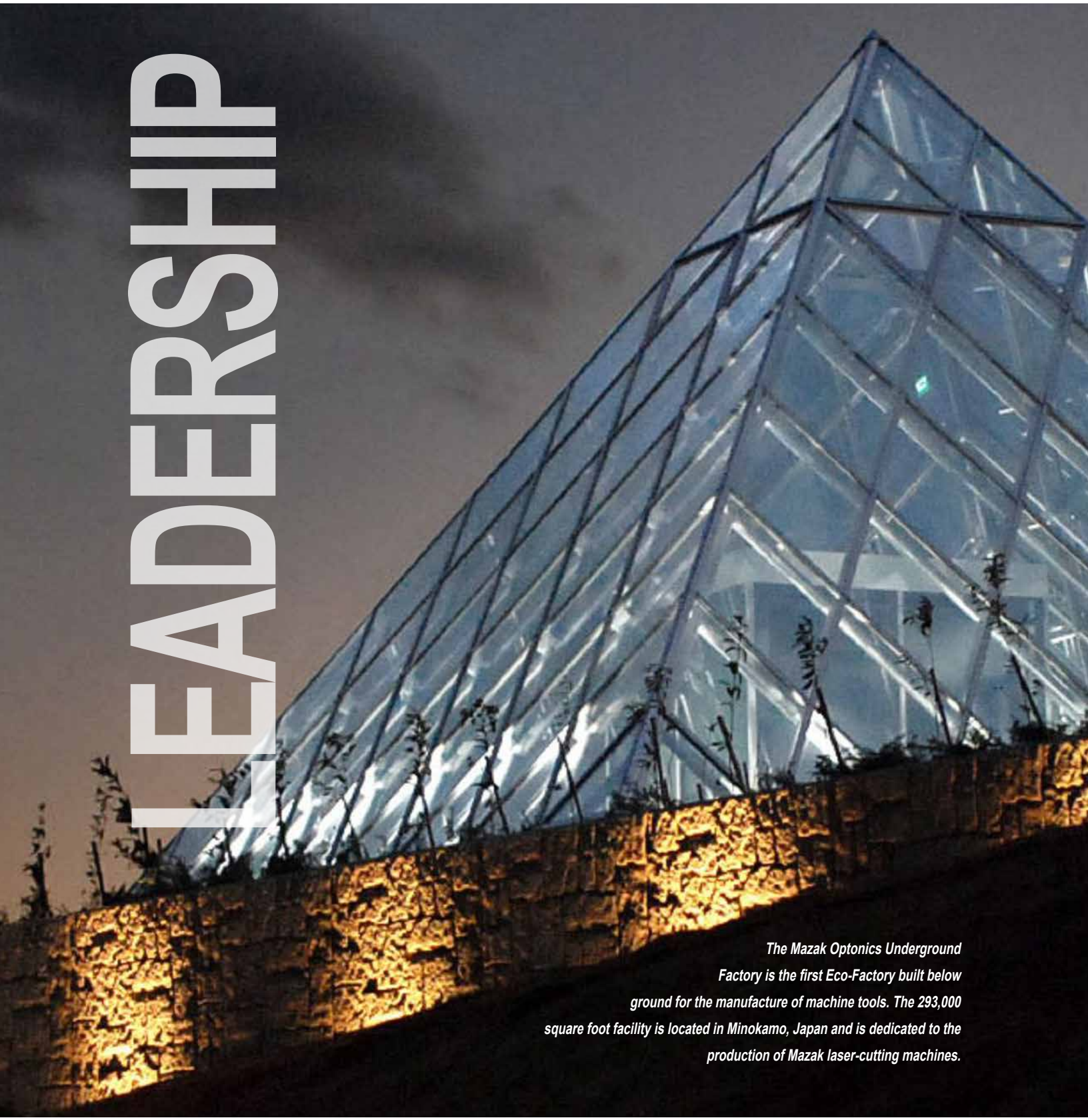
LASER-CUTTING TECHNOLOGY

PRODUCT OVERVIEW

Mazak
OPTONICS CORP.

LEADERSHIP



The Mazak Optonics Underground Factory is the first Eco-Factory built below ground for the manufacture of machine tools. The 293,000 square foot facility is located in Minokamo, Japan and is dedicated to the production of Mazak laser-cutting machines.

The above photo is of the glass pyramid entrance to the Mazak Optonics Underground Factory.

THE GLOBAL STRENGTH OF YAMAZAKI MAZAK

Yamazaki Mazak is the world's largest manufacturer of machine tools. We produce systems for the precision manufacturing of metal parts including laser-cutting machines, CNC turning centers, horizontal and vertical machining centers, multi-tasking machining centers, turnkey cells and software solutions to help customers achieve lean, efficient manufacturing operations. We have developed unique products that realize unsurpassed productivity and established 79 Technology and Technical Centers all over the world to provide total solutions and optimum service support close to our customers.

MAZAK OPTONICS LASER TECHNOLOGY

Mazak Optonics offers an extensive range of 2D and 3D laser-cutting equipment encompassing over 50 machine models. This innovative range of products enables Mazak to better meet your specific laser application needs. Mazak is a laser technology leader who can significantly improve production efficiency, competitive positioning and profitability. We utilize innovative engineering and intelligent automation to simplify operation and deliver more consistent machine performance. Mazak Optonics supports our large North American installation base from our North American headquarters in Elgin, IL.

The color orange symbolizes warmth and a well-rounded character. It also represents the passion Mazak employees have in their relentless pursuit to help customers achieve success.

Yamazaki Mazak Minokamo 1 Plant in Gifu-Prefecture, Japan.

One of the bays at Mazak Optonics' award winning underground laser production facility.

Mazak Corporation's Headquarters for the Americas, Manufacturing Plant and Technology Center in Florence, KY.

Mazak Optonics Corporation's North American support facility in Elgin, IL is the largest dedicated laser technology center in the world.

The Elgin Laser Technology Center is a key focal point for laser symposiums, training and application development.

Mazak's exclusive Fiber Intelligent Multi-Function Torch improves performance and increases throughput.

OPTIPLEX 3015/4020 Fiber

Superior performance in mild steel, stainless steel, aluminum and other exotics

PROCESS: 2D, FLYING OPTICS, 2 PALLET CHANGER

PERFORMANCE ADVANTAGES

- Mazak's new Fiber technology extends the performance advantages delivered by our industry-leading OPTIPLEX CO2.
- OPTIPLEX 3015 Fiber incorporates Intelligent Multi-Function Torch and Nozzle Changer technology to directly increase the productivity of the end user by allowing the machine to optimize the torch setup automatically per program. This optimization can dramatically improve cut speeds, increase throughput and require less operator intervention, delivering more predictable processing day after day.
- 2 pallet changer design with a helical rack and pinion positioning system that features high throughput and rugged construction.
- New Preview 3 control with 15" touch screen and integrated tech tables simplifies operation.
- OPTIPLEX Fiber series machines are available in 2.0kW and 4.0kW configurations.

Models	3015	4020
Table Sizes	60" x 120"	78"x157"
Generator	IPG	
Watts	2.0kW	4.0kW
Thickness *		
MS	0.625"	0.875"
SS	0.315"	0.625"
AL	0.315"	0.625"
Positioning	Helical rack and pinion	
Positioning A	±0.002"/19.7"	
Rapid Feed	4724 ipm	
Acceleration	1.2G	
CNC	New Preview 3	

NEW MAZAK MULTI-FUNCTION TORCH

The Mazak exclusive Intelligent Multi-Function Torch has been designed to extend the performance advantages of Fiber laser-cutting machines. It delivers a group of Intelligent features including Intelligent Setup Functions that simplify setup and improve operation consistency.

Intelligent Setup Functions

- **Auto Nozzle Changing**
- **Beam Diameter Control**
- **Auto Focus Positioning**
- **Auto Profiler Calibration**
- **Auto Nozzle Cleaning**

*** Actual cutting performance is based on various parameters including material type and quality, assist gas and cutting speed.**

STRENGTH

CO2 series machines deliver overall better performance when cutting thicker mild steel plate.

OPTIPLEX 3015/4020 CO2

A flexible job shop laser-cutting system that does not compromise performance

PROCESS: 2D, FLYING OPTICS, 2 PALLET CHANGER

PERFORMANCE ADVANTAGES

- The OPTIPLEX CO2 offers unique flexible performance features that specifically meet the needs of high variation job shops.
- Designed to integrate Intelligent automation features with superior cutting speeds, the OPTIPLEX uses Mazak's AO|5 automated setup functions. This AO|5 system overcomes the typical challenges of using varied workpiece materials by improving productivity without compromising cutting conditions.
- 2 pallet changer design with a helical rack and pinion positioning system that features high throughput and rugged construction.
- New Preview 3 control with 15" touch screen and integrated tech tables simplifies operation.
- OPTIPLEX CO2 series machines are available in 2.5kW, 4.0kW and 6.0kW configurations.
- New Type 10 resonator with ECO Mode lowers operating costs.

Models	3015		4020
Table Sizes	60" x 120"		78"x157"
Resonator	New Type 10 with ECO Mode		
Watts	2.5kW	4.0kW	6.0KW
Thickness *			
MS	0.750"	1.000"	1.000"
SS	0.375"	0.500"	0.590"
AL	0.250"	0.375"	0.472"
Positioning	Helical rack and pinion		
Positioning A	±0.002"/19.7"		
Rapid Feed	4724 ipm		
Acceleration	1.2G		
CNC	New Preview 3		

SUPER TURBO-X 3015 CO2

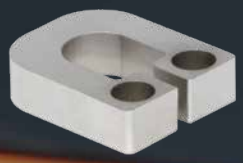
Rugged workhorse with new leading-edge technology

PROCESS: 2D, HYBRID

PERFORMANCE ADVANTAGES

- The SUPER TURBO-X is built on the industry's most reliable laser platform. It features a rugged hybrid design and is a laser production workhorse.
- The new Opti-Pod offers automated setup features that help minimize preparation time and improve extended unattended operation. These features include intelligent setup functions for automated nozzle spatter removal, a nozzle changer and focal point measurement and adjustment capability.
- The STX also incorporates a new Servo Focus Torch. This servo driven system significantly reduces piercing time and increases productivity.
- New Preview 3 control with 15" touch screen and integrated tech tables simplifies operation.
- STX series machines are available in 2.5kW and 4.0kW CO2 configurations
- New Type 10 resonator with ECO Mode lowers operating costs.

Models	3015	4020
Table Sizes	60" x 120"	78"x157"
Resonator	New Type 10 with ECO Mode	
Watts	2.5kW	4.0kW
Thickness *		
MS	0.750"	1.000"
SS	0.375"	0.500"
AL	0.250"	0.375"
Positioning	Ball screw	
Positioning A	±0.0004"/19.7"	
Rapid Feed	1968 ipm	
Acceleration	0.4G	
CNC	New Preview 3	



*** Actual cutting performance is based on various parameters including material type and quality, assist gas and cutting speed.**

Mazak integrates leading edge technology into our entire range of laser-cutting machines.

OPTIPLEX NEXUS 3015 CO2

Simply Innovative **- the NEXUS combines high performance with a compact, flexible design**

PROCESS: 2D, FLYING OPTICS

PERFORMANCE ADVANTAGES

- The OPTIPLEX NEXUS CO2 offers unique performance features in a flexible design that is available in a single fixed pallet, manual pallet or automated 2 pallet design. It is the ideal machine for a fabrication job shop expanding into laser-cutting services.
- Designed to integrate Intelligent Setup and Monitoring Functions, the NEXUS delivers features normally available only on the highest technology machines. These features simplify operation and reduce operator dependancy.
- The helical rack and pinion positioning system features high throughput and rugged construction.
- The NEXUS has been engineered to be utilized with Mazak's extensive range of automated material handling systems.
- New Preview 3 control with 15" touch screen and integrated tech tables simplifies operation.
- New Type 10 resonator with ECO Mode lowers operating costs.

Models	3015
Table Sizes	60" x 120"
Resonator	New Type 10 with ECO Mode
Watts	2.5kW
Thickness *	
MS	0.750"
SS	0.375"
AL	0.250"
Positioning	Helical rack and pinion
Positioning A	±0.002"/19.7"
Rapid Feed	2362 ipm
Acceleration	1.2G
CNC	New Preview 3

SUPER TURBO-X 44 CO2

A compact dynamo for when floor space is limited

PROCESS: 2D, FLYING OPTICS

PERFORMANCE ADVANTAGES

- The SUPER TURBO-X 44 offers a unique 4' x 4' table design for easy accessibility and proven performance.
- The STX-44 is ideal for job shops focused on smaller parts or production environments where the cutting envelope meets application demands.
- The STX-44 utilizes a meehanite frame which greatly reduces vibrations that can occur during high-speed cutting. This results in consistent, superior accuracy and low maintenance requirements.
- The completely enclosed cutting area meets FDA Class 1 safety standards, providing a safe, clean work environment.
- STX-44 is available in 2.5kW and 4.0kW CO2 configurations.
- New Type 10 resonator with ECO Mode lowers operating costs.

Models	X-44	
Table Sizes	48" x 48"	
Resonator	New Type 10 with ECO Mode	
Watts	2.5kW	4.0kW
Thickness *		
MS	0.750"	1.000"
SS	0.375"	0.500"
AL	0.250"	0.375"
Positioning	Ball screw	
Positioning A	±0.0004"/19.7"	
Rapid Feed	945 ipm	
Acceleration	.4G	
CNC	Preview	

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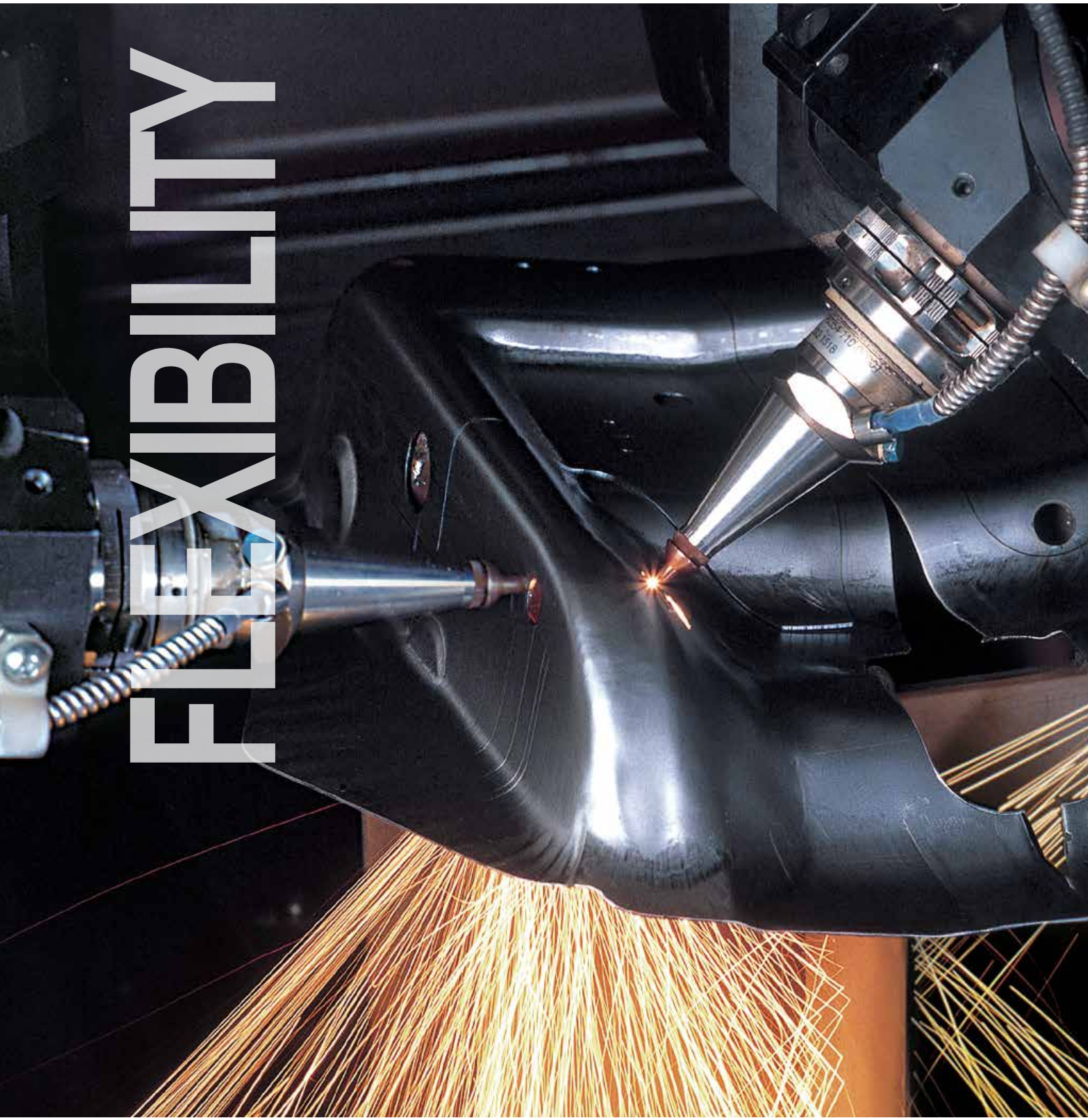
FLEXIBILITY



3D laser-cutting machines can significantly reduce the processing time for many applications.

SPACE GEAR-U44 CO2

The SPACE GEAR-U44 delivers the ultimate 2D/3D job shop flexibility

PROCESS: 2D/3D, FLYING OPTICS

PERFORMANCE ADVANTAGES

- The SPACE GEAR-U44 is a compact and affordable all-in-one 2D/3D laser center for maximum flexibility. Use its triple-mode, 6-axis capabilities to expand your shop's horizons and raise yourself above the competition.
- The SG-U44 is capable of cutting tube, including rectangular, round, and triangular pipe as well as C, H, I and L-beams within a 6.0 inch diameter.
- The 5-axis torch and simultaneously controlled chuck let the SG-U44 fabricate - in one operation - precise angle cuts, weld-prep bevels and advanced contours such as saddle joint cuts.
- The 64-bit control incorporates illustrated fill-in-the-blank screens to quickly program complex contours.
- With its multi-axis torch, the SG-U44 also laser-cuts stamped, hydroformed and spun pre-formed parts as well as high-speed 2D cuts and bevels in flat material.

Models	U44	
Table Sizes	48" x 48"	
Resonator	New Type 10 with ECO Mode	
Watts	2.5kW	4.0kW
Thickness *		
MS	0.750"	0.875"
SS	0.312"	0.375"
AL	0.250"	0.375"
Positioning	Ball screw	
Positioning A	±0.0004"/19.7"	
Rapid Feed	945 ipm	
Acceleration	0.3G	
CNC	Fanuc L-64	

SPACE GEAR MkII CO2

The versatility to laser-cut 2D/3D parts including flat sheets, tubes and structural material

PROCESS: 2D/3D, HYBRID

PERFORMANCE ADVANTAGES

- Mazak's SPACE GEAR 510 MkII delivers full size machine performance with the flexibility of 2D/3D features.
- 2D mode is for flat sheet and plate up to .87" thick.
- 3D mode makes use of our compact cutting head with ±360° rotation in the A-axis and ±135° in the B-axis to maintain a normal cutting angle to all preformed sculptured surfaces. A non-contact profiler maintains a constant stand-off distance and eliminates marring of the part.
- Tubes, pipes, and structural shapes can all be processed by adding a CNC rotary chuck and supports for long workpieces. In all, six axes of CNC control allow you to cut weld preps, angled features, and much more in a single setup.
- Mazak's Space CAM and FX TUBE software options generate NC code from a 3D CAD drawing, imported or crafted in the system.

Models	510	
Table Sizes	60" x 120"	
Resonator	New Type 10 with ECO Mode	
Watts	2.5kW	4.0kW
Thickness *		
MS	0.750"	0.875"
SS	0.312"	0.375"
AL	0.250"	0.375"
Positioning	Ball screw	
Positioning A	±0.0004"/19.7"	
Rapid Feed	945 ipm	
Acceleration	0.3G	
CNC	Fanuc L-64	

*** Actual cutting performance is based on various parameters including material type and quality, assist gas and cutting speed.**

TUBE&PIPE

Mazak offers two series of laser tube-cutting machines that deliver a wide range of benefits for fabricators.

TUBE GEAR 150 2D CO2

Precision 2D tube laser-cutting system with bundle material loading

PROCESS: 2D, HYBRID

PERFORMANCE ADVANTAGES

- The Mazak TUBE GEAR's capabilities for thin-walled 2D applications offer increased efficiency and a significant reduction in cost per part.
- Available with a 2.5kW resonator, the TUBE GEAR can process round and rectangular tube and pipe with diameters of up to 6 inches. It has a standard 5" Servo Focus torch and can make cuts at a rapid traverse rate of up to 6,299 IPM.
- The system's ergonomic design positions loading, unloading and operation on the same side of the machine to improve efficiency and minimize required floor space. It includes a bundle material load/unload system which allows for increased throughput for large lot sizes up to 4.2 tons while still comprising a smaller footprint than similar machines.
- The new Fanuc 31i control and drive system improves processing speed and the bundle loading system helps realize extended, unattended operation.

Models	150
Std. Dia.	6"rd/6"sq
Mat. Weight	387 lbs./pc., 9261 lbs./bundle
Mat. Length	78.74" - 255.91"
Resonator	Type 10 with ECO Mode
Watts	2.5kW
Thickness *	
MS	0.230"
SS	0.230"
AL	0.230"
Positioning	Rack & pinion, ball screw
Position-ing A	Y/Z ±0.0004"/19.7" X/U/V ±0.0020"/19.7"
CNC	Mazak FX

FABRI GEAR 220/400 3D CO2

Rugged 3D precision for tube and structural applications

PROCESS: 2D, HYBRID

PERFORMANCE ADVANTAGES

- The 3D FABRI GEAR cuts a wide variety of tubes including round, square, rectangular and triangular. It can also process I and H beams, C-channel, angle iron and additional user-defined shapes from mild or stainless steel. This extensive range of capabilities makes the machine ideal for many industries and applications.
- Featuring a powerful, high-precision 6-axis laser, the 3D FABRI GEAR can handle larger, longer, thicker and heavier material than similar machines due to its rigid workpiece handling system incorporating a four chuck design. It also has improved processing speeds, tighter tolerances and can be used for drilling and tapping.
- 6-axis laser cutting means you can cut at any desired angle for weld prep, plus achieve the highest accuracy for easy fit-up of assemblies - all in a single program cycle.

Models	220	400
Std. Dia.	8.66"rd/6"sq	16.0"rd/11.8"sq
Mat. Weight	728 lbs.	1058 lbs.
Length	6M-236",8M-315",12M-472",15M-590"	
Resonator	Type 10 with ECO Mode	
Watts	2.5kW	4.0kW
Thickness *		
MS	0.750"	0.875"
SS	0.312"	0.375"
AL	0.250"	0.375"
Positioning	Rack & pinion, ball screw	
Position-ing A	Y/Z ±0.0004"/19.7" X/U/V ±0.0020"/19.7"	
CNC	Mazak FX	

*** Actual cutting performance is based on various parameters including material type and quality, assist gas and cutting speed.**

The above photo includes three OPTIPLEX laser-cutting machines in flexible automation.

MAZAK ADVANCED AUTOMATION SOLUTIONS

Material automation systems will extend the throughput capacity of your machines

PROCESS: 2D, MATERIAL AUTOMATION

AUTOMATION SYSTEMS

The benefits that result from a company implementing laser automation are profound. A typical standalone laser is utilized only a fraction of the usable workweek. It sits idle while waiting for setup or material, as well as during lunch breaks and off hours. Owners who track actual laser cut time are almost always shocked to see the reality of the underutilization of such a major asset.

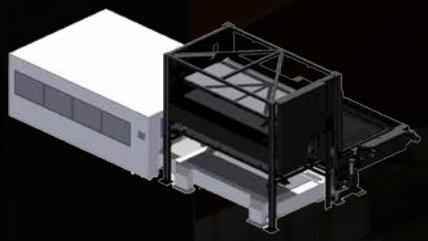
Automation systems provide the ability to flex capacity through lights-out operation, without the burden of adding manpower. It also makes one-piece flow more practical, while producing short-run efficiencies that will reduce non value-added fabricating time. The bottom line is typically up to a 50% increase in capacity as compared to standalone machines and a significant reduction in lead times.

Mazak was the first manufacturer to introduce laser cutting machines into a Flexible Manufacturing System. Today we offer the following systems:

- Compact load/unload
- Vertical flexible manufacturing
- Automated part sorting
- Automated storage/retrieval

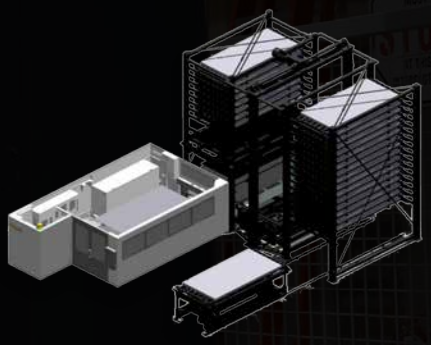
COMPACT LOAD/UNLOAD SYSTEM

The below image illustrates a Vertical Compact Load/Unload System. It takes up very little additional floorspace and is typically utilized in operations with fewer material changes such as batch production.



COMPACT VERTICAL FMS

Veritcal Flexible Manufacturing Systems also are also compact in design and deliver the flexibility to automate many material types/thicknesses. Designs are modular, enabling the addition of multiple storage towers and unload configurations, but are dedicated to a single machine system.



LINEAR FMS

Linear Systems deliver all of the modularity and flexibility of vertical systems, but enable inclusion of multiple machines within a single system. Mazak Linear Automation Systems can integrate both CO2 and Fiber laser-cutting machines into a single FMS as illustrated to the left.

Over 700 Mazak laser-cutting machines are in automation systems that are currently reducing operating costs for their owners in North America *- significantly more than any other manufacturer.*

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