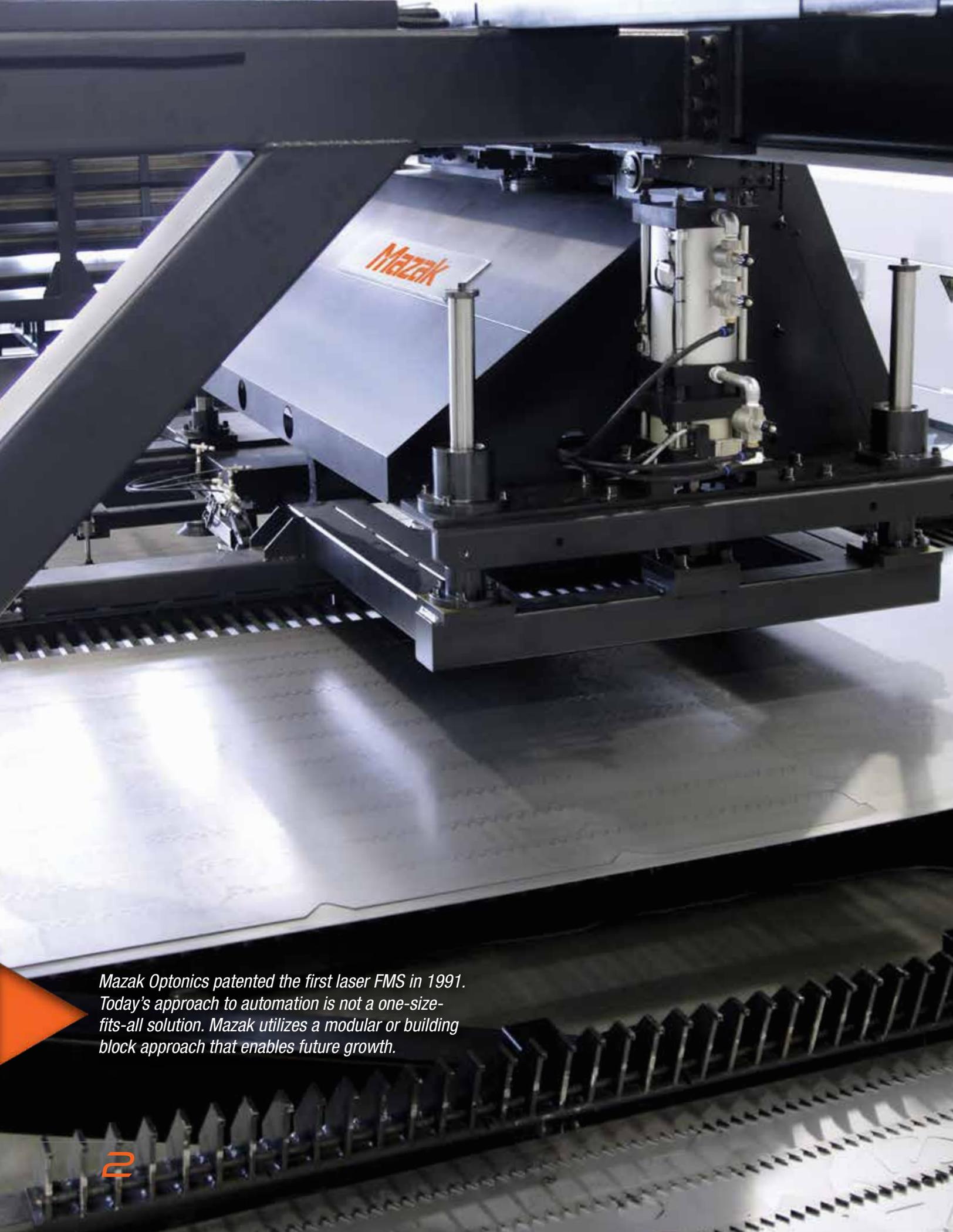


Mazak
OPTONICS CORP.
AUTOMATION





Mazak Optonics patented the first laser FMS in 1991. Today's approach to automation is not a one-size-fits-all solution. Mazak utilizes a modular or building block approach that enables future growth.

MAZAK ADVANCED AUTOMATION

MATERIAL AUTOMATION SYSTEMS WILL EXTEND THE THROUGHPUT CAPACITY OF YOUR MACHINES

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 (FMS). Today we offer the following systems:

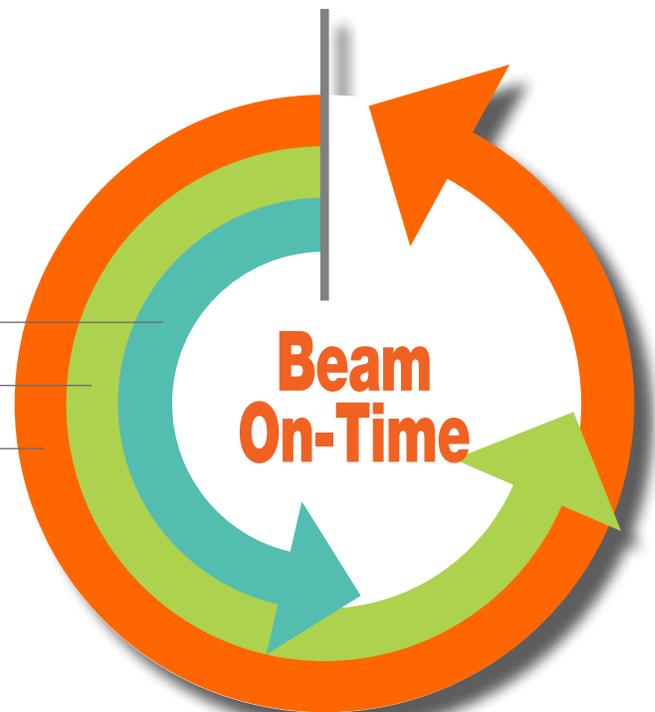
- ▶ QUICK CELL Compact Load/Unload Systems
- ▶ EXTENSIBLE MANUFACTURING CELL
- ▶ M-SERIES Automation Systems
- ▶ K-SERIES Automation Systems
- ▶ C-SERIES Automation Systems
- ▶ LASER FLEX Modular Automation Systems
- ▶ AUTOMATED STORAGE/RETRIEVAL
- ▶ SORTEK Multi-functional Sorting System
- ▶ SMART CELL Robotic Sorting System

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AUTOMATION PRODUCTIVITY

1. Standalone Shuttle Table 52%
2. Load/Unload System 75%
3. Flexible Manufacturing System 92%



The compact QUICK CELL 3015 is an economical solution for job shops or small batch production environments.



QUICK CELL

Watch the QUICK CELL
Demo Video



COMPACT SINGLE MACHINE AUTOMATION WITH AN ECONOMICAL INVESTMENT

The QUICK CELL 3015 Compact Automation Cell utilizes rugged construction and an innovative design to deliver high performance for fabrication job shops and production environments. The base design is a very compact load/unload, which can be configured as a full FMS with 6, 10 or 14 shelves. The number of shelves for material compared to finished parts can be specified at the time of order. QUICK CELL utilizes independent load and unload drive systems, reducing

work piece material changeover times. A scheduling unit is integrated into the QUICK CELL to simplify planning and operation. QUICK CELL is available in the following system configurations.

QUICK CELL 3015 with Pallet Changer Extension

QUICK CELL 3015 with 6 Level Stocker

QUICK CELL 3015 with 10 Level Stocker

QUICK CELL 3015 with 14 Level Stocker



QUICK CELL 3015 WITH 6 LEVEL STOCKER

Model	QUICK CELL 3015 with Pallet Changer Extension	QUICK CELL 3015 with 6 Level Stocker	QUICK CELL 3015 with 10 Level Stocker	QUICK CELL 3015 with 14 Level Stocker
Number of machines serviced	1	1	1	1
Maximum sheet size	3000 x 1500 mm	3000 x 1500 mm	3000 x 1500 mm	3000 x 1500 mm
Maximum sheet thickness	25 mm	25 mm	25 mm	25 mm
Maximum pallet capacity	3,000 kg	3,000 kg	3,000 kg	3,000 kg
Number of shelves	na	6	10	14
Material stack height	90 mm	90 mm	90 mm	90 mm
Loading type	Suction cups	Suction cups	Suction cups	Suction cups
Unloading type	Rake	Rake	Rake	Rake
Load/unload cycle time	60 seconds	60 seconds	60 seconds	60 seconds
Connection to AS/R	na	na	na	na



Mazak's EMC series utilizes a modular approach that enables future growth. The standard configuration can expand to a total of four machines.

EXTENSIBLE MANUFACTURING CELL

Watch the EMC
Demo Video



RUGGED LINEAR MANUFACTURING SYSTEM FOR HIGH VOLUME THROUGHPUT

Mazak's EXTENSIBLE MANUFACTURING CELL (EMC) is an FMS system that utilizes a modular or building block approach that enables future growth. Mazak's EMC series enables you to modify your configuration as your needs change, including the

number of machines within the cell. Standard configurations can expand to a total of four machines. The rugged design and construction of EMC systems deliver high material storage/transfer capacities and a long production life. Available only in a 3015 configuration.

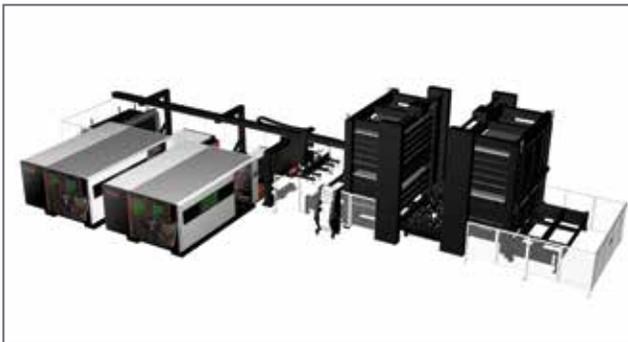
EXTENSIBLE MANUFACTURING CELL EXAMPLES



EMC 3015 ONE LASER (LUL)



EMC 3015 ONE LASER + ONE TOWER



EMC 3015 TWO LASERS + TWO TOWERS



EMC 3015 TWO LASERS + TWO TOWERS + UL TOWER

Model	EMC 3015 one laser (LUL)	EMC 3015 one laser + one tower	EMC 3015 two lasers + two towers	EMC 3015 two lasers + two towers + UL tower
Number of machines serviced	1	1	2	2
Maximum sheet size	3000 x 1500 mm	3000 x 1500 mm	3000 x 1500 mm	3000 x 1500 mm
Maximum sheet thickness	25 mm	25 mm	25 mm	25 mm
Maximum pallet capacity	3,000 kg	3,000 kg	3,000 kg	3000 kg
Number of shelves	na	10	20 (loading)	30 (20 load, 10 unload)
Material stack height	90 mm	90 mm	90 mm	90 mm
Loading type	Suction cups	Suction cups	Suction cups	Suction cups
Unloading type	Rake	Rake	Rake	Rake
Load/unload cycle time	90 seconds	90 seconds	270 seconds	270 seconds
Connection to AS/R	No	No	No	No

6

M-Series automation solutions can handle work sheets from 1mm to 25 mm without changing hardware.

3

8

Watch the M-SERIES
Demo Video



MAXIMUM FLEXIBILITY FOR JOB SHOPS AND SHORT RUN PRODUCTION

Mazak's M-Series of automation is the most flexible solution for meeting difficult customer needs. A wide range of peripheral devices and functions expand the range of applications including conveyors, over/under carts and labelers. Systems feature a small footprint and highly customizable configurations.

M-Series systems are available in a variety of 3015, 4020 and reverse flow configurations. They can be integrated into an AUTOMATED STORAGE/RETRIEVAL System for even greater capacity.

Mazak's M-Series automation can incorporate systems to separate parts and automatically load them onto pallets in production environments.

Format	3015	4020
Number of machines serviced	Up to 3	Up to 3
Maximum sheet size	3000 x 1500 mm	4000 x 2000 mm
Maximum sheet thickness	25 mm	25 mm
Maximum pallet capacity	3,000 kg	3,000 kg or 5,000 kg
Number of shelves	Customizable to ceiling height	Customizable to ceiling height
Material stack height	85 mm raw/ 90 mm UL (customizable)	48 mm raw/ 60 mm UL (customizable)
Loading type	Suction cups	Suction cups
Unloading type	Rake	Rake
Load/unload cycle time	Under 60 seconds (based on one-laser configuration)	80 seconds (based on one-laser configuration)
Connection to AS/R	Yes	Yes

M-SERIES EXAMPLES



MCS 3015 ONE LASER (LUL)



MST 3015 ONE LASER + ONE TOWER

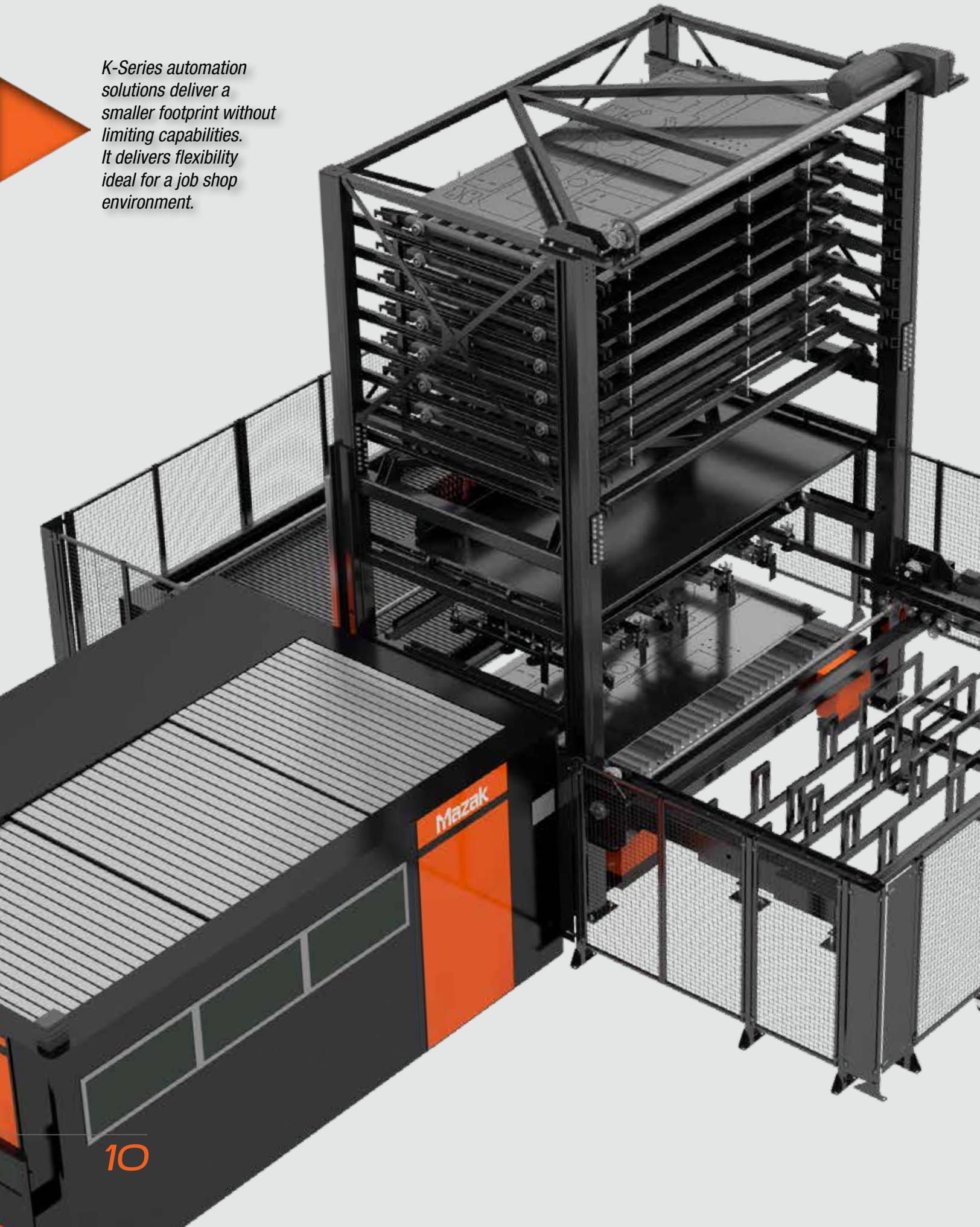


MDT 3015 TWO LASERS + TWO TOWERS



MDT 3015 TWO LASERS + TWO TOWERS + UL CART

K-Series automation solutions deliver a smaller footprint without limiting capabilities. It delivers flexibility ideal for a job shop environment.



Watch the K-SERIES
Demo Video



MAXIMIZING THE AVAILABLE FLOORSPACE FOR JOB SHOPS

Mazak's K-Series automation is designed to maximize the available floor space by utilizing vertical space for job shops. The expandable design allows the customers to grow from load/unload to one material tower and two-tower storage system with all the cut parts returning to the towers. Available in a variety of 3015, 4020 and reverse flow configuration. It is limited to one-laser system.

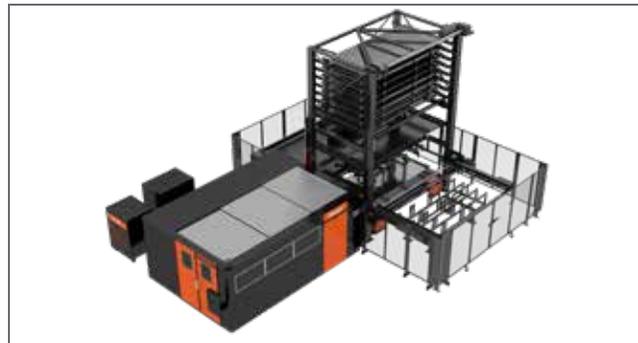
Mazak's K-Series automation can also be designed to incorporate systems to separate parts and automatically load them onto pallets in production environments.

Format	3015	4020
Number of machines serviced	1	1
Maximum sheet size	3000 x 1500 mm	4000 x 2000 mm
Maximum sheet thickness	25 mm	25 mm
Maximum pallet capacity	3,000 kg	3,000 kg
Number of shelves	Customized based on ceiling height	
Material stack height	85/90 mm	48/60 mm
Loading type	Suction cups	Suction cups
Unloading type	Rake	Rake
Load/unload cycle time	60 seconds	80 seconds
Connection to AS/R	No	No

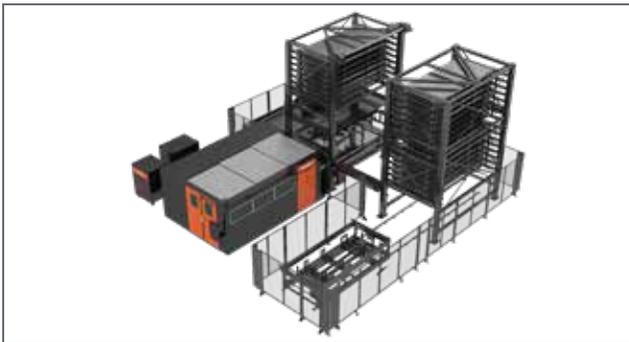
K-SERIES EXAMPLES



KCS 3015 ONE LASER (LUL)



KST 3015 ONE LASER + ONE TOWER



KDT 3015 ONE LASER + TWO TOWERS

The C-Series is a compact and affordable solution for single machine automation.



Watch the C-SERIES
Demo Video

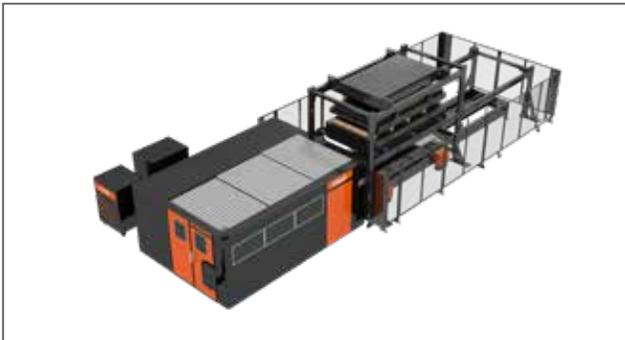


COMPACT AND SIMPLE LOAD/UNLOAD FOR NARROW FOOTPRINTS

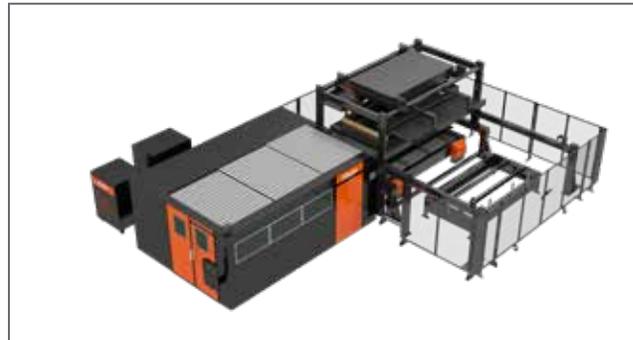
Mazak's C-Series is a simple load/unload system most suitable to place along the wall or limited floor space in small job shops. The system can be a lateral or frontal configuration, and it comes with one load pallet and one unload pallet for continuous production. Available in a variety of 3015 and 4020 configurations, and it is limited to one-laser system.

Format	3015	4020
Number of machines serviced	1	1
Maximum sheet size	3000 x 1500 mm	4000 x 2000 mm
Maximum sheet thickness	25 mm	25 mm
Maximum pallet capacity	3,000 kg	3,000 kg
Number of shelves	Customized based on ceiling height	
Material stack height	85/90 mm	48/60 mm
Loading type	Suction cups	Suction cups
Unloading type	Rake	Rake
Load/unload cycle time	60 seconds	80 seconds
Connection to AS/R	No	No

C-SERIES EXAMPLES



CSL 3015 ONE LASER (LUL - LATERAL)



CSF 3015 ONE LASER (LUL - FRONT)



Mazak's LASER FLEX systems incorporate both suction cups to load raw material and an independent clamshell unload system that accelerates sheet load/unload cycles. An optional SOFT TOUCH belt system on the forks reduces scratches on finished work.

Watch the LASER FLEX
Demo Video



HIGH THROUGHPUT AUTOMATION SYSTEM FOR PRODUCTION ENVIRONMENTS

LASER FLEX automation systems are designed for high volume production environments. They have a modular design and are available in a wide range of configurations and features that can be customized to facilitate throughput. LASER FLEX systems utilize independent load/unload functions to accelerate sheet-to-sheet cutting productivity. Sheets are loaded utilizing a suction cup based system and unloaded by a clamshell fork system. The clamshell forks can optionally be ordered with a SOFT TOUCH belt system to reduce the possibility of scratching finished workpieces. Towers can be added for load/unload capacity while cart systems and conveyors allow workpiece separation as production continues.

LASER FLEX systems are available in a variety of 3015, 4020 and reverse flow configurations. They can be integrated into an AUTOMATED STORAGE/RETRIEVAL System for greater capacity.

Mazak's LASER FLEX automation can also be designed to incorporate systems to separate parts and automatically load them onto pallets in production environments.

Format	3015	4020
Number of machines serviced	Up to 3	Up to 3
Maximum sheet size	3000 x 1500 mm	4000 x 2000 mm
Maximum sheet thickness	25 mm	25 mm
Maximum pallet capacity	3,000 kg	3,000 kg or 5,000 kg
Number of shelves	Customizable to ceiling height	Customizable to ceiling height
Material stack height	90 mm standard (customizable)	60 mm standard (customizable)
Loading type	Suction cups	Suction cups
Unloading type	Rake	Rake
Load/unload cycle time	Under 60 seconds (based on one-laser configuration)	80 seconds (based on one-laser configuration)
Connection to AS/R	Yes	Yes

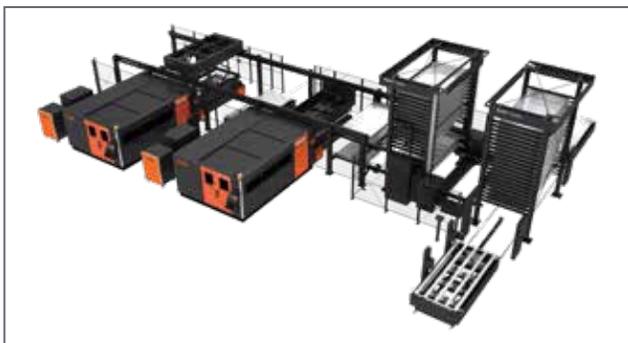
LASER FLEX EXAMPLES



LF 3015 ONE LASER (LUL)



LF 3015 ONE LASER + ONE TOWER



LF 3015 TWO LASERS + TWO TOWERS + UL CART



LF 3015 TWO LASERS + TWO TOWERS + CONVEYOR



*This AUTOMATED STORAGE/
RETRIEVAL SYSTEM
integrates two Mazak
OPTIPLEX fiber laser-
cutting machines to
maximize throughput of
components for the building
construction industry.*

AUTOMATED STORAGE/RETRIEVAL

Learn More
About the AS/R



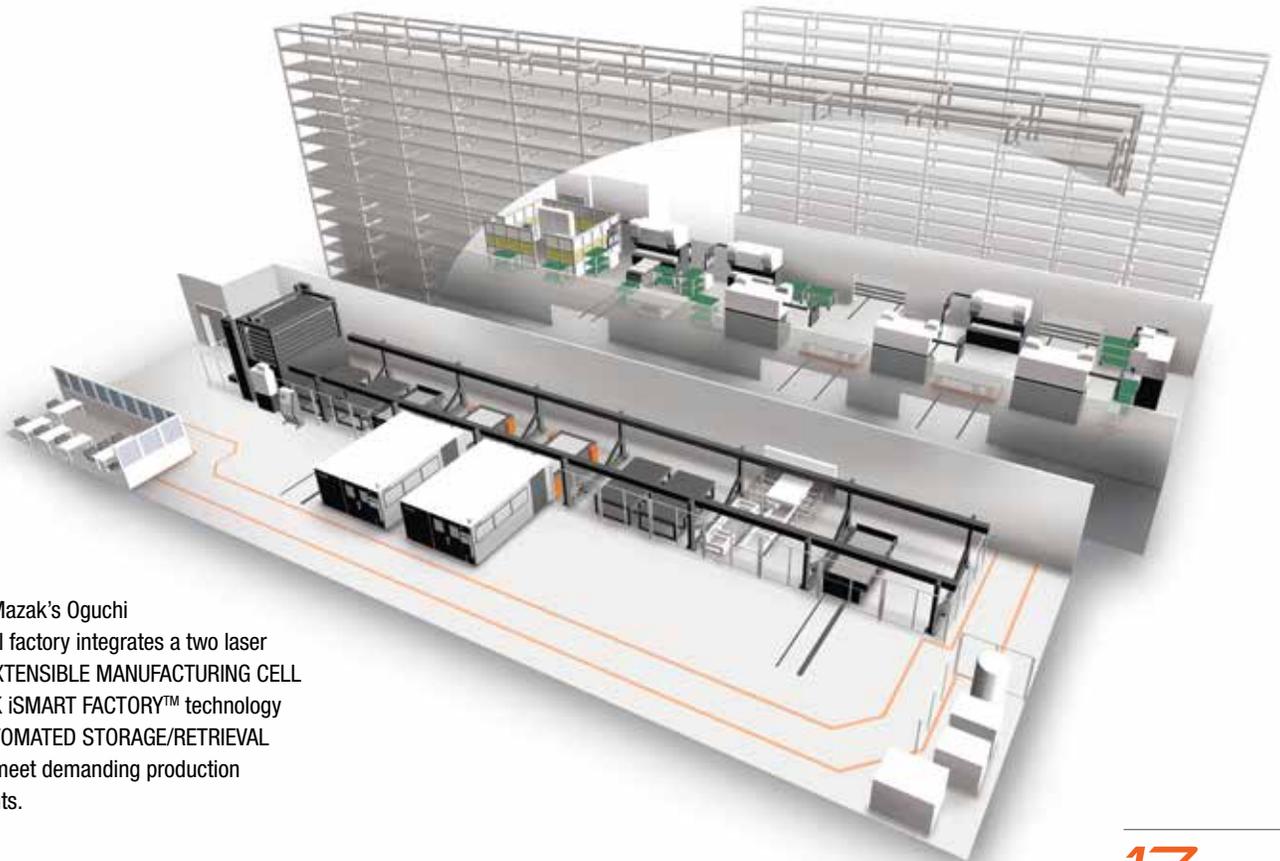
MAXIMIZES SPACE, FLEXIBILITY AND OPERATIONAL EFFICIENCY

An AUTOMATED STORAGE/RETRIEVAL (AS/R) System is a strategic investment for a fabrication operation. It delivers a competitive advantage that enables manufacturers to meet changing customer demands with significant operational efficiencies. The benefits of an AS/R System include reduced labor for transporting material/worksheets into and out of inventory and optimizing floor space costs by storing vertically. Sheets are often stored more densely than in systems where they are stored and retrieved manually.

An AS/R System can be utilized to support all functions within your fabrication operation including cutting, bending, welding and finishing. The systems operate under computerized control, maintaining an inventory of stored sheets in various stages of production. The computer determines where in the storage area

the sheets can be retrieved and schedules the delivery through a system of conveyors and or automated robotic handlers that moves them to the manufacturing floor.

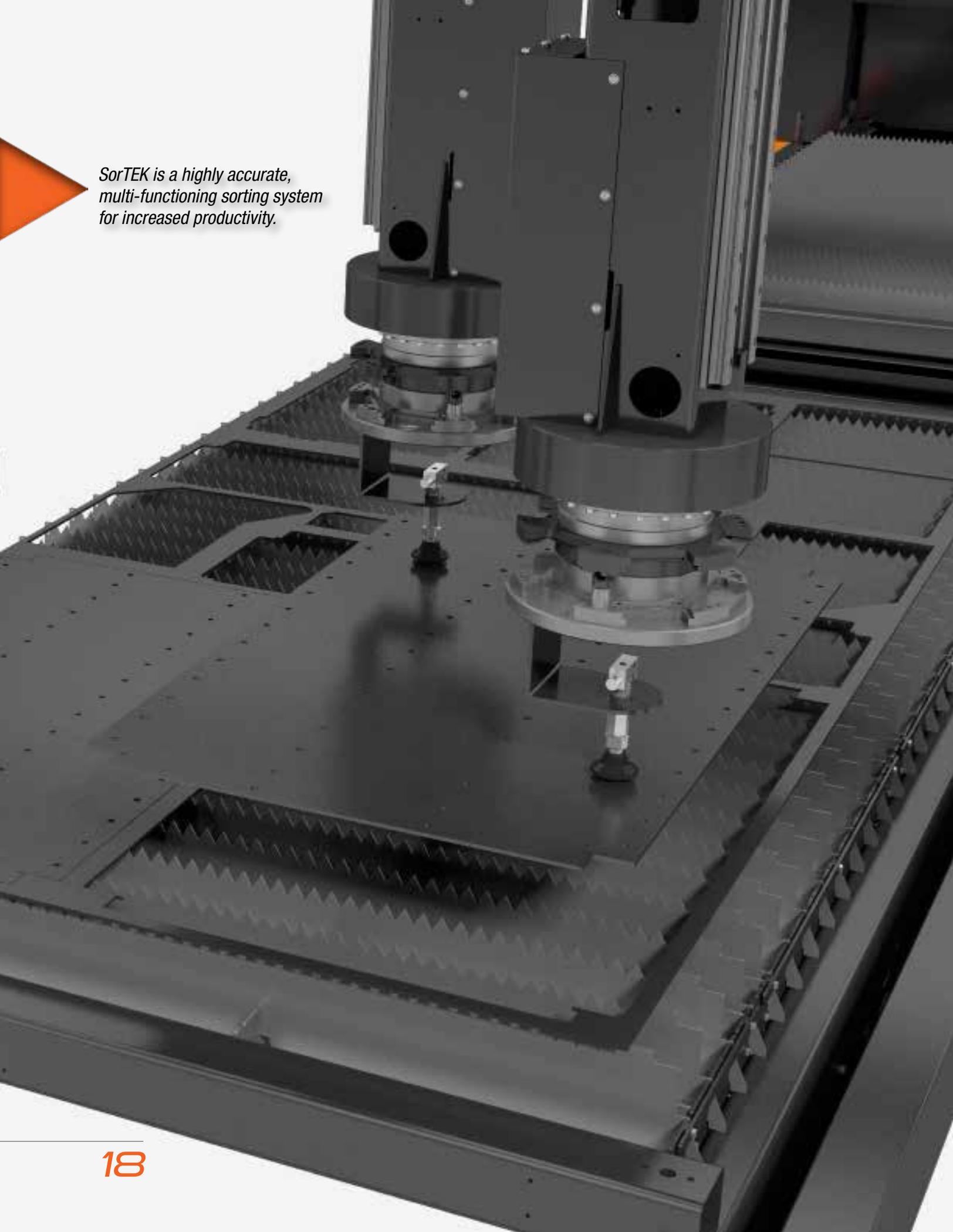
Mazak AS/R Systems can be integrated with LASER FLEX, MODULAR COMPACT, LATERAL COMPACT and EXTENSIBLE MANUFACTURING CELLS. They can be designed to store/retrieve 2412, 3015 and 4020 size worksheets.



Yamazaki Mazak's Oguchi sheet metal factory integrates a two laser machine EXTENSIBLE MANUFACTURING CELL and MAZAK iSMART FACTORY™ technology into an AUTOMATED STORAGE/RETRIEVAL system to meet demanding production requirements.



*SorTEK is a highly accurate,
multi-functioning sorting system
for increased productivity.*



Watch the SorTEK
Demo Video

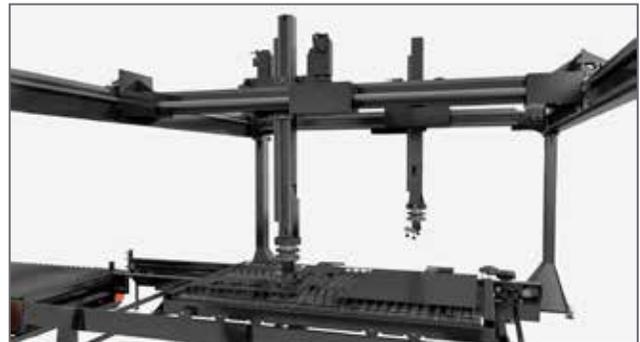


SORTEK MULTI-FUNCTION SORTING SYSTEM

Mazak's advanced part sorting system, SorTEK, provides for modular integration in a wide range of configurations. Sorting arms allow for both raw material loading, finished part sorting and skeleton removal. Multiple gripper options can be utilized both in tandem and singularly for higher productivity.

Format	3015	4020
Number of machines serviced	1	1
Maximum sheet size	3000 x 1500 mm	4000 x 2000 mm
Maximum sheet thickness	25 mm	25 mm
Loading type	Suction cups	Suction cups
Unloading type	Rake	Rake
Load/unload cycle time	60 seconds	80 seconds
Connection to AS/R	Yes	Yes
Gripper Type	Suction/Magnetic	
Maximum Part Weight	200lbs.	

SORTEK EXAMPLES



SMART CELL



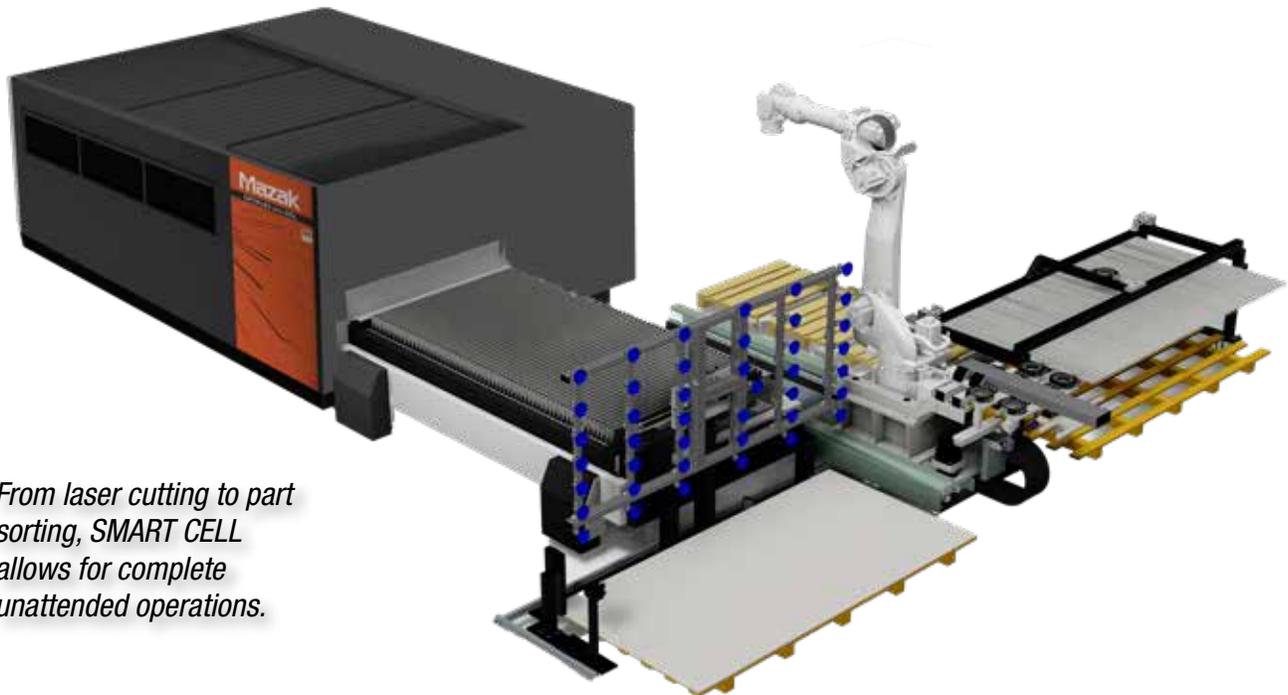
Watch the SMART CELL
Demo Video

AN ECONOMICAL INVESTMENT FOR HIGH-PERFORMANCE AUTOMATION

Improve your internal logistics and production flow with cutting-edge automation technology, Mazak's SMART CELL. The robotic sorting system utilizes a 6-axis industrial robot and an innovative design to deliver high performance for fabrication job shops and production environments. The base design is very

compact and provides modular integration in a wide range of configurations. SMART CELL incorporates multiple customizable magnetic or suction cup gripper options for sorting laser cut parts, loading raw material, and removing remnant material. This system is available to suit different types of applications for unattended production and can be integrated with other compact load and unload automation systems from Mazak.

Format	Smart Cell 225	Smart Cell 400	Smart Cell 600
Number of Machines Serviced	1	1	1
Maximum Sheet Size	3000 x 1500 mm	4000 x 2000 mm	4000x2000 mm
Maximum Sheet Thickness	7 mm	10 mm 3015 / 7mm 4020	16 mm 3015 / 10 mm 4020
Loading Type	Suction Cups	Suction Cups	Suction Cups
Unloading Type	Rake	Rake	Rake
Load/Unload Cycle Time	80 Seconds	90 Seconds	90 Seconds
Connection to AS/R	Yes	Yes	Yes
Gripper Type	Suction/Magnetic	Suction/Magnetic	Suction/Magnetic
Maximum Part Weight	100 lbs	100 lbs	100 lbs
Maximum Pallet Unload Height	600mm	600mm	600mm
Unload Pallet Dimensions	US Standard 40 x 48"	US Standard 40 x 48"	US Standard 40 x 48"



*From laser cutting to part
sorting, SMART CELL
allows for complete
unattended operations.*

ADDITIONAL PRODUCTIVITY SOLUTIONS

Watch the Additional Productivity
Solutions Demo Video



EXPANDED CAPABILITIES FOR LASER MACHINE MATERIAL HANDLING

A series of modular components are available that can extend the range of application, facilitate throughput and improve the overall efficiency of your laser automation cell. The solutions on this page are a few of the most common components utilized.

CONVEYORS

Conveyors are available in belt type for single sheet unloading of up to 5mm thick material and metal type for thicker material over 5mm. It allows for immediate access to a cut sheet outside of the safety fence and it permits you to safely move on to the next process in your production.

OVER/UNDER CARTS

Carts are available in 3,000 kg and 5,000 kg capacities. They enable the operator to access a hot job immediately after the laser-cut or provide the ability to stack cut sheets in unattended operation.

DESCENDING SCISSOR TABLE

Scissor tables allow stacking of laser-cut sheets by lowering the table height after each sheet is unloaded. They are available in 3,000 kg and 5,000 kg capacities.

LABELER

A simple labeling function is available using a Zebra inkjet printer for easy part sorting after the laser-cut operation. The unit offers black & white print only with capability to print simple geometry and bar code printing as an option.

4-PALLET UNLOAD TOWER

A mini unload tower equipped with 4 buffer unload pallets for unattended operation can stack completed work sheets. The operator can remove an unload pallet stacked with cut sheets by opening the tower gate and picking up the pallet with a fork lift.

8-PALLET UNLOAD TOWER

A mini unload tower with 2 x 4-pallet towers on both sides of the unload lifter provides more cut sheet stacking capacity.

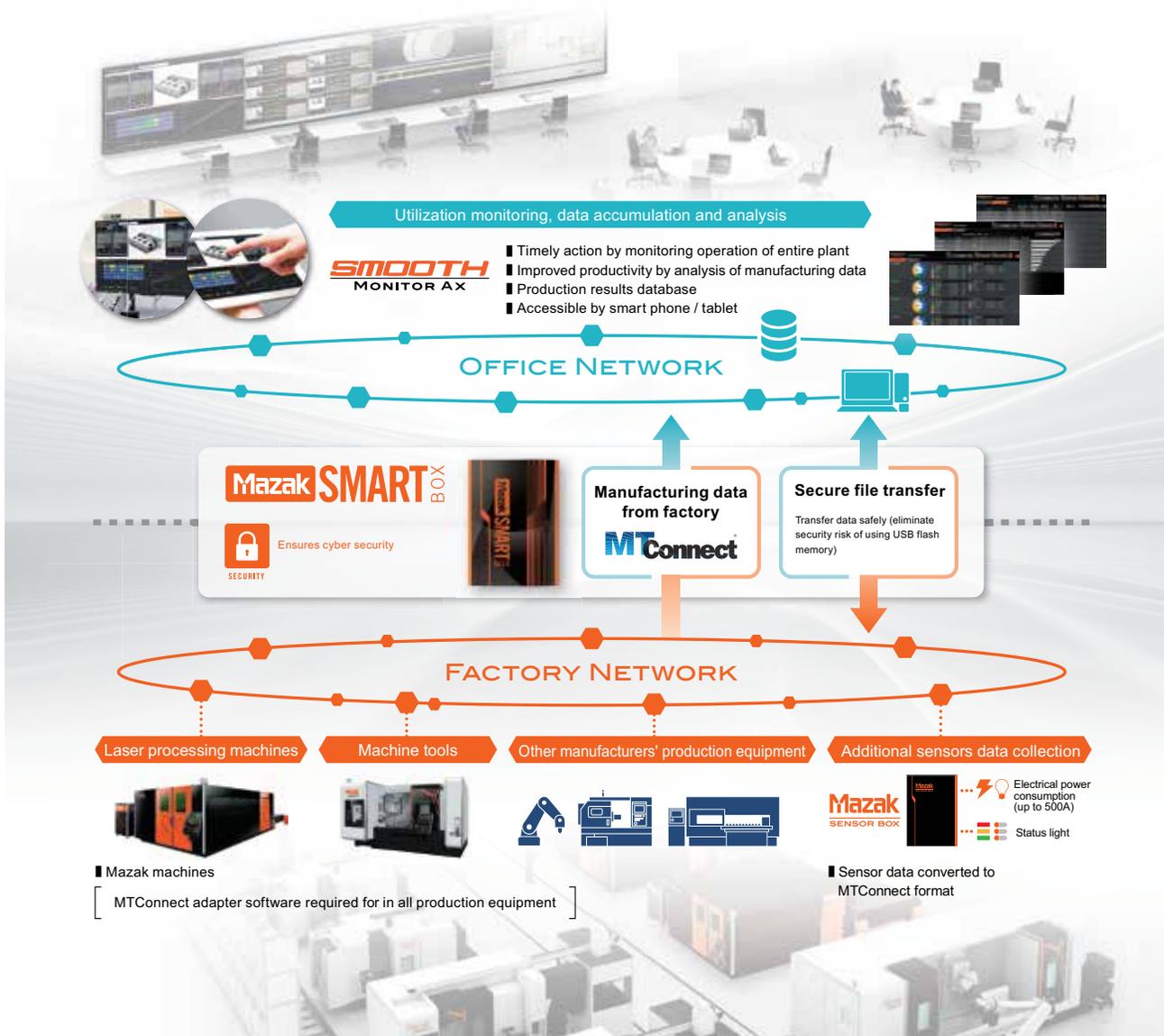
PART SORTING SYSTEMS

Mazak automation can be designed to incorporate systems to separate parts and automatically load them onto pallets in production environments.

For information on our extensive range of additional productivity solutions or for special engineered solutions to meet your special requirements, please contact your Mazak representative.

Mazak iSMART Factory™

Technology that helps manage real-time machine and factory performance.



TAKE RAW DATA, READ AND ANALYZE IT, THEN TURN IT INTO ACTIONABLE INFORMATION

An element of the Mazak iSMART Factory™ concept is the ability to utilize software that enables you to visualize the performance of cells, departments and the overall plant as compared to historical or target performance. These insights are the real-time tools that utilize IoT technology that helps enable fabricators to manage the process rather than reacting to historical reporting.

- ▶ See the productivity and increased profitability as it happens in real-time
- ▶ Productivity problems can be identified fast - accelerating resolution
- ▶ Plant-wide productivity increases in the range of 10% to 50%
- ▶ Dashboard metrics can be available for everyone on the shop floor to see

Mazak iSMART Factory™ offers an industrial internet platform solution for manufacturing including hardware and software that connects directly to manufacturing equipment. It is designed to monitor every machine in your shop, CNC machines, non-CNC machines, fabrication centers and manual processes, all tied together in a production process manufacturing execution system.

Machine monitoring delivers instantaneous, automatic and timed proactive email and text alerts to minimize downtime. Detailed analyses of downtime root causes points to areas requiring more operator training. Identification and removal of unnecessary optional stops helps recover lost production time.

Smooth Monitor AX

A software solution that gives you shop floor visibility and reporting

Smooth Monitor AX monitors machine operation status by connecting machines to a digital network. You can access operating status and metrics at a computer station, on a tablet or a cell phone.

Mazak SMARTBOX™

Secures data in an IoT environment

The Mazak SMARTBOX™ enables connectivity of machines and other production equipment to provide enhanced monitoring and analytical capabilities including advanced cyber security protection. Mazak SMARTBOX™ is specially designed for IoT by preventing unauthorized access.

MTConnect®

Digital information protocol for data transfer

MTConnect® is an open-source, royalty-free manufacturing protocol that easily connects devices and systems from different suppliers to capture and share information in a common format, such as XML. Mazak has incorporated this protocol within our machines to help standardize and simplify communication. It is a cornerstone in the implementation of Mazak iSMART Factory™ capabilities.

Mazak SENSOR BOX

Helps convert sensor signals into MTConnect® compatible outputs

Mazak SENSOR BOX expands monitoring capabilities to legacy machines and auxiliary devices. Sensors can include signal light status, coolant levels, temperatures, power consumption and other critical information. Sensor signals are converted in to MTConnect® protocol and communicated to Smooth Monitor AX.

Mazak

OPTONICS CORP.

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