



# **MEDICAL EXPERTS**

**ADVANCED MANUFACTURING  
TECHNOLOGY AND SUPPORT  
FOR THE MEDICAL INDUSTRY**

**Mazak**



We've Got You Covered from

# HEAD TO TOE

At Mazak, we understand the specialized machining requirements that come with processing medical parts.

That's why we have [the most advanced manufacturing technology and support resources in the industry](#), providing acute market knowledge, an extremely broad machine tool selection and extensive applications expertise.

Whether you're machining trial implants, orthopedic devices or surgical instruments from titanium, Inconel® or stainless steel, we have what you need to optimize your manufacturing operations, produce intricate and complex parts with absolute precision as well as reduce design-to-market time at the lowest possible cost.



MEDICAL IMPLANTS



SURGICAL INSTRUMENTS



DENTAL IMPLANTS



VARIOUS MATERIALS

## TECHNOLOGY

Extensive experience working with medical manufacturers keeps our research and development focused on developing and refining innovations that enhance your operations. In fact, we continuously monitor trends and identify challenges so that we can create advanced technologies that adapt to an evolving market, including:

- Machines for fast prototype development up to efficient high-volume production.
- Multi-Tasking machines that reduce lead times, boost precision and lower operating expenses.
- **DONE IN ONE®** machines that process parts complete in a single setup.
- Manufacturing equipment that provides high throughput and consistent quality.
- High-speed spindles that produce superior surface finishes.
- Advanced CNC technology for easy programming and fast 5-axis machining.
- Easy automation integration for continuous part processing and lights-out production.
- Small footprint, highly productive machines that conserve valuable floor space.



## SUPPORT

Through our extensive support network, well-established machine service infrastructure, industry partnerships and medical expertise, we can help you tackle highly challenging part processing applications. This includes establishing predictable and stable manufacturing methods to stay compliant with stringent industry standards and government regulations.

- Eight regional Technology Centers and a Technical Center enhance our support capabilities across North America.
- We work with certified technology partners to provide highly optimized turnkey systems.
- Our vast CAM knowledge can optimize your Multi-Tasking and 5-axis programming.
- Our **Optimum Plus** total support program fulfills your every part, service and training need.
- We provide secure applications development and guarantee system design privacy.

# QUALITY PARTS FOR PATIENT SAFETY AND CLINICAL SUCCESS

When it comes to producing implants — both trial and major — or instruments for the medical and dental fields, we have a solution that can help you consistently machine with surgical precision. The following are part types and materials you can productively process with our machines.



## Medical Implants:

- Acetabular cups, femoral caps and stems for hip replacements
- Femoral parts, bearing inserts and tibial trays for knee replacements
- Cardiovascular parts for circulatory support and valve repair
- Complex contoured bone plate solutions
- Flat plates for spine, humeral, ankle and finger operations

## Surgical Instruments:

- Surgery trays
- Rasps, cut blocks and cutters
- Bone saws and shears
- Drills and reamers
- Knives, pliers and forceps
- X-ray machine parts
- CAT scan system components

## Dental Implants:

- Abutments
- Bridges and bars
- Crowns
- Pins

## Materials:

- Inconel®
- Titanium
- Cobalt chrome
- Zirconia
- Stainless steel



# MEDICAL HEROES

## INTEGREX MULTI-TASKING MACHINES

These high-precision machines can process most or all of your medical parts in one cycle. By combining several cutting processes, including turning, milling, drilling and more, on one machine, you significantly reduce your setup times and eliminate the inaccuracies that occur when moving a part across multiple workstations.



### **INTEGREX i-150**

This Multi-Tasking machine brings versatility and accuracy to the production of small, complex components from 2.5" bar stock materials. It performs DONE IN ONE machining, which includes turning and full 5-axis milling operations, with the help of a 5,000-rpm turning spindle and powerful 12,000-rpm milling spindle with a versatile 200-degree B-axis. Second operations are carried out by a lower work station where finished parts can be automatically unloaded.



### **INTEGREX i-100S**

Combining the capabilities of a high-powered turning center and full-function machining center, this Multi-Tasking machine easily produces precision parts in single setups. Plus, it features a second turning spindle for DONE IN ONE machining as well as works to minimize fixtures, tools, handling and non-cut times.



### **INTEGREX i-100ST**

Through its two turning spindles, milling spindle and lower turret, this Multi-Tasking machine can process first and second machining operations simultaneously or perform required sequential operations on a single workpiece. And because the machine handles all processes from raw material input through final machining, users benefit from dramatic reductions in lead times and improvements in workpiece accuracy through the elimination of multiple setups.



### **INTEGREX i-100 BARTAC-ST**

Providing unsurpassed efficiency in the machining of bar material up to 4", this Multi-Tasking machine features an INTELLIGENT BAR LOADER SYSTEM that automatically feeds out the material the required distance from the chuck and minimizes the bar remnant. Also, adding to the machine's advanced capabilities are its two turning spindles, milling spindle and lower turret that allow for DONE IN ONE prismatic part processing with optional unloader.

# MEDICAL MARVELS

## VARIAXIS MULTI-SURFACE, 5-AXIS MACHINING CENTERS

These small-footprint machines bring high-speed, high-accuracy performance to medical part production. Because of their multi-surface, 5-axis capabilities, you gain infinite possibilities as to the part sizes and shapes you can process. You also benefit from increased throughput and shortened lead times.



### **VARIAXIS j-500/5X**

This machining center provides cost-effective single setup part processing thanks to its high-accuracy 5-axis rotary/tilt table and DONE IN ONE capabilities. It employs a powerful high-rigidity spindle available in rpm speeds of 12,000 or 18,000 for tackling a variety of tough materials. Available with tool storage capacities of 18 or 30 tools, the machine can change tools without having to return its table to the home position, resulting in lower cycle times.



### **VARIAXIS j-600/5X**

Through its high-precision rotary/tilt table, this machining center offers high-value simultaneous 5-axis capabilities and DONE IN ONE operations for processing parts in single setups. It relies on a powerful high-rigidity spindle in rpm speeds of 12,000 or 18,000 for tackling a variety of tough materials. Available with tool storage capacities of 18 or 30 tools, the machine can change tools without having to return its table to the home position, resulting in lower cycle times.



### **VARIAXIS i-500**

Able to produce parts in single setups, this machining center offers full simultaneous 5-axis capabilities as well as performs multiple and complex curved surface machining. It comes standard with a 12,000-rpm spindle, with an optional high-torque version. Maximum spindle speeds of 18,000, 25,000 and 30,000 rpm are also available to exceed various metal removal requirements. An automatic tool changer with tool storage capacities up to 120 tools also adds to this machine's exceptional versatility.



### **VARIAXIS i-600**

This machining center offers full simultaneous 5-axis capabilities as well as performs multiple and complex curved surface machining to effectively process parts in single setups. It comes standard with a 12,000-rpm spindle, with an optional high-torque version. Maximum spindle speeds of 18,000, 25,000 and 30,000 rpm are also available to exceed various metal removal requirements. An automatic tool changer with tool storage capacities up to 120 tools also adds to this machine's exceptional versatility.

# MEDICAL WONDERS

## VC MACHINING CENTERS

These cost-effective machines employ the latest, most advanced milling technology for boosting productivity and growing your medical part manufacturing business. And because these machines come in 3- or 5-axis versions, we can ensure you have the best solution for your needs with the lowest cost of ownership in the industry.



### VC-300A/5X

Offering an excellent price-to-performance ratio, this machining center comes with either a 3-axis table for basic workpiece geometries or a rotary/tilt table for full simultaneous 5-axis performance. Both feature powerful 40-taper spindles available in rpm speeds of 10,000, 12,000 or 20,000 for unbeatable metal removal capabilities. An automatic tool changer reduces non-cut times, while 18 and 24 tool storage capacities ensure continuous machining operations.



### VC-500A/5X

Bringing together advanced technology and maximum value, this machining center comes with a trunnion-style rotary/tilt table for full simultaneous 5-axis performance. It employs a powerful 40-taper spindle that's available in rpm speeds of 12,000, 15,000 or 20,000 for unbeatable metal removal. An automatic tool changer reduces non-cut times, while 30, 40 and 60 tool storage capacities ensure continuous machining operations.

Visit [MazakUSA.com/medical](http://MazakUSA.com/medical) to see our complete line of machines for the medical industry.

# EASY PROGRAMMING AND FAST MACHINING

Whether you're running 3-axis or Multi-Tasking operations, we're able to meet your unique medical requirements through our advanced control technology that perfectly complements our machine tools and systems.



## MAZATROL SmoothX CNC

Revolutionary programming for highly complex workpiece geometries

- INTEGREX i-150
- INTEGREX i-100S
- INTEGREX i-100ST
- INTEGREX i-100 BARTAC-ST
- VARIAXIS i-500
- VARIAXIS i-600
- VARIAXIS j-500/5X
- VARIAXIS j-600/5X
- VC-300A/5X
- VC-500A/5X

As the fastest, most progressive CNC on the market, the user-friendly [MAZATROL SmoothX](#) ensures the shortest possible machining cycle times, especially in fine increment programs for simultaneous 5-axis operations. Innovative software functions, including High Gain Feed Forward Control, Smooth Corner Control and Variable Acceleration Control, bring maximum productivity to highly complex parts production. Advanced hardware such as a tilting CNC panel and intuitive, multi-touch control screen allows for complete ease of use, while an SD card stores up to 32GB of program data.

# MACHINE SPECIFICATIONS

		INTEGREX i-150	INTEGREX i-100S	INTEGREX i-100ST	INTEGREX i-100 BARTAC-ST
CAPACITY	TABLE	N/A	N/A	N/A	N/A
SPINDLE	TAPER	HSK (CAPTO C6, KM-63)	HSK (CAPTO C6, KM-63)	HSK (CAPTO C6, KM-63)	HSK (CAPTO C6, KM-63)
	STANDARD RPM SPEED	5,000 (MAIN SPINDLE) 12,000 (MILLING SPINDLE)	6,000 (MAIN SPINDLE) 6,000 (SECOND SPINDLE) 12,000 (MILLING SPINDLE)	6,000 (MAIN SPINDLE) 6,000 (SECOND SPINDLE) 12,000 (MILLING SPINDLE)	2,000 (MAIN SPINDLE) 6,000 (SECOND SPINDLE) 12,000 (MILLING SPINDLE)
	OPTIONAL RPM SPEEDS	20,000 (MILLING SPINDLE)	20,000 (MILLING SPINDLE)	20,000 (MILLING SPINDLE)	20,000 (MILLING SPINDLE)
	STANDARD MOTOR OUTPUT	MAIN SPINDLE, 30 MINUTE RATING	15 HP	15 HP	15 HP
SECOND SPINDLE, 30 MINUTE RATING		—	15 HP	15 HP	15 HP
MILLING SPINDLE		10 HP (20% ED RATING)	10 HP (30 MINUTE RATING)	10 HP (20% ED RATING)	10 HP (30 MINUTE RATING)
MAGAZINE	STANDARD NUMBER OF TOOLS	36	36	36	36
	OPTIONAL NUMBER OF TOOLS	72	72	72	72
ROTARY AXIS	B-AXIS (STROKE/INCREMENT)	-10°-190° / .0001	-30°-210° / .0001	-30°-210° / .0001	-30°-210° / .0001
	C-AXIS	360° / .0001	360° / .0001	360° / .0001	360° / .0001
FEED AXIS	X-AXIS	14.57"	17.72"	17.72"	17.72"
	Y-AXIS	7.84"	8.27"	8.27"	8.27"
	Z-AXIS	17.13"	35.59"	35.59"	35.59"
	X2-AXIS	N/A	N/A	8.66"	8.66"
	Y2-AXIS	N/A	N/A	35.55"	35.66"
MACHINE SIZE	WIDTH	91.4"	98.2"	98.2"	98.2"
	LENGTH	99.6"	119.3"	119.3"	127.2"
	HEIGHT	98.5"	98.5"	98.5"	98.5"

		VARIAXIS i-500	VARIAXIS i-600	VARIAXIS j-500/5X	VARIAXIS j-600/5X	VC-300A/5X	VC-500A/5X
CAPACITY	TABLE	Ø19.69" X 15.75"	Ø23.62" X 19.69"	Ø19.69" X 15.75"	Ø23.62" X 19.69"	RIGHT/LEFT: 11.8" LONGITUDINAL: 15.75"	Ø19.680" X 12"
SPINDLE	TAPER	#40 (HSK)	#40 (HSK)	#40 (HSK)	#40 (HSK)	#40	#40
	STANDARD RPM SPEED	12,000	12,000	12,000	12,000	10,000	10,000
	OPTIONAL RPM SPEEDS	12,000 HIGH TORQUE; 18,000, 25,000 AND 30,000	12,000 HIGH TORQUE; 18,000, 25,000 AND 30,000	18,000	18,000	12,000 AND 20,000	12,000, 15,000 AND 20,000
	STANDARD MOTOR OUTPUT	30 HP (30 MINUTE RATING)	30 HP (30 MINUTE RATING)	15 HP (30 MINUTE RATING)	15 HP (30 MINUTE RATING)	15 HP (40% ED)	15 HP (40% ED)
MAGAZINE	STANDARD NUMBER OF TOOLS	40	40	18	18	18	30
	OPTIONAL NUMBER OF TOOLS	40, 60, 80, 120, 160, 200, 240, 280, 320 AND 360	40, 80, 120, 160, 200, 240, 280, 320 AND 360	30	30	24	40 AND 60
ROTARY AXIS	A-AXIS	-120° ~ +30°	-120° ~ +30°	-120° ~ +30°	N/A	N/A	N/A
	B-AXIS (STROKE/INCREMENT)	N/A	N/A	N/A	-120° ~ +90°	-120° ~ +20°	±110°
	C-AXIS	±360°	±360°	±360°	±360°	±360°	±360°
FEED AXIS	X-AXIS	13.78"	20.08"	13.78"	33.46"	11.81"	19.88"
	Y-AXIS	21.65"	35.83"	21.65"	21.65"	11.81"	19.88"
	Z-AXIS	20.08"	20.08"	20.08"	20.08"	20.08"	20.07"
MACHINE SIZE	WIDTH	94.49"	86.61"	74.8"	94.49"	38.58"	99.2"
	LENGTH	120.47"	149.84"	120.47"	123.39"	96.46"	118"
	HEIGHT	117.13"	125.47"	111.81"	120.47"	104.33"	118.11"

## PROGRAMMING OPTIMIZATION

CAM software, which generates part-machining programs for CNC machine tools, is essential for the quick and accurate processing of medical parts with complex geometries. However, with the wide variety of CAM software available today, it can be difficult to differentiate between the intricacies of each one as they relate to your application requirements.

At Mazak, we have proficiency in all of the leading CAM systems, which enables us to help you optimize your Multi-Tasking and 5-axis programming no matter what system you are running inside your shop.

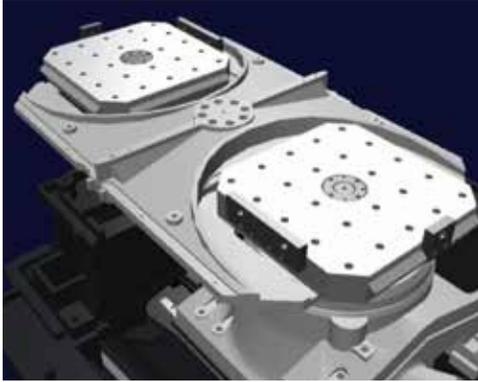


**OUR EXTENSIVE CAM SOFTWARE EXPERIENCE** can assist you in tasks that include:

- Determining the best possible CAM system for your needs.
- Programming every machine tool in your shop in a uniform manner.
- Reading any type of electronic data and manipulating it for machining efficiency.
- Generating efficient tool paths for a variety of complex geometries quickly and easily.
- Simulating the machining process in a “virtual” environment to ensure program accuracy.
- Producing clear, easy to understand process setup documentation for the shop floor.

# UNINTERRUPTED MACHINING AND LIGHTS-OUT PRODUCTION

Adding automation to medical part production can greatly increase your machine tool utilization and give you the competitive advantage. Through our own internal capabilities and strategic partnerships, we can provide you with a standardized or customized automation system that offers immediate benefits for increased productivity and consistent part quality.



## TWO-PALLET CHANGER

Provides continuous part processing on these machines:

- VARIAXIS i-500
- VARIAXIS j-500/5X
- VARIAXIS i-600
- VARIAXIS j-600/5X

This simple and efficient automation option boosts productivity by allowing operators to load, unload and inspect parts on one pallet, while the machines continue to work uninterrupted on parts fixtured on the other pallet.



## STAND-ALONE ROBOTS

Stand-alone [articulated robots](#) make it easy for manufacturers to handle part transfers and peripheral operations, eliminating the challenges that come with handling large, heavy or cumbersome parts. These robots use rotary joints to achieve an increased range of motion. From simple two-joint robots to complex 10-joint robots, you have the power to choose just how much range of motion is necessary to gain the competitive advantage.



## PALLETECH AUTOMATION SYSTEM

Brings amazing production flexibility to these machines:

- VARIAXIS i-500
- VARIAXIS i-600

A Mazak exclusive, this [multi-tasking automation solution](#) brings high levels of efficiency to high-mix, low-volume production as well as high-volume operations. It is available in 1-, 2-, and 3-level pallet stoker configurations. And because of its modular pre-engineered construction, PALLETECH easily expands and can accommodate up to 16 machines, 6 to 240 pallets and up to eight loading stations.

# WE'VE GOT YOUR BACK

We believe in working closely with each of our medical customers to increase their productivity, efficiency and equipment utilization, and we are able to do so through our Technology and Technical Centers and Optimum Plus total support program.

## Technology and Technical Centers

Our eight Technology Centers and a Technical Center spread across North America provide easy access to the latest, most advanced manufacturing systems for optimizing your part-production processes. You can also take advantage of each location's industry expertise, training programs and application resources to achieve improved throughput, shorter production lead times and increased profitability.

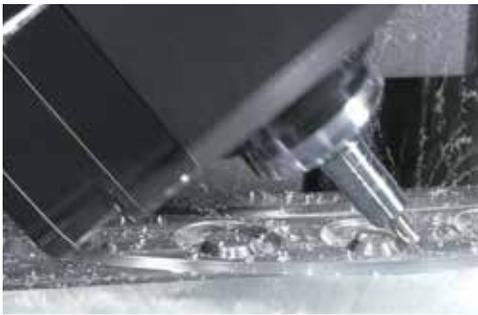


[Click here for more information on Mazak Technology Centers.](#)

## Optimum Plus

This total support program represents our company-wide commitment to helping you maximize the value of your Mazak purchase, achieve the best possible competitive advantage and keep your equipment running smoothly at all times.

The program encompasses five distinct areas to ensure complete customer care.



### **SINGLE-SOURCE SERVICE**

We are your single point of contact for any Mazak-related service need, whether it involves a machine, control, accessory or automation solution.

### **MACHINE & CNC SUPPORT**

Every Mazak machine comes with a comprehensive warranty, free technical phone support and software upgrades for the entire life of the product.

### **PARTS SUPPORT**

We have the industry's largest inventory of spare parts, ensuring 97% same-day shipping on part orders. [Click here to register for after hours parts support.](#)



### **PROGRESSIVE LEARNING**

We partner with our customers to train them to achieve the highest levels of productivity and profitability.

### **SPINDLE & UNIT REBUILD**

Our industry-leading exchange and rebuild program offers new and remanufactured spindles, index tables, ATC shifters and milling turrets for 24-hour shipment.

# GLOBAL SUPPORT NETWORK

MAZAK PROVIDES TOTAL BEFORE AND AFTER SALES AND SUPPORT

## FAST SPARE PARTS DELIVERY

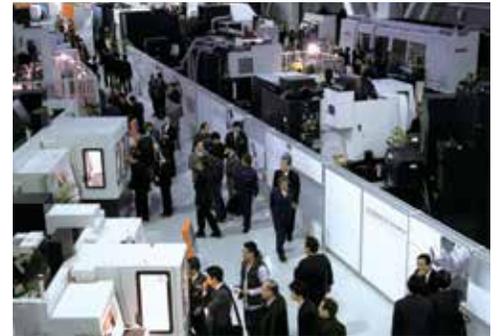
To consistently achieve high machine uptime and maximum performance, it is imperative that spare parts are available as quickly as possible when they are needed. The World Parts Center is designed to supply spare parts worldwide 24 hours a day, 365 days a year. The World Parts Center works closely with our regional parts centers all over the world to ensure that they are properly stocked to support the installed base of machines in each region.



## TECHNOLOGY AND TECHNICAL CENTERS

Yamazaki Mazak has established more than 38 Technology Centers and 40 Technical Centers in more than 20 countries. In addition to providing machine demonstrations and introductions to advanced technology and concepts, our Technology and Technical Centers have been established to provide opportunities for our customers to learn how to improve productivity with their machine tools after they have been purchased and installed.

The Technology and Technical Centers are the local bases for our team of highly skilled service engineers that provide support to customers wherever their manufacturing facilities are located.



## WORLDWIDE R&D CENTERS

Yamazaki Mazak has established strong R&D Centers in all of its manufacturing plants so that product development can consistently reflect local customer requirements as quickly as possible.



## MAZAK GLOBAL SUPPORT NETWORK

The worldwide production base and the worldwide network of Technology Centers and Technical Centers provides technical support for higher productivity and timely service.



EUROPE  
Yamazaki Mazak U.K. Ltd.



CHINA  
Ningxia Little Giant Machine Tool Co., Ltd.



SOUTHEAST ASIA, INDIA AND OCEANIA  
Yamazaki Mazak Singapore Pte., Ltd.



JAPAN  
Yamazaki Mazak Minokamo Corporation  
Minokamo Plant 1



JAPAN  
Yamazaki Mazak Corporation



NORTH, CENTRAL AND SOUTH AMERICA  
Mazak Corporation



JAPAN  
Yamazaki Mazak Minokamo Corporation  
Minokamo Plant 2



JAPAN  
Yamazaki Mazak Seiko Corporation



JAPAN  
Yamazaki Mazak Optonics Corporation



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