



AW MILLER
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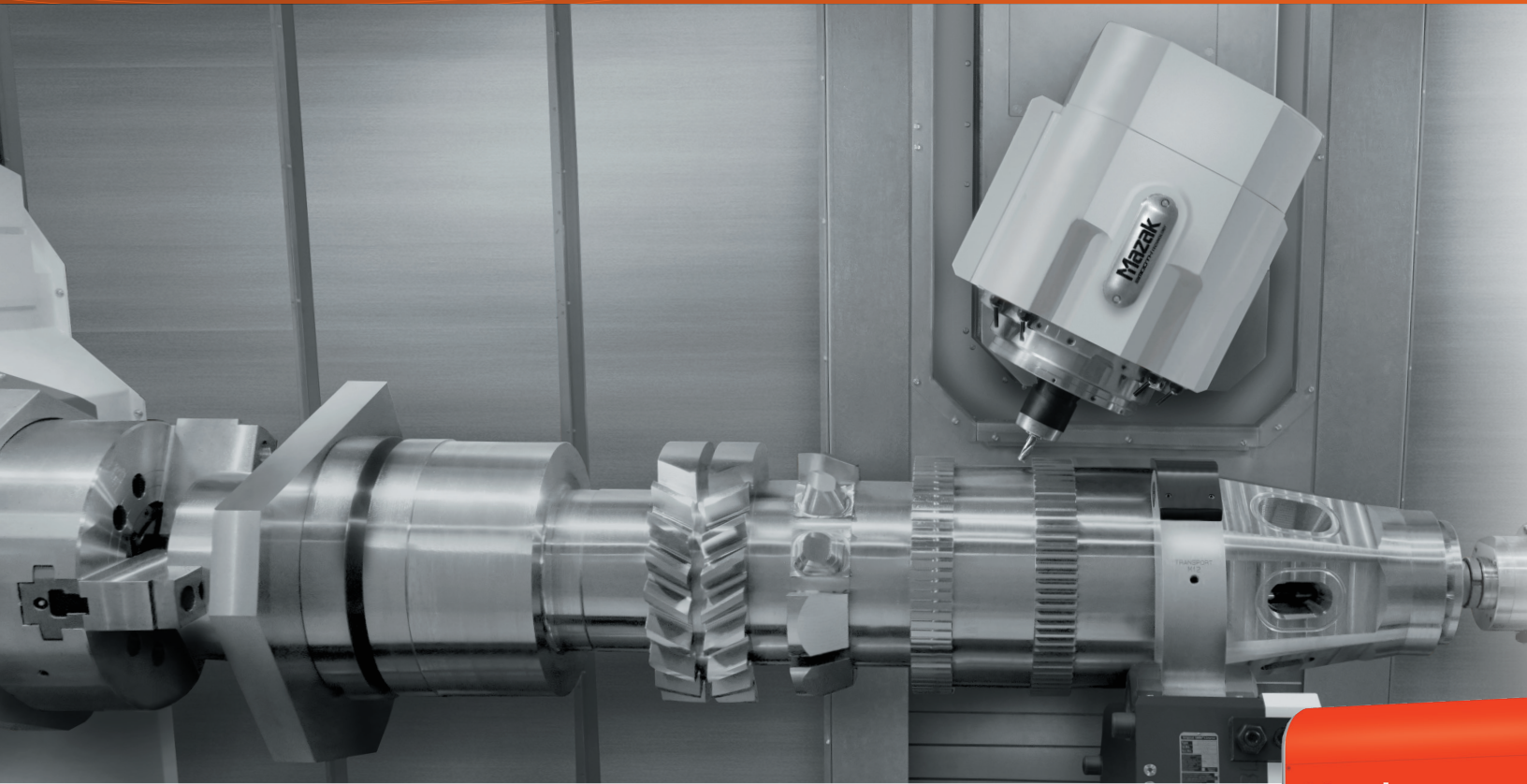
INTEGREX i-500

Mazak

[Multi-Tasking Machine]



INTEGREX i-500



Advanced INTEGREX with exceptional Multi-Tasking performance

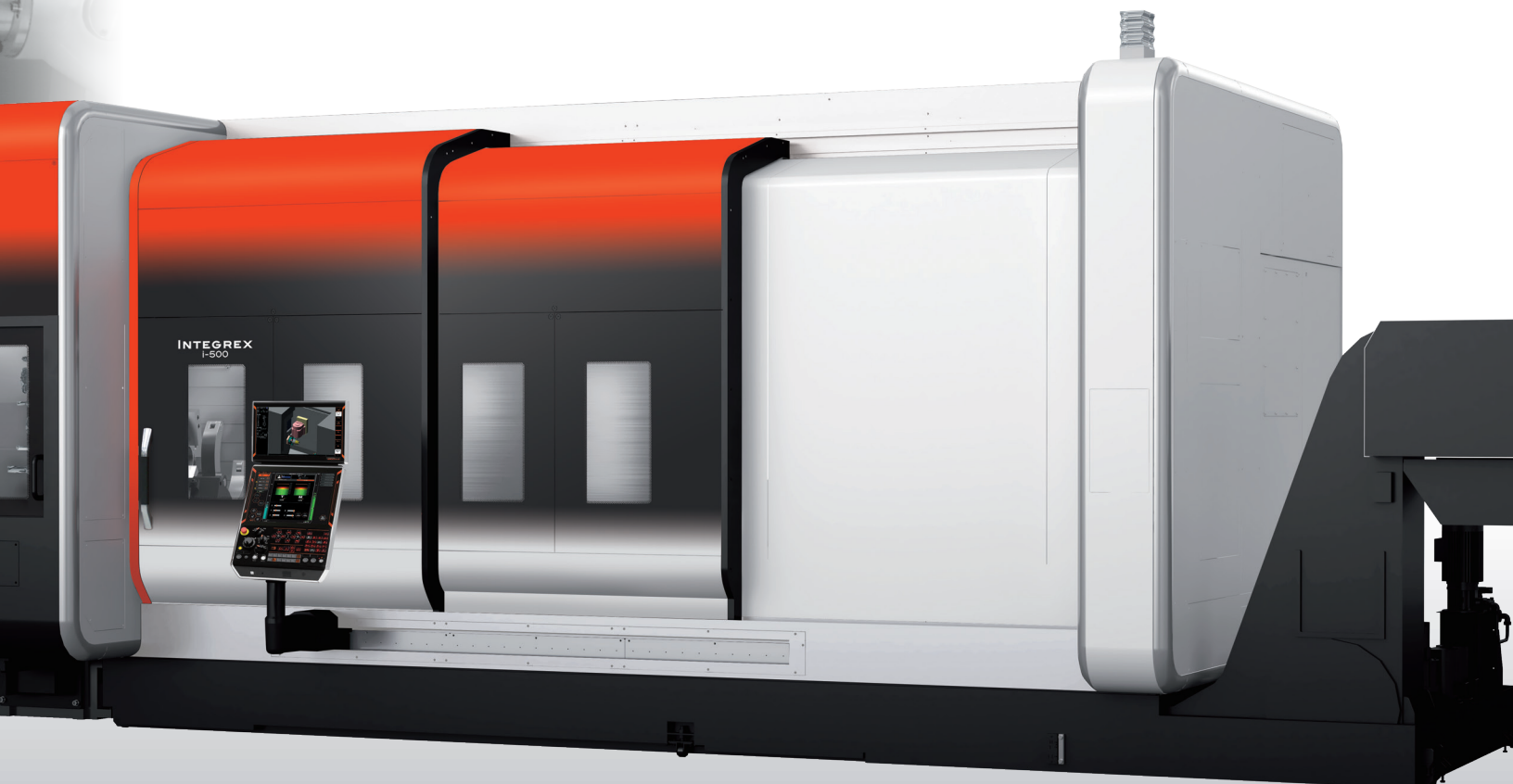
- Exceptional ease of operation, compact design, large machining area, high-power spindles and high-rigidity construction
- Based on more than 30 years of accumulated experience in the production of Multi-Tasking machines
- Exceptional performance versatility: Gear milling, gear hobbing, deep drilling capability and many other advanced functions



Wide variety of specifications to meet any production requirements

A wide range of universal, tailstock, second-spindle and lower turret specifications is available, as well as turning and milling spindles, to enable optimal customization for machining in all industries.

Universal	Main spindle	Milling spindle	Second spindle	Tailstock	Lower turret
1500U	4000 rpm 30 kW (40 HP) ø91 mm (ø3.58")	12000 rpm 24 kW (32 HP) #40 spindle	4000 rpm 30 kW (40 HP) ø91 mm (ø3.58")	MT No.5 Built-in center	9D Tuning/Milling
2500U	3300 rpm 37 kW (50 HP) ø112 mm (ø4.41")	12000 rpm 37 kW (50 HP) #40 high-output spindle	3300 rpm 37 kW (50 HP) ø112 mm (ø4.41")		
3000U	2500 rpm 37 kW (50 HP) ø132 mm (ø5.20")	20000 rpm 24 kW (32 HP) #40 high-speed spindle	2500 rpm 37 kW (50 HP) ø132 mm (ø5.20")		
	2000 rpm 37 kW (50 HP) ø185 mm (ø7.28")	10000 rpm 37 kW (50 HP) #50 spindle			



INTEGREX i-500

Shown with optional equipment

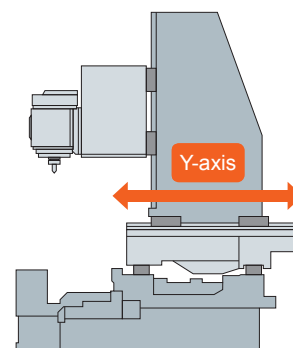
Higher Accuracy

All components of the INTEGREX i-500 are designed with maximum rigidity, including the machine bed, carriage and spindle headstocks.



Orthogonal machine design for high-accuracy machining

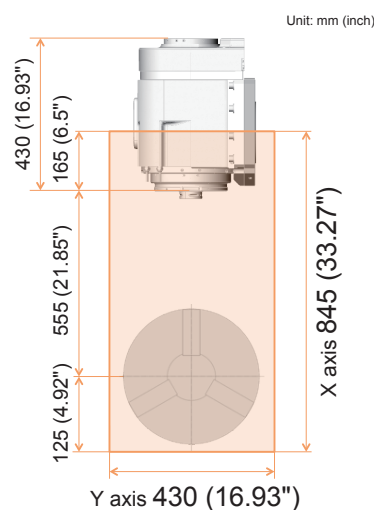
Improved machine structure and rigidity enable high-accuracy machining.



Compact milling spindle headstock

The standard compact milling spindle is smaller than on comparable machines, which expands the machining area and reduces interference.

Large Y-axis stroke	430 mm (16.93")
Large machining area Max. swing/Max. machining diameter	ø700 mm (ø27.56")
Max. tool length	500 mm (19.69")



High-accuracy rotary axes

A roller gear cam on the B axis eliminates backlash.

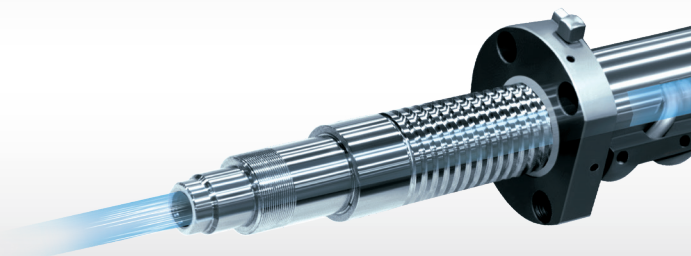
The C axis is equipped with a full circumference disk brake to ensure higher accuracy.

B-axis min. indexing increment: 0.0001°

C-axis min. indexing increment: 0.0001°

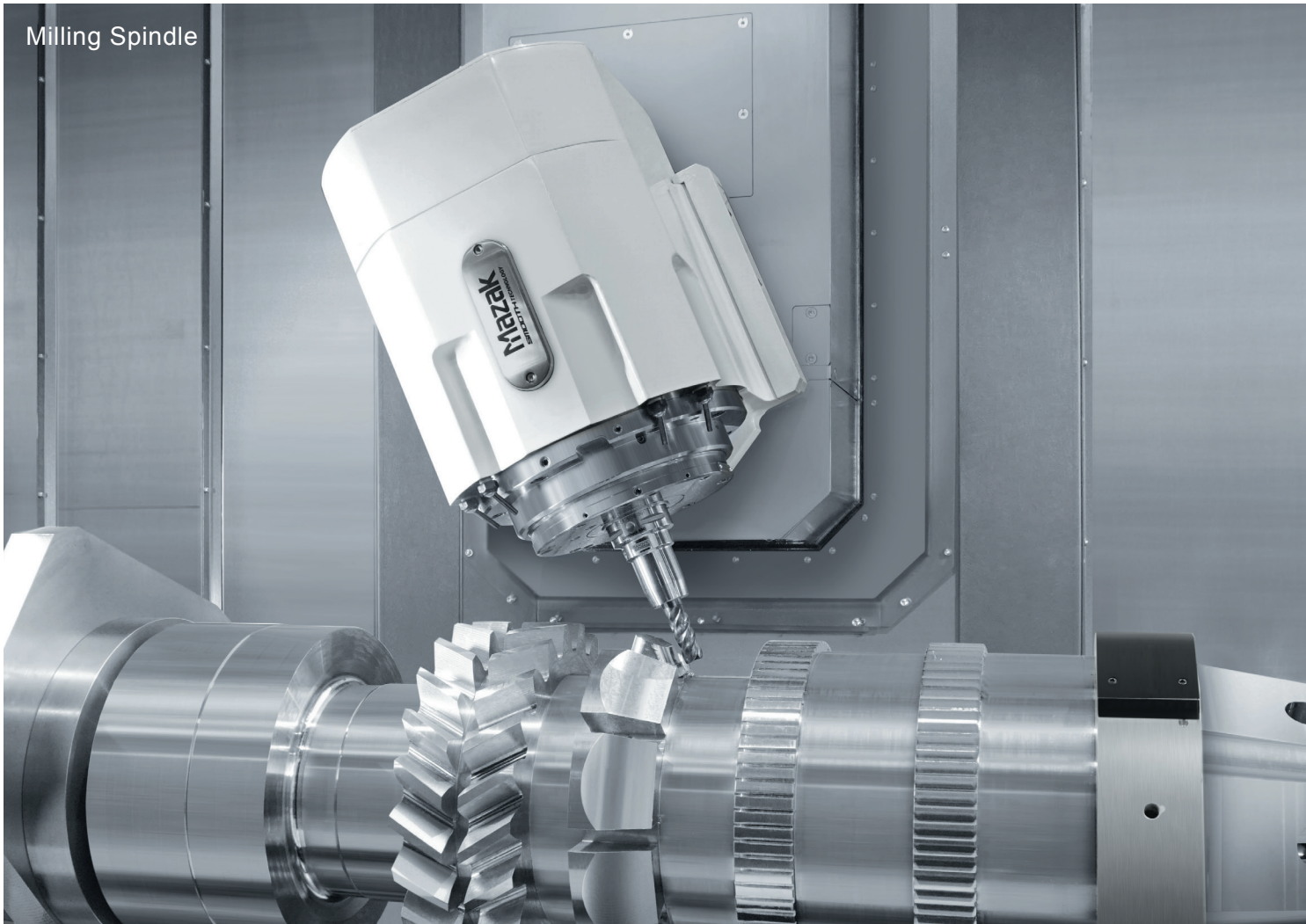
X, Y, Z-axis ball screw core cooling

Temperature-controlled cooling oil circulates through the ball screw cores to ensure stable machining accuracy over extended periods of high-speed operation.



Higher Productivity & Higher Accuracy

Milling Spindle



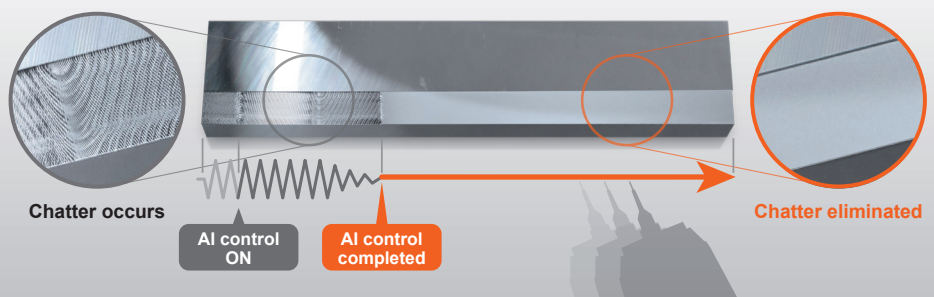
SMOOTH Ai Spindle

OPTION

AI detects milling spindle vibration and automatically adjusts machining conditions to produce unsurpassed surface finishes and high productivity. With AI, make adjustments easily and quickly, even without a skilled operator.



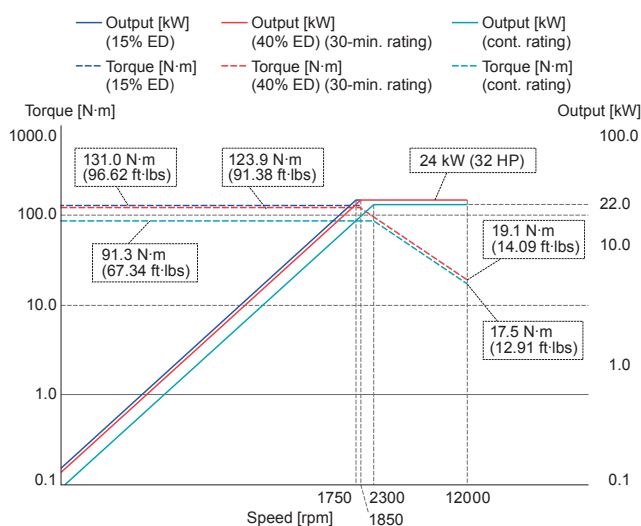
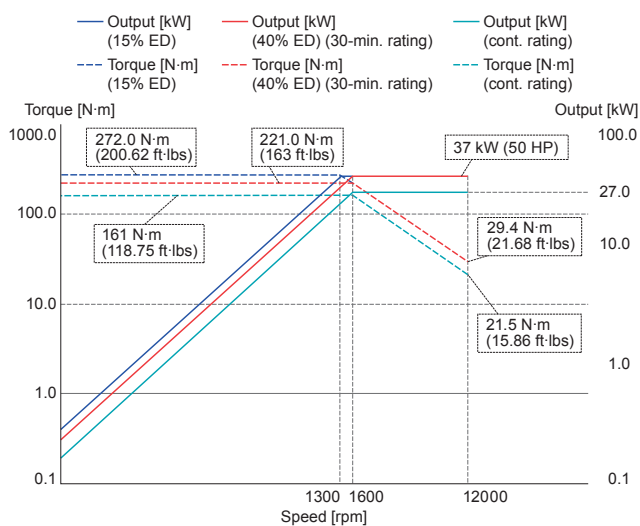
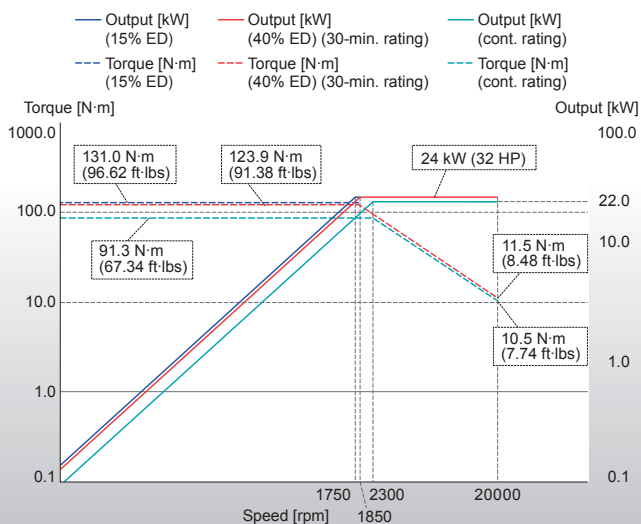
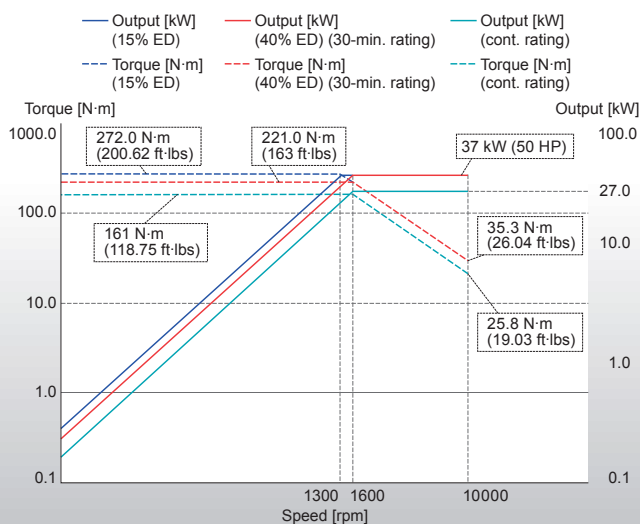
SMOOTH Ai SPINDLE



Wide range of milling spindle specifications available

The milling spindle is equipped with a high-output, high-torque integral spindle/motor. To meet a wide range of machining requirements, choose optional high-output and high-speed specifications, as well as a No. 50 taper spindle, in addition to the standard No. 40 taper spindle.

12000 rpm #40 spindle


12000 rpm #40 high-output spindle **OPTION**

20000 rpm #40 high-speed spindle **OPTION**

10000 rpm #50 high-output spindle **OPTION**


Higher Productivity and Higher Accuracy

Main spindle

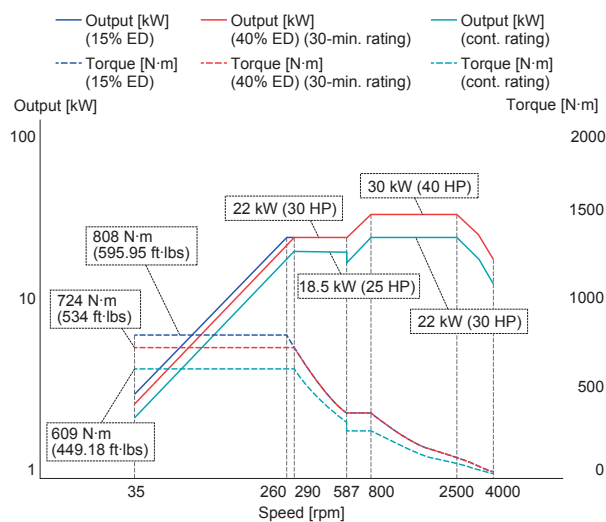
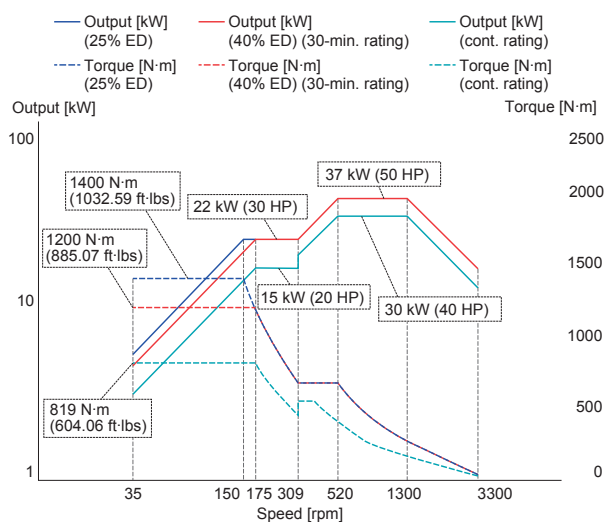
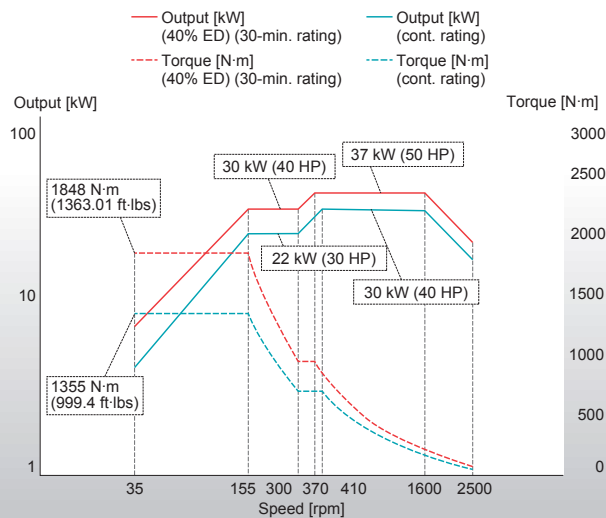


Second spindle

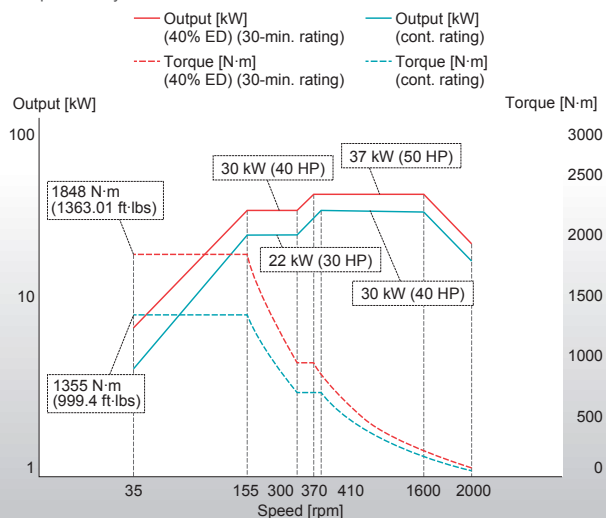


Turning spindle (main spindle, second spindle)

- Four sizes of spindle bores are available to meet your production requirements.
- The integral spindle/motor design enables continuous machining of first and second operations on machines equipped with the second spindle.
- The C-axis (minimum indexing increment: 0.0001°) is equipped with a full circumference disk brake and magnetic sensor to ensure higher accuracy. Second spindle standard specification is 0.001°.

4000 rpm spindle, $\varnothing 91$ mm ($\varnothing 3.58$ " bore)

3300 rpm spindle, $\varnothing 112$ mm ($\varnothing 4.41$ " bore) **OPTION**

2500 rpm high-torque spindle, $\varnothing 132$ mm ($\varnothing 5.2$ " bore) **OPTION**

2000 rpm high-torque spindle, $\varnothing 185$ mm ($\varnothing 7.28$ " bore) **OPTION**

Main spindle only

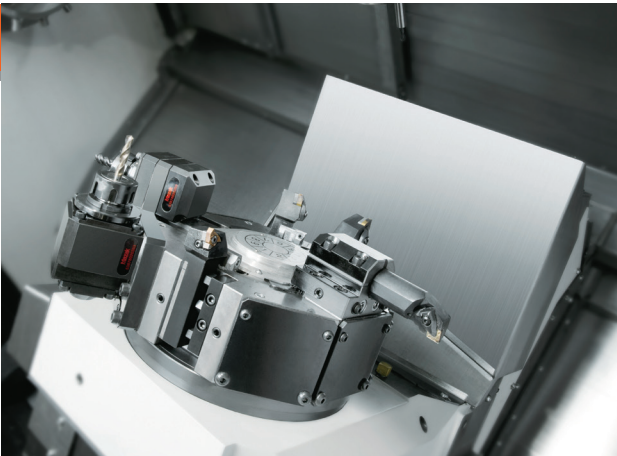


Higher Productivity

Lower turret

The lower turret makes it possible to cut with two tools simultaneously for higher productivity.

The unique turret design reduces the required number of tools. Use the same tool mounted on the lower turret to machine on both the main and second spindles.



Lower turret standard specification

9-position drum turret for an expanded range of machining.

Turret type	9-position drum turret
Number of tools	9 tools
Tool size	Turning tools: □25 mm (□1") Boring bar: ø40 mm (ø1.57")

Lower turret with rotary tools OPTION

New heavy-duty rotary tools for improved productivity.

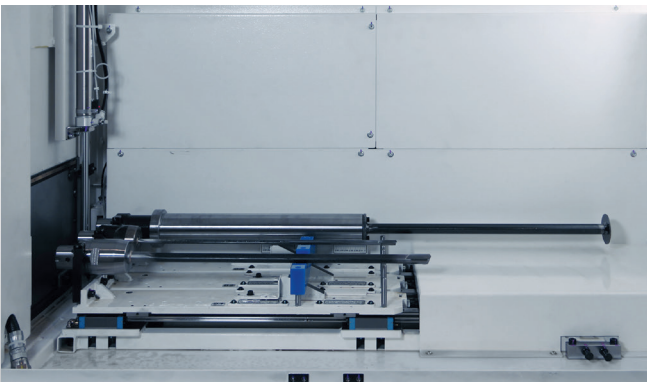
Number of tools	9 tools (max. 6 rotary tools)
Max. milling spindle speed	10000 rpm
Milling spindle power (10% ED)	AC 7.5 kW (10 HP)
Max. torque (10% ED)	48 N·m (35.4 ft·lbs)
Tool size	Drill ø20 mm (ø0.79")
	Tap M20 (3/4 UNC)

Long drill stocker

OPTION [2500U, 3000U]

The long drill stocker (available only for 2500U and 3000U models) is located over the tailstock/second spindle. Load a long drill in the milling spindle and rotate the B-axis to perform deep hole drilling.

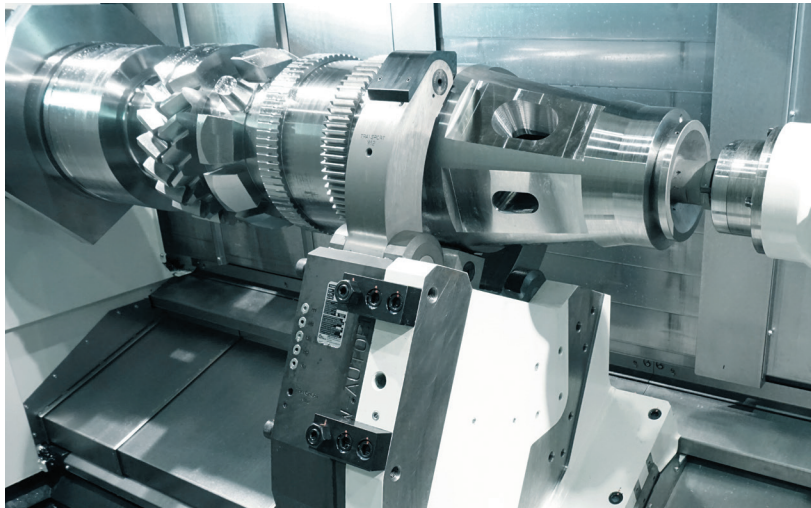
Max. tool diameter (#40/#50)	ø80 mm (ø3.15")/ø102 mm (ø4.02")
Max. tool length	1000 mm (39.37")
Tool weight (#40/#50)	20 kg (44 lbs)/37 kg (82 lbs)
Tool storage capacity (#40/#50)	3 tools/2 tools



Automatic steady rest

OPTION

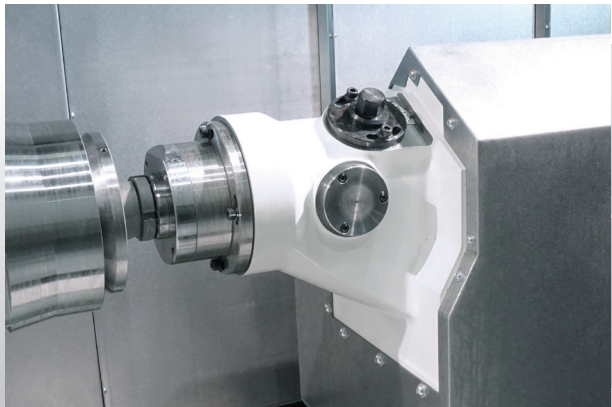
Various steady rests are available for high accuracy and efficient machining of long-shaft workpieces. The maximum supported workpiece diameter is $\varnothing 410$ mm ($\varnothing 16.14$ "). The CNC program can position the steady rests.



Steady rest manufacturer/model	Gripping diameter
SMW K5.1Z	$\varnothing 100$ mm ~ $\varnothing 410$ mm ($\varnothing 3.94$ " ~ $\varnothing 16.14$ ")
SMW K5Z	$\varnothing 80$ mm ~ $\varnothing 390$ mm ($\varnothing 3.15$ " ~ $\varnothing 15.35$ ")
SMW K4Z	$\varnothing 52$ mm ~ $\varnothing 280$ mm ($\varnothing 2.05$ " ~ $\varnothing 11.02$ ")
SMW SLU-X5.1Z	$\varnothing 85$ mm ~ $\varnothing 350$ mm ($\varnothing 3.35$ " ~ $\varnothing 13.78$ ")
SMW SLU-X5Z	$\varnothing 45$ mm ~ $\varnothing 310$ mm ($\varnothing 1.77$ " ~ $\varnothing 12.2$ ")
SMW SLU-X4Z	$\varnothing 30$ mm ~ $\varnothing 245$ mm ($\varnothing 1.18$ " ~ $\varnothing 9.65$ ")

NC Tailstock

The operator can set tailstock position on the setup screen and move the tailstock to the correct position by menu-key or M-code.



MT No.5 Built-in Center
Max. thrust: 10 kN (1019 kgf) (2248 lbs)

MT No.5 Built-in Center [2500U, 3000U]
Max. thrust: 15 kN (1530 kgf) (3372 lbs)

OPTION

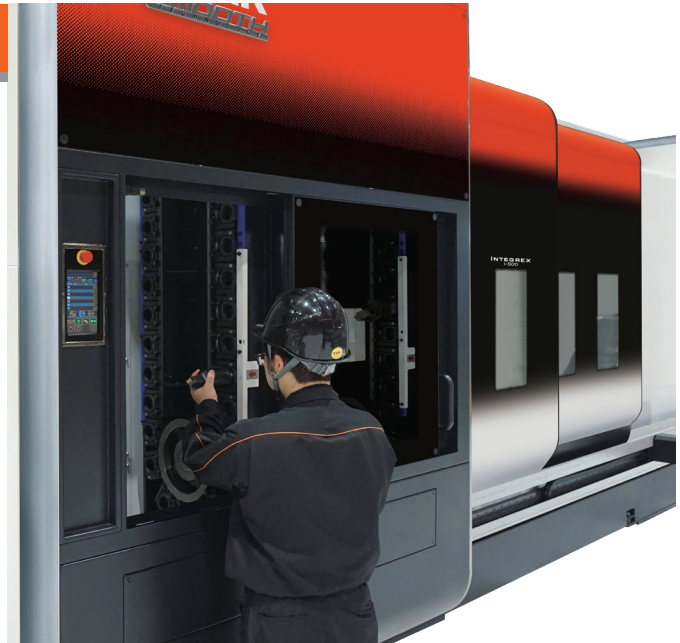
(Requires spindle bore $\varnothing 112$ mm ($\varnothing 4.41$ "), $\varnothing 132$ mm ($\varnothing 5.2$ ") or $\varnothing 185$ mm ($\varnothing 7.28$ "))

Ergonomics

Ergonomic machine design for unsurpassed ease of operation and maintenance

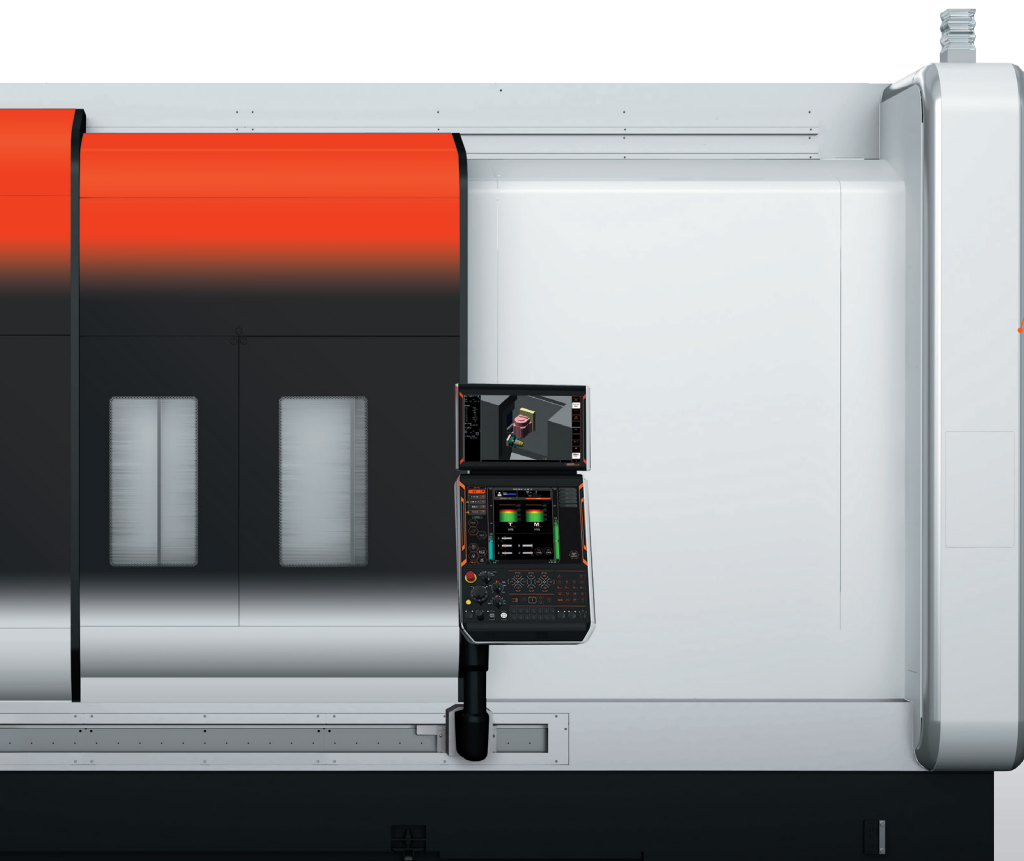
Convenient tool magazine access

The tool magazine is located at the front of the machine, which eliminates the time required for the operator to go back and forth to the rear of the machine. To avoid interference with the operation area around the machine, the tool magazine doors slide open left/right.



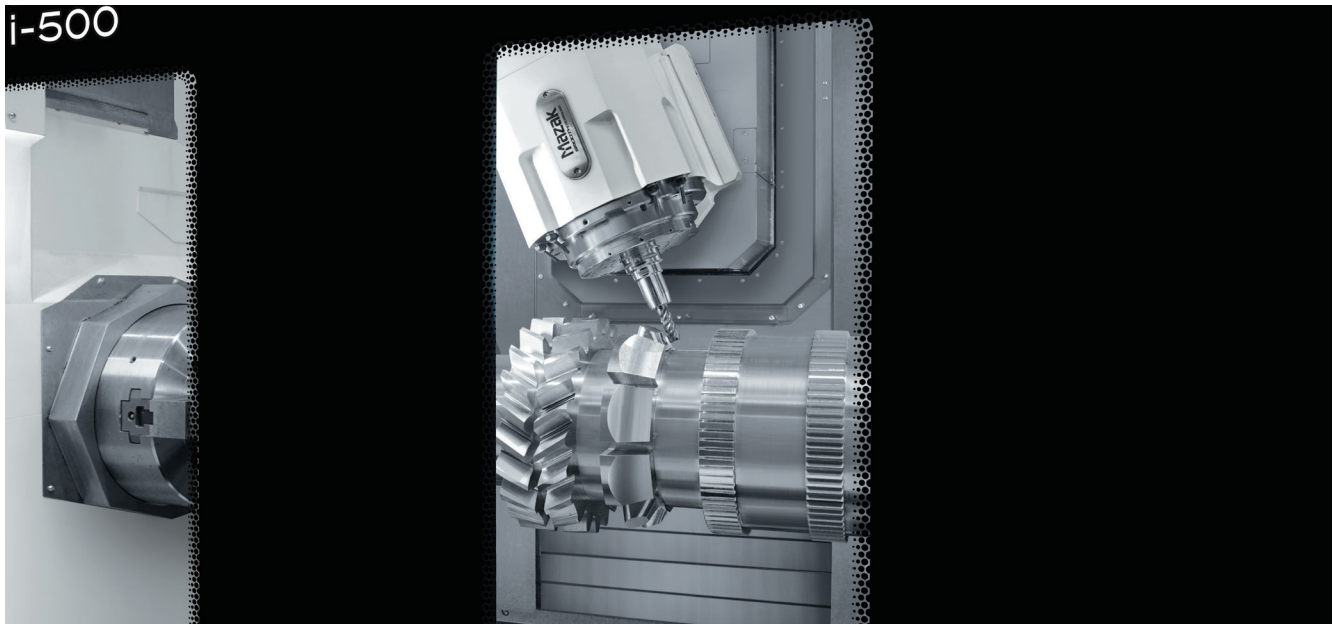
Maintenance area

Items that require frequent access for machine maintenance are arranged in one central location.



Large window

The large front door window enables the operator to monitor workpiece machining with ease.



Front cover height

For ease in loading/unloading heavy workpieces, the machine cover in front of the chuck is only 605 mm (23.82") high.



Innovation for Higher Productivity

MAZATROL *SMOOTH* Ai

New MAZATROL Smooth CNC

Designed with even faster and higher-precision control for unsurpassed productivity, the CNC uses AI and digital twin technology to elevate your production to the next level

- Touchscreen operation — similar to using your smartphone/tablet
- MAZATROL Smooth graphical user interface for unsurpassed ease of operation
- CNC system integrates with your Windows® PC
- Latest hardware and software for unprecedented speed and precision
- Higher machining speed for high-accuracy 5-axis machining
- Fine tuning function: Easy machining parameter setting for various workpieces
- MAZATROL TWINS: Software that increases productivity with real-time sharing and centralized management of various data



■ Automation

Advanced automation with robot and software



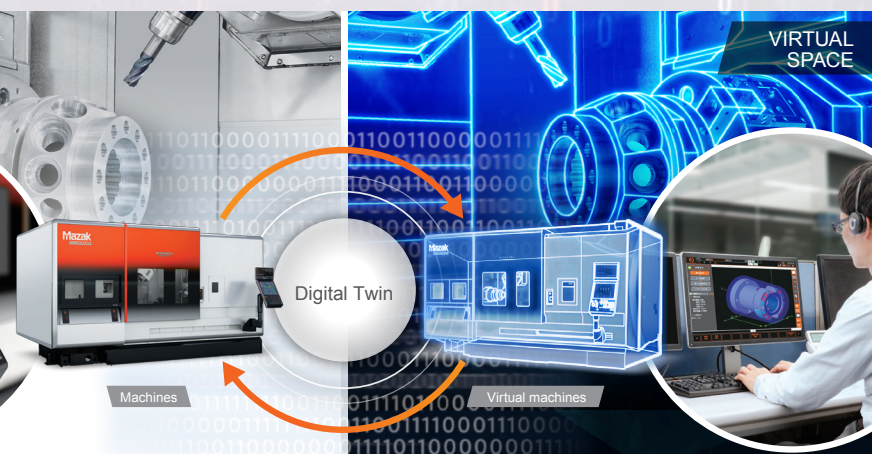
AI

Increase your productivity
with AI technology



Digital Twin

Create a virtual machine on your office PC for efficient setup
and improved productivity



Shown with optional MAZATROL SmoothAi dual monitor



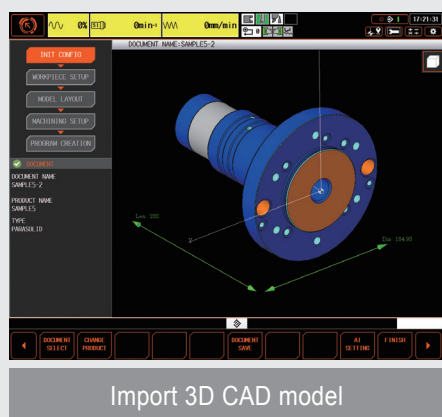
Innovative Functions for Higher Productivity

Improve productivity from programming to machining

Automatic programming

Solid MAZATROL

Generate a program automatically from 3D CAD data. AI learning draws on machining knowhow from programs created in the past, automatically calculates the machining process and generates the optimal program.



Required
time for
programming
2.5 min.



Setup

Project function

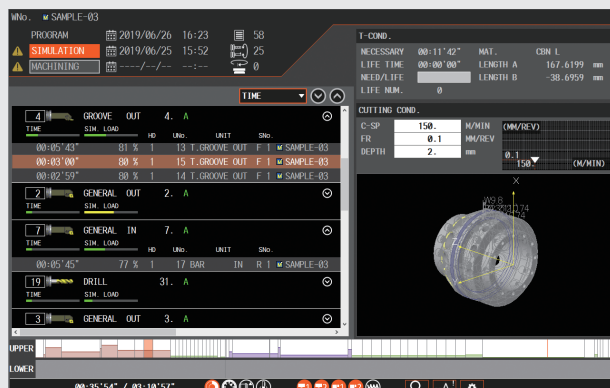
Data required to execute machining is managed as project data. Export project data to the machine for a drastic reduction in data-input time. Additionally, manage project data for an entire factory with SMOOTH Project Manager (optional software).

PROJECT-01		CREATE DATE: 2020/04/07 14:14		TOTAL PROGRAM 3
STORAGE AREA LIST		WORK No.	SIZE PROGRAM NAME	
STANDARD PROGRAM		M	SAMPLE-01	68 BLOCK--QUICK--
HDD OPERATION PROGRAM			SAMPLE-01-SUB1	281 BYTE
BACKUP PROGRAM			SAMPLE-01-SUB2	467 BYTE
CREATE PROJECT				
PROJECT LIST		PROJECT DATA LIST		
PROJECT DATA ...		CREATE DATE		
PROJECT-01		2020/04/07 14:14		
PROJECT-02		2019/07/04 13:26		
PROJECT-03		2020/04/07 13:41		
PROJECT-04		2019/07/04 13:31		

Simulation, test cutting (machining analysis, optimization)

SMOOTH Cutting Adviser

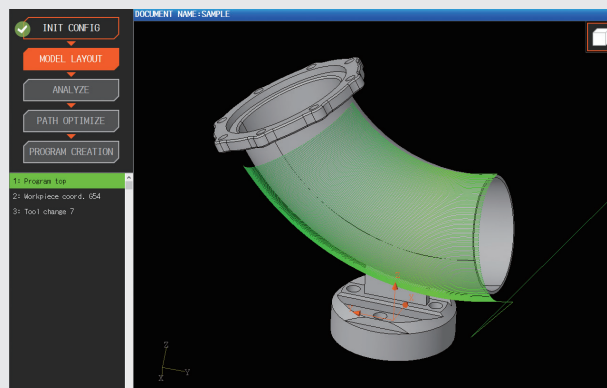
To optimize machining conditions, Cutting Adviser uses accumulated results to simulate and visualize machining processes.



SMC PLUS

OPTION

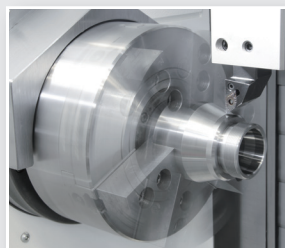
Compares the cutting point of the EIA program with the 3D model to change the correct command point and ensure both the correct tool path and high-accuracy finished surfaces.



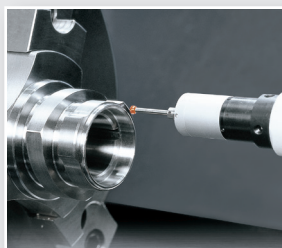
Machining

Ai Thermal Shield

Based on temperature changes, new algorithms automatically determine the amount of compensation to apply for even higher machining accuracy.



Machining



Workpiece inspection



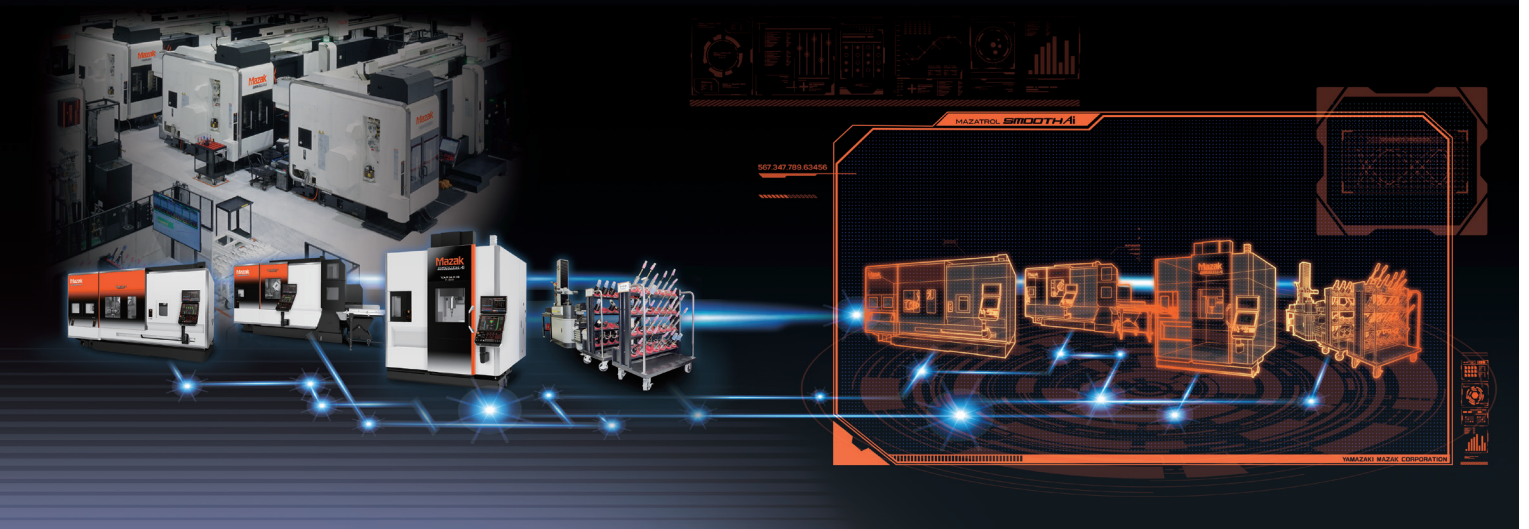
Simulation

Advanced Digital Technology for Manufacturing

MAZATROL TWINS (software) for high productivity

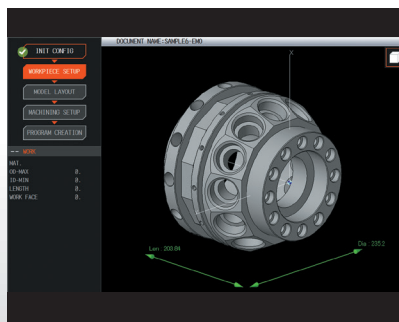
OPTION

Virtual machines in your office accurately duplicate the operation of machines on your factory floor. Substantially increase the efficiency of your production with available software and machines equipped with the MAZATROL SmoothAi CNC.

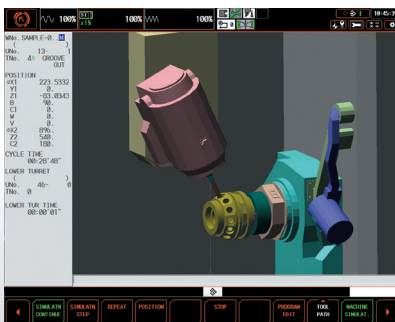


SMOOTH CAM Ai

Make and edit programs, perform simulation and analysis for multiple machines.



AI programming



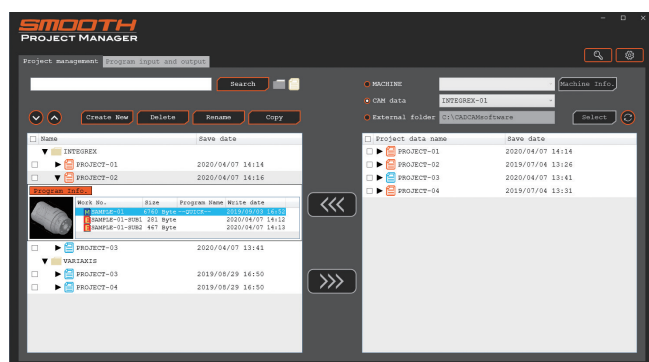
Fast simulation



Machining analysis • Optimization

SMOOTH Project Manager

SMOOTH Project Manager manages project data for the entire factory. Synchronize data between the machine in the factory and the PC in the office.



SMOOTH Tool Management

For higher productivity, SMOOTH Tool Management software manages data for the large number of tools in use by a factory.



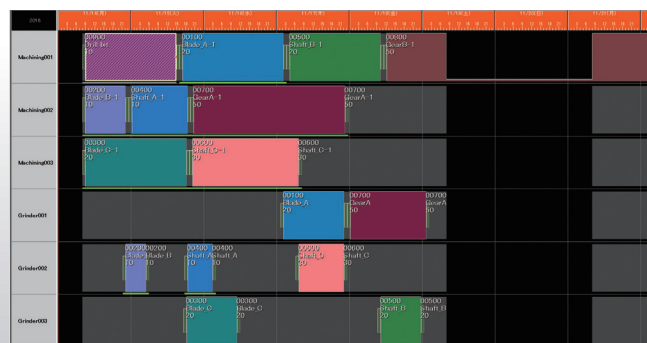
SMOOTH Monitor AX • SMOOTH Link

To improve factory productivity, SMOOTH Monitor AX software monitors operational status and analyzes accumulated manufacturing data. View operational status and machining programs on tablets and smartphones with SMOOTH Link, so the operator can view necessary information instantaneously away from the monitor.



SMOOTH Scheduler

SMOOTH Scheduler software uses production data to create effective machining schedules. Schedules are displayed for convenient monitoring of production progress.



■ Standard Machine Specifications

		INTEGREX i-500			INTEGREX i-500S			INTEGREX i-500ST	
		1500U	2500U	3000U	1500U	2500U	3000U	1500U	2500U
Capacity	Max. swing	ø700 mm (ø27.56")							
	Max. machining diameter (upper turret)	ø700 mm (ø27.56")							
	(lower turret)	—						ø490 mm (ø19.29")	
	Max. machining length* ¹	1574 mm (61.97")	2594 mm (102.13")	3074 mm (121.02")	1574 mm (61.97")	2594 mm (102.13")	3074 mm (121.02")	1574 mm (61.97")	2594 mm (102.13")
Travel	X-axis travel	845 mm (33.27")							
	Z-axis travel	1640 mm (64.57")	2660 mm (104.72")	3140 mm (123.62")	1640 mm (64.57")	2660 mm (104.72")	3140 mm (123.62")	1640 mm (64.57")	2660 mm (104.72")
	Y-axis travel	430 mm (16.93")							
	X2-axis travel (lower turret)	—						267 mm (10.51")	
	Z2-axis travel (lower turret)	—						1373 mm (54.06")	2393 mm (94.21")
	B-axis indexing range	-30° ~ 210°							
Main spindle	Chuck size	10"							
	Main spindle speed* ¹	4000 rpm							
	Main spindle nose	A2-8							
	Main spindle bore	ø91 mm (ø3.58")							
	Bearing ID	ø130 mm (ø5.12")							
	Max. bar work capacity* ¹	ø77 mm (ø3.03")							
	Min. indexing increment	0.0001°							
Second spindle	Chuck size	—			10"				
	Second spindle speed* ¹	—			4000 rpm				
	Second spindle nose	—			A2-8				
	Second spindle bore	—			ø91 mm (ø3.58")				
	Bearing ID	—			ø130 mm (ø5.12")				
	Min. indexing increment	—			0.001°				
Milling spindle	Milling spindle type	Spindle turret with ATC							
	Milling spindle speed	12000 rpm							
	Max. milling spindle torque	131 N·m (96.62 ft·lbs)							
	Turning tool shank height	25 mm (1")							
	Boring bar shank diameter	ø40 mm (ø1.57")							
	Min. B-axis indexing increment	0.0001°							
Lower turret	Turret type	—						9-position drum turret	
	Number of tools	—						9	
	Turning tool shank height	—						25 mm (1")	
	Boring bar shank diameter	—						ø40 mm (ø1.57")	
Rapid traverse rate	X axis	50 m/min (1969 ipm)							
	Z axis	50 m/min (1969 ipm)		40 m/min (1575 ipm)	50 m/min (1969 ipm)		40 m/min (1575 ipm)	50 m/min (1969 ipm)	
	Y axis	50 m/min (1969 ipm)							
	X2 axis	—						40 m/min (1575 ipm)	
	Z2 axis	—						40 m/min (1575 ipm)	32 m/min (1260 ipm)
	W axis	8 m/min (315 ipm)		4.5 m/min (177 ipm)	30 m/min (1181 ipm)	18 m/min (709 ipm)	12 m/min (472 ipm)	30 m/min (1181 ipm)	18 m/min (709 ipm)
Automatic tool changer system	Tool holder shank* ²	HSK-A63 (T63)							
	Tool storage capacity	36 tools							
	Max. tool diameter/length (from gauge line)	ø90 mm (ø3.54") (when adjacent pocket empty ø150 mm (ø5.91"))/500 mm (19.69")							
	Max. tool weight	12 kg (26 lbs)							
	Tool selection method	Random selection, shortest path (fixed pocket assignment)							
Tailstock	Center	MT No. 5			—				
	Travel (W axis)	1610 mm (63.39")	2630 mm (103.54")	3110 mm (122.44")	—				
Motors	Main spindle motor	30 kW (40 HP)/22 kW (30 HP)							
	40% ED (30-min. rating)/cont. rating)								
	Second spindle motor	—			30 kW (40 HP)/22 kW (30 HP)				
	40% ED (30-min. rating)/cont. rating)								
Power requirement	Milling spindle motor	24 kW (32 HP)/22 kW (30 HP)							
	40% ED (30 min.-rating)/cont. rating)								
Coolant	Required power capacity (cont. rating)	57.06 kVA			86.19 kVA			88.49 kVA	
	Air source	0.5 MPa (73 psi), more than 400 L (14.13 ft³)/min			0.5 MPa (73 psi), more than 460 L (16.24 ft³)/min			0.5 MPa (73 psi), more than 460 L (16.24 ft³)/min	
	Tank capacity	510 L (134 gal)	665 L (175 gal)	645 L (170 gal)	510 L (134 gal)	665 L (175 gal)	715 L (188 gal)	510 L (134 gal)	665 L (175 gal)
Machine size	Machine height	2950 mm (116.14")							
	Width × length	5595 mm × 3400 mm (220.28" × 133.86")	6980 mm × 3400 mm (274.80" × 133.86")	7280 mm × 3400 mm (286.61" × 133.86")	5595 mm × 3400 mm (220.28" × 133.86")	6980 mm × 3400 mm (274.80" × 133.86")	7775 mm × 3400 mm (306.10" × 133.86")	5595 mm × 3400 mm (220.28" × 133.86")	6980 mm × 3400 mm (274.80" × 133.86")
	Weight	21300 kg (46958 lbs)	23500 kg (51808 lbs)	24200 kg (53351 lbs)	21900 kg (48280 lbs)	24100 kg (53131 lbs)	25500 kg (56217 lbs)	22300 kg (49162 lbs)	24500 kg (54012 lbs)

*¹ Depends on chuck specifications **² Maximum capacity with through-hole chuck on main spindle

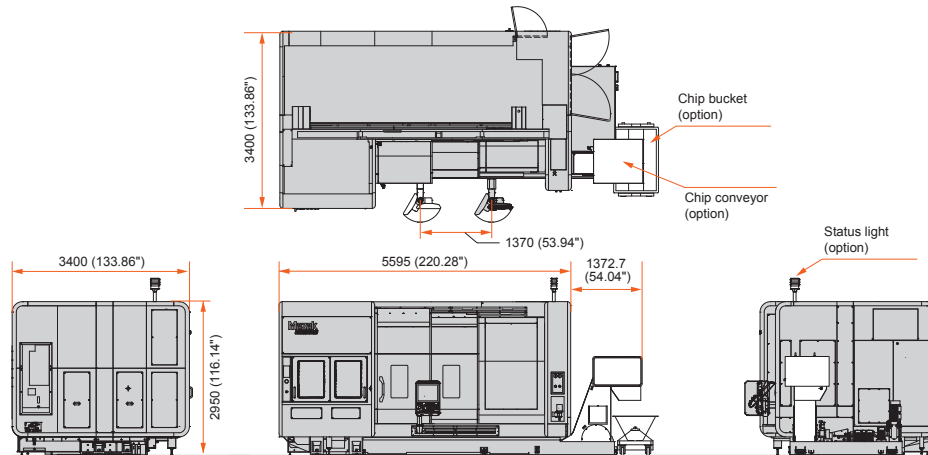
Standard and Optional Equipment

				●: Standard ○: Option -: N/A					
		i-500			i-500				
		S	S	ST	S	S	ST		
Machine	Main spindle 4000 rpm	●	●	●	Safety equipment	Hydraulic pressure interlock	●	●	●
	Main spindle 3300 rpm	○	○	○		Operator door interlock	●	●	●
	Main spindle 2500 rpm	○	○	○		Overload detection system	○	○	○
	Main spindle 2000 rpm	○	○	○		Tool breakage detection on magazine side	○	○	○
	Second spindle 4000 rpm	-	●	●	Factory automation	Tool eye (upper turret/automatic)	●	●	●
	Second spindle 3300 rpm	-	○	○		Tool eye (lower turret/automatic)	-	-	●
	Second spindle 2500 rpm	-	○	○		Automatic chuck jaw open/close	●	●	●
	Main spindle 0.0001° indexing • C-axis control	●	●	●		Chuck jaw open/close confirmation	●	●	●
	Second spindle 0.001° indexing (without C axis)	-	●	●		Automatic opening/closing front door	○	○	○
	Second spindle 0.0001° indexing C-axis control/synchronization function	-	○	○		Automatic power ON/OFF + warm-up system	●	●	●
	9D lower turret	-	-	●		Machining end buzzer	○	○	○
	Lower turret (rotary tools)	-	-	○		Preparation for visual tool ID/data management	○	○	○
	Main spindle hydraulic chuck (10" through-hole chuck)	●	●	●		Robot interface	○	○	○
	Main spindle hydraulic chuck (12", 15", 18" through-hole chuck)	○	○	○	Coolant/ Chip disposal	Cover coolant	●	●	●
	Second spindle hydraulic chuck (10" through-hole chuck)	-	●	●		Flood coolant	●	●	●
	Second spindle hydraulic chuck (12", 15" through-hole chuck)	-	○	○		Simultaneous discharge of 0.5 MPa (73 psi) coolant through spindle and flood coolant (milling spindle)	●	●	●
	Work stopper inside spindle	○	○	○		Simultaneous discharge of 1.5 MPa (218 psi) high-pressure coolant through spindle and flood coolant (milling spindle)	○	○	○
	Y-axis control	●	●	●		SUPERFLOW coolant system-simultaneous discharge of 7.0 MPa (1015 psi) high-pressure coolant through spindle and 0.5 MPa (73 psi) coolant	○	○	○
	B-axis 0.0001° indexing/contouring (EIA)	●	●	●		Flood coolant for lower turret	-	-	●
	Milling spindle 12000 rpm (HSK-A63)	●	●	●		Shower coolant	○	●	●
	Milling spindle 12000 rpm (CAPTO C6/KM4X-63)	○	○	○		Oil skimmer	○	○	○
	Milling spindle 20000 rpm (HSK-A63)	○	○	○		Coolant temperature control	○	○	○
	High output milling spindle 12000 rpm (HSK-A63/CAPTO C6/KM4X-63)	○	○	○		Mist collector	○	○	○
	High output milling spindle 10000 rpm (HSK-A100/CAPTO C8/KM4X-100)	○	○	○		Coolant & air blast for chuck jaws (main spindle)	○	○	○
	36-tool magazine	●	●	●		Air blast through spindle	○	○	○
	72-tool magazine	○	○	○		Air blast for chuck jaws (main spindle)	○	○	○
	110-tool magazine	○	○	○		Air blast for chuck jaws (second spindle)	-	●	●
	Long drill stocker (#40: 3, #50: 2) 2500U, 3000U only	○	○	○		Preparation for chip conveyor (side disposal/hinge)	●	●	●
	NC tailstock (MT5, 1 ton (2205 lbs) thrust)	●	-	-		Preparation for chip conveyor (side disposal/ConSep)	○	○	○
	Programmable tailstock thrust	●	-	-	Others	Chip conveyor (side disposal/hinge)	○	○	○
	Automatic steady rest	○	○	-		Chip conveyor (side disposal/ConSep)	○	○	○
	Work light	●	●	●		Chip bucket (rotating)	○	○	○
	Chuck clamping pressure program management (main spindle)	○	○	○		Chip bucket (fixed)	○	○	○
	Chuck clamping pressure program management (second spindle)	-	○	○		Grease cartridge	○	○	○
	Double foot pedal chuck switch	○	○	○		Manuals (CD)	●	●	●
	3-color machine status light	○	○	○		Additional manuals (CD or paper)	○	○	○
	1-color machine status light (yellow: operation end)	○	○	○		MAZATROL SmoothAi dual monitor	○	○	○
	1-color machine status light (red: alarm)	○	○	○					
	High accuracy	X, Y, Z-axis ball screw core cooling	●	●	●				
		Mazak monitoring system B (RMP 60)	○	○	○				
		Preparation for Mazak monitoring system B (RMP 60)	○	○	○				
		Scale feedback (B, C axis)	●	●	●				
		Scale feedback (X, Y, Z axis)	○	○	○				
		Scale feedback (X2/Z2 axis for lower turret)	-	-	○				
		Absolute position detection (linear axes)	●	●	●				
	X, Y, Z axis pitch error compensation input	●	●	●					

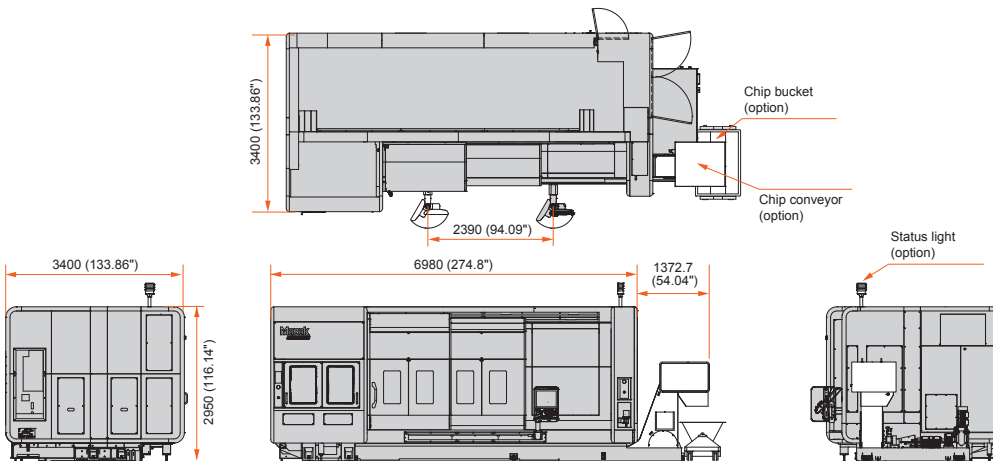
Machine Dimensions

Unit: mm (inch)

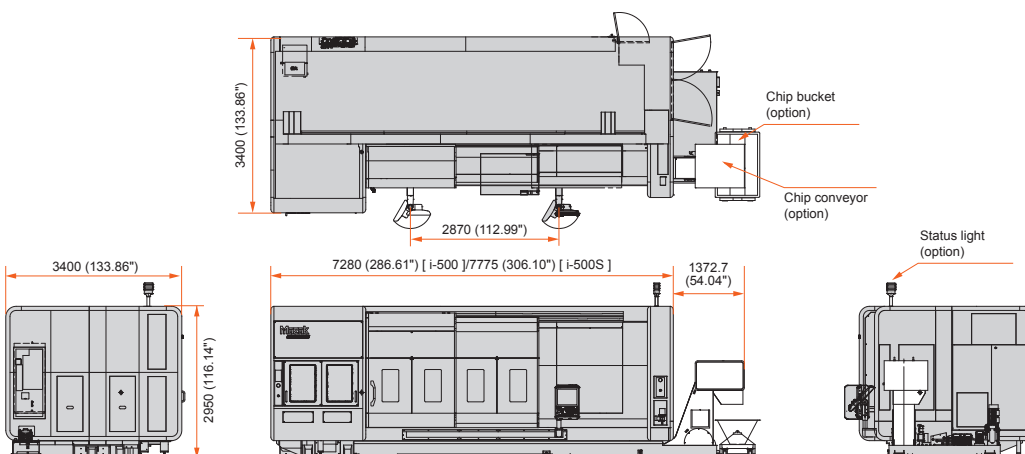
INTEGREX i-500, i-500S, i-500ST (1500U)



INTEGREX i-500, i-500S, i-500ST (2500U)



INTEGREX i-500, i-500S (3000U)



MAZATROL SmoothAi Specifications

	MAZATROL	EIA
Number of controlled axes	Simultaneous 2 ~ 4 axes	Simultaneous 5 axes*
Minimum input increment	0.0001 mm, 0.00001°, 0.0001°	
High-speed, high-precision control	Shape compensation, Smooth corner control, Rapid traverse overlap, Rotary axis shape compensation	Shape compensation, Smooth corner control, Rapid traverse overlap, Rotary axis shape compensation, High-speed machining mode, High-speed smoothing control, 5-axis spline*, Path error suppression control*, Tool path optimization*
Interpolation	Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Cylindrical interpolation, Polar coordinate interpolation, Constant lead threading, Re-threading*, Thread start point compensation*, Thread cut-speed override*, Synchronous tapping*	Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Spiral interpolation, Helical interpolation, Constant lead threading, Variable lead threading, Threading (C-axis interpolation type), Cylindrical interpolation*, Involute interpolation*, Fine spline interpolation*, NURBS interpolation*, Polar coordinate interpolation*, Re-threading*, Thread start point compensation*, Thread cut-speed override*, Synchronous tapping*
Feedrate	Rapid traverse, Cutting feed, Cutting feed (per minute), Cutting feed (per revolution), Dwell (time/rotation), Rapid traverse override, Cutting feed override, G0 speed variable control, Feedrate limitation, Variable acceleration control, G0 slope constant*	Rapid traverse, Cutting feed, Cutting feed (per minute), Cutting feed (per revolution), Inverse time feed, Dwell (time/rotation), Rapid traverse override, Cutting feed override, G0 speed variable control, Feedrate limitation, Time constant changing for G1, Variable acceleration control, G0 slope constant*
Program registration	Number of programs: 256 (Standard)/960 (Max.), Program memory: 2MB, Program memory expansion: 8MB*, Program memory expansion: 32MB*	
Control display	Display: 19" touch panel, Resolution: SXGA	
Spindle function	S-code output, Spindle speed limitation, Spindle speed override, Spindle speed reaching detection, Multiple position orient, Constant surface speed, Spindle speed command with decimal digits, Synchronized spindle control, Spindle speed range setting	
Tool functions	Number of tool offset: 4000, T code output for tool number, Tool life monitoring (time), Tool life monitoring (number of machined workpieces), Tool life monitoring (wear)	Number of tool offset: 4000, T code output for tool number, T code output for group number, Tool life monitoring (time), Tool life monitoring (number of machined workpieces), Tool life monitoring (wear)
Miscellaneous functions	M-code output, Simultaneous output of multiple M codes	
Tool offset functions	Tool position offset, Tool length offset, Tool diameter/tool nose R offset, Tool nose shape offset, Tool wear offset, Fixed amount offset, Simple wear offset	Tool position offset, Tool length offset, Tool diameter/tool nose R offset, Tool wear offset, Fixed amount offset, Simple wear offset
Coordinate system	Machine coordinate system, Work coordinate system, Local coordinate system, Additional work coordinates (300 set)	
Machine functions	—	Rotary axis prefilter, Tilted working plane, Polygonal machining*, Hobbing II*, Shaping function*, Dynamic compensation II*, Tool center point control*, Tool radius compensation for 5-axis machining*, Workpiece positioning error compensation*, 5-axis tool length compensation*, 5-axis parameter select*
Machine compensation	Backlash compensation, Pitch error compensation, Geometric deviation compensation, Ai Thermal shield, Volumetric compensation*	
Protection functions	Emergency stop, Interlock, Pre-move stroke check, Barrier, SAFETY SHIELD (manual mode), SAFETY SHIELD (automatic mode), VOICE ADVISER	
Automatic operation mode	Memory operation	Memory operation, Tape operation, MDI operation, EtherNet operation*
Automatic operation control	Optional stop, Dry run, Manual handle interruption, MDI interruption, TPS, Restart, Single process, Machine lock	Optional block skip, Optional stop, Dry run, Manual handle interruption, MDI interruption, TPS, Restart, Restart 2, Collation stop, Machine lock
Manual measuring functions	Tool-setting data teach, Tool length teach, Touch sensor coordinates measurement, Workpiece offset measurement, WPC coordinate measurement, Measurement on machine, Tool eye measurement	Tool-setting data teach, Tool length teach, Tool offset teach, Touch sensor coordinates measurement, Workpiece offset measurement, Measurement on machine, Tool eye measurement
Automatic measuring functions	WPC coordinate measurement, Automatic tool length measurement, Workpiece measurement, Sensor calibration, Tool eye auto tool measurement, Tool breakage detection	Automatic tool length measurement, Workpiece measurement, Sensor calibration, Tool eye auto tool measurement, Tool breakage detection
MDI measurement	Coordinate measurement	
Peripheral network	PROFIBUS-DP*, EtherNet I/P*, CC-Link*, CC-Link IE Field Basic	
Interface	SD card interface, USB	
Ethernet	10M/100M/1Gbps	

*Option



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