INTEGREX i-500

INTEGREX i-500

[Multi-tasking Machine]

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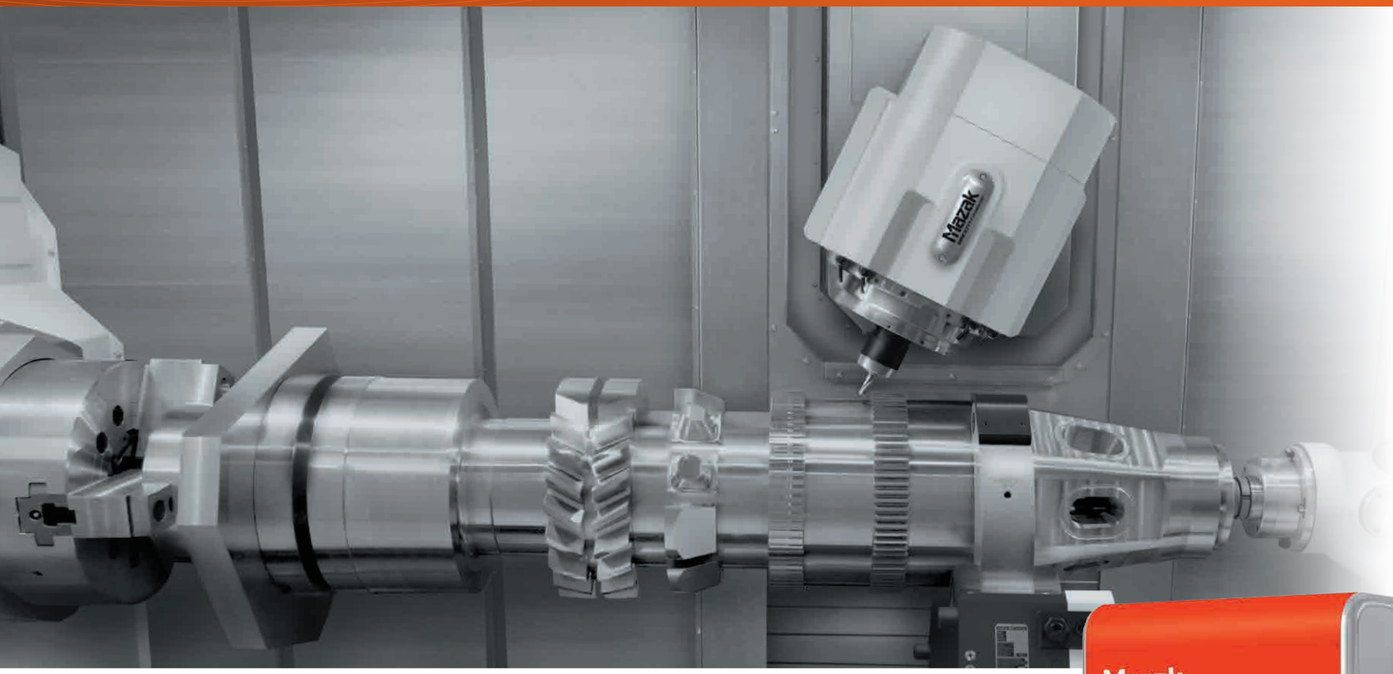
INTEGREX i-500 21.12.0 T 99J1A9721E

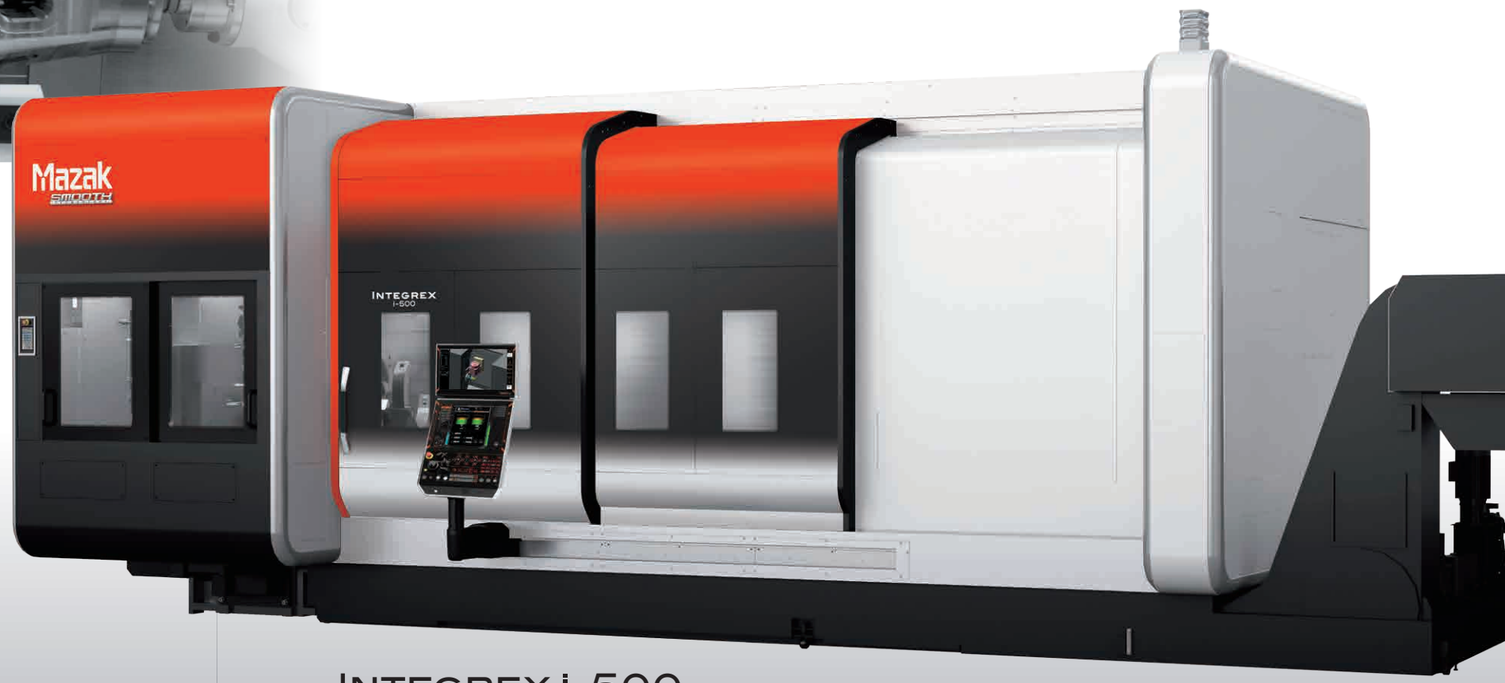
INTEGREX i-500



Wide variety of specifications to meet any production requirement

A wide range of universal, tailstock, second spindle and lower turret specifications are available as well as turning and milling spindles, enabling optimum customization for machining in all industries.

Universal	Main spindle	Milling spindle	Second spindle	Tailstock	Lower turret
1500U	4000 min^{-1} (rpm) 30 kW (40 HP) Φ91 mm	12000 min^{-1} (rpm) 24 kW (32 HP) #40 spindle	4000 min^{-1} (rpm) 30 kW (40 HP) Φ91 mm	MT No.5 Built-in center	9D Tuning / Milling
2500U	3300 min^{-1} (rpm) 37 kW (50 HP) Φ112 mm	12000 min^{-1} (rpm) 37 kW (50 HP) #40 high output spindle	3300 min^{-1} (rpm) 37 kW (50 HP) Φ112 mm		
3000U	2500 min^{-1} (rpm) 37 kW (50 HP) Φ132 mm	20000 min^{-1} (rpm) 24 kW (32 HP) #40 high speed spindle	2500 min^{-1} (rpm) 37 kW (50 HP) Φ132 mm		
	2000 min^{-1} (rpm) 37 kW (50 HP) Φ185 mm	10000 min^{-1} (rpm) 37 kW (50 HP) #50 spindle			



INTEGREX i-500

Shown with optional equipment

Advanced INTEGREX with exceptional multi-tasking performance

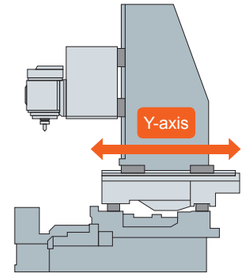
- Exceptional ease of operation, compact design, large machining area, high power spindles and high rigidity construction
- Incorporating experience accumulated in the production of multi-tasking machines for more than 30 years
- Exceptional performance versatility - gear milling, gear hobbing, deep drilling capability and many other advanced functions

Higher Accuracy

Units of the INTEGREX i-500, such as the machine bed, carriage and spindle headstocks, are designed with the maximum rigidity.

Orthogonal machine design for high-accuracy machining

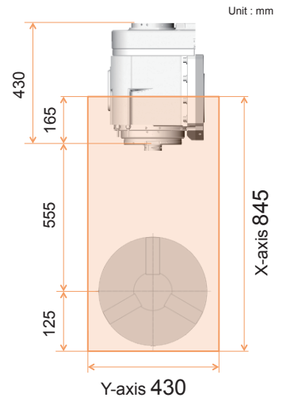
High-accuracy machining is available by improvement of the machine structure and rigidity.



Compact milling spindle headstock

The standard compact milling spindle is smaller than comparable machines to expand the machining area and reduce interference.

Large Y-axis stroke	430 mm
Large machining area Max. swing / max. machining diameter	Φ700 mm
Max. tool length	500 mm



High accuracy rotary axes

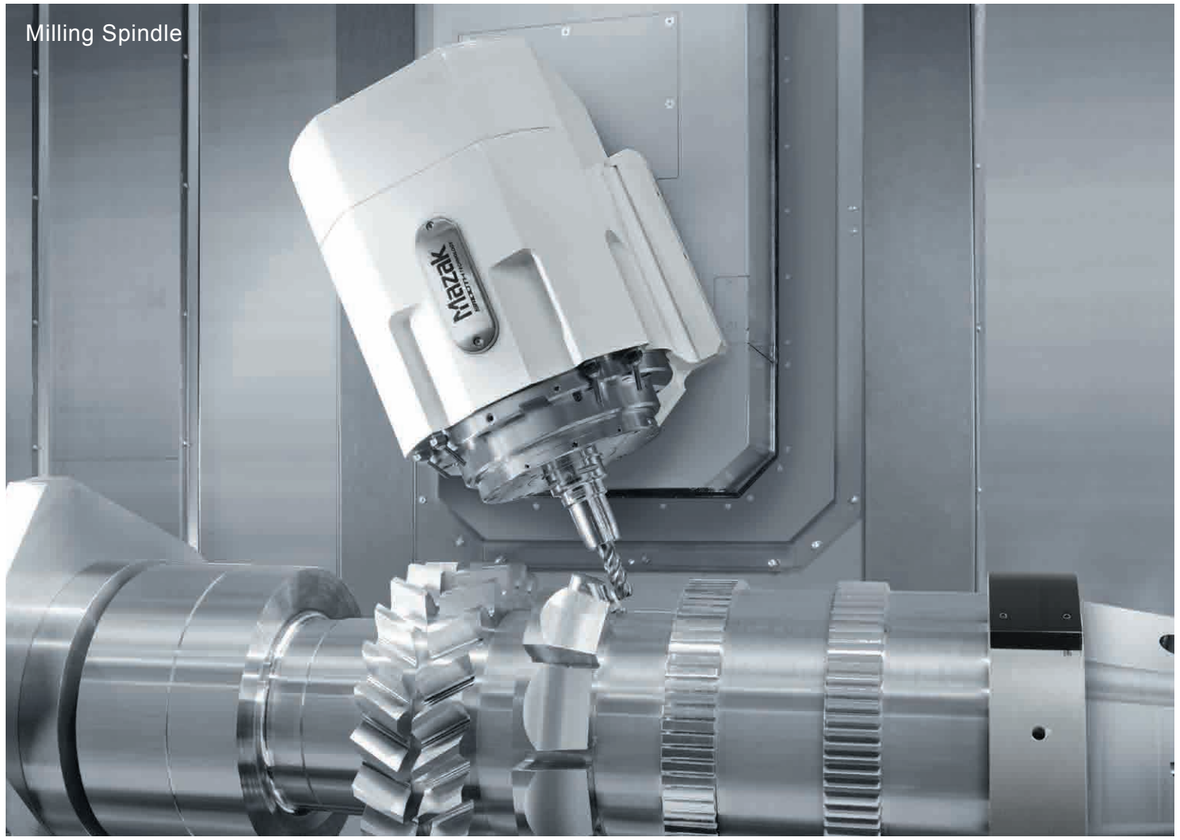
A roller gear cam on the B-axis eliminates backlash.
The C-axis is equipped with a full circumference disk brake to ensure higher accuracy.

B-axis min. indexing increment 0.0001°
C-axis min. indexing increment 0.0001°

X-, Y-, Z-axis ball screw core cooling

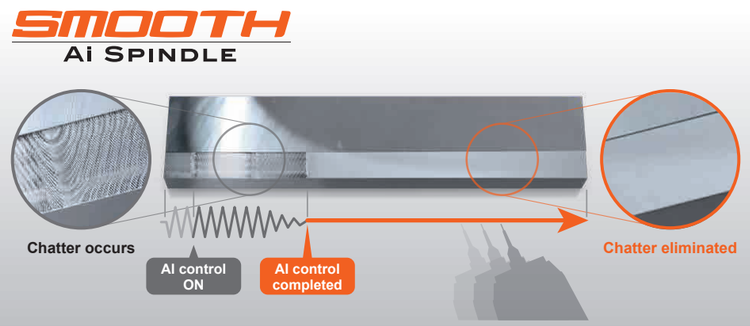
Temperature controlled cooling oil circulates through the ball screw cores to ensure stable machining accuracy over extended periods of high speed operation.

Higher Productivity & Higher Accuracy



Smooth Ai Spindle OPTION

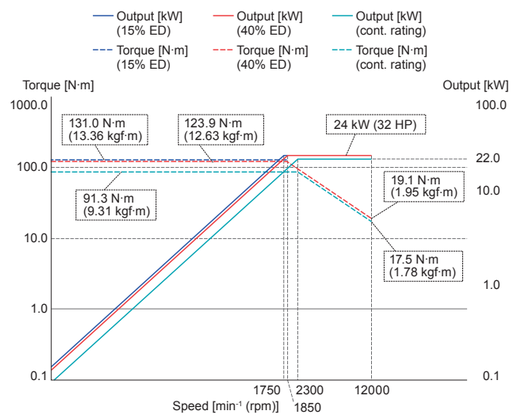
Using AI, milling spindle vibration is detected and machining conditions are automatically changed to produce unsurpassed surface finishes and high productivity. Thanks to AI, adjustments can be easily made in a short time without a skilled operator.



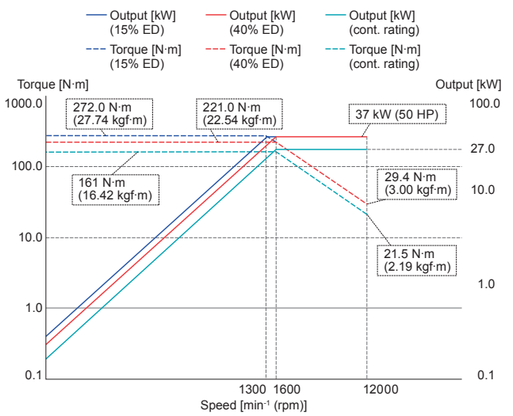
Wide range of available milling spindle specifications

The milling spindle is equipped with a high output, high torque integral spindle / motor.
In addition to the standard No.40 taper spindle, high output and high speed specifications as well as a No.50 taper spindle are optionally available to meet a wide range of machining requirements.

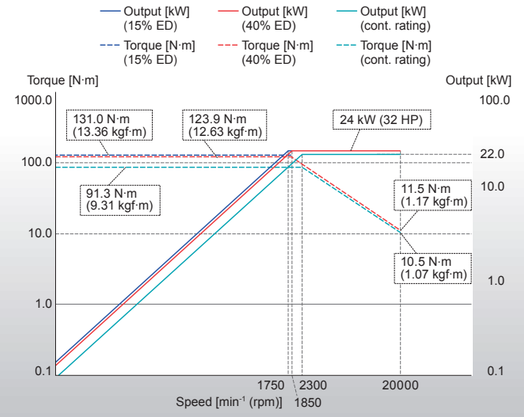
12000 min^{-1} (rpm) #40 spindle



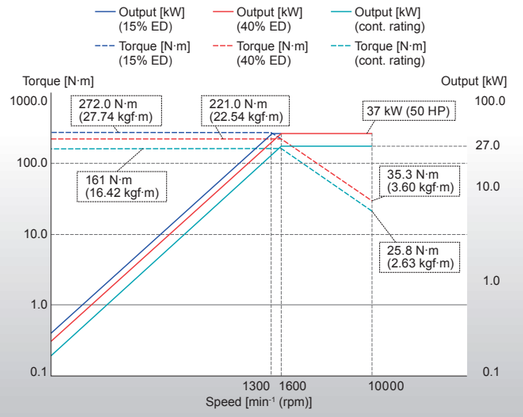
12000 min^{-1} (rpm) #40 high output spindle OPTION



20000 min^{-1} (rpm) #40 high speed spindle OPTION



10000 min^{-1} (rpm) #50 high output spindle OPTION

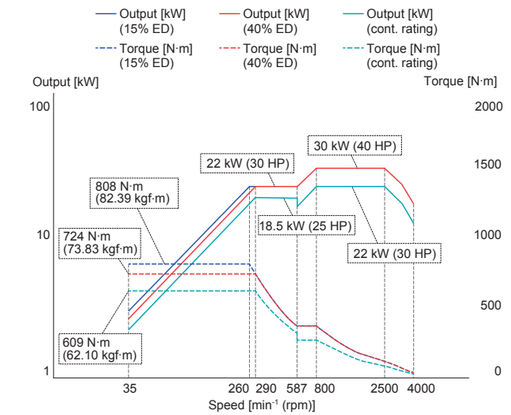


Higher Productivity & Higher Accuracy

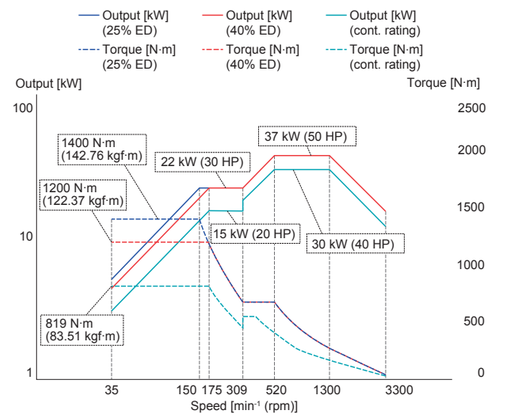
Turning spindle (main spindle, second spindle)

- 4 sizes of spindle bores are available to meet your production requirements.
- Thanks to the integral spindle / motor design, continuous machining of first and second operations can be performed 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°)

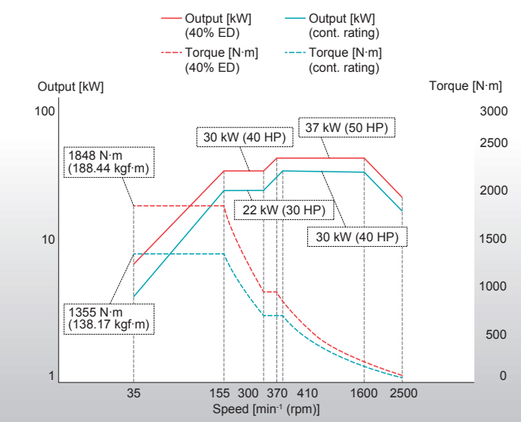
4000 min^{-1} (rpm) spindle, Φ91 mm bore



3300 min^{-1} (rpm) spindle, Φ112 mm bore OPTION

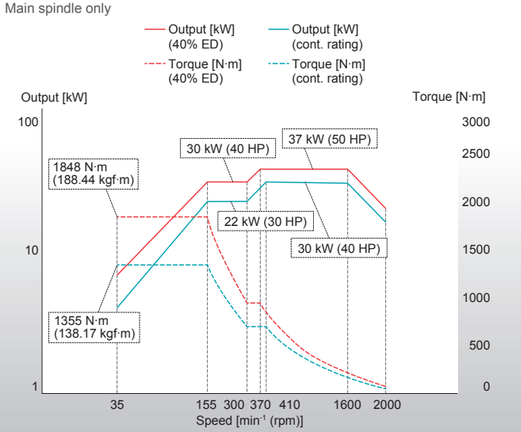


2500 min^{-1} (rpm) high torque spindle, Φ132 mm bore OPTION



2000 min^{-1} (rpm) high torque spindle, Φ185 mm bore OPTION

Main spindle only



Higher Productivity

Lower turret

The lower turret makes it possible to have two tools cutting simultaneously for higher productivity. The same tool mounted on the lower turret can be used for machining on both the main and second spindles thanks to the unique turret design that reduces the required number of tools.

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 Boring bar : Φ40 mm

Lower turret with rotary tools OPTION

Improved productivity thanks to new heavy-duty rotary tools.

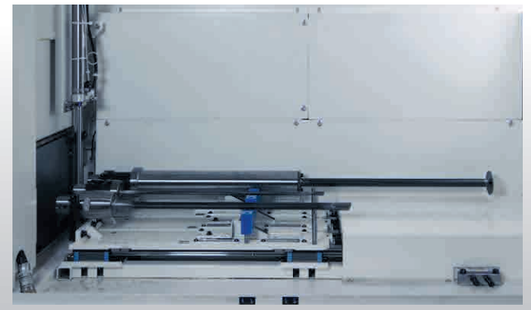
Number of tools	9 tools (max. 6 rotary tools)
Max. milling spindle speed	10000 min^{-1} (rpm)
Milling spindle power (10% ED)	AC 7.5 kW (10 HP)
Max. torque (10% ED)	48 N·m (4.8 kgf·m)
Tool size	Drill Φ20 mm
	Tap M20

Long drill stocker

OPTION [2500U, 3000U]

The long drill stocker is located over the tailstock / second spindle and is available for 2500U and 3000U models only. By loading a long drill in the milling spindle and rotating the B-axis, deep hole drilling can be performed.

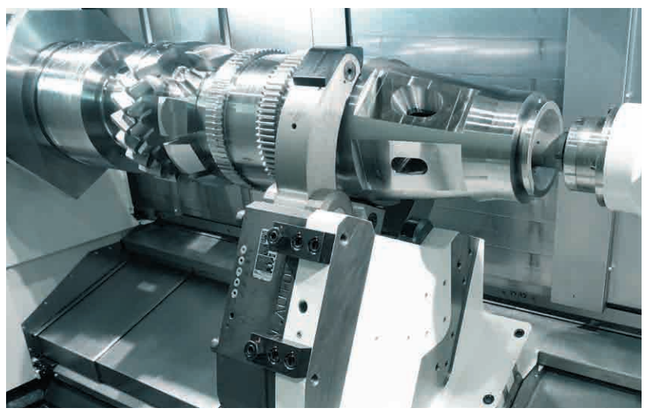
Max. tool diameter (#40 / #50)	Φ80 mm / Φ102 mm
Max. tool length	1000 mm
Tool weight (#40 / #50)	20 kg / 37 kg
Tool storage capacity (#40 / #50)	3 tools / 2 tools



Automatic steady rest

OPTION

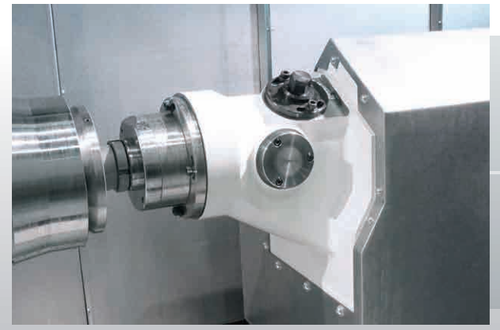
A variety of steady rests is available for high-accuracy and efficient machining of long shaft workpieces. The maximum workpiece diameter that can be supported is Φ410 mm. Positioning of the steady rests can be done by the CNC program.



Steady rest manufacturer / model	Gripping diameter
SMW K5.1Z	Φ100 mm ~ Φ410 mm
SMW K5Z	Φ80 mm ~ Φ390 mm
SMW K4Z	Φ52 mm ~ Φ280 mm
SMW SLU-X5.1Z	Φ85 mm ~ Φ350 mm
SMW SLU-X5Z	Φ45 mm ~ Φ310 mm
SMW SLU-X4Z	Φ30 mm ~ Φ245 mm

NC Tailstock

The operator can set the 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)

MT No.5 Built-in Center [2500U, 3000U]
Max. thrust : 15 kN (1530 kgf) OPTION
(Requires spindle bore Φ112 mm, Φ132 mm or Φ185 mm)

Unsurpassed ease of operation and maintenance thanks to ergonomic machine design

Convenient tool magazine access

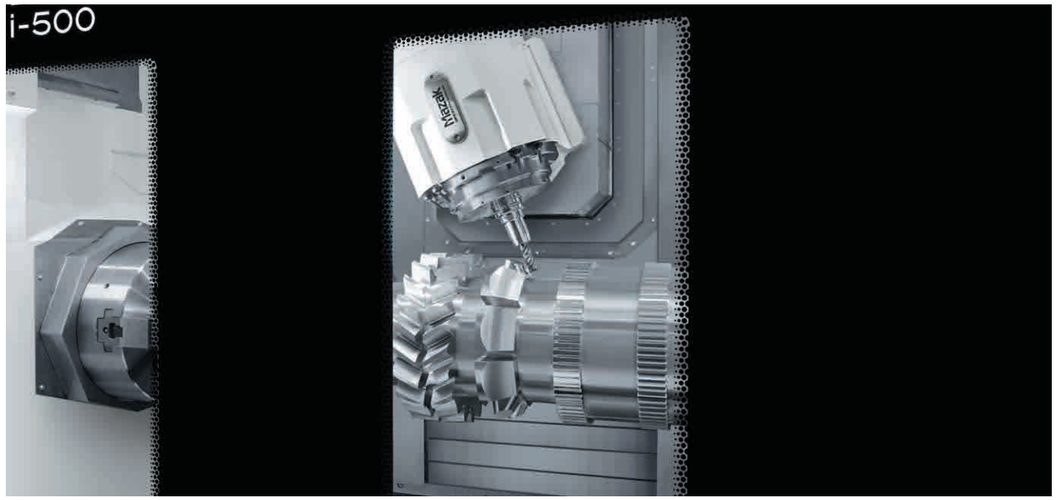
The tool magazine is located at the front of the machine eliminating the time required for the operator to go back and forth to the rear of the machine. The tool magazine doors are opened by sliding left / right to not interfere with the operation area around the machine.

Maintenance area

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

Large window

The large front door window allows workpiece machining to be easily monitored by the operator.



Front cover height

To ensure ease of loading / unloading heavy workpieces, the height of the machine cover in front of the chuck is a low 605 mm.

Innovation for Higher Productivity

MAZATROL SMOOTH Ai

New MAZATROL SmoothCNC

Designed to provide unsurpassed productivity through even faster and higher precision control while elevating your production to the next level with AI and digital twin technology

- Touch screen 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 enables real-time sharing and centralized management of various data for increase productivity

■ AI

Increase your productivity with AI technology

■ Digital Twin

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

■ Automation

Advanced automation utilizing robot and software

Shown with optional MAZATROL SmoothAi dual monitor

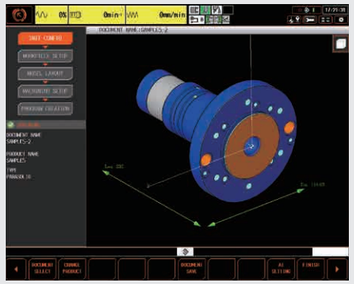
Innovative functions for higher productivity

Innovative functions to improve productivity from programming to machining

Automatic programming

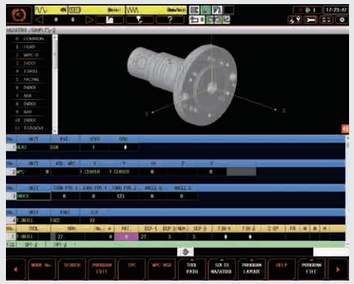
Solid MAZATROL

A program is automatically generated from 3D CAD data. AI learning utilizes the machining know-how from the programs created in the past, automatically calculates the machining process, generating the optimal program.



Import 3D CAD model

Required time for programming **2.5 min.**

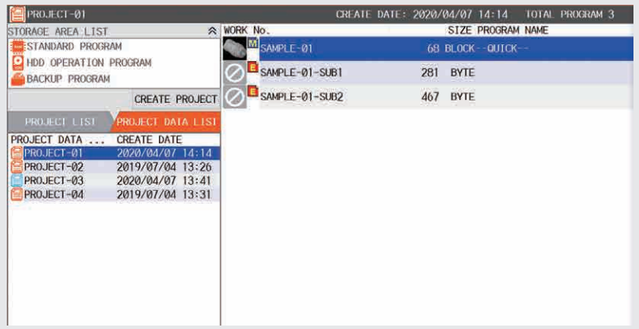


MAZATROL programming completed

Set up

Project function

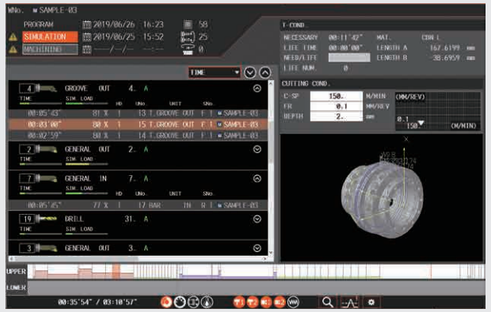
Data required to execute machining is managed as project data. Project data can be exported to the machine, drastically reducing time for inputting data. Additionally, project data of entire factory can be managed with Smooth Project Manager. (optional software)



Simulation, Test cutting (machining analysis, optimization)

Cutting Adviser

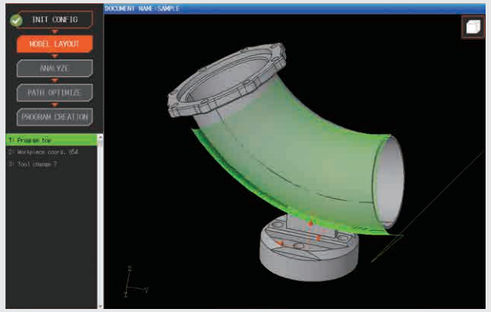
Cutting adviser optimizes machining conditions by machining simulation and visualization of machining process from accumulated machining results.



SMC PLUS

OPTION

Compares the cutting point of the EIA program with the 3D model so the correct command point can be changed to ensure the correct tool path and high accuracy finished surfaces.



Machining

Ai Thermal Shield

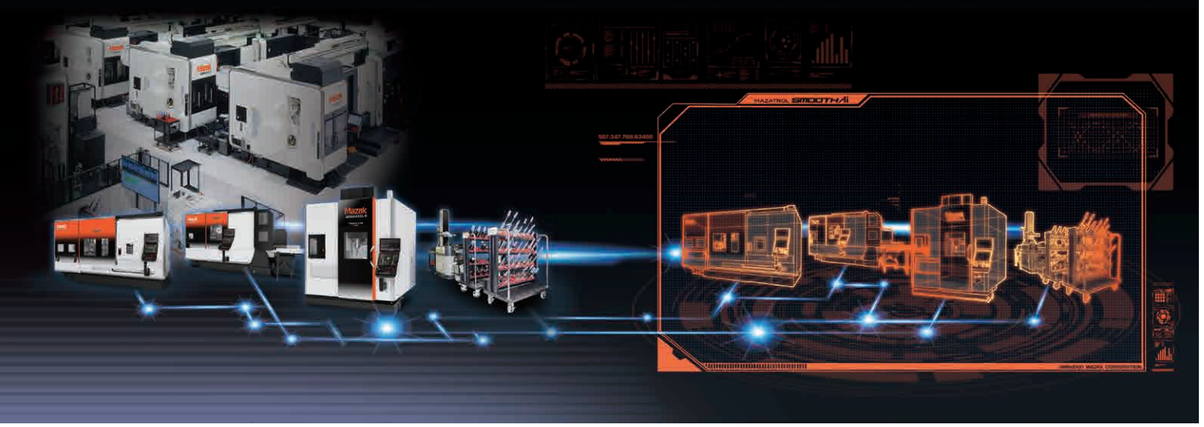
New algorithms automatically determine the amount of compensation to be applied according to changes in the temperature to ensure even higher machining accuracy.

Advanced digital technology for manufacturing

MAZATROL TWINS (software) for high productivity

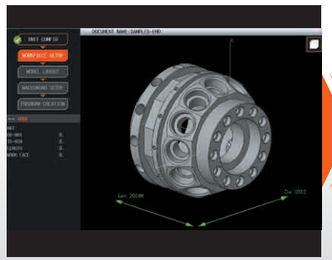
OPTION

Virtual machines in your office accurately duplicate the operation of machines on your factory floor. Available software can be used together with machines equipped with the MAZATROL SmoothAi CNC to substantially increase the efficiency of your production.

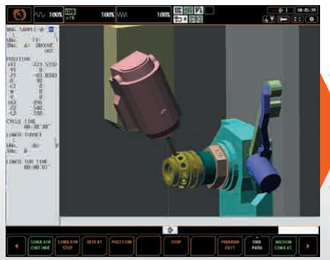


Smooth CAM Ai

Programs can be made and edited, as well as performing simulation and analysis on the Smooth CAM Ai for multiple machines.



AI programming

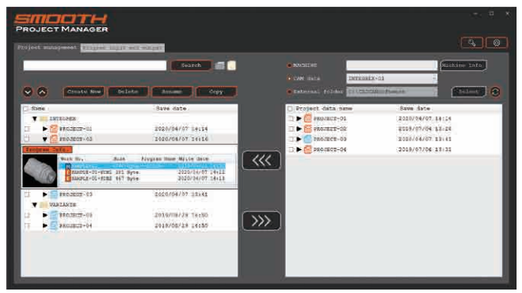


Fast simulation

Machining analysis·Optimization

Smooth Project Manager

Smooth Project Manager is used to manage the project data of the entire factory. The data can be synchronized between the machine in the factory and the PC in the office.



Smooth Tool Management

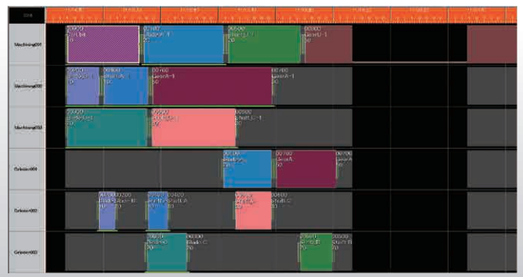
The Smooth Tool Management software manages data of the large number of tools in use by a factory for higher productivity.

Smooth Monitor AX·Smooth Link

Smooth Monitor AX is software to monitor operational status and analyze accumulated manufacturing data for factory productivity improvement.
Smooth Link is software to view operational status and machining programs on tables and smartphones, so the operator can instantly view necessary information while monitoring away from the monitor.

Smooth Scheduler

Smooth Scheduler is software to create effective machining schedules utilizing production data. 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	Φ700 mm							
	Max. machining diameter (upper turret)	Φ700 mm							
	(lower turret)	–						Φ490 mm	
	Max. machining length*1	1574 mm	2594 mm	3074 mm	1574 mm	2594 mm	3074 mm	1574 mm	2594 mm
Travel	X-axis travel	845 mm							
	Z-axis travel	1640 mm	2660 mm	3140 mm	1640 mm	2660 mm	3140 mm	1640 mm	2660 mm
	Y-axis travel	430 mm							
	X2-axis travel (lower turret)	–						267 mm	
	Z2-axis travel (lower turret)	–						1373 mm	2393 mm
	B-axis indexing range	-30° ~ 210°							
Main spindle	Chuck size	10"							
	Main spindle speed*1	4000 min^{-1} (rpm)							
	Main spindle nose	A2-8							
	Main spindle bore	Φ91 mm							
	Bearing ID	Φ130 mm							
	Max. bar work capacity*1	Φ77 mm							
	Min. indexing increment	0.0001°							
Second spindle	Chuck size	–			10"				
	Second spindle speed*1	–			4000 min^{-1} (rpm)				
	Second spindle nose	–			A2-8				
	Second spindle bore	–			Φ91 mm				
	Bearing ID	–			Φ130 mm				
	Min. indexing increment	–			0.001°				
Milling spindle	Milling spindle type	Spindle turret with ATC							
	Milling spindle speed	12000 min^{-1} (rpm)							
	Max. milling spindle torque	131 N·m (13.36 kgf·m)							
	Turning tool shank height	25 mm							
	Boring bar shank diameter	Φ40 mm							
	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	
	Boring bar shank diameter	–						Φ40 mm	
Feedrate	Rapid traverse rate : X-axis	50 m/min							
	Rapid traverse rate : Z-axis	50 m/min		40 m/min	50 m/min		40 m/min	50 m/min	
	Rapid traverse rate : Y-axis	50 m/min							
	Rapid traverse rate : X2-axis	–						40 m/min	
	Rapid traverse rate : Z2-axis	–						40 m/min	32 m/min
	Rapid traverse rate : W-axis	8 m/min		4.5 m/min	30 m/min	18 m/min	12 m/min	30 m/min	18 m/min
Automatic tool changer system	Tool holder shank*2	HSK-A63 (T63)							
	Tool storage capacity	36 tools							
	Max. tool diameter / length (from guage line)	Φ90 mm (when adjacent pocket empty Φ150 mm) / 500 mm							
	Max. tool weight	12 kg							
	Tool selection method	Random selection, shortest path (fixed pocket assignment)							
Tailstock	Center	MT No. 5			–				
	Travel (W-axis)	1610 mm	2630 mm	3110 mm	–				
Motors	Main spindle motor (40% ED / cont. rating)	30 kW (40 HP) / 22 kW (30 HP)							
	Second spindle motor (40% ED / cont. rating)	–			30 kW (40 HP) / 22 kW (30 HP)				
	Milling spindle motor (40% ED / cont. rating)	24 kW (32 HP) / 22 kW (30 HP)							
Power requirement	Required power capacity (cont. rating)	57.06 kVA			86.19 kVA			88.49 kVA	
	Air source	0.5 MPa (5 kgf/cm^2), more than 400 L / min			0.5 MPa (5 kgf/cm^2), more than 460 L / min			0.5 MPa (5 kgf/cm^2), more than 460 L / min	
Coolant	Tank capacity	510 L	665 L	645 L	510 L	665 L	715 L	510 L	665 L
Machine size	Machine height	2950 mm							
	Width × length	5595 mm × 3400 mm	6980 mm × 3400 mm	7280 mm × 3400 mm	5595 mm × 3400 mm	6980 mm × 3400 mm	7775 mm × 3400 mm	5595 mm × 3400 mm	6980 mm × 3400 mm
	Weight	21300 kg	23500 kg	24200 kg	21900 kg	24100 kg	25500 kg	22300 kg	24500 kg

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

Standard and Optional Equipment

● : Standard ○ : Option - : N / A

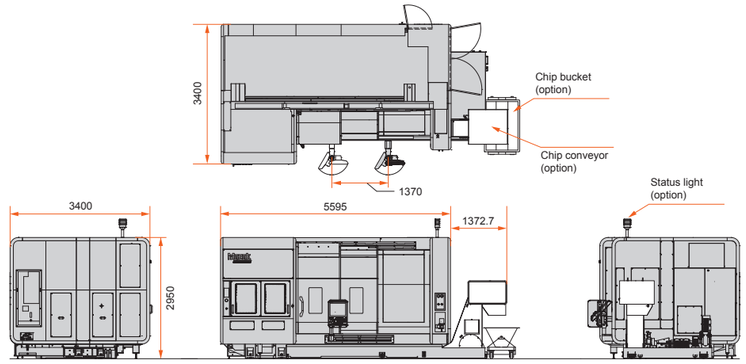
		i-500	S	ST
Machine	Main spindle 4000 min^{-1} (rpm)	●	●	●
	Main spindle 3300 min^{-1} (rpm)	○	○	○
	Main spindle 2500 min^{-1} (rpm)	○	○	○
	Main spindle 2000 min^{-1} (rpm)	○	○	○
	Second spindle 4000 min^{-1} (rpm)	-	●	●
	Second spindle 3300 min^{-1} (rpm)	-	○	○
	Second spindle 2500 min^{-1} (rpm)	-	○	○
	Main spindle 0.0001°indexing · C-axis control	●	●	●
	Second spindle 0.001°indexing (without C-axis)	-	●	●
	Second spindle 0.0001°indexing · C-axis control / synchronization function	-	○	○
	9D lower turret	-	-	●
	Lower turret (rotary tools)	-	-	○
	Main spindle hydraulic chuck (10" through-hole chuck)	●	●	●
	Main spindle hydraulic chuck (12", 15", 18" through-hole chuck)	○	○	○
	Second spindle hydraulic chuck (10" through-hole chuck)	-	●	●
	Second spindle hydraulic chuck (12", 15" through-hole chuck)	-	○	○
	Work stopper inside spindle	○	○	○
	Y-axis control	●	●	●
	B-axis 0.0001°indexing / contouring (EIA)	●	●	●
	Milling spindle 12000 min^{-1} (rpm) (HSK-A63)	●	●	●
	Milling spindle 12000 min^{-1} (rpm) (CAPTO C6 / KM4X-63)	○	○	○
	Milling spindle 20000 min^{-1} (rpm) (HSK-A63)	○	○	○
	High output milling spindle 12000 min^{-1} (rpm) (HSK-A63 / CAPTO C6 / KM4X-63)	○	○	○
	High output milling spindle 10000 min^{-1} (rpm) (HSK-A100 / CAPTO C8 / KM4X-100)	○	○	○
	36 tool magazine	●	●	●
	72 tool magazine	○	○	○
	110 tool magazine	○	○	○
	Long drill stocker (#40 : 3, #50 : 2) 2500U, 3000U only	○	○	○
	NC tailstock (MT5, 1 ton thrust)	●	-	-
	Programmable tailstock thrust	●	-	-
	Automatic steady rest	○	○	-
	Work light	●	●	●
	Chuck clamping pressure program management (main spindle)	○	○	○
	Chuck clamping pressure program management (second spindle)	-	○	○
	Double foot pedal chuck switch	○	○	○
	3 color machine status light	○	○	○
	1 color machine status light (yellow : operation end)	○	○	○
	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	●	●	●

		i-500	S	ST
Safety equipment	Hydraulic pressure interlock	●	●	●
	Operator door interlock	●	●	●
	Overload detection system	○	○	○
	Tool breakage detection on magazine side	○	○	○
Factory automation	Tool eye (upper turret / automatic)	○	○	○
	Tool eye (lower turret / automatic)	-	-	○
	Automatic chuck jaw open / close	●	●	●
	Chuck jaw open / close confirmation	●	●	●
	Automatic opening / closing front door	○	○	○
	Automatic power ON / OFF + warm-up system	●	●	●
	Machining end buzzer	○	○	○
	Preparation for visual tool ID / data management	○	○	○
	Robot interface	○	○	○
Coolant / Chip disposal	Cover coolant	●	●	●
	Flood coolant	●	●	●
	Simultaneous discharge of 0.5 MPa coolant through spindle and flood coolant (milling spindle)	●	●	●
	Simultaneous discharge of 1.5 MPa high-pressure coolant through spindle and flood coolant (milling spindle)	○	○	○
	SUPERFLOW coolant system-simultaneous discharge of 7.0 MPa high-pressure coolant through spindle and 0.5 MPa coolant	○	○	○
	Flood coolant for lower turret	-	-	●
	Shower coolant	○	●	●
	Oil skimmer	○	○	○
	Coolant temperature control	○	○	○
	Mist collector	○	○	○
	Coolant & air blast for chuck jaws (main spindle)	○	○	○
	Air blast through spindle	○	○	○
	Air blast for chuck jaws (main spindle)	○	○	○
	Air blast for chuck jaws (second spindle)	-	●	●
	Preparation for chip conveyor (side disposal / hinge)	●	●	●
	Preparation for chip conveyor (side disposal / ConSep)	○	○	○
	Chip conveyor (side disposal / hinge)	○	○	○
	Chip conveyor (side disposal / ConSep)	○	○	○
	Chip bucket (rotating)	○	○	○
	Chip bucket (fixed)	○	○	○
Others	Grease cartridge	○	○	○
	Manuals (CD)	●	●	●
	Additional manuals (CD or paper)	○	○	○
	MAZATROL SmoothAi dual monitor	○	○	○

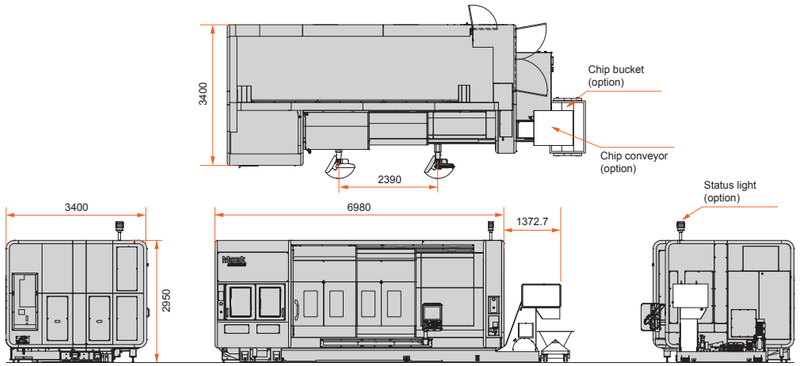
■ Machine Dimensions

Unit : mm

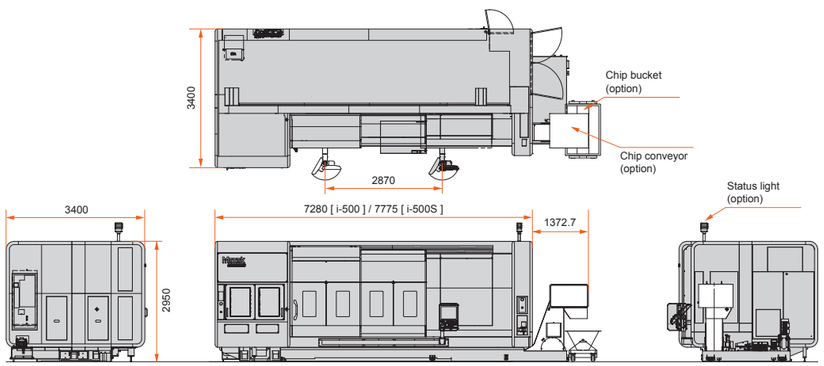
INTEGREX i-500, i-500S, i-500ST (1500U)



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*
Least input increment	0.0001 mm, 0.00001 inch, 0.0001 deg	
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 : 2 MB, Program memory expansion : 8 MB*, Program memory expansion : 32 MB*	
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	
Ether Net	10 M / 100 M / 1 Gbps	

*Option