AW MILLER
TECHNICAL SALES, INC.

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INTEGREX i-150

Mazak

[Compact Multi-tasking Machine]

Compact, High performance Multi-tasking machine

Compact floor space
5.8 m² (62.4 ft²)

Bar work capacity
Φ65 mm (Φ2.56")

Y-axis stroke
±100 mm (±3.94")

- Defines a new standard for small multi-tasking machines
- Eliminates problems of short axis strokes and small machining area
- Work handling system provides unsurpassed versatility
- Designed for exceptional ease of operation

New generation compact multi-tasking machine

INTEGREX i-150

Shown with optional status light

Advanced features of the MAZATROL SmoothX CNC

- Touch screen operation - Operates similar to your smart phone / tablet
- PC with Windows®8 embedded OS
- Fastest CNC in the world - Latest hardware and software for unprecedented speed and precision
- Easy conversational programming of multiple surface machining
- Smooth graphical user interface and support functions for unsurpassed ease of operation
- Fine tuning functions - Easily configure machine parameters for different workpiece materials and application requirements

Windows is a registered trademark of Microsoft Corporation in the United States and other countries. MTConnect is a registered trademark of AMT in the United States and other countries.

MAZATROL SmoothX

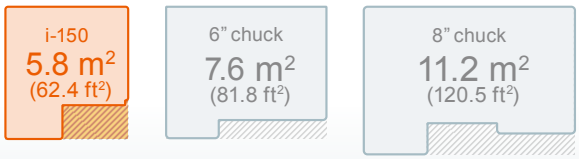
Higher Productivity

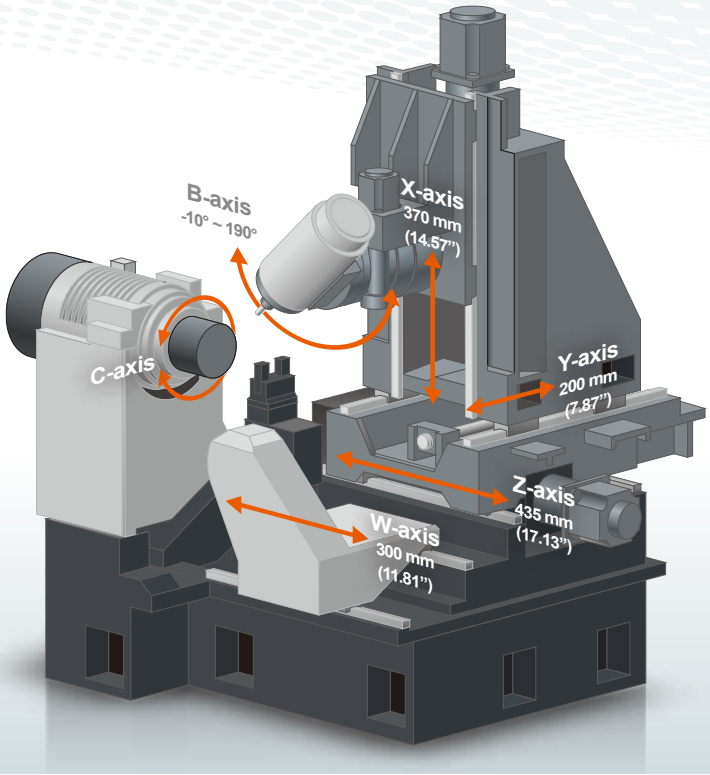
Compact machine with large machining area

Small floor space requirement with exceptional processing versatility

INTEGREX i-150 is designed for bar work up to Φ65 mm (2.56”) with even smaller floor space requirements than comparable machines. It is especially effective for companies that process angular workpiece surfaces and have little available floor space.

Comparable machines



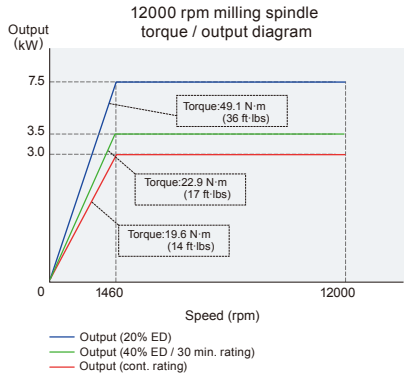


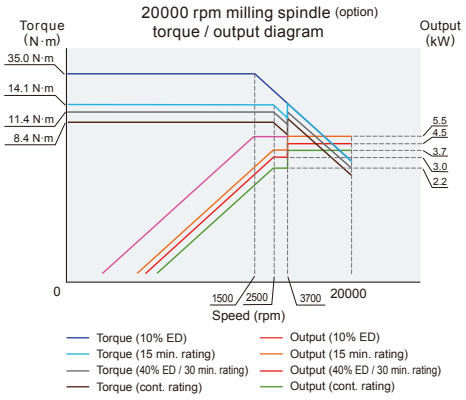
Long Y-axis stroke

The ±100 mm (±3.94”) Y-axis stroke, largest for this class of multi-tasking machines, provides an extremely wide range of machining.

High performance milling spindle designed to machine a wide variety of materials

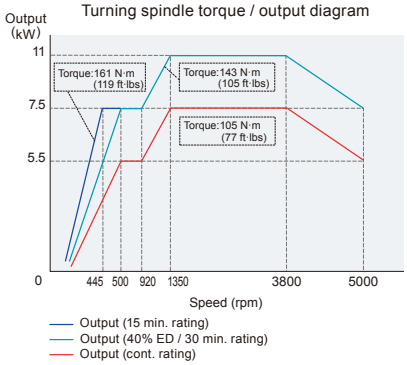
The integral spindle / motor with output of 7.5 kW (10 HP) and top spindle speed of 12000 rpm can effectively be used for a wide range of materials - from heavy duty rough cutting to high speed cutting of aluminum and other non-ferrous materials. High speed 20000 rpm spindle for milling and drilling of small workpieces is optionally available.





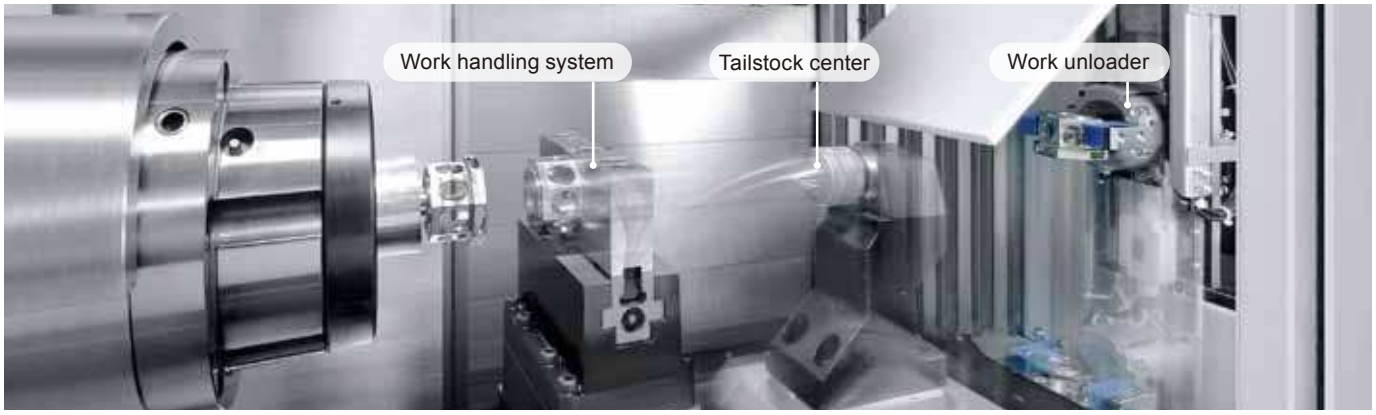
High accuracy turning spindle

Thanks to the 5000 rpm integral spindle / motor, vibration is minimized during high speed operation to ensure exceptional surface finishes and maximum tool life. Since no transmission with belts or gears is used, the higher efficiency of the integral spindle / motor delivers more power to the tool tip to be used for cutting.



Automation

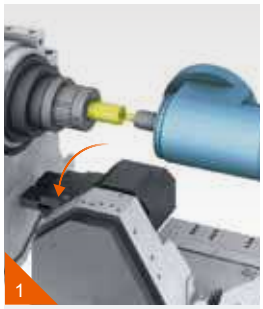
Continuous machining thanks to work handling system



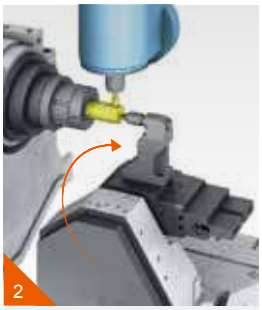
For the second operation, conventional machines normally process the workpiece by a second spindle. Such machines typically require a large amount of floor space even though the workpieces are relatively small.
After loading the workpiece, the work handling system is indexed and the second machining operation begins. To meet a wide variety of production requirements, the work handling system can clamp up to a maximum diameter of Φ65 mm (Φ2.56”).

Flow of automatic operation

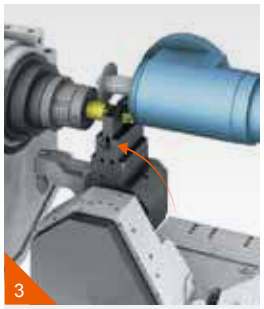
Automatic processing from bar material to finished part



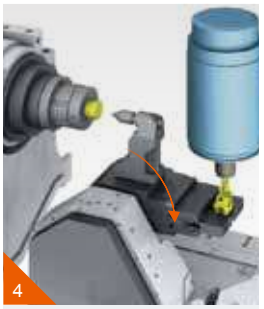
Barfeeder (option) automatically loads the material. When the milling spindle is positioned horizontally and brought down to the main centerline, the work handling system is indexed to the stand-by position in order to eliminate any machine interference.



Tailstock center on work handling system used as NC tailstock.



After the completion of the first machining process, the workpiece is cut off and clamped by the work handling system.



For the next step, the work handling system is indexed 90 degrees and the back face of the workpiece is machined.

The finished workpiece is removed by the work unloader.

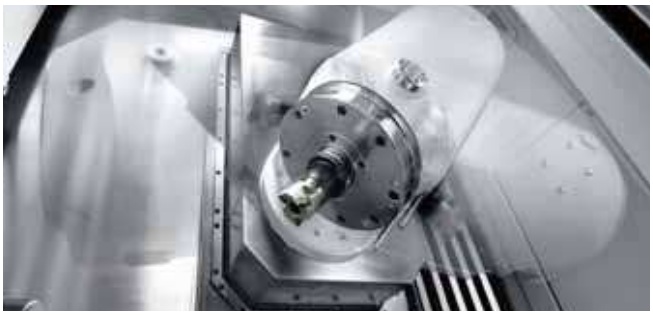
Higher Accuracy

Machine construction for high accuracy

The design of the INTEGREX i-150 incorporates advanced technology to meet the high accuracy machining requirements of a variety of industries.

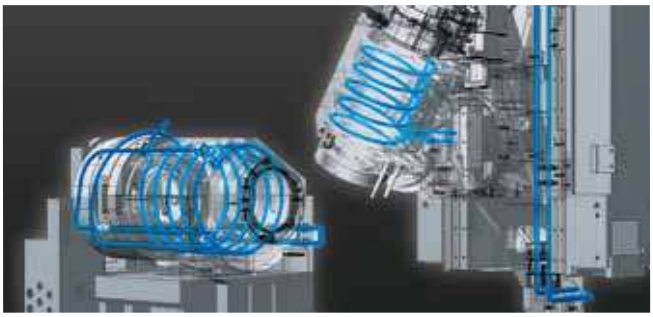
High accuracy B-axis positioning

The B-axis is driven by a roller gear cam, can be indexed in 0.0001 degree increments and has a scale feedback system as standard equipment. As a result, high accuracy positioning is realized over extended periods of operation. Additionally, B-axis indexing and positioning are operated by a roller gear cam and clamping brake system, providing stable high accuracy positioning for extended periods.



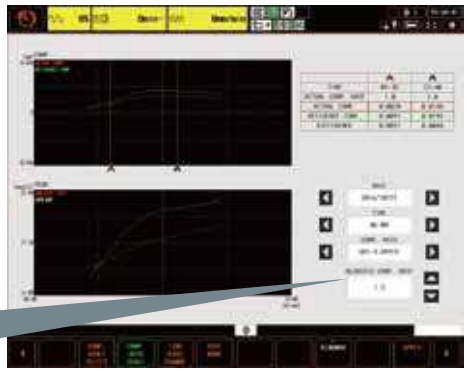
Heat countermeasures for the main spindle and milling spindle

Temperature controlled oil circulates through the spindle and motor housing to remove heat in order to ensure high accuracy machining.



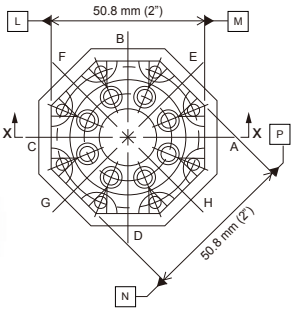
Heat displacement control - THERMAL SHIELD

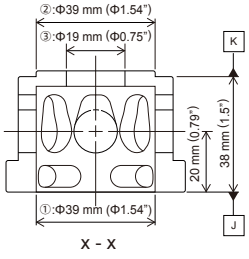
The THERMAL SHIELD is an automatic compensation for room temperature changes, which realizes enhanced continuous machining accuracy. Mazak has performed extensive testing in a variety of environments in a temperature controlled room and has used the results to develop a control system that automatically compensates for temperature changes in the machining area. Changes in the room temperature and compensation data are shown visually.



Temperature and compensation are displayed on screen.
Operator can adjust compensation by looking at the data.

INTEGREX i-150 accuracy - example





Measurement equipment : ZEISS PRISMO-10
Unit : mm (inch)

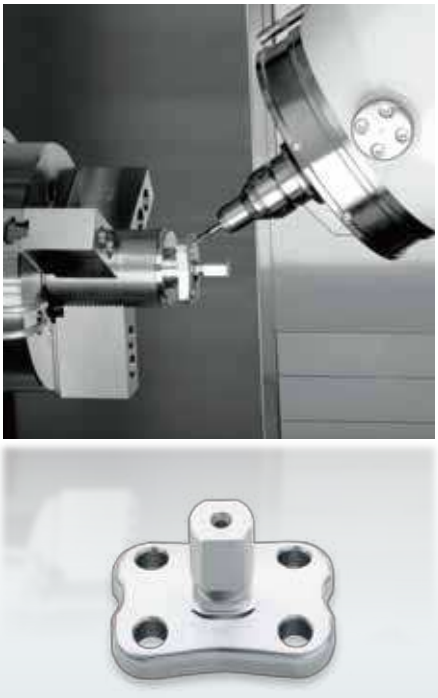
Measurement			Tolerance	Results
Concentricity	◎	①、②	Φ0.02 (Φ0.0008)	Φ0.011 (Φ0.00043)
	◎	①、③	Φ0.01 (Φ0.0004)	Φ0.007 (Φ0.00028)
Parallelism	//	J、K	0.02 (0.0008)	0.008 (0.00031)
	//	L、M	0.05 (0.0020)	0.002 (0.00008)
	//	N、P	0.05 (0.0020)	0.003 (0.00012)
Bore center intersection with A-C	A		±0.05 (±0.0020)	0
	B		±0.05 (±0.0020)	0
	C		±0.05 (±0.0020)	0
	D		±0.05 (±0.0020)	0
	E		±0.05 (±0.0020)	−0.002 (−0.00008)
	F		±0.05 (±0.0020)	0
	G		±0.05 (±0.0020)	0.001 (0.00004)
	H		±0.05 (±0.0020)	0

Note : Results may not be duplicated under different conditions (room temperature, workpiece materials, tool material, cutting conditions and others.)

Applications

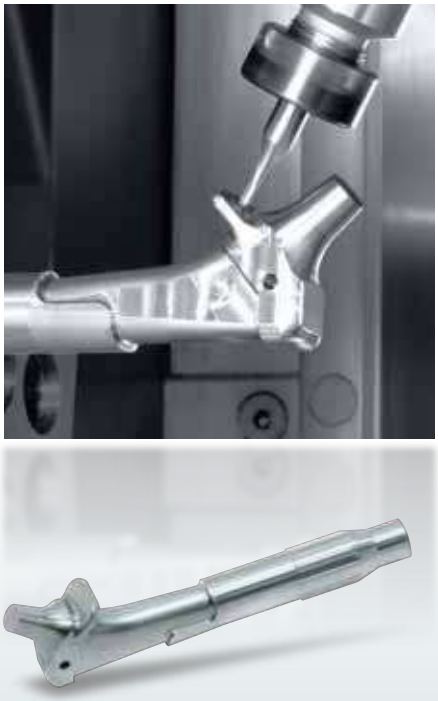
INTEGREX i-150 is designed to efficiently machine workpieces found in many industries

Sample workpieces



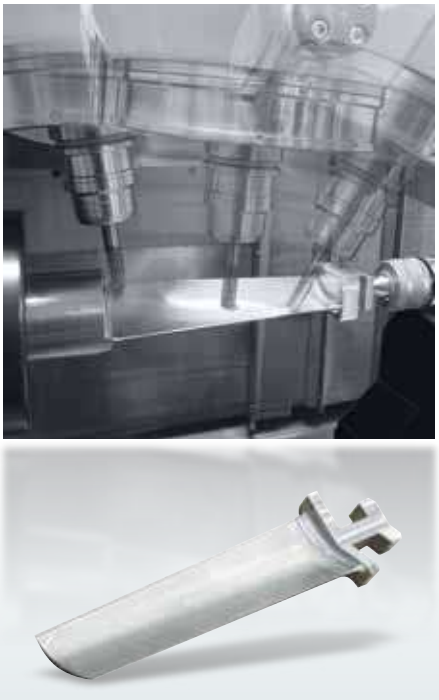
Artificial bone

Industry : Medical
Material : Stainless (SUS303)



Artificial bone

Industry : Medical
Material : Duralium (A2017B)



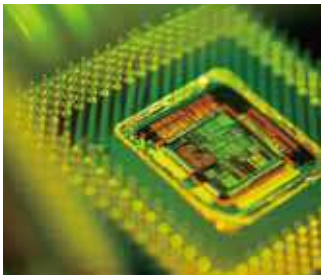
Turbine blade

Industry : Aerospace
Material : Stainless (SUS303)

Aerospace

Medical

Automotive



Semi conductor

Standard Machine Specifications

		INTEGREX i-150 Work handling system	INTEGREX i-150 Chucker
Capacity	Max. swing	Φ400 mm (Φ15.75")	
	Swing over cross slide	Φ400 mm (Φ15.75")	
	Max. machining length*	385 mm (15.16")	
	Bar work capacity*	Φ65 mm (Φ2.56")	
Travel	X-axis travel	370 mm (14.57")	
	Y-axis travel	200 mm (7.87")	
	Z-axis travel	435 mm (17.13")	
	W-axis travel	300 mm (11.81")	—
	B-axis travel	-10° ～ 190°	
Spindle	Spindle speed*	5000 rpm	
	Spindle nose	A2-6"	
	Spindle bore	Φ76 mm (Φ2.99")	
	Spindle bearing I.D.	Φ110 mm (Φ4.33")	
Milling spindle	Spindle type	Single spindle turret with ATC	
	Milling spindle speed	12000 rpm (option : 20000 rpm)	
	Min. indexing increment	0.0001°	
Work handling system	Max. workpiece diameter	Φ65 mm (Φ2.56")	—
Feedrate	Indexing time (VISE TURRET)	1 sec / 1 step	—
	Rapid traverse rate : X-axis	40 m/min (1575 IPM)	
	Rapid traverse rate : Y-axis	40 m/min (1575 IPM)	
	Rapid traverse rate : Z-axis	40 m/min (1575 IPM)	
	Rapid traverse rate : W-axis	30 m/min (1181 IPM)	—
	Rapid traverse rate : B-axis	40 rpm	
	Rapid traverse rate : C-axis	555 rpm	
Automatic tool changer	Tool shank type	HSK-A63 (option : CAPTO C6, KM-63)	
	Tool storage capacity	36 tools (option : 72 tools)	
	Max. tool diameter / length (from gauge line) / weight	Φ90 mm (Φ3.54") [with adjacent pockets empty : Φ125 mm (Φ4.92")] / 210 mm (8.27") / 5 kg (11 lbs)	
	Tool selection method	Double arm method	
	Tool change time (tool-to-tool)	1.7 sec	
Motors	Spindle motor (40% ED / cont. rating)	11 kW (15 HP) / 7.5 kW (10 HP)	
	Milling spindle motor (20% ED)	7.5 kW (10 HP)	
	Coolant pump motor (Mill spindle through coolant)	1.2 kW	
Power requirement	Required power capacity (cont. rating)	24.71 kVA	23.75 kVA
	Air source	0.5 MPa (5 kgf/cm²)、380 L/min (ANR)	
Coolant	Tank capacity (without chip conveyor)	195 L (52 gal)	
Machine size	Machine height	2500 mm (98.43")	
	Floor space requirement	2320 mm × 2500 mm (91.34" × 98.43")	
	Weight	7300 kg (16093 lbs)	7100 kg (15653 lbs)

Note : Max. spindle speed depends on chuck specifications

* Depends on chuck specifications

Standard and Optional Equipment

● : Standard ○ : Option

Machine	Main spindle 5000 rpm	●
	Spindle 0.0001° indexing · C-axis control	●
	Hydraulic chuck (6” through-hole chuck B-206-15B)	●
	Hydraulic chuck (6” through-hole chuck BB06A0515)	○
	Hydraulic chuck (8” through-hole chuck BB08A0615)	○
	B-axis 0.0001° / contouring (EIA)	●
	Rotary tool spindle 12000 rpm (HSK)	●
	Rotary tool spindle 20000 rpm (HSK only)	○
	36 tool magazine (HSK)	●
	36 tool magazine (CAPTO / KM)	○
	72 tool magazine (HSK / CAPTO / KM)	○
	Worlpiece handling device	●
	Tailstock attachment (with center)	○
	Jaws for workpiece handling device	○
	Work light	●
	High / low chuck pressure system	○
	Double foot switch	○
	Status light (3 colors)	○
	Status light (1 color) (machining end : yellow)	○
	Status light (1 color) (alarm : red)	○
High accuracy	Ball screw core cooling (X-, Z-axis)	●
	Ball screw core cooling (Y-axis)	○
	Mazak monitoring system B (OMP 60)	○
	Preparation for Mazak monitoring system B (OMP 60)	○
	Scale feedback (B-axis)	●
	Scale feedback (X-, Y-, Z-axis)	○
	Absolute position detection (linear axes)	●
	X-, Y-, Z-axis pitch error compensation input	●
Safety equipment	Hydraulic pressure interlock	●
	Operator door interlock	●
	Electrical ground leakage breaker	●
	Overload detection	○
	Tool breakage detection on magazine side	○

* Spindle speed depends on chuck specifications

Factory automation	Tool eye	●
	Automatic chuck jaw open / close	●
	Chuck jaw open / close confirmation	●
	Automatic opening / closing front door	○
	Automatic power ON / OFF + warm-up operation	●
	Machining end buzzer	○
	Visual tool ID / data management preparation	○
	Robot interface (MAZAK specification)	○
	Bar feeder interface	○
	Cover coolant	●
	Flood coolant	●
Coolant / Chip disposal	Simultaneous discharge of 0.5 MPa (73 PSI) coolant through spindle and flood coolant (upper turret)	●
	Simultaneous discharge of 1.5 MPa (218 PSI) high pressure coolant through spindle and flood coolant (upper turret)	○
	Simultaneous discharge of 3.5 MPa (508 PSI) high pressure coolant through spindle and 0.5 MPa (73 PSI) flood coolant (upper turret)	○
	Magnum coolant-simultaneous discharge of 7.0 MPa (1015 PSI) high pressure coolant through spindle and 0.5 MPa (73 PSI) flood coolant (upper turret)	○
	SUPERFLOW coolant system	○
	Oil skimmer	○
	Coolant temperature control	○
	Mist collector	○
	Coolant & air blast for chuck jaws	○
	Air blast through spindle	○
	Air blast for chuck jaws	○
	Chip pan (without chip conveyor)	●
	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 (rotary)	○
	Chip bucket (fixed)	○
Others	Hand held grease nozzle	○
	Manual (CD)	●
	Additional manuals (CD or paper)	○

MAZATROL SmoothX 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*
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 postion 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	ool position offset, Tool length offset, Tool diameter / tool nose R 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, 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 function	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, WPC coordinate measurement, Measurement on machine, Tool eye measurement
Automatic measuring function	WPC coordinate measurement, Automatic tool length measurement, Laser tool length / diameter measurement , Workpiece measurement, Sensor calibration, Tool eye auto tool measurement, Tool breakage detection, External tool breakage detection	Automatic tool length measurement, Laser tool length / diameter measurement, Workpiece measurement, Sensor calibration, Tool eye auto tool measurement, Tool breakage detection, External tool breakage detection*
MDI measurement	Coordinate measurement, Laser measurement	
Peripheral network	PROFIBUS-DP*, EtherNet/IP*, CC-Link*	
Memory	SD card interface, USB	
EtherNet	10 M / 100 M / 1 Gbps	

* Option