

Mazak

HCR-5000S

[Simultaneous 5-axis Horizontal Machining Center]



Simultaneous 5-axis horizontal machining center for high-speed machining of aluminum

- High-speed spindle and axial acceleration/deceleration
- Unique tilting/rotary table
- Center trough for smooth chip disposal



Simultaneous 5-axis Horizontal Machining Center

HCR-5000S



Spindle specifications for high productivity

12000 rpm, 18.5 kW [40% ED (30 min. rating)]

18000 rpm, 35 kW [40% ED (30 min. rating)]

OPTION

25000 rpm, 23 kW [40% ED (30 min. rating)]

OPTION

30000 rpm, 80 kW (cont. rating)

OPTION

High-speed feedrates for shorter cycle times

X-, Y-, Z-axis

rapid traverse rate: 60 m/min (2362 IPM)

Acceleration: 1 G - 0.8 G

(X, Y axis-Z axis)

A-, C-axis

rapid traverse rate: 30 rpm - 50 rpm

(A axis-C axis)

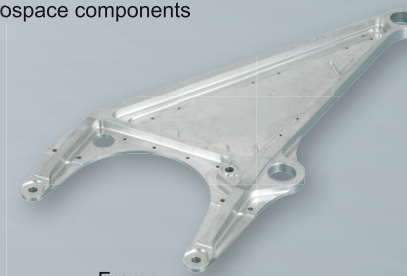
Smooth chip disposal

Extremely smooth chip disposal thanks to the unique tilting table (A-axis) design and center trough below table

High efficiency machining of small- and mid-size aerospace and semi-conductor components

Example workpieces:

Aerospace components



Frame

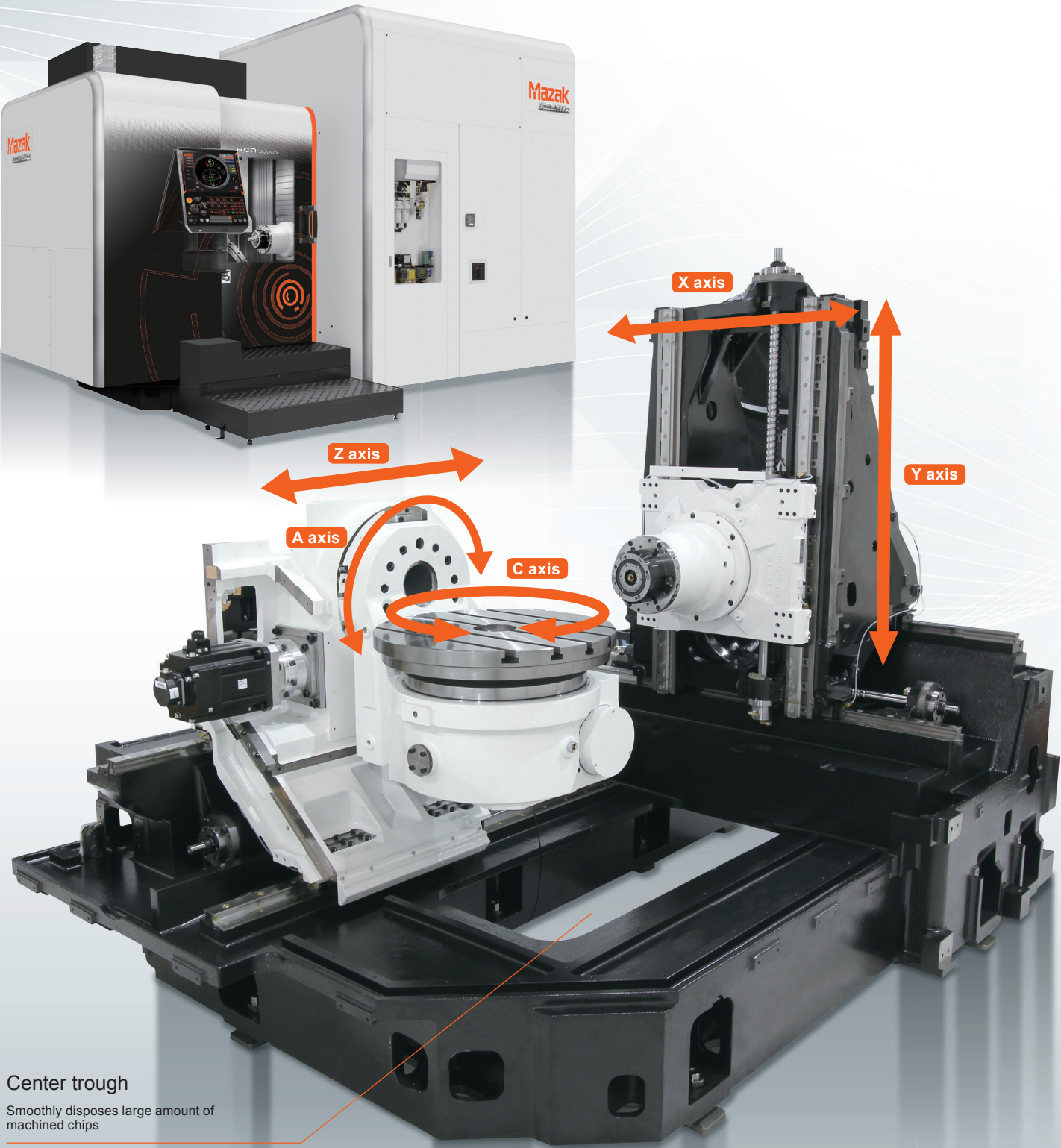


Bracket



Higher Productivity

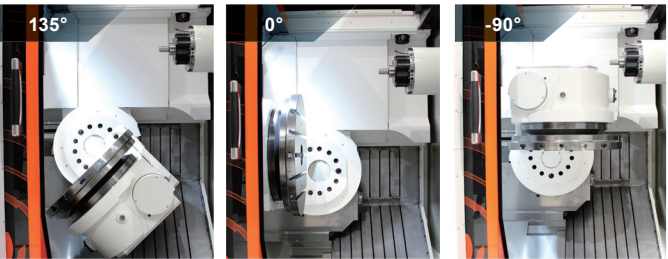
Machine designed for high productivity



A-, C-axis tilting rotary table

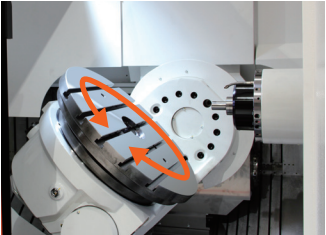
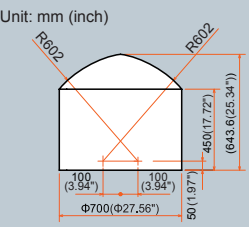
Roller gear cam

Both the A and C axes utilize a roller gear cam system for 0.0001° positioning increments and high-accuracy performance.



30 rpm
A-axis
rapid traverse rate

Max. workpiece dimensions



50 rpm
C-axis
rapid traverse rate

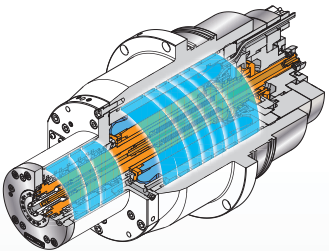
Spindle specifications to meet a variety of requirements

12000 rpm, 18.5 kW [40% ED (30 min. rating)]

18000 rpm, 35 kW [40% ED (30 min. rating)] **OPTION**

25000 rpm, 23 kW [40% ED (30 min. rating)] **OPTION**

30000 rpm, 80 kW (cont. rating) **OPTION**



Integral spindle/motor

Thanks to the integral spindle/motor design, vibration is minimized during high-speed operation to ensure exceptional surface finishes and maximum tool life.

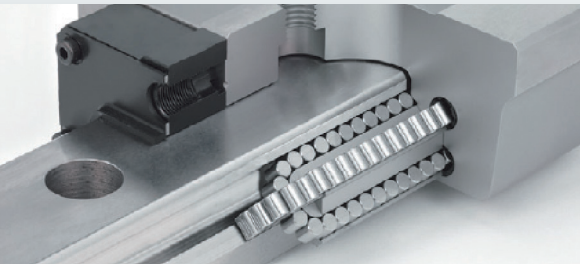
Spindle temperature control

For high-accuracy machining, temperature-controlled cooling oil is circulated around the spindle bearings and headstock to minimize any thermal change to the spindle.

X, Y, Z axes

Linear roller guides

The linear roller guides on the X, Y and Z axes utilized by the HCR-5000S provide high-accuracy positioning. Additionally, with their high rigidity and considerably lower friction, high-speed feedrates can be used over a wide range of machining, from heavy-duty to high-speed cutting.



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.

60 m/min
(2362 IPM)
X-, Y-, Z-axis
rapid traverse rate

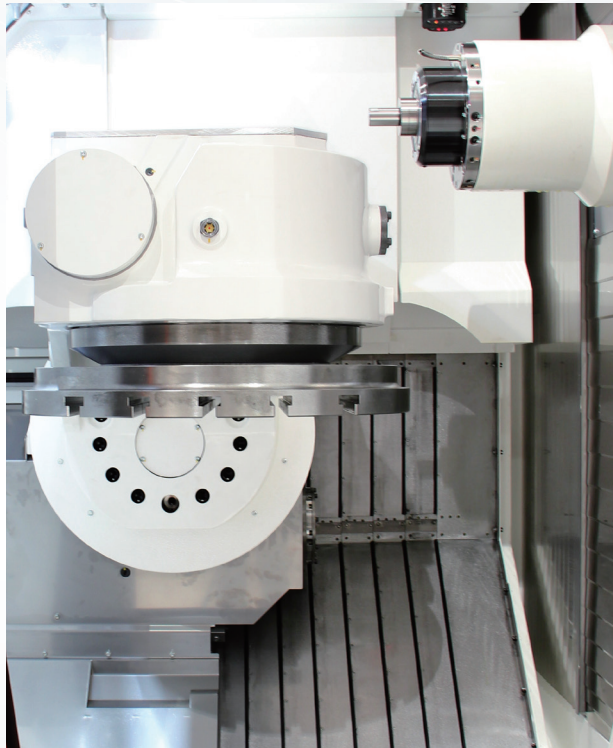
1.0 G [X, Y]
0.8 G [Z]
Axis acceleration/
deceleration

Coolant/chip disposal

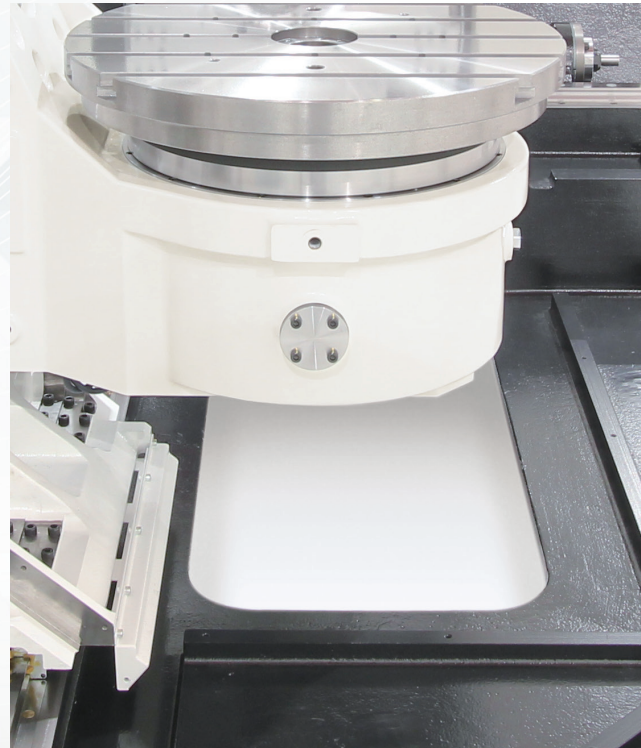
Smooth disposal of large amounts of machined chips

When machining aluminium, large amounts of chips are created. Coolant then flushes chips to the center trough conveyor below the table. In addition, by rotating the tilting table (A axis), chips accumulated on and inside the workpiece can fall to the center trough.

Tilting table (A axis: -90°)

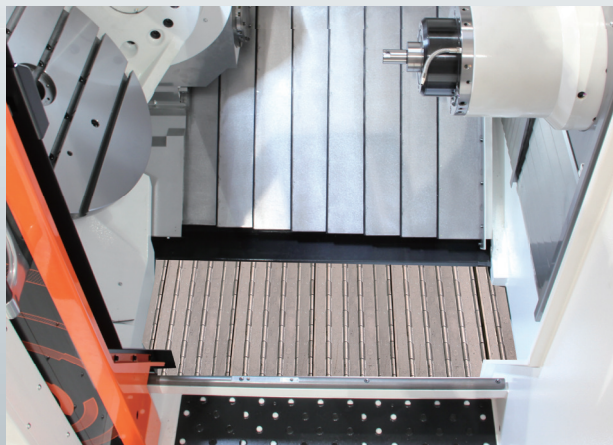


Center trough



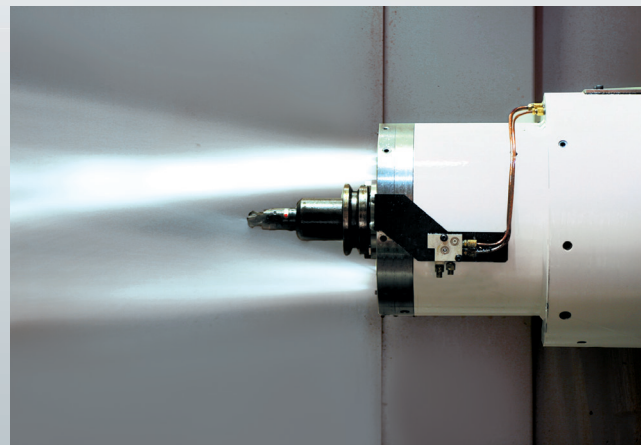
Chip conveyor

The chip conveyor located below the table within the center trough removes chips quickly and smoothly.



Flood coolant

Coolant is discharged from nozzles on the spindle housing to cool the workpiece and remove chips.



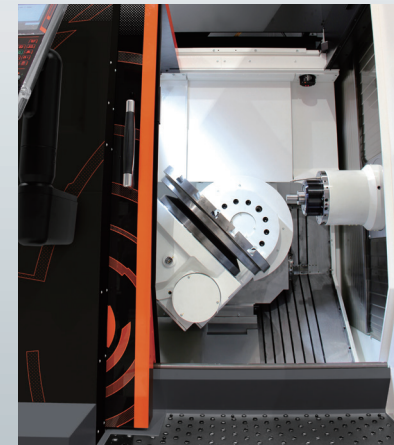
Ergonomics

Design focus on ergonomics provides unsurpassed ease of operation



Convenient workpiece loading/unloading

An overhead crane can be easily used for the loading/unloading of heavy workpieces and fixtures.



Convenient setup

Thanks to the step in front of the operator door, the distance from the operator to fixture/workpiece on the table and tool in the spindle is small for convenient setup.



Adjustable CNC touch panel

The operation touch panel can be tilted to the optimal position for any operator's height to ensure ease of operation.



Standard and Optional Equipment

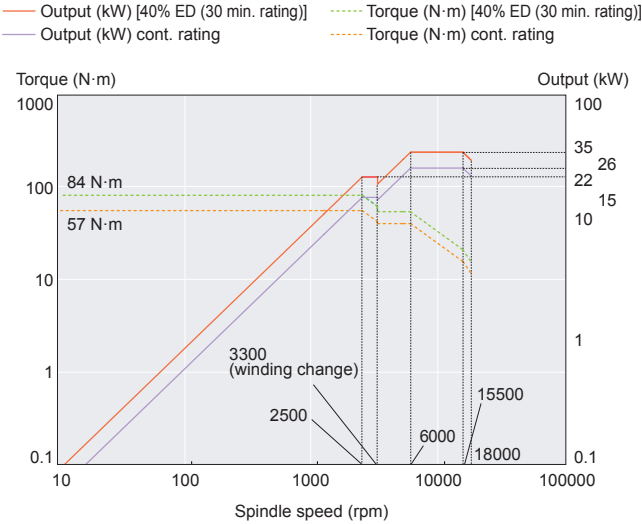
Standard: ● Option: ○

Spindle	12000 rpm (BBT-40)	●
	12000 rpm (No.40, HSK-A63)	○
	18000 rpm (No.40, BBT-40, HSK-A63)	○
	25000 rpm (BBT-40, HSK-A63)	○
	30000 rpm (HSK-A63)	○
Table	Tilting rotary table (A, C axis)	●
Tool Magazine	40-tool drum-type tool magazine (tool storage position: MAZATROL random memory)	●
	60-tool drum-type magazine (tool storage position: MAZATROL random memory)	○
	80-tool chain type	○
	120-tool chain type	○
	160-tool chain type	○
	180-tool rack type (TOOL HIVE)	○
	204-tool rack type (TOOL HIVE)	○
	240-tool rack type (TOOL HIVE)	○
	288-tool rack type (TOOL HIVE)	○
	312-tool rack type (TOOL HIVE)	○
	348-tool rack type (TOOL HIVE)	○
Setup	Automatic tool length measurement & tool breakage detection	●
	RENISHAW NC 4 laser tool length measurement	○
	Tool breakage detection	○
	Tool ID magazine operation panel	●
	Mazak monitoring system B RMP600	○
	Remote manual pulse generator (wired)	○
Factory Automation	Automatic power ON/OFF + warm-up operation	●
	Robot interface	○
Coolant/chip disposal	Flood coolant	●
	Coolant through spindle 0.8 MPa	●
	Coolant through spindle 1.5 MPa, 3.5 MPa	○
	SUPERFLOW coolant system	○
	Niagara coolant	●
	Secondary coolant filter for aluminum	○
	Hand-held coolant nozzle (for cleaning pallet changer)	○
	Oil skimmer (RB-200)	○
	Mist collector	○
	Preparation for chip conveyor (rear disposal)	●
High accuracy	Chip conveyor (rear disposal)	○
	Ball screw core cooling (X, Y, Z axis)	●
	Chiller unit	●
	Coolant temperature control	○
	Scale feedback (X, Y, Z, A, C axis)	○

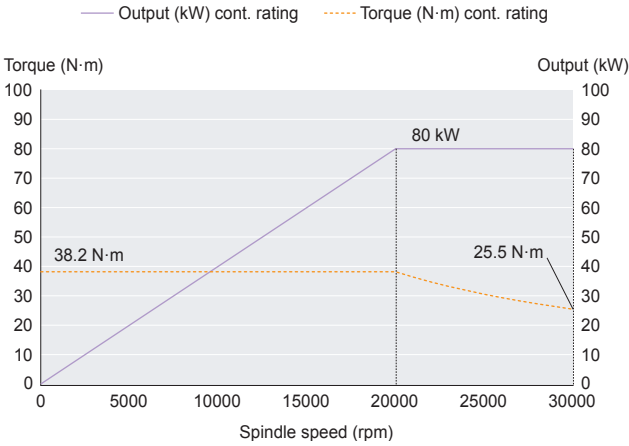
Note: Pallet changer version is also available which can be integrated into a PALLETECH manufacturing cell.

Spindle Output/Torque Diagram

18000 rpm spindle



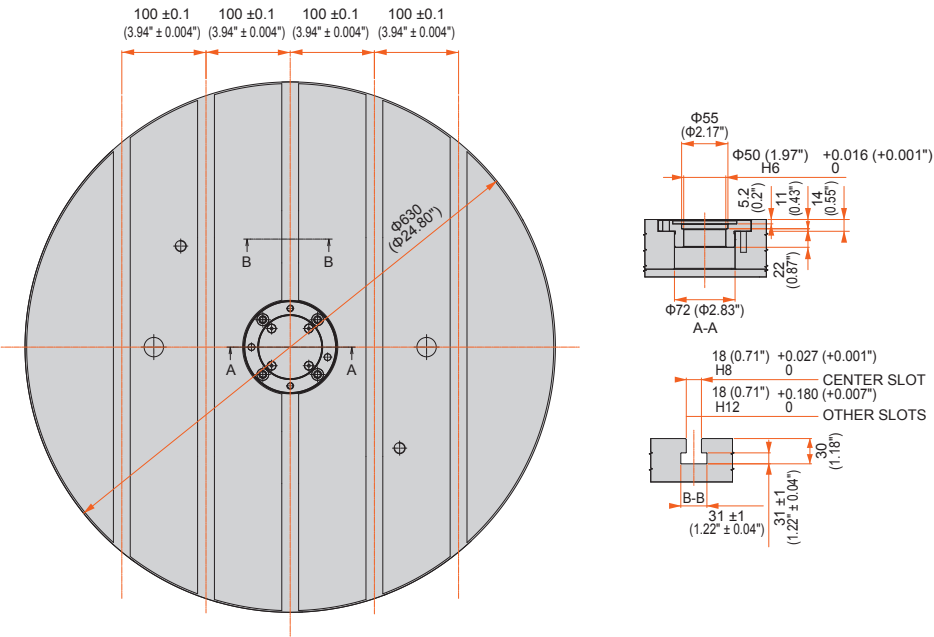
30000 rpm spindle [High speed, high output]



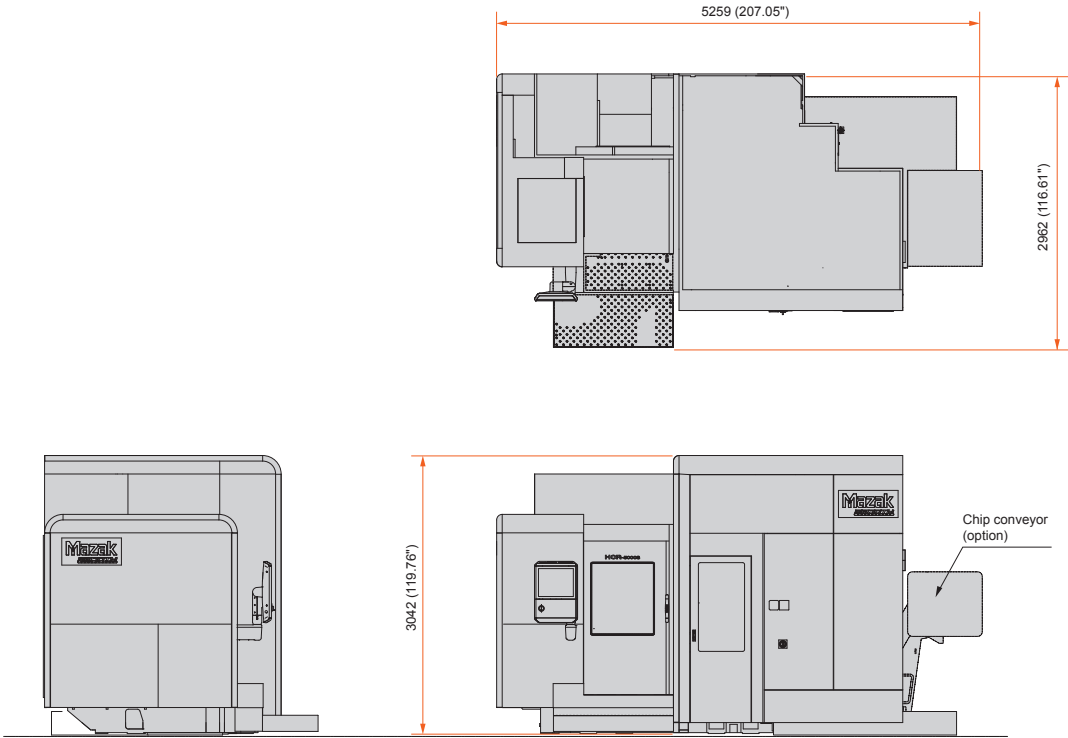
Dimensions

Unit: mm (inch)

Table Dimensions



Machine Dimensions



Standard Machine Specifications

Stroke	X axis (column right/left)	730 mm (28.74")
	Y axis (spindle up/down)	730 mm (28.74")
	Z axis (table back/forth)	730 mm (28.74")
	A axis (tilt table)	-90° ~ +135°
	C axis (table rotating)	±360°
	Distance between table top to spindle nose	50 mm ~ 780 mm (1.97" ~ 30.71")
Table	Table size	Φ630 mm (Φ24.80")
	Table top surface	18 mm (0.71") T-slot × 5
	Max. workpiece dimensions	Φ700 mm × 643.6 mm (Φ27.56" × 25.34")
	Table load capacity (evenly distributed)	500 kg (1102 lbs)
Spindle	Max. spindle speed	12000 rpm
	Spindle gear ranges	2 (electric)
	Spindle taper	No.40
	Spindle bearing ID	Φ70 mm (2.76")
	Spindle acceleration	1.48 s (0 → 12000 rpm)
Feedrate	Rapid traverse rate (X, Y, Z axes)*1	60 m/min (2362 IPM)
	Rapid traverse rate (A, C axes)	30 rpm, 50 rpm
	Cutting feedrate (X, Y, Z axes)*1	1 ~ 60000 mm/min (0.04 ~ 2362 IPM)
	Cutting feedrate (A, C axes)	1 ~ 30 rpm
	Axis acceleration/deceleration (X, Y, Z axes)	1 G, 1 G, 0.8 G
Automatic tool changer	Tool shank	No.40
	Tool magazine capacity	40
	Max. tool diameter/length (from gauge line)/weight	Φ95 mm/400 mm/12 kg (Φ3.74"/15.75"/26 lbs)
	Max. tool diameter (when adjacent pockets empty)	Φ170 mm (Φ6.69")
	Tool selection method	Random selection/shortest path
	Tool change time (chip-to-chip)	2.8 s
Motors	Spindle motor (40% ED (30 min. rating)/cont. rating)	35 kW/26 kW (47 HP/35 HP)
Machine size	Machine height	3042 mm
	Foor space requirement	2962 mm × 5259 mm (with chip conveyor) (116.61" × 207.05")
	Machine weight	11500 kg (25353 lbs)
CNC		MAZATROL SmoothX

*1 Limited feedrate with continuous axis movement

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 compensasion	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, Synchronous tapping*	Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Spiral interpolation, Helical interpolation, Cylindrical interpolation*, Involute interpolation*, Fine spline interpolation*, NURBS interpolation*, Polar coordinate interpolation*, 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 functions	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)	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)
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 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 place, HobbingⅡ*, Shaping function*, Dynamic compensationⅡ*, Tool center point control*, Tool radius compensation for 5-axis machining*, Workpiece positioning error compensation*
Machine compensation	Backlash compensation, Pitch error compensation, Geometric deviation compensation, Volumetric compensation*	
Protection functions	Emergency stop, Interlock, Pre-move Stroke Check, 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, MD interruption, TPS, Restart, Machine lock	Optional block skip, Optional stop, Dry run, Manual handle interruption, MD interruption, TPS, Restart, Restart 2, Collation stop, Machine lock
Manual measuring functions	Tool length teach, Touch sensor coordinates measurement, Workpiece offset measurement, WPC coordinate measurement, Measurement on machine	Tool length teach, Tool offset teach, Touch sensor coordinates measurement, Workpiece offset measurement, WPC coordinate measurement, Measurement on machine
Automatic measuring functions	WPC coordinate measurement, Automatic tool length measurement, Sensor calibration, Tool breakage detection, External tool breakage detection*	Automatic tool length measurement, Sensor calibration, Tool breakage detection, External tool breakage detection*
MDI measurement	Semi automatic tool length measurement, Full automatic tool length measurement, Coordinate measurement	
Interface	PROFIBUS-DP*, EtherNet/IP* CC-Link*	
Card interface	SD card interface, USB	
EtherNet	10 M/100 M/1 Gbps	

*Option



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