High Performance Machining of Complex Workpieces

Utilizing the latest technology, Mazak develops innovative machine tools in response to market requirements. The Mazak VORTEX Ⅱ series is designed to machine large workpieces such as aerospace components with complex contours with unsurpassed accuracy and efficiency.

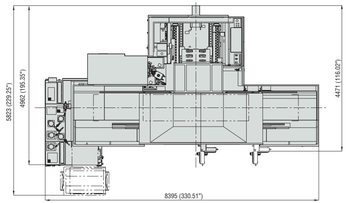
The unique tilting spindle design provides high accuracy as well heavy-duty machining capability thanks to the employment of backlash-free roller gear cams.

Together with the unequalled Mazak global support network, this machine effectively meets your production requirements now and in the future.

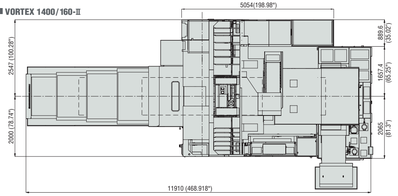
Simultaneous 5-axis vertical machining center

VORTEX Ⅱ SERIES

■ VORTEX 815/120-Ⅱ



■ VORTEX 1400/160-Ⅱ



VORTEX Ⅱ SERIES Machine Dimensions [mm (inch)]

Mazak

Your Partner for Innovation

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- Specifications are subject to change without notice.
- This product is subject to all applicable export control laws and regulations.
- The accuracy data and other data presented in this catalogue were obtained under specific conditions. They may not be duplicated under different conditions (room temperature, workpiece materials, tool material, cutting conditions, etc.)

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VORTEX Ⅱ series 06.08.5000 T 99J214506E0

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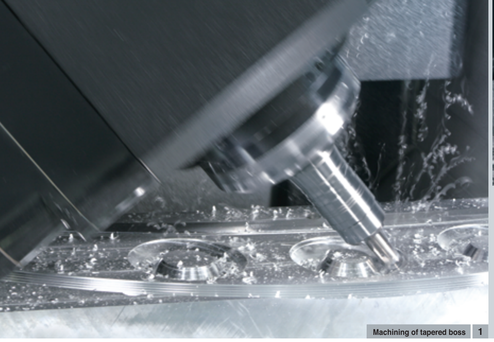
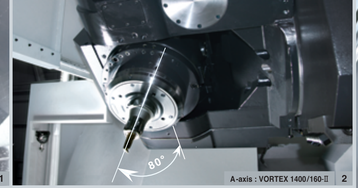
Simultaneous 5-Axis Vertical Machining Center

Mazak

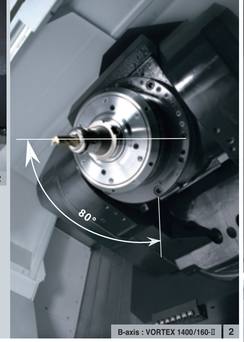


Machining of tapered boss 1

Machining of complex workpiece periphery 1



A-axis : VORTEX 1400/160-Ⅱ 2

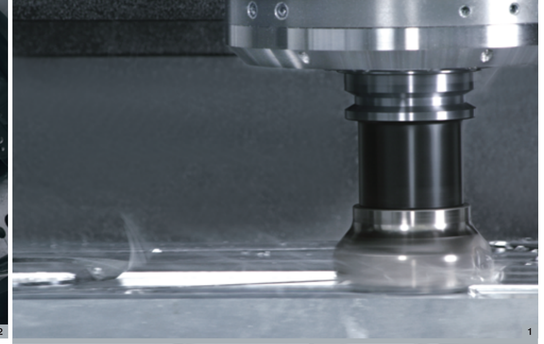


B-axis : VORTEX 1400/160-Ⅱ 2

1 The standard spindle has a top speed of 10000 rpm to machine a wide range of workpiece materials – from steel to non-ferrous. Additionally, two other integral spindle/motor specifications are optionally available for the VORTEX Ⅱ series to meet specific application requirements. The AC 75 kW (100 HP), 18000 rpm spindle is designed for the machining of complex contours using small-diameter tools. The optional 286 N-m (210 ft-lbs), 13000 rpm spindle can be used for a wide range of applications including difficult to machine materials.

MRR (Material: Aluminum [A5052])
10000 rpm spindle:5280 cc/min (322 in³/min) (Ø125 mm [Ø 5″] Face Mill - 6 teeth)

2 The rotary A and B axes are designed for machining aerospace components and can be positioned over a range of ±40 degrees. Each axis can be indexed in 0.0001 degree increments thanks to the roller gear cam system that eliminates backlash for high precision machining. The roller gear cam can transmit more than twice the torque when compared to a conventional worm drive for unsurpassed heavy-duty machining.

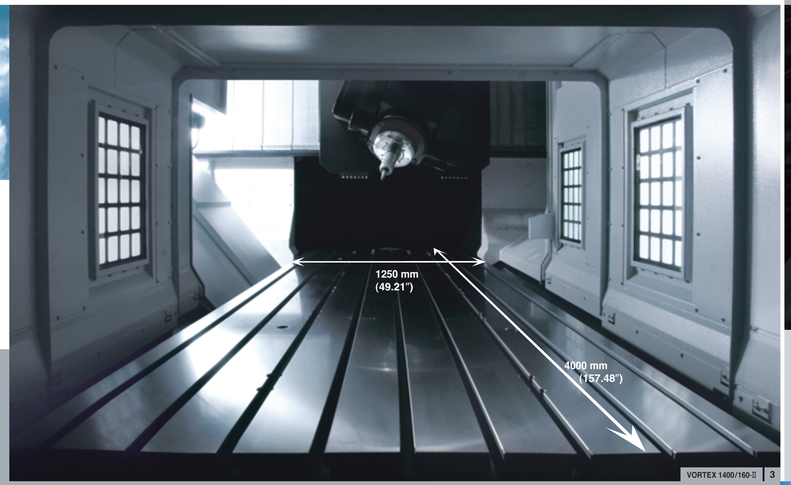


1

VORTEX 815/120-Ⅱ

VORTEX 1400/160-Ⅱ

Unlike 3-axis vertical machining centers, the VORTEX Ⅱ series can machine complex aerospace components by using the side face of a ball endmill thanks to its spindle A- and B- axes rotation. As a result, reducing machining time and high accuracy machining are realized.



VORTEX 1400/160-Ⅱ 3

3 Large Machining Area and Table for Large Workpieces
Two types of the VORTEX Ⅱ series are available to meet your production requirements: one is the double column VORTEX 1400/160 - Ⅱ, and the other is the column-feed type VORTEX 815/120 - Ⅱ.

	VORTEX 815/120 - Ⅱ	VORTEX 1400/160 - Ⅱ
Table size	3240 mm x 810 mm(127.56″ x 31.89″)	4000mm x 1250 mm(157.48″ x 49.21″)
X- / Y- / Z-axis	3048 / 810 /610 mm(120″ / 31.89″ / 24.02″)	4200/1400 /610 mm(165.35″ /55.12″ / 24.02″)

4 Unsurpassed productivity for the machining of complex surfaces is realized thanks to the ±40 degree rotary A- and B-axes and the high speed, high power spindle. Additionally, both the double column VORTEX 1400/160-Ⅱ and the column-feed type VORTEX 815/120-Ⅱ are available to meet a variety of production requirements.

4

5 The standard hinge-type chip conveyors installed in the troughs at both sides of the machine table smoothly remove the large volume of machined chips that are produced by high speed machining.

5

Standard Machine Specifications

		VORETEX 815 / 120 -Ⅱ	VORETEX 1400 / 160 -Ⅱ
Travel	X-axis travle (table right/left)	3048 mm (120")	4200 mm (165.35")
	Y-axis travel (spindle head forward/backward)	810 mm (31.89")	1400 mm (55.12")
	Z-axis travel (spindle head up/down)	610 mm (24.02")	610 mm (24.02)
	A-axis travel (spindle right/left tilt)	± 40°	± 40°
	B-axis travel (spindle back forth tilt)	± 40°	± 40°
	Distance from table top to spindle nose	127 ~ 737 mm (5° ~ 29.02")	200 ~ 810 mm (7.87" ~ 31.89")
Table	Table size	3240 x 810 mm (127.56" x 31.89")	4000 x 1250 mm (157.48" x 49.21")
	Table load capacity (evenly distributed)	3000 kg (6614 lbs)	5000 kg (11023 lbs)
	table surface configuration	18 mm (0.71") T-groove x 5.. 150 mm (5.91") pitch	22 mm (0.87") T-groove x 9.. 140 mm (5.51") pitch
Spindle	Max. spindle speed	10000 rpm	10000 rpm
	Spindle taper	No. 50	No. 50
	Spindle bearing ID	ø90 mm (ø3.54")	ø90 mm (ø3.54")
	Max. spindle torque	118 N · m (87 ft · lbs)	118 N · m (87 ft · lbs)
feedrate	Rapid traverse rate (X- / Y- / Z-axis)	24000 / 24000 / 20000 mm/min (945 / 945 / 787 IPM)	20000 / 32000 /20000 mm/min (787 / 1260 / 787 IPM)
	Rapid traverse rate (A-, B-axis)*1	3600 deg/min	3600 deg/min
	Cutting feedrate (X- / Y- / Z-axis)	1 ~ 8000 mm/min (0.04 ~ 315 IPM)	1 ~ 8000 mm/min (0.04 ~ 315 IPM)
	Cutting feedrate (A-, B-axis)	1800 deg/min	1800 deg/min
	Number of simultaneously controlled axes	5-axes	5-axes
	Min. indexing increments	0.0001°	0.0001°
Automatic tool changer	Tool shank type	CAT-50	CAT-50
	Tool storage capacity	30	30
	Max. tool diamter / length (from gauge line) / weight	ø125 mm / 380 mm / 20 kg (ø 4.92" / 14.96" / 44 lbs)	ø125 mm / 380 mm / 20 kg (ø 4.92" / 14.96" / 44 lbs)
	Max. tool diameter with adjacent tool pocket empty	ø 210 (ø 8.27")	ø 210 (ø 8.27")
	Tool selection method	Randome selction, shortest path	Randome selction, shortest path
	Tool change time	7.5 sec	9.8 sec
Motor	Spindle motor (30 min. / Cont. rating)	AC 37 kW (50 HP) / 30 kW (40 HP)	AC 37 kW (50 HP) / 30 kW (40 HP)
Power requirement	Electric power supply (30 min. / Cont. rating)	97 kVA / 87 kVA	116.8 kVA / 103.4 kVA
	Air supply capacity	600 NL/min (9 ft³/min)	600 NL/min (9 ft³/min)
Machine size	Machine height	3190 mm (125.59")	4058 mm (159.76")
	Required floor space	8395 x 4962 mm (330.51" x 195.35")	13700 x 7250 mm (539.37" x 285.43")
	Machine weight	22000 kg (48502 lbs)	37000 kg (81571 lbs)

*1: Limited feedrate with continuous axis movement.

Standard Equipment

- Coolant cover
- Flood coolant
- Hinge type chip conveyor
- Machine work light
- 1 set of manuals
- 1 set of adjusting tools

Optional Equipment

Machines	High-torque spindle 13000 rpm, [75kW (100 HP), 286Nm (210 ft-lbs)]
	High-speed spindle 18000 rpm, [75kW (100HP), 59Nm (43 ft-lbs), HSK A100]
	Big-Plus
	HSK-A100 Rapid traverse rate (X-,Y- & Z-axis) 40 m/min < High-speed spindle >
Factory Automation Equipment	60-tool magazine
	120-tool magazine
	2-Pallet changer
	Automatic power breaker
	Machining completion indicator signal tower
	3-color Machine status indicator tower
Environment and Safety Equipment	Top cover
Coolant / Chip Disposal	High-pressure coolant through spindle 0.8 MPa (114 PSI)
	High-pressure coolant through spindle 1.5MPa (213 PSI)
	Flood coolant 1.5MPa (213 PSI)
	Work air blast
	Niagara coolant system
	Chip conveyor (Consep)
	Chip bucket (Rotary,Fixed)
Convenient operation	Tool length measuring function
	Mazak measurement system
	Sub table