OKK

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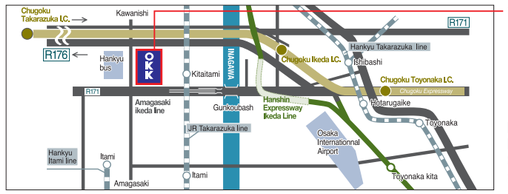
Access map



OKK Inagawa factory
8-10 Kitaitami, Itami, Hyogo Prefecture
664-0831, Japan

From Kansai International Airport :
Please take a airport bus bound for Osaka (Itami) International Airport and take a taxi to OKK.

Technical Center

S-Plant

W-Plant

Technical center is for test cutting, demonstration and training.
S-plant is for machining and assembly of spindles and tables.
W-plant is for final assembly of large sized machining centers.
All are located at Inagawa, Itami city, Hyogo, Japan

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OKK A DIVERSIFIED MANUFACTURER OF MACHINE TOOLS
Specializes In:
Machining centers
Graphite cutting machining centers
Grinding centers
CNC Milling machines
Conventional milling machines
Total die and mold making systems
Flexible manufacturing cells and systems

Other Products Include:
Textile Machinery
Water Maters

NOTE :
OKK reserves the right to change the information contained in this brochure wihtout notice.
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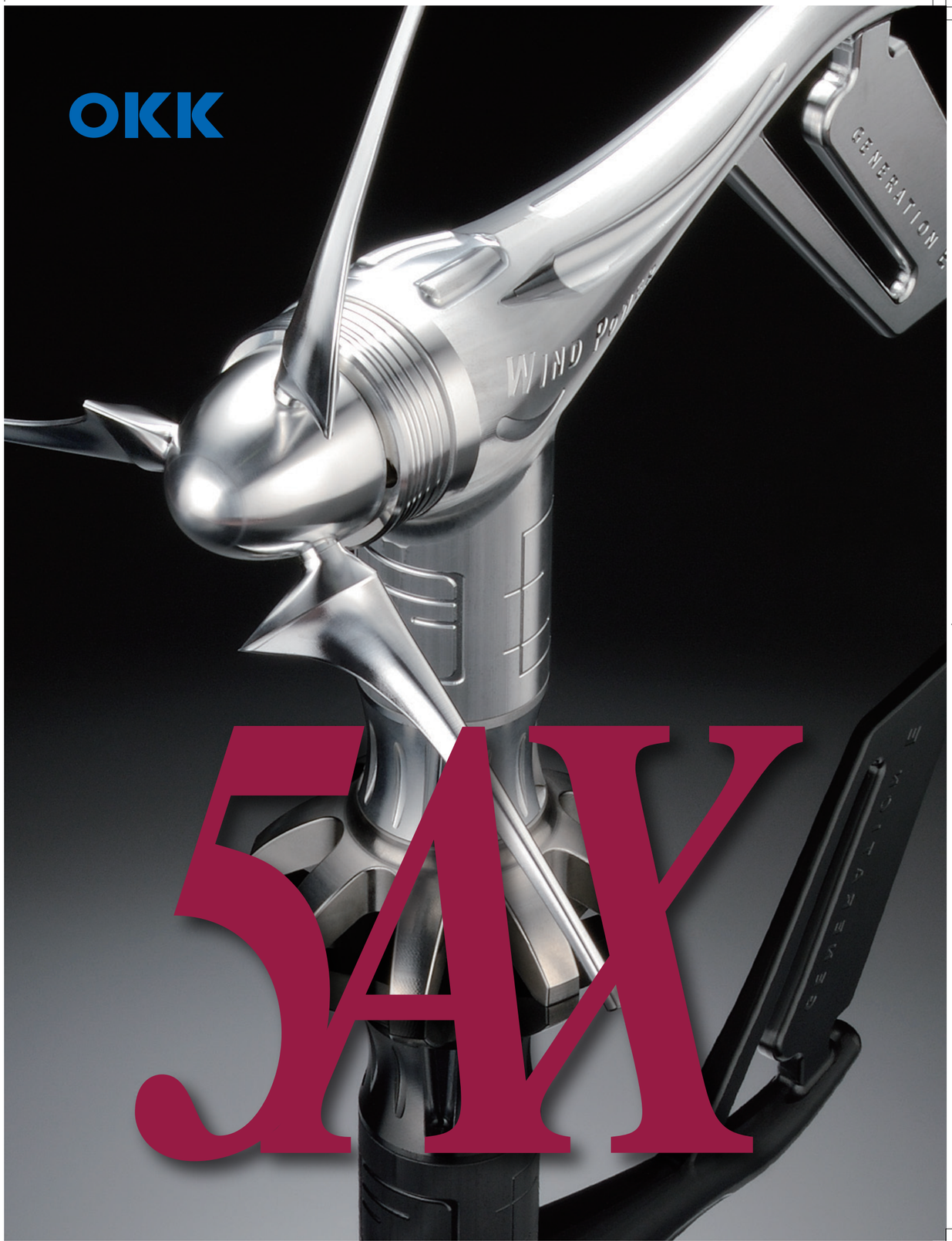


	Page
HM-X6000	3
VG5000	9
VM-X5	15
VC-X350	21
VC-X350L	21
VC-X500	21
VP9000-5AX	21
KCV800-5AX	29
KCV1000-5AX	29

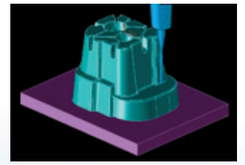
Effective for Highly-efficient Intensive machining of Dies and Parts that are more Complex or more Detailed and Complicated

Intensive machining enables shorter lead times.

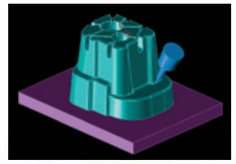
No accumulation of errors through multiple setup operations improves machining accuracy.

**Tilting a workpiece or a tool requires less extension of a tool.
Also, it allows the use of optimum rpm/ cutting speed for the tip of the tool.**

In the 3-axis machining for prototype or die fabrication, long extension of a tool has been needed. However, the 5-axis machining requires reduced extension of a tool and can improve accuracy and quality of machining. Also, it greatly reduces the time required for machining and enables highly efficient machining.



3-axis machining



Highly efficient 5-axis machining requiring less extension of a tool

Intensive machining can reduce costs for preparing fixtures.

This enables the machining of complex shapes such as impellers.

5AX

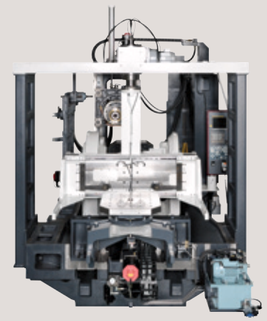
HM-X6000

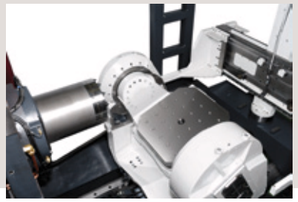
Exceptionally Efficient Machining of Complex Parts for Aircraft and Automotive Industries

OKK integrated the developed 5-axis vertical machining centers technologies and the HM-series highly rigid horizontal machining centers.

- Machining from roughing through finishing are combined and completed in a single chucking.
- Maximum machining size (diameter × height) : φ750 × 700 mm (φ29.53" × 27.56")
- The large trunion table produces highly rigid and accurate machining.

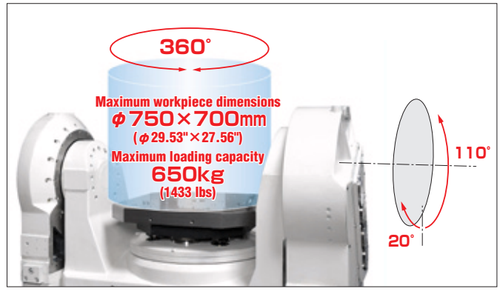
Exceptional Rigidity and Accuracy





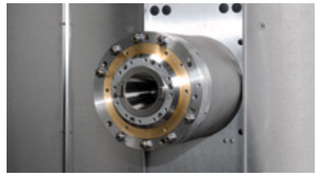
New Innovative Trunion Table Mechanism

The solid dual-disc clamping method of the Trunion table ensures the braking retaining force of 10000 N•m (7376 ft•lbs) for the A axis and 6800 N•m (5015 ft•lbs) for the B axis.
The double (hydraulic and mechanical) clamping method applied to the pallet clamping ensures the clamping force of 96000 N (21600 lbf) and provides safety at the time of the power failure.
The standard rotary scale feedback encoder on the A and B axes of the Trunion table maximizes the indexing accuracy.
Drive of the Trunion table was changed to the new rolling type from the conventional slide type. The non-backlash mechanism was applied to the tilting axis to improve the indexing accuracy.



High-powered Head interlock with Machine's High Rigidity

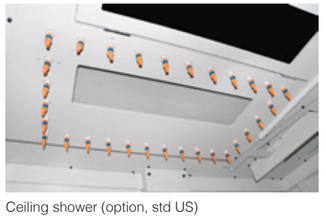
High-power machining is enabled with the high-torque BT50 MS spindle.



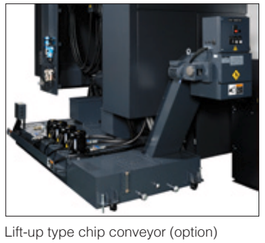
Spindle taper	No.50
Spindle motor	30 / 25 kW (40 / 34 HP)
Maximum torque	420N•m (310 ft•lbs) OP : 600N•m (443 ft•lbs)
Spindle diameter	φ100mm (φ3.94")

Chip Processing Measures

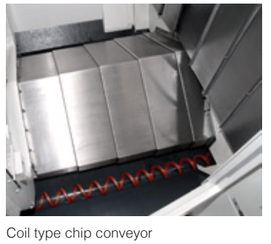
The scattered chips on the splash guard are prevented from accumulating by the use of the shower nozzles on the ceiling (ceiling shower: option, std US) and removed through the coil-type chip conveyors on the right and left sides.
The steeply inclined wall structure of the splash guards, i.e. large inclination angle of the telescopic cover and the top faces of the machine, deter chips from accumulating.



Ceiling shower (option, std US)



Lift-up type chip conveyor (option)



Coil type chip conveyor

Accuracy

Positioning Accuracy (without linear scale)

mm (inch)

Positioning Accuracy (X, Y, Z)	±0.0020 (±0.00008") /full lenght
Repeatability (X, Y, Z)	±0.0010 (±0.00004") /full lenght

(OKK tolerance)

Positioning Accuracy (with linear scale)

mm (inch)

Positioning Accuracy (X, Y, Z)	±0.0010 (±0.00004") /full lenght
Repeatability (X, Y, Z)	±0.0005 (±0.00002") /full lenght

(OKK tolerance)

Positioning Accuracy (with encoder)

mm (inch)

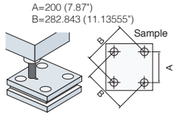
Positioning Accuracy	A axis: ±5 sec C axis: ±3 sec

(OKK tolerance)

Cutting Accuracy

mm (inch)

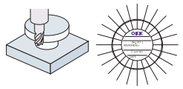
Item	OKK tolerance	Result
Axis direction	0.015 (0.00059")	0.003 (0.00012")
Diagonal direction	0.015 (0.00059")	0.005 (0.00020")
Deviation of hole dia	0.010 (0.00039")	0.005 (0.00020")



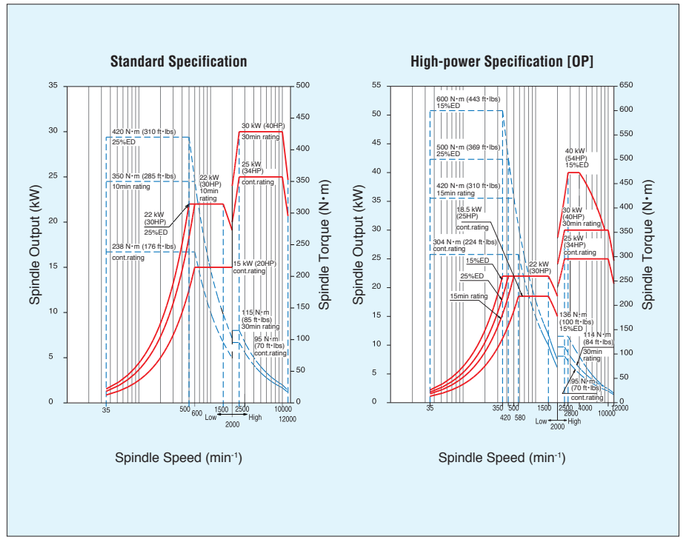
Circular Cutting Accuracy

mm (inch)

Item	OKK tolerance	Result
Circularity	0.005 (0.00020")	0.004 (0.00016")



Spindle Output and Torque Diagram (FANUC)



Remarks

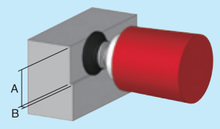
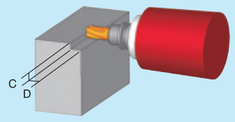
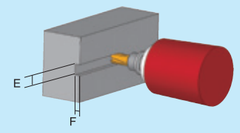
※1: The above sample data shows a short-time machining example and the results of continuous machining may differ from them.

※2: The above sample data shows the accuracy under OKK's in-house cutting test conditions. The results may vary with the conditions of the cutting tools and fixtures.

※3: The accuracy shown above are values obtained based on OKK's inspection standards under the conditions that the machine is installed according to OKK's foundation drawing and the ambient temperature remains constant.

Machining Capabilities (Workpiece material: S43C)

HM-X6000

	Face Mill 5" ×6 t	End Mill φ40 (φ1.57") ×6 t	End Mill φ40 (φ1.57") ×6 t
			
Spindle speed	300min-1	200min-1	200min-1
Cutting speed	120m/min (4724ipm)	25m/min (984ipm)	25m/min (984ipm)
Cut width	(A) 100mm (3.94")	(C) 20mm (0.79")	(E) 40mm (1.57")
Cut depth	(B) 6mm (0.24")	(D) 50mm (1.97")	(F) 20mm (0.79")
Feed rate	780mm/min (31ipm)	240mm/min (9ipm)	280mm/min (11ipm)
Feed per tooth	0.433mm/tooth (0.01705inch/tooth)	0.200mm/tooth (0.00787inch/tooth)	0.233mm/tooth (0.00917inch/tooth)
Cutting amount	468cm3/min (28.5cu-inch/min)	240cm3/min (14.6cu-inch/min)	224cm3/min (13.7cu-inch/min)
Spindle motor load	102%	80%	97%

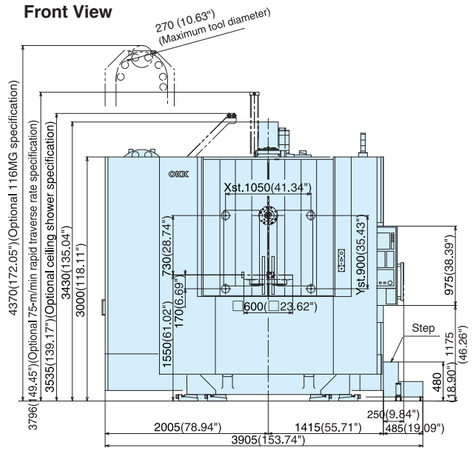
Note 1: The above machining data are obtained at the position of 0-degree table tilting angle.

Note 2: The above machining data show a sample actual machining and are for reference only.

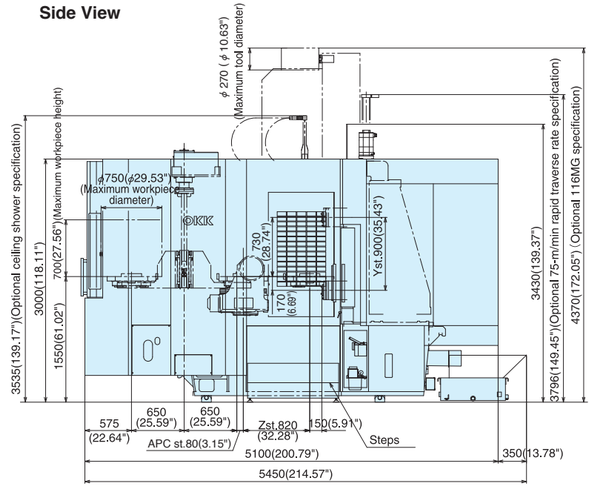
Main Dimensions of the Machine

HM-X6000

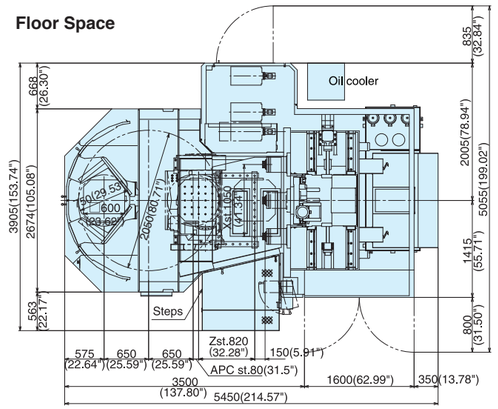
Front View



Side View

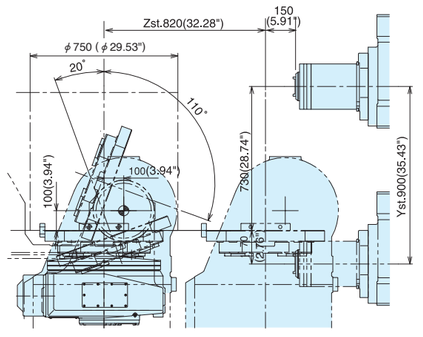


Floor Space

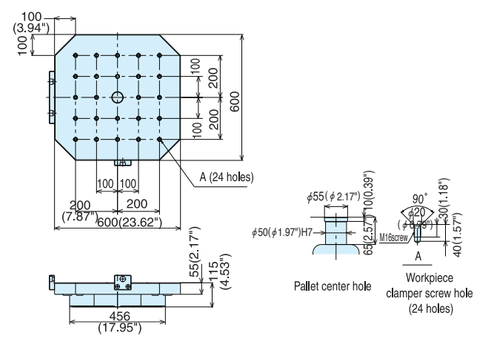


Strokes

(The drawing shows incorrect spindle center to pallet face minimum shows 70mm(2.76"))



Table



Specifications

HM-X6000

Item			Unit	Specification
Travel	Travel on X axis (Column: right / left)		mm	1050(41.34")
	Travel on Y axis (Spindle head: up / down)		mm	900(35.43")
	Travel on Z axis (Pallet: back / forth)		mm	820(32.28")
	Travel on A axis (Table tilting)		deg	20 to -110
	Travel on B axis (Table turning)		deg	360
	Distance from table top surface to spindle center		mm	-170 to 730(-6.69" to 28.74")
	Distance from table center to spindle nose		mm	150 to 970(5.91 " to 38.19")
Table	Table (Pallet) work surface area		mm	□600(□23.62")
	Max. workpiece weight loadable on table (A axis=0 deg)		kg	650(1433lbs)(Uniformly distributed load)
	Max. workpiece moment		N·m	392(289ft·lbs)
	Work surface configuration (Nominal dimension and the number of screw holes)			24×M16 holes
	Minimum index angle of table (pallet)		deg	0.001
	Table (Pallet) index time for 90 degrees		sec	A axis: 1.7 B axis: 0.6
	Pallet exchange time (New JIS evaluation time)		sec	18
Spindle	Spindle speed		min⁻¹	35 to 12000
	Spindle speed control Stepless control			Electrical two-speed control
	Spindle nose (Nominal number)			7/24 taper, No. 50
	Spindle bearing bore diameter		mm	φ100(φ3.94")
Feed rate	Rapid traverse rate	XYZ:	m/min	XYZ:54(2126ipm)
		AB:	min⁻¹	A:10 B:33.3
	Cutting feed rate	XYZ:	mm/min	1 to 40000(0.04 to 1575ipm)※1
		AB:	min⁻¹	A:5 B:5
Automatic tool changer (ATC)	Type of tool shank (Nominal number)			JIS B 6339 BT50
	Type of pull stud (Nominal number)			OKK only 90°
	Number of stored tools tools		tools	40※2
	Maximum tool diameter (With tools in adjacent pots)		mm	φ115(φ4.53")
	Maximum tool diameter (With no tools in adjacent pots)		mm	φ270(φ10.63")
	Maximum tool length (from the gauge line)		mm	500(19.69")
	Maximum tool weight		kg	25(55lbs)
	Tool selection method			Address fixed random method
	Tool exchange time (tool-to-tool)		sec	2.0
	Tool exchange time (cut-to-cut)		sec	4.2
Motor	For spindle (30-min rating / continuous rating)		kW	30/25(40/34HP)
	For feed axes	XYZ:	kW	FANUC XYZ:5.5(7HP)
		AB:	kW	FANUC A:5.5(7HP) B:4.5(6HP)
Required power source	Power supply		kVA	FANUC:76
	Supply voltage and supply frequency		V×Hz	AC200±10%×50/60±1
				AC220±10%×60±1※3
	Compressed air supply pressure		Mpa	0.4 to 0.6(58 to 87psi)※4
	Air supply flow rate		L/min(ANR)	500(132gpm)※5
Capacity of tank	For coolant		L	400(106gal)
	For spindle head cooling		L	72(19gal)
	For hydraulic unit		L	20(5gal)
Dimensions of Machine	Height of Machine (from floor level)		mm	3430(135.04")
	Floor space required for operation (width×depth)		mm	3905(153.74")×5450(214.57")
	Floor space including maintenance area (width×depth)		mm	5100(200.79")×6300(248.03")
	Weight of Machine		kg	20000(44100lbs)
	Controller			FANUC 3Ii-A5
	Operating environment temperature		℃	5 to 40

※1: Under the HQ or hyper HQ control
※2: Number of stored tools refers a total number of tools including the one installed on the spindle i.e. subtract one from the above for the actual number of tools stored in the tool magazine.
※3: When the supply voltage is 220 VAC, the supply frequency of 60 Hz only is applicable.
※4: Purity of the supplied air should be equivalent to Class 3.5.4 specified in ISO 8573-1 / JIS B8392-1 or higher.
※5: The flow rate for the standard specification machines is specified in the above.
When optional specification such as an air blow is added, add the corresponding air supply according to the operating frequency.

Standard Accessories

HM-X6000

Item	Q'ty
Lighting unit with one fluorescent lamp	1 set
Two-lamp-type signal lamp	1 set
Coolant unit with separate-type coolant tank	1 set
Ceiling cover / APC safety guard	1 set
Door interlock control	1 set
Slideway protection covers for X, Y and Z axes	1 set
Spindle air purge	1 set
Spindle head and ball screw cooling oil temperature controller	1 set
Hydraulic unit	1 set
Coil-type chip conveyor	2 sets
Edge locator	1 set
Automatic pallet changer (2APC)	1 set
Oil-air unit	1 set
Steps (before the operation panel)	1 set
Leveling blocks	1 set
Parts for machine transportation (excluding the hoisting jigs)	1 set
Automatic power-off system	1 set
Rotary encoder (A axis / B axis)	1 set
Electrical spare parts (fuses)	1 set
Instruction manual	1 set
Electrical instruction manual (including Hardware diagrams)	1 set

Optional Accessories

HM-X6000

Item	Specification
□75-m/min rapid traverse rate	
□Spindle motor	□8000 min⁻¹ (22/18.5 kW(30/25HP))
	□12000 min⁻¹ high-power specification (40/25 kW(54/30HP))
□Compatibility with Dual contact tool	
□Pull stud	□MAS Ⅰ
	□MAS Ⅱ
□Tool magazine	□60
	□80
	□116
	□120
	□160
	□176
	□236
□Additional pallet	
□Automatic door for the APC safety guard	
□Lift-up type chip conveyor	
□Chip bucket	□Fixed type(for Lift-up type chip conveyor)
	□Swing type(for Lift-up type chip conveyor)
□Ceiling shower	
□Workpiece flushing gun	
□Oil skimmer	
□Air blower	
□Oil-mist blower	
□Mist collector	
□Compatibility with through-spindle including high-pressure unit	□2MPa(290psi)
	□7MPa(1015psi)
□Thickener bag filter (Spare parts for high-pressure unit)	
□Minute amounts of cutting oil supply unit (Maker: BLUEBE)	
□Cutting oil (compatible with BLUEBE unit)	
□Linear scale	□For X and Y axes
	□For X, Y and Z axes
□Coolant cooler	
□Signal lamp	□Two-lamp type with buzzer
	□Three-lamp type with buzzer
	□Two-lamp type flasher
	□Three-lamp type flasher
□Additional M code	□4 sets
	□8 sets
□Standard tool set	
□Special machine painting color	
□Foundation bolts for bond anchoring	
□Bond for foundation work	
□Automatic magazine lubrication	
□Automatic greasing of guides and ball screws	
□Touch sensor system	□T0 (Manual measurement)
	□T1-A (Workpiece measurement)
	□T1-B (Workpiece measurement, Tool length measurement, Tool break detection)
	□T1-C (Tool length measurement, Tool break detection)
	□T0 software
□Integrating timer (Max 9999 hours)	
□Workpiece counter (5-digit display)	
□Calendar timer	
□OKK manual guide i (Animation of milling cycle for F31i)	
□Tool Magazine operation panel	

VG5000

Debut of Highly Rigid 5-axis Controlled Machining Center!

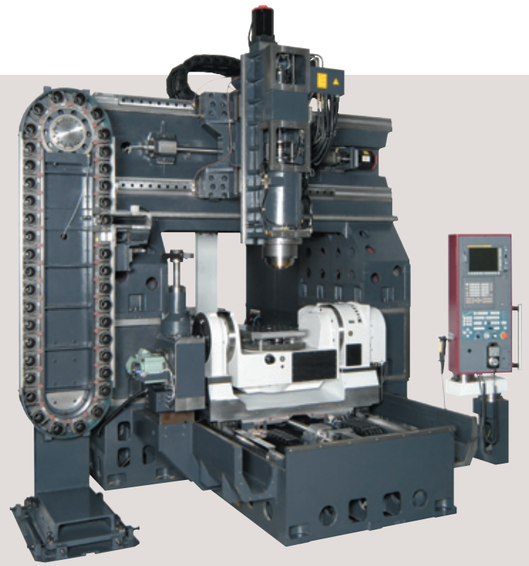
Designed for machining hard-to-cut materials such as stainless steel and titanium alloy.
Complete roughing to finishing operations in a single chucking.
Responds to all users' needs and achieves highly efficient and accurate machining through intensive machining even when machining aircraft parts, die components and so on.

Titanium Material Sample Workpiece

Material: Titanium
Coolant: Water-soluble coolant
Tooling: ϕ10 ～ 50mm (ϕ0.39 ～ 1.97") end mill
Cutting condition: S380 ～ S6000
F120 ～ F2000
Cutting time: 3 hours 20 minutes

- The tilt and rotary structure built in the table delivers the multiple surface machining and the simultaneous 5-axis controlled machining capability.
- The No.50 taper spindle can cover the machining of heavy-duty cutting at low speed through high-speed cutting.
- Drastically improved access to and operation of workpieces.
- Vastly improved performance in removal of chips from around the table.

※ The machines in the photographs of this brochure may include optional accessories.



Highly Rigid Main Body Structure

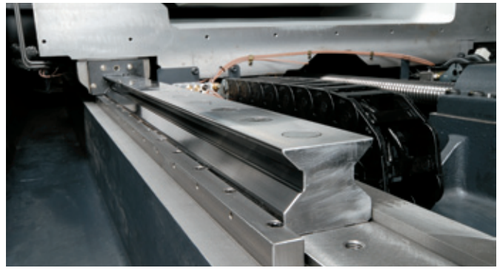
In order to ensure high rigidity and to improve the dampening performance for vibrations generated while machining, the bed and column structure are constructed of triangular ribs arranged to optimize the casting strength through FEM models.

High-speed and Highly Rigid Spindle

The No. 50, 7/24 taper spindle nose is used in combination with the 100mm(3.94") inner diameter, four-row combination angular bearing. The spindle rotating range is 35～12000min^{-1}.
Roughing and heavy-duty cutting of hard-to process materials are enabled due to the built-in motor that can output a maximum 600 N･m (450ft･lbs) (15% ED).

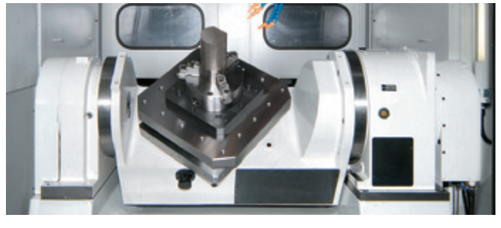
Feed Guide Face

Use of the highly rigid, large-size linear roller guide improves vibration dampening of the feed system.



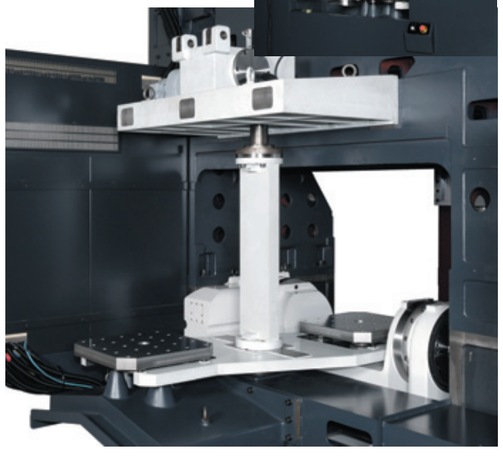
Table

To deliver driving torque, the drive sections of the tilt and rotary axes adopt the mechanism of 1/180 (A axis), 1/120 (C axis) reductionratio worm gears. 3870 N･m (2902 ft･lbs) clamping torque in the rotary axis assures rigidity in indexing and machining of multiple surfaces. With the brake mechanism on both sides, 5340 N･m (4005 ft･lbs) brake torque is achieved on the tilt axis.



APC (Automatic Pallet Changer) is included in the Standard Specification!

Arranging the APC in the rear of the machine not only ensures operability and accessibility of operators but improves visibility of workpiece machining area. At the same time it achieves a compact floor space design (saves about 20% of space compared with our conventional machines).



In addition to the APC included in the standard specification, the conveyor installed inside the machine processes chips completely and thus saves manpower and supports unmanned operation.

Accuracy

Positioning Accuracy (without linear scale)

mm (inch)

Positioning Accuracy (X, Y, Z)	±0.0020 (±0.00008") /full stroke
Repeatability (X, Y, Z)	±0.0010 (±0.00004") /full stroke

(OKK tolerance)

Positioning Accuracy (with linear scale)

mm (inch)

Positioning Accuracy (X, Y, Z)	±0.0010 (±0.00004") /full stroke
Repeatability (X, Y, Z)	±0.0005 (±0.00002") /full stroke

(OKK tolerance)

Positioning Accuracy (with encoder)

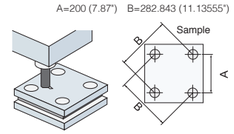
Positioning Accuracy	A axis: ±5 sec C axis: ±3 sec

(OKK tolerance)

Cutting Accuracy

mm (inch)

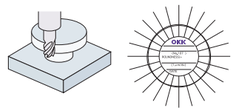
Item	OKK tolerance	Result
Axis direction	0.015 (0.00059")	0.003 (0.00012")
Diagonal direction	0.015 (0.00059")	0.005 (0.00020")
Deviation of hole dia	0.010 (0.00039")	0.005 (0.00020")



Circular Cutting Accuracy

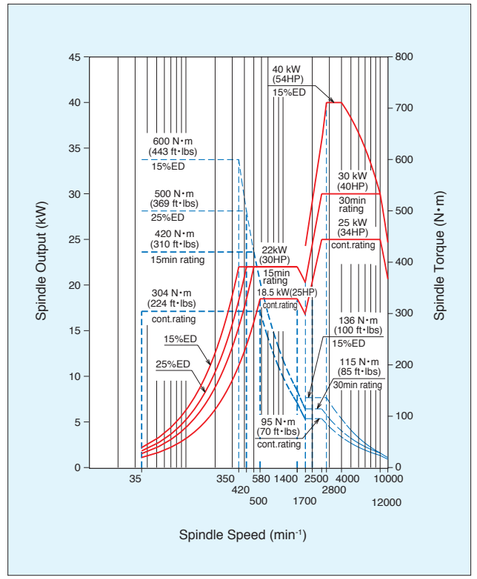
mm (inch)

Item	OKK tolerance	Result
Circularity	0.005 (0.00020")	0.0041 (0.00016")

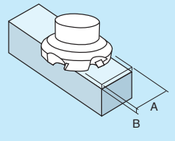
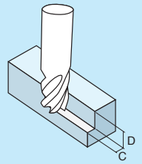
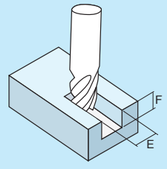


Remarks
※1: The above sample data shows a short-time machining example and the results of continuous machining may differ from them.
※2: The above sample data shows the accuracy under OKK's in-house cutting test conditions. The results may vary with the conditions of the cutting tools and fixtures.
※3: The accuracy shown above are values obtained based on OKK's inspection standards under the conditions that the machine is installed according to OKK's foundation drawing and the ambient temperature remains constant.

Spindle Output and Torque Diagram for Standard Specification (FANUC)

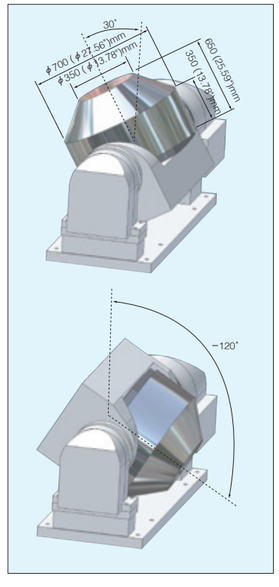


Machining Capabilities (Workpiece material: S45C)

	Face Mill 5"×6 t	Roughing End Mill φ40 (φ1.57")×6 t	Roughing End Mill φ40 (φ1.57")×6 t
			
Spindle speed	350 min-1	200 min-1	200 min-1
Cutting speed	140m/min (5512ipm)	25m/min (984ipm)	25m/min (984ipm)
Cut width	(A) 100mm (3.94")	(C) 20mm (0.79")	(E) 40mm (1.58")
Cut depth	(B) 7mm (0.28")	(D) 50mm (1.97")	(F) 20mm (0.79")
Feed rate	800mm/min (31ipm)	240mm/min (9ipm)	300mm/min (12ipm)
Feed per tooth	0.381mm/tooth (0.01500inch/tooth)	0.200mm/tooth (0.00787inch/tooth)	0.250mm/tooth (0.00984inch/tooth)
Cutting amount	560cm³/min (34.2cu-inch/min)	240cm³/min (14.6cu-inch/min)	240cm³/min (14.6cu-inch/min)
Spindle motor load	86%	71%	75%

Note 1: The above machining data are obtained at the position of 0-degree table tilting angle.
Note 2: The above machining data show a sample actual machining and are for reference only.

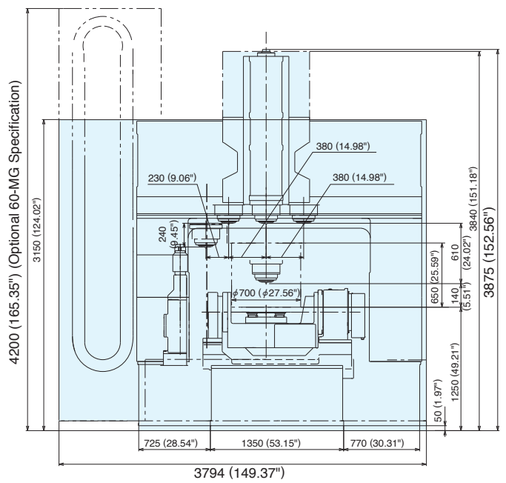
Maximum Dimensions Loadable on Table



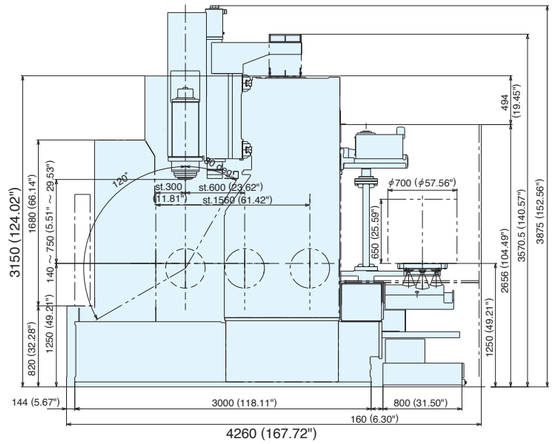
Main Dimensions of the Machine

VG5000

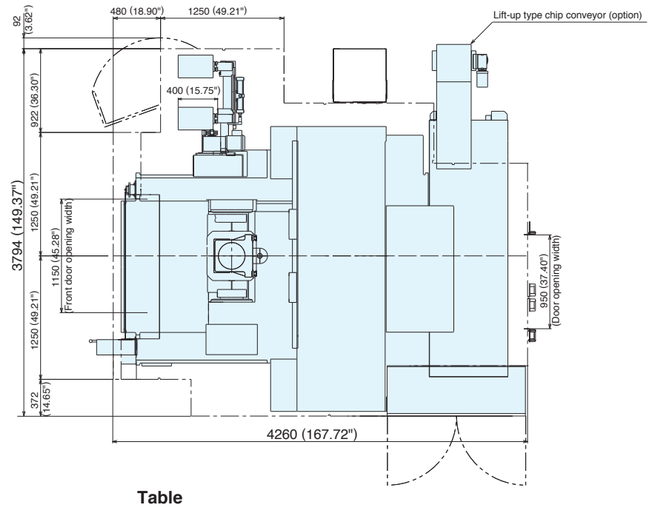
Front View



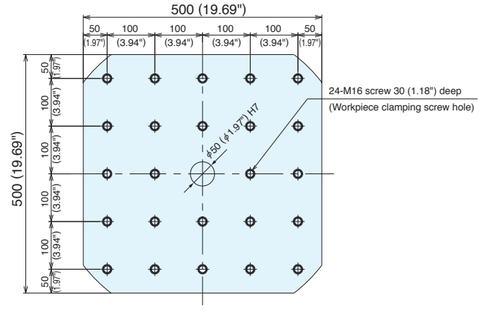
Side View



Floor Space



Table



Specifications

VG5000

Item			Unit	Specification
Travel	Travel on X axis (Saddle: right/left)		mm	760 (29.92")
	Travel on Y axis (Table: back/forth)		mm	900 (35.43")
	Travel on Z axis (Spindle head: up/down)		mm	610 (24.02")
	Travel on A axis (Table tilting)		deg	−120 to 30
	Travel on C axis (Table turning)		deg	360
	Distance from table top surface to spindle nose		mm	140 ~ 750 (5.51" ~ 29.53")
Table	Table (Pallet) work surface area (X-axis direction × Y-axis direction)		mm	500 (19.69") and 500 (19.69")
	Max. workpiece weight loadable on table (pallet)		kg	600 (1323 lbs) (for indexing)
	Table (Pallet) work surface configuration (nominal screw-hole size × number of holes)			M16 × 24 holes
	Distance to the table work surface from the floor		mm	1250 (49.21")
	Pallet exchange time		sec	16
Spindle	Spindle speed		min⁻¹	35 to 12000
	Number of spindle speed change steps			Stepless (electrical 2 steps)
	Spindle nose (nominal number)			7/24 taper, No. 50
	Spindle bearing bore diameter		mm	φ100 (φ3.94")
Feed Rate	Rapid traverse rate	X, Y and Z axes:	m/min	24 (945 ipm)
		A and C axes	min⁻¹	A: 20 C: 30
	Cutting feed rate	X, Y and Z axes:	mm/min	1 to 24000 (0.04 to 945 ipm) ※1
		A and C axes	min⁻¹	A: 20 C: 30
Automatic Tool Changer	Tool shank (nominal number)			JIS B6339 BT50
	Pull stud (nominal number)			OKK only 90°
	Number of stored tools		tools	40※2
	Maximum tool diameter (with adjacent tools)		mm	φ115 (φ4.53")
	Maximum tool diameter (without adjacent tools)		mm	φ230 (φ9.06")
	Maximum tool length (from the gauge line)		mm	400 (15.75")
	Maximum tool weight		kg	20 (44 lbs)
	Tool selection method			Address fixed method
	Tool exchange time (tool-to-tool)		sec	4.5
	Tool exchange time (cut-to-cut)		sec	10
Motors	For spindle (15% ED/30-min rating/continuous rating)		kW	40/30/25 (54/40/34 HP)
	For feed axes	X, Y and Z axes	kW	FANUC: 5.5 × 5.5 × 5.5 (7 × 7 × 7 HP)
		A and C axes	kW	FANUC: 5.5 × 5.5 (7 × 7 HP)
Required Power Supply	Power supply		kVA	FANUC: 70
	Supply voltage × supply frequency		V×Hz	200±10% × 50/60±1 220±10% × 60±1※3
	Compressed air supply pressure		MPa	0.4 to 0.6 (58 to 87 psi)※4
	Compressed air supply flow rate		L/min(ANR)	500 (132 gal/min)※5
Tank Capacity	Coolant tank		L	380 (100 gal)
	Spindle head cooling oil tank		L	72 (19 gal)
	Hydraulic unit tank		L	20 (5 gal)
Machine Size and Required Floor Space	Machine height from the floor surface		mm	3875 (152.56")
	Floor space required for operation (width × depth)		mm	3794 × 4260 (149.37" × 167.72")
	Floor space including maintenance area (width × depth)		mm	4600 × 5000 (181.10" × 196.85")
	Machine weight		kg	25000 (55100 lbs)
	Controller type			FANUC 31i-A5
	Temperature of operation environment		℃	5 to 40

※1: Under the HQ or Hyper HQ control
※2: The number of stored tools refers a total number of tools including the one installed on the spindle i.e. subtract one from the above for the actual number of tools stored in the tool magazine.
※3: When the supply voltage is 220VAC, the supply frequency of 60Hz only is applicable.
※4: Purity of the supplied air should be equivalent to Class 3.5.4 specified in ISO 8573-1 / JIS B8392-1 or higher.
※5: The flow rate for the standard specification machines is specified in the above.
When optional specification such as an air blow is added, add the corresponding air supply according to the operating frequency.

Standard Accessories

VG5000

Item	Q'ty
Lighting system (Two fluorescent lamps)	1 set
Coolant unit (Separate coolant tank)	1 set
Entire machine cover (Splash guard)	1 set
Door interlock control	1 set
Top cover	1 set
ATC shutter (operated automatically)	1 set
Slideway protection covers for X and Y axes	1 set
Spindle air purge	1 set
Spindle head and ball screw cooling oil temperature controller	1 set
Automatic grease lubrication unit	1 set
Hydraulic unit (for clamping the 5-axis table)	1 set
Coil-type chip conveyor	2 sets
Automatic pallet changer (2APC)	1 set
Leveling block	1 set
Foundation parts (Bond for anchoring is optional.)	1 set
Parts for machine transfer (excluding the hoisting jig)	1 set
Automatic power off	1 set
Electrical spare parts (fuses)	1 set
Instruction manual	1 set
Electrical manuals (including Hardware diagrams)	1 set

Optional Accessories

VG5000

Item	Specification	
☐Compatibility with Dual contact tool		
☐Pull stud	☐MAS Ⅰ	
	☐MAS Ⅱ	
☐Tool magazine	☐60	
	☐80	
	☐120	
☐Additional pallet		
☐Splash guard front door automatically open / close		
☐Lift-up type chip conveyor		
☐Chip bucket	☐Fixed type (for Lift-up type chip conveyor)	
	☐Swing type (for Lift-up type chip conveyor)	
☐Workpiece flushing gun		
☐Oil skimmer		
☐Air blower		
☐Oil-mist / air blower		
☐Mist collector		
☐High-pressure unit (for external fixed nozzles)	☐2MPa (290 psi)	
	☐7MPa (1015 psi)	
☐Compatibility with through-spindle (including high-pressure unit)	☐2MPa (290 psi)	☐Air
	☐7MPa (1015 psi)	
☐Thickener bag filter (Spare parts for high-pressure unit)		
☐Fine amount coolant supply unit (Maker: Bluebe)		
☐Coolant (for Bluebe)		
☐Linear scale	☐For X and Y axes	
	☐For X, Y and Z axes	
☐Coolant cooler		
☐Signal lamp	☐2-lamp tower type	☐With buzzer alarm
	☐3-lamp tower type	
	☐2-lamp rotary type	
	☐3-lamp rotary type	
☐Additional M code	☐4 sets	
	☐8 sets	
☐A set of bond for foundation work		
☐Standard tool set		
☐Coating color specified by customer		
☐Grease cartridge for automatic grease lubrication unit		
☐Touch panel for APC		
☐Touch sensor system	☐T0 (Manually operated type)	
	☐T1-A (Workpiece measurement)	
	☐T1-B (Workpiece measurement, Tool length measurement, Tool break detection)	
	☐T1-C (Tool length measurement, Tool break detection)	
	☐T0 software	
☐Laser measurement	☐Micro laser system (without covers) made by Blum: Max φ85 (φ3.35")	
☐Cumulative hour meter (9999H)		
☐Work counter (5 digits)		
☐Calendar timer		
☐OKK Manual Guide i (Animation of milling cycle for F31i)		
☐MG operation panel		

VM-X5

For machining small-to-medium-sized turbine blades efficiently at high speed

Sample workpiece

Material: SUS304

Coolant: Water-soluble coolant

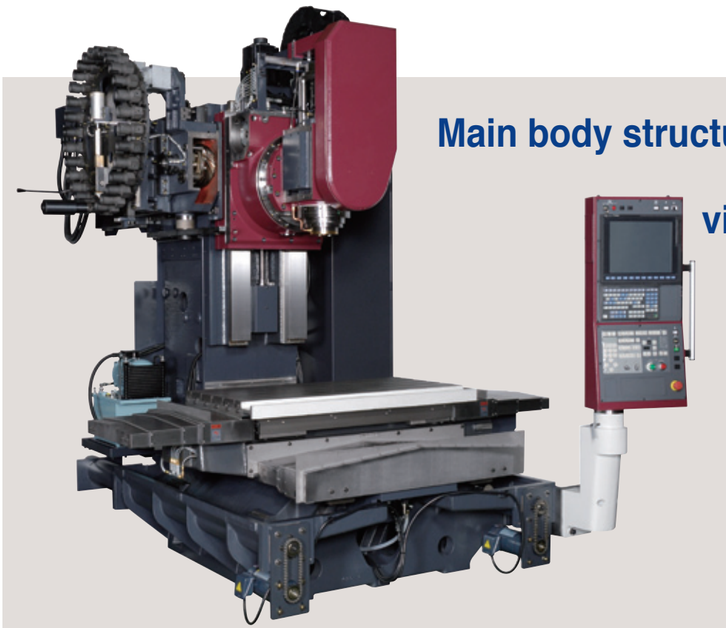
Tooling: ϕ25mm(ϕ0.98") end mill
ϕ12mm(ϕ0.47") radius end mill

Cutting condition: S1500 ～ S6000
F2400

VM-X5/250B

※ Machine picture includes optional accessories.

- The VM-X5 is the Perfect 5-axis machining center for blade machining having a tilting spindle (B axis) and rotary tables (A axis).
- Its high cutting performance is inherited from the VM5Ⅲ enabling shorter roughing times.
- The roller gear mechanism and the synchronized facing rotary tables on the machine generate no backlash and support high-precision machining.



Main body structure has excellent rigidity and vibration damping

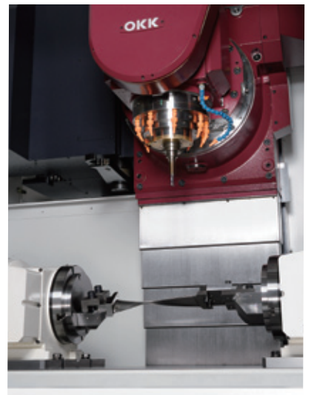
- VM5Ⅲ base is box-way construction on the X, Y & Z axis delivering rigidity and excellent vibration dampening.
- The large diameter support bearings on the B axis maintain overall rigidity.
- Maximum 600mm (23.62") long blades can be machined.

Machining an entire blade without reclamping

Large travel of the B axis and supporting both ends of a workpiece on the A axis enable machining the small to medium-size turbine blades completely from their roots to the blades without reclamping.

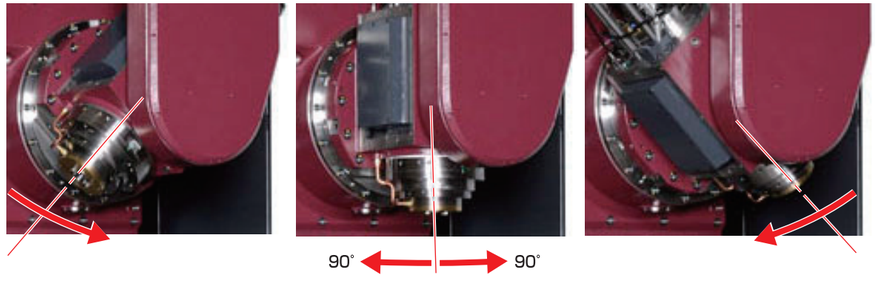
Rotary table

A axis direct drive rotary table outputs zero backlash, agile response and tight accuracy. Optional dual drive synchronized rotaries eliminate work piece twisting.



Tilting spindle

The roller gear mechanism used for driving the B axis combines the features of worm gear and rolling drive which supports the machine's high torque, high efficiency, smooth movements and high-precision machining.



Accuracy

Positioning Accuracy (without linear scale) mm (inch)

Positioning Accuracy (X, Y, Z)	±0.0030 (±0.00012") /full stroke
Repeatability (X, Y, Z)	±0.0020 (±0.00008") /full stroke

(OKK tolerance)

Positioning Accuracy (with linear scale) mm (inch)

Positioning Accuracy (X, Y, Z)	±0.0020 (±0.00020") /full stroke
Repeatability (X, Y, Z)	±0.0010 (±0.00004") /full stroke

(OKK tolerance)

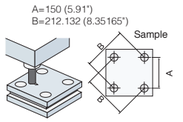
Positioning Accuracy (with encoder)

Positioning Accuracy	A axis: ±5 sec C axis: ±3 sec

(OKK tolerance)

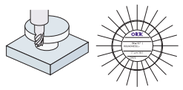
Cutting Accuracy mm (inch)

Item	OKK tolerance	Result
Axis direction	0.015 (0.00059")	0.002 (0.00008")
Diagonal direction	0.015 (0.00059")	-0.005 (-0.00020")
Deviation of hole dia	0.010 (0.00039")	0.003 (0.00012")



Circular Cutting Accuracy mm (inch)

Item	OKK tolerance	Result
Circularity	0.0150 (0.00059")	0.0055 (0.00022")



Remarks

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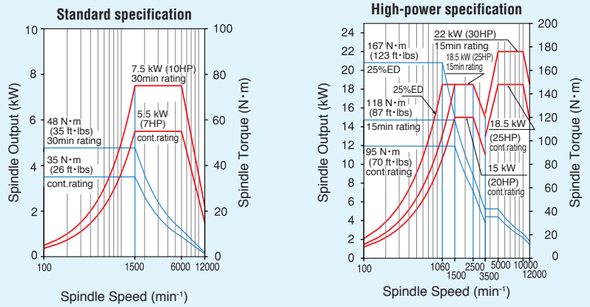
※2: The above sample data shows the accuracy under OKK's in-house cutting test conditions. The results may vary with the conditions of the cutting tools and fixtures.

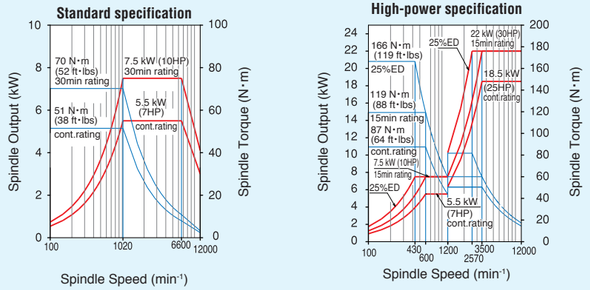
※3: The accuracy shown above are values obtained based on OKK's inspection standards under the conditions that the machine is installed according to OKK's foundation drawing and the ambient temperature remains constant.

Spindle Output and Torque Diagram

● FANUC

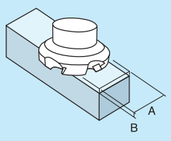
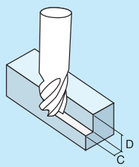
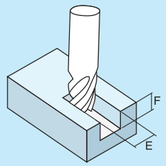


● MITSUBISHI



Machining Capabilities (Workpiece material: S43C)

VM-X5

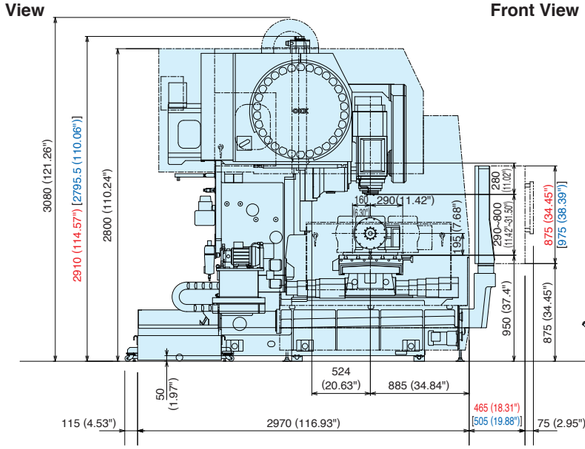
	Face Mill 4" ×5 t	End Mill φ32(φ1.26") ×6 t	End Mill φ32(φ1.26") ×6 t
			
Spindle speed	600min⁻¹	1600min⁻¹	1350min⁻¹
Cutting speed	190m/min (7480ipm)	160m/min (6299ipm)	135m/min (5315ipm)
Cut width	(A) 80mm (3.15")	(C) 16mm (0.63")	(E) 32mm (1.26")
Cut depth	(B) 3mm (0.12")	(D) 5mm (0.20")	(F) 3mm (0.12")
Feed rate	900mm/min (35ipm)	800mm/min (31ipm)	800mm/min (31ipm)
Feed per tooth	0.300mm/tooth (0.01181inch/tooth)	0.167mm/tooth (0.00657inch/tooth)	0.198mm/tooth (0.00780inch/tooth)
Cutting amount	216cm³/min (13.2cu-inch/min)	64cm³/min (3.9cu-inch/min)	76.8cm³/min (4.7cu-inch/min)
Spindle motor load	83%	12%	11%

Note 1: The above machining data are obtained at the position of 0-degree table tilting angle.
Note 2: The above machining data show a sample actual machining and are for reference only.

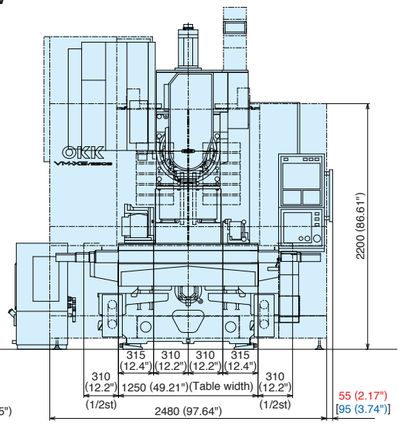
Main Dimensions of the Machine

VM-X5

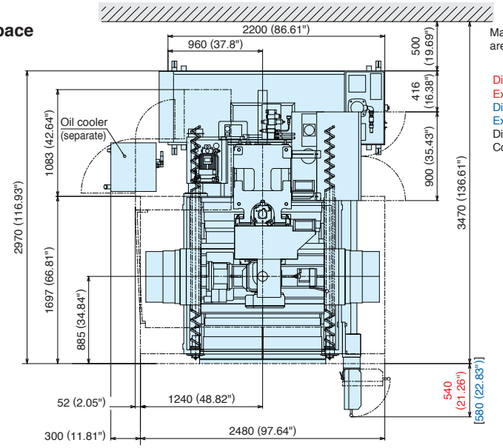
Side View



Front View



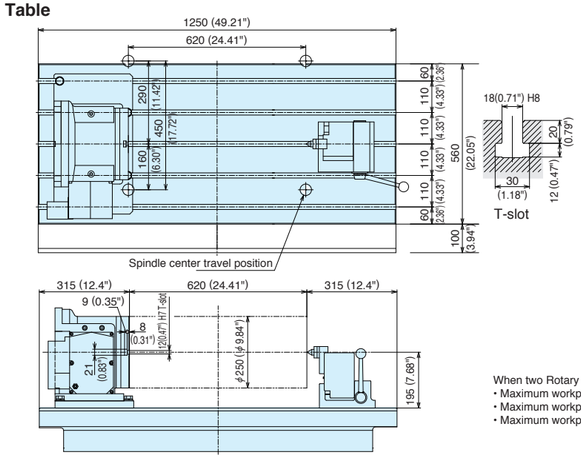
Floor Space



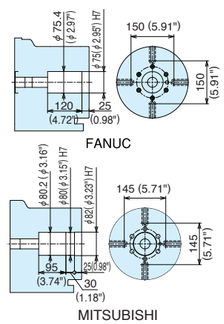
Maintenance area

Dimensions in red :
Exclusively for FANUC controller
Dimensions in blue :
Exclusively for MITSUBISHI controller
Dimensions in black :
Common to both FANUC and MITSUBISHI controllers

Table



Rotary table



When two Rotary tables are used
- Maximum workpiece length : 600[mm] (23.62")
- Maximum workpiece diameter : φ250[mm] (φ9.84")
- Maximum workpiece weight : 200[kg] (441lbs)
  (Workpiece both end must be fixed with Rotary table)
  (＊for a Rotary table 100[kg] (221lbs))

Main Specifications

VM-X5

Item			Unit	Specification
Travel	Travel on X axis (Table right / left)		mm	620(24.41")
	Travel on Y axis (Saddle back / forth)		mm	450(17.72")
	Travel on Z axis (Spindle head up / down)		mm	510(20.08")
	Travel on A axis (Table turning)		deg	360
	Travel on C axis (Spindle head swiveling)		deg	-90～90
	Distance from table top surface to spindle nose		mm	290～800(11.42"～31.50")
	Distance from column front to spindle center		mm	524(20.63") [510(20.08")※1]
Table	Table work surface area (X axis direction × Y axis direction)		mm	1250×560(49.21"×22.05")
	Max. workpiece weight loadable on table		kg	800(1764lbs)
	Table work surface configuration (T-slot nominal dimension × spacing × number of T slots)			18×110mm(4.33")×5
	Distance to the table work surface from the floor		mm	950(37.40")
Spindle	Spindle speed		min⁻¹	100～12000
	Number of spindle speed change steps			Electric stepless speed change (MS)
	Spindle nose (nominal number)			7/24 taper, No.40
	Spindle bearing bore diameter		mm	φ70(φ2.76")
Feed Rate	Rapid traverse rate	X, Y and Z axes:	m/min	X,Y:30(1181ipm) Z:20(787ipm)
		A and B axes	min⁻¹	A:100 B:30
	Cutting feed rate	X, Y and Z axes:	mm/min	X/Y/Z:1～20000(0.04～787ipm)※2
		A and B axes	min⁻¹	A:100 B:30
Automatic Tool Changer	Tool shank (nominal number)			BT40 Dual contact tool
	Pull stud (nominal number)			MAS 403 P40T-1
	Number of stored tools		tools	30
	Max. tool diameter (with tools in adjacent pots)		mm	φ80(φ3.15")
	Max. tool diameter (with no tools in adjacent pots)		mm	φ110(φ4.33")
	Max. tool length (from gauge line)		mm	280(11.02")
	Maximum tool weight [moment]		kg [N·m]	10(22lbs) [9.8(7.2ft·lbs)]
	Tool selection method			Memory random method
	Tool exchange time (tool-to-tool)		sec	5
	Tool exchange time (cut-to-cut)		sec	15
Motors	for Spindle (30min rating/continuous rating)		kW	7.5/5.5(10/7HP)
	for Feed axes	X, Y and Z axes	kW	MITSUBISHI X/Y:2.0(2.7HP) Z:4.5(6HP) FANUC X/Y:3.0(4HP) Z:7.0(9.4HP)
		A and B axes	kW	MITSUBISHI A:2.2(3HP) B:2.0(2.7HP) FANUC A:2.4(3.2HP) B:4.5(6HP)
	for Coolant pump		kW	0.4(0.5HP)
	for Spindle head cooling pump		kW	0.4(0.5HP)
	for Coil-type chip conveyor		kW	0.2(0.3HP)×2
	for ATC		kW	0.4(0.5HP)
Required Power Supply	Power supply		kVA	MITSUBISHI 30 FANUC 30
	Supply voltage × Supply frequency		V×Hz	200±10%×50/60±1 220±10%×60±1
	Compressed air supply pressure ※3		MPa	0.4～0.6(58～87PSI)
	Compressed air supply flow rate ※3 ※4		L/min(ANR)	400(106gal)
Tank Capacity	Spindle head cooling oil tank		L	50(13gal)
	Coolant tank capacity		L	280(74gal)
Machine Size and Required Floor Space	Machine height (from floor surface)		mm	3080(121.26")
	Floor space required for operation (width × depth)		mm	2540×2970(100.00"×116.93")
	Floor space required incl. maintenance area (width × depth)		mm	3800×4050(149.61"×159.45")
	Machine weight		kg	7900(17400lbs)
	Controller			Neomatic 750 F31i-A5
	Temperature of operation environment		℃	5～40
	Humidity of operation environment		%	10～90 (No dew)

※1: Z axis shutter specification
※2: Under the HQ or Hyper HQ control
※3: The value for the standard specification. It may vary with added options.
※4: Purity of the supplied air should be equivalent to Class 3.5.4 specified in ISO 8573-1 / JIS B8392-1 or higher.

Standard Accessories

VM-X5

Item	Qty	Remark
Lighting system	1 set	LED light
Coolant unit (Separate coolant tank)	1 set	Tank capacity : 280L (74 gal)
Entire machine cover (Splash guard)	1 set	Including front door and maintenance cover electromagnetic lock
Magazine safety cover	1 set	Including electromagnetic lock
Sliding surface protection steel sliding cover for X/Y/Z axes	1 set	
Spindle head cooling oil temperature controller	1 set	
Rear discharge coil-type chip conveyor	2 sets	1 set for each of right and left
Leveling block	1 set	
Parts for machine transfer	1 set	
Automatic power-off unit (with M02 or M30)	1 set	
Electric spare parts (fuses)	1 set	
Instruction manual (Specification, Foundation & Installation manual)	1 set	
Electrical instruction manuals (including Hardware diagram)	1 set	

Optional Accessories

VM-X5

Item	Specification	
□Additional one axis control		
□Column-up 250mm(9.84") [Standard: Column-up 150mm(5.91")]		
□Extension of X-axis stroke 1020mm(36.22") X-axis stroke		
□High-speed 20000min⁻¹ spindle (22/18.5kW (35/25HP))		
□High-torque spindle drive motor (22/18.5 kW (35/25HP))		
□Compatibility with Dual contact tool (HSK-A63)		
□Pull stud	□MAS Ⅱ	
	□OKK90°	
□Splash guard front door automatically open / close		
□Sliding surface protection steel sliding cover for Z axis		
□Ceiling cover		
□Chip flow coolant(400W)		
□Lift-up type chip conveyor		
□Chip bucket	□Fixed type (for Lift-up type chip conveyor)	
	□Swing type (for Lift-up type chip conveyor)	
□Workpiece flushing gun		
□Oil skimmer (Belt type)		
□Air blower ※		
□Mist collector	□2.2kW(3HP)installed separately	
	□Compatibility wit supplied device	
□High-pressure unit	□2MPa (290 psi)	
	□7MPa (1015 psi)	
□Compatibility with through-spindle (including high-pressure unit) ※	□2MPa (290 psi)	
	□7MPa (1015 psi)	
□Coolant cooler	□Separately installed type	
	□High-pressure unit integrated type (High-pressure unit is also required)	
□Fine amount coolant supply unit (Maker: Bluebe) ※		
□Coolant (for Bluebe)		
□Linear scale	□for X and Y axes	
	□for X, Y and Z axes	
□Lighting system	□Addition of 1-LED light	
□Signal lamp	□2-lamp tower type	□with Buzzer alarm
	□3-lamp tower type	
	□2-lamp rotary type	
	□3-lamp rotary type	
□Additional M code	□4 sets	
	□8 sets	
□Coating color specified by customer		
□Foundation bolts for bond anchoring		
□A set of bond for foundation work		
□Touch sensor system	□T1-A (Workpiece measurement) (OMP60 / MP700)	
	□T1-B (Workpiece measurement, Tool length measurement, Tool break detection) (OMP60 / MP700)	
	□T1-C (Tool length measurement, Tool break detection)	
	□T0 software	
□Laser measurementLaser system (without Covers): Max.φ85 (φ3.35")		
□Cumulative hour meter (9999H)		
□Work counter (5 digits)		
□Calendar timer		
□OKK Manual Guide i (Animation of milling cycle for F31i)		
□MG operation panel		

※ Optional specifications that can be added to the spindle at the same time vary with the spindle. For details, ask our company's sales department.

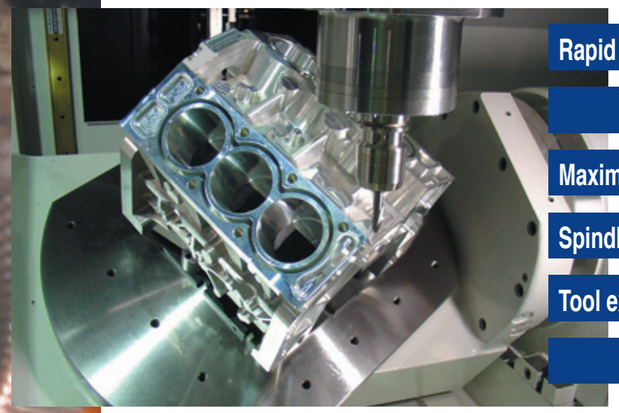
VC-X350 VC-X350L VC-X500 VP9000-5AX

※ The machines in the photographs of this brochure may include optional accessories.

VC-X350
VC-X350L
VC-X500
VP9000-5AX

Drastically reduced workpiece machining time

This specialized 5-axis machining center has been developed from OKK's advanced technologies. This machine eliminates loss of accuracy and burden on the operators caused by multi-setup operation and shortens lead time under process integration.



	VC-X350
Rapid traverse rate	50 m/min (1969ipm) (X and Y)
	36 m/min (1418 ipm) (Z)
Maximum feed acceleration	0.7 G
Spindle startup time	1.5 sec (0 → 12000 min^{-1})*
Tool exchange time	1.3 sec (Tool-to-tool)
	4.5 sec (Cut-to-cut)

* Spindle motor 22/18.5kW (30/25HP): option

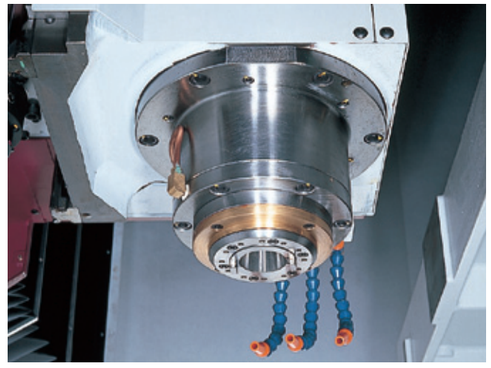
High-speed Table Control

Delivering high-speed 5-axis machining of large 800mm (31.50") diameter workpieces by utilizing 25 min^{-1} tilt axis feed and 50 min^{-1} rotation axis feed. *VP9000-5AX*

Wide selection of the spindle

Cutting performance is largely improved by the use of the motorized spindle (MS) which integrates a motor covering a wide and high output range. Acceleration time of the spindle can be as short as only 1.5 seconds (*) from the non-operating state to the speed of 12000 min^{-1}. High-speed spindle of 20000 min^{-1} or 22/18.5kW (30/25HP) high-power spindle can also be adopted optionally.

* Spindle motor 22/18.5kW (30/25HP): option



Sample Workpiece

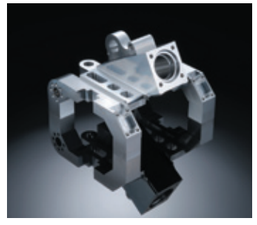
Material: SKD61

Coolant: Water-soluble coolant

Tooling: R2～5mm (R0.08 ～ 0.20") end mill

Cutting condition: S6000 ～ S8000 F1000 ～ F2400

Cutting time: 8 hours 59 minutes



Sample Workpiece

Material: A7075

Coolant: Water-soluble coolant

Tooling: φ10 ～ 25mm (φ0.39 ～ 0.98") end mill

Cutting condition: S8000 ～ S12000 F2400 ～ F8000

Cutting time: 1 hour 30 minutes

Accuracy

Positioning Accuracy (without linear scale)

mm (inch)

Positioning Accuracy (X, Y, Z)	±0.0020 (±0.00008") /full stroke
Repeatability (X, Y, Z)	±0.0010 (±0.00004") /full stroke

(OKK tolerance)

Positioning Accuracy (with linear scale)

mm (inch)

Positioning Accuracy (X, Y, Z)	±0.0010 (±0.00004") /full stroke
Repeatability (X, Y, Z)	±0.0005 (±0.00002") /full stroke

(OKK tolerance)

Positioning Accuracy (without encoder)

Positioning Accuracy	C axis: ±10 sec

(OKK tolerance)

Positioning Accuracy (with encoder)

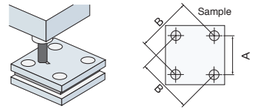
Positioning Accuracy	A axis: ±5 sec C axis: ±3 sec

(OKK tolerance)

Cutting Accuracy

mm (inch)

Item	OKK tolerance	Result		
		VC-X350	VC-X500	VP9000-5AX
Axis direction	0.015 (0.00059")	0.003 (0.00012")	0.003 (0.00012")	0.008 (0.00031")
Diagonal direction	0.015 (0.00059")	0.005 (0.00020")	0.005 (0.00020")	0.006 (0.00024")
Deviation of hole dia	0.010 (0.00039")	0.005 (0.00020")	0.005 (0.00020")	0.004 (0.00016")

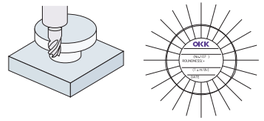


A=150 (5.91"), B=212.132 (8.35165") (VC-X350/VC-X500)
A=200 (7.87"), B=282.843 (11.13555") (VP9000-5AX)

Circular Cutting Accuracy

mm (inch)

Item	OKK tolerance	Result		
		VC-X350	VC-X500	VP9000-5AX
Circularity	0.005 (0.00020")	0.0042 (0.00017")	0.0042 (0.00017")	0.0040 (0.00016")



Remarks

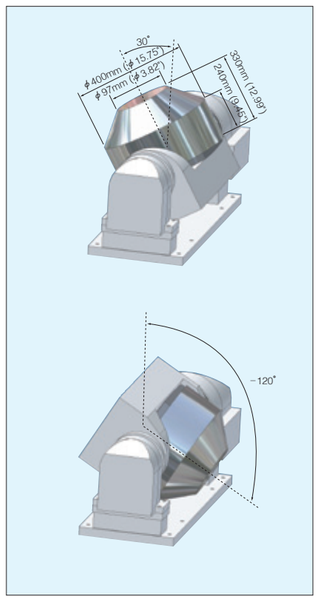
※1: The above sample data shows a short-time machining example and the results of continuous machining may differ from them.

※2: The above sample data shows the accuracy under OKK's in-house cutting test conditions. The results may vary with the conditions of the cutting tools and fixtures.

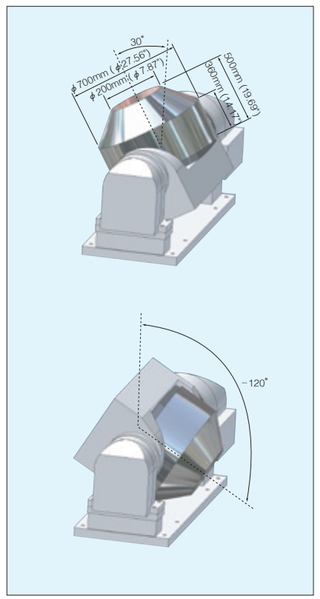
※3: The accuracy shown above are values obtained based on OKK's inspection standards under the conditions that the machine is installed according to OKK's foundation drawing and the ambient temperature remains constant.

Maximum Dimensions Loadable on Table

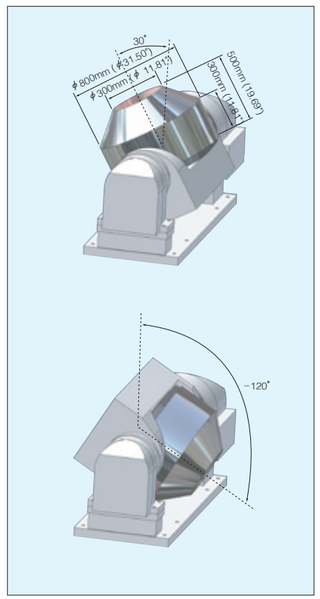
VC-X350



VC-X500

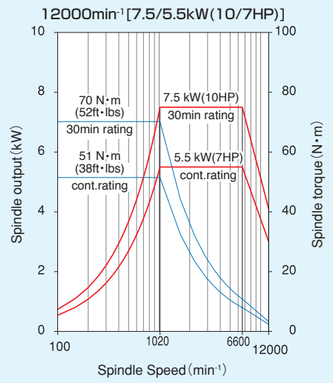


VP9000-5AX

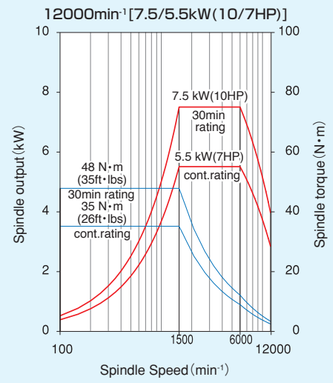


Spindle Output and Torque Diagram

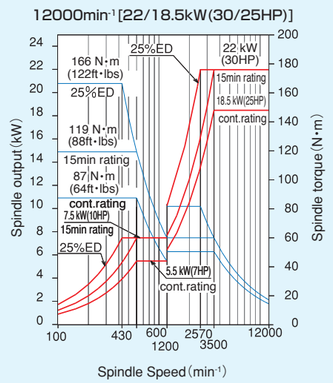
● MITSUBISHI



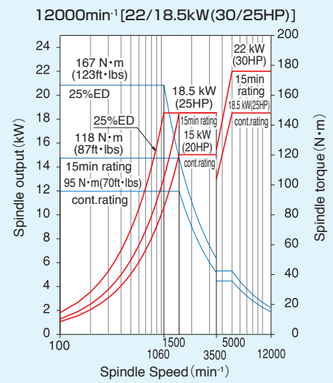
● FANUC



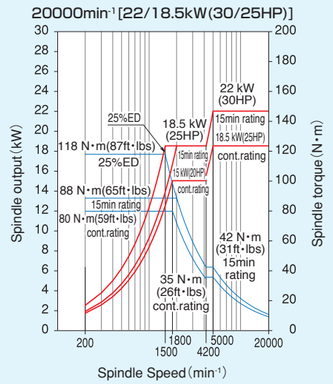
● MITSUBISHI



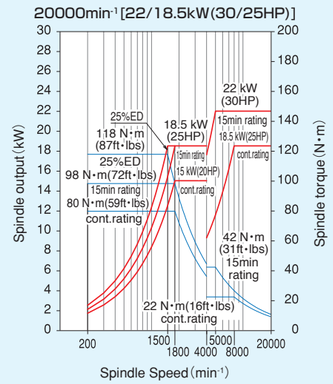
● FANUC



● MITSUBISHI



● FANUC



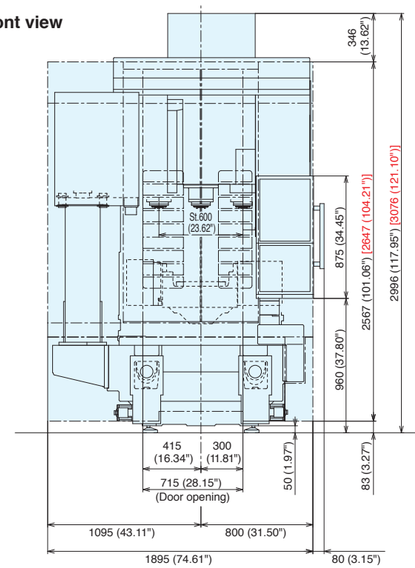
	12000min-1 7.5/5.5kW(10/7HP)	12000min-1 22/18.5kW(30/25HP)	20000min-1 22/18.5kW(30/25HP)
VC-X350	Standard	Option	Option
VC-X350L	Standard	Option	Option
VC-X500	–	Standard	Option
VP9000-5AX	Standard	Option	Option

※Controller for VC-X350L is FANUC only.

Main Dimensions of the Machine

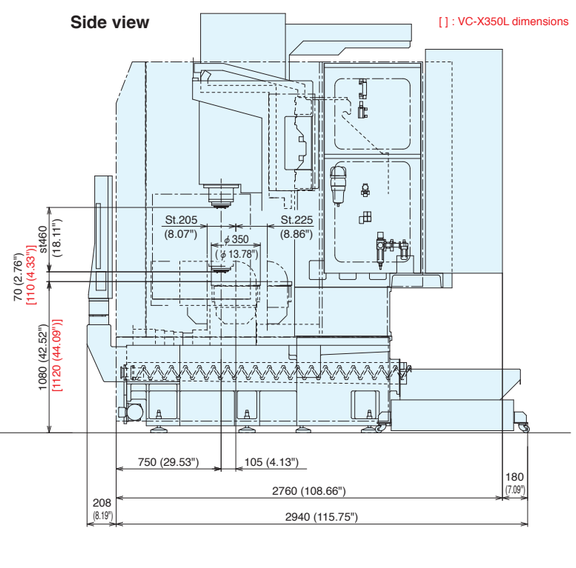
VC-X350 | VC-X350L

Front view

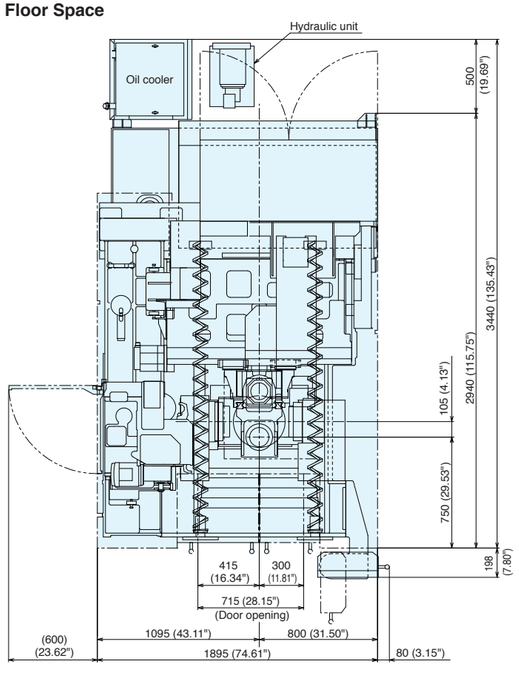


Side view

[ ] : VC-X350L dimensions

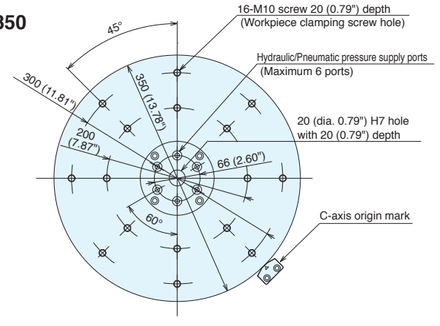


Floor Space

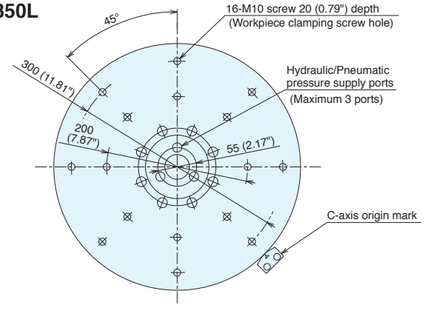


Table

VC-X350



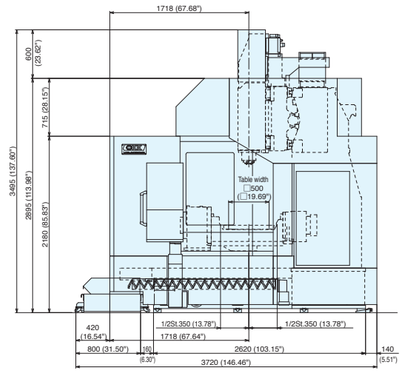
VC-X350L



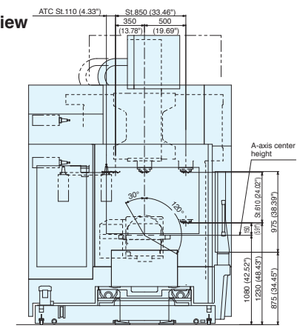
Main Dimensions of the Machine

VC-X500

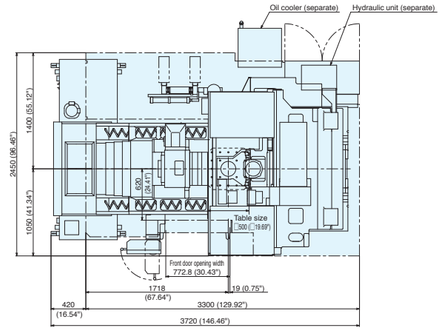
Front view



Side view



Floor Space



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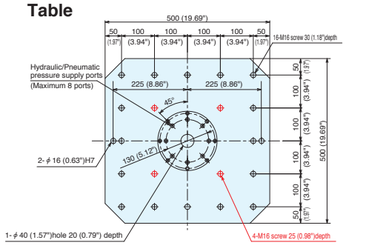
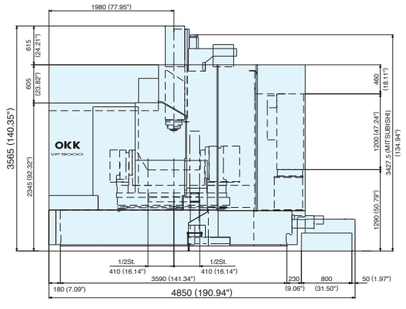


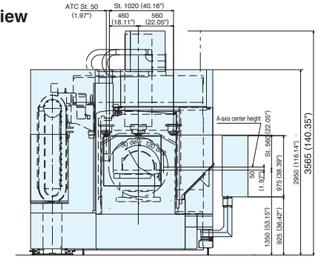
Main Dimensions of the Machine

VP9000-5AX

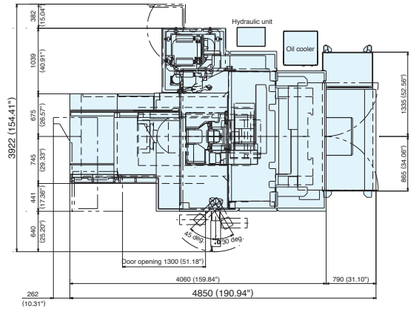
Front View



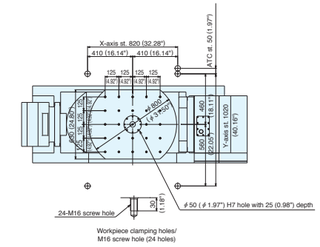
Side View



Floor Space



Table



Specifications

Item		Unit	VC-X350	VC-X350L	VC-X500	VP9000-5AX
Travel	Travel on X axis	mm	600 (23.62") (Spindle head right / left)	600 (23.62") (Spindle head right / left)	700 (27.56") (Table right / left)	820 (32.28") (Table right / left)
	Travel on Y axis	mm	430 (16.93") (Tabl back / forth)	430 (16.93") (Tabl back / forth)	850 (33.46") (Spindle head back / forth)	1020 (40.16") (Spindle head back / forth)
	Travel on Z axis (Spindle head up / down)	mm	460 (18.11")	460 (18.11")	610 (24.02")	560 (22.05")
	Travel on A axis (Table tilting)	deg	-120~30	-120~30	-120~30	-120~30
	Travel on C axis (Table turning)	deg	360	360	360	360
	Distance from table top surface to spindle nose	mm	70~530 (2.76"~20.87")	110~570 (4.33"~22.44")	150~760 (5.91"~29.92")	0~560 (0"~22.05")
	Distance from column front to spindle center	mm	520 (20.47")	520 (20.47")	530 (20.87")	520 (20.47")
Table	Table work surface area	mm	φ350 (φ13.78")	φ350 (φ13.78")	500×500 (19.69"×19.69")	φ800×630 (φ31.50"×24.80")
	Max. workpiece weight loadable on table	kg	200 (441 lbs)	100 (220 lbs)※1	500 (1102 lbs)	500 (1102 lbs)
	Table work surface configuration (nominal screw-hole size × number of holes)		M10×16 holes	M10×16 holes	M16×20 holes	M16×24 holes
	Distance to the table work surface from the floor	mm	1080 (42.52")	1120 (44.09")	1080 (42.52")	1350 (53.15")
Spindle	Spindle speed	min⁻¹	100~12000	100~12000	100~12000	100~12000
	Number of spindle speed change steps		Electric stepless speed change(MS)	Electric stepless speed change(MS)	Electric 2-step speed change(MS)	Electric stepless speed change(MS)
	Spindle nose (nominal number)		7/24 taper, No.40	7/24 taper, No.40	7/24 taper, No.40	7/24 taper, No.40
	Spindle bearing bore diameter	mm	φ65 (φ2.56")	φ65 (φ2.56")	φ65 (φ2.56")	φ65 (φ2.56")
Feed Rate	Rapid traverse rate X, Y and Z axes:	m/min	X:50 (1969 ipm) Z:36 (1417 ipm)	X:50 (1969 ipm) Z:36 (1417 ipm)	X:48 (1890 ipm) Z:32 (1260 ipm)	XYZ:32 (1260 ipm)
	Rapid traverse rate A and C axes	min⁻¹	A:44.4 C:66.7	A:44.4 C:100	A:25 C:50	A:25 C:50
	Cutting feed rate X, Y and Z axes:	mm/min	1~36000 (0.04~1417 ipm)※2	1~36000 (0.04~1417 ipm)※2	1~32000 (0.04~1260 ipm)※2	1~32000 (0.04~1260 ipm)※2
	Cutting feed rate A and C axes	min⁻¹	A:44.4 C:66.7	A:44.4 C:100	A:25 C:50	A:25 C:50
	in the turning function mode	min⁻¹	-	C:1000	-	-
Automatic Tool Changer	Tool shank (nominal number)		JIS B6339 BT40	BT40 Dual contact tool	BT40 Dual contact tool	JIS B6339 BT40
	Pull stud (nominal number)		MAS403 P40T-1	MAS403 P40T-1	MAS403 P40T-1	MAS403 P40T-1
	Number of stored tools	tools	20	20	40	40
	Maximum tool diameter	mm	φ125 (φ4.92")	φ125 (φ4.92")	φ92 (φ3.23") / φ125 (φ4.92") with no tools in adjacent pots	φ92 (φ3.23") / φ125 (φ4.92") with no tools in adjacent pots
	Maximum tool length (from the gauge line)	mm	300 (11.81")	300 (11.81")	350 (13.78")	300 (11.81")
	Maximum tool weight	kg	7 (15 lbs)	7 (15 lbs)	7 (15 lbs)	7 (15 lbs)
	Tool selection method		Memory random method	Memory random method	Address fixed random method	Address fixed random method
	Tool exchange time (tool-to-tool)	sec	1.3	1.3	2.0	3.2
	Tool exchange time (cut-to-cut)	sec	4.5※3	4.5※3	4.8	6.5
Motors	for Spindle (30min rating/continuous rating)	kW	7.5/5.5 (10/7 HP)	7.5/5.5 (10/7 HP)	22(15min rating)/18.5 (30(15min rating)/25 HP)	7.5/5.5 (10/7 HP)
	for Feed axes X, Y and Z axes	kW	MITSUBISHI XY:2 (2.7 HP) Z:3.5 (4.7 HP)	-	MITSUBISHI X:4.5 (6 HP) YZ:3.5 (4.7 HP)	MITSUBISHI XYZ:3.5 (4.7 HP)
	for Feed axes X, Y and Z axes	kW	FANUC XY:3 (4 HP) Z:4 (5.4 HP)	FANUC XY:3 (4 HP) Z:4 (5.4 HP)	FANUC X:5.5 (7.4 HP) YZ:4.5 (6 HP)	FANUC X:5.5 (7.4 HP) YZ:4.5 (6 HP)
	for Feed axes A and C axes	kW	MITSUBISHI A:3.5 (4.7 HP) C:2.2 (3 HP)	-	MITSUBISHI A:4.5 (6 HP) C:3.5 (4.7 HP)	MITSUBISHI A:7 (9.4 HP) C:3.5 (4.7 HP)
	for Feed axes A and C axes	kW	FANUC A:4.5 (6 HP) C:2.7 (3.6 HP)	FANUC A:4.5 (6 HP) C:6 (8 HP)	FANUC A:5.5 (7.4 HP) C:4.5 (6 HP)	FANUC A:6 (8 HP) C:4.5 (6 HP)
Required Power Supply	Power supply	kVA	MITSUBISHI:33 FANUC:32	FANUC:32	MITSUBISHI:51 FANUC:54	MITSUBISHI:42 FANUC:45
	Supply voltage × supply frequency	V×Hz	200±10%×50/60±1	200±10%×50/60±1	200±10%×50/60±1	200±10%×50/60±1
	Supply voltage × supply frequency	V×Hz	220±10%×60±1※4	220±10%×60±1※4	220±10%×60±1※4	220±10%×60±1※4
	Compressed air supply pressure	MPa	0.5 (73psi)※5	0.5 (73psi)※5	0.4~0.6 (58~87 psi)※5	0.4~0.6 (58~87 psi)※5
	Compressed air supply flow rate	L/min(ANR)	200 (53 more gal/ipm)※6	200 (53 more gal/ipm)※6	200 (53 more gal/ipm)※6	230 (61 more gal/ipm)※6
Tank Capacity	Coolant tank	L	280 (74 gal)	280 (74 gal)	260 (69 gal)	380 (100 gal)
	Spindle head cooling oil tank	L	50 (13 gal)	50 (13 gal)	50 (13 gal)	72 (19 gal)
	Hydraulic unit tank	L	20 (5 gal)	20 (5 gal)	20 (5 gal)	20 (5 gal)
Machine Size and Required Floor Space	Machine height from the floor surface	mm	2996 (117.95")	3076 (121.10")	3500 (137.80")	3565 (140.35")
	Floor space required for operation (width × depth)	mm	1895×3440 (74.61"×135.43")	1895×3440 (74.61"×135.43")	3720×2450 (146.46"×96.46")	4850×3660 (190.94"×144.09")
	Machine weight	kg	8500 (18700 lbs)	8500 (18700 lbs)	12000 (26500 lbs)	18000 (39700 lbs)
	Temperature of operation environment	°C	5~40	5~40	5~40	5~40
	Humidity of operation environment	%	10~90 (No dew)	10~90 (No dew)	10~90 (No dew)	10~90 (No dew)

※1: Max. inertia is 0.9 kg·m² for turning function.
※2: Under the HQ or Hyper HQ control
※3: Includes the ATC shutter operating time
※4: When the supply voltage is 220VAC, the supply frequency of 60Hz only is applicable.
※5: Purity of the supplied air should be equivalent to Class 3.5.4 specified in ISO 8573-1 / JIS B8392-1 or higher.
※6: The flow rate for the standard specification machines is specified in the above.
When optional specification such as an air blow is added, add the corresponding air supply according to the operating frequency.

Standard Accessories

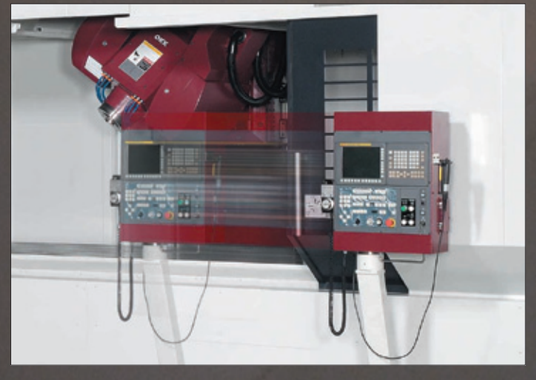
Item	VC-X350	VC-X350L	VC-X500	VP9000-5AX
	Q'ty			
Lighting system	1 lamp	1 lamp	LED 1 lamp	2 lamps
Coolant unit (Separate coolant tank)	1 set	1 set	1 set	1 set
Entire machine cover (Splash guard)	1 set	1 set	1 set	1 set
Door interlock	1 set	1 set	1 set	1 set
Top cover	1 set	1 set	1 set	1 set
Ceiling shower	-	-	option	1 set
ATC shutter (operated automatically)	1 set	1 set	1 set	1 set
Slideway protection covers for X and Y axes	1 set	1 set	1 set	1 set
Spindle air purge	1 set	1 set	1 set	1 set
Spindle head and ball screw cooling oil temperature controller	1 set	1 set	1 set	1 set
Automatic grease lubrication unit	Self Lubricated type	Self Lubricated type	1 set	1 set
Hydraulic unit (for clamping the 5-axis table)	1 set	1 set	1 set	1 set
Coil-type chip conveyor	1 set	1 set	1 set	1 set
Leveling block	1 set	1 set	1 set	1 set
Parts for machine transfer (excluding the hoisting jig)	1 set	1 set	1 set	1 set
Foundation parts (Bond for anchoring is optional)	-	-	-	1 set
Automatic power off	1 set	1 set	1 set	1 set
Rotary encoder (for A axis)	1 set	-	-	1 set
Rotary encoder (for A and C axes)	-	1 set	1 set	-
Electrical spare parts (fuses)	1 set	1 set	1 set	1 set
Instruction manual	1 set	1 set	1 set	1 set
Electrical manuals (including Hardware diagrams)	1 set	1 set	1 set	1 set

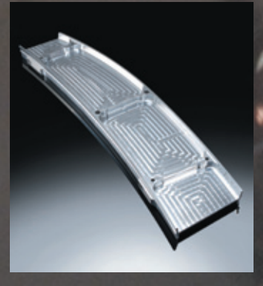
Optional Accessories

Item	Specification	
☐High-speed 20000min⁻¹ spindle (22/18.5kW (35/25HP))		
☐High-torque spindle drive motor (22/18.5 kW (35/25HP)) VC-X350 VC-X350L VP9000-5AX		
☐Compatibility with Dual contact tool VC-X350 VP9000-5AX		
☐Pull stud	☐MAS Ⅱ	
	☐OKK only 90°	
☐Tool magazine	☐30 VC-X350 VC-X350L	
	☐40 VC-X350 VC-X350L	
	☐60	
	☐80	
	☐120	
☐Automatic operation of splash guard front door		
☐Lift-up type chip conveyor		
☐Chip bucket	☐Fixed type (for Lift-up type chip conveyor)	
☐Workpiece flushing gun		
☐Air blower		
☐Oil-mist / air blower		
☐Mist collector		
☐Compatibility with oil-through-holder	☐BIG	
	☐NIKKEN	
	☐Others	
☐Compatibility with through-spindle (including high-pressure unit)	☐2MPa (290 psi)	☐Air
	☐7MPa (1015 psi)	
☐Preparation for through-spindle		
☐Thickener bag filter (Spare parts for high-pressure unit)		
☐Fine amount coolant supply unit (Maker: Bluebe)		
☐Coolant (for Bluebe)		
☐Linear scale	☐for X and Y axes	
	☐for X, Y and Z axes	
☐Rotary encoder (C axis) VC-X350 VP9000-5AX		
☐Coolant cooler		
☐Lighting system		
☐Signal lamp	☐2-lamp tower type	☐with Buzzer alarm
	☐3-lamp tower type	
	☐2-lamp rotary type	
	☐3-lamp rotary type	
☐Additional M code	☐4 sets	
	☐8 sets	
☐Foundation bolts for bond anchoring VC-X350 VC-X350L VC-X500		
☐A set of bond for foundation work		
☐Coating color specified by customer		
☐Grease cartridge for automatic grease lubrication unit VC-X500 VP9000-5AX		
☐Touch sensor system	☐T0 (Manually operated type)	
	☐T1-A (Workpiece measurement)	
	☐T1-B (Workpiece measurement, Tool length measurement, Tool break detection)	
	☐T1-C (Tool length measurement, Tool break detection)	
	☐T0 software	
☐Laser measurement(There is worlpiece size limit on VC-X500)	☐Laser system (without covers) made by Renishaw: Max.φ85 (φ3.35")	
	☐Micro laser system (without covers) made by Blum: Max.φ85 (φ3.35")	
☐Cumulative hour meter (9999H)		
☐Work counter (5 digits)		
☐Calendar timer		
☐OKK Manual Guide i (animation of milling cycle for F31i)		
☐MG operation panel		

KCV800-5AX
KCV1000-5AX

Movable operation panel





Sample Workpiece

Material: Aluminum
Coolant: Water-soluble coolant
Tooling: ϕ50mm (ϕ1.97") end mill
Cutting condition: S1000 ~ S6000

※ The machines in the photographs of this brochure may include optional accessories.

KCV800-5AX
KCV1000-5AX

Even large-sized aircraft parts can be machined at high speed and quite efficiently!

- **Tilting and swiveling structure of the spindle acheives 5-axis machining of large-sized workpieces.**
- **High-speed and highly efficient machining of aluminum workpieces is possible with the excellent cutting performance of the No. 50 taper high-speed and high-power spindle.**
- **Long table enables easy machining of long workpieces.**
- **Easy access to the spindle and workpieces are ensured by the structure of traversing column.**
- **Improved chip discharge mechanism enables processing a large amount of chips.**

Tilting and swiveling structure of the spindle

Thorough measures to control thermal displacement

Thermal displacement caused by generation of heat on the bearing is suppressed by the spindle housing cooling mechanism. Inaddition, the machine has the core-chilled ball screws in the feed axes.

Comprehensive chip processing

Besides the standard coil-type chip conveyors front and back of the table, the machine has additional coil-type chip conveyors on the right and left of the column for improved chip processing capability. Chips on the front face of the column and both sides of the X-axis shutter are flushed out into the conveyors.

Accuracy

Positioning Accuracy (without linear scale)

mm (inch)

	X	Y	Z
Positioning Accuracy	±0.0090 (±0.00035") /full stroke	±0.0030 (±0.00012") /full stroke	±0.0050 (±0.00020") /full stroke
Repeatability	±0.0020 (±0.00008") /full stroke		

(OKK tolerance)

Positioning Accuracy (with linear scale)

mm (inch)

	X	Y	Z
Positioning Accuracy	±0.0060 (±0.00024") /full stroke	±0.0020 (±0.00008") /full stroke	±0.0030 (±0.00012") /full stroke
Repeatability	±0.0010 (±0.00004") /full stroke		

(OKK tolerance)

Positioning Accuracy (with encoder)

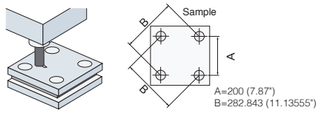
Positioning Accuracy	A axis: ±5 sec B axis: ±5 sec

(OKK tolerance)

Cutting Accuracy

mm (inch)

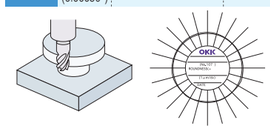
Item	OKK tolerance	Result
Axis direction	0.015 (0.00059")	0.007 (0.00028")
Diagonal direction	0.015 (0.00059")	0.008 (0.00031")
Deviation of hole dia	0.010 (0.00039")	0.005 (0.00020")



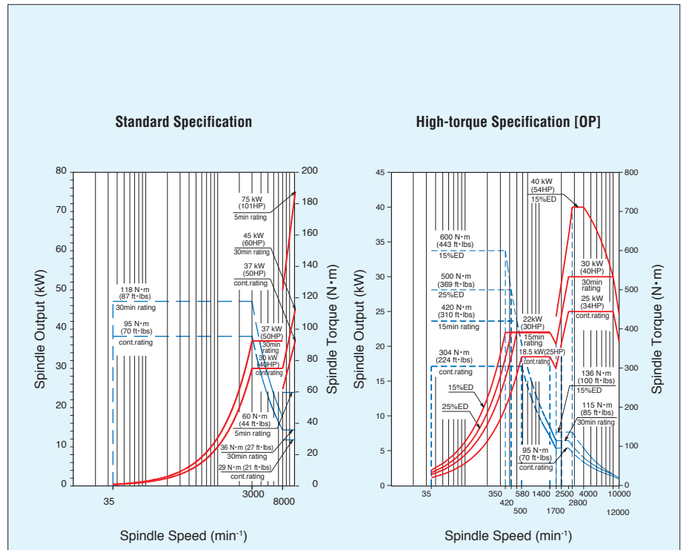
Circular Cutting Accuracy

mm (inch)

Item	OKK tolerance	Result	
		KCV800-5AX	KCV1000-5AX
Circularity	0.015 (0.00059")	0.0056 (0.00022")	0.0058 (0.00023")



Spindle Output and Torque Diagram (FANUC)



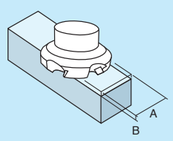
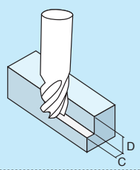
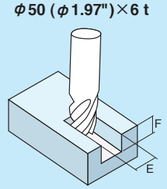
Remarks

※1: The above sample data shows a short-time machining example and the results of continuous machining may differ from them.

※2: The above sample data shows the accuracy under OKK's in-house cutting test conditions. The results may vary with the conditions of the cutting tools and fixtures.

※3: The accuracy shown above are values obtained based on OKK's inspection standards under the conditions that the machine is installed according to OKK's foundation drawing and the ambient temperature remains constant.

Machining Capabilities (Workpiece material: S45C)

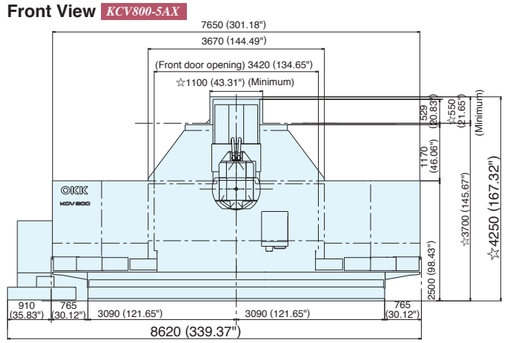
	Face Mill 5"×6 t	Roughing End Mill φ50 (φ1.97")×6 t	Roughing End Mill φ50 (φ1.97")×6 t
			
Spindle speed	300min-1	160min-1	160min-1
Cutting speed	120m/min (4724ipm)	25m/min (984ipm)	25m/min (984ipm)
Cut width	(A) 100mm (3.94")	(C) 50mm (1.97")	(E) 50mm (1.97")
Cut depth	(B) 3mm (0.12")	(D) 5mm (0.20")	(F) 5mm (0.20")
Feed rate	300mm/min (12ipm)	140mm/min (6ipm)	192mm/min (8ipm)
Feed per tooth	0.167mm/tooth (0.00657inch/tooth)	0.146mm/tooth (0.00575inch/tooth)	0.200mm/tooth (0.00787inch/tooth)
Cutting amount	90cm3/min (5.5cu-inch/min)	35cm3/min (2.1cu-inch/min)	48cm3/min (2.9cu-inch/min)
Spindle motor load	129%	100%	111%

Note 1: The above machining data show a sample actual machining and are for reference only.

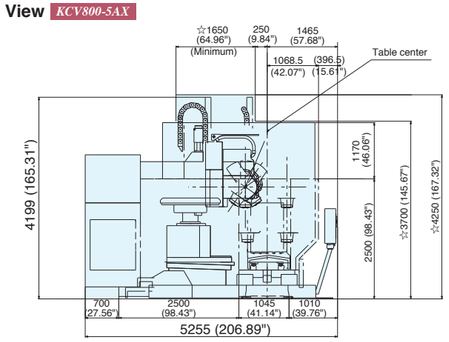
Main Dimensions of the Machine

KCV800-5AX KCV1000-5AX

Front View KCV800-5AX



Side View KCV800-5AX



[Note] ☆: Minimum space required for interference above the machine. Practical use will require more space.

Floor Space KCV800-5AX

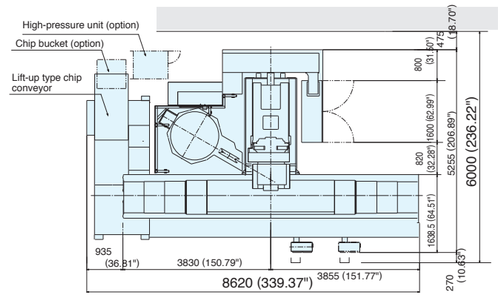
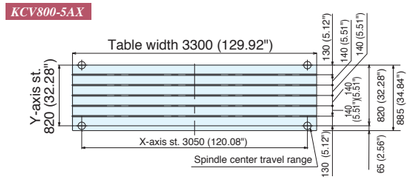
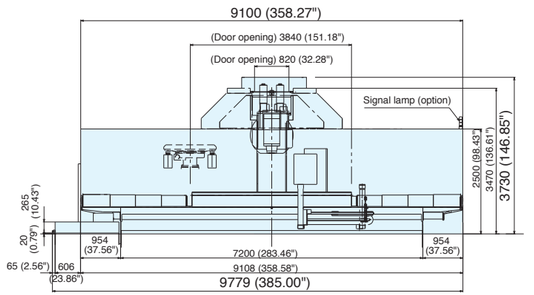


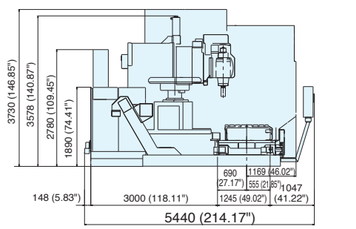
Table KCV800-5AX



Front View KCV1000-5AX



Side View KCV1000-5AX



Floor Space KCV1000-5AX

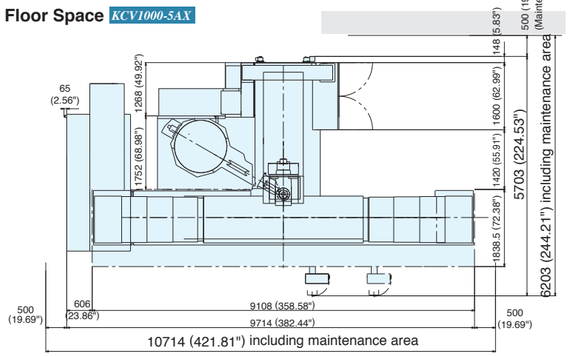
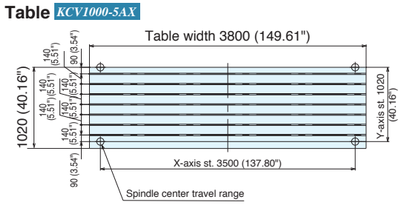


Table KCV1000-5AX



Specifications

Item			Unit	KCV800-5AX	KCV1000-5AX
Travel	Travel on X axis (Table: right/left)		mm	3050 (120.08")	3500 (137.80")
	Travel on Y axis (Column: back/forth)		mm	820 (32.28")	1020 (40.16")
	Travel on Z axis (Spindle head: up/down)		mm	720 (28.35")	720 (28.35")
	Travel on A axis (Spindle head: back/forth)		deg	−35 to 35 OP: −40 to 40	−35 to 35 OP: −40 to 40
	Travel on B axis (Spindle head: right/left)		deg	−35 to 35 OP: −40 to 40	−35 to 35 OP: −40 to 40
	Distance from table top surface to spindle nose		mm	200 (7.87") to 920 (36.22")	200 (7.87") to 920 (36.22")
	Distance from column front to spindle center		mm	885 (34.84")	1085 (42.72")
Table	Table work surface area (X-axis direction × Y-axis direction)		mm	3300×820 (129.92"×32.28")	3800×1020 (149.60"×40.16")
	Max. workpiece weight loadable on table		kg	3000 (6600 lbs)	4000 (8800 lbs)
	Table work surface configuration (Number and nominal dimension of T slots and spacing)		mm	Five 22mm (0.87") T slots with 140mm (5.51") pitch	Seven 22mm (0.87") T slots with 140mm (5.51") pitch
	Distance to the table work surface from the floor		mm	980 (38.58")	1000 (39.37")
Spindle	Spindle speed		min^{-1}	35 to 12000	35 to 12000
	Number of spindle speed change steps			Stepless	Stepless
	Spindle nose (nominal number)			7/24 taper, No.50	7/24 taper, No.50
	Spindle bearing bore diameter		mm	ø90 (ø3.54")	ø100 (ø3.94")
Feed Rate	Rapid traverse rate	X, Y and Z axes:	m/min	XY=24 (945 ipm) Z=20 (787 ipm)	XYZ=20 (787 ipm)
		A and B axes	min^{-1}	A=10 B=10	A=10 B=10
	Cutting feed rate	X, Y and Z axes:	mm/min	1 to 10000 (0.04 to 394 ipm)	1 to 10000 (0.04 to 394 ipm)
		A and B axes	min^{-1}	A=10 B=10	A=10 B=10
Automatic Tool Changer	Tool shank (nominal number)			JIS B 6339 BT50	JIS B 6339 BT50
	Pull stud (nominal number)			OKK only 90°	OKK only 90°
	Number of stored tools		tools	30 tools	30 tools
	Maximum tool diameter (with adjacent tools)		mm	ø100 (ø3.94")	ø100 (ø3.94")
	Maximum tool diameter (without adjacent tools)		mm	ø200 (ø7.87")	ø200 (ø7.87")
	Maximum tool length (from the gauge line)		mm	350 (13.78")	350 (13.78")
	Maximum tool weight		kg	20 (44 lbs)	20 (44 lbs)
	Tool selection method			Address fixing method	Address fixing method
	Tool exchange time (tool-to-tool)		sec	2.5	2.5
	Tool exchange time (cut-to-cut)		sec	13	15
Motors	For spindle (30min rating/continuous rating)		kW	45/37 (60HP/50HP) OP: 40/25 (54HP/34HP) (15%ED/cont.)	45/37 (60HP/50HP) OP: 40/25 (54HP/34HP) (15%ED/cont.)
	For feed axes	X, Y and Z axes	kW	FANUC X/Y/Z: 9.0 (12HP)	FANUC X/Y: 9.0 (12HP) Z: 9.0 (12HP)×2
		A and B axes	kW	FANUC A/B: 4.0 (5HP)	FANUC A/B: 4.0 (5HP)
Required Power Supply	Power supply		kVA	FANUC: 89	FANUC: 107
	Supply voltage × supply frequency		V×Hz	200±10%×50/60±1 220±10%×60±1 ※1	200±10%×50/60±1 220±10%×60±1 ※1
	Compressed air supply pressure		MPa	0.4 (58 psi) to 0.6 (87 psi)※2	0.4 (58 psi) to 0.6 (87 psi)※2
	Compressed air supply flow rate		L/min(ANR)	400 (106 gal)※3	400 (106 gal)※3
Tank Capacity	Coolant tank		L	1000 (264 gal)	1075 (284 gal)
	Spindle head cooling oil tank		L	72 (19 gal)	51 (13 gal)
	Spindle lubricating oil tank		L	2 (0.5 gal)	2 (0.5 gal)
	Slideway lubricating oil tank		L	6 (1.6 gal)	6 (1.6gal)
	Hydraulic unit tank		L	20 (5 gal)	20 (5 gal)
Machine Size and Required Floor Space	Machine height from the floor surface		mm	4200 (165.35")	3730 (146.85")
	Floor space required for operation (width × depth)		mm	8620×5255 (339.37"×206.89")	9714×5703 (382.44"×224.53")
	Floor space including maintenance area (width × depth)		mm	8620×6000 (339.37"×236.22")	10714×6203 (421.81"×244.21")
	Machine weight		kg	25000 (55100 lbs)	32000 (70500 lbs)
	Controller type			F30i	F30i
	Temperature of operation environment		℃	5 to 40	5 to 40

※1: When the supply voltage is 220VAC, the supply frequency of 60Hz only is applicable.
※2: Purity of the supplied air should be equivalent to Class 3.5.4 specified in ISO 8573-1 / JIS B8392-1 or higher.
※3: The flow rate for the standard specification machines is specified in the above.
When optional specification such as an air blow is added, add the corresponding air supply according to the operating frequency.

Standard Accessories

Item	KCV800-5AX	KCV1000-5AX
Lighting system (Two fluorescent lamps)	1 set	1 set
Coolant unit with lift-up type chip conveyor (for backwashing aluminum chips)	1 set	1 set
Coolant-through-spindle (Spindle compatibility only)	1 set	1 set
Entire machine cover (Splash guard)	1 set	1 set
Door inter-lock	1 set	1 set
Top cover	1 set	1 set
ATC shutter (operated automatically)	1 set	1 set
Slideway protection covers for X, Y and Z axes	1 set	1 set
Spindle air purge	1 set	1 set
Spindle head and ball screw cooling oil temperature controller	1 set	1 set
Hydraulic unit	1 set	1 set
Coil-type chip conveyor	4 sets	4 sets
Leveling block	1 set	1 set
Foundation parts (Bond for anchoring is optional.)	1 set	1 set
Parts for machine transfer (excluding the hoisting jig)	1 set	1 set
Automatic power off	1 set	1 set
Rotary encoder (A axis/B axis)	1 set	1 set
Electrical spare parts (fuses)	1 set	1 set
Instruction manual	1 set	1 set
Electrical manuals (including Hardware diagrams)	1 set	1 set

Optional Accessories

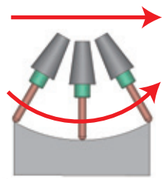
Item	Specification		KCV800-5AX	KCV1000-5AX
☐High-torque specification (15% ED/cont.rating)	600/304 N·m (443/224 ft·lbs), 40/25kW (54/34HP)			
☐Compatibility with Dual contact tool				
☐Change of pull stud	☐MAS Ⅰ ☐MAS Ⅱ			
☐Tool magazine	☐40			
☐Splash guard front door automatically open / close				
☐Chip bucket	☐Fixed type (for Lift-up type chip conveyor) ☐Swing type (for Lift-up type chip conveyor)			
☐Workpiece flushing gun				
☐Oil skimmer				
☐Air blower				
☐Mist collector				
☐High-pressure unit (for external fixed nozzles): 7MPa (1015 psi)				
☐Compatibility with through-spindle (including high-pressure unit): 7MPa (1015 psi)				
☐Thickener bag filter (Spare parts for high-pressure unit)				
☐Linear scale	☐For X and Y axes ☐For X, Y and Z axes			
☐Coolant cooler				
☐Signal lamp	☐2-lamp tower type ☐3-lamp tower type ☐2-lamp rotary type ☐3-lamp rotary type	☐With buzzer alarm		
☐Additional M code	☐4 sets ☐8 sets			
☐A set of bond for foundation work				
☐Standard tool set				
☐Coating color specified by customer				
☐Touch sensor system (Wireless types should use FM radio waves only.)	☐T1-A (Workpiece measurement) ☐T1-B (Workpiece measurement, Tool length measurement, Tool break detection)			
☐Laser measurement	☐Laser system (without covers) made by Renishaw	☐Max ø85 (ø3.35") ☐Max ø135 (ø5.31") ☐Max ø185 (ø7.28")		
	☐Micro laser system (without covers) made by Blum: Max ø85 (dia. 3.35")			
☐OKK Manual Guide i (Animation of milling cycle for F30i)				
☐MG operation panel				

5-axis support technologies

5-axis Control Function

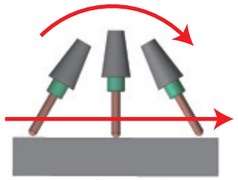
Tool center point control

Conventional movement



Produces errors due to movement of rotation axis

This function's movement



Loci of the tool tip as instructed

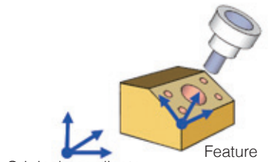
Tool Center Point Control simplifies 5-axis machining by controlling tool movement at the tool center, even if the tool axis direction changes. Tool tip speed is maintained and high-quality surfacing achieved.

5-axis indexing function

Inclined surface indexing (machining) command (Option)

The inclined surface indexing (machining) commands allow easy setting the surface to be machined by using the newly defined coordinate system (feature coordinate system).

It enables the simple creation of the machining programs similar to the programming for the normal 3-axis machining centers.



5-axis processing software MULTI-FACER Ⅱ

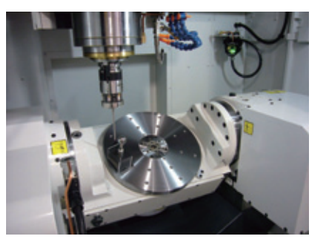
When indexing the planes to be processed on 5-axis machining centers, it may take time for setting the workpiece origins. Those workpiece origins can be set with ease by using MULTI-FACER Ⅱ that enables creating index programs easily without using calculators.

A^5 system (Option)

In the machining with the 5-axis machining center, the geometric errors (rotation axis's inclination and displacement) influence the machining accuracy largely.

This function automatically measures and corrects the geometric errors with the touch sensor.

It makes the high-accuracy 5-axis indexing and the high quality simultaneous 5-axis machining even better.



CONTROLLER

F31i-A5

Standard Specification	HM-X6000 / VG5000	VC-X350 / VC-X350L / VC-X500 / VP9000-5AX	VM-X5
	F31i-A5/ -B5(WindowsCE-installed Open CNC)		
No. of controlled axes : 5 (X, Y, Z, A, C) (X, Y, Z, A, B) ※1	○	○	○
No. of simultaneously controlled axes : 5 axes	○	○	○
Least input increment: 0.001mm / 0.0001"	○	○	○
Max.programmable dimension: ±999999.999mm / ±39370.0787"	○	○	○
Absolute / Incremental programming: G90 / G91	○	○	○
Decimal point input / Pocket calculator type decimal point input	○	○	○
Inch / Metric conversion: G20 / G21	○	○	○
Program code: ISO / EIA automatic discriminaton	○	○	○
Program format: FANUC standard format	○	○	○
Nano interpolation(internal)	○	○	○
Positioning: G00	○	○	○
Linear interpolation: G01	○	○	○
Circular interpolation: G02 / G03(CW / CCW) (including Radius designation)	○	○	○
Cutting feed rate: 6.3-digit F-code, direct command	○	○	○
Dwell: G04	○	○	○
Manual handle feed: manual pulse generator 1 set (0.001, 0.01, 0.1mm)	○	○	○
Rapid traverse override: 0 / 1 / 10 / 25 / 50 / 100%	○	○	○
Cutting feed rate override: 0 to 200%(every 10%)	○	○	○
Feed rate override cancel: M49 / M48	○	○	○
Rigid tapping: G84, G74(Mode designation: M29)	○	○	○
Part program storage capacity: 160m[64KB]	○	○	○
No. of registered programs: 120	○	○	○
Part program editing	○	○	○
Background editing	○	○	○
Extended part program editing	○	○	○
10.4" color LCD	○	○	○
Clock function	○	○	○
MDI (Manual Data Input)operation	○	○	○
Memory card interface	○	○	○
Spindle function: 5-digit S-code direct command	○	○	○
Spindle speed override: 50 to 150%(every 5%)	○	○	○
Tool function: 4-digit T-code direct command	○	○	○
ATC tool registration	○	○	○
Auxiliary function: 3-digit M-code programming	○	○	○
Multiple M-codes in 1 block: 3 codes(Max. 20 settings) (HM-X6000: 2 codes)	○	○	○
Tool length offset: G43, G44/G49	○	○	○
Tool diameter and cutting edge R compensation: G41, G42/G40	○	○	○
Tool offset sets: 99 sets	○	○	○
Tool offset memory C	○	○	○
Manual reference position return	○	○	○
Automatic reference position return: G28/G29	○	○	○
2nd reference position return: G30	○	○	○
Reference position return check: G27	○	○	○
Automatic coordinate system setting	○	○	○
Coordinate system setting: G92	○	○	○
Machine coordinate system: G53	○	○	○
Workpiece coordinate system: G54 to G59	○	○	○
Local coordinate system: G52	○	○	○
Program stop: M00	○	○	○
Optional stop: M01	○	○	○
Optional block skip: /	○	○	○
Dry run	○	○	○
Machine lock	○	○	○
Z-axis feed cancel	○	○	○
Auxiliary function lock	○	○	○
Graphic display	○	○	○
Program number search	○	○	○
Sequence number search	○	○	○
Program restart	○	○	○
Cycle start	○	○	○
Auto restart	○	○	○
Single block	○	○	○
Feed hold	○	○	○
Manual absolute on/off : parameter	○	○	○
Sub program control	○	○	○
Canned cycle: G73, G74, G76, G80 to G89	○	○	○
Mirror image function : parameter	○	○	○
Automatic corner override	○	○	○
Exact stop check/mode	○	○	○
Programmable data input: G10	○	○	○
Backlash compensation for each rapid traverse and cutting feed	○	○	○
Smooth backlash compensation	○	○	○
Memory pitch error compensation(interpolation type)	○	○	○
Skip function	○	○	○
Tool length manual measurement	○	○	○
Emergency stop	○	○	○
Data protection key	○	○	○
NC alarm display / alarm history display	○	○	○
Machine alarm display	○	○	○
Stored stroke check 1	○	○	○
Load monitor	○	○	○
Self-diagnosis	○	○	○
Absolute position detection	○	○	○
Manual Guide i (Basic) ※ excluding VC-X350L	○	○※	○
Stored stroke check 2,3 (for OKK use)	○	※2	–
3rd & 4th reference position return (for OKK use)	○	–	–
Tool center point control for 5 axis machining	※3	○	○
Inverse time feed	※3	○	○
Unidirectional positioning: G60	※3	○	○
Data server: ATA card(1GB)	※3	○	○
Coordinate system rotation: G68, G69	○	○	OP
Instruction of inclined plane indexing (Instruction of inclined plane machining)	OP	OP	○
Manual feed for 5 axis machining	–	–	○

Standard Specification	HM-X6000 / VG5000	VC-X350 / VC-X350L / VC-X500 / VP9000-5AX	VM-X5
	F31i-A5/ -B5(WindowsCE-installed Open CNC)		
Tool length compensation along tool vector	–	–	○
Straightness compensation	–	–	○
Multi spindle control	–	VC-X350L only	–
Constant surface speed control	–	VC-X350L only	–
Multiple repetitive cycles	–	VC-X350L only	–
Tool offset for Milling and Turning function	–	VC-X350L only	–
Tool geometry/wear compensation	–	VC-X350L only	–
Turning/Machining G code system switching function	–	VC-X350L only	–
Turning G code system B/C	–	VC-X350L only	–

Optional Specification				
15" color LCD		□	□	□
Least input increment: 0.0001mm / 0.00001"		□	□	□
FS15 tape format		□	□	□
Helical interpolation	PK	□	□	□
Cylindrical interpolation		□	□	□
Hypothetical axis interpolation		□	□	□
Spiral/Conical interpolation		□	□	□
Smooth interpolation		□	□	□
NURBS interpolation		□	□	□
Involute interpolation		□	□	□
One-digit F code feed		□	□	□
Handle feed 3 axes(Standard pulse handle is removed)		□	□	□
Part program storage capacity: 320m 128KB (250 in total)		□	□	□
Part program storage capacity: 640m 256KB (500 in total)		□	□	□
Part program storage capacity: 1280m 512KB (1000 in total)	PK	□	□	□
Part program storage capacity: 2560m 1MB (1000 in total)		□	□	□
Part program storage capacity: 5120m 2MB (1000 in total)		□	□	□
Part program storage capacity: 10240m 4MB (1000 in total)		□	□	□
Part program storage capacity: 20480m 8MB (1000 in total)		□	□	□
Data server: ATA card(4GB)		□	□	□
Spindle contour control(Cs contour control)		□	□	□
Tool position offset		□	□	□
3-dimensional cutter compensation		□	□	□
3-dimensional coordinate system conversion		□	□	□
Tool offset sets: 200 sets in total	PK	□	□	□
Tool offset sets: 400 sets in total		□	□	□
Tool offset sets: 499 sets in total		□	□	□
Tool offset sets: 999 sets in total		□	□	□
Addition of workpiece coordinate system(48 sets in total): G54.1 P1 to P48	PK	□	□	□
Addition of workpiece coordinate system(300 sets in total): G54.1 P1 to P300		□	□	□
Machining time stamp		□	□	□
Optional block skip: Total 9		□	□	□
Tool retract and return		□	□	□
Sequence number comparison and stop		□	□	□
Manual handle interruption		□	□	□
Programmable mirror image	PK	□	□	□
Optional chamfering / corner R		□	□	□
Custom macro	PK	STD	□	□
Interruption type custom macro		□	□	□
Addition of custom macro common variables: 600		□	□	□
Figure copy		□	□	□
Scaling: G50, G51		□	□	□
Chopping (Axis control by PMC)		□	□	□
Playback		□	□	□
Automatic tool length measurement: G37 / G37.1		□	□	□
Tool life management: 256 sets in total	PK	□	□	□
Addition of tool life management sets: 1024 sets in total		□	□	□
High-speed skip		□	□	□
Run hour and parts count display	PK	□	□	□
Manual Guide i (Milling cycle) ※ excluding VC-X350L		□	□※	□
RS232C interface: RS232C-1CH		□	□	□

Original OKK Software			
Machining support integrated software (incl. Help guidance, etc.)	STD	STD	STD
Tool support	STD	STD	STD
Program Editor	STD	STD	STD
EasyPRO	STD	STD	STD
A5 system	– (HM-X6000) OP(VG5000)	OP	–
Work Manager	OP	OP	OP
HQ control	STD	STD	STD
Hyper HQ control mode B	STD(HM-X6000) OP(VG5000)※3	STD	STD
HQ tuner (Hyper HQ control is also needed)	OP	OP	OP
5 Axis NC Option Package A	STD(HM-X6000) OP(VG5000)	STD	STD
NC option package (including the items with "PK")	OP	OP	OP
Multi-Facer Ⅱ (5-axis Processing Software)	STD	STD	–
Special canned cycle (including circular cutting)	OP	OP	OP
Cycle Mate F	OP	OP	OP
High-speed pattern macro	OP	OP	OP
Soft Scale Ⅱ m	STD	STD	–
Soft Scale Ⅲ	–	–	STD
Touch sensor T0 software	OP	OP	–
Tool failure detection system (Soft CCM)	OP	OP	OP
Adaptive control (Soft AC)	OP	OP	OP
Automatic restart at tool damage	OP	OP	OP

※1 HM-X6000, VM-X5
※2 Standard for VC-X500, VP9000-5AX
※3 included in "5 Axis NC Option Package A" option

CONTROLLER
F30i

Standard Specification	KCV800-5AX	KCV1000-5AX
	F30i-A/ -B(WindowsCE-installed Open CNC)	
No. of controlled axes : 5 (X, Y, Z, A, B)	○	
No. of simultaneously controlled axes : 5 axes	○	
Least input increment: 0.001mm / 0.0001"	○	
Max.programmable dimension: ±999999.999mm / ±39370.0787"	○	
Absolute / Incremental programming: G90 / G91	○	
Decimal point input / Pocket calculator type decimal point input	○	
Inch / Metric conversion: G20 / G21	○	
Program code: ISO / EIA automatic discriminaton	○	
Program format: FANUC standard format	○	
Nano interpolation(internal)	○	
Positioning: G00	○	
Linear interpolation: G01	○	
Circular interpolation: G02 / G03(CW / CCW) (including Radius designation)	○	
Cutting feed rate: 6.3-digit F-code, direct command	○	
Dwell: G04	○	
Manual handle feed: manual pulse generator 1 set (0.001, 0.01, 0.1mm)	○	
Rapid traverse override: 0 / 1 / 10 / 25 / 50 / 100%	○	
Cutting feed rate override: 0 to 200%(every 10%)	○	
Feed rate override cancel: M49 / M48	○	
Rigid tapping: G84, G74(Mode designation: M29)	○	
Part program storage capacity: 160m [64KB]	○	
No. of registered programs: 120	○	
Part program editing	○	
Background editing	○	
Extended part program editing	○	
10.4" color LCD	○	
Clock function	○	
MDI (Manual Data Input)operation	○	
Memory card interface	○	
Spindle function: 5-digit S-code direct command	○	
Spindle speed override: 50 to 150%(every 5%)	○	
Tool function: 4-digit T-code direct command	○	
ATC tool registration	○	
Auxiliary function: 3-digit M-code programming	○	
Multiple M-codes in 1 block: 3 codes(Max. 20 settings)	○	
Tool length offset: G43, G44/G49	○	
Tool diameter and cutting edge R compensation: G41, G42/G40	○	
Tool offset sets: 99 sets	○	
Tool offset memory C	○	
Manual reference position return	○	
Automatic reference position return: G28/G29	○	
2nd reference position return: G30	○	
Reference position return check: G27	○	
Automatic coordinate system setting	○	
Coordinate system setting: G92	○	
Machine coordinate system: G53	○	
Workpiece coordinate system: G54 to G59	○	
Local coordinate system: G52	○	
Program stop: M00	○	
Optional stop: M01	○	
Optional block skip: /	○	
Dry run	○	
Machine lock	○	
Z-axis feed cancel	○	
Auxiliary function lock	○	
Graphic display	○	
Program number search	○	
Sequence number search	○	
Program restart	○	
Cycle start	○	
Auto restart	○	
Single block	○	
Feed hold	○	
Manual absolute on/off : parameter	○	
Sub program control	○	
Canned cycle: G73, G74, G76, G80 to G89	○	
Mirror image function : parameter	○	
Automatic corner override	○	
Exact stop check/mode	○	
Programmable data input: G10	○	
Backlash compensation for each rapid traverse and cutting feed	○	
Smooth backlash compensation	○	
Memory pitch error compensation(interpolation type)	○	
Skip function	○	
Tool length manual measurement	○	
Emergency stop	○	
Data protection key	○	
NC alarm display / alarm history display	○	
Machine alarm display	○	
Stored stroke check 1	○	
Load monitor	○	
Self-diagnosis	○	
Absolute position detection	○	
Manual Guide i (Basic)	○	
Tool center point control for 5 axis machining	○	
Inverse time feed	○	
Unidirectional positioning: G60	○	
Data server: ATA card(1GB)	○	
Instruction of inclined plane indexing (Instruction of inclined plane machining)	○	
Manual feed for 5 axis machining	○	
Tool length compensation along tool vector	○	
Straightness compensation	○	
3-dimensional coordinate system conversion	○	

Optional Specification	KCV800-5AX	KCV1000-5AX
15" color LCD		□
Least input increment: 0.0001mm / 0.00001"		□
FS15 tape format		□
Helical interpolation PK		□
Cylindrical interpolation		□
Hypothetical axis interpolation		□
Spiral/Conical interpolation		□
Smooth interpolation		□
NURBS interpolation		□
Involute interpolation		□
One-digit F code feed		□
Handle feed 3 axes(Standard pulse handle is removed)		□
Part program storage capacity: 320m [128KB] (250 in total)		□
Part program storage capacity: 640m [256KB] (500 in total)		□
Part program storage capacity: 1280m [512KB] (1000 in total) PK		□
Part program storage capacity: 2560m [1MB] (1000 in total)		□
Part program storage capacity: 5120m [2MB] (1000 in total)		□
Part program storage capacity: 10240m [4MB] (1000 in total)		□
Part program storage capacity: 20480m [8MB] (1000 in total)		□
Data server: ATA card(4GB)		□
Spindle contour control(Cs contour control)		□
Tool position offset		□
3-dimensional cutter compensation		□
Tool offset sets: 200 sets in total PK		□
Tool offset sets: 400 sets in total		□
Tool offset sets: 499 sets in total		□
Tool offset sets: 999 sets in total		□
Addition of workpiece coordinate system(48 sets in total): G54.1 P1 to P48 PK		□
Addition of workpiece coordinate system(300 sets in total): G54.1 P1 to P300		□
Machining time stamp		□
Optional block skip: Total 9		□
Tool retract and return		□
Sequence number comparison and stop		□
Manual handle interruption		□
Programmable mirror image PK		□
Optional chamfering / corner R		□
Custom macro PK		□
Interruption type custom macro		□
Addition of custom macro common variables: 600		□
Figure copy		□
Coordinate system rotation: G68, G69		□
Scaling: G50, G51		□
Chopping (Axis control by PMC)		□
Playback		□
Automatic tool length measurement: G37 / G37.1		□
Tool life management: 256 sets in total PK		□
Addition of tool life management sets: 1024 sets in total		□
High-speed skip		□
Run hour and parts count display PK		□
Manual Guide i (Milling cycle)		□
RS232C interface: RS232C-1CH		□

Original OKK Software	
Machining support integrated software (incl. Help guidance, etc.)	STD
Tool support	STD
Program Editor	STD
EasyPRO	STD
Work Manager	OP
HQ control	STD
Hyper HQ control mode B	STD
HQ tuner (Hyper HQ control is also needed)	OP
NC option package (including the items with "PK")	OP
Special canned cycle (including circular cutting)	OP
Cycle Mate F	OP
High-speed pattern macro	OP
Tool failure detection system (Soft CCM)	OP
Adaptive control (Soft AC)	OP
Automatic restart at tool damage	OP

CONTROLLER
Neomatic 750

Standard Specification	VC-X350 / VC-X500 / VP9000-5AX	VM-X5
	Neomatic 750	
No. of controlled axes : 5 (X, Y, Z, A, C) (X, Y, Z, A, B) ※1	○	○
No. of simultaneously controlled axes : 5 axes	○	○
Least input increment : 0.001mm / 0.0001"	○	○
Least control increment: 1nm	○	○
Max. programmable dimension: ±99999.999mm /± 9999.9999°	○	○
Absolute / Incremental programming: G90 / G91	○	○
Decimal point input Ⅰ / Ⅱ	○	○
Inch / Metric conversion: G20 / G21	○	○
Program code: ISO / EIA automatic discrimination	○	○
Program format: Meldas standard format (M2 format needs to be instructed)	○	○
Positioning: G00	○	○
Linear interpolation: G01	○	○
Circular interpolation: G02 / G03(CW / CCW) (including Radius designation)	○	○
Cutting feed rate: 5.3-digit F-code, direct command	○	○
One digit F-code feed	○	○
Dwell: G04	○	○
Manual handle feed: Manual pulse generator 1 set(0.001, 0.01, 0.1mm)	○	○
Rapid traverse override: 0 / 1 / 10 / 25 / 50 / 100%	○	○
Cutting feed rate override: 0 to 200%(every 10%)	○	○
Feed rate override cancel: M49 / M48	○	○
Rigid tap cycle: G84, G74	○	○
Part program storage capacity: 160m [60KB]	○	○
No. of registered programs: 200	○	○
Part program editing	○	○
Background editing	○	○
Buffer modification	○	○
Color touch panel LCD (15" LCD VC-X350, VC-X500, VM-X5 / 10.4" LCD VP9000-5AX)	○	–
Integrating time display	○	○
Clock function	○	○
User definable key	○	○
MDI (Manual Data Input)operation	○	○
Menu list	○	○
Parameter/Operation/Alarm guidance	○	○
Ethernet interface	○	○
IC card/USB memory interface	○	○
IC card driving	○	○
Hard disk driving	○	○
Spindle function: 5-digit S-code direct command	○	○
Spindle speed override: 50 to 150%(every 5%)	○	○
Tool function: 4-digit T-code direct command	○	○
ATC tool registration	○	○
Miscellaneous function: 3-digit M-code programming	○	○
Multiple M-codes in 1 block: 3 codes(Max. 20 settings)	○	○
Tool length offset: G43, G44/G49	○	○
Tool position offset: G45 to G48	○	○
Cutter compensation: G38 to G42	○	○
Tool offset sets: 200 sets	○	○
Tool offset memory Ⅱ: tool geometry and wear offset	○	○
Manual reference position return	○	○
Automatic reference position return: G28 / G29	○	○
2nd to 4th reference position return: G30 P2 to P4	○	○
Reference position return check: G27	○	○
Automatic coordinate system setting	○	○
Coordinate system setting: G92	○	○
Selection of machine coordinate system setting: G53	○	○
Selection of workpiece coordinate system setting: G54 to G59	○	○
Local coordinate system setting: G52	○	○
Program stop: M00	○	○
Optional stop: M01	○	○
Optional block skip: /	○	○
Dry run	○	○
Machine lock	○	○
Z-axis feed cancel	○	○
Miscellaneous function lock	○	○
Program number search	○	○
Sequence number search	○	○
Program restart	○	○
Cycle start	○	○
Auto restart	○	○
Single block	○	○
Feed hold	○	○
Manual absolute on / off parameter	○	○
Machining time computation	○	○
Automatic operation handle interruption	○	○
Manual numerical command	○	○
Sub program control	○	○
Canned cycle: G73, G74, G76, G80 to G89	○	○
Linear angle designation	○	○
Circular cutting	○	○
Mirror image function: Parameter	○	○
Mirror image function: G code	○	○
Variable command: 200 sets	○	○
Automatic corner override	○	○
Exact stop check / mode	○	○
Programmable data input: G10 / G11	○	○
3D solid program check	○	○
Graphic display check	○	○
Backlash compensation	○	○
Memory pitch error compensation	○	○
Manual tool length measurement	○	○
Emergency stop	○	○
Data protection key	○	○

Standard Specification	VC-X350 / VC-X500 / VP9000-5AX	VM-X5
	Neomatic 750	
NC alarm display	○	○
Machine alarm message	○	○
Stored stroke limit Ⅰ / Ⅱ	○	○
Load monitor	○	○
Self-diagnosis	○	○
Absolute position detection	○	○
Tool center point control for 5 axis machining	○	○
Inverse time feed	○	○
Unidirectional positioning: G60	○	○
Programmable coordinate system rotation:G68, G69 / G68.1, G69.1 PK	○	OP
Inclined surface machining command	OP	○
Tool handle feed	–	○
Tool length compensation along tool vector	–	○

Optional Specification		
Program format: M2 / M0 format	□	□
Helical interpolation PK	□	□
Cylindrical interpolation	□	□
Hypothetical axis interpolation	□	□
Spiral/Conocal interpolation	□	□
NURBS interpolation	□	□
Handle feed 3 axes(Standard pulse handle is removed)	□	□
Part program storage capacity:320m [125KB] (200)	□	□
Part program storage capacity:600m [250KB] (400)	□	□
Part program storage capacity:1280m [500KB] (1000) PK	□	□
Part program storage capacity:2560m [1MB] (1000)	□	□
Part program storage capacity:5120m [2MB] (1000)	□	□
Computer link B: RS232C	□	□
Spindle contour control (Spindle position control)	□	□
3-dimensional cutter compensation	□	□
Tool offset sets: 400 sets	□	□
Tool offset sets: 999 sets	□	□
Extended workpiece coordinate system selection (48 sets): G54.1 P1 to P48 PK	□	□
Extended workpiece coordinate system selection (96 sets): G54.1 P1 to P96	□	□
Optional block skip: Total 9	□	□
Tool retract and return	□	□
Sequence number comparison and stop	□	□
Corner chamfering / corner R: Insert into straight line-straight line / straight line-circle arc PK	□	□
User macro and user macro interruption PK	□	□
Variable command: 300 sets in total	□	□
Variable command: 600 sets in total PK	□	□
Pattern rotation	□	□
Parameter coordinate system rotation PK	□	□
Special canned cycles: G34 to G36, G37.1 / G34 to G37	□	□
Scaling: G50, G51	□	□
Chopping function	□	□
Playback	□	□
Skip function: G31 PK	□	□
Automatic tool length measurement: G37 / G37.1	□	□
Tool life management Ⅱ: 200 sets PK	□	□
Additional tool life management sets: 400 in total	□	□
Additional tool life management sets: 600 in total	□	□
Additional tool life management sets: 800 in total	□	□
Additional tool life management sets: 1000 in total	□	□
External search (Standard for the machine with APC)	□	□
RS232C interface: RS232C-1CH	□	□

Original OKK Software		
Machining support integrated software (incl. Help guidance, etc.)	STD	STD
Tool support	STD	STD
Program Editor	STD	STD
EasyPRO	STD	STD
A5 system	OP※2	–
Work Manager	OP	OP
HQ control	STD	STD
Hyper HQ control mode Ⅱ	STD	STD
HQ tuner (Memory consumption : 4m)	OP	OP
NC option package (including the items with "PK")	OP	OP
Multi-Facer Ⅱ(5-axis Processing Software)	STD	–
Cycle Mate	OP	OP
High-speed pattern macro	OP	OP
Soft Scale Ⅱm	STD	–
Soft Scale Ⅲ	–	STD
Touch sensor T0 software	OP	–
Tool failure detection system(Soft CCM)	OP	OP
Adaptive control (Soft AC)	OP	OP
Automatic restart at tool damage	OP	OP

※1 VM-X5

※2 To be provided to the machines ordered in and after 2014 year