

OKK

100 Years of Reliability & Precision

OKK CORPORATION

5-axis Control Vertical Machining Center

VC-X
SERIES



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

VC-X350



Specifications

VC-X350

Travel distance

(X×Y×Z)

600×430×460mm (23.62"×16.93"×18.11")

(A×C)

-120°~+30°×360°

Table size

φ350mm (φ13.78")

Number of stored tools

20tools

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-X500



Machine picture includes optional accessories.

Specifications

VC-X500

Travel distance

(X×Y×Z)

700×850×610mm (27.56"×33.46"×24.02")

(A×C)

-120°~+30°×360°

Table size

500×500mm (19.69"×19.69")

Number of stored tools

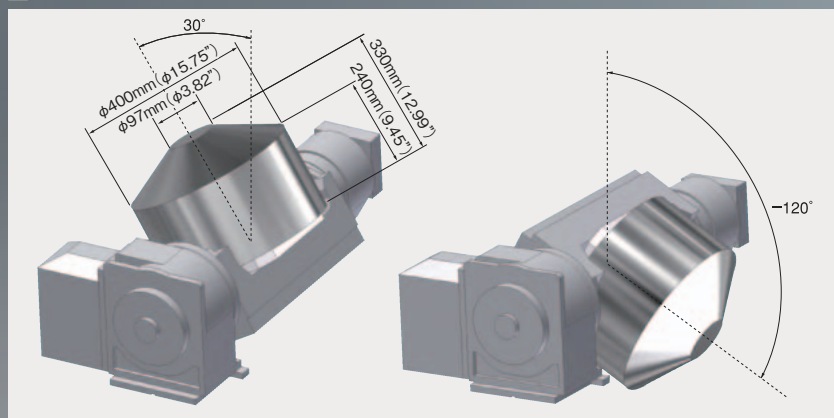
40tools

VC-X350

Compact machine with powerfully smooth feed

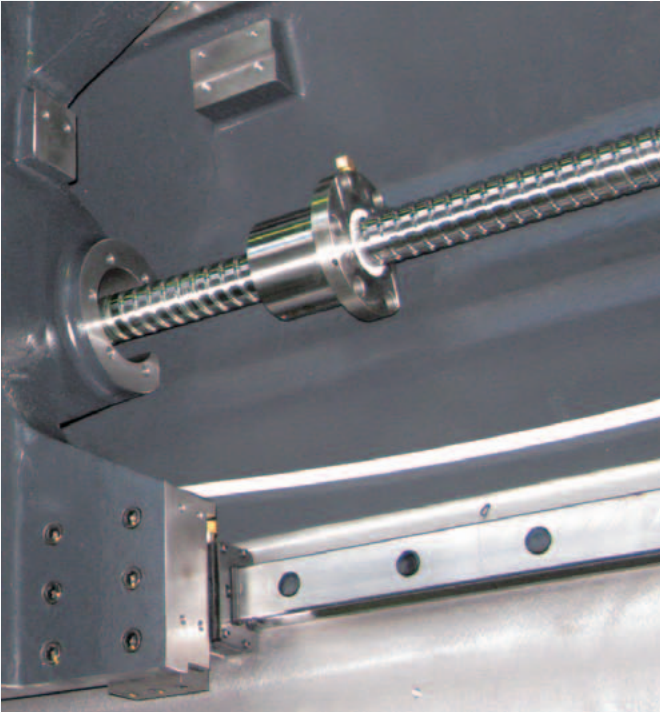


■ Maximum dimensions loadable on table



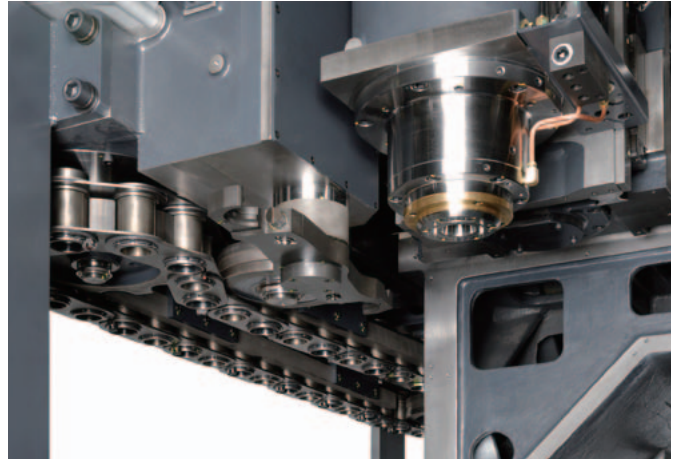
Powerfully Smooth Feed

Utilizing the larger than normal linear roller guides has doubled the guide-way rigidity. The high-rigidity guide combined with the large-diameter ball screws contributes to a vast improvement in cutting performance.



ATC [Automatic Tool Changer]

Consistent tool change operation and superior durability are ensured by use of OKK's original proven cam-controlled high-speed synchronized tool changer.



Environment-friendly eco design

Extending the maintenance period

Maintenance is extended to a long period by the using self-lubricated sealed ball screws and roller guides which also do not contribute any contaminating oil.

ECO sleep function

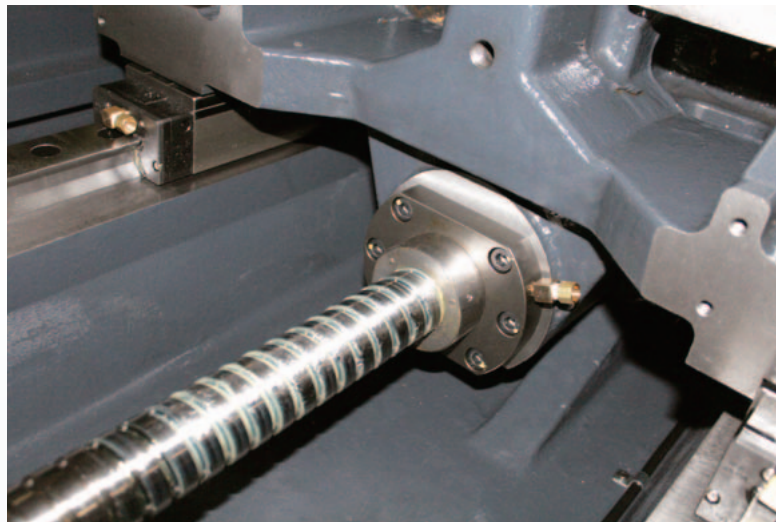
If the machine stands by for the period exceeding the specified time period, the machine's present mode is switched to a power-saving mode to reduce wasteful consumption of power, air and so on. When the power-saving mode is active, the equipment such as servos and chip conveyors are turned off. It is cancelled automatically when the setup operation is completed i.e. when the doors are closed.

LED light [Option]

LED light is used to reduce heat generated by the lighting system and contribute to power saving.

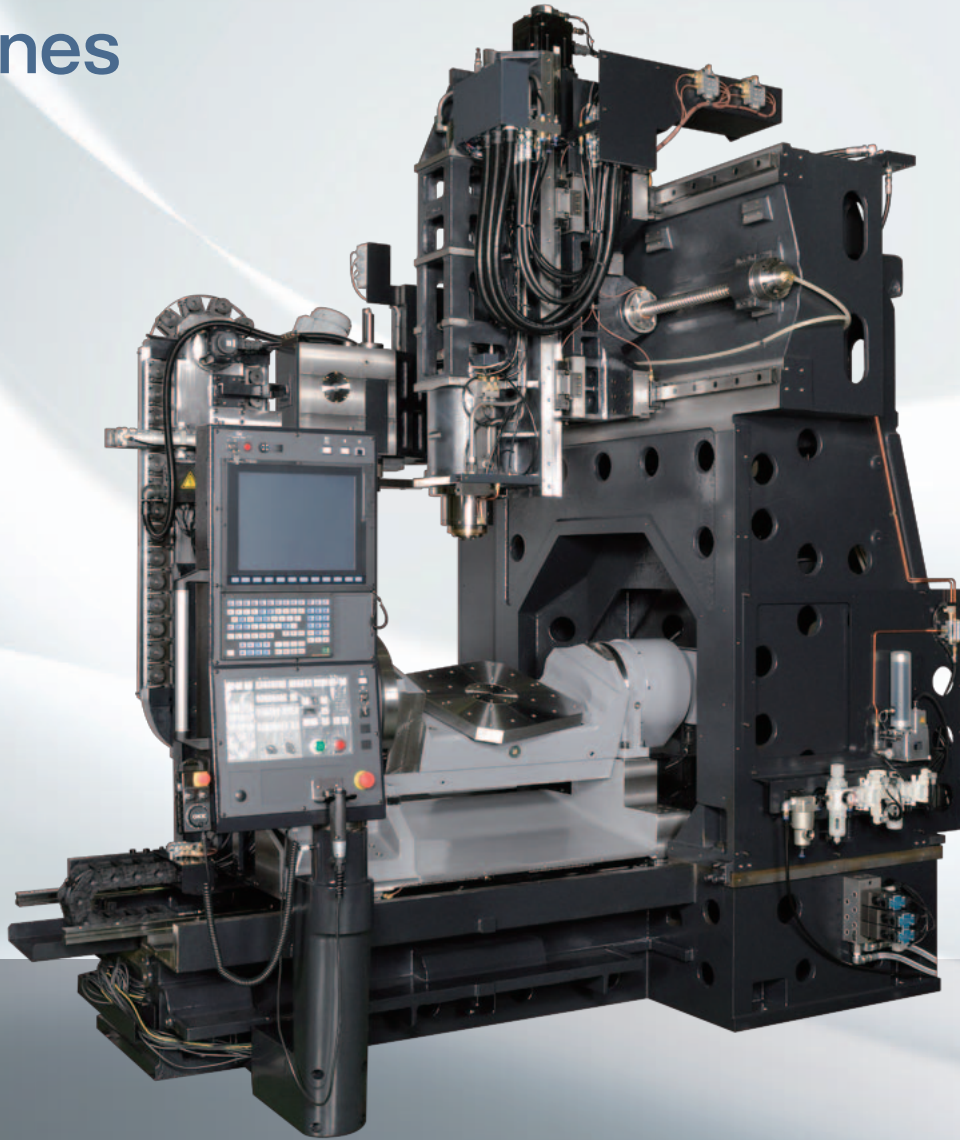
Provision of inverter-controlled hydraulic unit [Option]

An optional inverter-controlled hydraulic unit can be provided for the 5-axis table and tool clamp/unclamp mechanism which will reduce power consumption during non-operation.

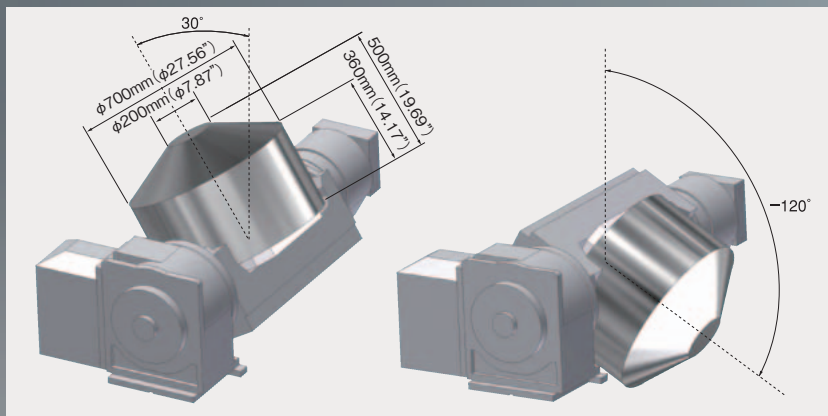


VC-X500

Highest-level space saving and loadable workpieces size among the same-class machines



Maximum dimensions loadable on table



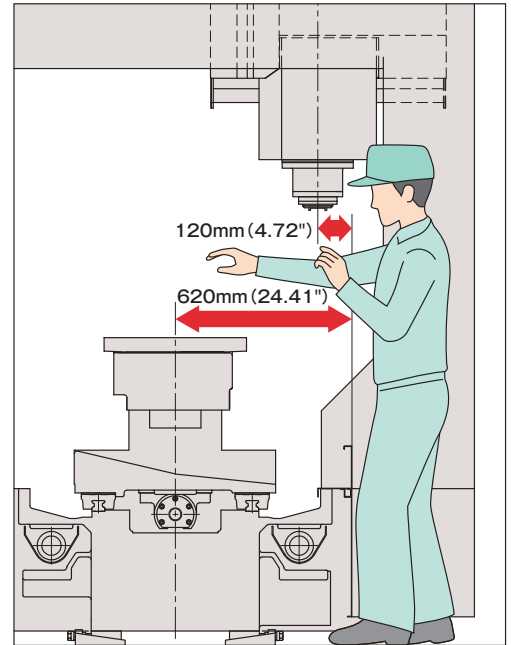
Large workpieces can be handle even though the required floor space is as small as 3300×2450mm (129.92"×96.46"). (60% up graded workpieces size compare with our company's VP600-5AX)

Improved accessibility



Distance of front cover to spindle center **120mm (4.72")**

Distance of front cover to table center **620mm (24.41")**

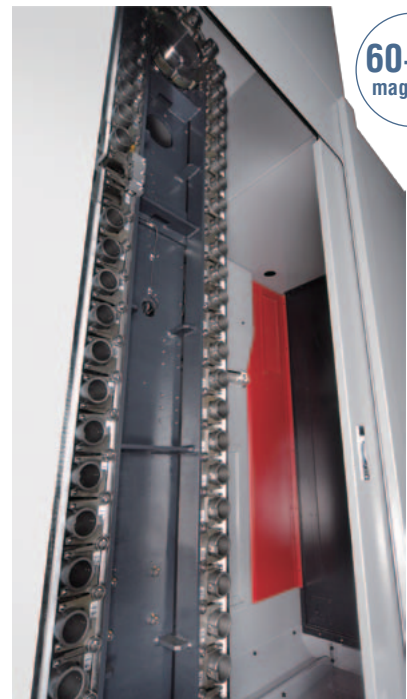


Tool magazine

Standard specification is the 40-tool storage magazine. The required floor space is not increased when choosing the optional 60-, 80- or 120-tool magazines.



40-tool magazine



60-tool magazine

VC-X350L VC-X500L

Equipped with Direct-Drive rotary table!
Next-generation 5-axis machine that
enables turning!



Specifications

VC-X350L

Rapid speed

(X×Y×Z)

50×50×36m/min (1969×1969×1417ipm)

(A×C)

44.4×100min⁻¹

in the turning function mode

C-axis:1000min⁻¹

Tool shank (nominal number)

BT40 Dual contact tool

Specifications

VC-X500L

Rapid speed

(X×Y×Z)

48×48×32m/min (1890×1890×1260ipm)

(A×C)

25×100min⁻¹

in the turning function mode

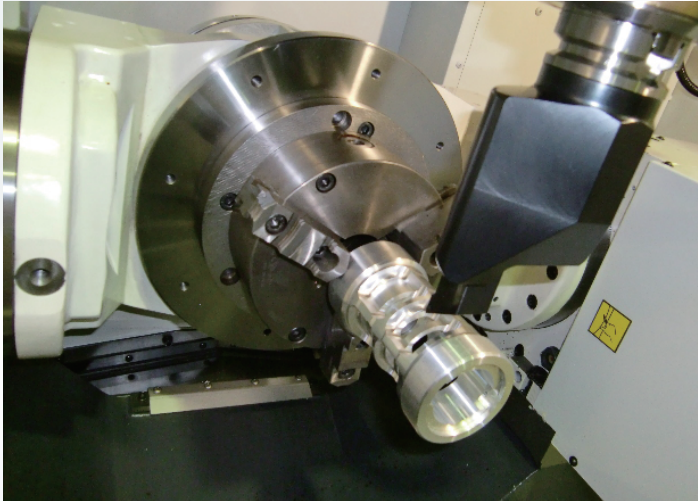
C-axis:1000min⁻¹

Tool shank (nominal number)

BT40 Dual contact tool

Equipped with turning function

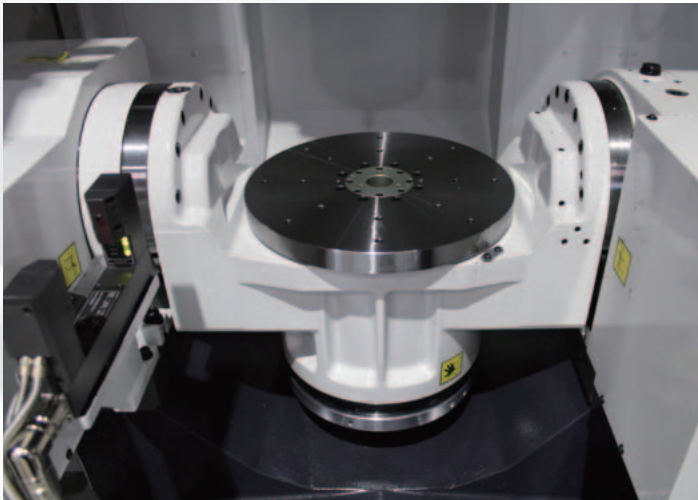
The maximum spindle speed of 1000 min⁻¹ has been realized for the C-axis and hydraulic disc clamp method is employed for the main spindle, which enables stable turning.



Combined with the main unit performance of the base machine, the Direct-Drive rotary table and unique clamp mechanism of the main spindle produce sufficient turning performance in terms of accuracy and rigidity.

Rotary table exclusive to VC-X350L, VC-X500L

The 1500 N·m (1106 ft·lbs) hydraulic clamp on the inclined axis (A-axis) and the 500 N·m (369 ft·lbs) air clamp on the rotational axis (C-axis) provide high-accuracy 5-axis machining allowing complex part geometries to be machined in a single operation.



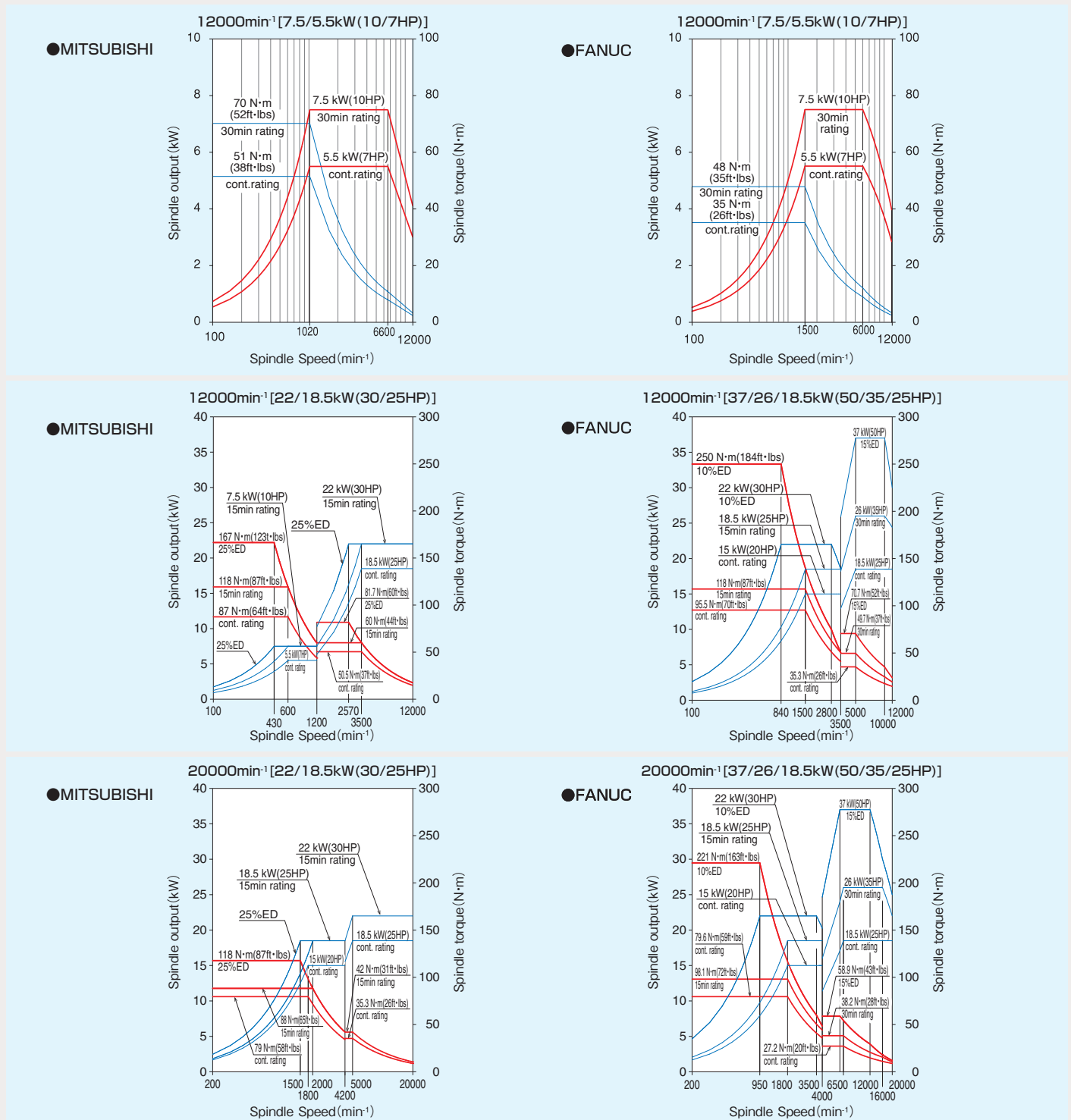
The standard specification includes three ports for supplying hydraulic/pneumatic pressure. They allow preparing for the jig by just adding valves and hoses. We can increase flexibility of your choice by adding the Automatic Workpiece Changers made by the companies such as System 3R International and EROWA so that we meet users' requirements regarding workpiece sizes, the number of pallets, etc.

The self-lubricating ball screws and roller guide make the machine maintenance free for a long period of time and free from oil contamination.

Standard NC functions for VC-X350L, VC-X500L

- Constant surface speed control
- Multi spindle control
- Turning G code system B/C
- Multiple repetitive cycles
- Tool geometry/wear compensation
- Tool offset for Milling and Turning function
- Turning/Machining G code system switching function

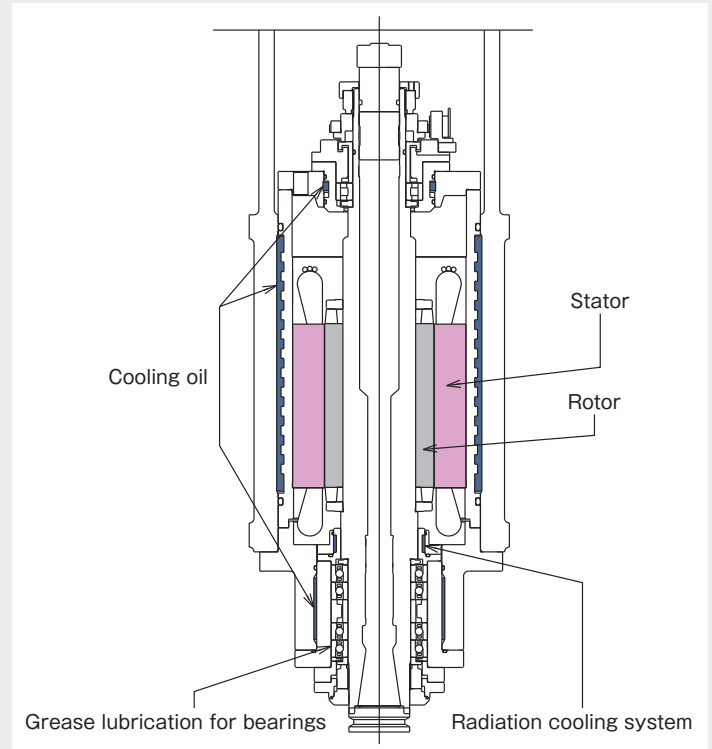
Spindle output and Torque diagram



		12000min ⁻¹	12000min ⁻¹	20000min ⁻¹
VC-X350	MITSUBISHI	Standard: 7.5/5.5kW (10/7HP)	Option: 22/18.5kW(30/25HP)	Option: 22/18.5kW(30/25HP)
VC-X350L	FANUC	Standard: 7.5/5.5kW (10/7HP)	Option: 37/26/18.5kW(50/35/25HP)	Option: 37/26/18.5kW(50/35/25HP)
VC-X500	MITSUBISHI	—	Standard: 22/18.5kW(30/25HP)	Option: 22/18.5kW(30/25HP)
VC-X500L	FANUC	—	Standard: 37/26/18.5kW(50/35/25HP)	Option: 37/26/18.5kW(50/35/25HP)

Standard provision of 12000min⁻¹ 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 12000min⁻¹. 22/18.5kW (30/25HP) high-power spindle or high-speed spindle of 20000min⁻¹ can also be adopted optionally.



Accuracy

■ Positioning accuracy (when Linear scale is not used) mm (inch)

Positioning accuracy	X,Y,Z : ±0.0020 (±0.00008")/full length
Positioning repeatability	X,Y,Z : ±0.0010 (±0.00004")/full length

(OKK tolerance)

■ Positioning accuracy (when Linear scale is used) mm (inch)

Positioning accuracy	X,Y,Z : ±0.0010 (±0.00004")/full length
Positioning repeatability	X,Y,Z : ±0.0005 (±0.00002")/full length

(OKK tolerance)

■ Positioning accuracy (when Rotary encoder is not used) mm (inch)

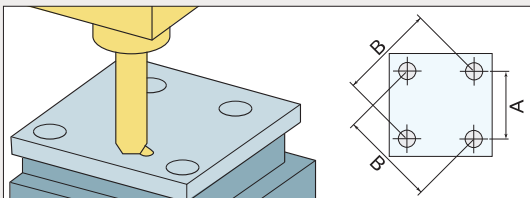
Positioning accuracy	C-axis : ±10sec
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(OKK tolerance)

■ Positioning accuracy (when Rotary encoder is used) mm (inch)

Positioning accuracy	A-axis : ±5sec C-axis : ±3sec
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(OKK tolerance)



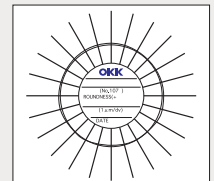
A=150 (5.91"), B=212.132 (8.35")

■ Positioning machining accuracy mm (inch)

Item	OKK tolerance	Example record	
		VC-X350	VC-X500
Axial direction	0.015 (0.00059")	0.003 (0.00012")	0.003 (0.00012")
Diagonal direction	0.015 (0.00059")	0.005 (0.00020")	0.005 (0.00020")
Difference in diameter	0.010 (0.00039")	0.005 (0.00020")	0.005 (0.00020")

■ Circular machining accuracy mm (inch)

Item	OKK tolerance	Example record	
		VC-X350	VC-X500
Circularity	0.005 (0.00020")	0.0042 (0.00017")	0.0042 (0.00017")



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.

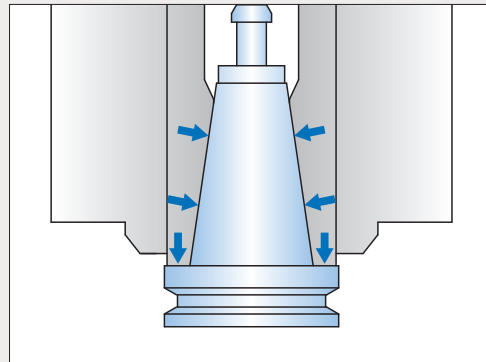
Dual contact tool BT type

VC-X350 : Option

VC-X350L, VC-X500, VC-X500L : Standard

Improvements in rigidity of tools have been achieved by contact faces of spindle-nose and tool holders flange. This has a great effect not only for heavy load machining but also high speed machining.

(The performance is different due to the cutting tools and cutting conditions.)



LED light

VC-X350, VC-X350L, VC-X500, VC-X500L : Standard

LED light is used to reduce heat generated by the lighting system and contribute to power saving.

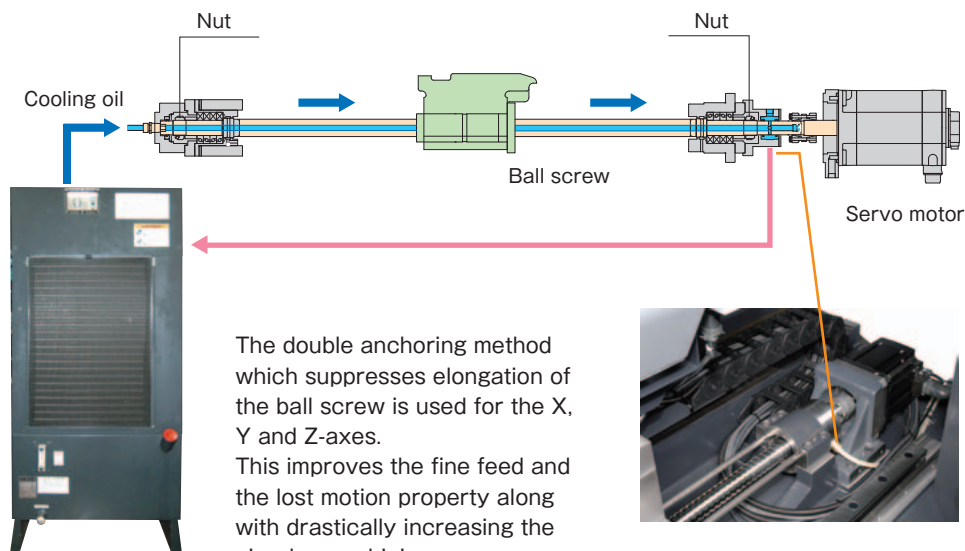


Core chilled ball screw and Double-anchor pre-tension system

VC-X350, VC-X350L : Option

VC-X500, VC-X500L : Standard

Lubricating oil temperature controller



The X, Y and Z-axes use core chilled ball screws. This suppresses thermal displacement and helps maintain high accuracy for many hours of operation by circulating the temperature-controlled oil.

The double anchoring method which suppresses elongation of the ball screw is used for the X, Y and Z-axes.

This improves the fine feed and the lost motion property along with drastically increasing the circular machining accuracy.

Improved reliability and Operating efficiency

Maintenance

Daily-inspected equipment are installed together in one place to improve the operating efficiency.



Photo is VC-X500.

Coil-type chip conveyors (Standard)

Thorough chip processing measures

Standard machine has two coil-type chip conveyors. (VC-X350, VC-X350L and VC-X500)
The coil-type chip conveyors are capable of removing a large amount of chips from the machine promptly.

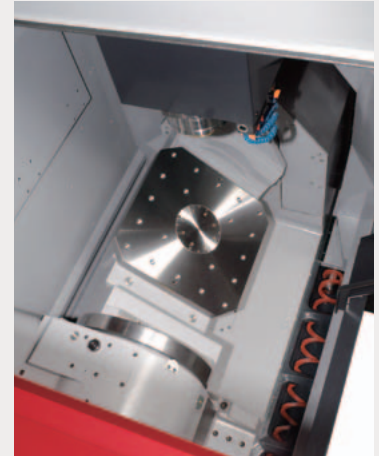














Photo is VC-X500.

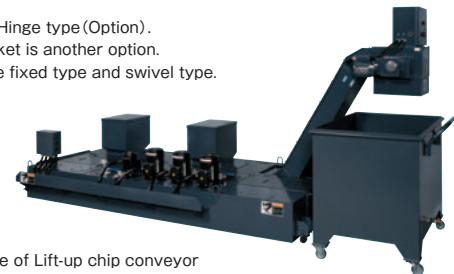
Lift-up Chip Conveyor (Option)

Suitable Lift-up Chip Conveyor according to Type of Chips ◎ : Most suitable; ○ : Usable; △ : Conditionally usable; × : Not usable; - : Not applicable

Type of chip conveyor		Hinged type		Scraper type		Magnet scraper type		Scraper type with drum filter		Magnet scraper type with drum filter			
		Use	Not use	Use	Not use	Use	Not use	Use	Not use	Use	Not use		
Type of chips	Magnetizable chips	Steel	Short curl 	◎	◎	○	○	◎	◎	○	-	◎	-
			Spiral 	◎	◎	△※2	△※2	△※2	△※2	×	-	×	-
			Long 	◎	◎	×	×	×	×	×	-	×	-
			Needle shape 	×	△※1	×	○	○※3	○	○	-	◎	-
			Powder or small lump 	×	△※1	×	○	○※3	○	○	-	◎	-
	Non-magnetizable chips	Aluminum	Needle shape 	×	△※1	×	○	○※3	○	-	◎	-	
			Powder or small lump 	×	△※1	×	○	○※3	○	△※3	-	◎	-
			Short curl 	×	◎	△※4	○	-	-	◎	-	◎	-
			Spiral 	○	◎	○	○	-	-	△※5	-	△※5	-
			Long 	○	◎	○	○	-	-	△※5	-	△※5	-
Needle shape 	×	△※1	×	○	-	-	◎	-	◎	-			
Powder or small lump 	×	△※1	×	○	-	-	◎	-	◎	-			

- ※1 Minute chips can enter the conveyor casing through a gap between hinged plates. Therefore, cleaning inside the conveyor frequently is needed.
- ※2 Long chips can easily be caught by a scraper. Therefore, measures for shortening the chips such as the step feed and removing the caught chips are needed.
- ※3 If the coolant flow rate is large, chips can flow out of the conveyor casing and cause clogging of filters. Therefore, combined use of a magnet plate is recommended.
- ※4 If the coolant flow rate is large, chips can flow out of the conveyor casing and cause clogging of filters. Therefore, cleaning filters frequently is needed.
- ※5 Long chips can easily be caught by a scraper. Therefore, removing them regularly is needed. Drum filters are damaged if they are not removed.

Photo is Hinge type (Option).
Chip bucket is another option.
There are fixed type and swivel type.



※Example of Lift-up chip conveyor

Sample workpieces

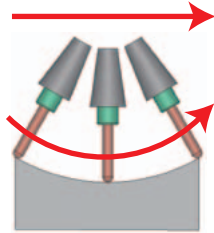


5-axis support technologies

5-axis Control Function

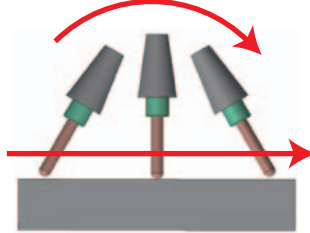
Tool center point control (Standard)

Conventional movement



Produces errors due to movement of rotation axis

This function's movement



Loci of the tool tip as instructed

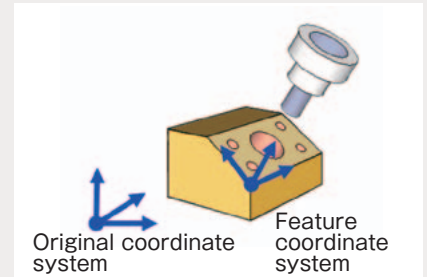
Tool Center Point Control simplifies 5-axis machining by controlling tool movement at the tool center, even if the tool axis direction changes. Tool tip speed is maintained and high-quality surfacing achieved.

5-axis indexing function

Inclined surface indexing (machining) command (Option)

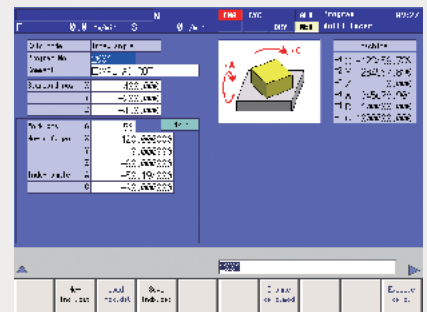
The inclined surface indexing (machining) commands allow easy setting the surface to be machined by using the newly defined coordinate system (feature coordinate system).

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-FACERII (Standard)

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-FACERII that enables creating index programs easily without using calculators.

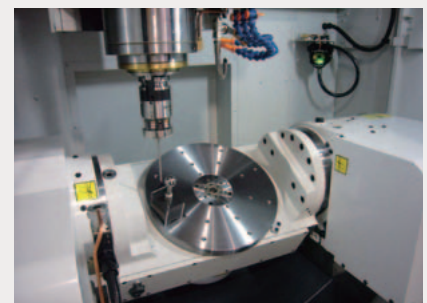


A⁵ system (Option)

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.



SPECIFICATIONS

Main Specifications

Item	Unit	Specification			
		VC-X350	VC-X350L		
Travel	Travel on X axis (Spindle head right / left)	mm	600 (23.62")		
	Travel on Y axis (Table back / forth)	mm	430 (16.93")		
	Travel on Z axis (Spindle head up / down)	mm	460 (18.11")		
	Travel on A axis (Table tilting)	deg	-120~+30		
	Travel on C axis (Table turning)	deg	360		
	Distance from table top surface to spindle nose	mm	70~530 (2.76"~20.87")	110~570 (4.33"~22.44")	
	Distance from column front to spindle center	mm	520 (20.47")		
Table	Table work surface area	mm	φ350 (φ13.78")		
	Max. workpiece weight loadable on table	kg	200 (441 lbs)	100(220 lbs)*1	
	Table work surface configuration (nominal screw-hole size × number of holes)		M10×16 holes		
	Distance to the table work surface from the floor	mm	1080 (42.52")	1120 (44.09")	
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	φ65 (φ2.56")		
Feed Rate	Rapid traverse rate	X, Y and Z axes	m/min XY:50 (1969 ipm) Z:36 (1417 ipm)		
		A and C axes	A:44.4 C:66.7	A:44.4 C:100	
	Cutting feed rate	X, Y and Z axes	mm/min 1~36000 (0.04~1417 ipm)*2		
		A and C axes	A:44.4 C:66.7	A:44.4 C:100	
Automatic Tool Changer	in the turning function mode	min ⁻¹	-	C:1000	
	Tool shank (nominal number)		JIS B6339 BT40	BT40 (Dual-contact BT type)	
	Pull stud (nominal number)		MAS403 P40T-1		
	Number of stored tools	tool	20		
	Max. tool diameter	mm	φ125 (φ4.92")		
	Max. tool length (from the gauge line)	mm	300 (11.81")		
	Max. tool weight	kg	7 (15 lbs)		
	Tool selection method		Memory random method		
	Tool exchange time (tool-to-tool)	sec	1.3		
	Tool exchange time (cut-to-cut)	sec	4.5*3		
Motors	for Spindle (30-min rating/continuous rating)	kW	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)	-
				FANUC XY:3 (4 HP) Z:4 (5.4 HP)	
	for Feed axes	A and C axes	kW	MITSUBISHI A:3.5 (4.7 HP) C:2.2(3 HP)	-
			FANUC A:4.5(6 HP) C:2.7(3.6 HP)	FANUC A:4.5 (6 HP) C:6(8 HP)	
Required Power Supply	Power supply	kVA	MITSUBISHI:33 FANUC:32		
	Supply voltage × supply frequency	V×Hz	200±10%×50/60±1		
	Compressed air supply pressure	MPa	0.5 (73 psi)*5		
	Compressed air supply flow rate	L/min(ANR)	200 (53 gpm)*6		
Tank Capacity	Coolant tank	L	280 (74 gal)		
	Spindle head cooling oil tank	L	50 (13 gal)		
	Hydraulic unit tank	L	20 (5 gal)		
Machine Size and Required Floor Space	Machine height from the floor surface	mm	3070 (120.87")	3150 (124.02")	
	Floor space required for operation (width × depth)	mm	1895×3440 (74.61"×135.43")		
	Machine weight	kg	8500 (18700 lbs)		
	Temperature of operation environment	°C	5~40		
Humidity of operation environment	%	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 thr 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	Qty	Remark
Compatibility with Dual contact tool*1	1 set	BT type
Compatibility with turning specification*1	1 set	C axis:1000min ⁻¹
Lighting system	1 set	Fluorescent light ×1
Coolant unit (Separate coolant tank)	1 set	Tank capacity:280L (74 gal)
Coil-type chip conveyor	1 set	1 set for each of right and left
Entire machine cover (Splash guard)	1 set	
Slideway protection covers for X and Y axes	1 set	
ATC shutter	1 set	
Spindle head cooling oil temperature controller	1 set	
Hydraulic unit	1 set	
Safety equipment	1 set	Including frontdoor and magazine door electromagnetic lock
Leveling block	1 set	
Parts for machine transfer	1 set	
Automatic power-off unit	1 set	
Rotary encoder	1 set	for A axis (tilting axis) *2 for A axis (tilting axis) and C axis (turning axis) *1
Electric spare parts (fuses)	1 set	
Instruction manual	1 set	
Electrical manuals (operation, maintenance, parts list, hardware diagrams)	1 set	

*1:for VC-X350L only

*2:for VC-X350 only

Optional Accessories

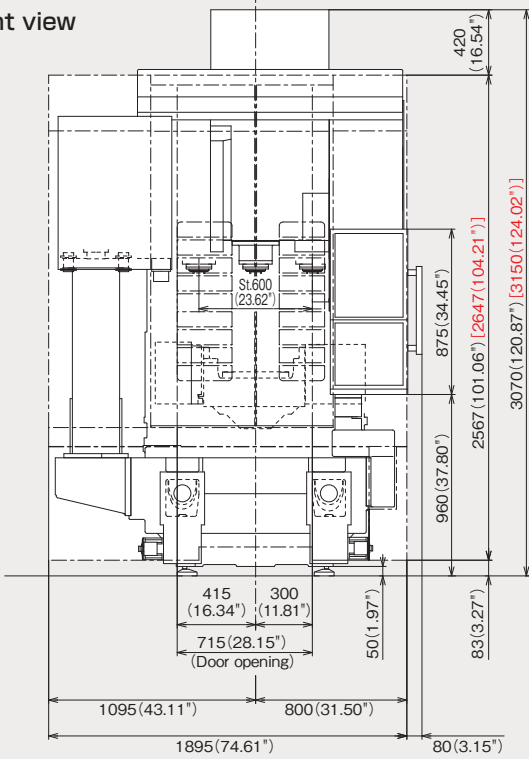
Item	Specification
Compatibility with Dual contact tool	BT type*1, HSK-A63
Spindle motor	12000min ⁻¹ MITSUBISHI 22/18.5kW(30/25HP) FANUC 37/26/18.5kW(50/35/25HP)
	20000min ⁻¹ MITSUBISHI 22/18.5kW(30/25HP) FANUC 37/26/18.5kW(50/35/25HP)
Number of stored tools	30tools, 40tools, 60tools, 80tools,
Linear scale feed back*2	XY-axis / XYZ-axis
Rotary encoder*1	for C axis (turning axis)
Lift-up chip conveyor	Hinged type / Scraper type / Scraper type with floor magnet / Scraper type with dram filter
Flushing chips with coolant	
Compatibility with oil-hole holder	1.1kW(1.5 HP)
Spindle through coolant	2MPa(290 psi) coolant / 7MPa(1015 psi) coolant / with air
Foundation parts	Bond anchoring method
Workpiece flushing equipment	Shower gun type
Oil-mist/air blower	
Air blower	
Signal lamp	Two-lamp type / Three-lamp type (With buzzer / Without buzzer)
Splash guard automatically open / close	Front door
Hydraulic supply ports for fixture	VC-X350:Max.6 ports, VC-X350L:Max.3 ports
Touch sensor system T0	Workpiece measurement, Tool length/diameter measurement
Touch sensor system T1	Workpiece measurement, Tool length measurement, Tool break detection
Lighting system	Fluorescent light ×2, LED light ×1 / ×2

*1:for VC-X350 only

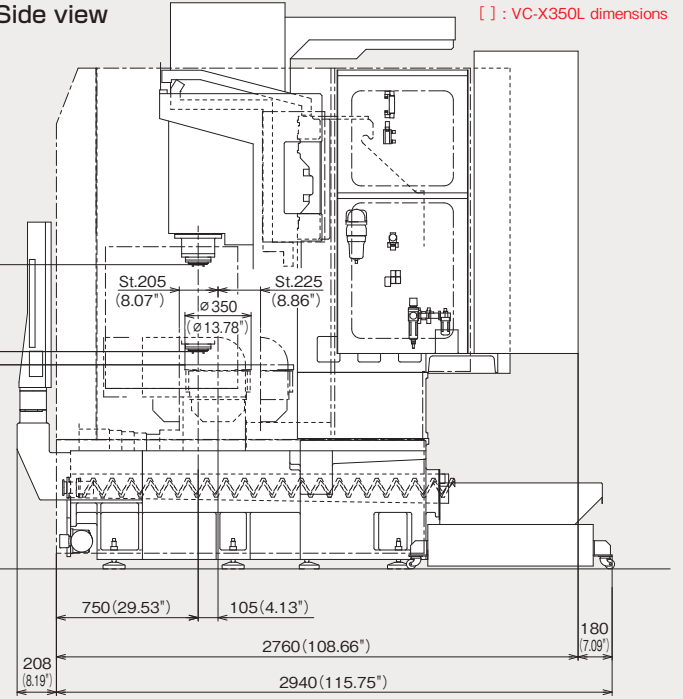
*2:When the linear scale is added, cleanliness of the supplied air should be equivalent to or higher than the classes 1.5.1 specified in ISO 8573-1 / JIS B8392-1 in order to prevent generating problems.

Main dimensions of the machine

Front view

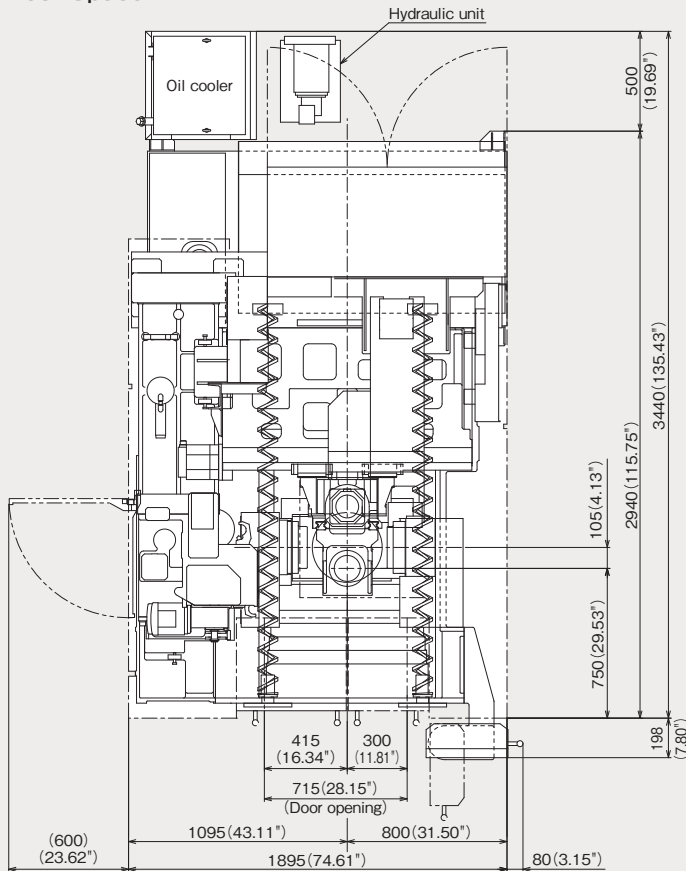


Side view



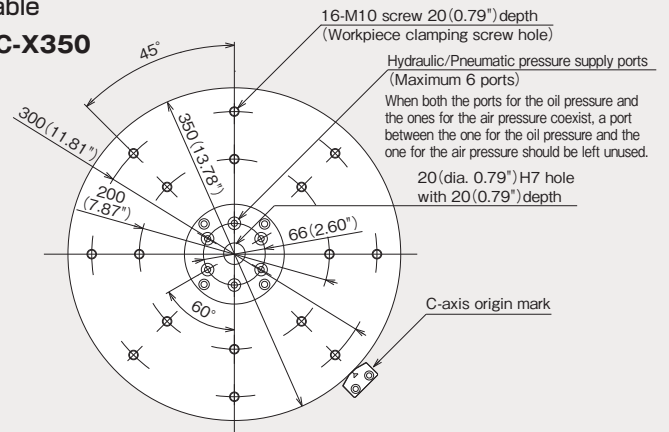
[] : VC-X350L dimensions

Floor Space

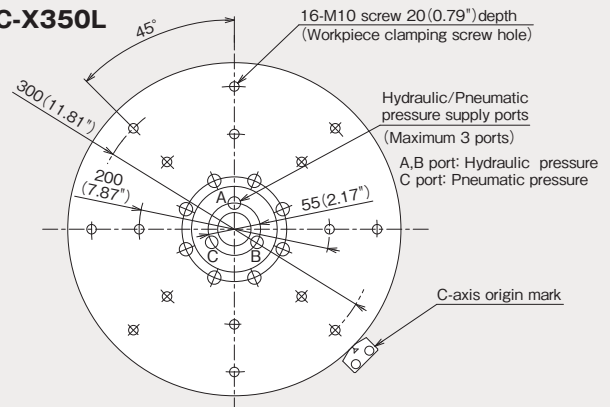


Table

VC-X350



VC-X350L



SPECIFICATIONS

Main Specifications

Item	Unit	Specification		
		VC-X500	VC-X500L	
Travel	Travel on X axis (Table right / left)	mm	700 (27.56")	
	Travel on Y axis (Spindle head back / forth)	mm	850 (33.46")	
	Travel on Z axis (Spindle head up / down)	mm	610 (24.02")	
	Travel on A axis (Table tilting)	deg	-120~+30	
	Travel on C axis (Table turning)	deg	360	
	Distance from table top surface to spindle nose	mm	150~760 (5.91"~29.92")	
	Distance from column front to spindle center	mm	530 (20.87")	
Table	Table work surface area	mm	500×500 (19.69"×19.69")	
	Max. workpiece weight loadable on table	kg	500 (1102 lbs)	
	Table work surface configuration (nominal screw-hole size × number of holes)		M16×20 holes	
	Distance to the table work surface from the floor	mm	1080 (42.52")	
Spindle	Spindle speed	min ⁻¹	100~12000	
	Number of spindle speed change steps		Electric 2-step speed change(MS)	
	Spindle nose (nominal number)		7/24 taper, No.40	
	Spindle bearing bore diameter	mm	φ65 (φ2.56")	
Feed Rate	Rapid traverse rate	X, Y and Z axes	m/min XY:48 (1890 ipm) Z:32 (1260 ipm)	
	Cutting feed rate	A and C axes	min ⁻¹ A:25 C:50	
		X, Y and Z axes	mm/min 1~32000 (0.04~1260 ipm) ^{*2}	
	in the turning function mode	A and C axes	min ⁻¹ A:25 C:50	
Automatic Tool Changer	Tool shank (nominal number)		BT40 (Dual-contact BT type)	
	Pull stud (nominal number)		MAS403 P40T-1	
	Number of stored tools	tool	40	
	Max. tool diameter	mm	φ82 (φ3.23")	
	Max. tool length (from the gauge line)	mm	350 (13.78")	
	Max. tool weight	kg	7 (15 lbs)	
	Tool selection method		Address fixed random method	
	Tool exchange time (tool-to-tool)	sec	2.0	
Motors	for Spindle		MITSUBISHI (15-min rating/continuous rating) 22/18.5(30/25HP)	
			FANUC (15%ED/30-min rating/continuous rating) 37/26/18.5(50/35/25HP)	
	for Feed axes	X, Y and Z axes	kW	MITSUBISHI X:4.5 (6 HP) YZ:3.5 (4.7 HP)
		A and C axes	kW	FANUC X:5.5 (7.4 HP) YZ:4.5 (6 HP)
	for Feed axes	A and C axes	kW	MITSUBISHI A:4.5 (6 HP) C:3.5 (4.7 HP)
			kW	FANUC A:5.5 (7.4 HP) C:4.5 (6 HP)
Required Power Supply	Power supply	kVA	MITSUBISHI:51 FANUC:54 FANUC:46	
	Supply voltage × supply frequency	V×Hz	200±10%×50/60±1	
	Compressed air supply pressure	MPa	220±10%×60±1	
	Compressed air supply flow rate	L/min(ANR)	0.4~0.6 (58~87 psi) ^{*3}	
Tank Capacity	Coolant tank	L	260 (69 gal)	
	Spindle head cooling oil tank	L	50 (13 gal)	
	Hydraulic unit tank	L	20 (5 gal)	
Machine Size and Required Floor Space	Machine height from the floor surface	mm	3495 (137.60")	
	Floor space required for operation (width × depth)	mm	3720×2450 (146.46"×96.46")	
	Machine weight	kg	12000 (26500 lbs)	
	Temperature of operation environment	°C	5~40	
Humidity of operation environment	%	10~90 (No dew)		

*1:Max. inertia is 7.8 kg·m² for turning function.

*2:Under the HQ or Hyper HQ control.

*3: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

Item	Qty	Remark
Compatibility with Dual contact tool	1 set	BT type
Compatibility with turning specification ^{*1}	1 set	C axis:1000min ⁻¹
Lighting system	1 set	LED light ×1
Coolant unit (Separate coolant tank)	1 set	Tank capacity:260L (69 gal)
Coil-type chip conveyor	1 set	1 set for each of front and rear sides
Entire machine cover (Splash guard)	1 set	
Slideway protection covers for X and Y axes	1 set	
ATC shutter	1 set	
Spindle head cooling oil temperature controller	1 set	
Automatic greasing unit	1 set	
Hydraulic unit	1 set	for clamping A/C axis table
Safety equipment	1 set	Including magazine door and operator door electromagnetic lock
Leveling block	1 set	
Parts for machine transfer	1 set	
Automatic power-off unit	1 set	
Rotary encoder	1 set	for A axis (tilting axis) and C axis (turning axis)
Electric spare parts (fuses)	1 set	
Instruction manual	1 set	
Electrical manuals (operation, maintenance, parts list, hardware diagrams)	1 set	

*1:for VC-X500L only

Optional Accessories

Item	Specification
Compatibility with Dual contact tool	HSK-A63
Spindle motor	20000min ⁻¹ MITSUBISHI ^{*1} 22/18.5kW(30/25HP) FANUC 37/26/18.5kW(50/35/25HP)
Number of stored tools	60tools, 80tools, 120tools
Linear scale feed back ^{*2}	XY-axis / XYZ-axis
Lift-up chip conveyor	Hinged type ^{*3} / Scaraper type ^{*3} / Scraper type with floor magnet ^{*3} / Scraper type with dram filter ^{*4}
Compatibility with oil-hole holder	
Spindle through coolant	2MPa(290 psi) coolant / 7MPa(1015 psi) coolant / with air
Workpiece flushing equipment	Shower gun type
Oil-mist/air blower	
Air blower	
Signal lamp	Two-lamp type / Three-lamp type (With buzzer / Without buzzer)
Splash guard automatically open / close	Front door
Hydraulic supply ports for fixture	Max.8 ports
Touch sensor system T0	Workpiece measurement, Tool length/diameter measurement
Touch sensor system T1	Workpiece measurement, Tool length measurement, Tool break detection
T0 soft	
Mist collector	
Foundation parts	Bond anchoring method
Standard tool set	
Color specified by customer	
Lighting system	LED light ×2

*1:for VC-X500 only

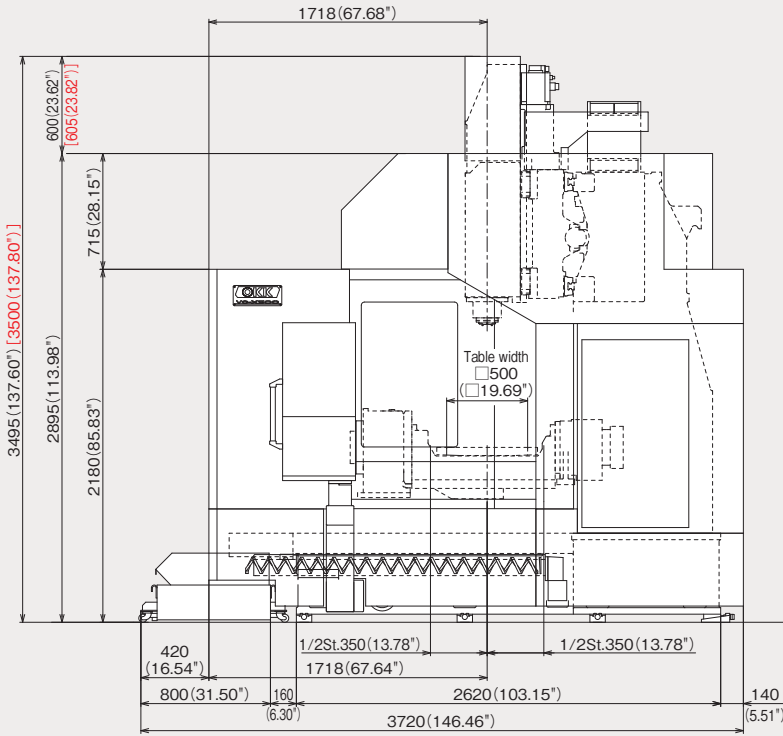
*2:When the linear scale is added, cleanliness of the supplied air should be equivalent to or higher than the classes 1.5.1 specified in ISO 8573-1 / JIS B8392-1 in order to prevent generating problems.

*3:The machine columns should be raised by 30 mm.

*4:The machine columns should be raised by 100 mm.

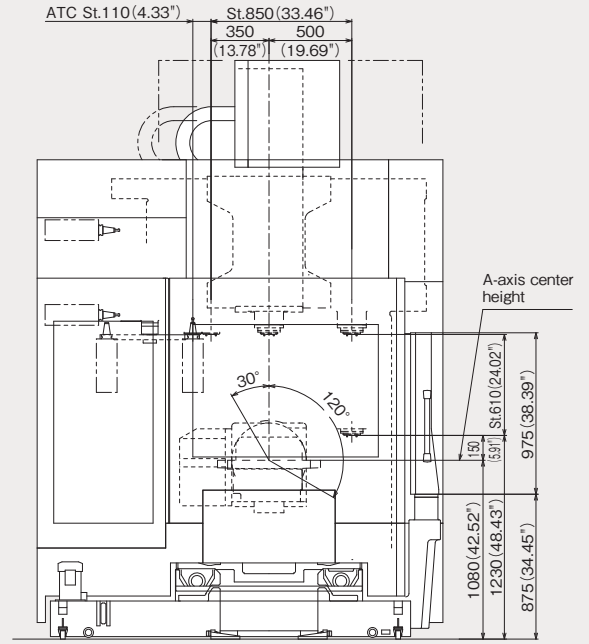
Main dimensions of the machine

Front view

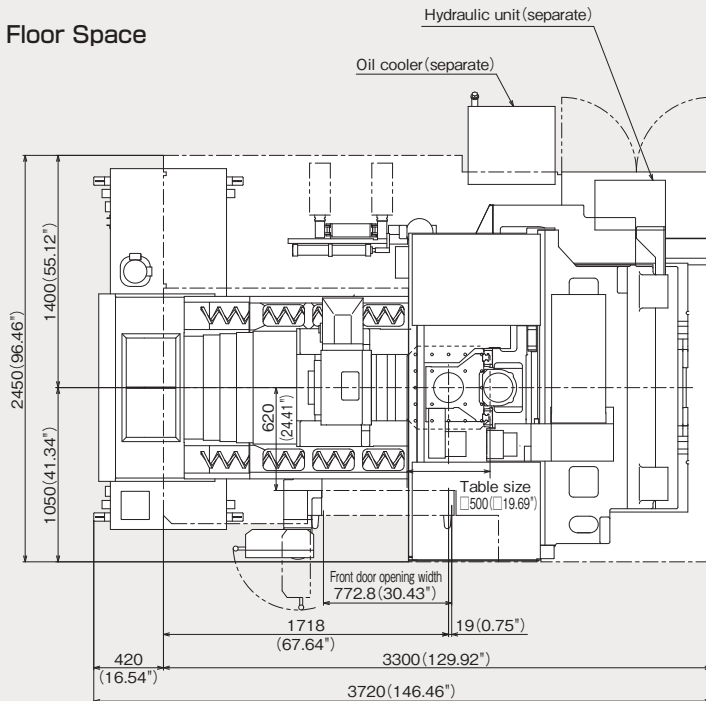


Side view

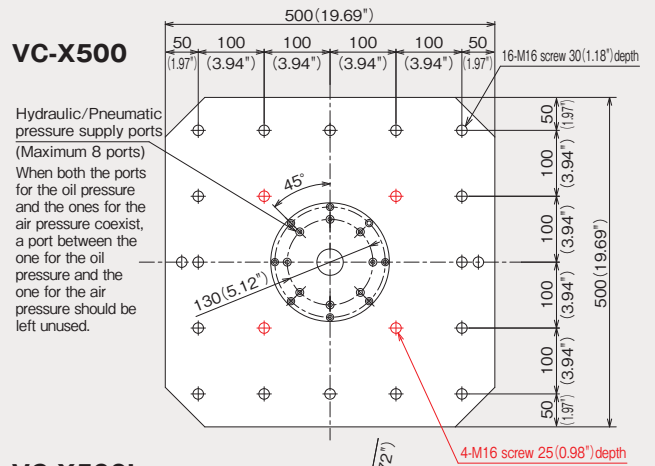
[] : VC-X500L dimensions



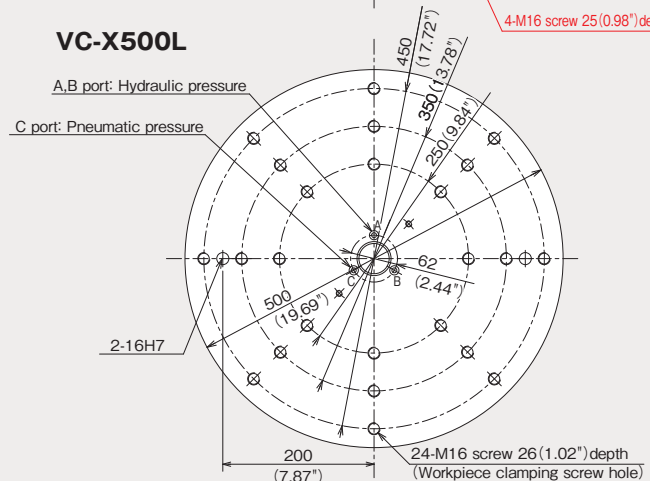
Floor Space



Table



VC-X500L



VC-X350/VC-X350L/VC-X500/VC-X500L CONTROLLER

FANUC Controller F31i-B5

(WindowsCE-installed Open CNC)

Standard Specification	Standard Specification	Optional Specification
No. of controlled axes : 5 (X, Y, Z, A, B)	Auto restart	Part program storage capacity: 20480m [8MB] (1000 in total)
No. of simultaneously controlled axes : 5 axes	Single block	Data server: ATA card (4GB)
Least input increment: 0.001mm / 0.0001"	Feed hold	Spindle contour control (Cs contour control)
Max. programmable dimension: ±999999.999mm / ±39370.0787"	Manual absolute on/off parameter	Tool position offset
Absolute / Incremental programming: G90 / G91	Sub program control	3-dimensional cutter compensation
Decimal point input / Pocket calculator type decimal point input	Canned cycle: G73, G74, G76, G80 to G89	Tool offset sets: 200 sets in total PK1
Inch / Metric conversion: G20 / G21	Mirror image function parameter	Tool offset sets: 400 sets in total
Program code: ISO / EIA automatic discrimination	Automatic corner override	Tool offset sets: 499 sets in total
Program format: FANUC standard format	Exact stop check/mode	Tool offset sets: 999 sets in total
Nano interpolation (internal)	Programmable data input: G10	Addition of workpiece coordinate system (48 sets in total): G54.1 P1 to P48 PK1
Positioning: G00	Graphic display	Addition of workpiece coordinate system (300 sets in total): G54.1 P1 to P300
Linear interpolation: G01	Backlash compensation for each rapid traverse and cutting feed	Machining time stamp
Circular interpolation: G02 / G03 (CW / CCW) (including Radius designation)	Smooth backlash compensation	Optional block skip: Total 9
Cutting feed rate: 6.3-digit F-code, direct command	Memory pitch error compensation (interpolation type)	Tool retract and return
Dwell: G04	Skip function	Sequence number comparison and stop
Manual handle feed: manual pulse generator 1 set (0.001, 0.01, 0.1mm)	Tool length manual measurement	Manual handle interruption
Rapid traverse override: 0 / 1 / 10 / 25 / 50 / 100%	Emergency stop	Programmable mirror image PK1
Cutting feed rate override: 0 to 200% (every 10%)	Data protection key	Optional chamfering / corner R
Feed rate override cancel: M49 / M48	NC alarm display / alarm history display	Custom macro PK1
Rigid tapping: G84, G74 (Mode designation: M29)	Machine alarm display	Interruption type custom macro
Part program storage capacity: 160m [64KB]	Stored stroke limit 1	Addition of custom macro common variables: 600
No. of registered programs: 120	Stored stroke limit 2,3 (for OKK use) ^{Note 1}	Figure copy
Part program editing	Load monitor	Scaling: G50, G51
Background editing	Self-diagnosis	Chopping
Extended part program editing	Absolute position detection	Playback
15-inch color LCD / QWERTY key MDI	Manual Guide i (Basic) ※ for VC-X350 and VC-X500	Tool life management: 256 sets in total PK1
Clock function	Tool center point control for 5 axis machining	Addition of tool life management sets: 1024 sets in total
MDI (manual data input) operation	Coordinate system rotation: G68, G69	High-speed skip
Memory card / USB interface	Inverse time feed	Run hour and parts count display PK1
Spindle function: 5-digit S-code direct command	Unidirectional positioning: G60	Manual Guide i (Milling cycle) ※ for VC-X350 and VC-X500
Spindle speed override: 50 to 150% (every 5%)	Hyper HQ control mode B	Instruction of inclined plane indexing (Instruction of inclined plane machining)
Tool function: 4-digit T-code direct command	Data server: ATA card (1GB)	RS232C interface: RS232C-1CH
ATC tool registration	Multi spindle control ^{Note 2}	
Auxiliary function: 3-digit M-code programming	Constant surface speed control ^{Note 2}	
Multiple M-codes in 1 block: 3 codes (Max. 20 settings)	Multiple repetitive cycles ^{Note 2}	
Tool length offset: G43, G44/G49	Tool offset for Milling and Turning function ^{Note 2}	
Tool diameter and cutting edge R compensation: G41, G42/G40	Tool geometry/wear compensation ^{Note 2}	
Tool offset sets: 99 sets	Turning/Machining G code system switching function ^{Note 2}	
Tool offset memory C	Turning G code system B/C ^{Note 2}	
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		
Program number search		
Sequence number search		
Program restart		
Cycle start		

Original OKK Software

Machining support integrated software (incl. Help guidance, etc.)	STD
Tool support	STD
Program Editor	STD
EasyPRO	STD
A5-system (A) Measurement of turning center	OP
A5-system (B) Measurement of turning center + Measurement of geometric error	OP
Work Manager	OP
HQ control	STD
NC option package (including the items with "PK1")	OP
Multi-Facer II (5-axis processing software)	STD
Special canned cycle (including circular cutting)	OP
Cycle Mate F	OP
Soft Scale II _m	STD
Touch sensor T0 software	OP
Tool failure detection system (Soft CCM)	OP
Adaptive control (Soft AC)	OP
Automatic restart at tool damage	OP

Note 1: Standard specification for VC-X500/VC-X500L
 Note 2: Standard specification for VC-X350L/VC-X500L
 STD: Standard specification
 OP: Optional specification

VC-X350/VC-X500 CONTROLLER

MITSUBISHI Controller N750

Standard Specification
No. of controlled axes : 5 (X, Y, Z, A, C)
No. of simultaneously controlled axes : 5 axes
Least input increment : 0.001mm / 0.0001"
Max. programmable dimension:±99999.999mm /± 9999.9999"
Absolute / Incremental programming: G90 / G91
Decimal point inputI/II
Inch / Metric conversion: G20 / G21
Program code: EIA / ISO automatic discrimination
Program format: Meldas standard format (M2 format needs to be instructed)
Least control increment:1nm
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
15" color touch-panel LCD
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
Tool position offset: G45 to G48
Cutter compensation: G38 to G42
Tool offset sets: 200 sets
Tool offset memoryII: 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

Standard Specification
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
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
Programmable coordinate system rotation:G68, G69 / G68.1, G69.1
Inverse time feed
Unidirectional positioning: G60

Optional Specification
Program format: M2 / M0 format
Helical interpolation PK1
Cylindrical interpolation
Hypothetical axis interpolation
Spiral/Conical 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) PK1
Part program storage capacity:2560m[1MB] (1000)
Part program storage capacity:5120m[2MB] (1000)
RS232C interface: RS232C-1CH

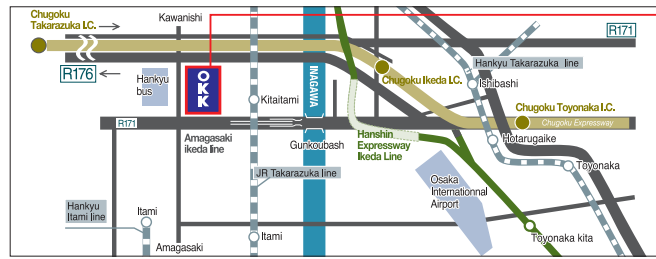
Optional Specification
Computer link B: RS232C
Spindle contour control (Spindle position control)
3-dimensional cutter compensation
Tool offset sets: 400 sets
Tool offset sets: 999 sets
Addition of workpiece coordinate system pair (48 pairs): G54.1 P1 to P48 PK1
Addition of workpiece coordinate system pair (96 pairs): G54.1 P1 to P96
Optional block skip: Total 9
Tool retract and recover
Sequence number comparison and stop
Corner chamfering / corner R: Insert into straight line-straight line / straight line-circle arc PK1
User macro and user macro interruption PK1
Variable command: 300 sets in total
Variable command: 600 sets in total PK1
Pattern rotation
Parameter coordinate system rotation PK1
Special canned cycles: G34 to G36, G37.1 / G34 to G37
Scaling: G50, G51
Chopping function
Playback
Skip function: G31 PK1
Tool life management II: 200 sets PK1
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)
Inclined surface machining command

Original OKK Software
Machining support integrated software (incl. Help guidance, etc.) STD
Tool support STD
Program Editor STD
EasyPRO STD
A5-system (A) Measurement of turning center OP
A5-system (B) Measurement of turning center + Measurement of geometric error OP
Work Manager OP
HQ control STD
Hyper HQ control mode II STD
NC option package (including the items with "PK1") OP
Multi-Facer II (5-axis processing software) STD
Cycle Mate OP
Soft Scale IIm STD
Touch sensor T0 software OP
Tool failure detection system (Soft CCM) OP
Adaptive control (Soft AC) OP
Automatic restart at tool damage OP

STD: Standard specification
OP: Optional specification

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