

FA SERIES

xx27/33 5-axis Double Column Machining Center



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FA-E-202306

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Providing a Wide Range on High Performance 5-Axis Machining

5-axis machining efficiently shortens the paths in machining, considerably reduces the cutting time, and extends the life of cutting tool.

Rigid structure designed by double column frame meets wide range of machining requirements.

High dynamic performance on XYZ-axis with high accuracy 2-axis head realizes high excellent performance in multi-angle machining with 5-axis machining center.

12,000rpm, HSK-A100 spindle achieves high speed requirements.

- ▶ X axis travel: 3,100~8,100 mm
- ▶ Y axis travel: 2,700 / 3,300 mm
- ▶ Z axis travel: 1,000 / 1,200 mm
- ▶ Port width: 2,200/2,700 mm

High Accuracy 5-Axis Machine

- ▶ High XYZ straightness: 0.01mm/m and 0.015mm/full travel
- ▶ XYZ axis position accuracy $\pm 0.01\text{mm}$ / full travel, repeatability accuracy $\pm 0.002\text{mm}$ (JIS B6333)
- ▶ B axis position accuracy $\pm 5''$, C axis position accuracy $\pm 3''$
- ▶ Kinematic compensation : TCPM 0.04mm
- ▶ Thermal compensation : 0.03mm under spindle operation and environmental variation.

5Axis

Dynamic synchronization accuracy reaches 0.04mm. (TCPM)

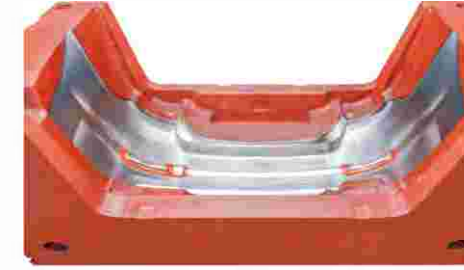


Machining Application



5- Axis Synchronized Cutting Precision Verified Mold

- L280 x W280 x H120mm
- Axes synchronized machining and fixed axis machining accuracy < 0.04mm.



Bumper Mold

- Size: L1,000 x W400 x H350mm
- Material: FC300
- Long spindle nose is the benefit to enhance the tool rigidity and reduce the cutting vibration.
- D20R10 ball end tool reciprocating projection machining
- Pitch: 0.5mm
- Spindle speed: 12,000 rpm
- Feed rate: 5,000 mm/min



Aircraft Wing Rib

- Size: L1,225 x W625 x H55 mm
- Material: Al 6061
- Finished / row material ratio: 84%
- High-efficiency machining of D63 copy milling cutter
- 5 axis synchronized finishing with D20 end mill
- Side fillet machining with horizontal orientation
- One setup, Total finish time: 3hr.



Turbine Blade

- Size: D300 x H160 mm
- Material: Aluminum
- Aero component machining
- 5-axis synchronized machining
- D10 Taped ball nose end mill
- Spindle Speed: 10,000 rpm
- Feed rate: 5,000 mm/min
- Surrounding cutting
- Surface roughness: Ra 3.2 μm



Aircraft Floor Frame

- Size: L1,250 x W620 x H60
- Material: Al 6061
- Finished / row material ratio: 85%
- High-efficiency machining of D63 copy milling cutter
- Ae50mm ; Ap20mm ;
- Removal rate: 5,000cc/min
- One setup, Total finish time: 3.4hr.
- 5-axis synchronized machining

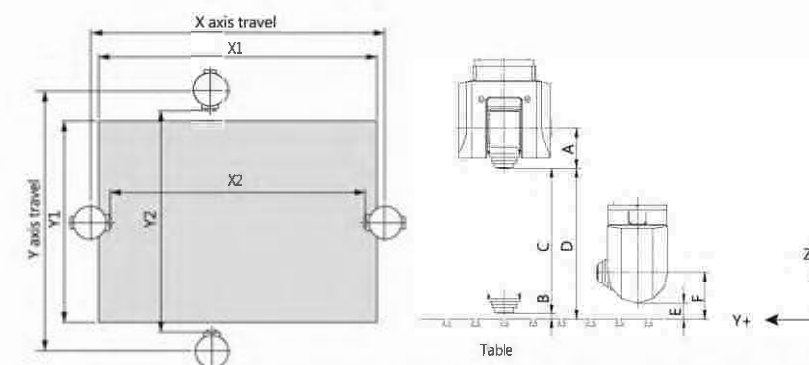
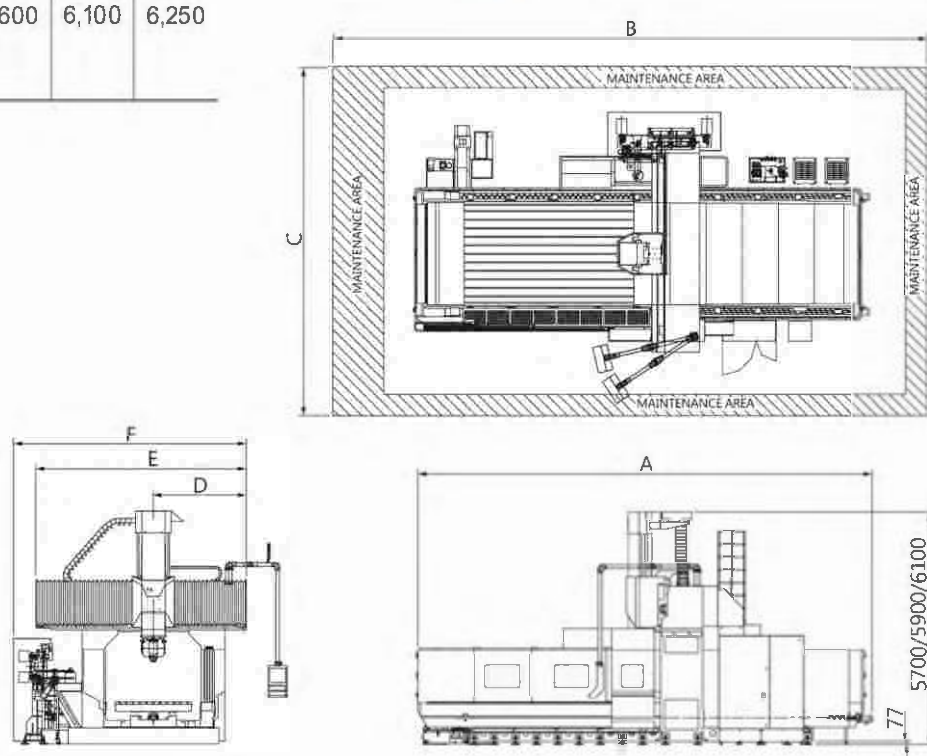


TIRE Mold (Segment Type)

- Size: 660 x 600 x 260mm
- Material: S45C
- Corner smooth flow cut via 5-axis synchronized machining.
- D25 High feed rough cutting: F10,000
- F3,000 R6 finishing
- Multi-axis project machining
- Spindle speed: 15,000 rpm
- Feed rate: 4,000 mm/min

Working Range

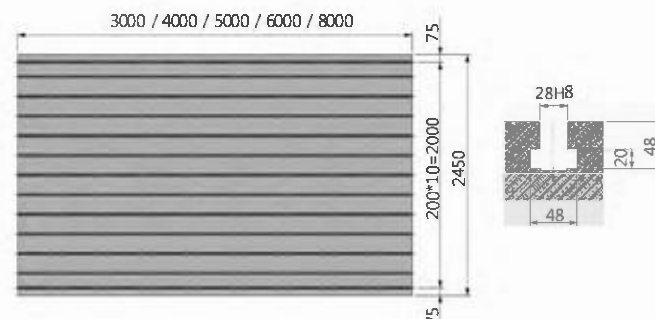
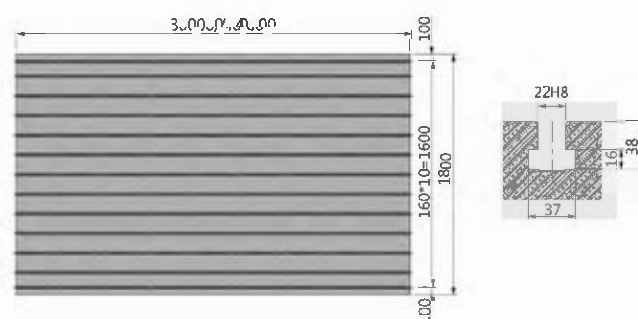
▶ FA-xx27 / FA-xx33 series



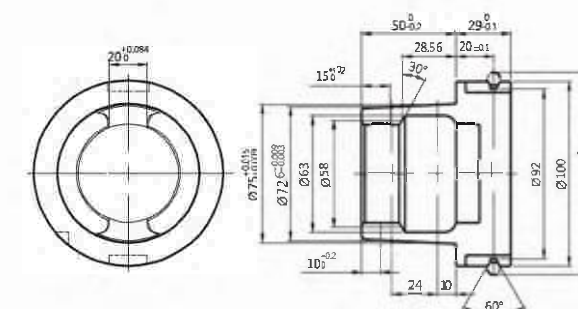
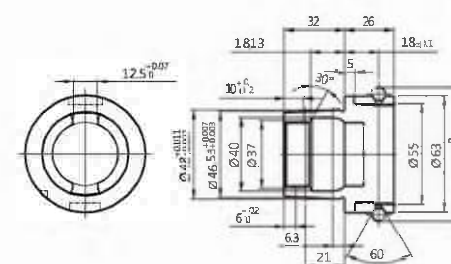
Model	Spindle	Xaxis travel	X1	X2	Yaxis travel	Y1	Y2	A	B	C	D	E	F
FA-3027	HSK-A63	3,100	3,000	2,480	2,700	1,800	2,080	310	225	1,000/ 1,200	1,225/ 1,425	335	520
FA-4027		4,100	4,000	3,480									
FA-3027	HSK-A100	3,100	3,000	2,330			1,930	385	150	1,000/ 1,200	1,150/ 1,350	260	520
FA-4027		4,100	4,000	3,330									
FA-3033	HSK-A63	3,100	3,000	2,580	3,300	2,450	2,680	310	210	1,000/ 1,200	1,210/ 1,410	320	510
FA-4033		4,100	4,000	3,580									
FA-5033		5,100	5,000	4,580									
FA-6033		6,100	6,000	5,580									
FA-8033		8,100	8,000	7,580									
FA-3033	HSK-A100	3,100	3,000	2,430			2,530	385	135	1,000/ 1,200	1,135/ 1,335	245	510
FA-4033		4,100	4,000	3,430									
FA-5033		5,100	5,000	4,430									
FA-6033		6,100	6,000	5,430									
FA-8033		8,100	8,000	7,430									

Tool Shank

▶ FA-xx33 series



▶ Tool shank / HSK-A100



Specification

Model			Unit	FA-3027	FA-4027	FA-3033	FA-4033	FA-5033	FA-6033	FA-8033
Travel										
X axis			mm	3,100	4,100	3,100	4,100	5,100	6,100	8,100
Y axis			mm	2,700		3,300				
Z axis			mm	1,000/ 1,200(Opt.)		1,000/ 1,200(Opt.)				
Distance from spindle nose to table	Z=1,000	HSK-A100	mm	150~1,150		135~1,135				85~1,085
		HSK-A63	mm	125~1,125		110~1,100				60~1,060
	Z=1,200	HSK-A100	mm	150~1,350		135~1,335				85~1,285
		HSK-A63	mm	125~1,325		110~1,310				60~1,260
Distance between columns (port width)			mm	2,200		2,700				
Table										
Table size (X direction x Y direction)			mm	3,000 x 1,800	4,000 x 1,800	3,000 x 2,450	4,000 x 2,450	5,000 x 2,450	6,000 x 2,450	8,000 x 2,450
T-slot (Width x Number x Pitch)			mm	22 x 11 x 160		28 x 11 x 200(150)				
Max. table load			kg	10,000	12,000	13,000	16,000	20,000	22,000	24,000
Spindle										
Spindle speed			rpm	12,000 (20,000 Opt.)		12,000 (20,000 Opt.)				
Spindle motor (cont./ 30 min rated)			kW	34 / 43		34 / 43				
Spindle taper			-	HSK-A100/HSK-A63 (Opt.)		HSK-A100/ HSK-A63 (Opt.)				
Feed										
Cutting feed rate			mm/min	1-10,000		1-10,000				
Rapid traverse(X / Y / Z)			m/min	24 / 18 / 15	18 / 18 / 15	24 / 15 / 15	18 / 15 / 15	12.5 / 15 / 15	10 / 15 / 15	8 / 15 / 15
3 axes motor power (FANUC) (X/Y/Z)			kW	8.6 / 8.6 / 6.5		8.6 / 8.6 / 6.5				
Accuracy										
Positioning accuracy (JIS B6333)			mm	±0.005/ 300, ±0.008/ Full travel		±0.005/ 300, ±0.010/ Full travel				
Positioning accuracy (ISO-230-2 & VDI 3441)			mm	P0.018		P0.022			P0.035	
Repeatability (JIS B6333)			mm	±0.002		±0.002			±0.002	
Repeatability (ISO-230-2 & VDI 3441)			mm	Ps0.015		Ps0.020			Ps0.025	
ATC										
Tool magazine capacity / Vertical type tool change			pcs	24 / 32 (Opt.) / 40 (Opt.)		24 / 32(Opt.) / 40(Opt.)				
Max. tool diameter (full)			mm	HSK-A100: Ø110 HSK-A63:Ø75 (Opt.)		HSK-A100: Ø110 HSK-A63:Ø75 (Opt.)				
Max. tool length			mm	300		300				
Max. tool weight			kg	HSK-A100: 15 HSK-A63:8(Opt.)		HSK-A100: 15 HSK-A63:8(Opt.)				
Tool shank			-	HSK-A100 / HSK-A63(Opt.)		HSK-A100 / HSK-A63(Opt.)				
Lubrication										
Main Hydraulic power			kW	3.7		3.7				
Cytec Hydraulic power			kW	0.75		0.75				
Coolant tank (2 sets)			kW	7.2		7.2				
Coolant tank capacity			L	44		44				
Coolant motor power			kW	1.7		1.7				
Coolant tank capacity			L	600		800				
General										
Power requirement			kVA	HSK-A100:130/HSK-A63:110 (Opt.)		HSK-A100:130 / HSK-A63:110(Opt.)				
Pneumatic requirement			kg/cm²	6		6				
Machine net weight			kg	31,500	34,500	48,000	54,000	60,000	66,000	78,000
Machine gross weight			kg	35,500	38,500	51,000	58,000	65,000	72,000	86,000
Floor space (LxWxH)			m	10.7x7.5x5.8	12.7x7.5x5.8	11.2x8.2x5.8	13.2x8.2x5.8	15.4x8.2x5.8	17.4x8.2x5.8	21.6x8.2x5.8

Standard Accessory & Function

- 1 HEIDENHAIN TNC 640 Controller
- 2 Spindle 12,000 rpm with tool shank HSK-A100
- 3 Blum TC 60 auto measurement compensation of rotation axis accuracy
- 4 HEIDENHAIN DCM (Dynamic Collision Monitoring) function
2 axis head central control and monitoring protection system:
Spindle cutting vibration protection
- 5 Spindle and motor overloading protection
B/C rotating motor overloading protection
Spindle overloading protected by software
- 6 Spindle and structure thermal compensation system
- 7 Spindle cooling device
- 8 Twin hydraulic cylinders with pressured air assistance balancing system
- 9 X axis ball screw supporter (available for FA-xx33 and X>4m)
- 10 24 tools magazine with ATC
- 11 Centralized auto lubrication system
- 12 Independent lubrication oil collector for 3 axes
- 13 Air blast through spindle
- 14 Wash gun and pneumatic interface
- 15 Spindle ring coolant nozzle
- 16 Cutting fluid cooling system
- 17 Enclosed sheet metal guard (without roof)
- 18 Swiveling arm type operation panel
- 19 Screw type chip conveyor on table side
- 20 Steel belt chip conveyor / water tank
- 21 Air conditioner for electrical cabinet
- 22 Working lamp
- 23 Operation cycle finish and alarm light
- 24 Movable manual pulse generator
- 25 Footswitch for tool clamping
- 26 RJ45 interface
- 27 XYZ axis linear scale
- 28 XYZ axis travel hard limits protection
- 29 Remote monitoring software (standard)
- 30 Auto power off function
- 31 Foundation pads and bolts kits
- 32 Adjustment tool and tool kits

Optional Accessory & Function

- 1 20,000 rpm HSK-A63 Spindle
- 2 Z axis travel 1,200 mm
- 3 200 higher column
- 4 Sub working table
- 5 Coolant through spindle system 20 / 60 bar
- 6 The interface of coolant through spindle
- 7 Oil mist cooling device (MQL)
- 8 32/40 tool magazine with ATC
- 9 Overhead pendulum type operation panel
- 10 Helical blade screw conveyor on table sides
- 11 Chip cart
- 12 Independent manual pulse generator
- 13 Remote monitoring software (professional)
- 14 Auto tool length measurement
- 15 Transformer
- 16 Enclosed sheet metal guard (with roof)
(only for X < 4m, standard column height)
- 17 Oil mist recycle device
- 18 Oil skimmer

