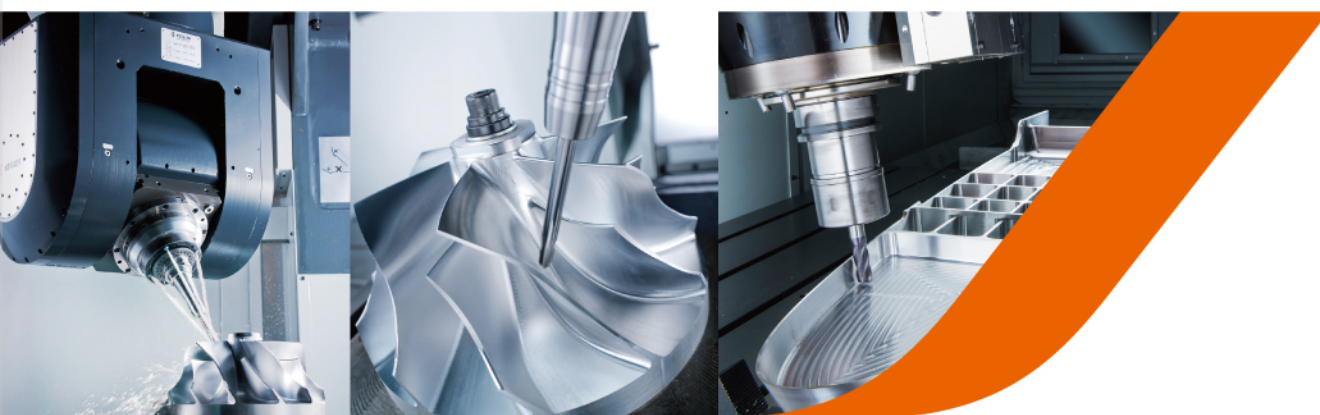


FA SERIES



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FA-E-201910

FA SERIES

5-axis Double Column Machining Center



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.

20,000rpm, HSK-A63 / 12,000rpm, HSK-A100 spindle achieves high speed requirements.

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

High Accuracy 5-Axis Machine

- ▶ High XYZ straightness : 0.01mm/m and 0.015mm/full travel
- ▶ XYZ axis position accuracy ± 0.01 mm / full travel, repeatability accuracy ± 0.002 mm (JIS B63333)
- ▶ B axis position accuracy $\pm 5^\circ$, C axis position accuracy $\pm 3^\circ$
- ▶ Kinematic compensation : TCPM 0.04mm
- ▶ Thermal compensation : 0.03mm under spindle operation and environmental variation.

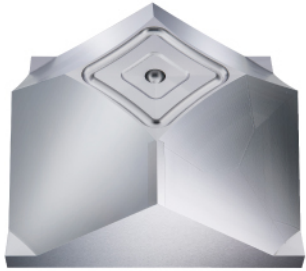
5-Axis

Dynamic synchronization accuracy reaches 0.04mm. (TCPM)





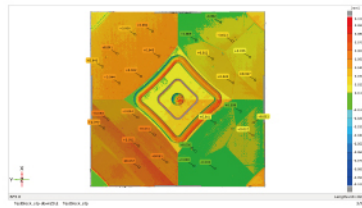
High Speed.
High Precision.
High Efficiency.



5- Axis Synchronized Cutting Precision Verified Mold

L280 x W280 x H120mm

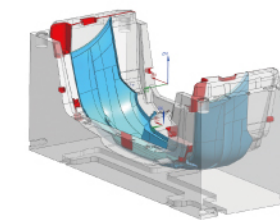
Axes synchronized machining and
fixed axis machining accuracy < 0.04mm.



Bumper Mold

Synchronous 2 axes machining, increased 30%
machining efficiency

Long tool length upgraded tool rigidity efficiently and
decreased cutting vibration.



Aircraft Wing Structure

5-axis synchronized machining

2 mm Thin Wall Parts Feature



Car Headlight Mold

0.2G high acceleration mold finishing

High feed rough machining: D25, F10,000mm/min, 160cc/min

High feed mold surface finishing: F4,000mm/min

High surface roughness: Ra0.4 μ m

0.04 mm contour accuracy



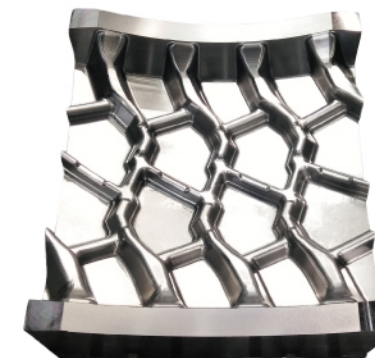
Turbine Blade

5-axis synchronized machining,

5,000 mm/min feed rate

Aero component machining

Ra 3.2 μ m surface roughness



Tire Mold (Segment Type)

Corner smooth flow cut via 5-axis
synchronized machining.

High feed rough cutting: F10,000 D25 160cc/min

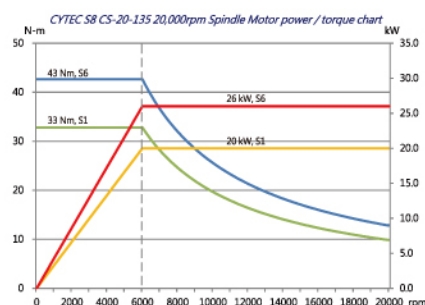
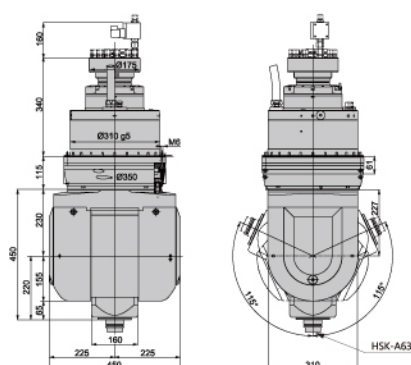
F 3,000 R5, 22 hours

Compact Continuous 2-Axis Head

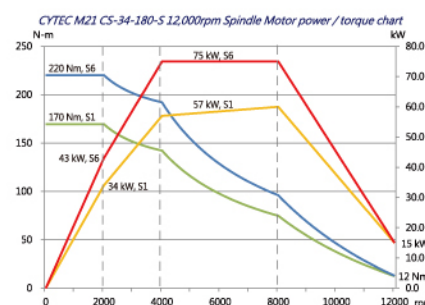
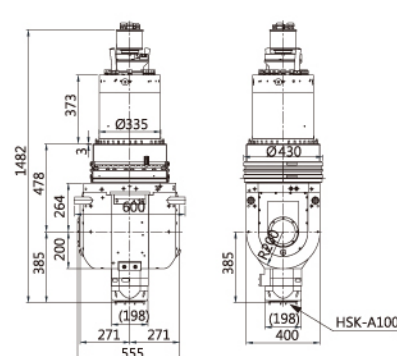
Specification	Unit	S8 CS20-135		M21 CS34-180S		M21 CS34-180	
		B-axis	C-axis	B-axis	C-axis	B-axis	C-axis
Swiveling range	degree	$\pm 115^\circ$	$\pm 360^\circ$	$\pm 94^\circ$ ($\pm 105^\circ$)*	$\pm 360^\circ$	$\pm 94^\circ$ ($\pm 105^\circ$)*	$\pm 360^\circ$
Positioning accuracy	sec	$\pm 5''$	$\pm 2''$	$\pm 5''$	$\pm 3''$	$\pm 5''$	$\pm 3''$
Rotation speed	rpm	60	60	20	20	20	20
Rotation torque(cont.)	Nm	315	350	700	700	700	700
Rotation torque(max)	Nm	680	500	1,000	1,200	1,000	1,200
Clamping torque	Nm	1,500	1,500	4,000	4,000	4,000	4,000

* B axis positioning: 1. The degree was $\pm 94^\circ$ with blocks.
2. The safe degree was $\pm 110^\circ$ without blocks.

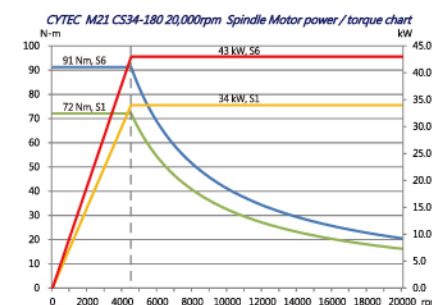
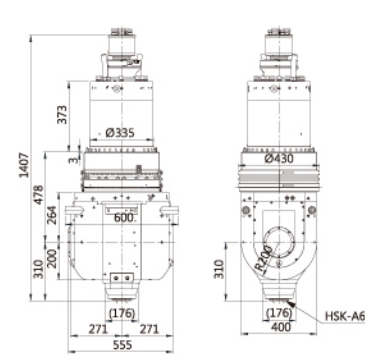
▼ S8 CS-20-135 /
20,000rpm / HSK A63



▼ M21 CS34-180S /
12,000rpm / HSK A100

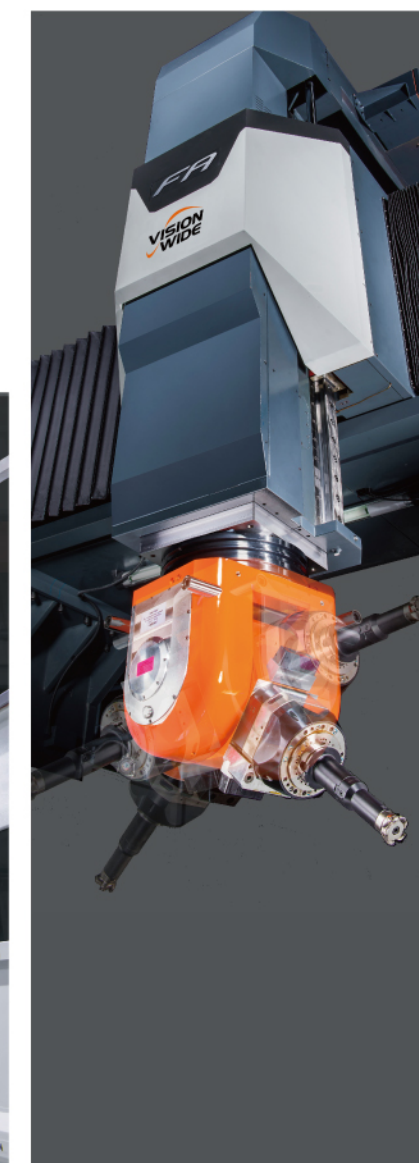
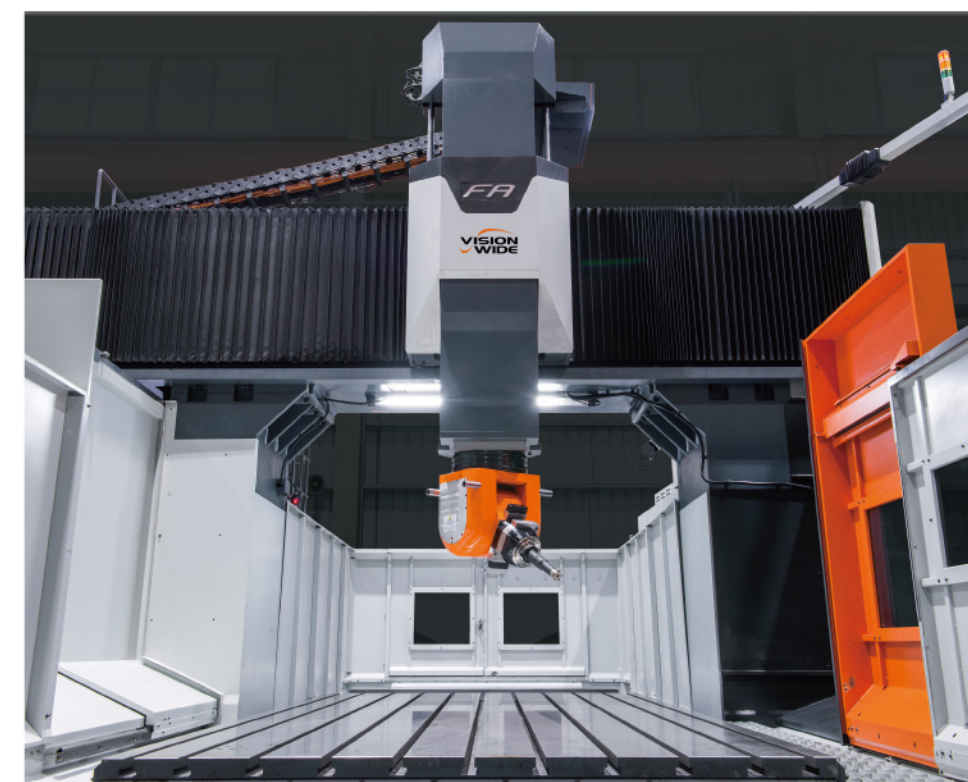
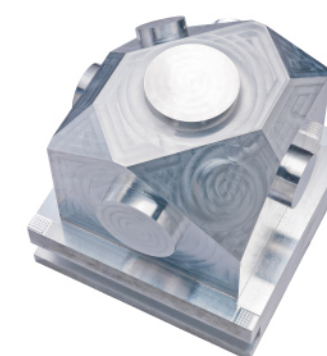


▼ M21 CS34-180 /
20,000rpm / HSK A63



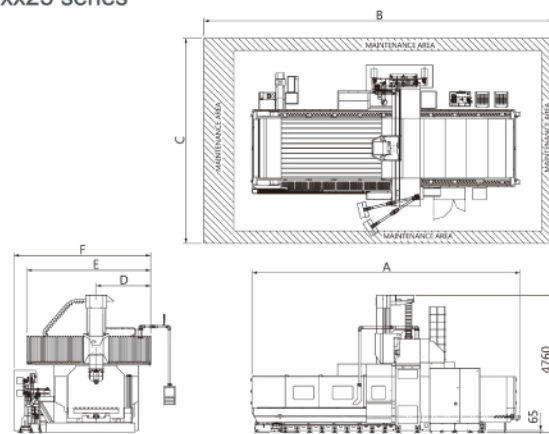
Compact Continuous 2-Axis Head

- ▶ Fork structure and dual bearing support B-axis realized maximal cutting rigidity.
- ▶ Built-in and no-backlash direct driver motor design provide best synchronized performance.
- ▶ Ring-type optical linear scale in B/C axis offer the best stability instead of mechanical transmission
- ▶ High resolution feedback system ensured best accuracy performance.



Machine Dimension

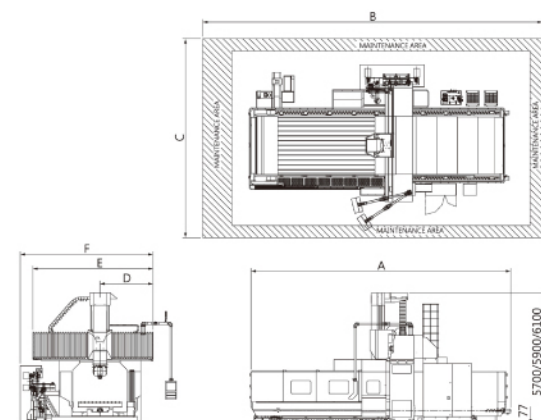
▶ FA-xx23 series



Unit:mm

Model	A	B	C	D	E	F
FA-2123	6,600	8,000	8,000	2,000	4,540	4,700
FA-2623	7,600	9,000				
FA-3123	8,600	10,000				
FA-4123	10,600	12,000				

▶ FA-xx27 / FA-xx33 series

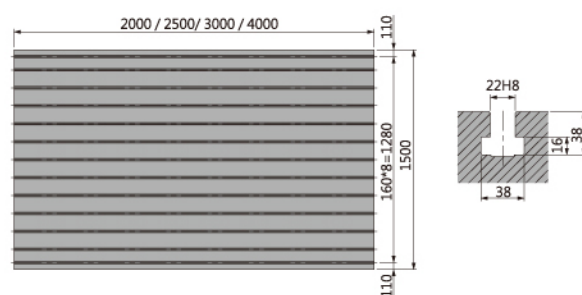


Unit:mm

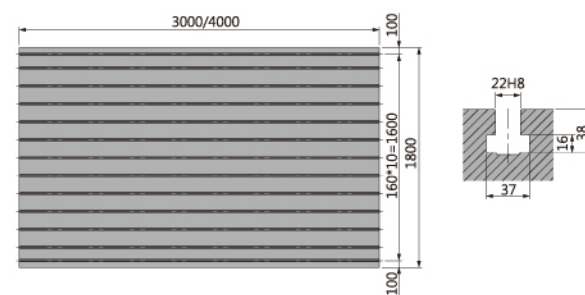
Model	A	B	C	D	E	F
FA-3127	8,700	10,700	7,500	2,250	5,250	5,450
FA-4127	10,700	12,700				
FA-3233	8,800	11,200	8,200	2,600	6,100	6,250
FA-4233	10,800	13,200				
FA-5233	13,000	15,400				
FA-6233	15,000	17,400				
FA-8233	19,200	21,600				

Table Dimension

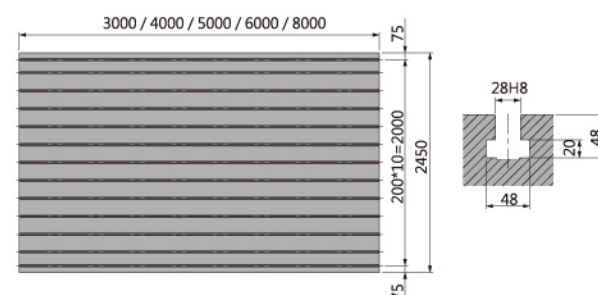
▶ FA-xx23 series



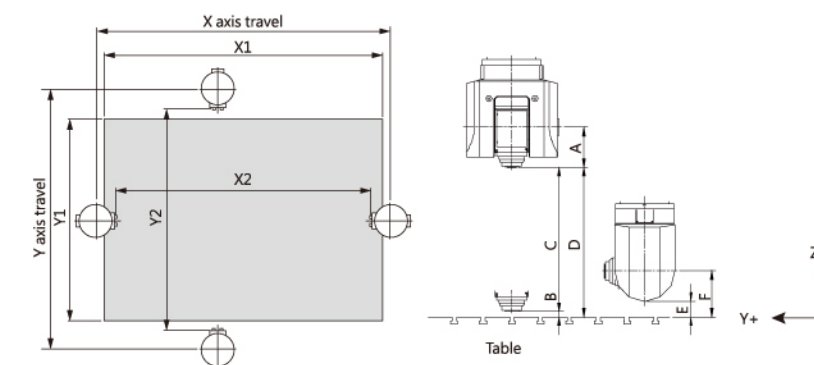
▶ FA-xx27 series



▶ FA-xx33 series



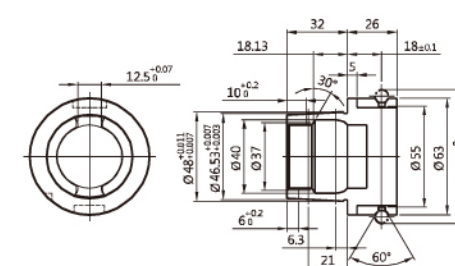
Working Range



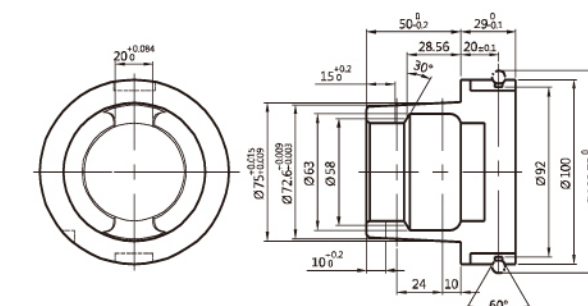
Model	Spindle	X axis travel	X1	X2	Y axis travel	Y1	Y2	A	B	C	D	E	F
FA-2123	HSK-A63	2,100	2,000	1,660	2,300	1,500	1,860	220	130	1,000/ 1,200	930/ 1,130	195	350
FA-2623		2,600	2,500	2,160									
FA-3123		3,100	3,000	2,660									
FA-4123		4,100	4,000	3,660									
FA-3127	HSK-A63	3,100	3,000	2,480	2,700	1,800	2,080	310	216	1,000/ 1,200	1,216/ 1,416	326	526
FA-4127		4,100	4,000	3,480									
FA-3127	HSK-A100	3,100	3,000	2,330			1,930	385	141	1,000/ 1,200	1,141/ 1,341	326	526
FA-4127		4,100	4,000	3,330									
FA-3233	HSK-A63	3,200	3,000	2,580	3,300	2,450	2,680	310	200	1,000/ 1,200	1,200/ 1,400	310	510
FA-4233		4,200	4,000	3,580									
FA-5233		5,200	5,000	4,580									
FA-6233		6,200	6,000	5,580									
FA-8233		8,200	8,000	7,580									
FA-3233	HSK-A100	3,200	3,000	2,430			2,530	385	125	1,000/ 1,200	1,125/ 1,325	310	510
FA-4233		4,200	4,000	3,430									
FA-5233		5,200	5,000	4,430									
FA-6233		6,200	6,000	5,430									
FA-8233		8,200	8,000	7,430				385	75		1,075/ 1,275	260	460

Tool Shank Dimension

▶ Tool shank / HSK-A63



▶ Tool shank / HSK-A100



Specification

MODEL		Unit	FA-2123	FA-2623	FA-3123	FA-4123	FA-3127	FA-4127	FA-3233	FA-4233	FA-5233	FA-6233	FA-8233
TRAVEL													
X axes		mm	2,100	2,600	3,100	4,100	3,100	4,100	3,200	4,200	5,200	6,200	8,200
Y axes		mm	2,300				2,700		3,300				
Z axes		mm	1,000/ 1,200 (Opt.)				1,000/ 1,200 (Opt.)		1,000/ 1,200 (Opt.)				
Distance from spindle nose to table	Z=1,000	HSK-A100	mm				141~1,141		125~1,125				75~1,075
		HSK-A63	mm				230~1,230		200~1,200				150~1,150
	Z=1,200	HSK-A100	mm				141~1,341		125~1,325				75~1,275
		HSK-A63	mm				230~1,430		200~1,400				150~1,350
Distance form spindle center to column		mm	453				453		453				
Distance between columns (port width)		mm	1,700				2,200		2,700				
TABLE													
Dimension		mm	2,000x1,500	2,500x1,500	3,000x1,500	4,000x1,500	3,000x1,800	4,000x1,800	3,000x2,450	4,000x2,450	5,000x2,450	6,000x2,450	8,000x2,450
T-slot (Width x Number x Pitch)		mm	22x9x160				22x11x160		28x11x200(150)				
Max. table load		kg	8,000	9,000	10,000	12,000	10,000	12,000	13,000	16,000	20,000	22,000	24,000
SPINDLE													
Spindle motor (cont./ 30 min rated)		kW	20/26				57/75 (34/43 Opt.)		57/75 (34/ 43 Opt.)				
Spindle speed		rpm	20,000				12,000 (20,000 Opt.)		12,000 (20,000 Opt.)				
Spindle taper		-	HSK-A63				HSK-A100/HSK-A63 (Opt.)		HSK-A100/ HSK-A63 (Opt.)				
FEED													
Cutting feedrate		mm/min	1-10,000				1-10,000		1-10,000				
Rapid traverse		m/min	X:24,Y:20,Z:15			X:18,Y:20,Z:15	X:24,Y:18,Z:15	X:18,Y:18,Z:15	X:24,Y:15,Z:15	X:18,Y:15,Z:15	X:12.5,Y:15,Z:15	X:10,Y:15,Z:15	X:8,Y:15,Z:15
X,Y,Z power capacity		kW	X:4, Y:4, Z:4			X:6, Y:4, Z:4	X:8.6, Y:8.6, Z:6.5			X:8.6, Y:8.6, Z:6.5			
ACCURACY													
Positioning accuracy (JIS B6333 / VDI3441)		mm	±0.005/ 300, ±0.008/ Full travel				±0.005/ 300, ±0.008/ Full travel		±0.005/ 300, ±0.010/ Full travel				
		mm	P0.016		P0.018		P0.018		P0.022		P0.035		
Repeatability accuracy (JIS B6333 / VDI3441)		mm	±0.002				±0.002		±0.002		±0.002		
		mm	Ps0.015				Ps0.015		Ps0.020		Ps0.025		
ATC													
ATC capacity	Vertical	pcs	24 / 32 (Opt.) / 40(Opt.)				24 / 32(Opt.) / 40(Opt.)		24 / 32(Opt.) / 40(Opt.)				
Max. tool weight		kg	8				HSK-A100:15/ HSK-A63: 8(Opt.)		HSK-A100:15/ HSK-A63: 8(Opt.)				
Tool size (DxL) (Full tools)		-	Φ 75x300L				HSK-A100: Φ 110x300L/ HSK-A63: Φ 75x300L (Opt.)		HSK-A100: Φ 110x300L/ HSK-A63: Φ 75x300L(Opt.)				
Tool shank		-	HSK-A63				HSK-A100 / HSK-A63 (Opt.)		HSK-A100 / HSK-A63(Opt.)				
LUBRICATION													
Main Hydraulic power		kW	3.7				3.7		3.7				
Cytec Hydraulic power		kW	0.75				0.75		0.75				
Coolant tank (2 sets)		kW	7.2				7.2		7.2				
Coolant tank capacity		L	44				44		44				
Coolant motor power		kW	1.7				1.7		1.7				
Coolant tank capacity		L	600				600		800				
OTHERS													
Power requirement		kVA	110				HSK-A100:130/HSK-A63:110(Opt.)		HSK-A100:130 / HSK-A63:110(Opt.)				
Pneumatic input pressure		kg/cm³	6				6		6				
Machine net weight		kg	27,500	30,000	35,000	40,000	31,500	34,500	48,000	54,000	60,000	66,000	78,000
Machine gross weight		kg	31,000	33,500	38,500	43,500	35,500	38,500	51,000	58,000	65,000	72,000	86,000
Max. space (LxWxH)		m	8x8x4.5	9x8x4.5	10x8x4.5	12x8x4.5	10.7x7.5x5.7	12.7x7.5x5.7	11.2x8.2x5.7	13.2x8.2x5.7	15.4x8.2x5.7	17.4x8.2x5.7	15.4x8.2x5.7

Standard Accessory & Function

- 1 HEIDENHAIN TNC640 controller
- 2 Spindle 20,000rpm with tool shank HSK-A63(FA-xx23 Series)
Spindle 12,000rpm with tool shank HSK-A100 (FA-xx27 / FA-xx33 Series)
- 3 Blum TC 60 auto measurement compensation of rotation axis accuracy
- 4 HEIDENHAIN DCM (Dynamic Collision Monitoring) function
- 5 2-axis head central control and monitoring protection system:
Spindle cutting vibration protection
Spindle and motor overloading protection
B/C rotating motor overloading protection
Spindle overloading protected by software
- 6 Spindle and structure temperature thermal compensation system
- 7 Spindle cooling device
- 8 Twin hydraulic cylinders with pressured air assistance balancing system(FA-xx27 / FA-xx33 Series)
- 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
- 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 Caterpillar type chip conveyor
- 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 feedback
- 28 XYZ axis travel hard limits protection
- 29 Remote monitoring software-Standard
(Not available for Siemens controller)
- 30 Auto power off function
- 31 Foundation pads and bolts kits
- 32 Adjustment tool and tool kits

Optional Accessory & Function

- 1 20,000rpm HSK-A63 Spindle(FA-xx27 / FA-xx33 Series)
- 2 Z-axis travel 1200mm(FA-xx27 / FA-xx33 Series)
- 3 200 higher column(FA-xx27 / FA-xx33 Series)
- 4 Sub working table
- 5 Coolant through spindle system
- 6 Reserved interface for coolant through spindle system
- 7 Oil mist cooling device
- 8 32/40 tool magazine with ATC
- 9 Overhead pendulum type operation panel
- 10 Chip auger on table side
- 11 Chip cart
- 12 Independent manual pulse generator
- 13 Remote monitoring software-Professional
- 14 (Not available for Siemens controller)
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

