



FAIR FRIEND • ENGINEERING • EXCELLENCE • LEADERSHIP • EXPERTISE • RELIABILITY



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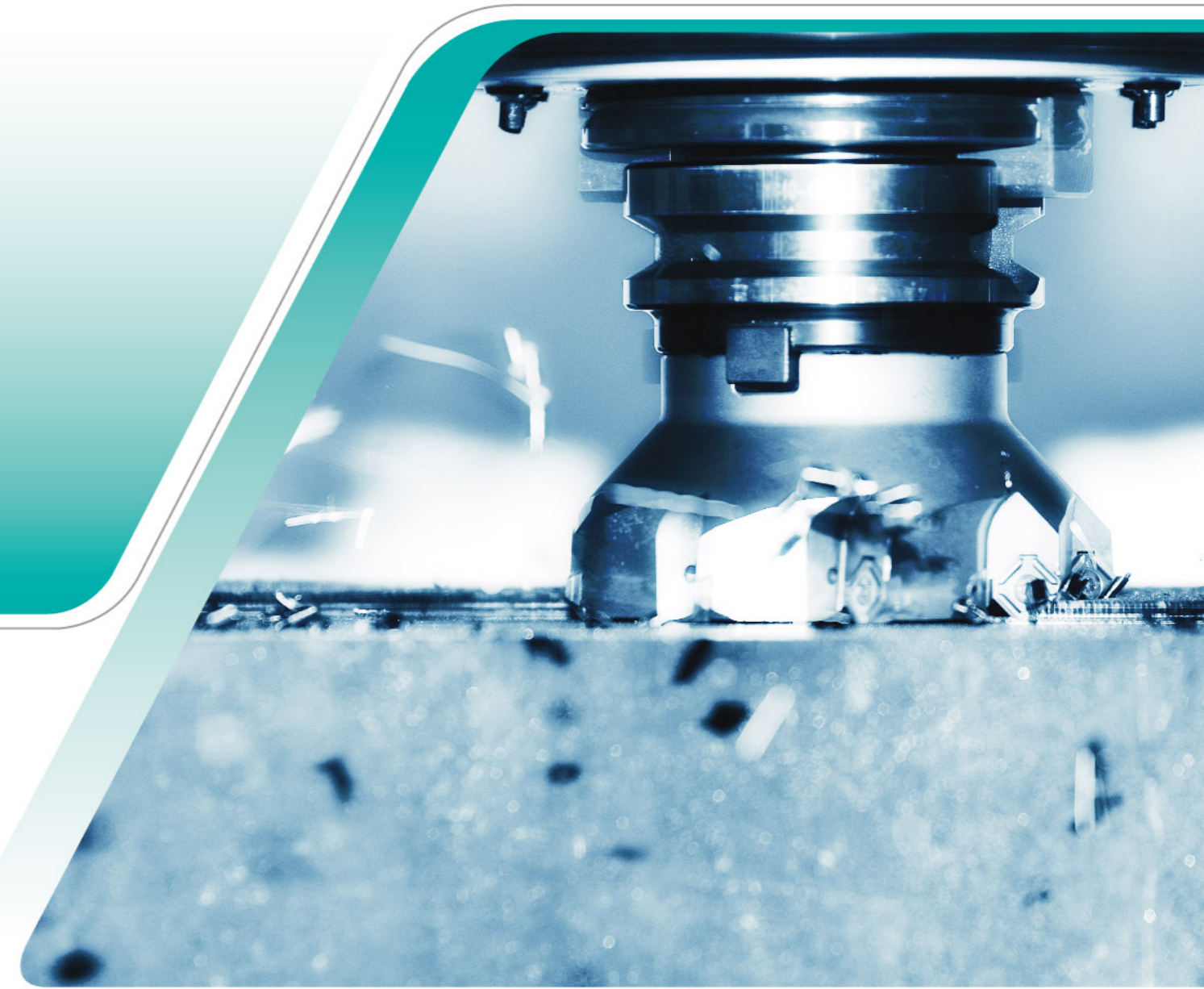
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FDM SERIES

CNC Double Column Machining Center

FDM series is from FFG European core technology and concepts of excellent design Satisfy for your different processing conditions

- Suitable for large mold & die and mold base processing.
- The maximum load of the table is 30,000 kg [Please refer to specification] .
- The X-axis travel can be extended up to 8200 mm and the Z-axis travel can be extended from standard 800 mm to optional 1000 mm / 1200 mm / 1400 mm.
- Thermal affinity & thermal inhibition management.
- Z axis adopts the hydraulic cylinder balance design. The movement is smooth and steady.
- X and Y axis utilize extra heavy duty design. The motion rigidity is stable.
- Perfect design on column distance and spindle dimension provide stability during heavy cutting.
- The machine structure is made of cast iron, by tempering and stress-relieved. Ensure to maintain the optimum rigidity and stability.



FEELER®
FDM-SERIES

Provide variety of choices Especially the following industries

- Aerospace industry
- Mold & Die industry
- Large automobile parts
- Structural parts five-face processing

FDM-4228 **B**
FDM-4228 **U**
FDM-4228 **H**

FDM-X X X X [FDM-3228~FDM-8235]

(x100mm) Distance between two columns
(x100mm) X axis travel

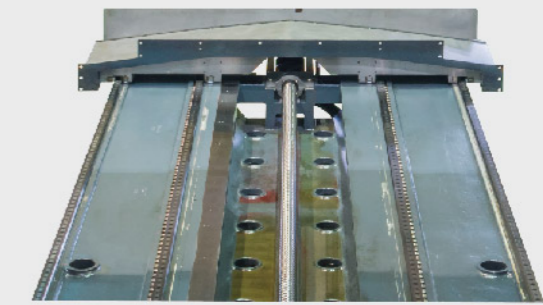
- B** - Box-way-Square-ram model (Heavy-cutting model)
- U** - Five-axis model
- H** - High-speed model

Perfectly structural design

Create high production capacity
High stability and precision machining performance

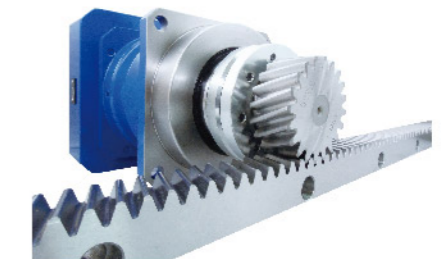
FDM series have great machining depths and faster feedrate. Minimize the vibration, maintain optimum rigidity and stability. Achieve high productivity capacity.

- The box-type construction with rib-enhanced design reveals extraordinary rigidity.
- The table is fully supported design without overhang.
- The large column distance and axis travel are available for large workpiece processing. The maximum load of the table is 30,000 kg [Please refer to specification]



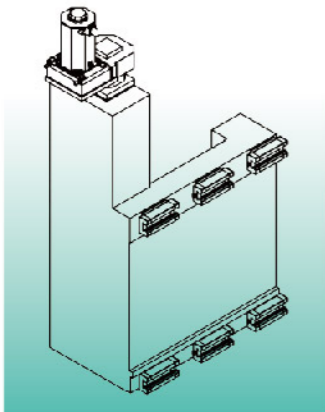
■ X axis design

- Direct-Driven reducer transmission (X-axis travel 3~6m)
- Four line linear-guideway design on X axis (column distance 2800/3200/3500mm)
- Highly heavy load design on table (OPT.)
- Symmetric drive design on ball screw
- Ball screw thermal elongation management
- X-axis travel 7,200~8,200mm, use Rack and Pinion drive design. Featuring backlash -fresh and minimum pitch error. Maintain optimal machining accuracy. (Avoid the thermal deformation caused by ball screw on long travel, which affects the machining accuracy.)



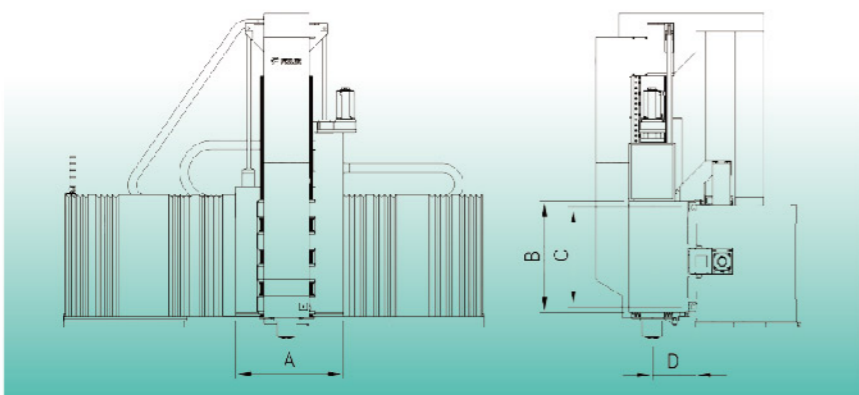
■ Y axis design

- Six blocks design for superior dynamic rigidity
- Ball screw thermal elongation management



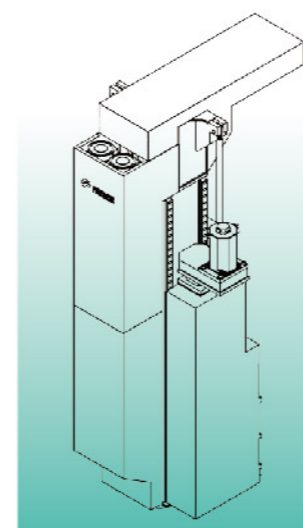
■ Beam design

- Increase the span of the cross-section (A \ B)
 - Widen the span of the two linear-guideways (C)
 - The shortest free overhang distance (D).
- Effectively improve the dynamic stability and processing accuracy.



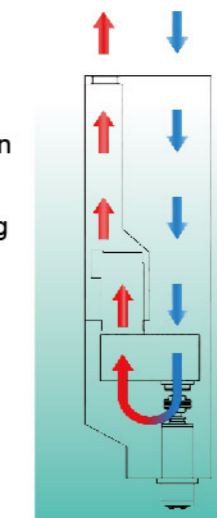
■ Z axis design (PATENT)

- Adopts three linear-guideways design
- The ball screw adopts right side configuration with minimum overhang distance.
- Each linear-guideway adopts four-blocks design
- Counter weight cylinder, spindle center, drive system and the three linear-guideways achieve the best stable and symmetrical design.



■ Spindle motor insulation design

- Efficiently dissipate heat and block the thermal from the spindle motor to enhance accuracy.



Perfect Design



■ Desktop operating panel (STD.)

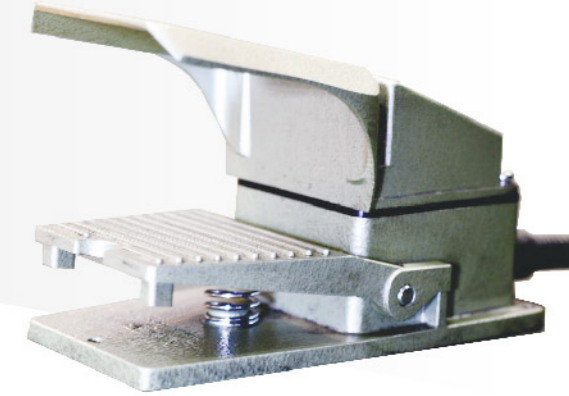
■ Controller

- STD : FANUC 0i-MF
- OPT : 1. FANUC 32i-M / 31i-M
- 2. MITSUBISHI (M80 / M830)
- 3. SIEMENS (828D / 840DSL)
- 4. HEIDENHAIN (iTNC 640)



■ Chip Conveyor (STD.)

- The chip conveyor delivers chips to the cart. Available to different height of faucet according to customer demands.

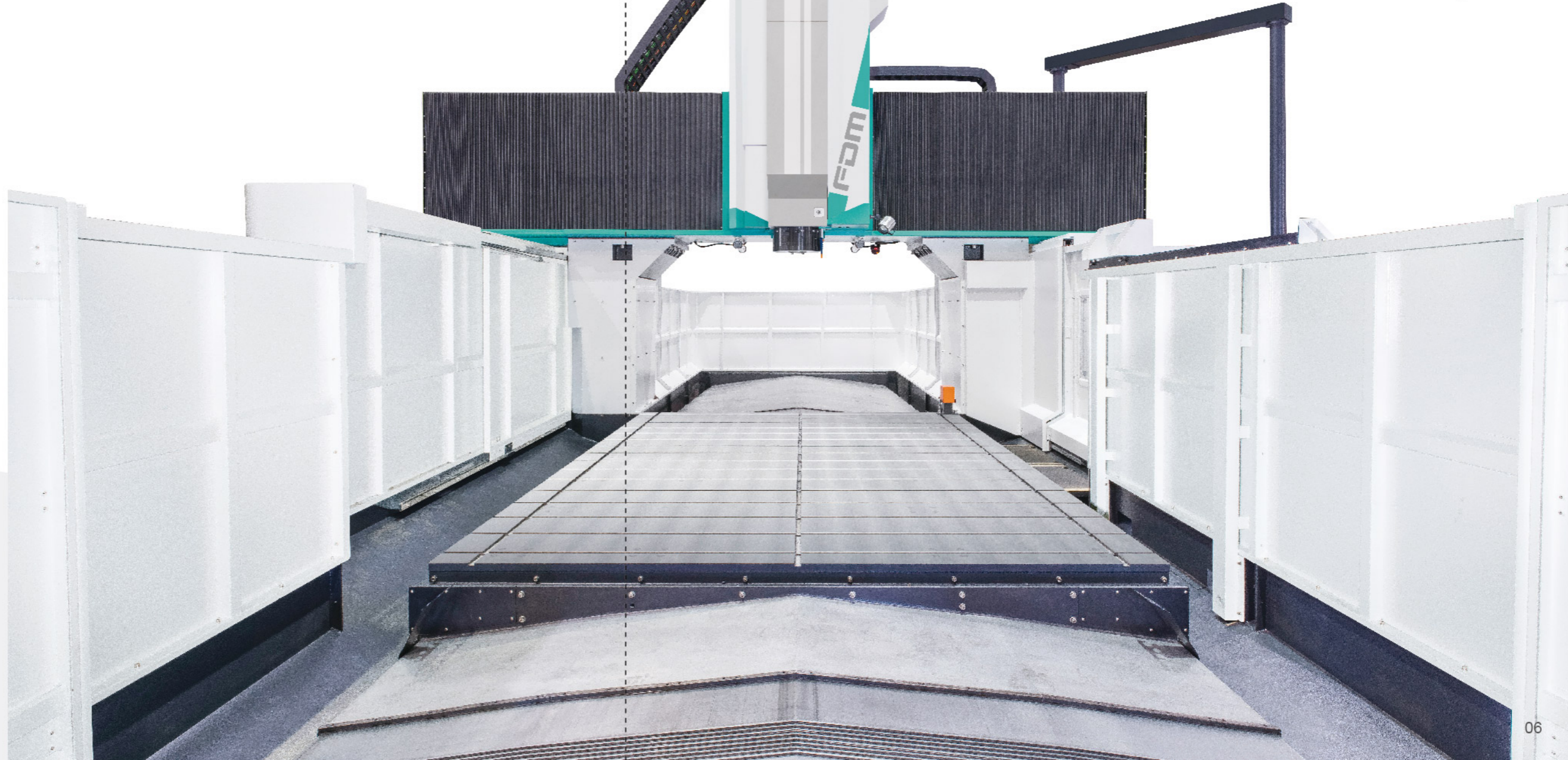


■ Foot Switch (STD.)

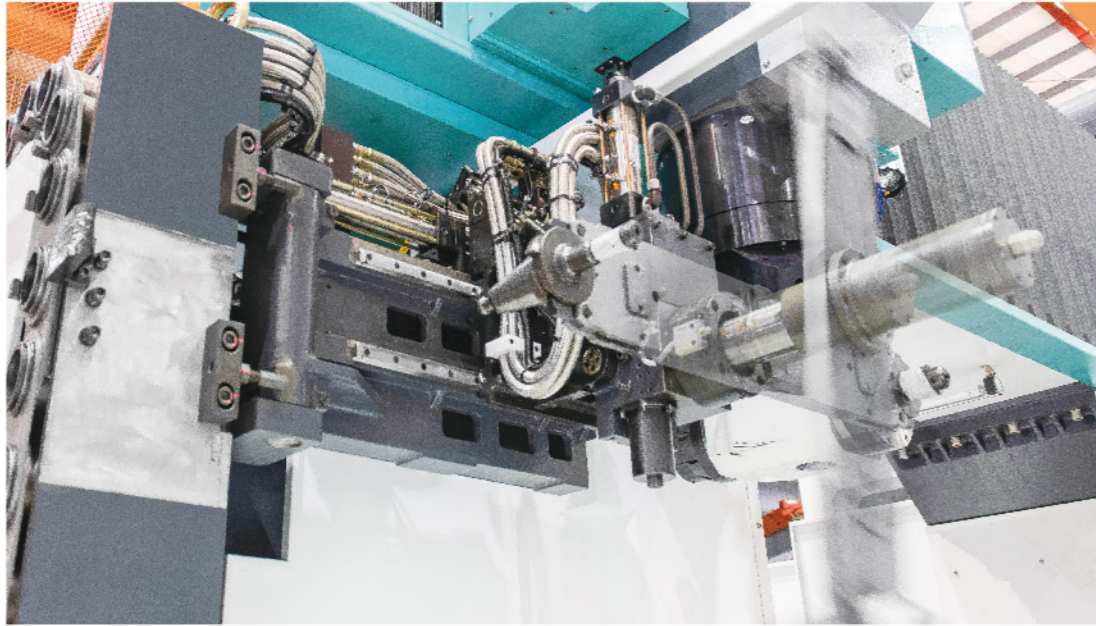
- By using the foot switch, the operator can conveniently clamp or release the tool from spindle.

■ Pendant Control Panel (OPT.)

- The Pendant Control Panel allows more space for operator.



Vertical Type / Vertical - Horizontal Type Tool Magazine



* Equip with AAC system could consider to select Vertical-Horizontal type magazine as option, to reach tool change automatically.

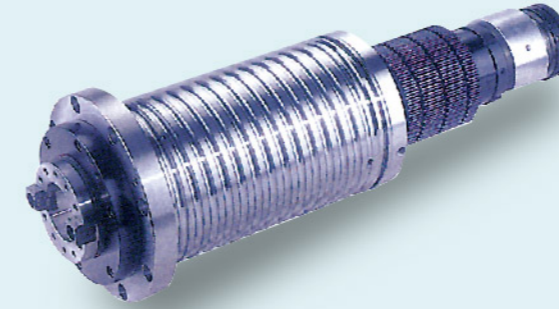
Standard

- 24T

Optional

- 32T Vertical Type/ Vertical-Horizontal Type
- 40T Vertical Type/ Vertical-Horizontal Type
- 90T Vertical Type/ Vertical-Horizontal Type

Spindle



■ Belt Type Spindle

- Spindle taper BT/DIN/CAT50 with short nose design makes the spindle excellent for heavy cutting.
- The spindle is driven through a planetary gear box.
- Spindle taper BT / DIN / CAT50
- 4000 / 6000rpm (STD.)
- 8000rpm (OPT.)



■ Gear Type spindle

- Excellent for heavy cutting.
- Spindle is driven by gear box.
- Spindle taper BT / DIN / CAT50
- 4000 / 6000rpm (STD.)

■ Direct-Driven Spindle (OPT.)

- Available for high speed cutting.
- Without gear box.
- Spindle taper BT / DIN / CAT40: 10000 / 12000 / 15000rpm (HSK-A63 is available)
- Spindle taper BT / DIN / CAT50: 10000rpm (HSK-100A is available)

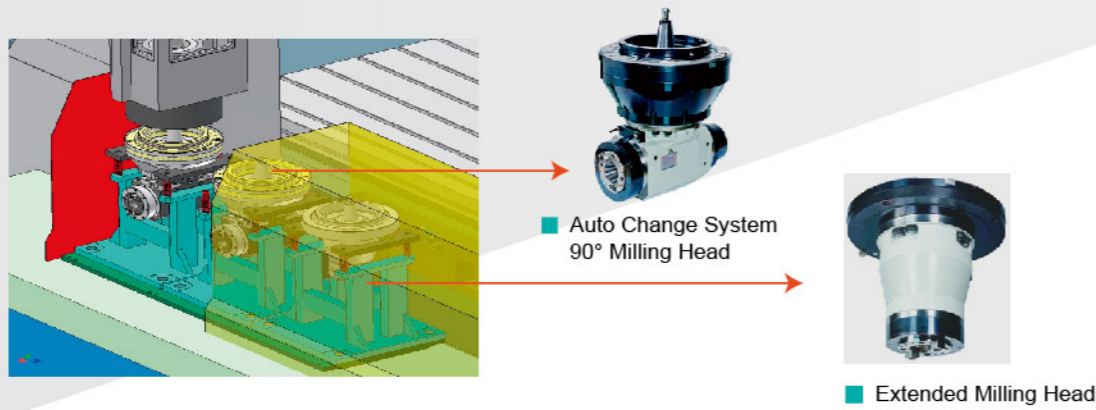
Spindle motor (BT50, FANUC)

Spindle Type	Spindle Speed	Spindle Power			Spindle Torque		
		α 15	α 22	α 30	α 15	α 22	α 30
Belt Type Spindle	4000 rpm	15/18.5 kW	22/26 kW	30/37 kW	576 Nm	840 Nm	1498 Nm
	6000 rpm				384 Nm	560 Nm	
	8000 rpm				384 Nm	560 Nm	
Gear Type Spindle	4000 rpm	15/18.5 kW	22/26 kW	30/37 kW	575 Nm	842 Nm	1498 Nm
	6000 rpm				405 Nm	591 Nm	997 Nm
	8000 rpm						

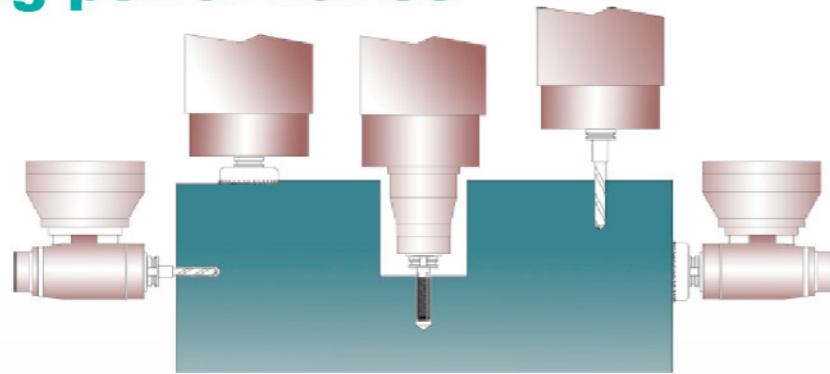
* Direct-Driven type provide separately

Optional

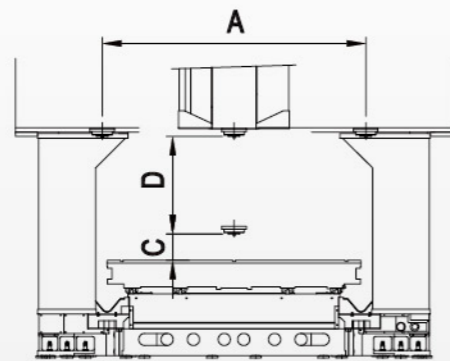
- Equip with Automatic Head Attachment Changer System to reach real automatic producing.
- Provide variety milling head.



Provide variety processing performance



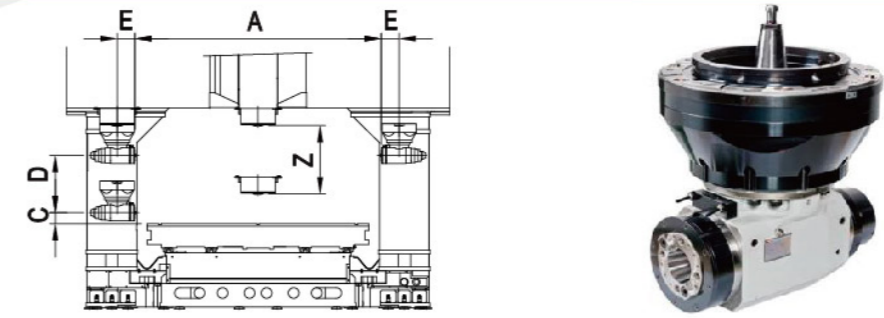
Gear Type Spindle (OPT)



Column Distance	A (Y-axis travel)	Z-axis travel 800				Z-axis travel 1000				Z-axis travel 1200	Z-axis travel 1400	
		Column extend										
		0	200	400	600	0	200	400	0	200	0	
C ~ C+D (Spindle Nose to Table Top)												
2800	2700	Short Spindle nose										
3200	3100		270-1070	470-1270	670-1470	870-1670	270-1270	470-1470	670-1670	270-1470	470-1670	270-1670
3500	3400											
2800	2700	Long Spindle nose										
3200	3100		150-950	350-1150	550-1350	750-1550	150-1150	350-1350	550-1550	150-1350	350-1550	150-1550
3500	3400											

* Unit: mm

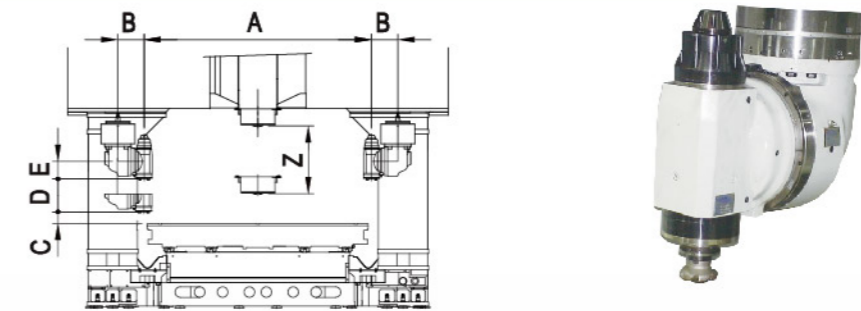
AAC auto change system 90°Milling head 3500 rpm



Column Distance	Y-axis travel	A	E	Z-axis travel (without head)									
				Z-axis travel 800				Z-axis travel 1000					
				Column extend									
				0	200	400	600	0	200	400	0	200	0
C~C+D (with head, Spindle Nose to Table Top)													
2800	3300	2882	209	130-600	130-800	200-1000	400-1200	130-800	130-1000	200-1200	130-1000	130-1200	130-1400
3200	3700	3282		(C=130)	(C=130)	(C=200)	(C=400)	(C=130)	(C=130)	(C=200)	(C=130)	(C=130)	(C=130)
3500	4000	3528											

* Unit: mm

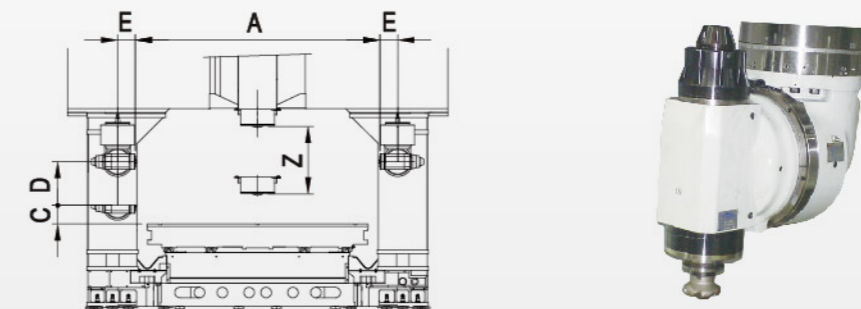
AAC auto change system Orthogonal Milling Head 3500 rpm - Vertical Machining



Column Distance	Y-axis travel	A	B	E	Z-axis travel (without head)										
					Z-axis travel 800				Z-axis travel 1000						
					Column extend										
					0	200	400	600	0	200	400	0	200	0	
C~C+D (with head, Spindle Nose to Table Top)															
2800	3300	2680	310	209	24-324	24-524	24-724	124-924	24-524	24-724	24-924	24-724	24-924	24-924	
3200	3700	3080			(C=24)	(C=24)	(C=24)	(C=124)	(C=24)	(C=24)	(C=24)	(C=24)	(C=24)	(C=24)	(C=24)
3500	4000	3380													

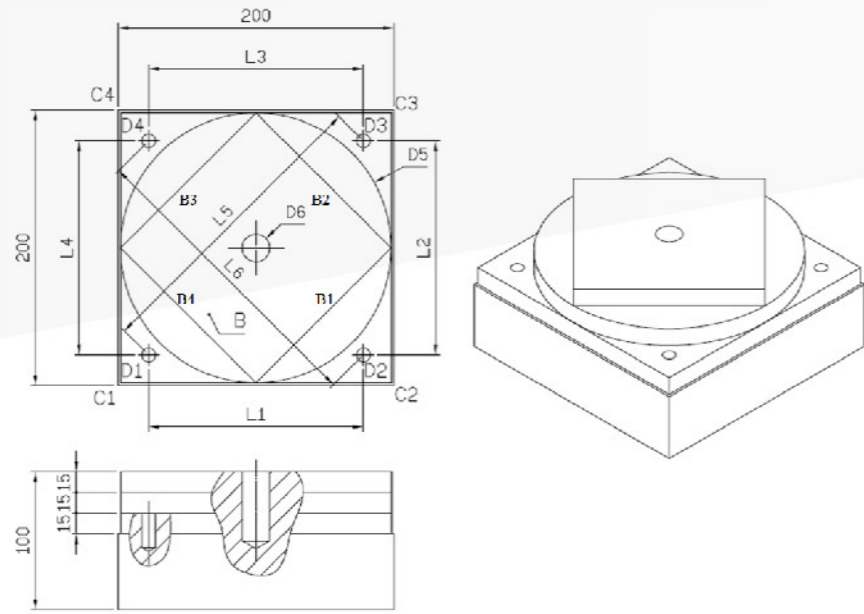
* Unit: mm

AAC auto change system Orthogonal Milling Head 3500 rpm - Horizontal Machining



Column Distance	Y-axis travel	A	E	Z-axis travel (without head)										
				Z-axis travel 800				Z-axis travel 1000						
				Column extend										
				0	200	400	600	0	200	400	0	200	0	
C~C+D (with head, Spindle Nose to Table Top)														
2800	3300	2882	209	233-533	233-733	233-933	333-1133	233-733	233-933	233-1133	233-933	233-1133	233-1133	
3200	3700	3282		(C=233)	(C=233)	(C=233)	(C=333)	(C=233)	(C=233)	(C=233)	(C=233)	(C=233)	(C=233)	
3500	4000	3582												

* Unit: mm

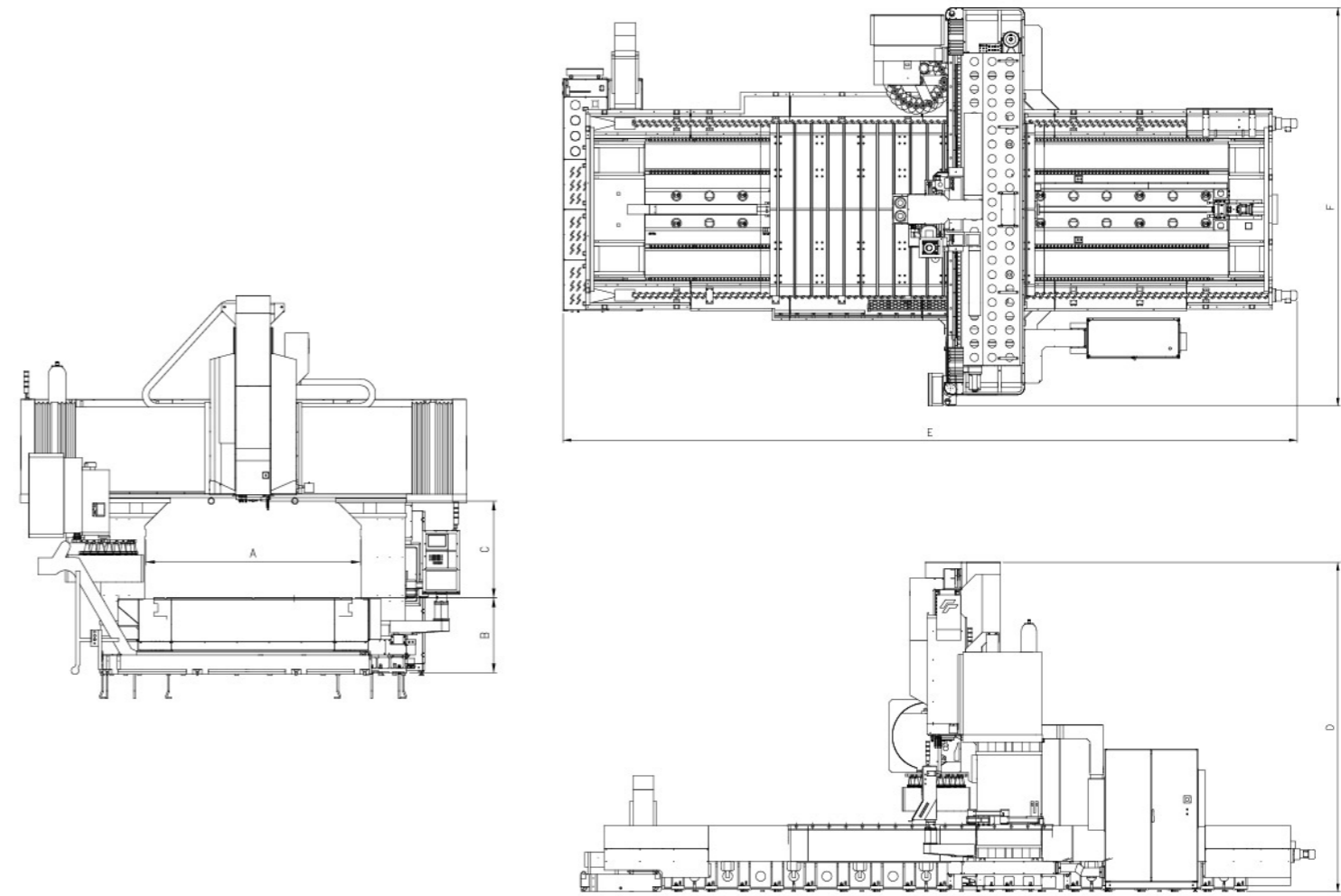


Drilling		Face milling		Tapping	
Tool	Ø55	Tool	Ø125x9	Tool	M60
Spindle motor	22/26 kW	Spindle motor	22/26 kW	Spindle motor	22/26 kW
Cutting depth	100 mm	Cutting width	110 mm	Cutting depth	45 mm
Cutting rate	50 mm/min	Cutting depth	5 mm	Cutting rate	450 mm/min
Workpiece Material	S45C	Cutting rate	1000 mm/min	Workpiece Material	S45C
		Material cutting output	550 c.c/min		
		Workpiece material	S45C		

	Test items	Permissible tolerance	Test data
Boring	Position accuracy(L1)	0.02mm	0.006mm
	Position accuracy(L2)	0.02mm	0.004mm
	Position accuracy(L3)	0.02mm	0.007mm
	Position accuracy(L4)	0.02mm	0.006mm
	Position accuracy(L5)	0.02mm	0.005mm
	Position accuracy(L6)	0.02mm	0.004mm
Round Cutting	Roundness D5	0.02mm	0.005mm
End milling (SIDE)	Verticality B1&B2	0.02mm	0.013mm
	Verticality B2&B3	0.02mm	0.01mm
	Verticality B3&B4	0.02mm	0.007mm
	Verticality B4&B1	0.02mm	0.01mm
End milling (Straight)	Parallelism B1&B3	0.02mm	0.003mm
	Parallelism B2&B4	0.02mm	0.008mm
	Verticality C1C2&C2C3	0.02mm	0.001mm
	Verticality C2C3&C3C4	0.02mm	0.001mm
	Verticality C3C4&C4C1	0.02mm	0.001mm
	Verticality C4C1&C1C2	0.02mm	0mm
	Parallelism C1C2&C3C4	0.02mm	0.001mm
	Parallelism C2C3&C4C1	0.02mm	0.001mm

*Each machine has different results of the accuracy test, so the actual test data which depends on the cutting conditions, equipment and environmental will be different.

Floor Space & Layout



ISO50

Mchine Volume	A Cloum Distance	B Table to Ground	C Spindle Nose to Table Top				D Height				E Length	F Width
			Z=800	Z=1000	Z=1200	Z=1400	Z=800	Z=1000	Z=1200	Z=1400		
			FDM-3228	2800	985	270~1070	270~1270	270~1470	270~1670	4400		
FDM-4228	11500	6050										
FDM-5228	13500	6050										
FDM-6228	17000	6050										
FDM-7228	19000	6050										
FDM-8228	21000	6050										
FDM-4232	3200	985	270~1070	270~1270	270~1470	270~1670	4400	5000	5600	6200	11500	6500
FDM-5232											13500	6500
FDM-6232											17000	6500
FDM-7232											19000	6500
FDM-8232											21000	6500
FDM-4235											3500	985
FDM-5235	13500	6800										
FDM-6235	17000	6800										
FDM-7235	19000	6800										
FDM-8235	21000	6800										

Unit: mm

Machine Specifications

FDM- $\frac{X}{A} \frac{X}{B} \frac{X}{A} \frac{X}{B}$ A (The first two digits) x100mm: X axis travel
B (The last two digits) x100mm: Distance between two columns

MODEL	Unit	FDM-3228	FDM-4228	FDM-5228	FDM-6228	FDM-7228	FDM-8228	FDM-4232	FDM-5232	FDM-6232	FDM-7232	FDM-8232	FDM-4235	FDM-5235	FDM-6235	FDM-7235	FDM-8235
TABLE																	
Overall Size	mm	3000x2600	4000x2600	5000x2600	6000x2600	7000x2600	8000x2600	4000x2600 (3000)	5000x2600 (3000)	6000x2600 (3000)	7000x2600 (3000)	8000x2600 (3000)	4000x3000 (3300)	5000x3000 (3300)	6000x3000 (3300)	7000x3000 (3300)	8000x3000 (3300)
T Slots	mm	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Maximum Loading	ton	12 (16)	15 (21)	18 (23)	21 (24)	18 (27)	20 (30)	21 (24)	23 (26)	24 (27)	27 (30)	30	24 (27)	26 (29)	27 (30)	27 (30)	30
TRAVEL																	
X Axis	mm	3200	4200	5200	6200	7200	8200	4200	5200	6200	7200	8200	4200	5200	6200	7200	8200
Y Axis	mm	2700 (3300)	2700 (3300)	2700 (3300)	2700 (3300)	2700 (3300)	2700 (3300)	3100 (3700)	3100 (3700)	3100 (3700)	3100 (3700)	3100 (3700)	3400 (4000)	3400 (4000)	3400 (4000)	3400 (4000)	3400 (4000)
Z Axis	mm	800 (1000、1200、1400)						800 (1000、1200、1400)									
DISTANCES																	
Between Two Columns	rpm	2800	2800	2800	2800	2800	2800	3200	3200	3200	3200	3200	3500	3500	3500	3500	3500
Spindle Nose To Table Top	rpm	270~1070 (Z=800) / 270~1270 (Z=1000) / 270~1470 (Z=1200) / 270~1670 (Z=1400)						270~1070 (Z=800) / 270~1270 (Z=1000) / 270~1470 (Z=1200) / 270~1670 (Z=1400)									
SPINDLE NOSE TO TABLE TOP																	
Speed of main spindle	rpm	6000 (4000/8000)						6000 (4000/8000)									
Speed of motor-cont/30min	kW	FANUC 15/18.5(22/26) / SIEMENS 15/20.5(22/30) / HEIDENHAIN 15/20.5(20/30)						FANUC 15/18.5(22/26) / SIEMENS 15/20.5(22/30) / HEIDENHAIN 15/20.5(20/30)									
Taper		BT/DIN/CAT 50 (#40)						BT/DIN/CAT 50 (#40)									
FEED RATE																	
Rapid Feedrate X/Y/Z	mm/min	1~7000						1~7000									
Cutting Feedrate X/Y/Z	mm/min	15/15/12			12/15/12			15/15/12		12/15/12		15/15/12		12/15/12			
Minimum Setting	mm	0.001						0.001									
ATC																	
No. of ATC		24 (32/40/60/90)						24 (32/40/60/90)									
Max. Length of Tool	mm	350 (STD:24T) / 400 (OPT:32T/40T/60T/90T)						350 (STD:24T) / 400 (OPT:32T/40T/60T/90T)									
Max. Weight of Tool	kg	18 (STD:24T) / 25 (OPT:32T/40T/60T/90T)						18 (STD:24T) / 25 (OPT:32T/40T/60T/90T)									
Max. Dia of Tool (with Adjacent Tool)	mm	110 (STD:24T) / 125 (OPT:32T/40T/60T/90T)						110 (STD:24T) / 125 (OPT:32T/40T/60T/90T)									
Max. Dia of Tool (without Adjacent Tool)	mm	200 (STD:24T) / 250 (OPT:32T/40T/60T/90T)						200 (STD:24T) / 250 (OPT:32T/40T/60T/90T)									
COOLANT & LUBRICATION																	
Coolant Tank Volume	L	840			980			840		980		920		1060			
Hydraulics Tank Volume	L	70						70									
Lubrication Tank Volume	L	8			12.6			8		12.6		8		12.6			
MISCELLANEOUS																	
Machine Net Weight (around)	ton	45	51	58	73	82	91	56	63	75	86	100	61	68	77	87	106
Power Required	kVA	50						50									
Pneumatics Required	kg/cm ²	7						7									
Hydraulics Required	kg/cm ²	70						70									
Controller		FANUC 0i-M(32i-M/31i-M) MITSUBISHI (M80/M830) SIEMENS (828D/840DSL) HEIDENHAIN (iTNC 640)						FANUC 0i-M(32i-M/31i-M) MITSUBISHI (M80/M830) SIEMENS (828D/840DSL) HEIDENHAIN (iTNC 640)									

*Values in brackets () are optional. *Specifications are subject to change without notice

Standard Features & Accessories

- AUTOMATIC LUBRICATION SYSTEM
- AUTOMATIC POWER OFF
- AICC II (200 Block / 30m)
- A.T.C. 24
- DATA SERVER + 2G CF CARD
- HEAT EXCHANGER IN CABINET
- LEVELLING BOLTS & PADS
- MACHINE & CONTROLLER MANUALS
- M.P.G.
- RS-232C & RJ-45 TERMINAL INTERFACE
- SPINDLE SPEED 6000 rpm
- SPINDLE MOTOR 15/18 5kW .
- SPINDLE AIR BLAST SYSTEM
- SPINDLE OIL COOLER
- SCREW AUGER & CHAIN TYPE CHIP CONVEYORS & CART
- SPLASH GUARD
- TOOLS BOX FOR MACHINE ADJUSTMENT
- WORKING LAMP & ALARM LAMP

Optional Accessories

- AUXILIARY WORK TABLE
- AIR CONDITIONER IN ELECTRIC CABINET
- AUTO TOOL CHANGE: 32/40/60 TOOLS
- CNC ROTARY TABLE
- COOLANT THROUGH SPINDLE (CTS 20 bar)
- CUTTING COOLANT MIST DEVICE
- FULL SPLASH GUARD WITH TOP ROOF
- TOOL SHANK
- TOOL PRESETTER (TS-27)
- WORKPIECE COORDINATE MEASURING (OMP 60)
- X/Y/Z AXIS LINEAR SCALES
- THERMAL DISTORTION COMPENSATION MODULE
- AAC ATTACHMENT SYSTEM
- COOLANT TANK
- AIR GUN
- 90° MILLING HEAD
- ORTHOGONAL MILLING HEAD
- EXTENDED MILLING HEAD ETC.