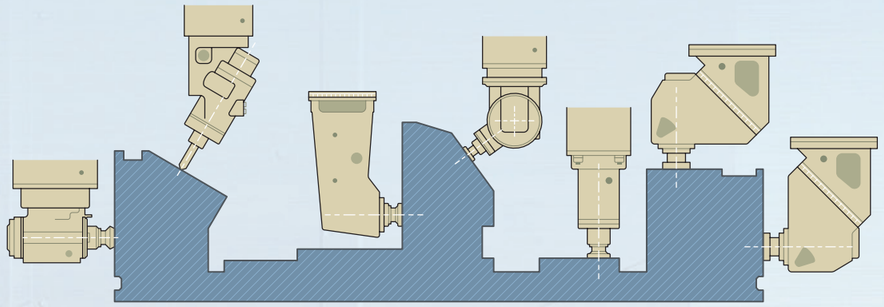
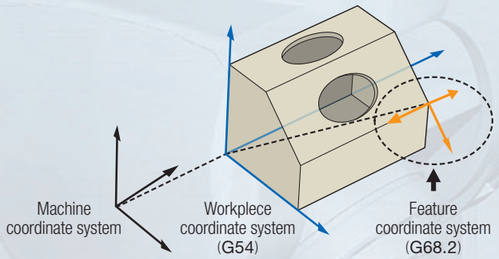
FOUR-STAR

Quality, Credibility, Innovation, Service

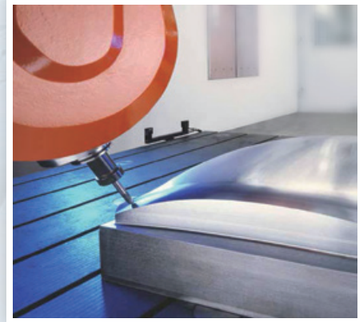


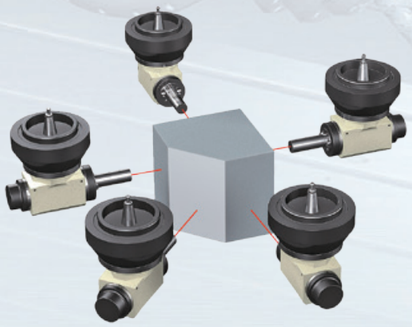
▲ Special angle milling head

▼ 3D Tilted Working Plane Indexing

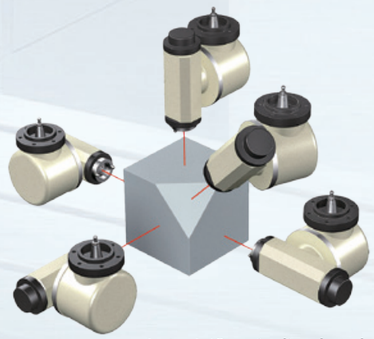


▼ 5 Axis Simultaneous milling head





Auto 90° milling head



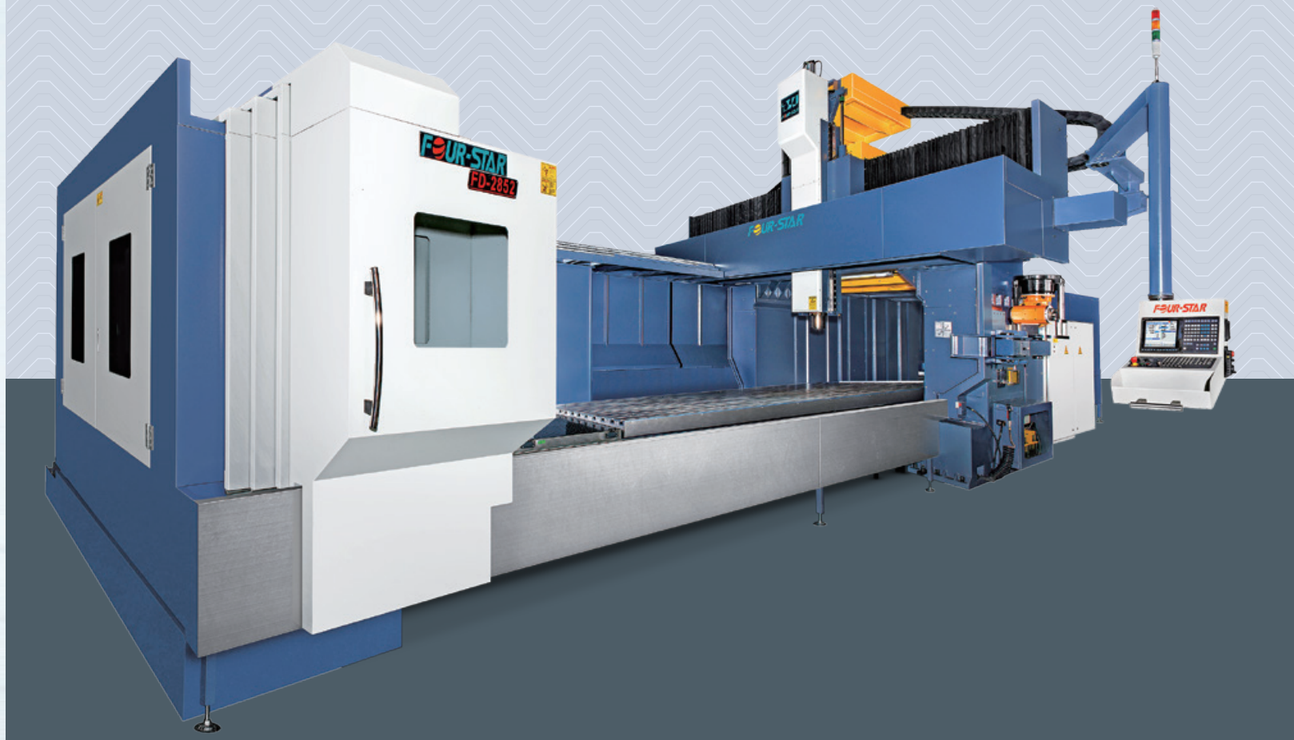
Auto A/C swiveling head

YONG JU PRECISION TECHNOLOGY CO.,LTD.
TEL：+886-4-2565-3981 E-mail：yjpt@fourstarcnc.com
FAX：+886-4-2560-8430 http：//www.fourstarcnc.com
No.6-2, Lane 292, Da Lin Road, Da Ya District, Taichung City, 42847, Taiwan.

2017. March

FOUR-STAR

FD series
FIXED DOUBLE COLUMNS MACHINING CENTER



www.fourstarcnc.com

FIXED COLUMNS

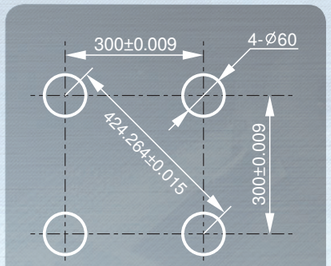
FIXED CROSS-RAIL **FD**

MOVING CROSS-RAIL **FDW**

FOUR-STAR

FD series
FIXED DOUBLE COLUMNS

▼ Fully enclosure splash guard



High precision machining

TRAVEL

X-travel: 2200~6000mm

Y-travel: 1400/1800/2100/2400/2800mm
3200/3600/4200mm

Z-travel: 800/1100/1400/1500mm

MODEL INFO

FD-42 60+5F

- +5F: + Auto angle milling head
- 60: **Y** travel + 650mm
- x100 → 60: **X** axis travel 6000mm
- x100 → 42: Distance between columns 4250mm
- FD: Fixed Double Columns

▲ Semi enclosure type splash guard (no top)

ⓘ For FD-14~FD-24A

FDW series
MOVING CROSS-RAIL

MODEL INFO

FDW-36 60+5A

- +5A: +5 Axis simultaneous milling head
- 60: **Y** travel + 650mm
- x100 → 60: **X** axis travel 6000mm
- x100 → 36: Distance between columns 3650mm
- W: **W** type moving cross-rail
- FD: Fixed Double Columns

TRAVEL

X-travel: 2200~6000mm

Y-travel: 1800/2100/2400/2800/3200/3600/4200mm

Z-travel: 800/1100/1400mm

W-travel: 1000~2000mm

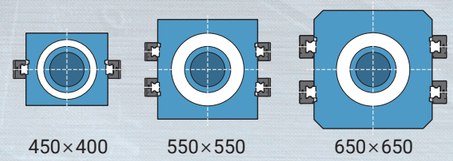
▲ Open type splash guard (two sides)

ⓘ For FD-28~FD-42 & FDW series

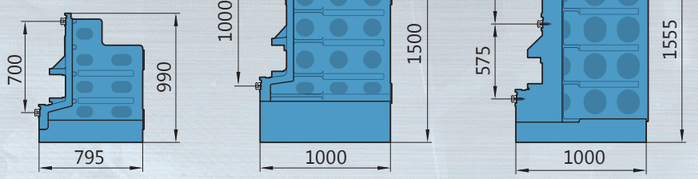
FD series
FIXED DOUBLE COLUMNS

Structural Design
(For FD-3660)

MEEHANITE®



Optimal Rigidity

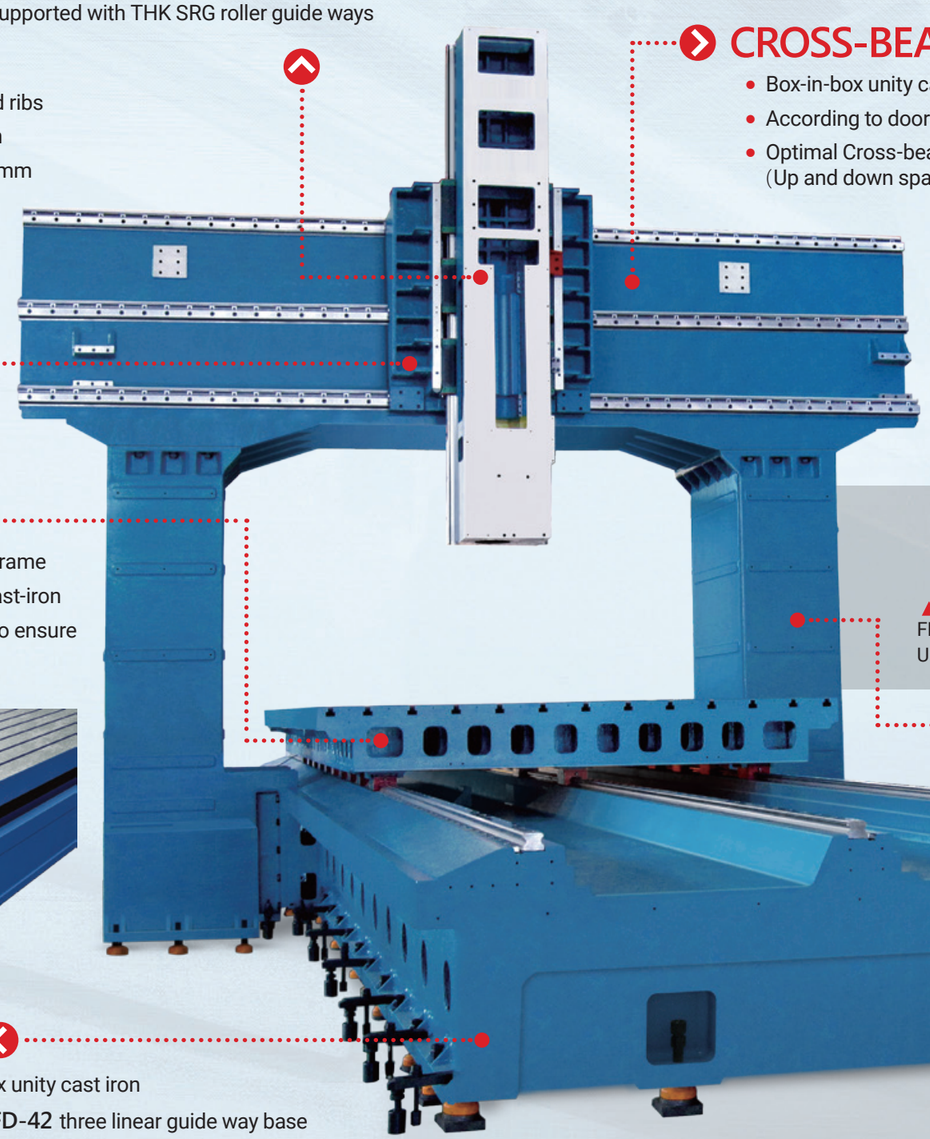


FD-14/18/21/24A　FD-28/32　FD-36/42

SPINDLE BOX (RAM)
- Optimal design **450**x**400**mm² (**std**)
- Heavy duty RAM size **550**x**550**mm², **650**x**650**mm² (**opt**)
- Supported with THK SRG roller guide ways

SADDLE
- Unity frame with reinforced ribs
- Stair type structural design
- Best track span 700~1150mm

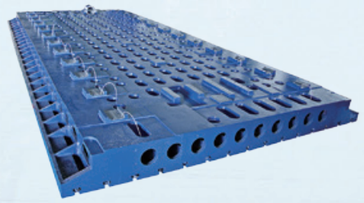
CROSS-BEAM
- Box-in-box unity cast-iron frame
- According to door width matching best cross-beam design
- Optimal Cross-beam design
  (Up and down span increase, front and rare narrow distance)



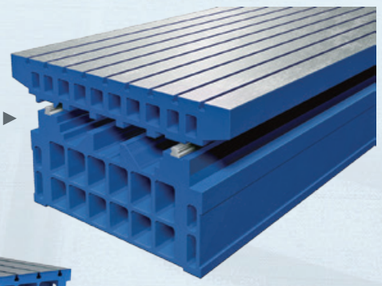
▲ FD-14 Series Cross-beam & Column
Unity frame with reinforced ribs.

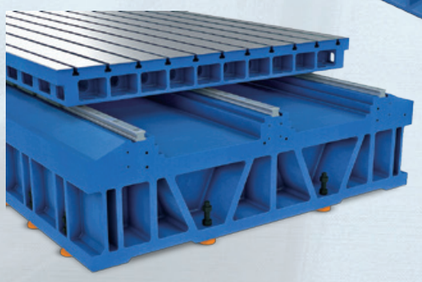
Patent certificate

TABLE
- Double layer loop frame
- Box-in-box unity cast-iron
- More linear block to ensure rigidity & accuracy



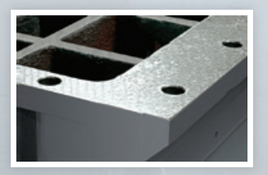
FD-14~FD-24A ▶





BASE
- Box-in-box unity cast iron
- **FD-28~FD-42** three linear guide way base
- Track with large span, High base, High rigid design

COLUMN
- Box-in-box unity cast iron frame
- Enlarge 50% column base increase rigidity
- All mounted surface made by precise hand-scraping

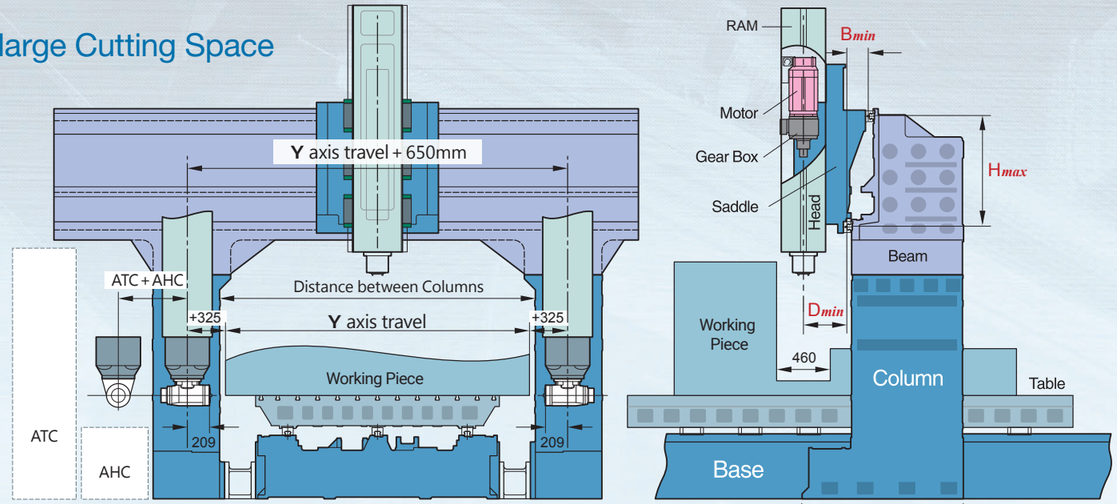


Optimization design

10 key indicators for Double Columns Machining Center

1 Box-in-Box unity cast-iron structure.
2 AHC and Column separate independent firm ground.
3 Columns and base separate independent firm ground.
4 Extend Y travel for auto 5F machining.
5 All linear guideways enhance rigidity and accuracy.
6 Crossbeam guideways span max H_{max} and B_{min}.
7 Distance between spindle center and crossbeam D_{min}.
8 Spindle motor placed on top, to isolate vibration and heat source.
9 With planetary gearbox efficiency over 95%.
10 Gearbox is placed on the top for depth machining.

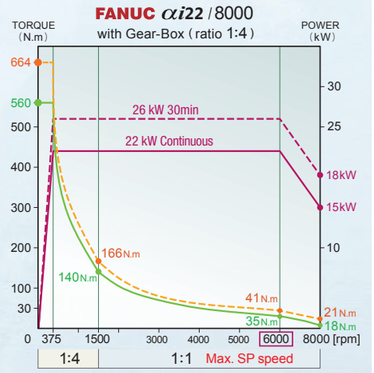
Enlarge Cutting Space

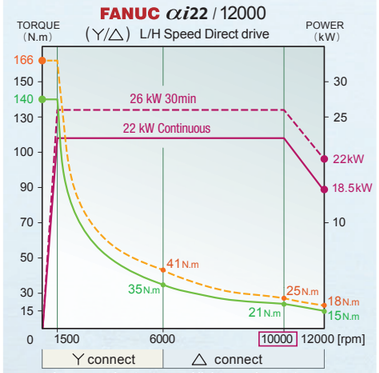


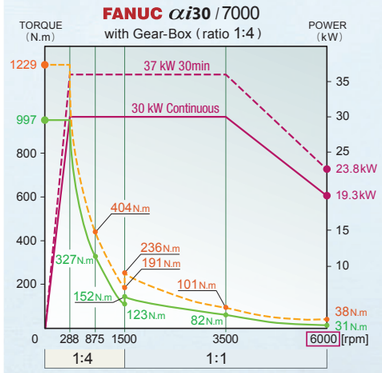
▲ Extend Y-travel for auto-5F cutting space

Enlarge column Base ▶ Extend 50%

Cutting Capability

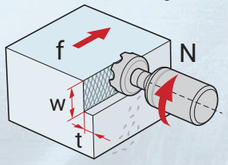




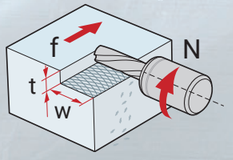


Cutting Record

▼ Horizontal Face milling



▼ Horizontal End milling

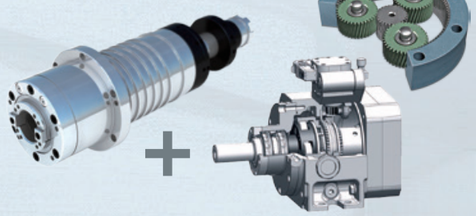


Type		Horizontal Face milling	Horizontal End milling
Material		S45C	S45C
Cutter diameter	mm	200	80
Speed	rpm	360	400
Cutting speed	m/min	226	100
Cutter width	mm	180	50
Cutter Depth	mm	5	30
Feed rate	mm/min	1250	600
Rate of metal removal	cc/min	1125	900
Power	kW	22	22
Rate of metal removal/kW	cc/kW	51	41

Optimal Efficiency Transmission

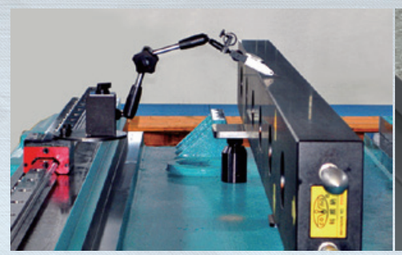
Direct drive spindle with
P4 level precision ball bearing is oil chilled to reduce thermal deformation.

Planetary gear

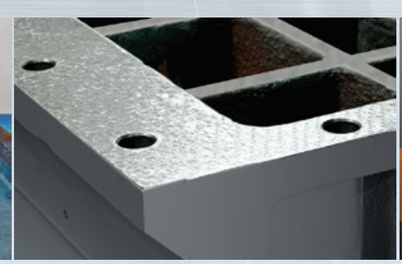


Two speed ratio IN-LINE gearbox
Full enclosure, high power and performance.

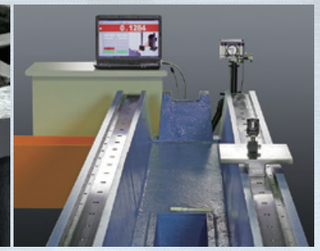
Quality Assurance



▲ High-precision assembly SOP.



▲ All mounted surface by precise hand-scraping.



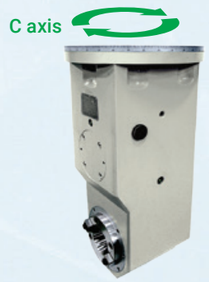
▲ Calibration straightness and flatness by laser.

Special Angle Milling Head (Exchange Type)

Type	Automatic	Semi-Automatic	Manual
Head exchange	Auto (hydraulic)	Manual (8 bolts)	Manual (8 bolts)
Head indexed	Auto (5°/2.5°/1°)	Auto (5°)	Manual (5° / free)
Tool clamped	Booster	Booster	Bolt

90° head

Extension head



Extension 90° head

Universal head
(Only manual)

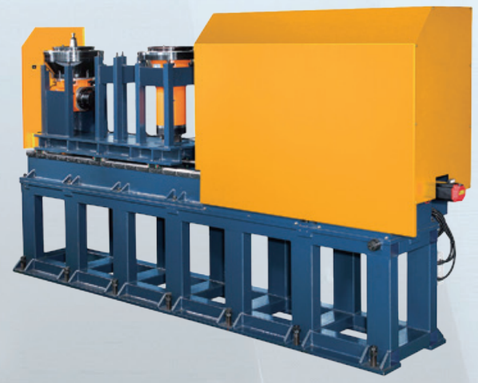
AC swiveling head

Special Milling Head (Fixed Type)

5 Face head
(dual tool shank)

5 Axis simultaneous head
(HSK A63/A100, 15~80kW, 30~400Nm, 6000~24000rpm)

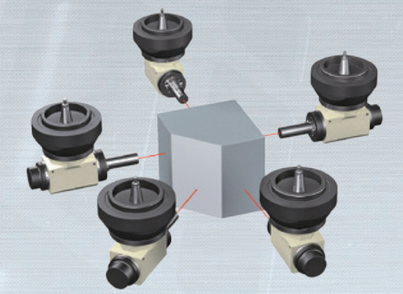
Auto Head exChanger (AHC)



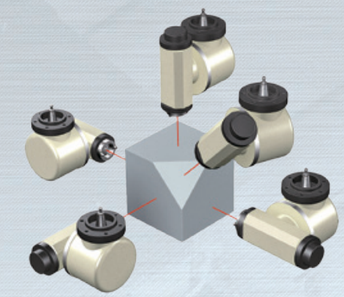
AHC for Auto angle milling heads (max.6 heads)

Auto 5F Milling Function

1. Smart human multi-face machining
2. Coordinate rotation function
3. 3D tilting machining function
4. 3D rigid tapping function
5. 3D manual feed function
6. AICC II high speed high precision
7. Jerk control
8. Tool life management function
9. Tool radius compensation
10. Power failure protection function



Auto 90° milling head

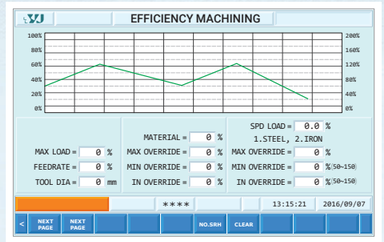


Auto A/C swiveling head

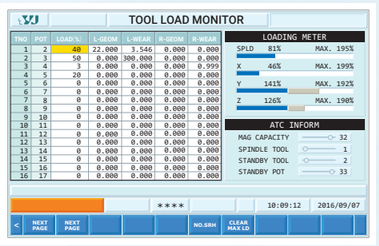
SHMI (Smart Human-Machine Interaction)

▼ Main screen **MAIN**

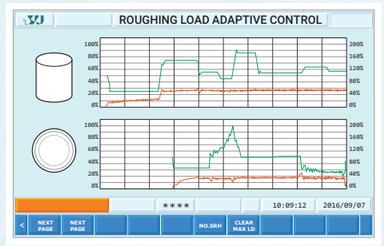
▼ Efficiency machining **EM**



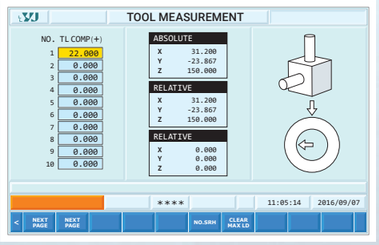
▼ Tool load monitor **TLM**



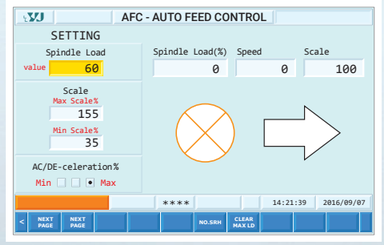
▼ Roughing load adaptive control **RLAC**



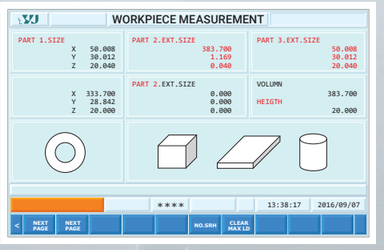
▼ Tool measurement **TM**



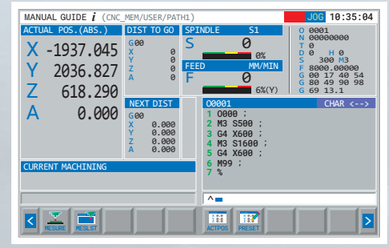
▼ Auto feed control (AFC) **AFC**



▼ Workpiece measurement **WM**



▼ Dialogue guideline **DG**



FANUC 0*i*MF & 31*i*MB Function List

Specifications	0*i*MF	31*i*MB
Max controlled axes number	7	20
Max simultaneous controlled axis	4	4
Tandem / Torque control	○	○
Increment system C	○	★
Dual position feedback *1	★	★
Linear scale I/F with absolute address reference mark *1	★	★
HRV2 / HRV3 control	○	○
Inch / metric conversion	○	○
Interlock	○	○
Machine lock	○	○
Emergency stop	○	○
Over travel	○	○
Stroke limit check before move	○	○
Mirror image	○	○
Position switch	○	○
Operation		
MDI operation	○	○
DNC operation	○	○
Program restart	○	○
Retraction for rigid tapping	○	○
Retraction for 3D rigid tapping *2	★	★
Buffer register	○	○
Dry run	○	○
Single block	○	○
Jog feed	○	○
3-dimensional manual feed	★	★
Manual handle interruption	○	○
Incremental feed	○	○
Auxiliary / Spindle speed function		
Auxiliary function	○	○
High-speed M/S/T/B interface	○	○
Spindle override	○	○
Spindle orientation	○	○
Rigid tapping	○	○
Rigid tapping by manual handle	★	★
Interpolation functions		
Nano interpolation	○	○
Positioning	○	○
Exact stop	○	○
Linear interpolation	○	○
Circular interpolation	○	○
Dwell	○	○
Cylindrical interpolation	○	★
Helical interpolation	○	★
Nano smoothing *3	★	★
Jerk control *3	★	★
Tolerance control *3	★	★
Thread cutting, synchronous cutting	○	○
Skip function	○	○
Optional block skip	○	○
Reference position return check	○	○
Editing Operation		
Part program storage size ×3	○	○
Part program editing	○	○
Program protect	○	○
Extended part program editing	○	○
Background editing	○	○
Data server editing / operation	○	○
Accuracy compensation function		
Stored pitch error compensation	○	○
Smooth backlash compensation	○	○
Interpolation type straightness compensation	○	○

Specifications	0*i*MF	31*i*MB
Guidance function		
Manual Guide *i*	○	○
Program input		
Absolute / incremental programming	○	○
Decimal point programming calculator type	○	○
Polar coordinate command	○	○
Coordinate system setting	○	○
Automatic coordinate system setting	○	○
Workpiece coordinate system	○	○
Addition of workpiece coordinate system	○	○
Programmable data input	○	○
Sub program call	○	○
Custom macro	○	○
Addition of custom macro common variables	○	○
Canned cycles for drilling	○	○
Circular interpolation by R programming	○	○
3-dimensional coordinate system conversion	○	○
Automatic corner override	○	○
Scaling	○	○
Coordinate system rotation	○	★
Tilted working plane indexing	★	★
Setting and display		
Parameter setting and display	○	○
Alarm display	○	○
Alarm history display	○	○
Operator message history display	○	○
Operator history display	○	○
Run hour and parts count display	○	○
Multi-language display	○	○
Dynamic display language switching	○	○
Erase CRT screen display	○	○
Self-diagnosis function	○	○
Graphic display	○	○
Machining condition selection function	○	○
Feed function		
Rapid traverse rate	○	○
Rapid traverse override	○	○
Feed per minute	○	○
Federate override	○	○
Jog override	○	○
AI contour control II	○	○
Data input / output		
Memory card input / output	○	○
Screen hard copy	○	○
Power Mate CNC manager	○	○
External I/O device control	○	○
Fast data server	○	○
Tool function / Tool compensation		
Tool offset pairs	○	○
Tool offset memory C	○	○
Tool offset	○	○
Tool length measurement	○	○
Automatic tool length measurement	○	○
Tool life management	○	★
Other Function		
Embedded Ethernet	○	○
Fast Ethernet	○	○
PMC system	○	○
PMC function	○	○
I/O Link DI/DO points	○	○
Backlash compensation	○	○
Stored pitch error compensation	○	○

○ Standard ★ Optional accessories function *1 For linear scale. *2 For auto milling head. *3 For mold cutting.

FD Series Specification list

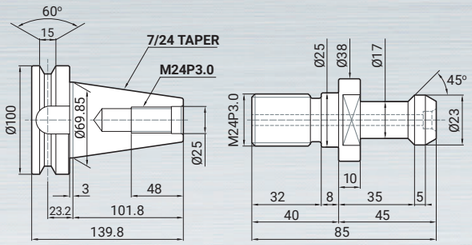
Item		Unit	FD-14			FD-18					FD-21					FD-24A			
Model		FD-	1422	1427	1432	1822	1827	1832	1842	1852	2122	2127	2132	2142	2152	2427A	2432A	2442A	2452A
Distance between columns		mm	1400			1850					2150					2450			
Table size	Length	mm	2000	2500	3000	2000	2500	3000	4000	5000	2000	2500	3000	4000	5000	2500	3000	4000	5000
	Width	mm	1200			1500					1800					2000			
Max. Table Load		ton	10	12	15	12	13	15	18	20	12	13	15	18	20	13	15	18	20
T-slot	Width × Pitch × No.	mm	22 × 150 × 7			22 × 150 × 9					22 × 150 × 11					22 × 150 × 13			
Travel	X-axis	mm	2200	2700	3200	2200	2700	3200	4200	5200	2200	2700	3200	4200	5200	2700	3200	4200	5200
	Y-axis	mm	1300			1800					2100					2400			
	Z-axis	mm	800			800 (opt. 1100)													
Spindle	Nose to table	mm	30 ~ 830			180 ~ 980			75 ~ 875		180 ~ 980			75 ~ 875		130 ~ 930		75 ~ 875	
	Center to column	mm	430			430													
	Taper / Speed / Power	rpm/kW				BBT 50 - 6000rpm - 22/26kW + 2 stage gearbox													
feedrate	Cutting	m/min	10			8			7		7			6					
	X axis	m/min	22	20	20	22	20	20	18	15	20	18	18	15	12	18	18	15	12
	Y/Z axis	m/min	18/18			18/15								15/15					
Accuracy		mm	Positioning ±0.015 / full travel ; Repeatability ±0.003																
ATC & tool magazine	Capcity / Dia.	mm	24 tools / max. dia Ø110 (Full tool) ; Ø200 (Adjacent empty)																
	Max. Length / Weight	Kg/mm	18kg / 380mm																
	Tool selection		Random shortest direction / M24 P3.0-45°																
Machine size	Length	m	6.4	7.4	8.4	6.4	7.4	8.4	11.1	13.1	6.4	7.4	8.4	11.1	13.1	7.4	8.4	11.1	13.1
	Width	m	4.00			4.55					4.85					5.15			
	Height	m	4.10			4.57 (5.47)													
Machine Weight (app.)		ton	20	22	24	24	26	28	32	36	25	27	29	33	37	28	30	35	40

FD-28				FD-32				FD-36			FD-42		
2832	2842	2852	2860	3232	3242	3252	3260	3642	3652	3660	4242	4252	4260
2850				3250				3650			4250		
3000	4000	5000	6000	3000	4000	5000	6000	4000	5000	6000	4000	5000	6000
2200				2600				3000			3000 (opt. 3400)		
18	20	22	24	18	20	22	24	20	22	24	22	24	26
28 × 180 × 13				28 × 200 × 13				28 × 200 × 15					
3200	4200	5200	6000	3200	4200	5200	6000	4200	5200	6000	4200	5200	6000
2800				3200				3600			4200		
1100 (opt. 1400)								1100 (opt. 1400/1500)					
180 ~ 1280				150 ~ 1250				260 ~ 1360					
430								470					
BBT 50 - 6000rpm - 22/26kW + 2 stage gearbox													
6								6					
15	12	10	10	15	12	10	10	12	10	10	12	10	10
15/12								12/12					
Positioning ±0.015 / full travel ; Repeatability ±0.003													
32 tools / max. dia Ø125 (Full tool) ; Ø220 (Adjacent empty)													
20kg / 400mm													
Random shortest direction / M24 P3.0-45°													
9.4	11.4	13.4	15.4	9.4	11.4	13.4	15.4	11.4	13.4	15.4	11.4	13.4	15.4
6.00				6.40				6.80			7.40		
5.2 (6.1)								5.55 (6.45)					
44	49	54	59	50	55	60	65	62	67	72	68	73	78

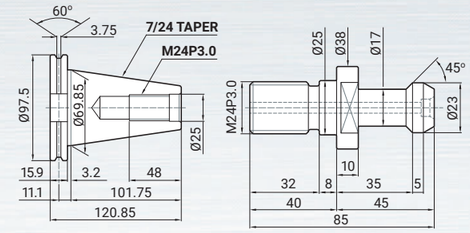
ⓘ All data will change based on the actual situation without notice.

Tool shank & Pull stud dimension

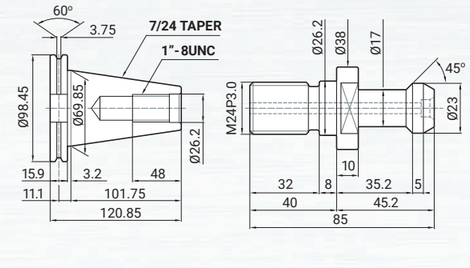
Standard : **BT-50** (JIS MAS 403 / MAS 403 P50T-1)



Standard : **ISO-50/SK-50** (DIN69871A / MAS 403 P50T-1)



Standard : **CAT-50** (ANSI B5.50 CAT50 / CAT-MAS 403 P50T-1)



Standard Accessories

1. FANUC 0iMF + 10.4" LCD
2. Spindle cooler
3. Spindle air blast
4. N2 Counter balancing system
5. Dual stage H/L planetary gearbox
6. Independent auto lubrication system
7. Program end alarm lamp
8. Rigid tapping
9. Electric cabinet heat exchanger
10. USB / RS232 / Ethernet interface
11. Coolant system
12. Dual spiral type chip remover
13. Metal belt chip conveyor with cart
14. Cam type ATC 24pcs (FD14 ~ FD24A)
15. Chain type ATC 32pcs (FD28 ~ FD42)
16. Semi-enclosure splash guard (FD14 ~ FD24A)
17. Open type splash guard (FD28 ~ FD42)
18. ATC auto door
19. Foot switch for tool away
20. Working lamp
21. Leveling screw + foundation bolts
22. Tool kit & Operator's manual
23. Air / water cleaning equipment
24. W axis linear scale (2 pcs) (FDW series)

Optional Accessories

1. X travel 7m ~ 10m (FD28 ~ FD42)
2. Mitsubishi / Siemens / Heidenhain Controller
3. Spindle power 30/37 kW with gearbox
4. High speed Spindle (8000~20000rpm)
5. Coolant Through Spindle (CTS)
6. 90° milling head (Auto, Semi-auto, Manual)
7. Extend milling head (Auto, Semi-auto, Manual)
8. AC swiveling milling head (Auto, Manual)
9. AHC system (for auto milling head)
10. Toggle head stand
    (for semi-auto / Manual milling head)
11. Five face milling head (Fixed type)
12. Universal milling head (Fixed type, Manual)
13. 5 axis simultaneous milling head
14. Y travel extend 650mm (for Auto 5F machining)
15. Heavy duty RAM 550 × 550 (FD-28 and up)
16. X, Y, Z axis linear scale
17. Tool length measurement
18. Auto work piece measurement
19. CNC rotary table (indexed / simultaneous)
20. Coolant thru tool holder device
21. Full enclosure splash guard
22. Oil skimmer
23. Transformer

Machine Layout & Dimension