

CHEVALIER®

Grinding / Turning / Milling



FVM-DC Series

Double Column Vertical Machining Center

FVM-8088 • 80125 • 80160DC

FVM-104125 • 104160 • 104200DC

FVM-133160 • 133200DC

FVM-80 • 104 • 133DC Series

Double Column Vertical Machining Center
Provides Stability, Precision and Accuracy



Note : The machine shown above includes optional fully enclosed splash guard and protection cover for through spindle coolant system and other options.

FVM-80 • 104 • 133DC Series

Double Column Vertical Machining Center

Established in 1978 and a major player in its industry, Chevalier manufactures grinding, turning and milling machining centers machines for the gas and oil, energy, aerospace, medical, automobile, semiconductor, telecommunications industries and job shops. Our experience is in developing and manufacturing high precision machines that meet the current and future demand for large workpiece machining.

The double column vertical machining center from Chevalier is suitable for your large workpieces. The machine is designed with a heavily ribbed machine base to ensure best rigidity and stability of the machine.



The exclusive design of the spindle center position is close to the bridge center, which results in consistent accuracy and smooth movement, especially for cutting rigidity.

The double column vertical machining center features its big size column and extra-wide spacing of box guide ways on a slanted Y-axis and close symmetrical design of the Z-axis. All models feature a 30 HP spindle motor with a two-speed gearbox.

The big size column and box-type beam construction provide better support and damping. The X-axis adopts the heavy-duty roller guide way to provide better acceleration and prevent a stick-slip problem.

The FVM-DC series not only handles the big workpieces but does it with cutting-edge control. The FANUC 0i-M controller comes with an AICC high-speed machining contour control, which has a smooth 3-D interpolation contouring control and an optional 200-block look-ahead function.

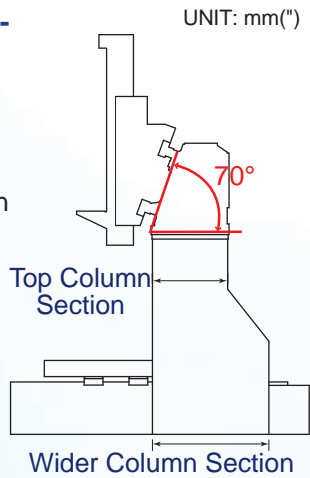
Table Size: Up to 5,100mm(L) x 3,000mm(W) (200" x 118")
Table Load: Up to 18,000 kgs (39,600 lbs.)
X / Y / Z Travel: Up to 5,000mm(X) x 3,400mm(Y) x 1,000mm(Z)
(196.8" x 133.8" x 39.3")
Spindle Speed: 6,000rpm / Optional 8,000rpm
Spindle Motor: Up to 26kW(35HP optional)
Spindle Taper: BT50 / CT50 / DIN50
Guide Way Design: X axis: linear roller
Y axis: box
Z axis: box

FVM-80 • 104 • 133DC Series

Machine Structure

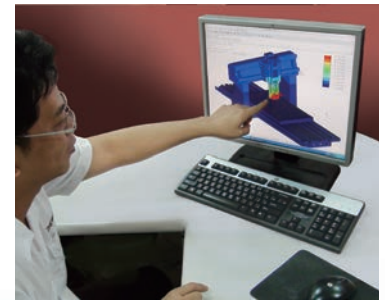
Bridge Column and Base -

The machine column is tightly fixed on both sides of the machine base. The bottom column section is wider than the top to protect the machine from tilting forward. The design of bridge column not only balance the weight but also ensure the machine rigidity and minimizes deformation. The machine base and cross-rail design with Meehanite casting ensure best rigidity and stability.



FEA (Finite Element Analysis) -

Our R&D Division uses Pro-E CAD 3D modeling software that enables our design engineers to achieve Finite Element Analysis and Dynamic Simulation through all phases of the design process. This ensures that all Chevalier machines perform at maximum accuracy, flexibility and rigidity.



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Machine Structure

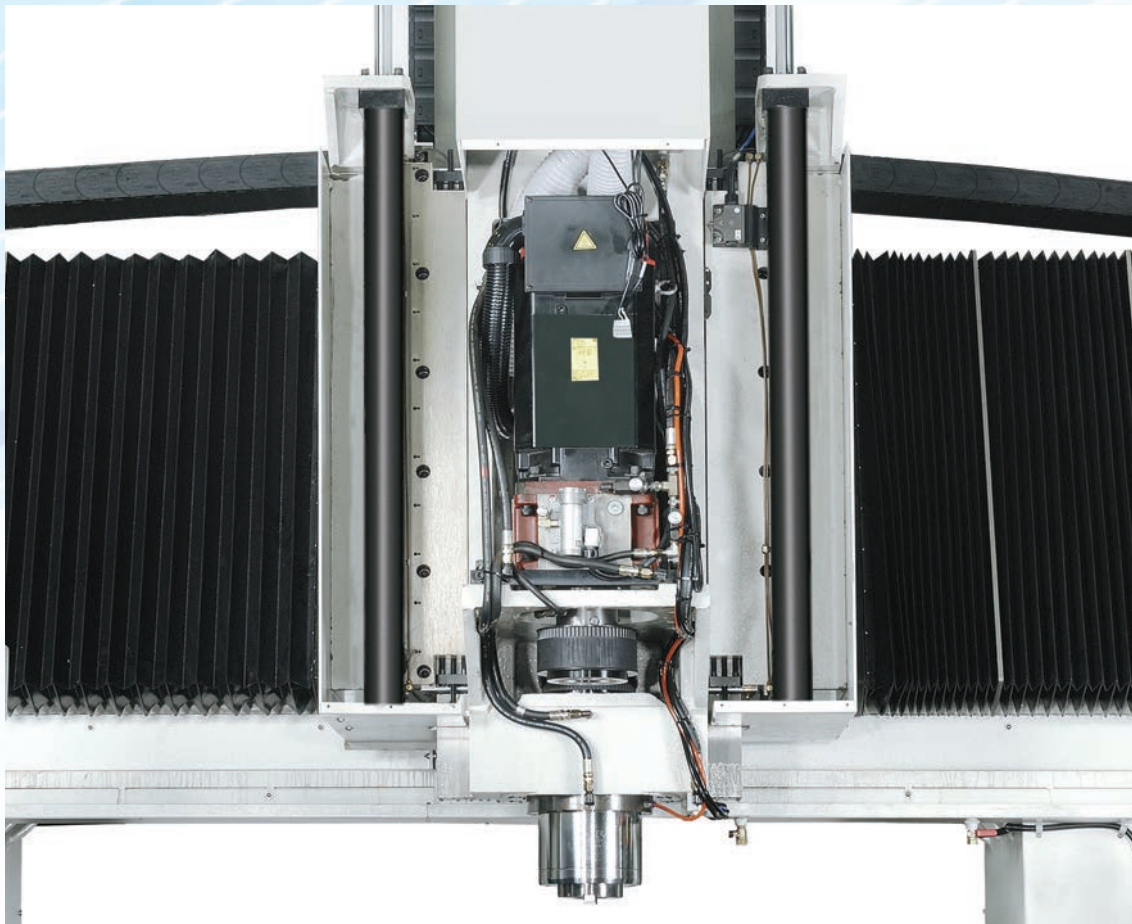
Advanced Spindle Design - High-speed 6,000rpm spindle speed is standard with a two-step gear transmission. The spindle incorporates high precision angular contact ball bearings for high cutting rigidity. The two-step gear transmission provides 560NM (413 ft.-lbs.) torque output at 375rpm that is ideal for machining hard material.

A more powerful 26kW (35HP) spindle motor is available as an option. Cooperated with two-step gear transmission, it will provide 662NM(488ft.-lbs.)torque output at 375rpm.



Gear Box Device is Ideal for Heavy Cutting - The 50-taper, cartridge-type, air purged, spindle is driven by a gearbox with a low-speed range for extra high torque output during heavy cutting. Additionally, the spindle, bearings and gears employ a forced cooling system to prevent thermal deformation and maintain accuracy.

Hydraulic Counter Balance System - Hydraulic counter balance system with nitrogen effectively reduces vibration of the Z-axis. When hydraulic pressure is low, nitrogen will fill the cylinder to help balance the weight.

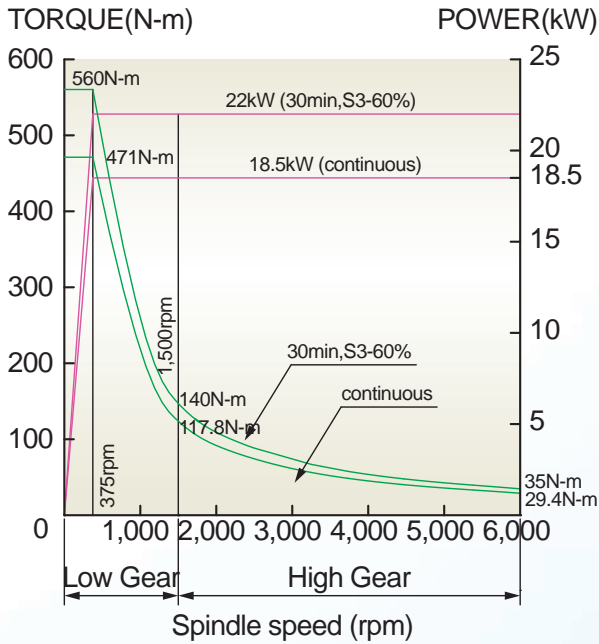


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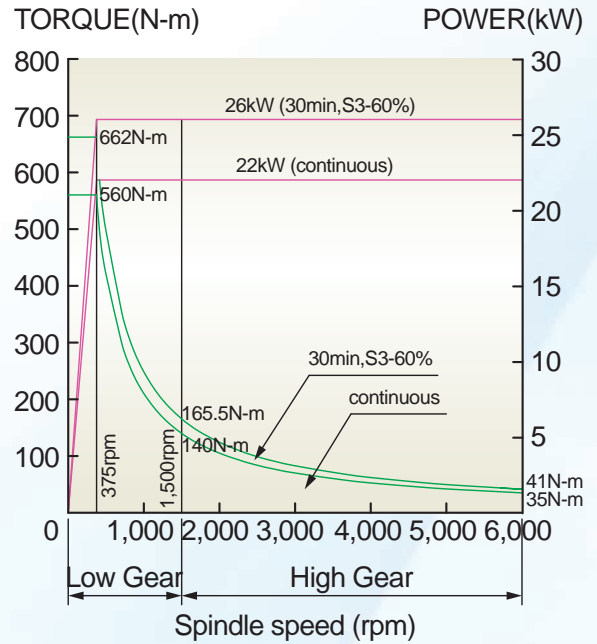
Spindle Torque Chart

UNIT: mm (")

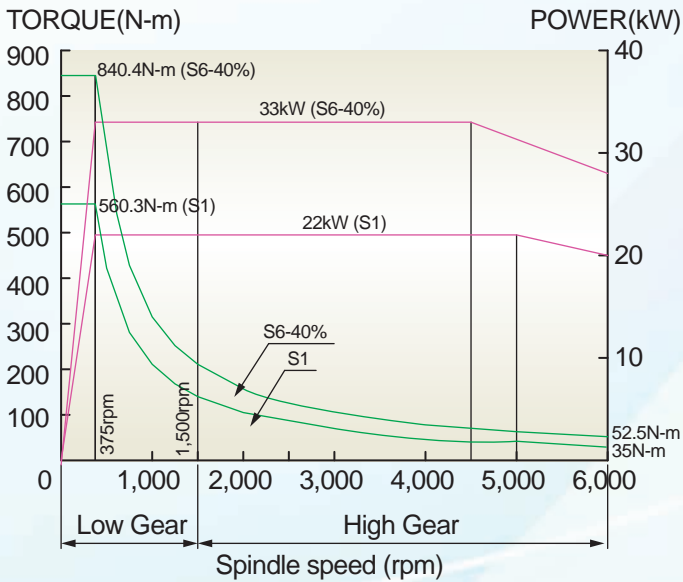
FANUC 22kW (30 HP)



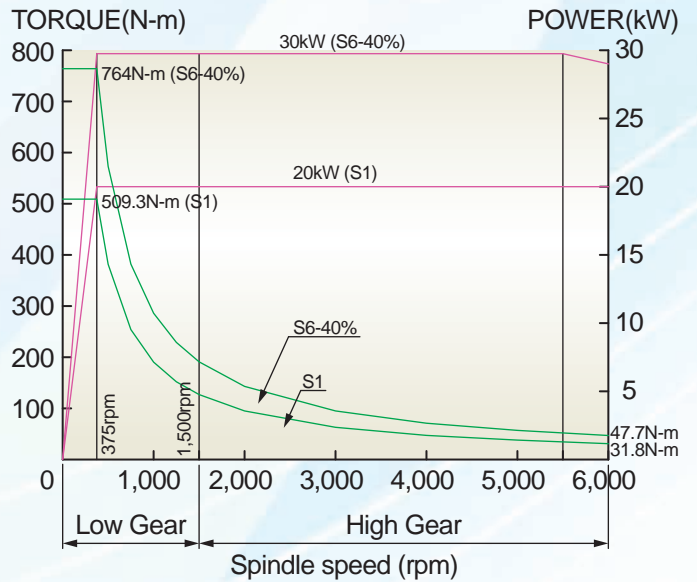
Optional FANUC 26kW (35 HP)



SIEMENS



HEIDENHAIN

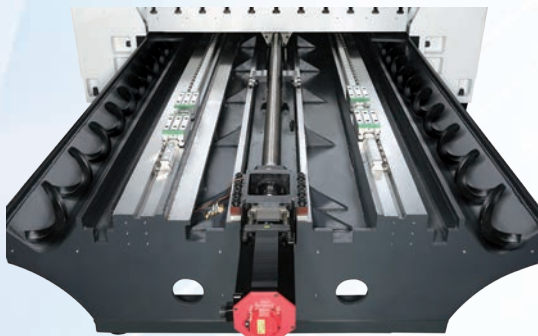


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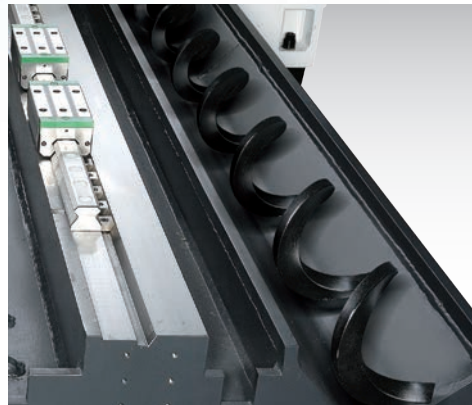
Axes Transmission Design

Guide Way Design - The mechanical design enables the table to bear loads for high-speed operations. The box way Y- and Z-axis design features smooth moving and excellent cutting rigidity.

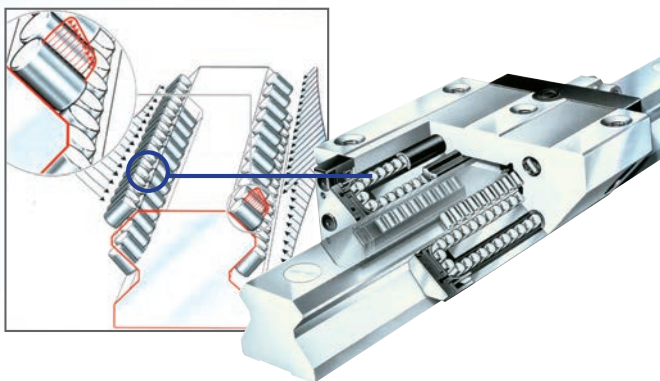
Extra wide box ways are coated with Turcite-B and then meticulously cross-scraped by hand to ensure adequate lubrication and consequently, smooth movement reduces drag and achieves optimal wear-resistance.



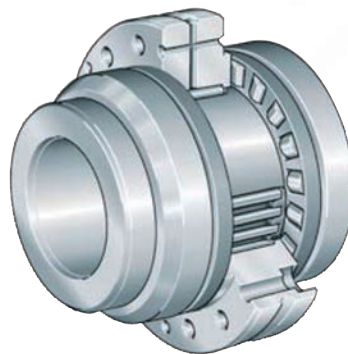
Chip Channel - The chip channel is located on each side of the X-axis and is one-piece with the casting that comes with individual chip augers. A high volume flood coolant washes down and re-circulates from a high capacity coolant tank.



High-Precision Roller Guide Ways - The linear guideways in the X-axis run with high precision roller type linear bearings for heavier load capacity and increased feedrate.



High Precision Bearing - The high precision bearings support the ballscrews on X- and Y-axis. Bearings of Z-axis reduce backlash problems, resulting in high positioning accuracy on all axes.



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An extra-long, extra-wide work space facilitates easy loading and unloading of large workpieces. FVM-DC series offer load capacities up to 18,000 kgs (39,600 lbs.).

UNIT: mm (")

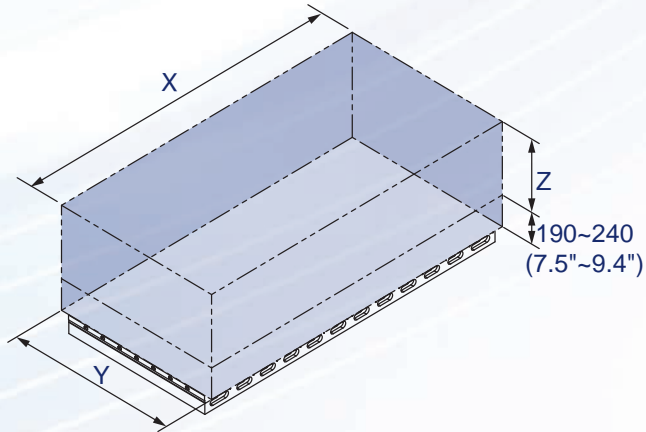
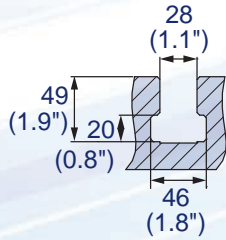
Model	X / Y / Z Travel	Distance Between Columns
FVM-8088DC	2,200 x 2,000 x 1,000 (86.6" x 78.7" x 39.3")	2,200 (86.6")
FVM-80125DC	3,000 x 2,000 x 1,000 (118.1" x 78.7" x 39.3")	2,200 (86.6")
FVM-80160DC	4,000 x 2,000 x 1,000 (157.4" x 78.7" x 39.3")	2,200 (86.6")
FVM-104125DC	3,000 x 2,600 x 1,000 (118.1" x 102.3" x 39.3")	2,800 (110")
FVM-104160DC	4,000 x 2,600 x 1,000 (157.4" x 102.3" x 39.3")	2,800 (110")
FVM-104200DC	5,000 x 2,600 x 1,000 (196.8" x 102.3" x 39.3")	2,800 (110")
FVM-133160DC	4,000 x 3,400 x 1,000 (157.4" x 133.8" x 39.3")	3,600 (141.7")
FVM-133200DC	5,000 x 3,400 x 1,000 (196.8" x 133.8" x 39.3")	3,600 (141.7")

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Machining Capacity

UNIT: mm (")

Table and T-slot



t o l S - T

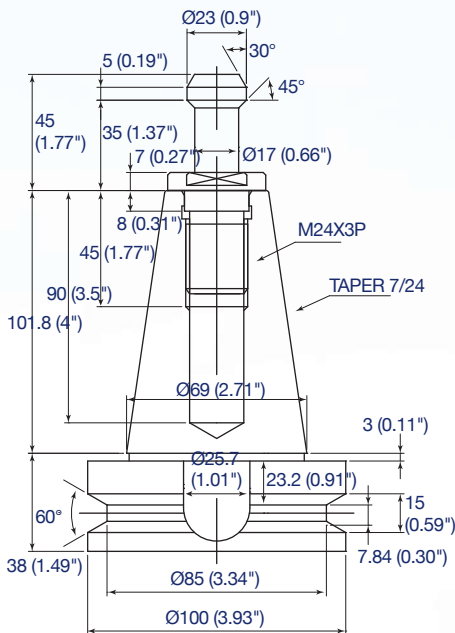
Work Space (X/Y/Z)

X/Y/Z Machining Capacity without considering tool dimension

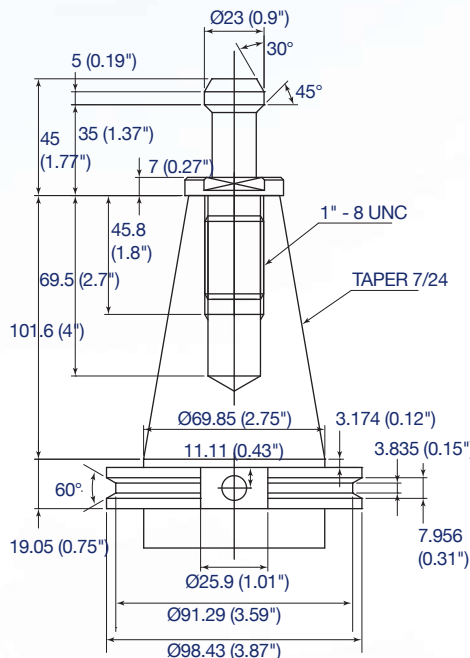
Model	X	Y	Z
FVM-8088DC	2,100 (82.6")	1,900 (74.8")	1,000 (39.3")
FVM-80125DC	3,000 (118.1")	1,900 (74.8")	1,000 (39.3")
FVM-80160DC	4,000 (157.4")	1,900 (74.8")	1,000 (39.3")
FVM-104125DC	3,000 (118.1")	2,500 (98.4")	1,000 (39.3")
FVM-104160DC	4,000 (157.4")	2,500 (98.4")	1,000 (39.3")
FVM-104200DC	5,000 (196.8")	2,500 (98.4")	1,000 (39.3")
FVM-133160DC	4,000 (157.4")	3,300 (129.9")	1,000 (39.3")
FVM-133200DC	5,000 (196.8")	3,300 (129.9")	1,000 (39.3")

Tool Shank and Pull Stud

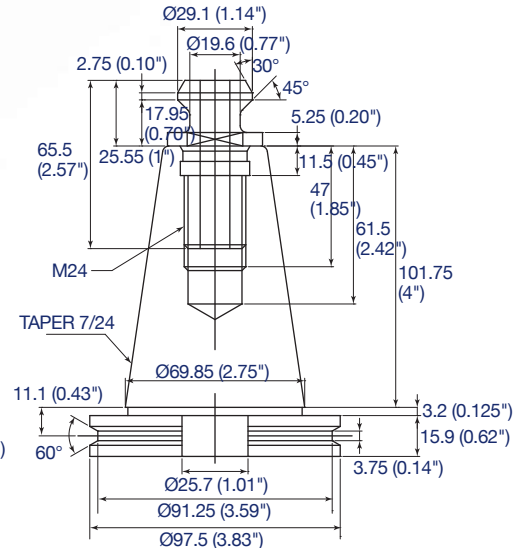
BT-50



CT-50



DIN-50

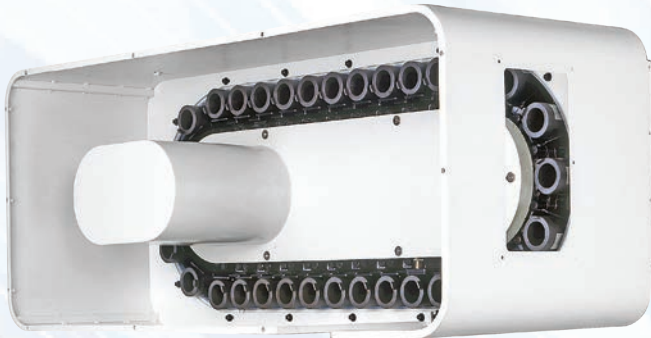


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Accessories

Tool Changer and Chain Type Magazine

- Standard magazine capacity: 40 tools
- Optional magazine capacity: 60 tools
- Maximum tool size: Ø225x350mm
- Adjacent tool size: Ø125x350 mm



Pre-wired Coolant Through Spindle

The pre-wired high-pressure coolant through spindle is standard on this series of machine. This beneficial feature eliminates after market engineering, enabling end-user to connect the high-pressure coolant system quickly with less down time.



Standard Accessory

1. FANUC 0iM 10.4LCD
2. 40 Station ATC
3. Spindle air curtain system
4. Spindle oil chiller
5. Spindle air blast system
6. Auto lubrication system
7. Hydraulic system
8. Dual chip auger system on X-axis
9. Chain type chip conveyer on Y-axis
10. High splash guard
11. Work light
12. Pilot light
13. Water tank
14. Air conditioned electric cabinet
15. Lamp for electric cabinet
16. Foot pedal for tool clamping and unclamping
17. MPG Handle wheel
18. Leveling bolts and pads
19. Bolt kit with tools for foundation
20. Tools and tool box
21. Operation manual & parts list
22. Rigid tapping
23. Automatic power off
24. RS232 and USB Interface
25. Chip cart
26. Air gun and water gun

Optional Accessory

1. FANUC 31i Controller
2. SIEMENS 840D Controller
3. HEIDENHAIN TNC640 Controller
4. 60 Station ATC
5. Through spindle coolant system
6. X/Y/Z Axis linear scale(Closed loop)
7. CNC rotary table
8. Auto tool length measurement system
9. Auto workpiece measurement system
10. Fully enclosed splash guard
11. Protection cover for through spindle coolant system
12. 90° Milling head
13. CE conformity
14. Extension head

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Other Available Work Heads



Universal Head By Manual Positioning (Manual Swivel Arm Available)

- This head is fitted on the spindle manually with any degree positioning.
- Tool change and tool release are manually operated.
- Coolant thru spindle is not applicable on this head.
- Max. speed is 1,200rpm.



90 Degree Head By Manual Positioning (Manual Swivel Arm Available)

- This head is fitted on the spindle manually with any degree positioning.
- Tool change and tool release are manually operated.
- Coolant thru spindle is not applicable on this head.
- Max. speed is 2,000rpm.



90 Degree Head With Power Clamp/Unclamp (Manual Swivel Arm Available)

- This head is fitted in the spindle manually with any degree positioning. The positioning can be manual or automatic adjusted by bevel gear for accurate positioning.
- Tool change is manual, but tool release can be manually or hydraulically controlled for quick tool change.
- Coolant thru spindle is not applicable on this head.
- Max. speed is 2,000rpm.



90 Degree Deep Boring Head

- This head is fitted on the spindle manually with any degree positioning.
- Tool change and tool release are manually operated.
- Coolant thru spindle is not applicable on this head.
- Max. speed is 800rpm.



Straight Extension Head

- This head is fitted on the spindle manually with any degree positioning.
- Tool change and tool release are manually operated.
- Coolant thru spindle is not applicable on this head.
- Max. speed is 2,000rpm.

Control System

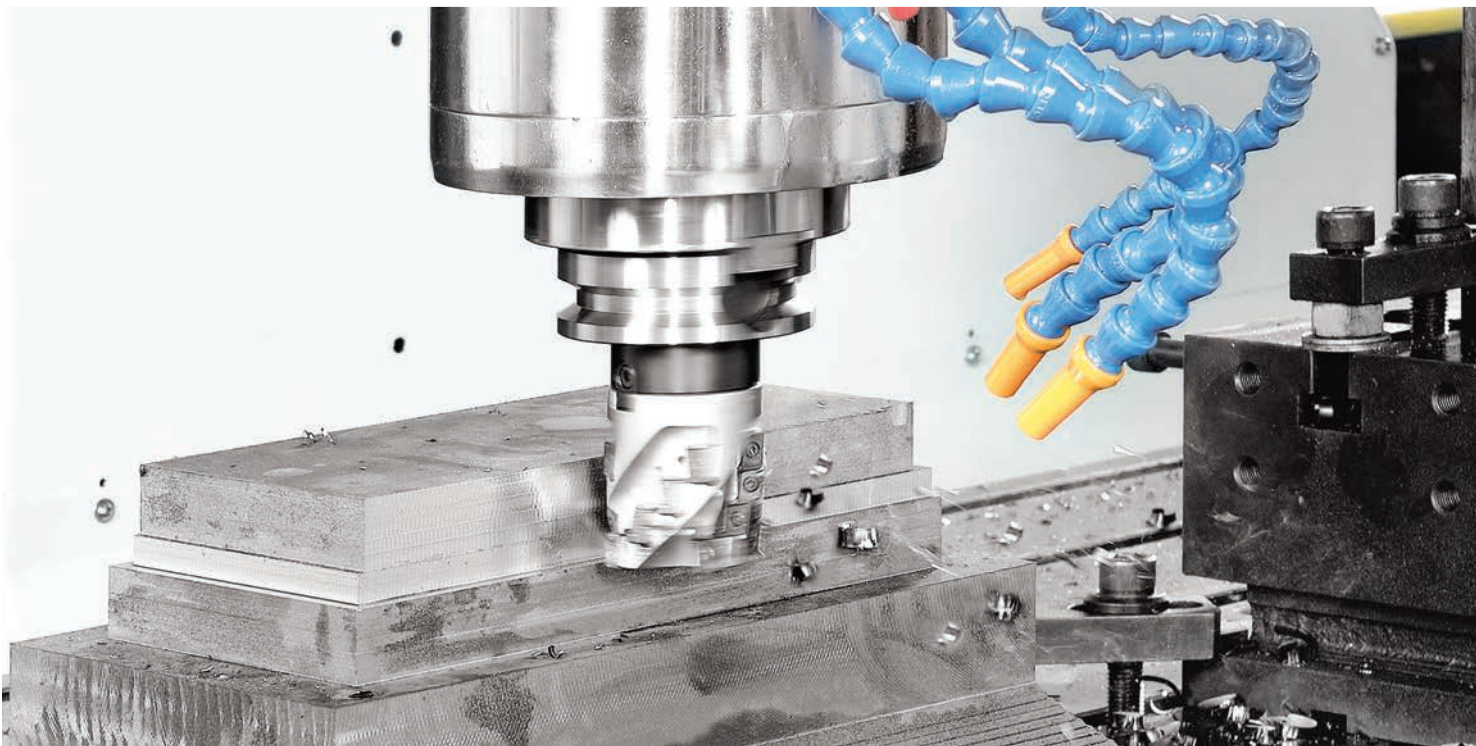
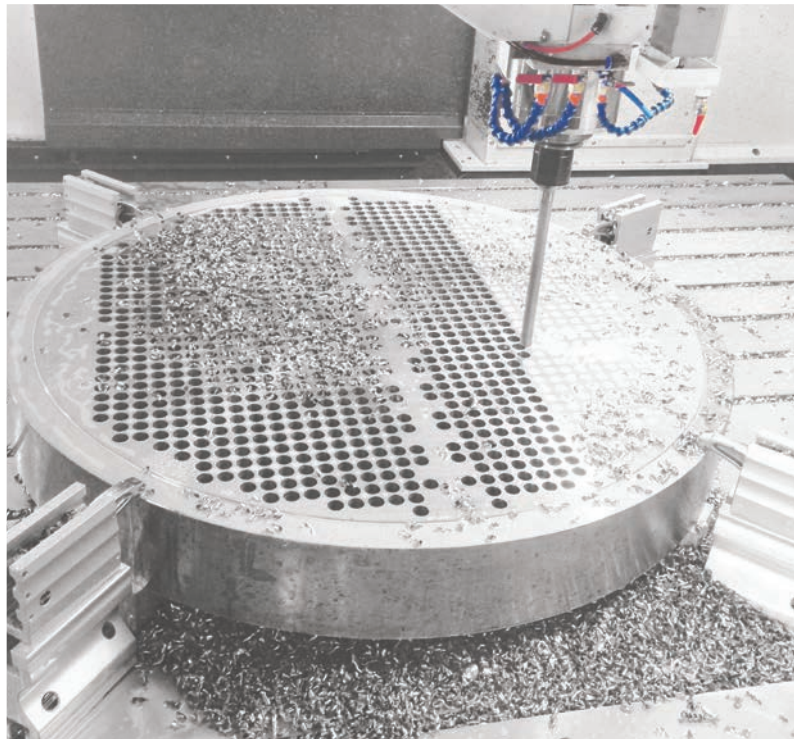
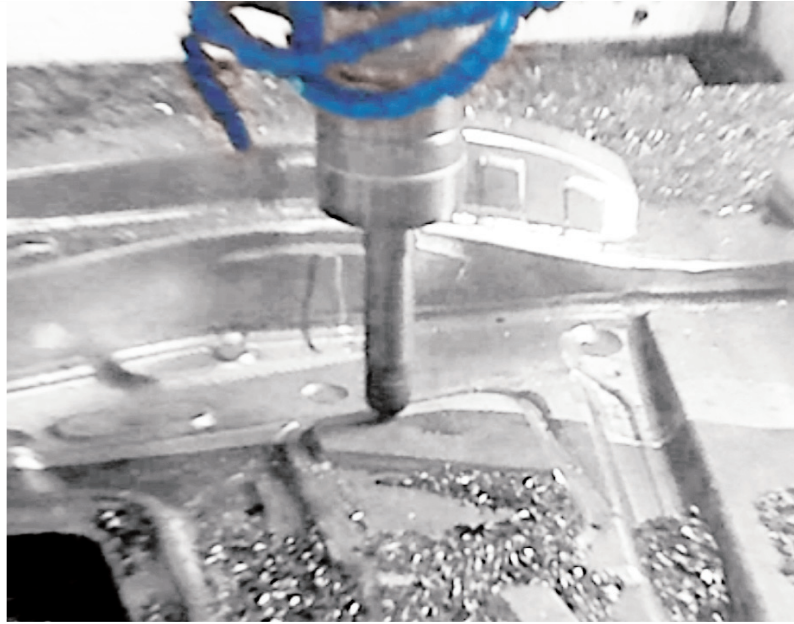
User-Friendly Control - The FANUC Oi-M control's 10.4" color LCD is standard.

The latest version for Fanuc Oi series, integrating various advanced features and more powerful than the previous ones.

- Every control comes with USB hub as standard, and Control operating manual is stored in CD.
- Make use of existing programs without modification
- Simple programming and operation
- Operator friendly graphic display for part program verification
- Extended help functions and alarm/operation history
- Cutter Compensation for direct input from drawings
- Canned cycles and Custom Macro B for simplified part programming
- Controlled X/Y/Z-axes
- Linear, circular, cylindrical and helical interpolation
- Memory card interface (PCMCIA front slot)
- I/O interface
- Ethernet and data server
- Manual Guide i
- Remote type manual pulse generator (MPG)
- Rigid tapping
- Optional: AI nano high-speed machining mode (AICC II) (200 blocks look-ahead) with jerk control and nano smooth.

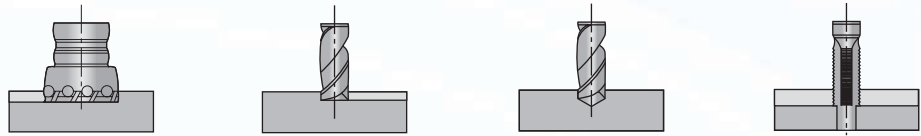
Chevalier also provides HEIDENHAIN and SIEMENS controllers to meet the various machining requirements.





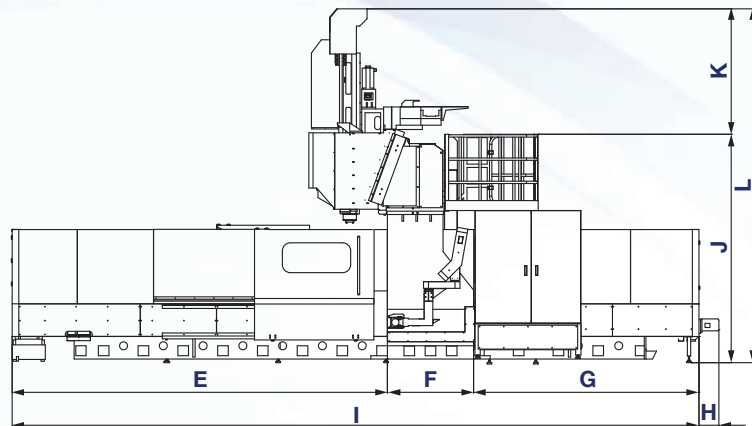
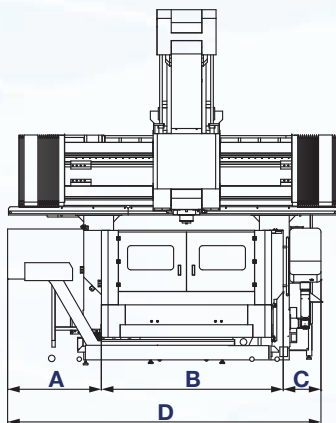
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Cutting Performance



	Face Mill	End Mill	Drill	Tapping
Tool	Ø125 x 9T	Ø63 x 4T	Ø50	M30 x 3.5P
Cutting Width	100 mm	40 mm	-	-
Cutting Depth	3 mm	12.5 mm	50 mm	40 mm
Cutting Federate	2400 mm/min	800 mm/min	84 mm/min	40 mm/min
Chip Removal	720c.c/min	400c.c/min	-	-
Workpiece Material	S45C	S45C	S45C	S45C
Spindle Load	140%	90%	38%	29%
Z-axis Mechanical Position	-630mm	-850mm	-	-
SPindle RPM	-	-	-	120

Dimensional Drawings



UNIT: mm (")

Model	FVM-8088DC	FVM-80125DC	FVM-80160DC	FVM-104125DC	FVM-104160DC	FVM-104200DC	FVM-133160DC	FVM-133200DC
A	1,490 (58.6")	1,490 (58.6")	1,490 (58.6")	1,490 (58.6")	1,490 (58.6")	1,490 (58.6")	1,490 (58.6")	1,490 (58.6")
B	2,745 (108")	2,745 (108")	2,745 (108")	3,170 (124.8")	3,170 (124.8")	3,170 (124.8")	4,450 (175.1")	4,450 (175.1")
C	570 (22.4")	570 (22.4")	570 (22.4")	570 (22.4")	570 (22.4")	570 (22.4")	570 (22.4")	570 (22.4")
D	4,825 (189.9")	4,825 (189.9")	4,825 (189.9")	5,230 (205.9")	5,230 (205.9")	5,230 (205.9")	6,510 (256.2")	6,510 (256.2")
E	3,500 (137.7")	4,500 (177.1")	5,660 (222.8")	4,500 (177.1")	5,660 (222.8")	6,660 (262.2")	5,660 (222.8")	6,660 (262.2")
F	1,300 (51.1")	1,300 (51.1")	1,300 (51.1")	1,300 (51.1")	1,300 (51.1")	1,300 (51.1")	1,300 (51.1")	1,300 (51.1")
G	1,620 (63.7")	2,250 (88.5")	3,400 (133.8")	2,250 (88.5")	3,400 (133.8")	4,400 (173.2")	3,400 (133.8")	4,400 (173.2")
H	300 (11.8")	300 (11.8")	300 (11.8")	300 (11.8")	300 (11.8")	300 (11.8")	300 (11.8")	300 (11.8")
I	6,420 (252.7")	8,050 (316.9")	10,360 (407.8")	8,050 (316.9")	10,360 (407.8")	12,360 (486.6")	10,360 (407.8")	12,360 (486.6")
J	3,445 (135.6")	3,445 (135.6")	3,445 (135.6")	3,445 (135.6")	3,445 (135.6")	3,445 (135.6")	3,445 (135.6")	3,445 (135.6")
K	1,895 (74.6")	1,895 (74.6")	1,895 (74.6")	1,895 (74.6")	1,895 (74.6")	1,895 (74.6")	1,895 (74.6")	1,895 (74.6")
L	5,340 (210.2")	5,340 (210.2")	5,340 (210.2")	5,340 (210.2")	5,340 (210.2")	5,340 (210.2")	5,340 (210.2")	5,340 (210.2")

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Specification

Item	Description	Unit	FVM-8088DC	FVM-80125DC	FVM-80160DC		
Table	Table Size	mm(")	2,200 x 1,800 (86.6" x 70.8")	3,200 x 1,800 (125.9" x 70.8")	4,200 x 1,800 (165.3" x 70.8")		
	Table Loading	kg(lbs.)	8,000 (17,600)	10,000 (22,000)	12,000 (26,400)		
	T Slots (W x Pitch / PC)	mm(")	28 x 170 / 11 (1.1" x 6.7" / 11)				
Travel	X Axis	mm(")	2,200 (86.6")	3,000 (118.1")	4,000 (157.4")		
	Y Axis	mm(")	2,000 (78.7")				
	Z Axis	mm(")	1,000 (39.3")				
	Spindel nose to table surface	mm(")	240~1,240 (9.4"~48.8")				
	Distance between the columns	mm(")	2,200 (86.6")				
	Table height from floor	mm(")	840 (33.1")				
Spindle	Spindle Taper	-	BT50 / CAT50 / DIN50				
	Spindle Speed	rpm	6,000 / Optional 8,000				
	Spindle Power(30min,S3-60%)	kW(HP)	22.5 (30HP) / Optional 26 (35HP)				
	Spindle Chiller	-	With 32# Oil circulated cooling				
Feed Rate	X Axis Rapid Traverse	m/min (inch/ min)	10 (393")				
	Y Axis Rapid Traverse		10 (393")				
	Z Axis Rapid Traverse		12 (472")				
	Cutting Feed		1-7 (39.3"-275")				
	X/Y/Z Axis Ball Screw Diameter	mm(")	80 / 80 / 50 (3.15" / 3.15" / 1.97")				
Tool Changer	A.T.C	set	40 / Optional 60				
	Max. Tool Diameter	mm(")	125 (5") With adjacent tool				
	Max. Tool Diameter	mm(")	215 (8.4") Without adjacent tool				
	Max. Tool Length	mm(")	350 (13.7")				
	Max. Tool Weight	kg(lbs.)	20 (44)				
	ATC Time - T / T	sec	6				
Guide Way	Linear Guide Size (W / P.C)	mm(")	55 / 2 (2.28"x2)				
	Sliding Block P.C.	sets	6	10	14		
	Y / Z-Axes Box Way Width	mm(")	175 / 70 (6.8" / 2.7")				
Accuracy	Positioning Accuracy	mm(")	JIS6338 ±0.005 / 300mm				
	Positioning Accuracy	mm(")	VDI 3441 P: 0.025 (0.0010")	VDI 3441 P: 0.030 (0.0012")	VDI 3441 P: 0.040 (0.0016")		
	Repeatability	mm(")	JIS6338 ±0.003 (0.0001")				
	Repeatability	mm(")	VDI 3441 P: 0.020 (0.0008")	VDI 3441 P: 0.025 (0.0010")	VDI 3441 P: 0.030 (0.0012")		
Motor	3 Axis X / Y / Z	kW(HP)	9 / 7 / 7 (12 / 9 / 9)				
	Coolant Unit Motor	kW(HP)	2 (2.7)				
Tank Capacity	Lub. Tank (2 sets)	L(gals)	4 / 12 (1 / 3)				
	Hydraulic Tank Capacity	L(gals)	150 (39)				
	Coolant Tank	L(gals)	700 (184)				
Air Supply	Air System Pressure	kg/cm ²	6				
Power	Required Electric Power	KVA	50				
Machine Size	Installation Area (L x W x H)	mm(")	6,720 x 4,825 x 5,340 (264.5" x 190" x 210.2")	8,350 x 4,825 x 5,340 (328.7" x 190" x 210.2")	10,660 x 4,825 x 5,340 (419.6" x 190" x 210.2")		
	Machine Weight	kg(lbs.)	35,000 (77,000)	39,000 (85,800)	45,000 (99,000)		

	FVM-104125DC	FVM-104160DC	FVM-104200DC	FVM-133160DC	FVM-133200DC
	3,200 x 2,200 (125.9" x 86.6")	4,200 x 2,200 (165.3" x 86.6")	5,200 x 2,200 (204.7" x 86.6")	4,100 x 3,000 (161.4" x 118.1")	5,100 x 3,000 (200.7" x 118.1")
	11,000 (24,200)	13,000 (28,600)	16,000 (35,200)	15,000 (33,000)	18,000 (39,600)
	28 x 200 / 11 (1.1" x 7.87" / 11)			28 x 200 / 15 (1.1" x 7.87" / 15)	
	3,000 (118.1")	4,000 (157.4")	5,000 (196.8")	4,000 (157.4")	5,000 (196.8")
	2,600 (102.3")			3,400 (133.9")	
	1,000 (39.3")				
	190~1,190 (7.48"~46.9")				
	2,800 (110.2")			3,600 (141.7")	
	890(35")				
	BT50 / CAT50 / DIN50				
	6,000 / Optional 8,000				
	22.5 (30HP) / Optional 26 (35HP)				
	With 32# Oil circulated cooling				
	10 (393")	8 (314")		10 (393")	8 (314")
	10 (393")				
	12 (472")				
	1-7 (39.3"-275")				
	80 / 80 / 50 (3.15" / 3.15" / 1.97")				
	40 / Optional 60				
	125 (5") Without adjacent tool				
	215 (8.4") Without adjacent tool				
	350 (13.7")				
	20 (44)				
	6				
	55 / 2 (2.28"x2), 45/2 (2")			55 / 4 (2.28"x4)	
	12 / 12	14 / 14		28	36
	175 / 70 (6.8" / 2.7")				
	JIS6338 ±0.005 / 300mm				
	VDI 3441 P: 0.030 (0.0012")	VDI 3441 P: 0.040 (0.0016")	VDI 3441 P: 0.050 (0.0020")	VDI 3441 P: 0.040 (0.0016")	VDI 3441 P: 0.050 (0.0020")
	JIS6338 ±0.003 (0.0001")				
	VDI 3441 P: 0.025 (0.0010")	VDI 3441 P: 0.030 (0.0012")	VDI 3441 P: 0.035 (0.0014")	VDI 3441 P: 0.030 (0.0012")	VDI 3441 P: 0.035 (0.0014")
	9 / 7 / 7 (12 / 9 / 9)			9 / 9 / 7 (12 / 12 / 9)	
	2 (2.7)				
	4 / 12 (1 / 3)				
	150 (39)				
	800 (211.2)			1,000 (264)	
	6				
	50				60
	8,350 x 5,230 x 5,340 (328.7" x 205.9" x 210.2")	10,660 x 5,230 x 5,340 (419.6" x 205.9" x 210.2")	12,660 x 5,230 x 5,340 (498.4" x 205.9" x 210.2")	10,660 x 6,510 x 5,340 (419.6" x 205.9" x 210.2")	12,660 x 6,510 x 5,340 (498.4" x 205.9" x 210.2")
	46,000 (101,200)	50,000 (110,000)	56,000 (123,200)	55,000 (121,000)	62,000 (136,400)



Grinding Machine

Grinding Machine

Turning Machine

Milling Machine

Headquarters

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