

CHEVALIER®

Grinding / Turning / Milling



FVM-DCL Series

Double Column Bridge Machine

FVM-3016DCL II

FVM-3016DCL II

Double Column Vertical Machining Center

The FVM-3016DCL II, a next-generation, premier double-column bridge machine, offers a heavy-duty structure, powerful spindle and state-of-the-art craftsmanship. This machine is backed by Chevalier's more than 30 years' of experience in developing and manufacturing high-precision machine tools.

Better stability. Higher profitability. Increased productivity. Ease of operation. This machine is designed for high-speed, high-precision and high-productivity machining and is suitable for such industries as aerospace, automotive industries, mold making and job shops. Its heavy-duty frame offers extreme rigidity, with major parts of the machine constructed of high-quality cast iron for superior stability. The oversized column and box-type beam construction provide excellent support and damping characteristics. The cross rail is designed with three rigid 55mm (2.1") linear roller ways that support the load in vertical and horizontal directions. The entire X-travel of the table is fully supported by two linear ways and 12 pieces of sliding blocks, eliminating overhanging problems.

The 35 HP (opt.), FANUC high torques digital spindle motor with two-speed gearbox that produces high torque machining capability in low-speed and better finish surface in high-speed. Higher machining speeds are achieved through the optional 10,000RPM direct coupling spindle that provides a fast RAM-up speed without excessive vibration and thermal expansion.





FVM-3016DCL II

Table Size: 3,100W x 1,450Lmm (122"W x 57"L)

Max. Workpiece Capacity: 3,000W x 1,500L x 780Hmm (118"W x 59"L x 30.7"H)

Table Load: up to 10,000kgs (22,000 lbs.)

XYZ Travel: up to 3,100(X), 1,600(Y), 780(Z)mm (122"X, 63"Y, 30.7"Z)

Spindle Taper: #50

Tool Storage: 24ATC, 32/40 Optional

Machine Dimension: 6,730W x 8,475L x 4,595Hmm (265"W x 333.6"L x 180.9"H)

Machine Weight: 28,000kg (61,600 lbs.)

FVM-3016DCL II

Machine Structure

Extremely Rigid Casting

The heavily ribbed cast-iron base with casting ensures best rigidity and stability of the machine. The oversized column and box-type beam construction provide better support and damping character.

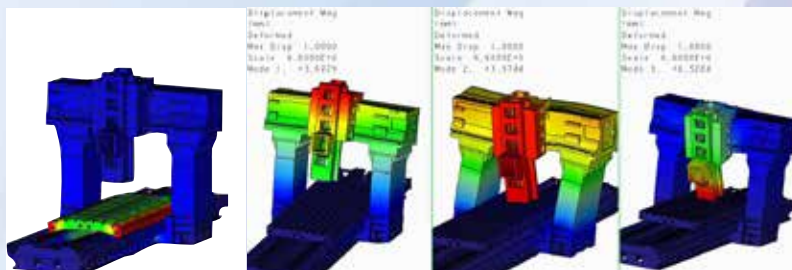
Rigid Table

The whole travel of table is fully supported. The heavy-duty roller guideways are adopted on X-axis, providing a better acceleration and preventing stick-slip problem. The table size is W.3,100 x L.1,450mm (122"W x 57"L) with a table load of 10,000kg (22,000 lbs.)



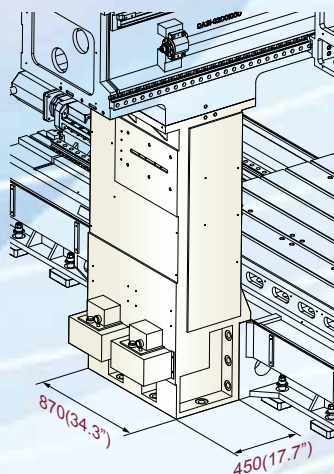
3D Integrated Design and FEM Analysis

3D integrated design and FEM (finite elements analysis) is utilized to optimize dynamic balance of the machine. One-piece casting column structure integrated with the machine base enhances the rigidity of Y and Z axes to ensure the machining accuracy and stability during heavy-duty cutting.



Column

The machine column is tightly fixed on both sides of the machine base.



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Standard Gear-drive Spindle

The spindle is supported by P4 class high precision angular contact ball bearings. The whole spindle unit is heat treated, precision-ground, dynamic-balanced, as well as carefully assembled and tested to ensure superior dynamic running accuracy. Especially designed for heavy-duty machining, two-step gear drive provides up to 6,000rpm high spindle power and torque output. Two-step speed changer can shift into low speed providing high torque output for heavy-duty cutting, high speed for surface finishing, as well as idle running for workpiece setup.

Great Cutting Capability

The two-speed 6,000rpm gearbox generates a maximum torque of 666NM in a lower RPM to satisfy tough cutting conditions. An optional 10,000rpm direct drive spindle is available in this model for high-speed machining applications.

Optional Direct-drive Spindle

The direct-drive spindle speed is up to 10,000rpm. During machining, the spindle can reduce the mandrel vibration caused by lateral force to achieve high transmission efficiency, which is suitable for high-speed machining, especially for most kinds of applications in mold & die industries.

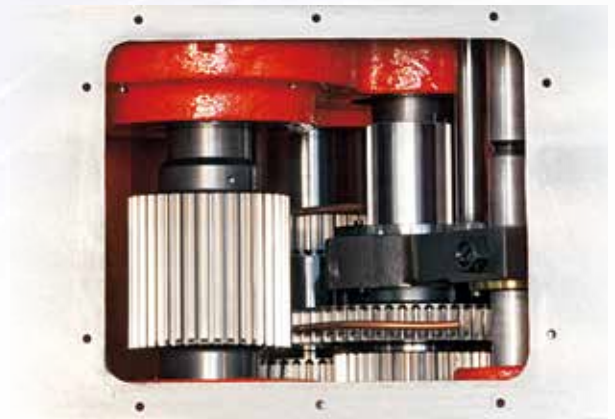
Spindle Air Purge Design

This spindle air system purges positive air pressure through the spindle to prevent the spindle from contaminations by coolant and swart.

Torque Chart



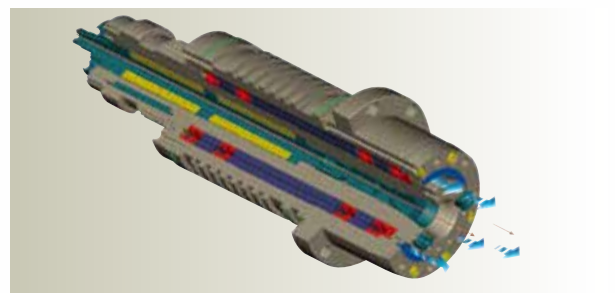
Gear Driven Spindle



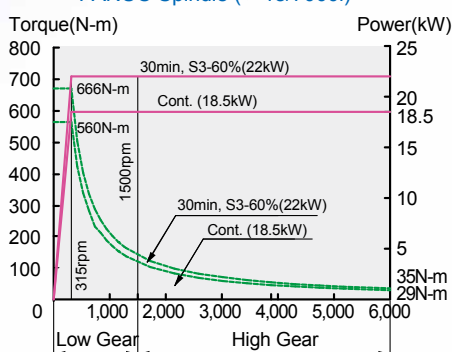
Two-speed Gearbox



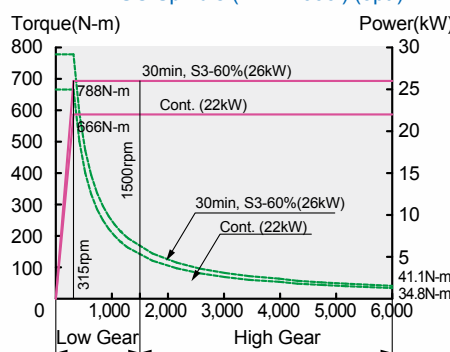
Direct Drive Spindle



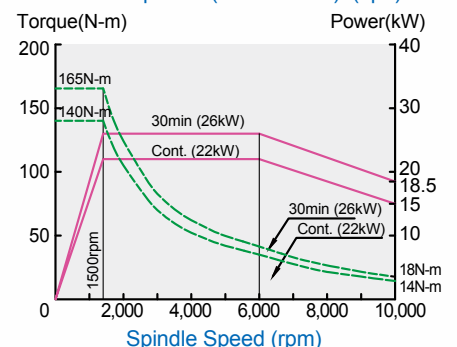
FANUC Spindle (α 18/7000i)



FANUC Spindle (α 22/7000i) (opt.)



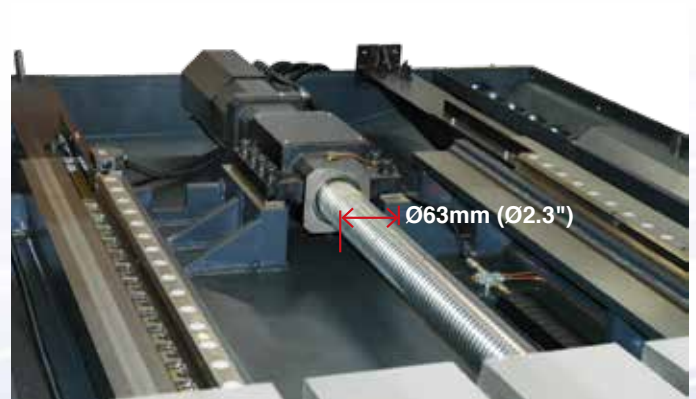
FANUC Spindle (α 22/10000i) (opt.)



FVM-3016DCL II

Axes

The roller type linear guideway design on X and Y axes with a big diameter of 63mm (2.3") ballscrew on X-axis enable the table to bear load up to 10,000 kg (22,000 lbs) for high-speed operations. The box ways on Z-axis features smooth movement up to 780 mm (30.7") and excellent cutting rigidity. Extra wide box ways are coated with Turcite-B and then meticulously cross-scraped by hand to ensure sufficient lubrication and as a result, smooth movement reduces drag and optimizes wear-resistance. Motor is directly mounted to ballscrew and gear box for more power and increased axial thrust.



Three-piece Linear Guideways Design on Crossrail

The Series features a three piece 55mm (2.1") linear roller guide ways design on the Y-axis.



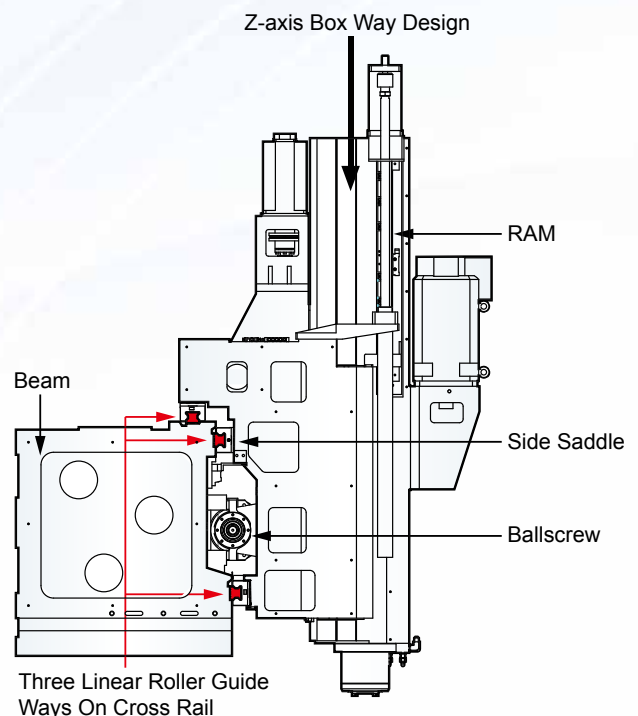
X and Y axes Guideway Design

X and Y axes utilize roller type linear guideway for heavy loading capacity. During machining, the rigid design can transfer vibration with ease, and simultaneously endure the force from every direction to perform high machining accuracy. It is suitable for high-speed machining with long travel distance, which can substantially decrease the output of horsepower drive that the machine need, as well as perform excellent machining rigidity and stability.

Direct drive on X, Y, Z axes ensures high transmission efficiency and minimizes backlash along with the reduction gear box that also provides a much higher torque for heavy-duty machining.

Z Axis Design

The box way design on Z-axis gives the machine excellent support during cutting. Low vibration and superior acceleration ensures cutting accuracy under all conditions. The box ways Z axis design achieves smooth moving and great cutting rigidity. Extra wide box ways are coated with Turcite-B and then meticulously cross-scraped by hand to ensure sufficient lubrication and as a result, smooth movement reduce drag and optimum wear-resistance.



Three rigid linear roller ways on Y-axis provide support in vertical and horizontal directions.

FVM-3016DCL II

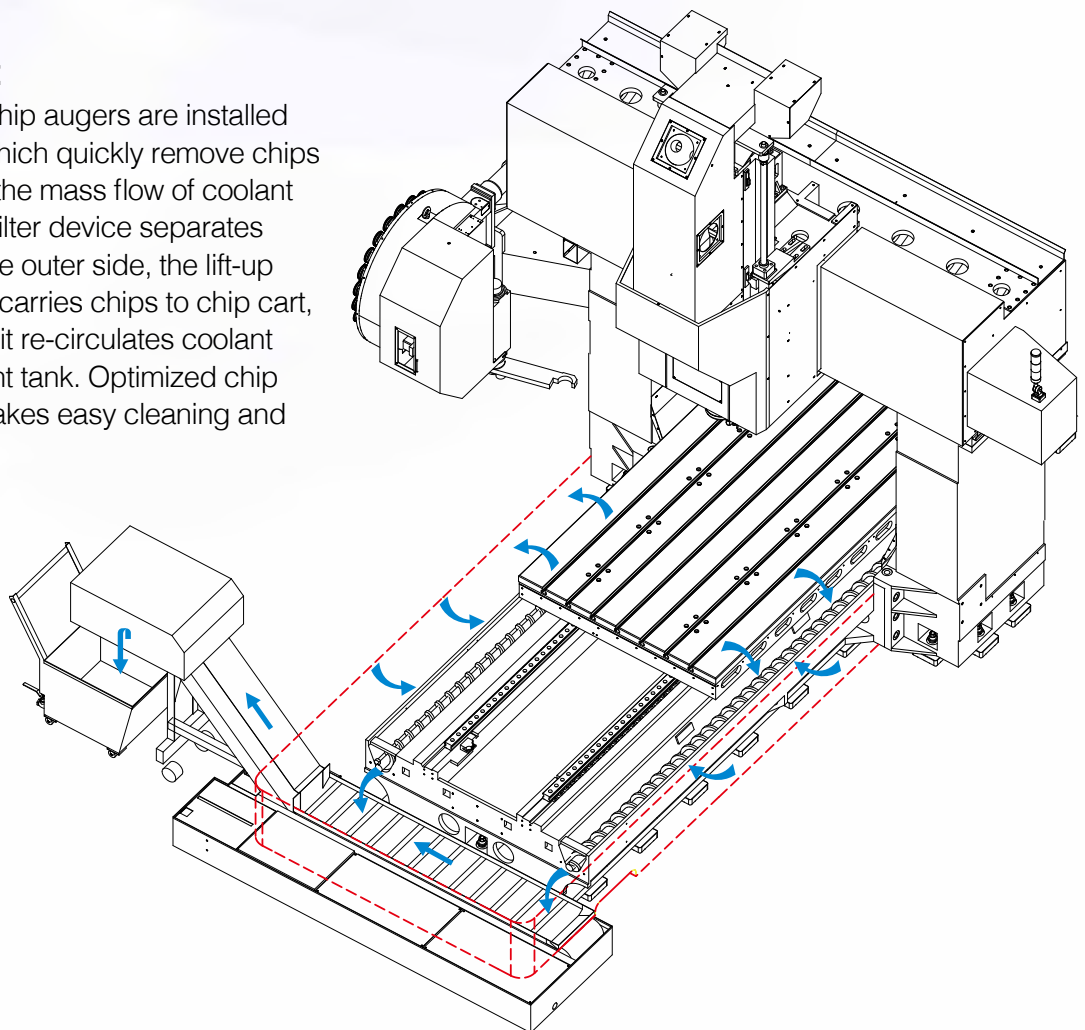
Hydraulic Counter Balance System

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.



Chip Management

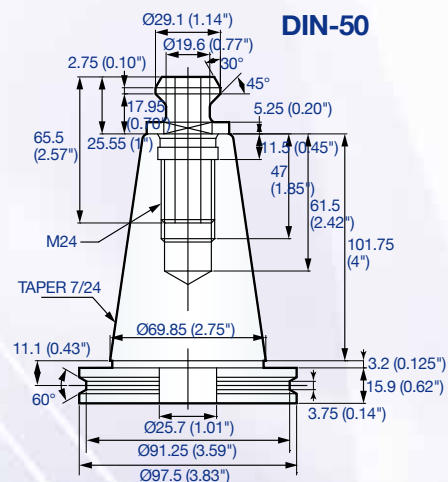
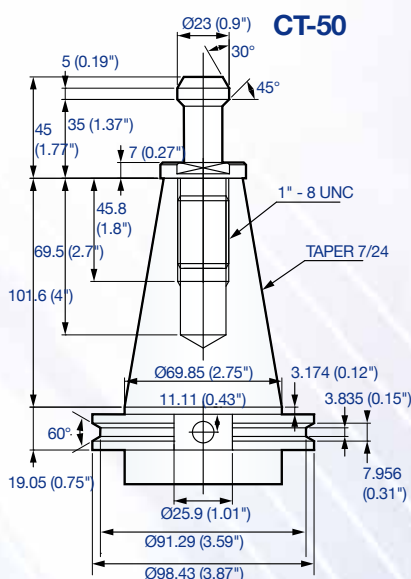
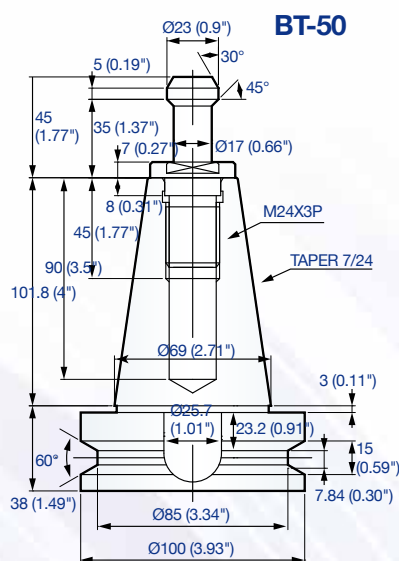
On the inner side, dual chip augers are installed on both sides of table, which quickly remove chips out of the machine, and the mass flow of coolant washes down and chip filter device separates chips and coolant. On the outer side, the lift-up chip conveyor on Y-axis carries chips to chip cart, and coolant recycling unit re-circulates coolant to a high capacity coolant tank. Optimized chip removal arrangement makes easy cleaning and maintenance.



FVM-3016DCL II

Spindle Size

Unit:mm(")



Capacity



THE FVM-3016DCL II features an extra-long, extra-wide work space with easy loading and unloading of large workpieces. The series offers a load capacity of up to 10,000Kg (22,000 Lbs.). The X, Y, Z-travel is 3,100mm x 1,600mm x 780mm (122" x 63" x 30.7") and the distance between the columns is 1,800mm (70.8").

Control Features



The FANUC 0i-M standard control with an AICC high-speed machining contour has a smooth 3D interpolation contouring control with an optional 200-block look-ahead function. Other features include:

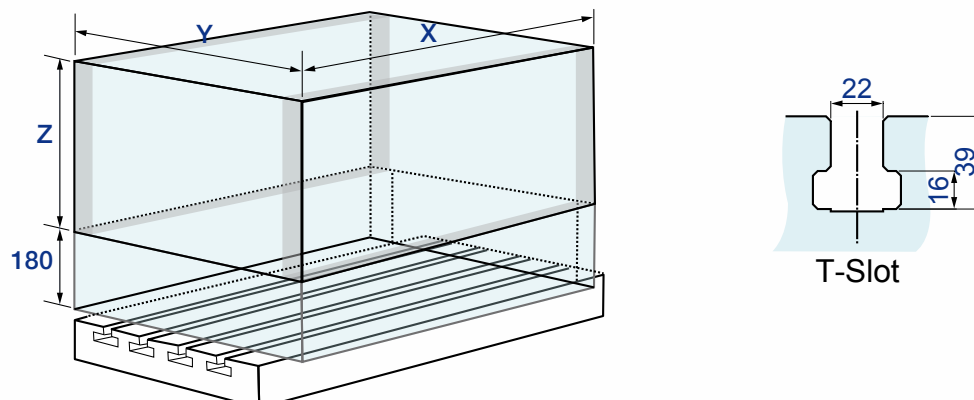
- Operator friendly graphic display for program verification
- Cutter compensation for direct input from drawings
- Linear, circular, cylindrical and helical interpolation
- Ethernet and data server
- Manual Guide Oi
- Rigid tapping
- Remote type manual pulse generator (MPG)

Optional controls available for various machining applications: FANUC 31i control, Heidenhain TNC640 or Siemens 828D

FVM-3016DCL II

Unit:mm(")

Table and T-Slots



X/Y/Z Machining Capacity without considering (tool dimension)

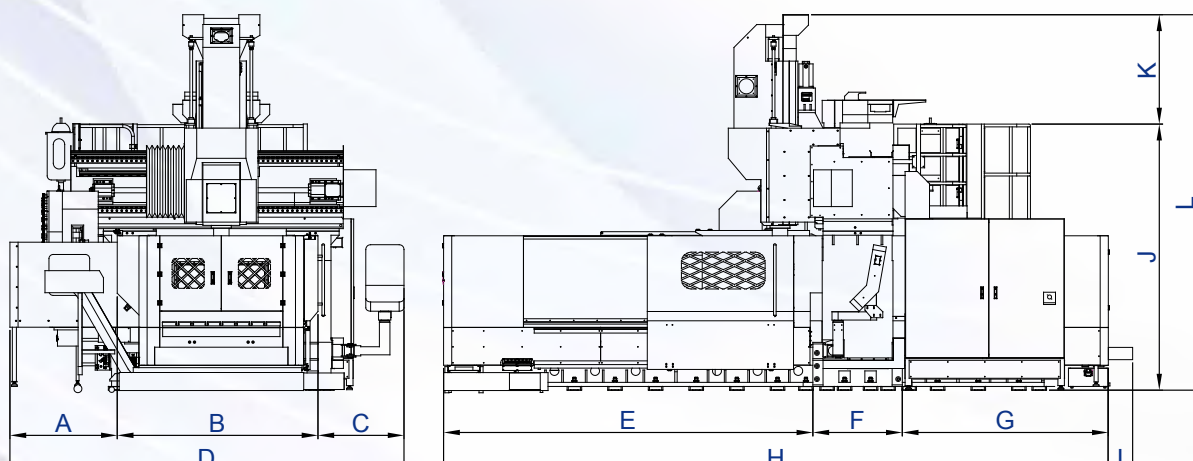
MODEL	X	Y	Z
FVM-3016DCL II	3,000 (118")	1,500 (59")	780 (30.7")

Cutting Performance



	Face Mill	End Mill	Drill	Tapping
Tool Dia.	Ø125 x 9T	Ø32 x 4T	Ø50	M48 x 5P
Cutting Width	100 mm	25 mm	-	-
Cutting Depth	3.5 mm	25 mm	100 mm	50 mm
Cutting Feederate	2400 mm/min	640 mm/min	48 mm/min	500 mm/min
Chip Removal	840 c.c./min	400 c.c./min	-	-
Workpiece Material	S45C	S45C	S45C	S45C
Spindle Load	143 %	89 %	120 %	90 %
Z-axis Mechanical Position	-422 mm	-412 mm	-	-
Spindle RPM	-	-	-	100

Machine Dimensions



A	B	C	D	E	F	G	H	I	J	K	L
1,320 (51.97")	2,470 (97.24")	1,060 (41.73")	4,850 (190.94")	4,545 (178.94")	1,100 (43.31")	2,535 (99.80")	8,180 (322.05")	300 (11.81")	3,255 (128.15")	1,340 (52.76")	4,595 (180.90")

FVM-3016DCL II

Accessories



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

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



Coolant-Through-Spindle (opt.)

Providing high pressure coolant, this spindle can efficiently take out chips and heat from deep hole drilling greatly enhancing tool cutting performance and longevity as well as parts accuracy.



4th Axis and Rotary Table (opt.)

The 4th axis and rotary table are available for the complex part machining and furthermore, more machining ideas can be realized to maximize the possibility of the machine.



Auto Tool Length Measurement System (opt.)

The linear working principle of the tool setting probe can monitor the smallest tools in micro-machining applications. The system prevents the tool from breakage and can be applied for machine axes and temperature compensations.



Optional Linear Scale (opt.)

For absolute positioning accuracy, linear scales for 3 axes can ensure exact axis positioning under fluctuating temperature while machining.



Auto Workpiece Measurement System (opt.)

The auto workpiece measurement system can precisely detect workpiece position and provide correct workpiece orientation. Moreover, the system can be applied for thermal compensation and performs contour measurement.

Standard Accessories

- FANUC 0i-M Controller 10.4" TFT
- Remote MPG Hand Wheel
- 24 Tool ATC (Arm Type)
- Spindle Air Purge System
- Air Blast Chip Blower
- Auto Lubrication System
- Work Light
- Pilot Light
- Spindle/Gear Head Oil Chiller
- Hydraulic System
- High Splash Guard
- Dual Chip Auger System on X-Axis
- Lift-up Chip Conveyor on Y-Axis
- Chip Cart
- Coolant Tank
- Air Conditioned Electric Cabinet
- Foot Pedal for Tool Clamping / Unclamping
- Air Gun
- Water Gun
- Tool Box w/ Hand Tools
- Operation Manual
- Automatic Power Off
- RS232 Interface, USB Interface & Ethernet
- Foundation Kit
- Heat Exchanger

Optional Accessories

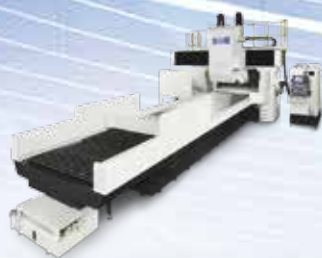
- FANUC 31i Control
- SIEMENS 828D Control
- HEIDENHAIN TNC 640 Control
- Through Spindle Coolant System (20Bar~70Bar) 1,000 PSI
- X/Y/Z Axes Linear Scale (Closed Loop)
- 4th Axis CNC Rotary Table
- Auto Tool Length Measurement System
- Auto Workpiece Measurement System
- Oil Skimmer
- 32/40 ATC (Chain Type)
- Fully Enclosed Splash Guard
- 10,000rpm Direct-Drive Spindle
- CE Conformity
- 90-degree Milling Head
- Top Guard for Coolant-Through-Spindle

FVM-3016DCL II

Specifications

Item	Description	FVM-3016DCLII
Capacity	Table size	3,100mm x 1,450mm (122" x 57")
	Table loading	10,000kg (22,000 lbs.)
	Machining capacity (W x L x H)	3,000mm x 1,500mm x 780mm (118" x 59" x 30.7")
	T slots (W x Pitch x Pcs)	22mm x 180mm x 7 (0.9" x 7" x 7)
Travel	X-axis	3,100mm (122")
	Y-axis	1,600mm (63")
	Z-axis	780mm (30.7")
	Spindle nose to table surface	180~960mm
	Distance between columns	1,800mm (70.8")
	Height from table to ground	840mm (33")
Spindle	Spindle taper	#50 (7/24)
	Spindle speed / transmission type	6,000rpm / Gear Box
		10,000rpm / Opt. Direct Drive
	Spindle power (Gearbox)	18kW (30HP) / Opt. 26kW (35HP)
Axes Feed Rate	X axis rapid feed	20m/min (787 in/min)
	Y axis rapid feed	20m/min (787 in/min)
	Z axis rapid feed	15m/min (590 in/min)
	X/Y/Z axes cutting feed	1~8 m/min (39.3~315 in/min)
	Z-axis counter balance system	Hydraulic counter balance system
	X/Y/Z axes ballscrew diameter	Ø63 / Ø63 / Ø50mm
Automatic Tool Changer	Tool shank	BT50 / CAT50 / DIN50
	Tool storage capacity	24 sets; Opt. 32/40 sets
	Dia. of max. tool (w/ adjacent tool)	125mm (4.9")
	Dia. of max. tool (w/o adjacent tool)	215mm (8.4")
	Max. tool length	300mm (11.8")
	Max. tool weight	15kg (33 lbs.)
	Tool changing time (T-T)	5 sec.
Accuracy	Positioning accuracy	P: 0.030 (0.0012")
	Repeatability accuracy	Ps: 0.028 (0.0011")
Motor	Axes motor (X/Y/Z)	7/7/4kW (9/9/5HP)
	Hydraulic motor	2.2kW (3HP)
	Coolant motor	2kW (2.7HP)
Tank Capacity	Hydraulic tank	40L (10.4 gals.)
	Oil/grease tank	2 sets: 6 L (1.6 gals.)
	Coolant tank	450L (117 gals.)
Power & Air Requirements	Power required	50kVA
	Compressed air supply (pressure/flow)	6kg/cm ² (200NL/min)
Dimensions	Machine height	4,595mm (180.9")
	Required floor space (W x L)	6,730 x 8,475mm (265" x 333.6")
	Machine weight	28,000kg (61,600 lbs.)

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Grinding Machine



Grinding Machine



Turning Machine



Milling Machine

Headquarters

FALCON MACHINE TOOLS CO., LTD.

No. 34, Hsing Kong Road, Shang Kang, Chang Hua
TAIWAN 50971

Tel: +886 4 799 1126 Fax: +886 4 798 0011

www.chevalier.com.tw

overseas@chevalier.com.tw

U.S.A. Headquarters

CHEVALIER MACHINERY INC.

9925 Tabor Place, Santa Fe Springs, CA 90670 U.S.A.

Tel: (562) 903 1929 Fax: (562) 903 3959

www.chevalierusa.com

info@chevalierusa.com

