



EM Series

High-speed Vertical Machining Center

Minimizing machining time with high rapid speed

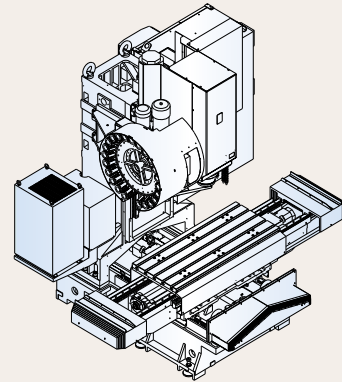


CHEVALIER[®]
Grinding / Turning / Milling

We shape your ideas.™

High-speed Vertical Machining Center

The EM Series is the best value for the money. This high-speed VMC delivers more bang for your buck and increases your production capabilities. The series is engineered with efficiency to satisfy the need for large quantity machining. Choose from three models: EM1620L, EM2033L and EM2040L.



There is nothing sacrificed or compromised in the EM Series. Major parts of the machine are constructed with high-density cast iron offering superior stability. The machine's base is supported by full travel, enabling it to be suitable for high-speed machining. All three axes are built with high-speed linear ways providing smooth quick movement without delay.

Our exclusive iMachine Communications System™ (iMCS) software includes remote machine monitoring, data analysis, alarm history and maintenance updates for overall equipment effectiveness (OEE).

And to ensure the affordable EM Series VMCs continue to operate efficiently for years to come, we back them with our no-nonsense standards and legendary service for reliable performance.



The EM2033L is shown with optional accessories.



Engineered with efficiency to satisfy the need for large quantity machining

Key Features and Benefits

The EM Series vertical machining center is engineered with high efficiency, high accuracy machining to satisfy the need for large quantity machining.

- 1— 3-axes are driven by preloaded C3 ballscrews and super-fast linear ways.
- 2— Powerful 15 kW spindle motor handles up to 10,000 rpm.
- 3— Attractive finish surface in high-speed with enough torque in lower rpm (optional 12,000 - 15,000 rpm).
- 4— Tool capacity is 24 tools with a random tool, double-arm tool change.
- 5— Decreases machining costs and increases productivity.
- 6— Offers iMCS for IoT readiness for 24/7 productivity.
- 7— Legendary Chevalier service.



Heavy-duty construction for superior stability and rapid speed

Machine Construction EM1620L

For machining precision, the EM Series VMCs are designed with Finite Element Method (FEM) to calculate the displacements and stresses in the machine design due to operational loads. The Series achieves superior stability with the high-density, dense cast iron construction of its main structure (base, table, column, saddle). Precision is further enhanced by using pretensioned Class C3 ballscrews in all three axes, which are built with linear ways for smooth quick movement. Servo motors directly coupled to the ballscrews increase movement sensitivity while dramatically reducing backlash. The machine base is supported by full travel, making it suitable for high speed machining.



EM1620L

Spindle speed

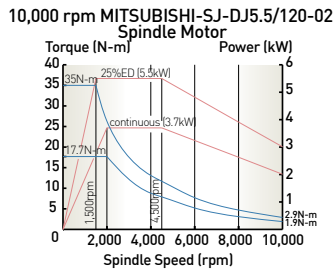
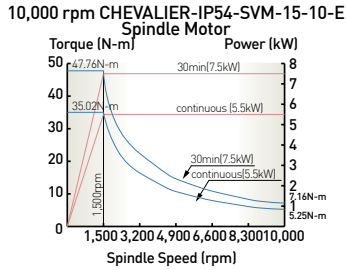
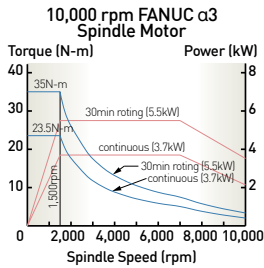
- Belt drive: 10,000 rpm, 12,000 rpm (optional)
- Rapid on (X / Y / Z) axis 48 / 48 / 36 m/min (1,889 / 1,889 / 1,417 ipm)

Spindle design

- Spindle motor: FANUC α 3/12,000i 3.7 / 5.5 kW (cont./30 min)
- Large diameter spindle includes four Class P4 high-precision angular contact ball bearings to increase spindle rigidity and loading capacity and maintain high accuracy during high speed machining.
- Maximum rigid tapping speed: up to 6,000 rpm



The EM1620L is shown with optional accessories.



Three axes built with linear ways for smooth quick movement

Tool magazine system

- Tool shank: #40
- Tool capacity: 24+1 tools
- Max. tool length: 200 mm (7.9")
- Max. tool weight: 7 kg (15.4 lbs.) (#40)
- Max. tool diameter:
 - with adjacent tool - \varnothing 80 mm (\varnothing 3.1")
 - without adjacent tool -
 - \varnothing 125 mm (\varnothing 4.9") EM1620L
 - \varnothing 150 mm (\varnothing 5.9") EM2033L/EM2040L
- Drive type: Cam type
- Tool change time T-T: 3 sec.
- Tool changing: Arm type



EM1620L

Air counter balance system

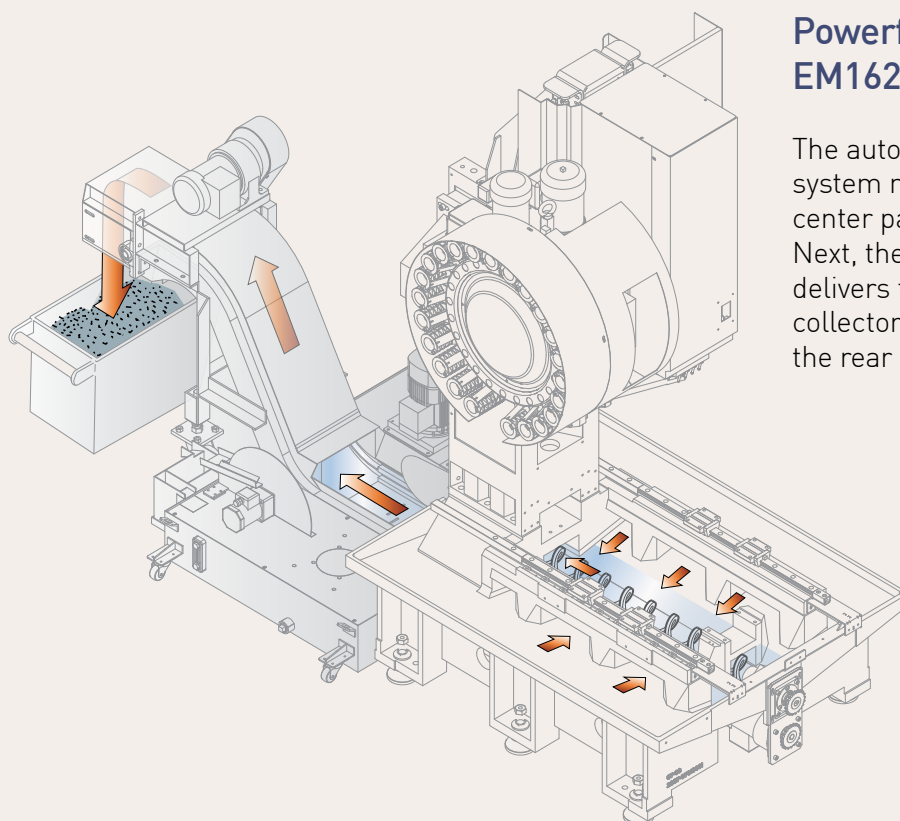
Z-axis spindle head is equipped with an air counter balance system that ensures the accuracy of the Z-axis.

Coolant system

- Tank capacity: 130 L (34 gals.)
- Oil skimmer (optional)
- Chip conveyor (optional)
- Internal auger chip conveyor (standard)
- Through-spindle coolant technology is a cost-saving, tool-saving feature that improves throughput for high-speed machining to meet high demands (optional).



Through-spindle coolant for faster cutting, better hole quality and greater throughput



Powerful chip disposal design EM1620L

The automatic chip flushing system moves cut chips to the center part of the machine base. Next, the auger chip conveyor delivers the cut chips to the chip collector, which is located at the rear of machine base.

Machine Construction

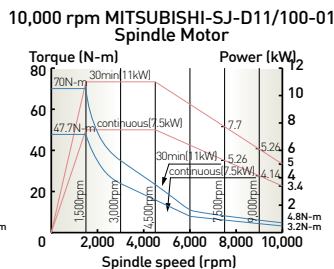
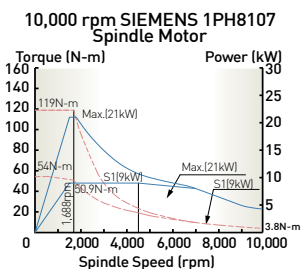
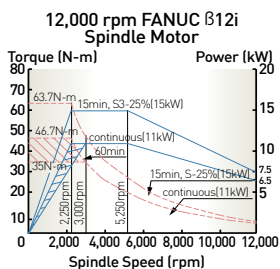
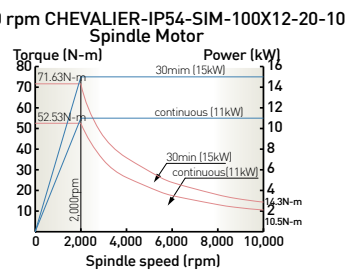
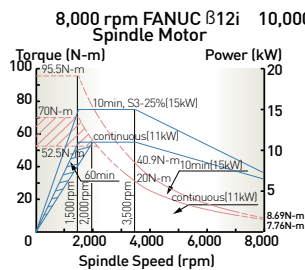
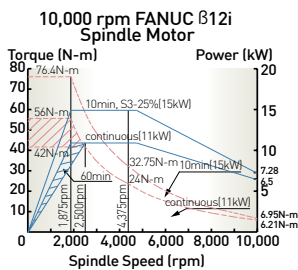
EM2033L / EM2040L

Spindle speed

- Belt drive: 10,000 rpm
8,000/12,000 rpm (optional)
- Rapid on (X / Y / Z) axis:
36 / 36 / 24 m/min (1,417 / 1,417 / 944 ipm)



The EM2040L is shown with optional accessories.



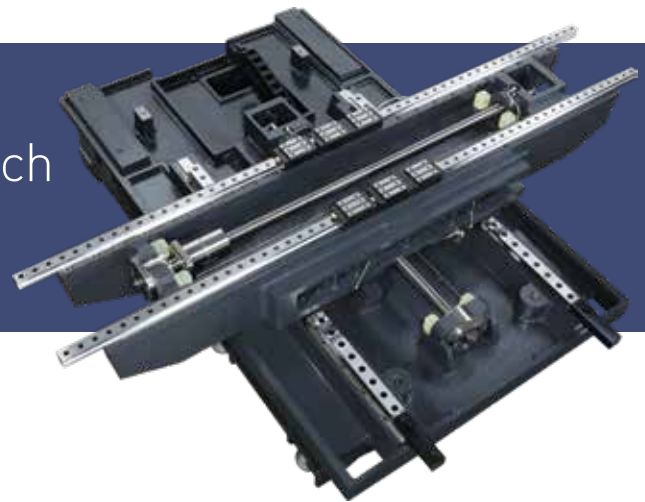
Structural design provides much higher accuracy and rigidity

High accuracy ballscrews

- 3-axes Class C3 high-pretensioned ballscrews $\varnothing 40$ mm x P12 mm ($\varnothing 1.57$ " x P0.47")

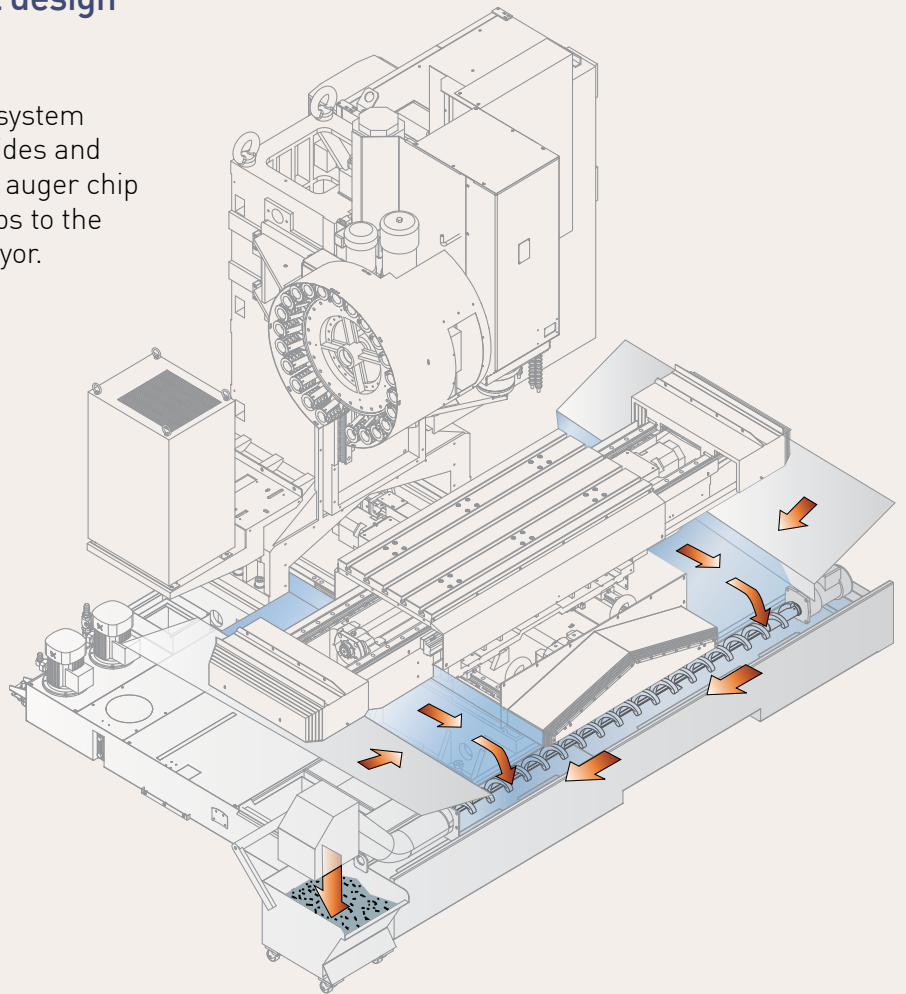
X/Y/Z linear ways

- 3-axes linear ways, Z-axis use a longer sliding block for heavier rigidity.
- Y-axis travel 530 mm (20.9") for EM2033L and EM2040L.
- X / Y one-piece motor seat on machine base and saddle—design provides much higher accuracy and rigidity.



Powerful chip disposal design EM2033L / EM2040L

The automatic chip flushing system washes the chips off to the sides and into the chip auger. Next, the auger chip conveyor delivers the cut chips to the front of the lift-up chip conveyor.



iMachine Communications System™ (iMCS)

iMCS is a comprehensive remote monitoring software that integrates with IoT functions on Chevalier's CNC machines to perform 24/7 data collection, utilization monitoring, data analysis, alarm history, maintenance and overall equipment effectiveness (OEE), all which help to avoid downtime and increases productivity. Additional PC and software are required.





Controls

Control specifications

- Standard Fanuc 0iM control
- Part program storage size: 2 MB
- Manual Guide 0i
- 10.4" color LCD
- AICC II (200 Block)

Optional controls

- Chevalier SMART iSE control: 15" color LCD
- Mitsubishi control: 10.4" color LCD
- Siemens control: 10.4" color LCD

The perfect control for time-critical CNC machining

Fanuc-0iM

1. 10.4" color LCD
2. Linear interpolation
3. 3-axes simultaneous controllable
4. Circular interpolation
5. Helical interpolation
6. Exact stop G09
7. Skip function G31
8. Automatic acceleration, deceleration
9. Polar coordinate command G15 / G16
10. Scaling G50 / G51
11. Automatic override for inner corners G62
12. Coordinate system rotation G68 / G69
13. Rigid tapping M29
14. Program date input G10
15. Part program storage size: 2 MB
16. Number of registrable programs: 1,000
17. Background editing
18. Manual guide 0i

Chevalier SMART iSE*

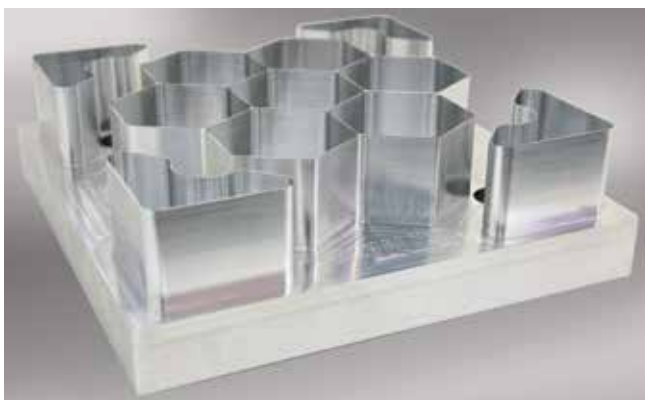
1. 15" color LCD
2. Software stroke limit
3. Quad-peak error positive compensation
4. Axis coupling
5. Virtual axis
6. Multiple channel
7. MPG simulation
8. Optional skip 10 sets
9. B stop/program end
10. Workpiece coordinate 100 sets
11. Extension G code
12. Tool life management
13. Edit protection
14. Network
15. USB 3 sets
16. Operating records display
17. Graphic simulation

Siemens 828D*

1. 10.4" color LCD
2. Linear interpolation
3. Circular interpolation
4. Helical interpolation
5. Skip function
6. Workpiece coordinate system
7. Coordinate system rotation
8. Rigid tapping
9. Mirror image, scaling, rotation
10. Canned cycles for drilling / milling
11. Part program storage size: 3 MB

*Not sold in U.S.A.

Applications



The EM Series is the best value from prototypes to volume-based applications

Tool Shank and Pull Stud EM1620L / EM2033L / EM2040L

Units: mm

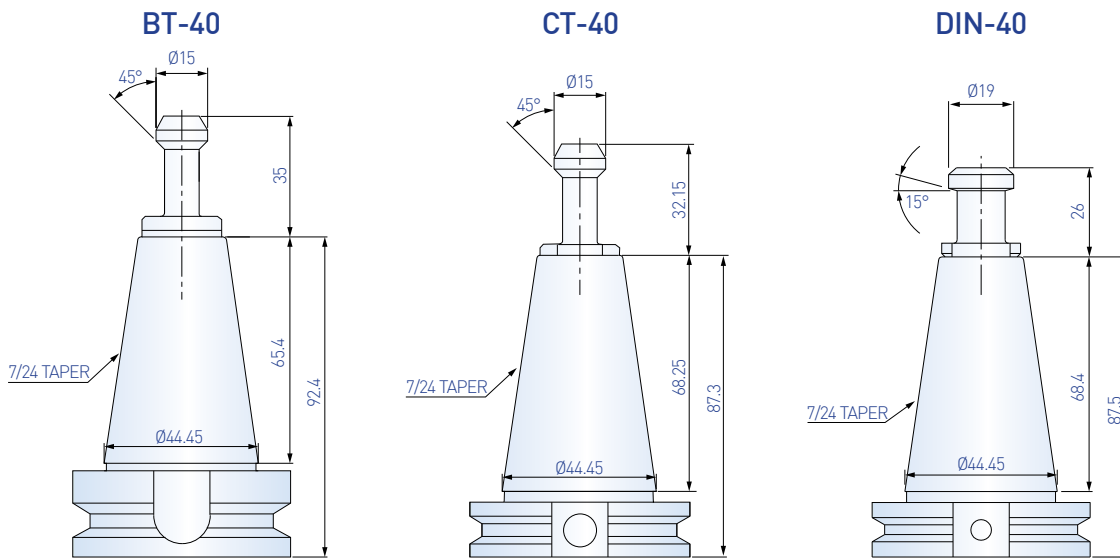
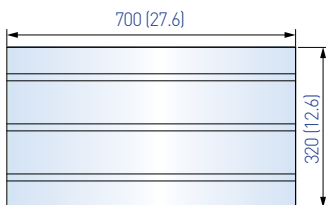
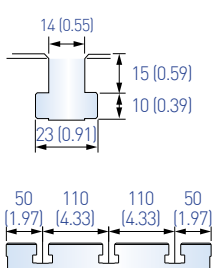
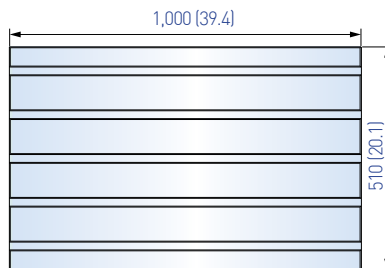
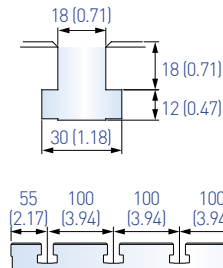


Table and T-slot Dimensions EM1620L

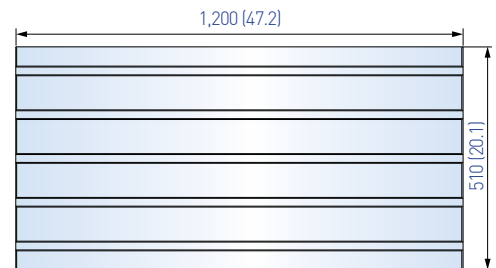
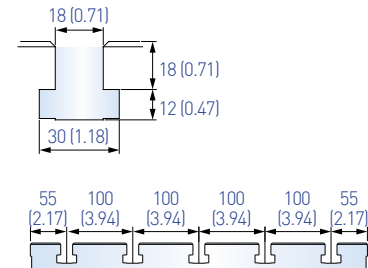
Units: mm (")



EM2033L

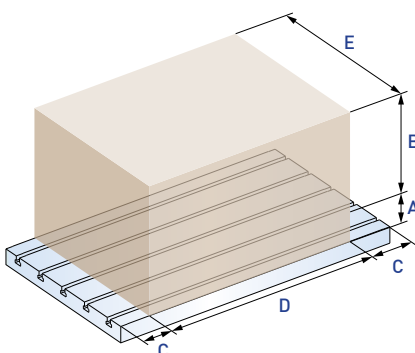


EM2040L



Max. Working Space

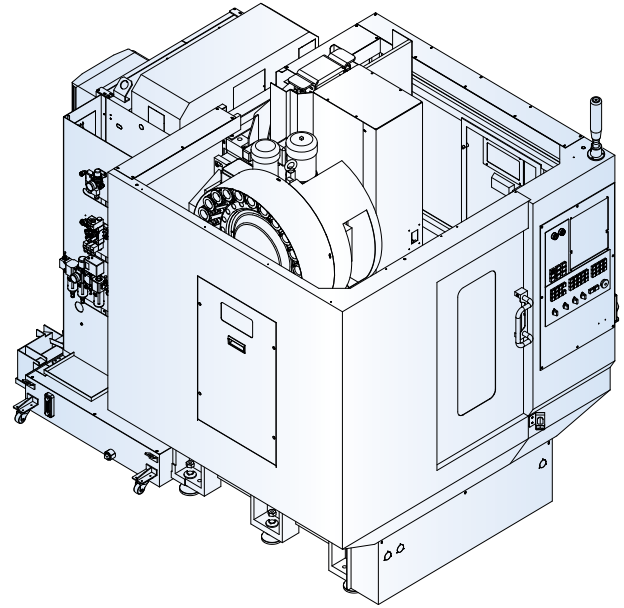
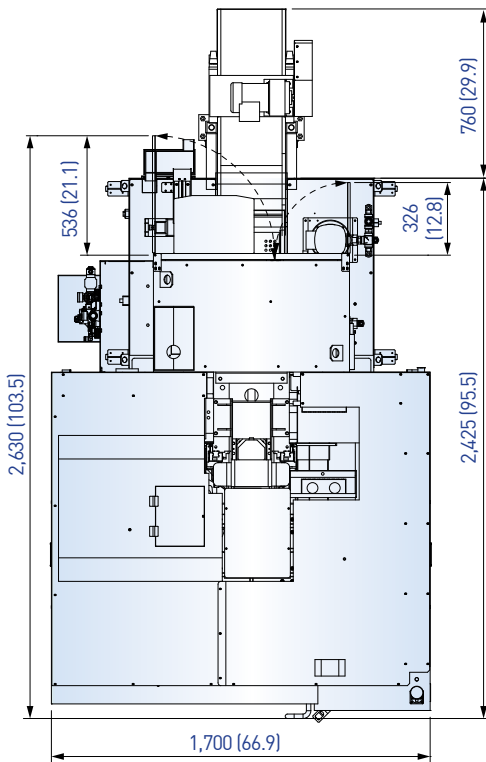
Units: mm (")



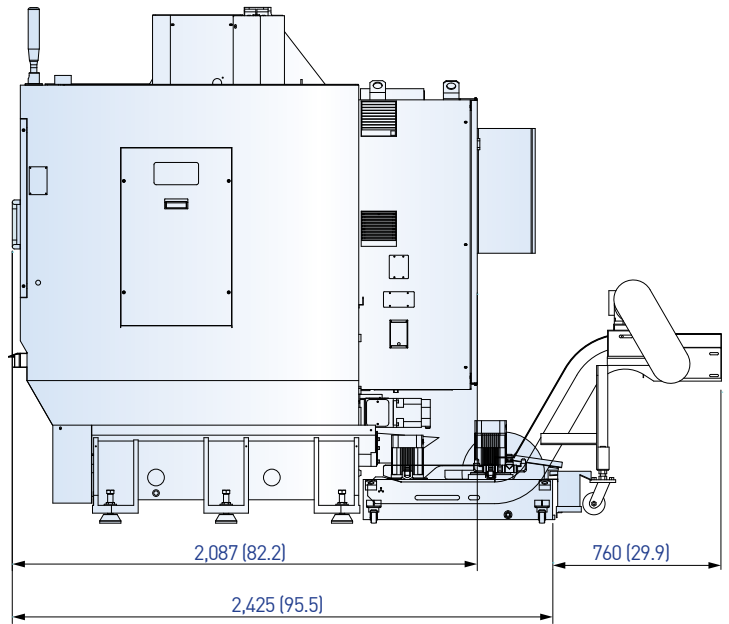
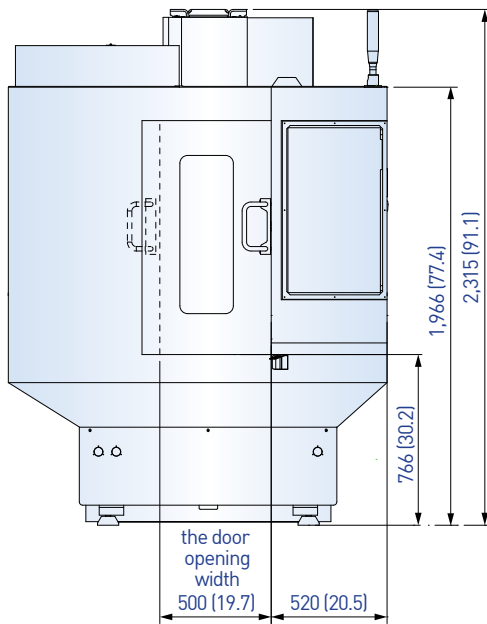
MODEL	A	B	C	D	E
EM1620L	150 (5.9)	380 (15.0)	90 (3.5)	520 (20.5)	320 (12.6)
EM2033L	150 (5.9)	510 (20.1)	75 (2.9)	850 (33.5)	510 (20.1)
EM2040L	130 (5.1)	510 (20.1)	90 (3.5)	1,020 (40.2)	510 (20.1)

Machine Dimensions EM1620L

Units: mm (")

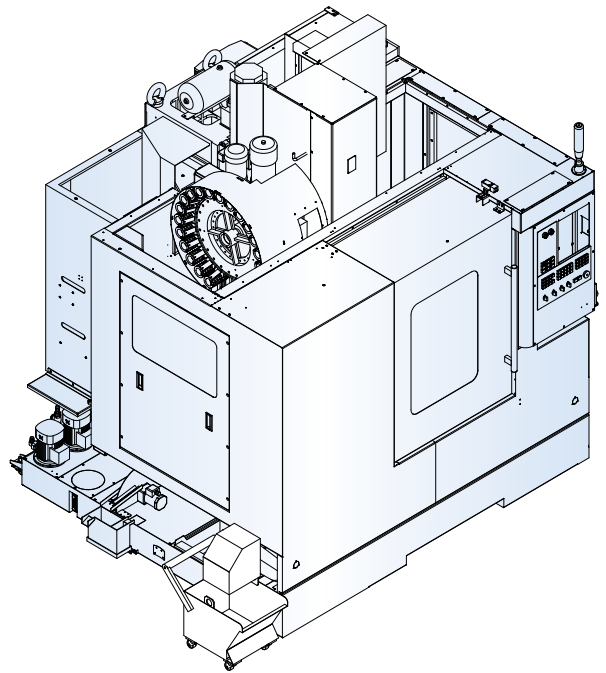
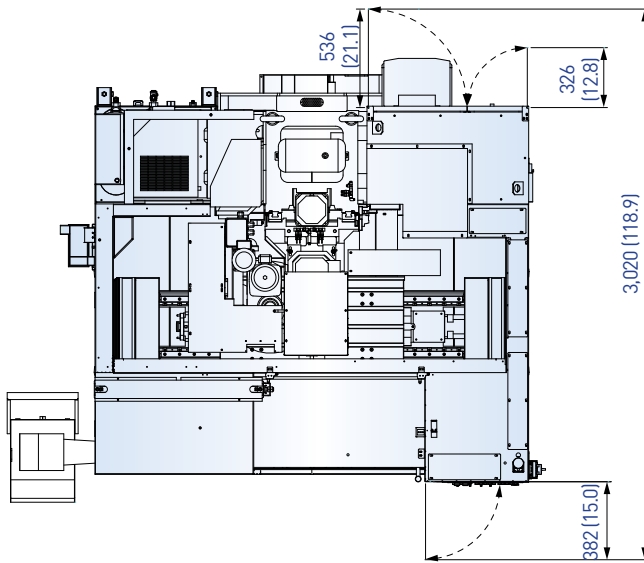


Note: Machine shown with optional accessories.

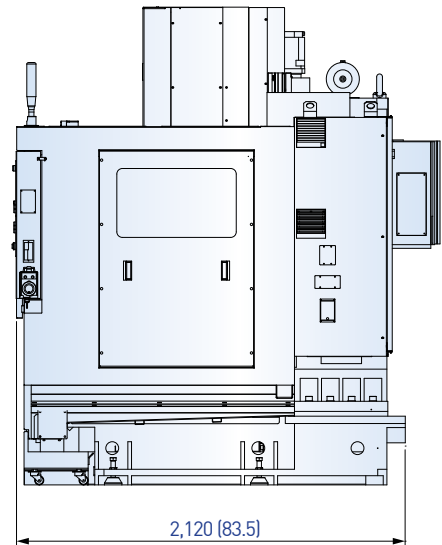
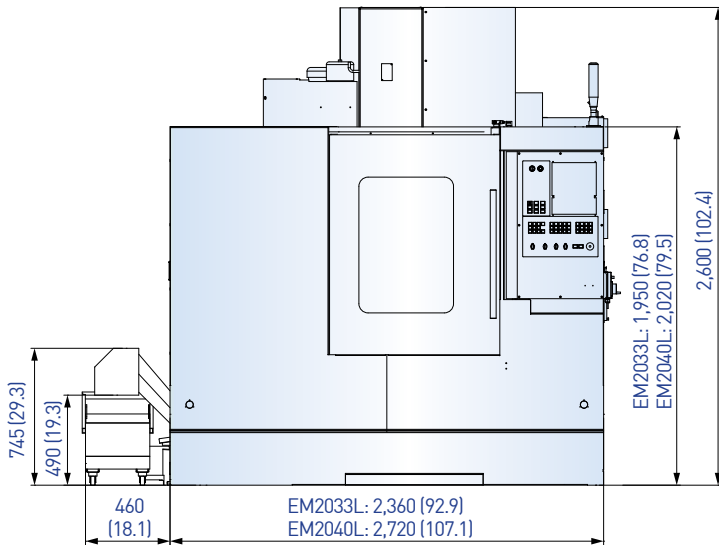


Machine Dimensions EM2033L / EM2040L

Units: mm (")



Note: Machine shown with optional accessories.





Faster response, faster acceleration/deceleration for increased productivity

Accessories

Standard accessories

- Fanuc 0iM control 10.4" color LCD
- 24+1 station arm type ATC
- Spindle air seal
- Spindle air blast
- Air blast chip blower
- Rear chip flash system
- Auger chip conveyor (EM1620L on Y axis, EM20L on X axis)
- LED working lamp
- Warning lamp
- Semi enclosed splash guard
- Coolant system
- Central lubrication system
- Leveling bolts and pads
- Bolt kit with tools for foundation
- Tools & tool box
- Rigid tapping
- Remote MPG
- Workpiece cleaning gun
- Operation manual and parts list

Optional accessories

- Siemens 828D control (EM20L)
- Chevalier SMART iSE control
- Mitsubishi M80A control
- 32-station chain type tool magazine (EM20L)
- Pull studs (BT-40, CT-40 or DIN-40)
- Spindle oil cooler
- CTS preparation device
- Coolant through spindle
- 4th axis preparation
- 4th axis complete set
- Automatic work piece measurement system
- Automatic tool length measurement
- Linear scales
- Oil skimmer
- Coolant gun
- Heat exchanger for electric cabinet
- Steel belt type chip conveyor
- Scraper type chip conveyor
- Automatic power off
- Transformer
- Full roof enclosure

Specifications

Item	Description	EM1620L	EM2033L	EM2040L
Table	Table size	700 x 320 mm (27.6" x 12.6")	1,000 x 510 mm (39.4" x 20.1")	1,200 x 510 mm (47.2" x 20.1")
	T-slots (width x pitch x no.)	14 mm x 110 mm x 3 (0.6" x 4.3" x 3)	18 mm x 100 mm x 5 (0.7" x 3.9" x 5)	18 mm x 100 mm x 5 (0.7" x 3.9" x 5)
	Max. table load	250 kg (550 lbs.)	500 kg (1,100 lbs.)	600 kg (1,320 lbs.)
Travel	X-travel	520 mm (20.5")	850 mm (33.5")	1,020 mm (40.2")
	Y-travel	368 mm (14.5")	530 mm (20.9")	
	Z-travel	380 mm (15.0")	510 mm (20.1")	
Spindle	Spindle nose to table surface	150-530 mm (5.9"-20.9")	150-660 mm (5.9"-26.0")	130-640 mm (5.1"-25.2")
	Spindle center to column	368 mm (14.5")	585 mm (23.0")	
	Spindle taper		#40 BIG PLUS	
	Spindle speed	Belt drive: 10,000 rpm (Optional 12,000 rpm) Direct drive: 10,000 rpm (Optional 12,000 rpm)		Belt drive: 10,000 rpm (Optional 8,000/12,000 rpm) Direct drive: 10,000 rpm (Optional 12,000 rpm)
	Spindle diameter	Ø60 mm (Ø2.4")		Ø70 mm (Ø2.8")
Feed rates	Rapid traverse (X/Y/Z)	48 / 48 / 36 m/min (1,889 / 1,889 / 1,417 ipm)	36 / 36 / 24 m/min (1,417 / 1,417 / 944 ipm)	
	Cutting feed (X/Y/Z)	1-10 m/min (39.3-393 ipm)	1-10 m/min (39.3-393 ipm)	
	Vertical axis counter weight	Pneumatic counter balance		-
Automatic tool changer	Tool storage capacity		24+1 arm type	
	Tool shank		BT 40 (Optional CT 40* / DIN 40)	
	Tool change time (T-T)		3 sec.	
	Pull stud		P40T-1	
	Max. tool diameter with adjacent tool		Ø80 mm (Ø3.1")	
	Max. tool length	200 mm (7.9")		300 mm (11.8")
Motors	Spindle motor	Fanuc: 3.7/5.5 kW Mitsubishi: 3.7/5.5 kW Chevalier: 5.5 kW		Fanuc: 11/15 kW Mitsubishi: 7.5/11 kW Siemens: 9 kW Chevalier: 11 kW
	Axis motors (X/Y/Z)	Fanuc: 1.2/1.2/1.2 kW Mitsubishi: 1.5/1.5/2.2 kW Chevalier: 1.8/1.8/1.8 kW		Fanuc: 1.8/1.8/2.5 kW Mitsubishi: 2/2/3.5 kW Siemens: 3.3/3.3/3.8 kW Chevalier: 2.9/2.9/4.4 kW
	Coolant motor		0.59 kW (0.8 HP)	
Power and air requirement	Power required	15 kVA		20 kVA
	Total air consumption		6 kg/cm ² (86 psi) 200 NL/min (7 cfm)	
Machine dimension	Floor space (W x D x H)	1,700 x 2,630 x 2,315 mm (66.9" x 103.5" x 91.1")	2,360 x 3,020 x 2,600 mm (92.9" x 118.9" x 102.4")	2,720 x 3,020 x 2,600 mm (107.0" x 118.5" x 102.4")
	Net weight	2,300 kg (5,070 lbs.)	5,800 kg (12,700 lbs.)	6,200 kg (13,600 lbs.)
Accuracy	Positioning accuracy		0.010 mm (0.00040")	
	Repeatability accuracy		0.007 mm (0.00028")	
	Accuracy standard		VDI 3441	

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*U.S.A. standard

Inspection

Laser calibration

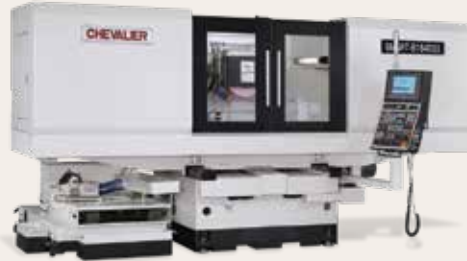
After assembling, all machines are measured and calibrated by state-of-the-art laser calibration equipment. This ensures precise verification and compensation of the machines, resulting in increased accuracy and repeatability.



Ball bar testing

The machine is put through a series of circular moves in the X / Y plane, and 1/2 circle moves in the X / Z and Y / Z planes. Encoder data from the bar is fed into a computer, which outputs a chart of machine accuracy. Any deviations in squareness or length show up as distorted circles that are very easy for a technician to spot. This chart assures that the machine is accurate and properly aligned.





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