



**UNi5X-400**

5-Axis Vertical Machining Center

Expertly engineered for  
complex-shaped workpieces



**CHEVALIER®**  
Grinding / Turning / Milling

We shape your ideas.™

## Expertly engineered for complex-shaped workpieces

The UNI5X-400 five-axis vertical machining center can provide the required stability, speed and accuracy when machining complex workpieces. The machine's high rigidity achieves the best stability, and the BIG-PLUS® double-sided restraint spindle design can achieve excellent speed and accuracy.

This machine type can be widely used in aerospace, automotive, medical treatment, mold, pneumatic and hydraulic components, electronics, semiconductor, and job shop industries.

Our exclusive iMachine Communications System™ (iMCS) software includes remote machine monitoring, data analysis, alarm history and maintenance updates to improve overall equipment efficiency (OEE) and is the equipment required for the construction of smart factories.

## Finally, a 5-axis VMC that's affordable

### Key Features and Benefits

- 1—Improves part accuracy by eliminating the need to move workpieces to multiple workstations.
- 2—Eliminates the need for special cutting tools.
- 3—Machines in a single pass instead of many small incremental passes to improve the surface and present better machining quality.
- 4—Increases tool cutting length while maintaining the same cutting feed rate to reduce cutting forces and increase tool life.
- 5—Requires fewer machines in use to save shop floor space and simplify machining management.
- 6—Decreases machining costs and increases productivity.
- 7—Offers iMCS for IoT readiness for 24/7 productivity.
- 8—Legendary Chevalier service.



Note: Machine shown with optional accessories.



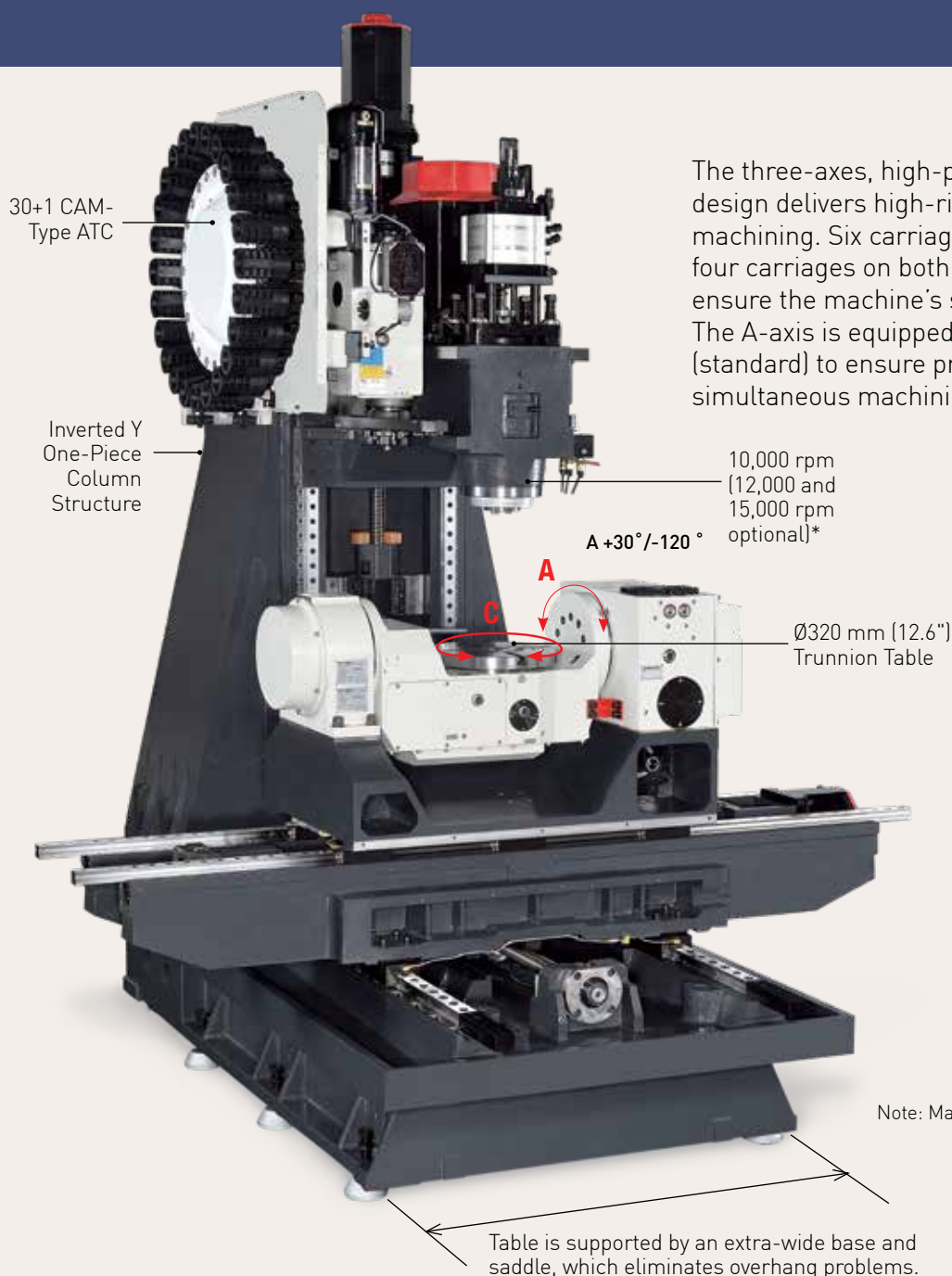
Accommodates various complex shapes and high-precision parts or molds machining to save costs



## Machine Construction

Machining precision depends on a rigid, stable infrastructure to eliminate vibrations. The UNi5X-400 VMC achieves superior stability by constructing the main structure (base, table, column, saddle) of high-quality, dense cast iron. Precision is further enhanced by using pretensioned Class C3 ballscrews in all three axes. Servo motors directly coupled to the ballscrews increase movement sensitivity while dramatically reducing backlash.

### Heavy-duty construction for superior stability



The three-axes, high-precision linear guideway design delivers high-rigidity and high-precision machining. Six carriages on the X-axis and four carriages on both the Y-axis and Z-axis ensure the machine's stability and accuracy. The A-axis is equipped with absolute encoders (standard) to ensure precise, complex 5-axis simultaneous machining.

- The high-rigidity direct drive spindle outputs torque up to 95.5 N-m.
- The compact 30/40 magazine saves space and is driven by a servo motor to make automatic tool changing fast and precise.
- The control position and swivel are ergonomically designed to make operating and monitoring machining status easy.

\*U.S.A.: 12,000 rpm standard (15,000 rpm optional).

Note: Machine shown with optional accessories

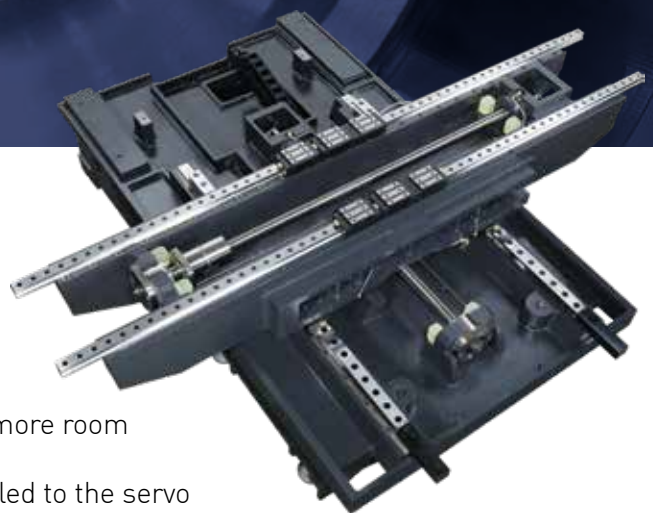


The inverted Y one-piece column structure provides superior rigidity



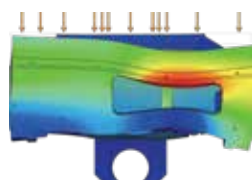
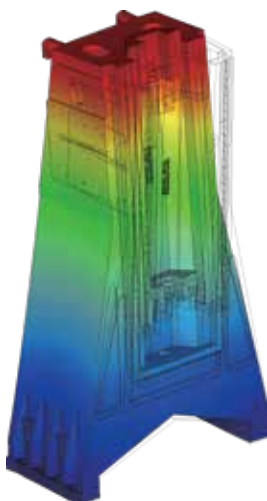
### Rugged axis power transmission and accurate motion control

- Inverted Y-axis travel provides more room for machining wider parts.
- All linear axes are directly coupled to the servo motors with the X- and Y-axis utilizing a one-piece casted bearing block to reduce vibration and backlash.
- Standard roller guideways in all three axes.



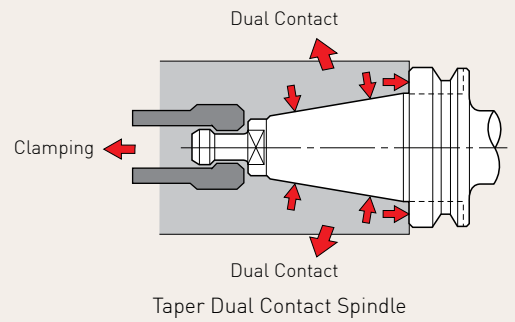
### Topology analysis and Finite Element Method (FEM)

Simulation uses topology analysis and FEM methods to calculate the machine's displacements and stresses from operational loads (such as forces and pressures) to ensure superior stability and rigidity.



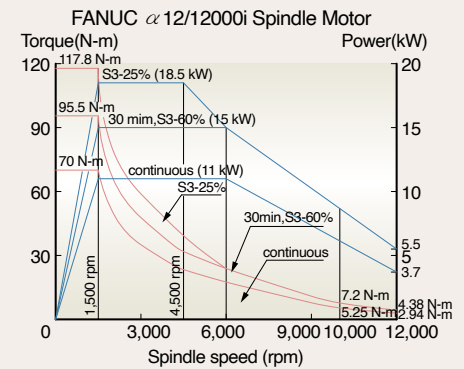
## Spindle

The UNi5X-400 delivers superior accuracy during high-speed machining. To achieve this, the 40-taper BIG-PLUS® spindle design uses four P4 Class, high-precision angular-contact ball bearings to increase spindle rigidity and loading capacity. It also reduces vibration, noise and thermal expansion.



Spindle	
Spindle taper	#40 BIG-PLUS®
Spindle speed	10,000 rpm (12,000/15,000 rpm optional)*
Transmission type	Direct drive
Spindle diameter	Ø70 mm [2.8"]

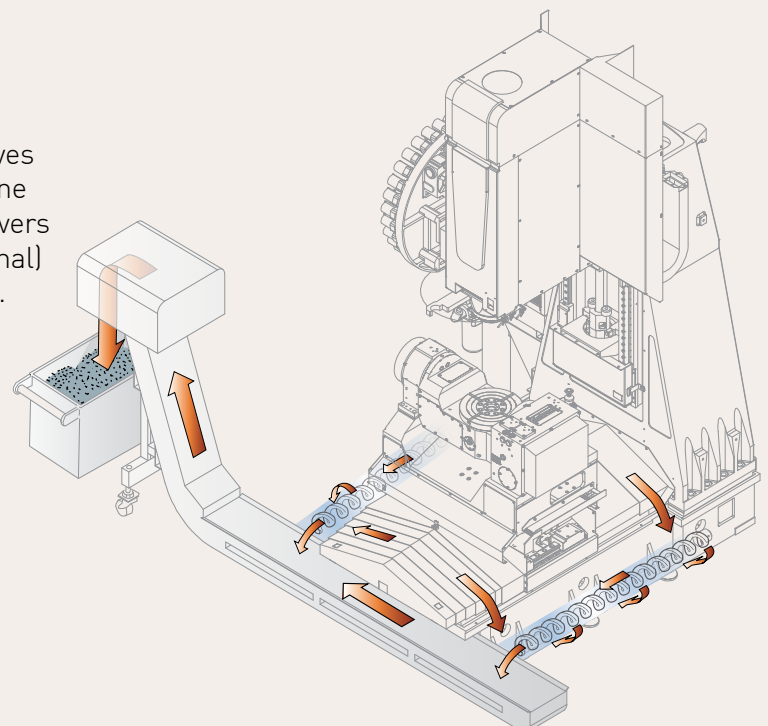
\*U.S.A.: 12,000 rpm standard (15,000 rpm optional).



The rigid spindle reduces vibration to ensure greater accuracy

## Efficient chip disposal design

The automatic chip flushing system moves cutting chips to either side of the machine base. The screw-type chip conveyor delivers cutting chips to the chip conveyor (optional) located at the front of the machine base.





## 5-axis, machine tool dynamic accuracy measurement and compensation system

This technology measures and compensates the static/dynamic backlash of the transmission and rotary axes. For static backlash calibration, the error of transmission axis can be compensated to 1  $\mu\text{m}$  and the rotary axis static backlash error can be compensated to 0.001°.

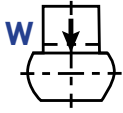
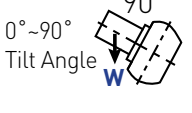
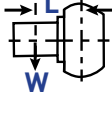
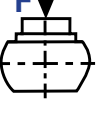
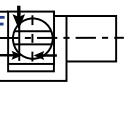
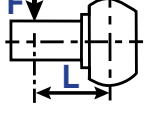
## Trunnion table

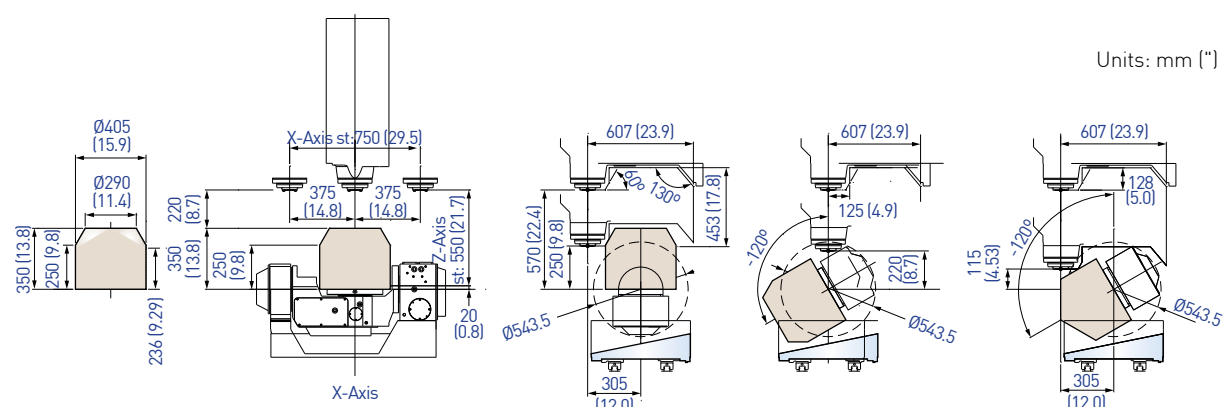
A heavy-duty three-piece cross roller bearing provides excellent part loading and machining capability. There is  $\pm 10''$  angle encoder for the A-axis.

Item	A-axis Tilting	C-axis Rotation
Max. table load	100 kg (220 lbs.)	
Diameter of center hole	$\varnothing 50$ (H7) mm	
Positioning accuracy	12 sec.	20 sec.
Repeatability accuracy	5 sec.	10 sec.
Min. setting angle	0.001°	
Revolutions per minute	25 rpm	
Break tightening force	140 kg-m	70 kg-m
Braking pressure (air source)	5 kgf/cm <sup>2</sup>	



## Maximum working area and loading

Allowable Loading Capacity		Allowable Work Movement	Allowable Loading (when table clamped)		
					
100 Kg	100 Kg	100 N-m	16,000 N-m	700 N-m	1,400 N-m





## Controls

### Control specifications

- Standard Fanuc 0iM control for 4+1 axis applications
- 4-axis simultaneous control
- Part program storage size: 2MB
- Manual Guide i
- 10.4" color LCD
- Tilted working plane indexing G68.2
- AICC II (200 Block)

### Optional controls

- Siemens 828D control: 10.4" color LCD (4-axis simultaneous)
- Heidenhain TNC640 HSCI control: 15" color LCD (5-axis simultaneous)

## iMachine Communications System™ (iMCS)

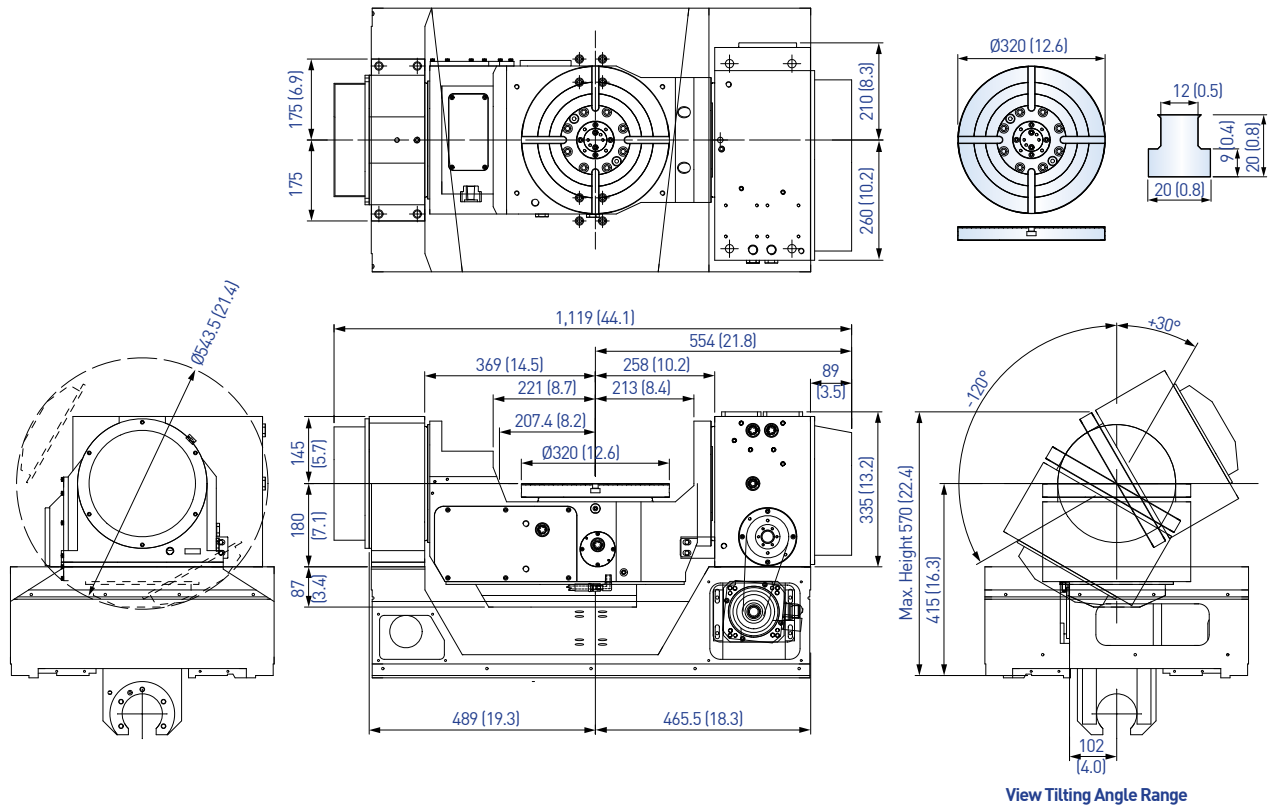
iMCS is a comprehensive remote monitoring software that integrates with IoT functions on Chevalier's CNC machines to perform 24/7 data collection, utilization monitoring, data analysis, alarm history, maintenance and overall equipment effectiveness (OEE), all which help to avoid downtime and increases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





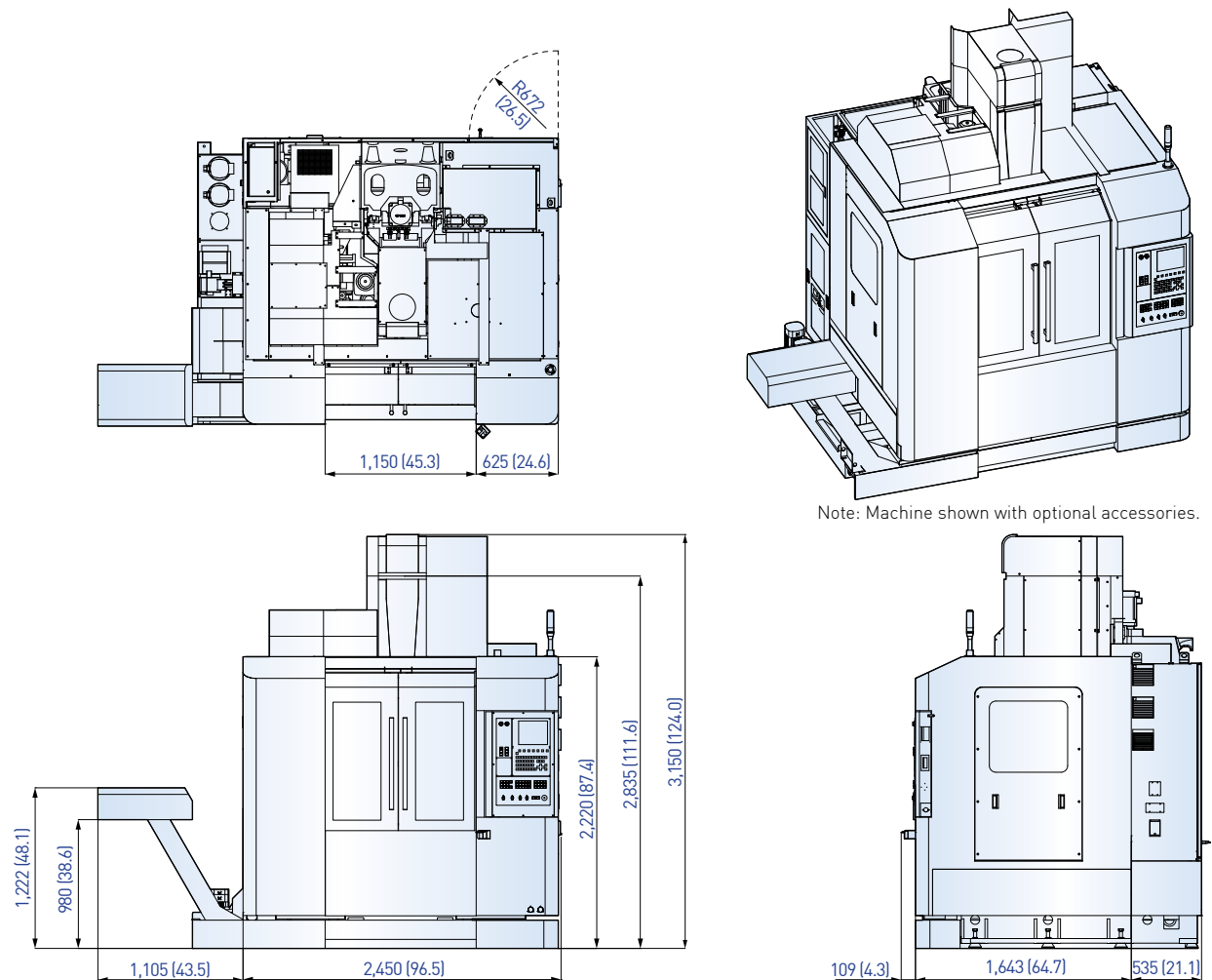
# Trunnion Table and T-Slot Dimensions

Units: mm (")



# Machine Dimensions

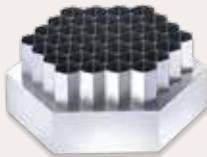
Units: mm (")



## Applications



Workpiece	Cutting Material	Tool	Cutting Mode	Speed (rpm)	Feed Rate (mm/min)	Total Time
Vibration plate Ø200 x 30 mm	AL-7075	EDM 10	Rough	11,141	3,342	00:50:40
		EDM 8	Rough	11,931	3,851	
		EDM 5	Rough	12,732	3,674	
		EDM 10	Finish	12,732	2,292	
		EDM 8	Finish	13,926	2,507	
		EDM 6	Finish	14,854	2,228	
		DR 2.6	Drill	2,500	160	
		DR 3.4	Drill	2,000	160	



Workpiece	Cutting Material	Tool	Cutting Mode	Speed (rpm)	Feed Rate (mm/min)	Total Time
Honeycomb 100 x 100 x 40 mm	AL-6061	EDM 10	Rough	8,000	2,400	01:21:57
		DR 10	Rough	2,000	80	
		EDM 4	Rough	8,000	1,200	
		EDM 4	Finish	10,000	1,000	



## Accessories

### Standard accessories

1. Fanuc 0iM control\*\*
2. Direct-drive spindle (10,000 rpm)\*
3. Spindle air seal
4. Cutting blast
5. Spindle oil chiller
6. Remote MPG
7. RS232 / USB Interface / Ethernet / PCMCIA
8. Fully enclosed
9. 3-axis telescope cover
10. 30+1 arm type ATC
11. A-axis angle encoder (±10")
12. Automatic way lubrication system
13. Pneumatic system
14. Rear chip flush system
15. Electric cabinet power indication lamp
16. Water gun and workpiece cleaning gun
17. LED work lamp and warning lamp
18. Coolant system
19. Tools & tool box
20. Leveling bolts and pads
21. Wireless receiver for workpiece measurement system (Blum)

### Optional accessories

1. Siemens 828D control: 10.4" LCD color (4-axis simultaneous)
2. Heidenhain TNC640 HSCI control: 15" LCD color (5-axis simultaneous)
3. Direct-drive spindle (12,000 and 15,000 rpm)\*
4. High-pressure coolant through spindle
5. 40-station, chain type ATC
6. Linear scales
7. A-/C-axis angle encoder (±5")
8. Automatic workpiece measurement system
9. Tool length measurement
10. Internal dual-screw chip augers
11. Lift-up chip conveyor
12. Oil skimmer
13. Oil mist collector
14. Air conditioner for electric cabinet
15. Transformer

# Specifications

Item	Description	UNi5X-400
Capacity	Table size Workpiece dimensions Max. table load	Ø320 mm (Ø12.6") Ø400 x H350 mm (Ø15.7" x H13.8") 100 kg (220 lbs.)
Travel	X-travel Y-travel Z-travel	750 mm (29.5") 610 mm (24.0") 550 mm (21.7")
Feed rates	Rapid traverse (X/Y/Z) Cutting feed (X/Y/Z)	36/36/30 m/min (1,417/1,417/1,181 ipm) 10/10/10 m/min (394/394/394 ipm)
Accuracy	VDI 3441 positioning accuracy (X/Y/Z) VDI 3441 repeatability accuracy (X/Y/Z) A-axis positioning C-axis positioning (while with optional angle encoder) A-axis repeatability C-axis repeatability (while with optional angle encoder)	0.010 mm (0.0004") 0.007 mm (0.0003") 12 sec. 20 (12) sec.  5 sec. 10 (4) sec.
A/C-axis	A-axis (tilting) C-axis (rotating) Revolutions per minute	150° (+30° / -120°) 360° 25 rpm
Spindle	Spindle taper Spindle power Spindle speed Pull stud Spindle center to column Spindle nose to table surface	BBT40 Fanuc: 11/15 kW, Siemens: 11 kW, Heidenhain: 10 kW Direct drive 10,000 rpm (optional 12,000/15,000 rpm)* P40T-1 685 mm (27.0") 20-570 mm (0.8" ~ 22.4")
Automatic tool changer	Tool storage capacity Max. tool diameter with adjacent tool Max. tool diameter without adjacent tool Max. tool length Max. tool weight	30+1 arm type ATC 76 mm (3.0") 150 mm (5.9") 300 mm (11.8") 7 kg (15.4 lbs.)
Tank capacity	Coolant tank capacity	570 L (150 gals.)
Power and air requirement	Power required  Total air consumption Pressure Flow	Fanuc: 25 kVA, Siemens/Heidenhain: 29 kVA  6 kg/cm² (86 psi) 200 NL/min (7 cfm)
Machine dimensions	Floor space (W x D x H) Net weight	2,450 x 2,287 x 3,150 mm (96.5" x 90.0" x 124.0") 7,050 kg (15,500 lbs.)

All content is for reference only and may be subject to change without notice or obligation.

\*U.S.A.: 12,000 rpm standard (15,000 rpm optional).







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