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SHARP Model SVX-500 5-Axis Simultaneous Vertical Machining Center



5-Axis Simultaneous Machining

Minimize handling, maximize productivity

SHARP's 5-axis Vertical Machining Center allows 5-sided machining and 5-axis simultaneous machining to increase productivity at a reduced cost compared to other similar machines.

Compared to a 3-axis machine that requires a separate setup for cutting different sides of a part, machine can clamp a part one time and rotate into a series of positions to machine each side without re-fixturing.

A 5-axis simultaneous machining center has the additional benefit, especially for mold work, of using shorter and stronger tools to speed up the feed rate, taking heavier and deeper cuts without sacrificing accuracy. It also maintains longer tool life and delivers smoother and finer finish of the part. For complex multiple helical shape parts, simultaneous 5 axis cutting motion is essential.

The trunnion table design of the Model SVX-500 machine offers maximum undercut capability due to the table rotating -110 to + 20 along the A axis (front and back) and 360 degree along the C axis. Parts with numerous angled holes and cross section through them can easily be positioned to create the compound angle, so the machine can do straight hole drilling. Otherwise it would need multiple setups, or need compound- angle drills heads to do the job, which limits the speeds and feeds and often do not have through-coolant capability.

For CNC controls, the Fanuc 31i or Siemens Sinumerik are available as standard controls and drive systems.

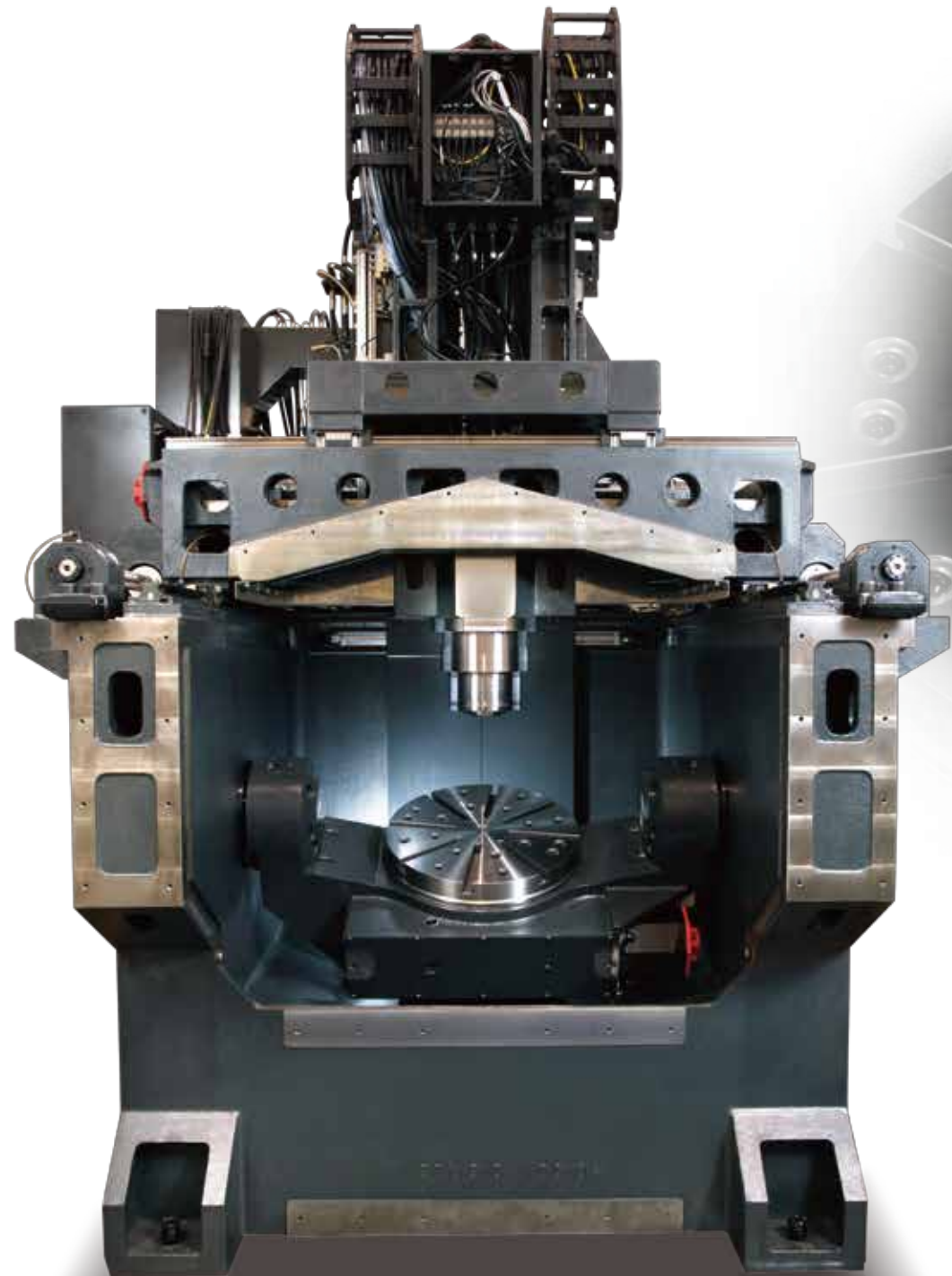
Complex Machining Made Easy

The 5-axis simultaneous model is perfect for precision machining of parts like the impeller and the mold for the golf ball.



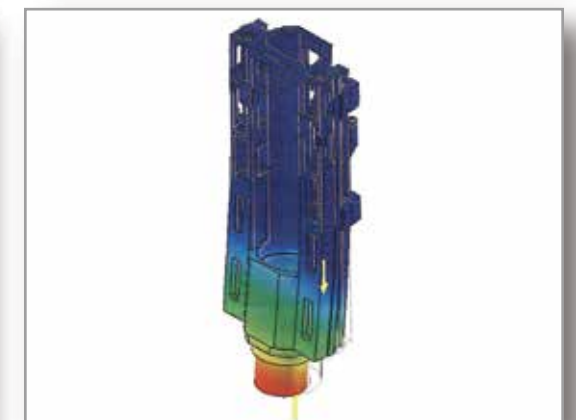
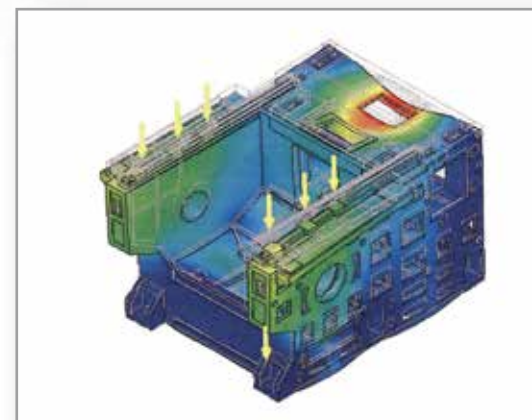
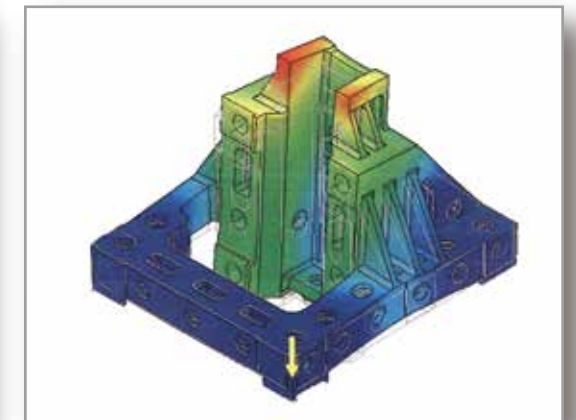
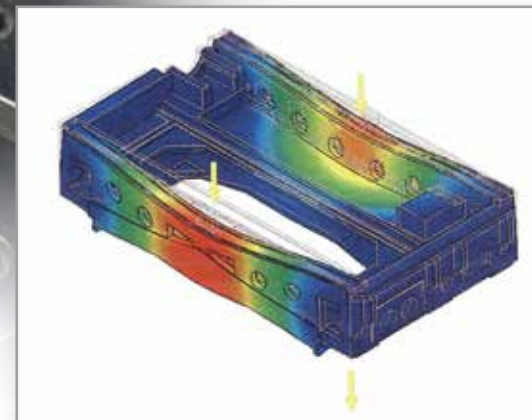
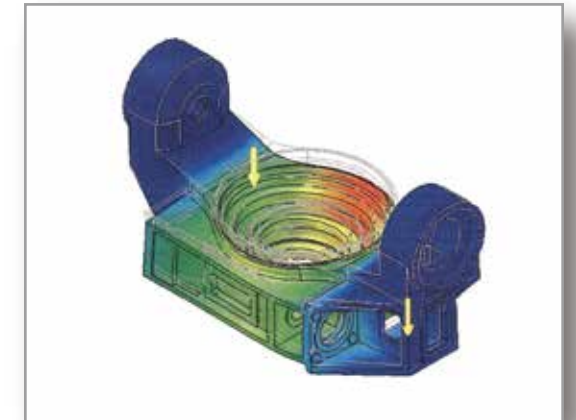
Box-in-Box Construction

The machine is constructed using the box-in-box design to assure precision and rigidity under different cutting conditions. The work piece is fixed along the X, Y axis to allow large heavy parts to be machined with high accuracy. The spindle head moves on highly rigid roller guide ways along the X and Y axis on top of the box structure. Such arrangement maintains total machine balance and eliminates overhang due to the moving table.



Rigidity By Design

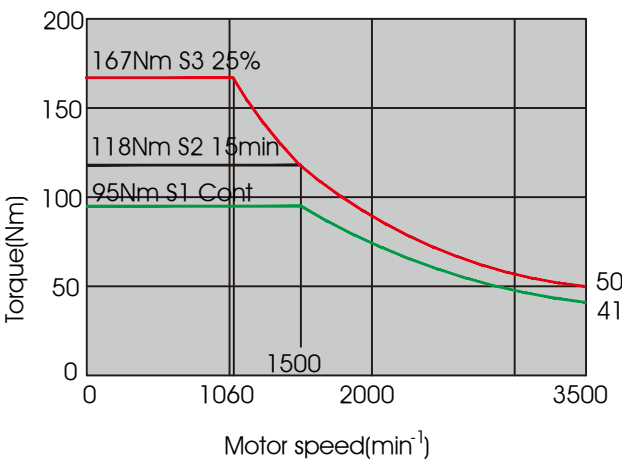
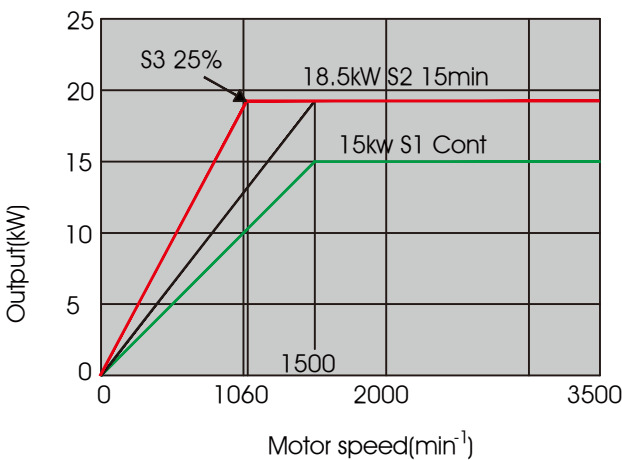
All major castings are analyzed using Finite Element Method (FEM) to locate areas of stress and strain, multiple loading conditions from thermal, gravitational, centrifugal and other forced displacements. Ribs locations are properly defined to maintain rigidity throughout the entire machine.



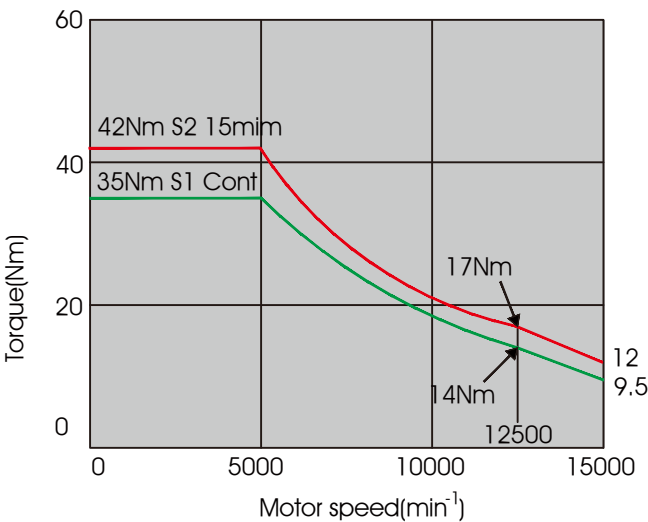
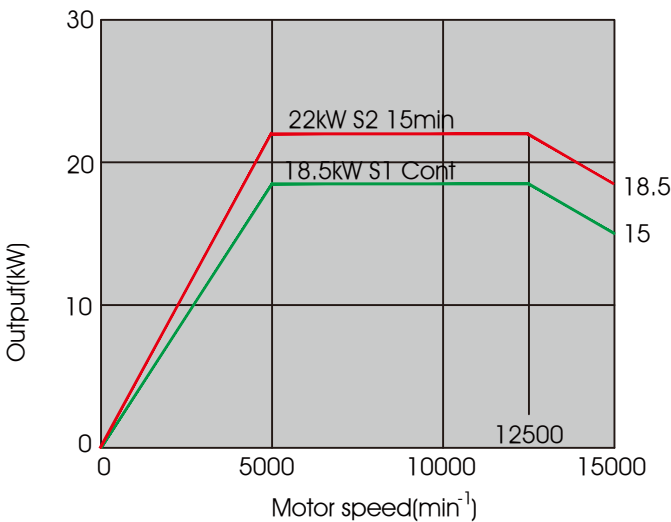
High Precision Spindle

The standard 25 HP, 15,000 rpm spindle is mounted on high precision, high power ceramic bearings that delivers 87 ft-lb (118Nm) of torque with High-Low windings built in the spindle. The spindle provides dual contact between the spindle face and the angle face of the tooling. It greatly increases tool rigidity, reduce run out on the high speed 15,000 rpm spindle.

LOW WINDINGS



HIGH WINDINGS

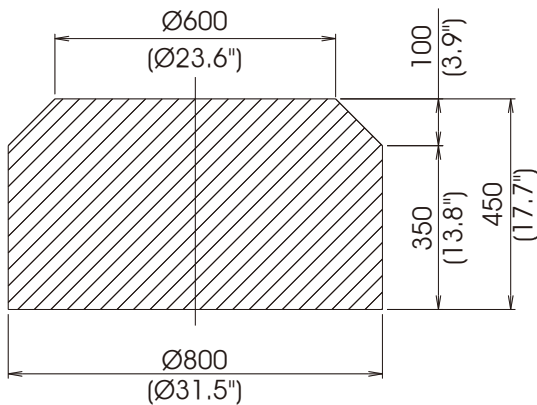


SPINDLE POWER & TORQUE CHART

Large Volume Trunnion Table

The integrated trunnion table offers ample under cut capability as it can tilt -110 degree to +20 degree. Its large work envelope delivers more torque at low rpm than a swivel head machine. Its design also facilitates the transition from 3 axis to 5 axis machining practice due to the similarity in approach to parts.

Working Envelope

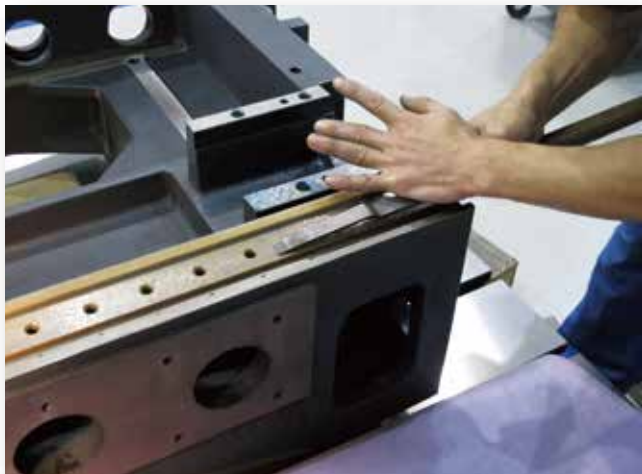


- Travel:** A axis: -110 degree ~ +20 degree, C axis: 360 degree
- Capacity:** 19.7" (500 mm) diameter, 770 lbs. (350 Kg.)
- T-slot:** width: 0.7" (18 mm), 45 degree
- Accuracies:** Indexing: +/- 6 arc sec (A axis), +/- 5 arc sec (C axis)
Repeatability: +/- 3 arc sec (A axis), +/- 3 arc sec (C axis) Based on VDI 3441



Precision through Craftsmanship and Technology

Structural mating surfaces are precision hand scraped to increase the flatness and to improve geometric accuracy (straightness and squareness) of the whole assembly. This provides near perfect alignment assuring long term accuracy. Linear scales and rotary encoders are installed to ensure such high accuracy.



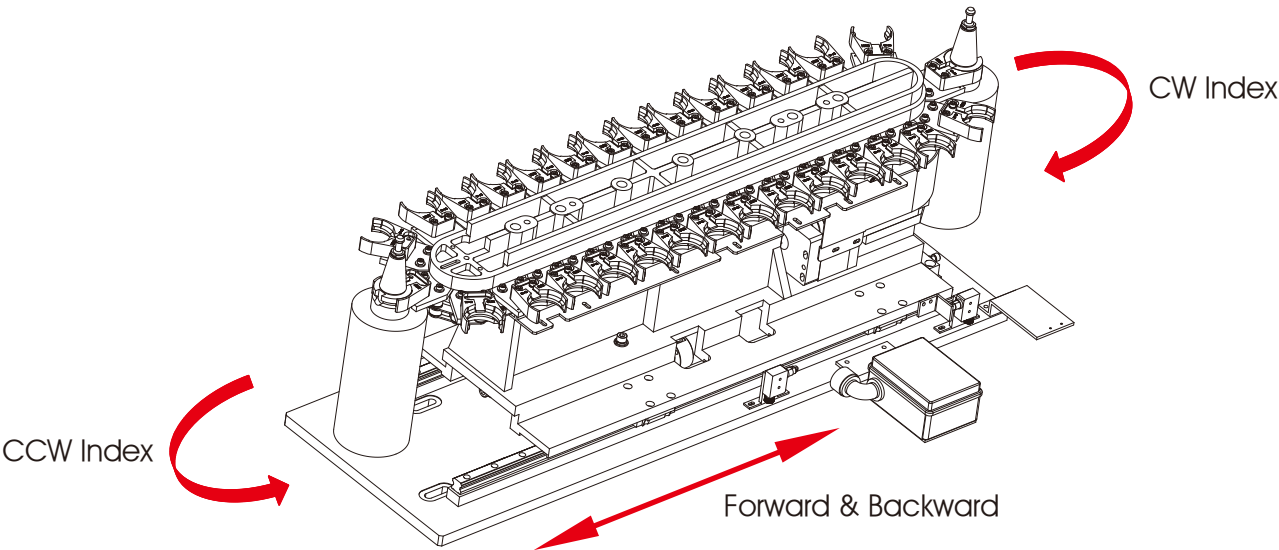
Fast And Durable Linear Axes Travel

The machine utilizes highly rigid Roller Guide System with low gravity center and low friction to maintain fine finish on workpieces even under heavy cutting conditions. Rapid feed rate on the X and Y axes is 2,362 in/min (60M/min), and on the Z axis is 1,890 in./min (48M/min). Such high rapid traverse speed reduces non-cutting time and improves productivity.



Efficient Automatic Tool Change System (ATC)

The ATC is located at the back of the machine and make the tool change from behind the spindle. It eliminates the action of a swing arm. All tools sit vertically on the stand. This simple mechanism avoids malfunction. Its location allows easy access for maintenance from the back of the machine.



Thermal Stability Management

To stabilize thermal expansion that may affect accuracy, the high speed spindle is equipped with oil chiller and the ballscrew brackets have cooling system.

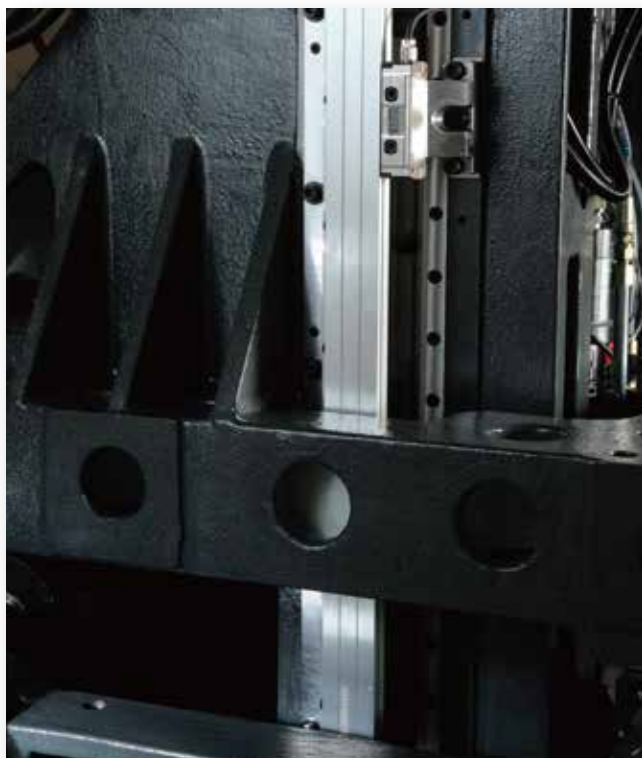


ballscrew bracket cooling feature



Spindle oil chiller

Linear scale & Rotary encoder
are installed to maintain high accuracy



Linear scale by Heidenhain



Rotary encoder

Rigorous Testing and Inspection Procedures

All machines are tested under different cutting conditions. Inspections are done by various instruments to assure conformation to all standards.



Taper cone cutting test



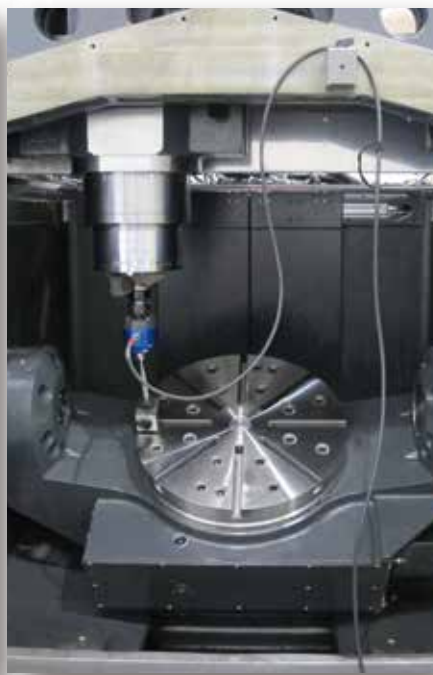
Taper cone cutting test



Heavy load cutting test



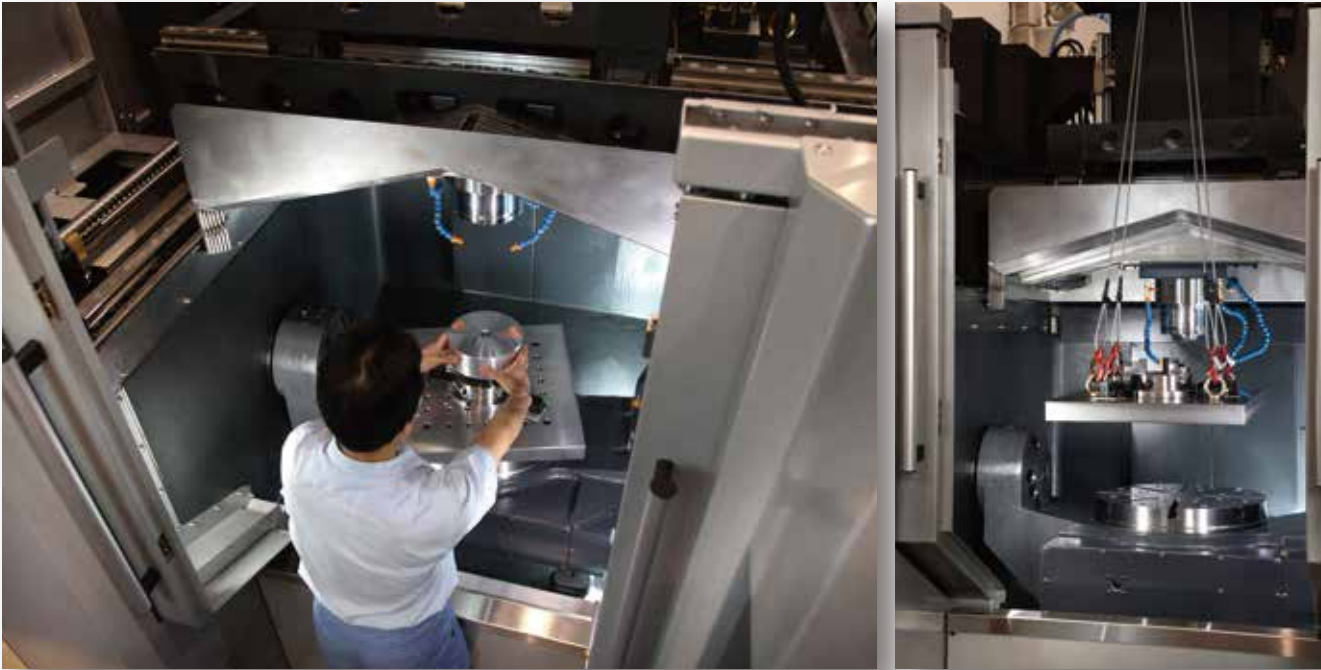
Laser inspection



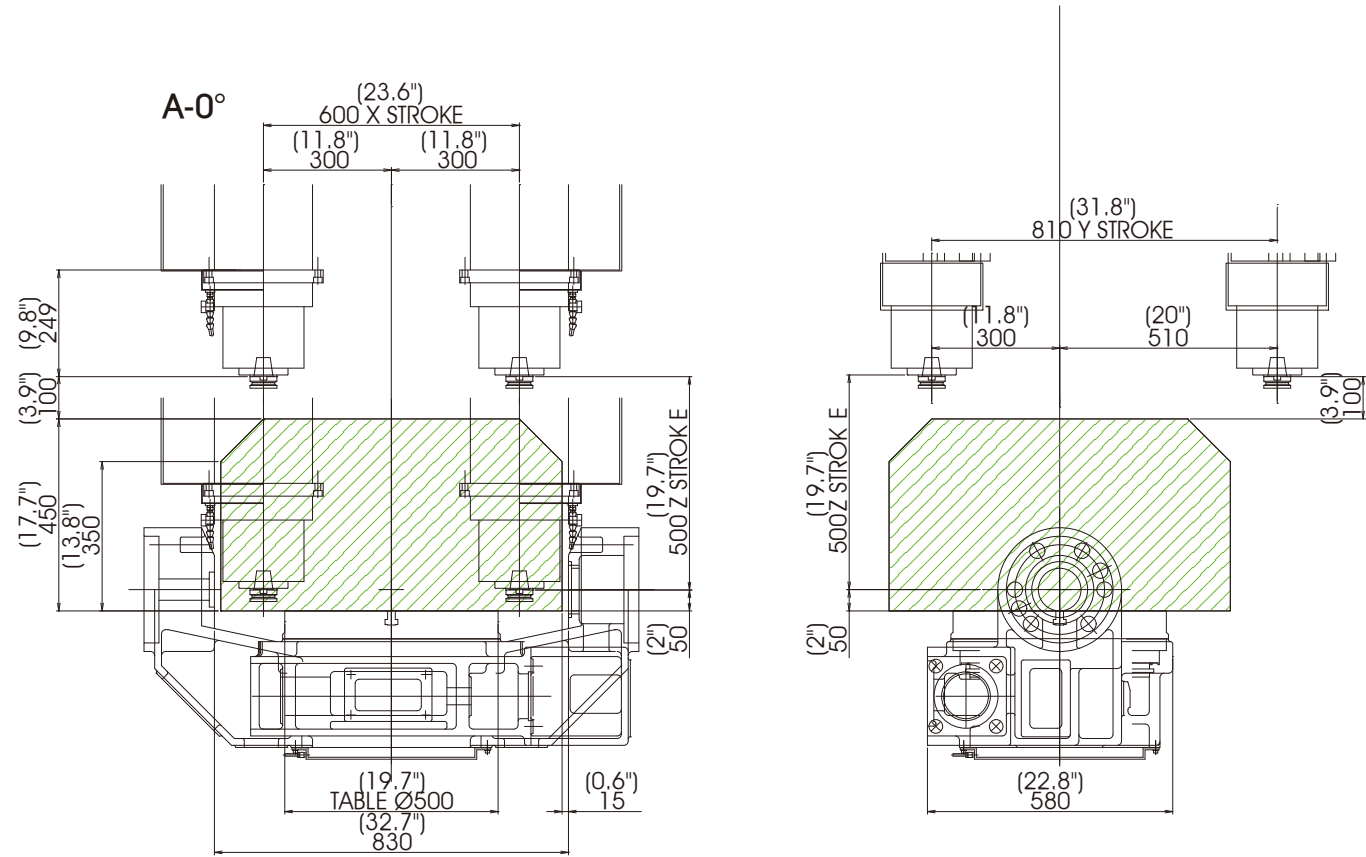
Rotational inspection, R-Test

Easy Access, Simple maintenance Design

The machine is ergonomically designed for operator comfort and safety. Easy approach for handling work piece, reaching for the spindle, inspecting ATC system, lifting with cranes, or performing maintenance work.



Tool Interference Diagram



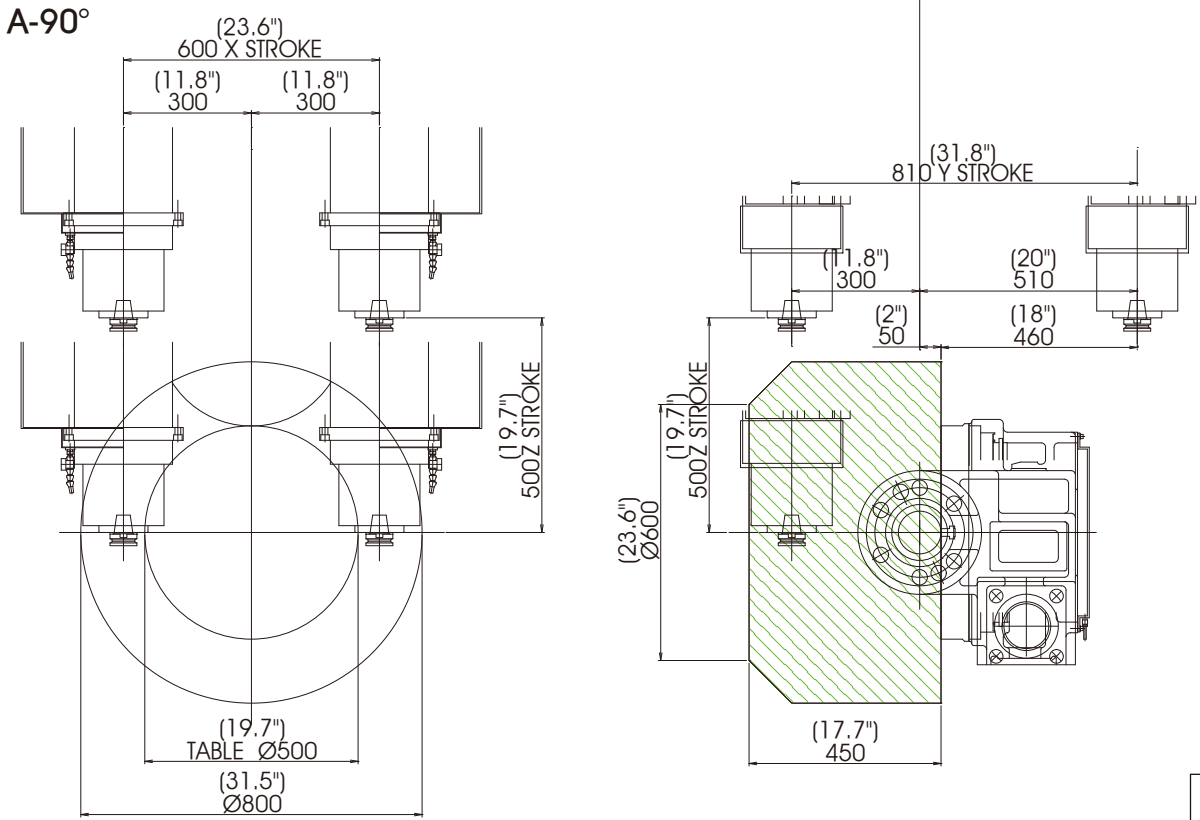
Convenience Features



LED work light

Front mounted coolant gun and air gun

Chip Conveyor situated at back of machine for easy disposal of chips



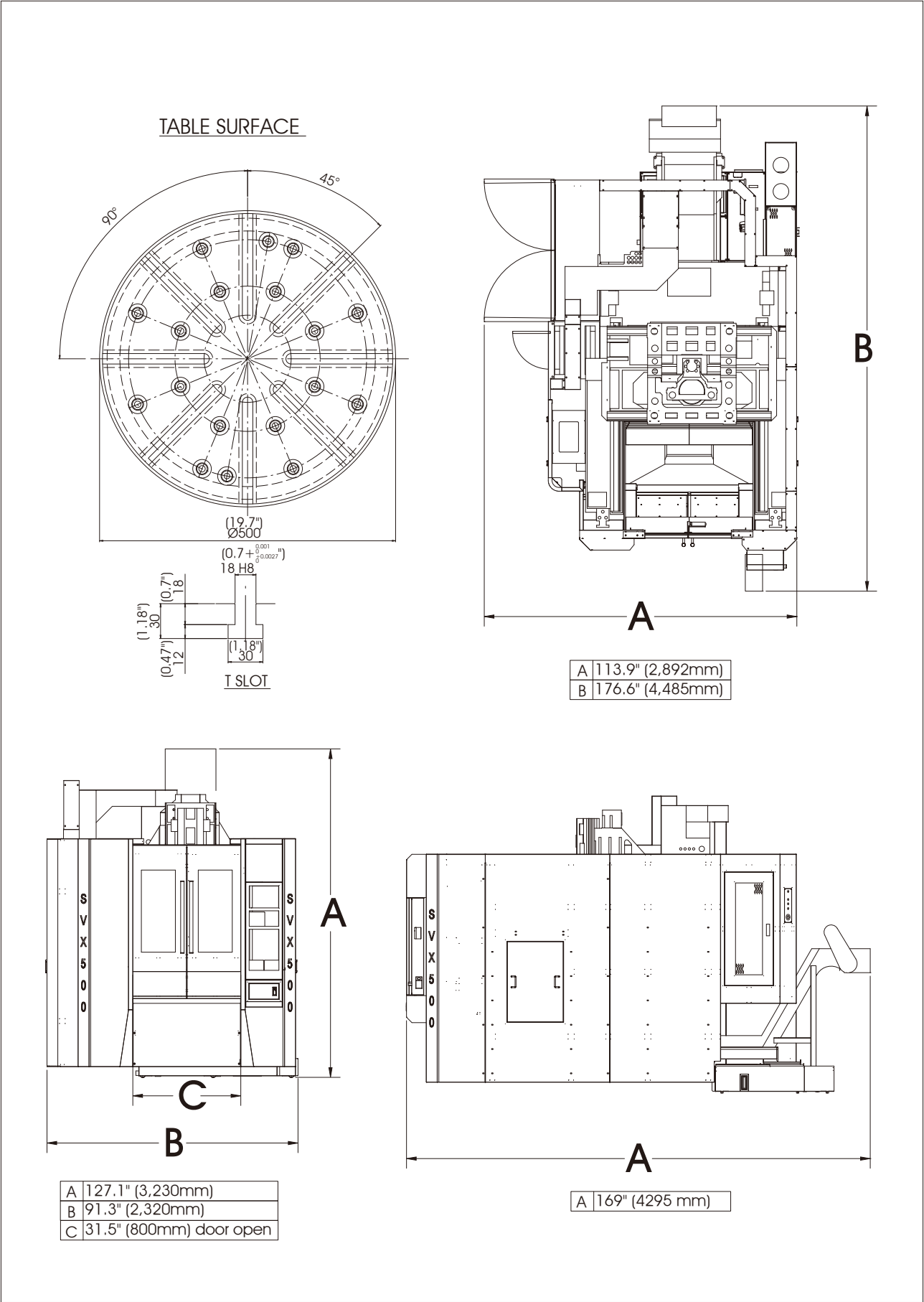
SHARP SVX-500-F Specifications and Standard Accessories (for USA)

Model		unit	SVX-500-F
Control			
Fanuc			31i-B5
Screen Size			10.4"
Travel			
X axis travel		inch (mm)	23.6" (600)
Y axis travel		inch (mm)	31.9" (810)
Z axis travel		inch (mm)	19.7" (500)
A axis travel		Degree	-110~20°
C axis travel		Degree	360°
Spindle nose to table (A=0°)		inch (mm)	2"-21.7" (50-550)
Linear system roller guide (SRN-45)		mm	45 (Roller)
Table			
Table area		inch (mm)	19.7" (500)
Max. work piece weight		kg (lb)	350 (770)
T-Slot (Width x Degree)			0.7"x45°(18x45°)
Spindle			
Speed		rpm	15,000
Taper			CAT40
Bearing			Ceramic bearing
Type			Built in
Spindle oil chiller			Oil Type
Feed rate			
Rapid traverse X/Y Axis		ipm (mm/min)	2,362 (60,000)
Rapid traverse Z Axis		ipm (mm/min)	1,890 (48,000)
Cutting feed rate		ipm (mm/min)	0.04 –1,890 (1 - 48,000)
Transmission			Direct drive
Motor			
Spindle motor:		Hp (Kw)	20 / 25 (15/18.5)
Feed motor (Fanuc)		Hp (Kw)	X/Y/Z/C : 6 (4.5), A : 7.3 (5.5)
Automatic tool changer			
ATC capacity			30
Method of tool selection			Set tool number
ATC type			Carousel, CAT 40
Max. tool diameter		inch (mm)	2.99" (76)
Max. tool length		inch (mm)	11.8" (300)
Max. tool weight		lb (kg)	15.4 (7)
Without adjacent tool		inch (mm)	4.9" (125)
Air blast when making tool change			OK
Accuracy			
X / Y / Z axis	Position	± inch (mm)	+/-0.00006" (0.0015)
	Repeatability	± inch (mm)	+/-0.00006" (0.0015)
A axis	Indexing	arc seconds	±6
	Repeatability	arc seconds	±3
C axis	Indexing	arc seconds	±5
	Repeatability	arc seconds	±3
Machine size			
Floor space		inch (mm)	W : 91.3" (2320) x D : 169" (4295)
Height		inch (mm)	127.1" (3230)
Weight		lb (kg)	28,050 (12,750)
Door opening		inch (mm)	31.5" (800)
Coolant system			
Number of flood coolant nozzles			6
Coolant tank capacity		gal (L)	63 (240)
Chip conveyor			Hinge type
Air blower nozzle (for cutting dry)			1
Power requirements			
Electrical		220V / 60 Hz	3 Phase / 45 KVA
Air			6 CFM @ 88psi

Standard Accessories:

1. Fanuc 31i - B5 controller 10.4" LCD
2. Fanuc two years warranty
3. AICC II (200block look ahead)
4. Manual guide I
5. USB port
6. Embedded Ethernet
7. RS-232C interface
8. 5120 M memory
9. 3 Dimensional cutter
10. 3D interference check
11. High-speed smooth TCP
12. Rigid tapping
13. 3 axis (X/Y/Z) linear scale
14. 2 axis (A/C) rotary encoder
15. Spindle air blast (Auto)
16. Automatic lubrication system
17. 4-additional M code
18. M30 auto power off
19. Removable hand wheel M.P.G
20. Safety door lock
21. Electric cabinet heat exchanger
22. LED work light
23. Alarm light
24. Spindle oil chiller
25. Oil skimmer
26. Cutting coolant around the spindle
27. Hinge type chip conveyor with bucket
28. Fully enclosure splash guard
29. Coolant system -240L tank capacity
30. CTS preparation (70 Bar)
31. Coolant gun
32. Air gun
33. Air accumulator
34. Leveling bolts and pads
35. Adjusting tool with tool box
36. Voltage : 3PH 220V 60HZ / 45KVA
37. 780-49364ATS (silver) / RAL7021 (black)
38. Operator's manual and part list menu in English

Siemens, Heidenhain control
are also available



* Proper foundation and environmental controls are required