UV 650

High Performance 5-axis Vertical Machining Center

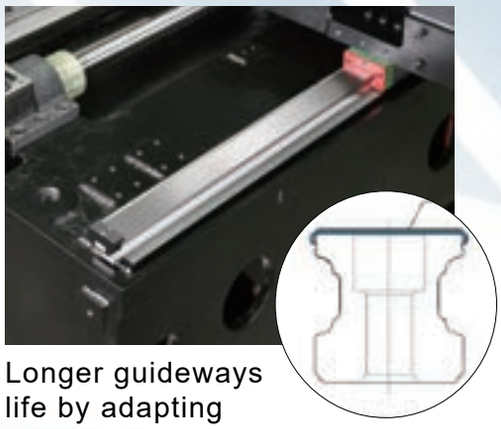
YCM®

UV 650

The YCM UV 650 5-axis vertical machining center provides excellent cutting performance and high accuracy. Designed to reduce part handling, setup and overall lead-time, while improving part quality, precision and surface finish of complex shapes and contours required for multiple industries such as job shop, medical, aerospace, and die & mold.

- 12,000 (15,000) rpm IDD PLUS spindle
- ø650 mm ø25.6" 2-axis B/C type tilt-rotary
- Max. workpiece weight 300 kg 661 lb
- ATC magazine: 40T(std.) 48 / 60T(opt.)
- X/Y/Z-axis rapid rate 36 / 36 / 36 m/min.
- Compact footprint
- User-friendly machine designed for easy operation

Robust 45 mm roller guideways and slide blocks on X/Y/Z-axis allows fast, accurate machining required for adverse 5-axis machining.



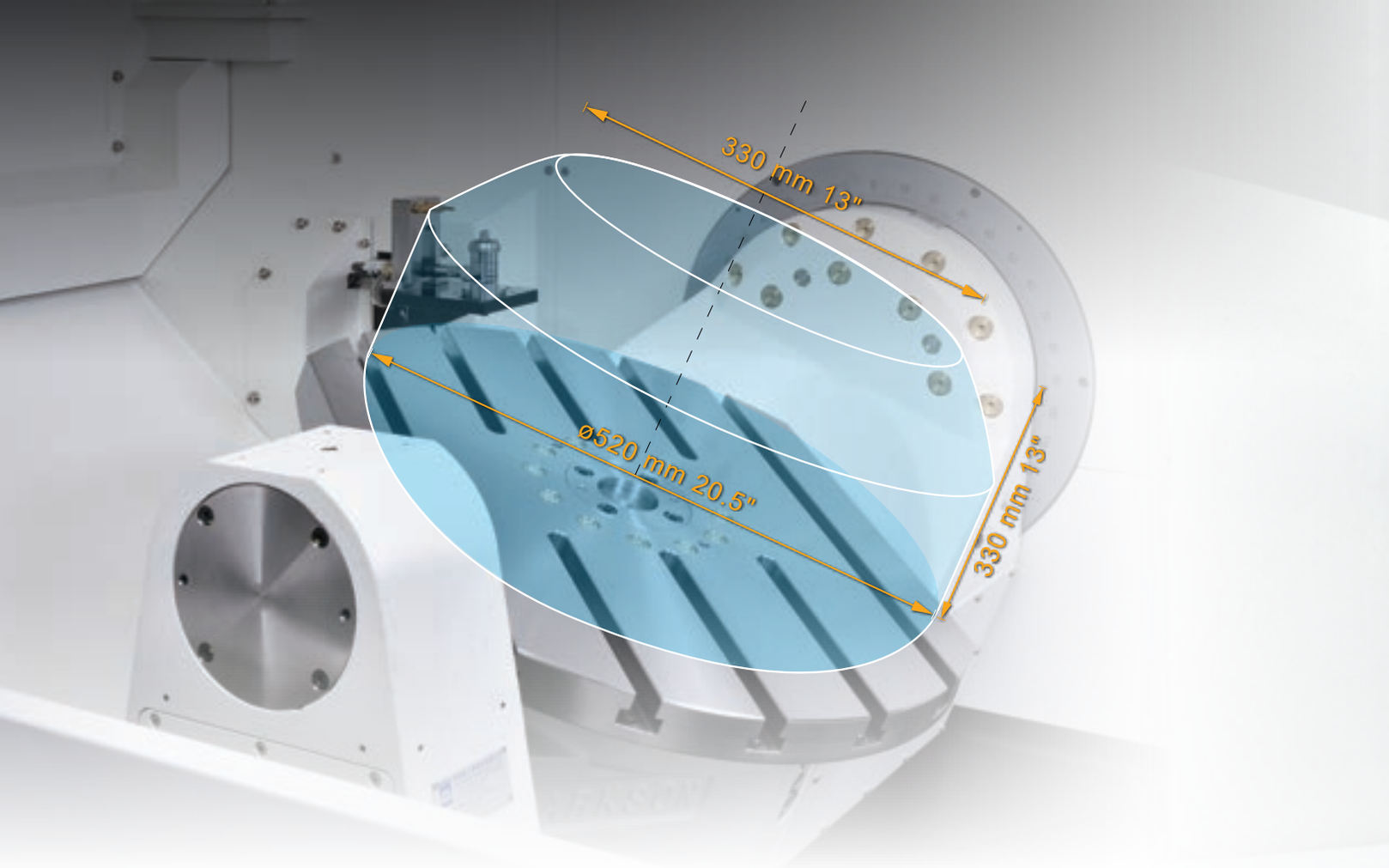
Longer guideways life by adapting cover-plates on the linear rails, minimizing potential contamination.

Robust Structure Design

- High Quality, Rugged MEEHANITE™ Castings – YCM's In-House Foundry follows strict international MEEHANITE standards ensuring high stiffness, rigidity, and vibration dampening that results in superior thermal stability, and cutting performance.
- Reinforced saddle features provides optimum stiffness, rigidity and stability.
- Extra wide base and column design enables solid support and excellent cutting performance when machining complex parts at a high feeds and speeds.

Accurate and Thermally

- Linear scales are mounted in X/Y/Z-axis and rotary encoders in the B & C axis allowing for the most demanding machining accuracies.
- The X/Y/Z-axis are fitted with high precision roller guideways and fixed pre-tensioned, double-nut, direct drive ballscrews, allowing for fast and accurate machining.

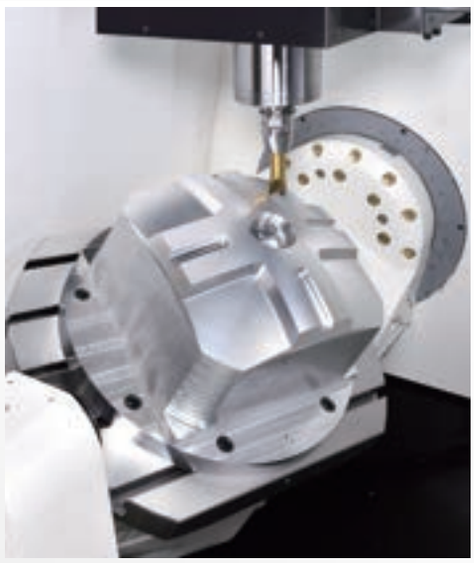


B/C-axis Rotary Table

- Table Size: **ø650 x 520** mm ø25.6" x 20.5"
- Max. workpiece dimension
  ø520 x 330 mm ø20.5" x 13"

  (It has considered the max. tool length 250mm 9.8", max. tool diameter ø125mm 4.9", max. B-axis travel and automatic tool measurement system interference.)

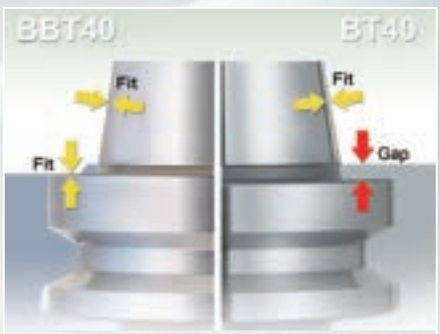
  (Applying specific B-axis angle and specific tools, the max. workpiece dimension can reach ø650 x (50+R460) mm ø25.6" x (2" +R18"). And it is recommended to use 3D simulation before machining process.)
- B-Axis Travel: **160˚ (-50˚ /+110˚)**
- Max. Work Load:
  300kg 661 lb **(0˚ ~45˚)**
  200kg 441 lb **(45˚ ~90˚)**



- High precision rotary encoders in the B and C axes as a standard feature, allowing for the most demanding machining accuracies.
- Larger size tailstock support allows fast, rigid and accurate machining of complex 5-axis components.
- The tilt-rotary table features a full circular hydraulic braking system that provides rigid B/C-axis clamping during indexing machining applications.

YCM In-house IDD Spindle

- The YCM IDD spindle design provides power, speed, and stiffness required for the most adverse machining applications while providing long spindle life.
- Ceramic bearings help to minimize heat and provide thermal stability improving overall machining accuracy.
- Powerful 17 kW max. hollow shaft spindle motor – allows machining of the toughest materials, while also providing with fine surface finishes and the ability to add CTS 70 bar (1,000 psi) coolant through spindle (CTS) easily.



Big Plus Spindle Design

Dual Contact Spindle provides higher rigidity, stiffness, longer tool life, and improved accuracy when performing high-speed.

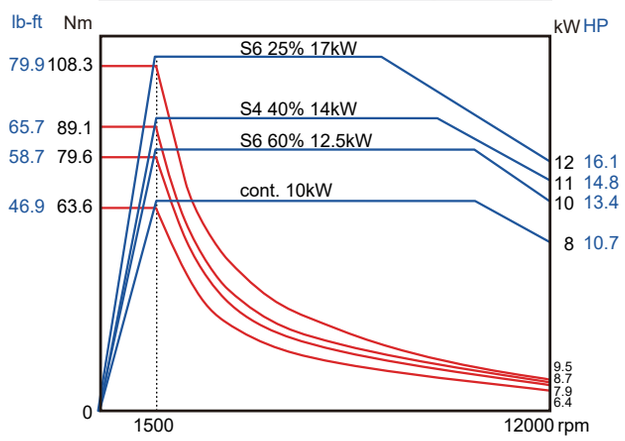
Max. Spindle Speed
12,000 rpm
15,000 rpm (opt.)

Max. Spindle Power 17 kW
22.8 HP

Max. Spindle Torque 108 Nm

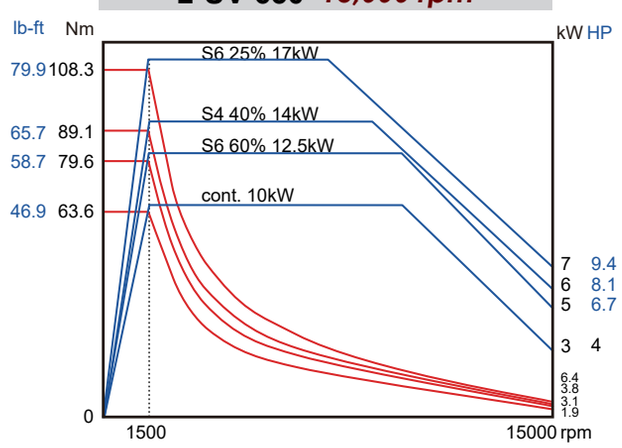
STANDARD POWER TORQUE

■ **UV 650** *12,000 rpm*



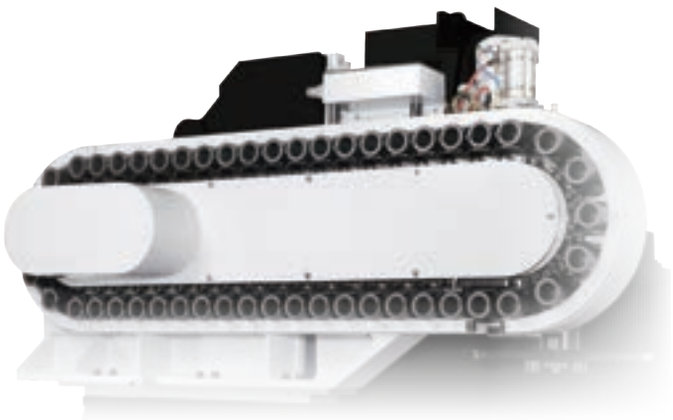
OPTIONAL POWER TORQUE

■ **UV 650** *15,000 rpm*



Tool Magazine

- Chain type 40T magazine as standard
- Wide selection of optional tool magazine, including 48 / 60T
- Absolute encoder ATC system tracks tool pot position in the event of a mishap



Automatic Tool Changer

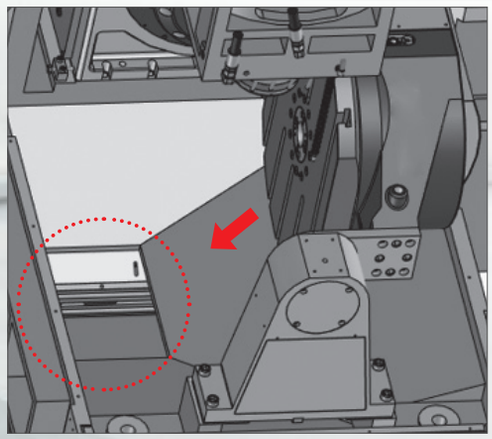
- Tool to Tool time: 1.8 sec.
- Standard ATC auto door minimizes chips and coolant from entering the tool magazine area.
- This design incorporates an inverter type cam-box-motor for easy ATC recovery in the event of a mishap. The tool change arm is designed for low inertia allowing precise positioning and long service life.

Chip Removal

- 4-coolant lock lines around the spindle, 2-coolant lock lines on the right side of the spindle, cutting air-blast with 1-lock line on the right side of spindle, coolant gun, and air gun.
- Standard shower coolant nozzles mounted from the roof provide optimal chip removal.
- Efficient chip discharge with steep angle allow unhindered chip flow to the chip conveyor.

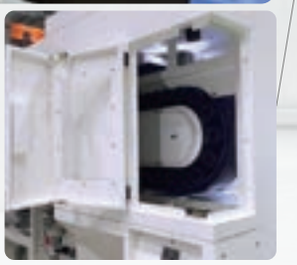
Chips Flush Coolant Device

Shower Coolant



Chip Discharge

User-friendly Operation



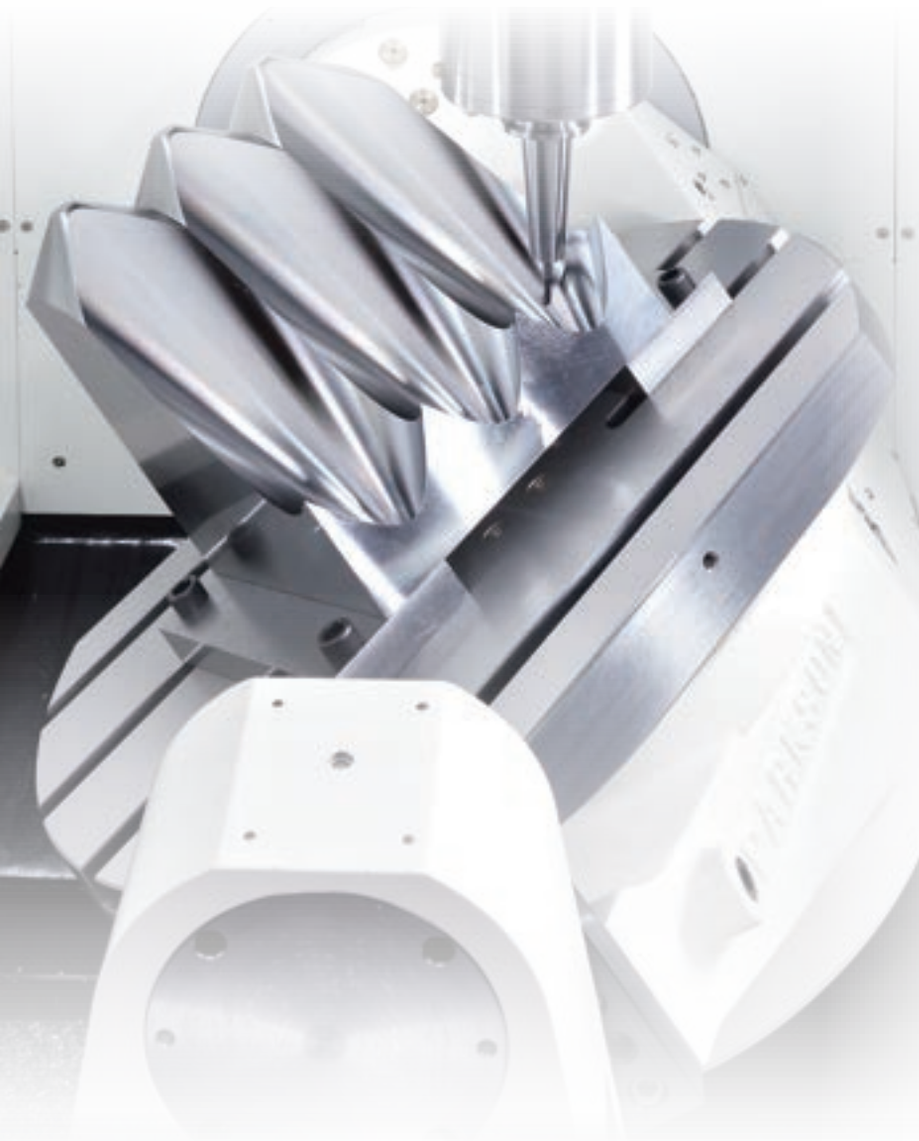
1. Large front and right side doors allowing easy reach and unrestricted access.
2. Optional right side automatic door can be selected to combine with robot, gantry, or pallet allowing for automated unmanned operation.
3. The controller allows 145-degree swivel movement and can be operated at the front or right side of the machine.
4. Bellows type roof-top cover ensures chip and coolant containment. The middle section can also be easily and automatically unlatched and moved back on a track by cylinder when loading heavy parts on the table with an overhead crane.
5. Easy operator access to the tool magazine for the quick change of tools.

Automatic Tool Measurement

- Fast tool setting and breakage monitoring
- Streamline the setup process and reduce non-machining time

Touch Probe and Datum Sphere

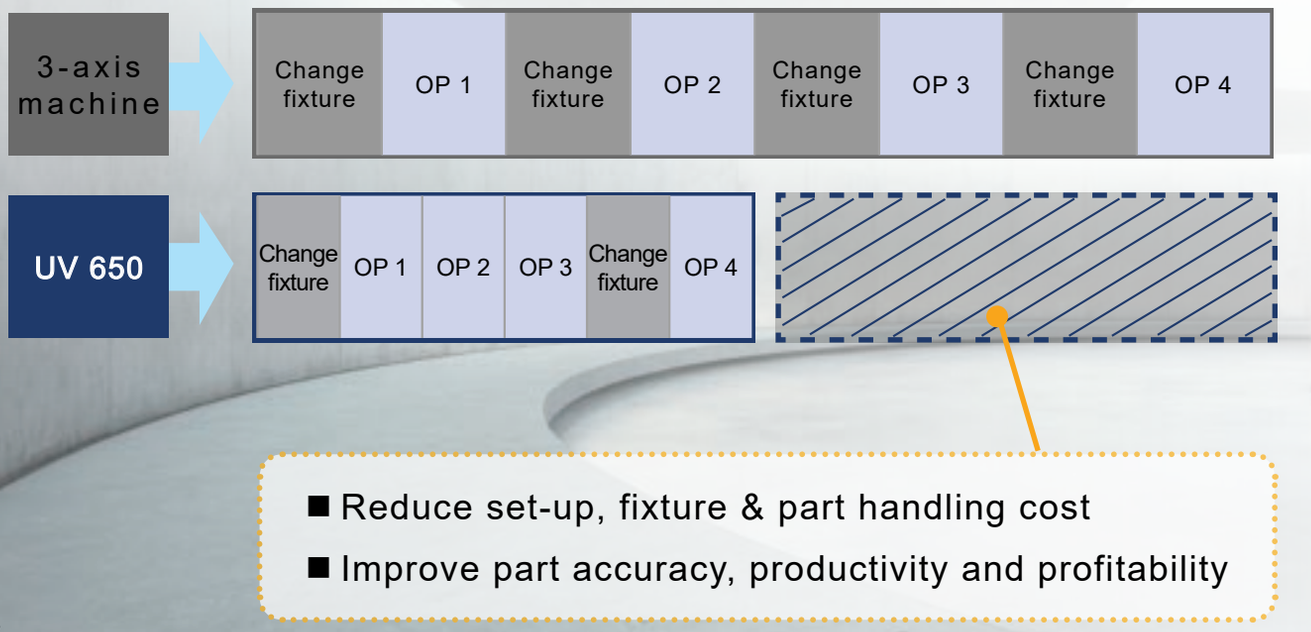
- Quick automatic tuning for geometric error
- Improve the dimensional accuracy of the finished workpieces



Advantages of 5-Axis Machining

- Allows the manufacturing of complex, intricate parts that would otherwise require multiple set-ups, or multiple machines to produce the same part.
- Improves overall part accuracy, quality, productivity and machining efficiency by completing multiple sides, faces, and surfaces in a single set-up, while also greatly reducing parts handling time and minimizing human intervention.
- Reduce fixture cost and potential errors caused by poor fixtures or inadequate fixture clamping.
- Greatly reduce tool lengths and increase tool and cutting rigidity allowing superior machining quality and surface finishes in part cavities that are normally hard to obtain when machining with much longer tools on a traditional 3-axis machine.

Differences between 3-axis and 5-axis machining



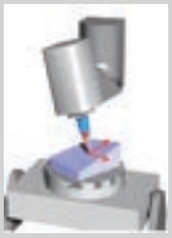
HEIDENHAIN TNC 640 Exclusive Function

Heidenhain TNC 640

- Simultaneous 5-axis control
- TFT color flat-panel display 19-inch
- Storage medium: SSDR solid state disk with 21 GB
- Programming in HEIDENHAIN conversational format, with SmarT.NC or according to DIN/ISO
- Tool Center Point Management (TCPM)
- Dynamic Collision Monitoring (DCM)
- 0.5 ms Short block processing time

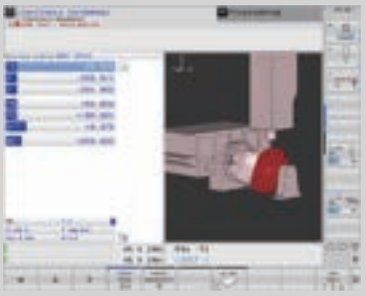
Tilted Working Plane Command

The PLANE function is a powerful function for defining tilted working planes in various manners.



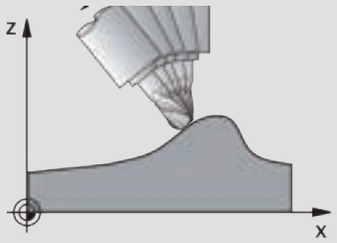
Dynamic Collision Monitoring (DCM)

Dynamic collision monitoring to protect operators and machine.



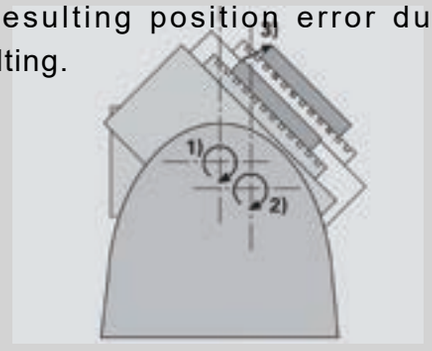
TCPM (Tool Center Point Management)

The offset of the tilting axes is compensated so that the tool tip remains on the contour.



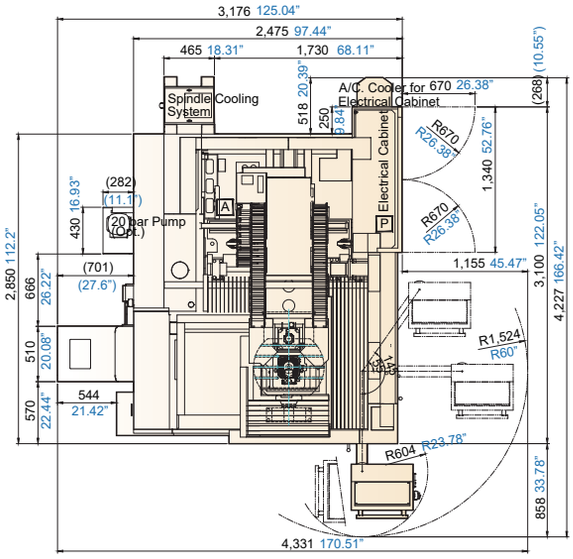
Kinematic Compensation

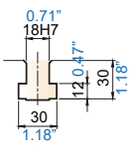
- Position of the rotary axis in the kinematics model of the control.
- Actual position of the rotary axis.
- Resulting position error during tilting.

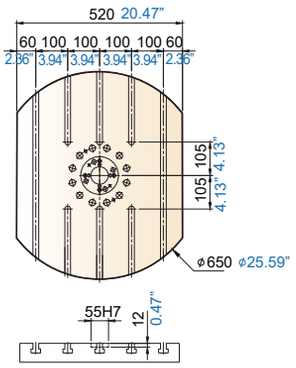


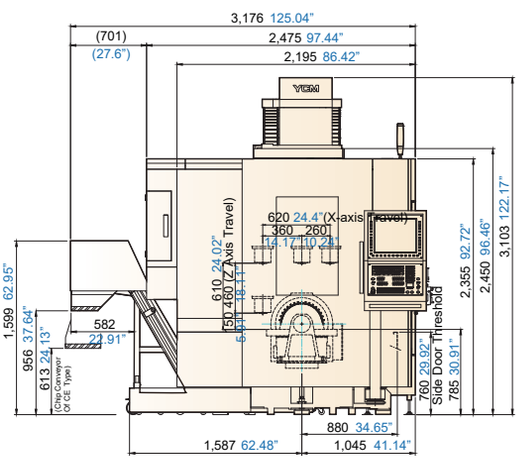
DIMENSIONS

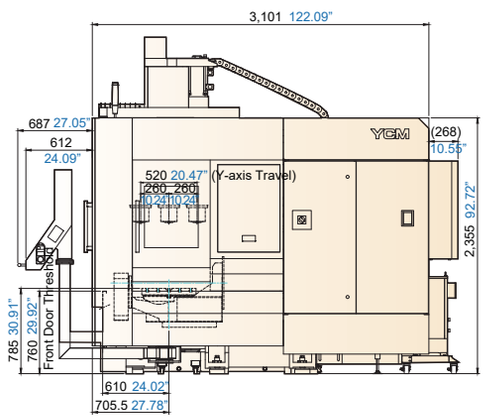
Unit: mm inch



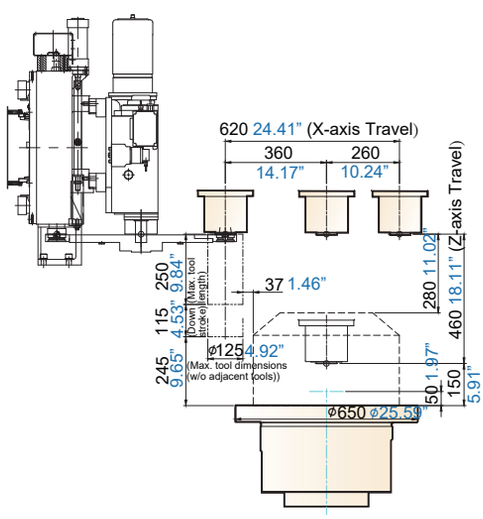


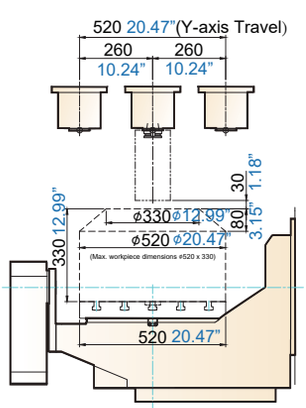






MACHINING AREA

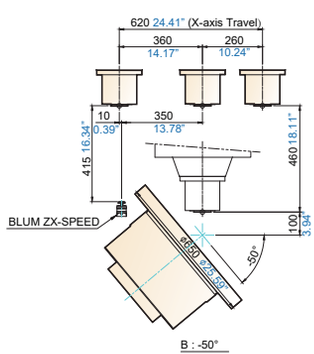


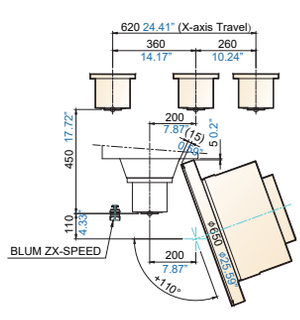


◎Max. workpiece dimension ø520 x 330 mm

(It has considered the max. tool length 250mm, max. tool diameter ø125mm, max. B-axis travel and automatic tool measurement system interference.)
(Applying specific B-axis angle and specific tools, the max. workpiece dimension can reach ø650 x (50+R460) mm. And it is recommended to use 3D simulation before machining process.)

INTERFERENCE AREA





SPECIFICATIONS

		UV 650	
SPINDLE			
Spindle Speed/ Power (std.)	rpm rpm kW HP	12,000 rpm 10 / 12.5 / 14 / 17 kW 13.4 / 16.8 / 18.8 / 22.8 HP (cont. / S6-60% / S6-40% / S6-25%)	
Spindle Speed/ Power (opt)	rpm rpm kW HP	15,000 rpm 10 / 12.5 / 14 / 17 kW 13.4 / 16.8 / 18.8 / 22.8 HP (cont. / S6-60% / S6-40% / S6-25%)	
Spindle Taper		BBT40	
TRAVEL			
X-axis Travel	mm inch	620 24.4"	
Y-axis Travel	mm inch	520 20.5"	
Z-axis Travel	mm inch	460 18.1"	
Distance between Spindle Nose and Table Top	mm inch	150~610 mm 5.9"~24"	
TABLE			
Table Size	mm inch	ø650 x 520 ø25.6" x 20.5"	
T-Slots x Size x Pitch		5 x 18 mm x 100 mm 5 x 0.7" x 3.9"	
Max. Load on Table (B-axis tilting angle 0˚ ~45˚)	kg lb	300 661	
Max. Load on Table (B-axis tilting angle 45˚ ~90˚)	kg lb	200 441	
Max. Workpiece Dimensions	mm inch	ø520 x 330 mm ø20.5" x 13"	
B/C AXIS			
B-axis	deg	160˚ (-50˚ ~ +110˚)	
C-axis	deg	360	
B/C-axis Feedrate	rev/min	25	
ACCURACY		ISO 10791-4	YCM*
Axial Travel		Full Length	
Positioning (B/C) A	arc sec.	28 / 28	10 / 10
Repeatability (B/C) R	arc sec.	16 / 16	8 / 6
Positioning (X/Y/Z) A	mm inch	0.025 / 0.025 / 0.022 0.00098" / 0.00098" / 0.00087"	0.007 / 0.007 / 0.007 0.00028" / 0.00028" / 0.00028"
Repeatability (X/Y/Z) R	mm inch	0.015 / 0.015 / 0.012 0.00059" / 0.00059" / 0.00047"	0.005 / 0.005 / 0.005 0.0002" / 0.0002" / 0.0002"
*All values shown above are measured for the machine in good air-conditioned environment.			
FEEDRATE			
X/Y/Z Rapid Feedrate	m/min ipm	36 / 36 / 36 1,417 / 1,417 / 1,417	
Cutting Feedrate	m/min ipm	1~20,000 0.04~787	
ATC			
Tool Magazine Capacity (opt.)	T	40 (48 / 60)	
Max. Tool Weight	kg lb	6 13.2	
Max. Tool Length (Without adjacent tools)	mm inch	ø76 x 250 (ø125 x 250) ø3" x 9.8" (ø4.9" x 9.8")	
Tool Selection Method		Random	
GENERAL			
Machine Weight	kg lb	10,000 22,046	

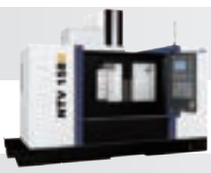
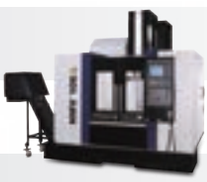
ACCESSORIES

		UV 650
SPINDLE		
Spindle Cooling System		●
Coolant Through Spindle (CTS)		○
B/C-AXIS		
Optical Encoder		●
SPINDLE AUXILIARY EQUIPMENT		
Spindle Air Blast		●
Spindle Air Seal		●
Coolant System		
Heavy Duty Coolant Pump		●
CHIP REMOVAL SYSTEM		
Chip Conveyor (Left Side)	Chain Type	●
	Scraper Type	○
Chips Flush on Saddle		●
Air Gun		●
Coolant Gun		●
ELECTRICAL SYSTEM		
A/C Cooler for Electrical Cabinet		●
AUXILIARY SYSTEM		
Oil-mist Collector		○
Cutting Air Blast		●
Automatic Power Off Device		●
Automatic Lubrication		●
PERIPHERALS		
Automatic Tool Length Measurement System	Contact Type	●
	Non-Contact Type	○
Automatic Workpiece Measurement System		●
Linear Scale		●
Oil Skimmer		●
GENERAL		
CE		●
Safety Door		●
Automatic Door (Right Side)		○
ATC Door		●
Full Chip Enclosure with Top		●
Leveling Blocks and Bolts		●
Foundation Bolts		○
CNC Control		
HEIDENHAIN	TNC640	●

Above specifications may vary depending on the machine and the surrounding environment.
The manufacturer reserves the right to modify the design, specifications, mechanisms, etc., to improve the performance of the machine without notice. The test data provided in this catalog is performed under specific test procedures and environmental conditions.

VMC — Vertical Machining Center

FP Series *High Precision High Performance Die Mold Vertical Machining Center*
FP66A, FP100A, NFP66A

NXV Series *High Performance Vertical Machining Center*
NXV600A, NXV560A-APC, NXV1020A/AM, NXV1270A, NXV1380A, NXV1680A/B

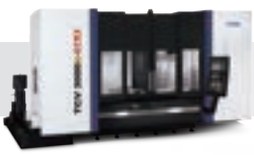
TV Series *Heavy Duty Vertical Machining Center*
TV116B, TV146B, TV158B, TV188B, TV2110B, TV2610B

NTV Series *High Efficiency T-base Vertical Machining Center*
NTV158A/B

NMV Series *High Performance High Rigidity Vertical Machining Center*
NMV76A, NMV106A

NFX Series *High Productivity Full 5-axis Vertical Machining Center*
NFX400A

UV Series *High Performance 5-axis Vertical Machining Center*
UV650



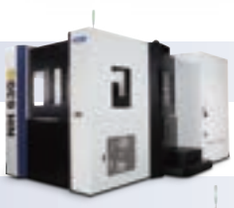
NSV Series *Ultra High Performance Vertical Machining Center*
NSV66A/AM, NSV106A/AM/AS/AMS, NSV156A

TCV Series *High Performance Traveling Column Vertical Machining Center*
TCV2000A, TCV3000A, TCV3000A-5AF/5AX

DCV Series *Advanced Double Column Vertical Machining Center*
DCV2012A/B, DCV3016B~6035B, DCV2018A~4018A-5AX, DCV4030B~6030B-5AX

NDC Series *High Performance Double Column Vertical Machining Center*
NDC2016B~4016B, NDC3022B~6027B, NDC2018B~4018B-AHC, NDC3022B~6027B-AHC

HMC — Horizontal Machining Center



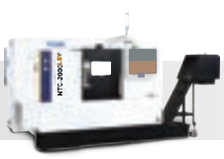
NH Series *High Speed High Precision Horizontal Machining Center*
NH500A, NH630B, NH800B

CNC LATHES — CNC Turning Center

NT Series *High Performance Mill/Turn Center*
NT-2500SY

GT Series *High Performance Geo Turning Center*
GT-200B/MA, GT-250B/MA, GT-300B/MA/LMB

TC Series *High Performance High Precision CNC Lathe*
TC-16LA/LB, TC-26, TC-36, TC-46 1000/1650/2300/3200, TC-46M 3200



NTC Series *High Efficiency CNC Turning Center*
NTC-2000LY/LSY

INTEGRATION AND SOLUTIONS

iOPERATION Software Enhancement Exclusively from YCM — **Integrated Operation Control System**

iConnect — **Intelligent Production Management**

Automation Solutions

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