fives

HIGH PRECISION MACHINES

MATERIAL REMOVAL

Giddings & Lewis

Vertical Turning Centers



Multi-functional large capacity machining

- Configure the machine to the application with VTC modular design
- Rigidity of hydrostatic ram handles heavy cuts with greater accuracy
- High capacity table bearings support heavy loads
- VTC Series uses standard modular tools reducing tooling costs
- Automation and large range of features for added functionality

VTC Series - Vertical Turning Centers

MULTIFUNCTIONAL / MODULAR / PRODUCTIVE

Whether it's standard turning, hard turning, grinding, live spindle machining, four-axis operations or cutting on multiple sides of the part, there is a Giddings & Lewis vertical turning center configuration to meet the demand.

- Optimize standard turning operations with the ability to cut from both sides of center and probe diameters. Full X-axis travel left and right of center makes this possible
- Perform milling, drilling and tapping on the side of a part without a second setup with a right angle head
- The optional live spindle adds grinding, milling, drilling and tapping capabilities. Giddings & Lewis C-axis provides full contouring

Fives Giddings & Lewis modular designs allow for configurations of the machine to fit the application

- The Y-axis attachment enables cutting of off-center part features on the side of the part
- Simultaneously cut parts with a four-axis VTC featuring two heads and rams. Rough with one head and finish with the other. Perform ID and OD cuts at the same time
- Turn features on the sides of parts with the optional sidehead. Rigid and able to reach under obstructions such as lips or flanges, the side head adds machining versatility

Robust hydrostatic ram

High precision rail positioning and leveling

Modular tools KM80 and Capto C8

Mist collection and high pressure coolant

Camera systems

Standard and full enclosures options



Variety of tool changers available

Family of attachments

Siemens or Fanuc controls

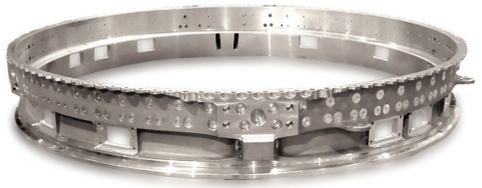
Pallet shuttle systems

Cast iron base and column for rigidity

Chucks and work holding systems

Capacity and versatility to machine parts in a wide range of industries

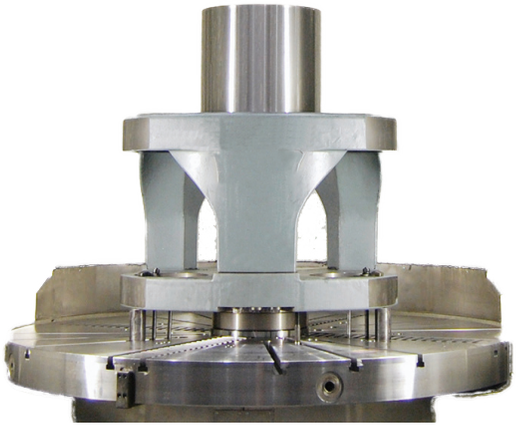
Aerospace



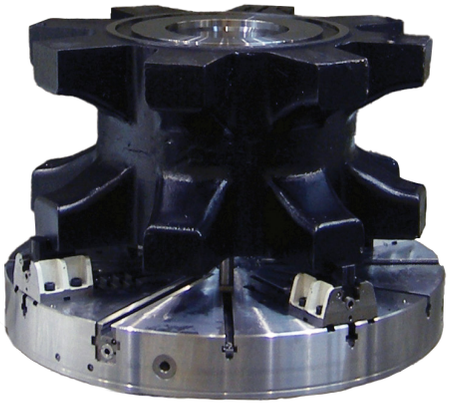
Gears and Bearings



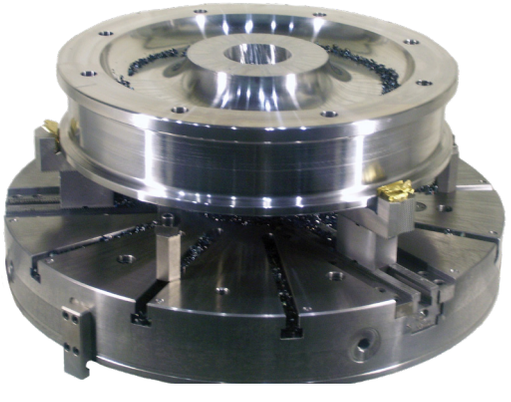
Energy / Wind



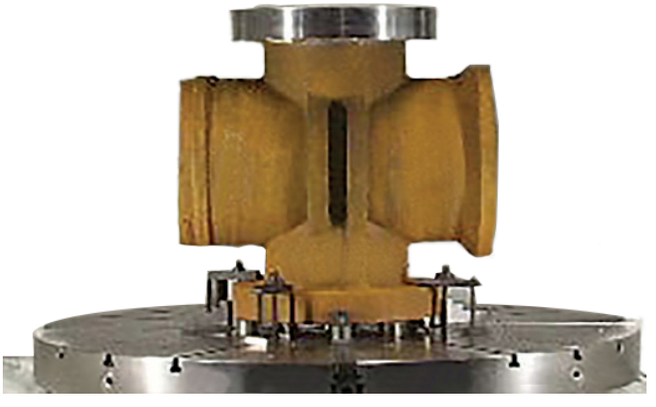
Heavy Equipment



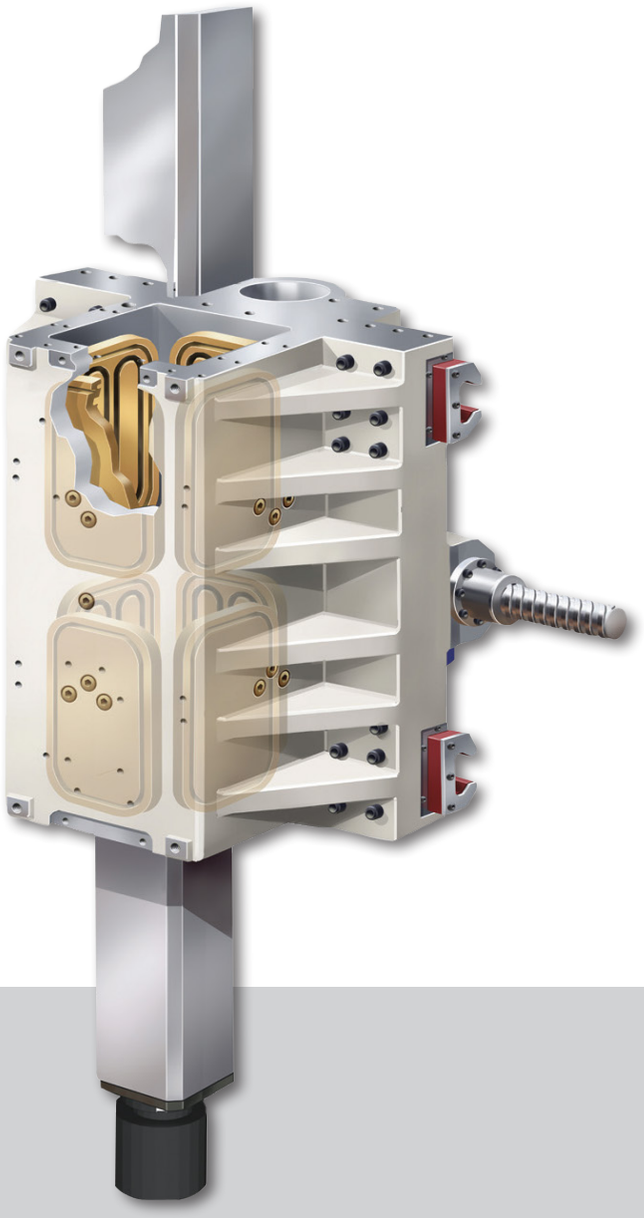
Rail



Oil and Gas



Robust design - Superior value



RIGID HYDROSTATIC RAM

Heavy cuts and better surface finishes with greater accuracy are possible due to the high dynamic stiffness of the hydrostatic ram.

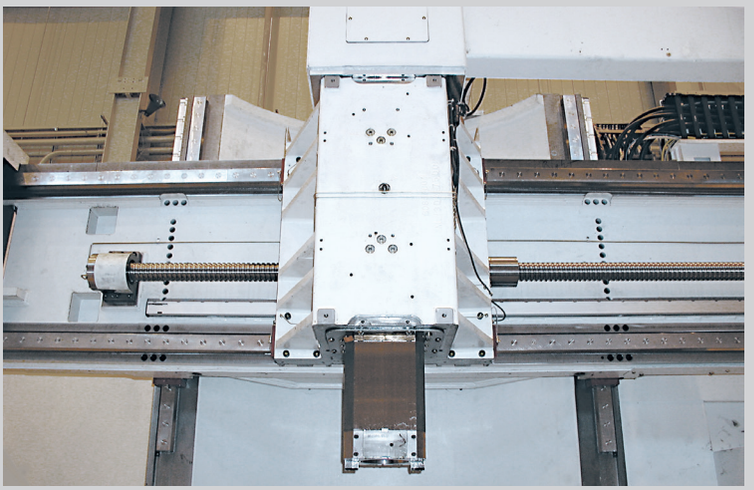
— One-piece headstock casting is rigid, symmetrical and thermally stable
— Large 250 mm (9.8 in) square ram able to reach into 324 mm (12.8 in) minimum bore diameters
— Wear-free system uses preloaded hydrostatic pads. The hydrostatic design eliminates the need for gibs while maintaining alignments and accuracies
— Rapid traverse of 20 mpm (787 ipm)

Heavy cuts and better surface finish with greater accuracy due to the high dynamic stiffness of hydrostatic ram

ACCURATE CROSS SLIDE ELEVATION AND CLAMPING

The hydraulic actuation of the cross slide elevation and clamping system is simple, safe and accurate.

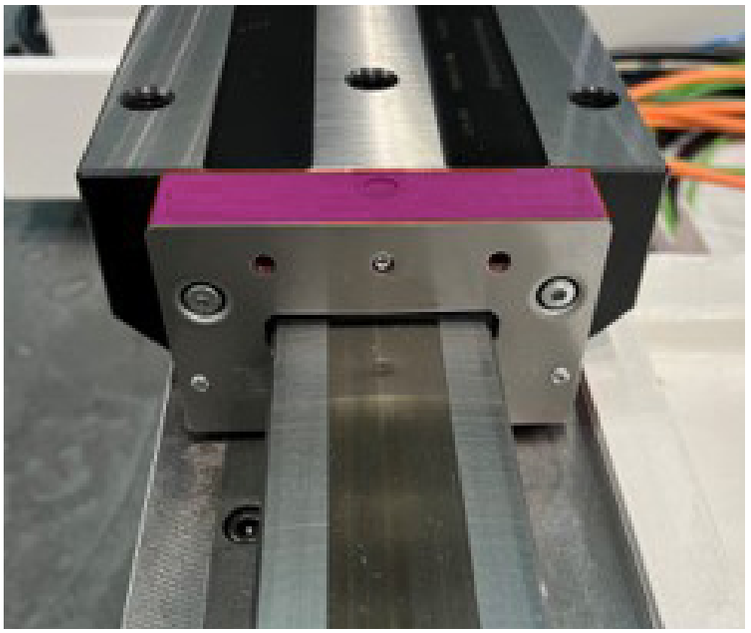
— Infinite number of cross slide positions. Adjustable cross slide accomodates parts of varying heights while minimizing ram extension
— Precision cross slide leveling using dual linear scale feedback, provides immediate machine referencing and eliminates need for limit switches
— Hydraulic cylinder elevates rail. Mechanical clamps secure rail with 1,000 kN (225,000 lb) of force per side



Fixed-rail models available

For low profile parts such as bearings, fixed-rail vertical turning centers are available.

High-performance features

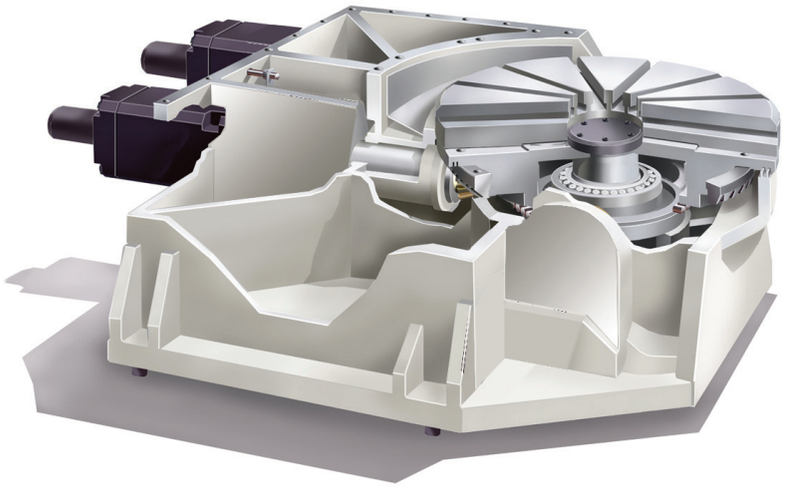


RIGID HIGH-SPEED WAY SYSTEM

Heavy-duty, size 65, linear roller bearing carriages ride on hardened and ground guideways. This rigid low-friction system supports high loads and fast 20 mpm (787 ipm) traverse speeds. Advantages of a roller bearing system:

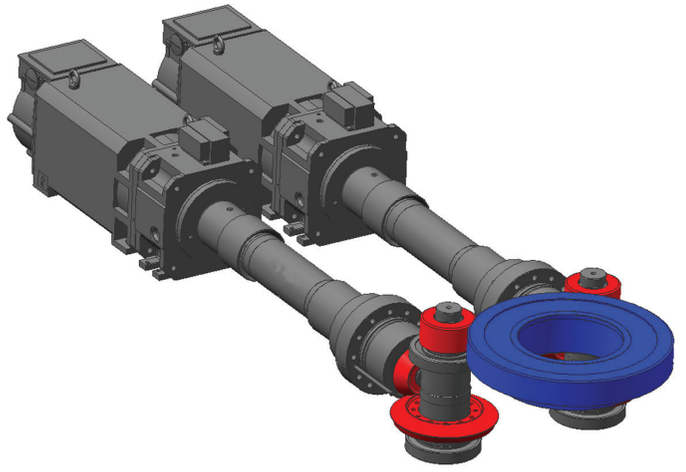
— Lower friction results in higher positioning accuracy, better circular/contouring accuracy and low thermal growth for consistent accuracy
— Low maintenance and ease of repair. Roller guides require less oil, reducing coolant contamination. Robust design and ease of replacement of the roller guides reduces the machine's overall life cycle cost

Lower friction results in higher positioning accuracy



FAST, HIGH-CAPACITY TABLE AND BEARINGS

— Table speeds to 630 rpm
— Dual motor transmission provides additional power
— Combination angular and roller thrust bearing design minimizes part deflection and provides superior load carrying capacity
— Table runout of 0.005 mm (0.0002 in) TIR radially and axially produces precise, quality parts
— Two-speed transmission with 4:1 gear ratio



FULL CONTOURING WITH C-AXIS

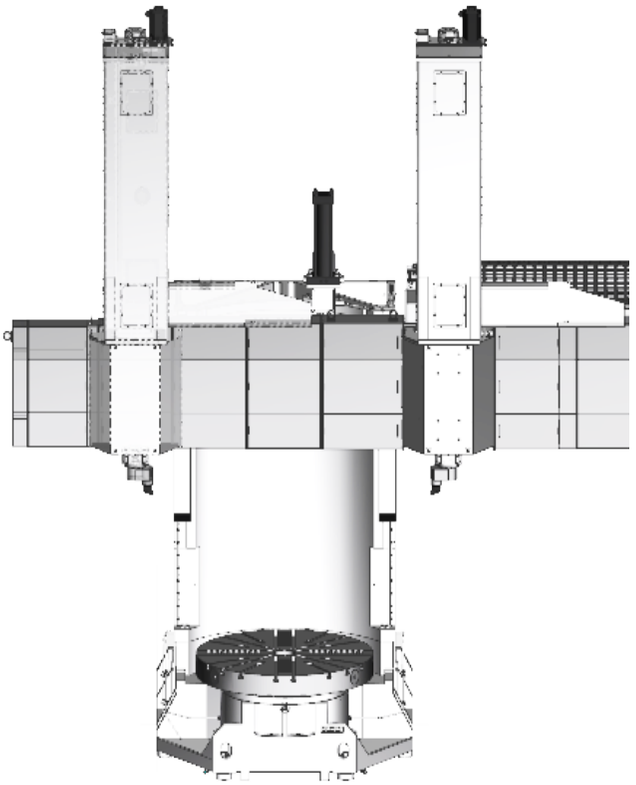
Drill and mill turn a variety of features anywhere on a workpiece with the 360,000 position full contouring/positioning table. Dual pinions, under independent servo control, are meshed with the table ring gear providing a preloaded backlash-free joint.

C-Axis Rapid Traverse		
VTC 1000	rpm	20
VTC 1250 / 1600	rpm	10
VTC 2000 / 2500	rpm	5
VTC 3000 / 3500 / 4500	rpm	1.6

Large part capacity and productive machining capabilities

LARGE SWING CAPACITY AND ERGONOMIC ACCESS

— 1200 to 4700 mm (47.2 to 185 in) maximum swing
— Wide operator access to parts
— All enclosures allow easy crane loading of parts
— Convenient tool loading and servicing with tool changer installed at floor-level
— Floor-level installation eliminates need for special foundations and facilitates machine relocation





FULL X-AXIS TRAVEL

Cut from both sides of center and probe diameters with full X-Axis travel left and right of center. Part processing time is optimized with the capability of cutting from both sides since longer time is spent in the cut and fewer tool changes are required. Full X-axis travel left and right of center is available on VTC 1250 through 3500.

Optimize cutting with full X-axis travel left and right of center

SERVICE PANEL AND COOLANT SYSTEMS

— Centralized services simplify maintenance. Gauges and fluid levels are positioned on one well-marked, floor-level service panel for easy monitoring and maintenance
— Coolant systems offer a choice of coolant pressure from 16 to 70 bar and tank capacities of 900 to 1800 liters. The systems provide clean coolant to the tool tip and optimize chip evacuation. Filter options and programmable pressure settings allow for flexible machining processes
— Ultra high pressure coolant for hard metal turning applications for improved chip management and longer tool life





Tooling systems

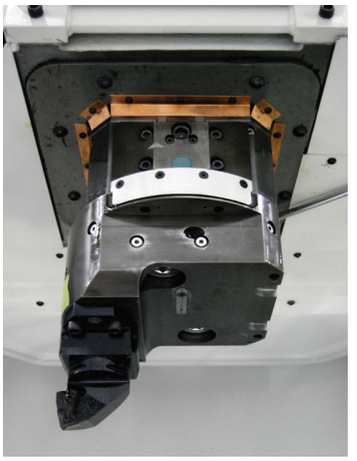
COST-EFFECTIVE MODULAR TOOLING SYSTEM

The Giddings & Lewis tooling systems accept standard industry tool retention systems and modular tools reducing tooling costs.

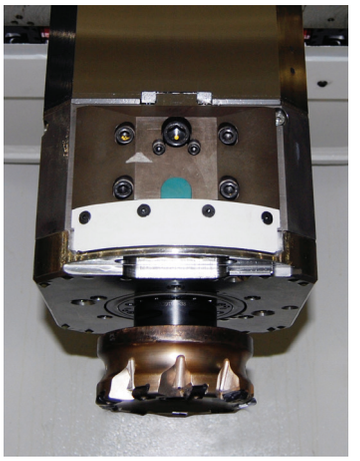
— Large gauge diameter provides optimal taper contact and permits use of long tools
— Accepts standard modular tools including Sandvik Capto® C8 and Kennametal KM80



Modular Tooling



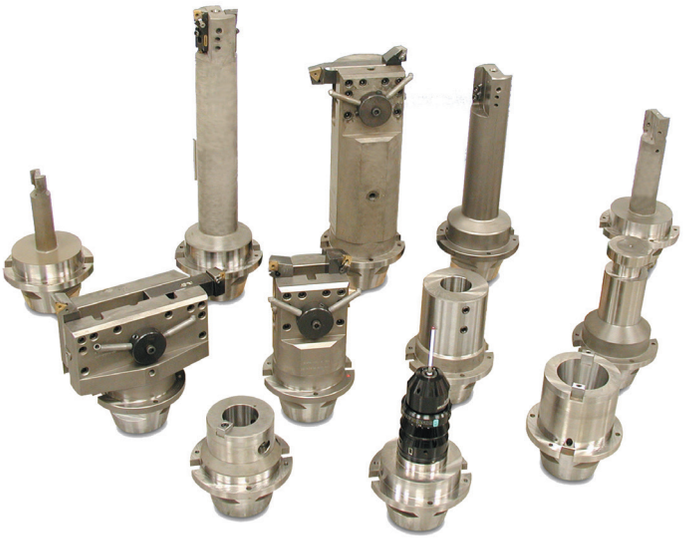
Left-Hand Turning Adapter



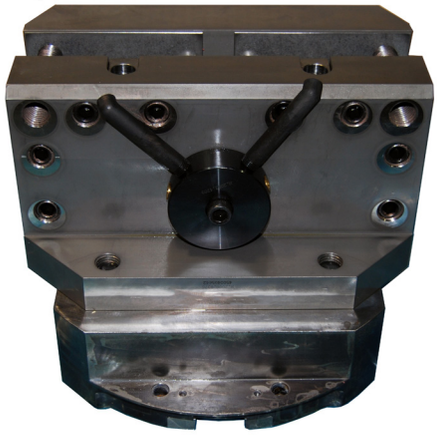
Live Spindle Milling Head

PROPRIETARY TOOLING SYSTEMS

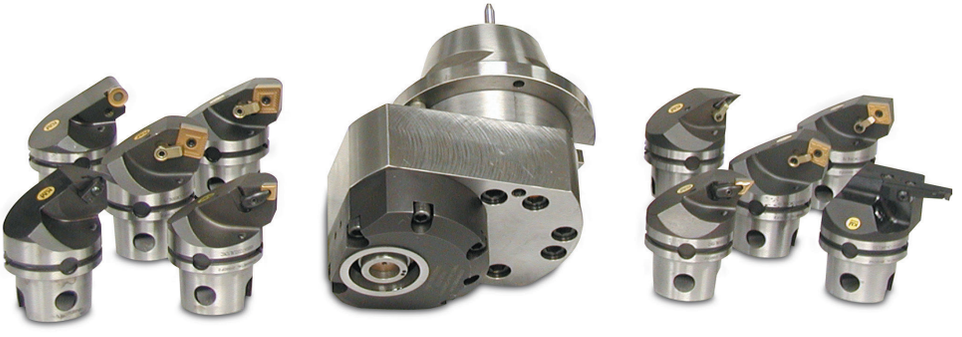
— Coolant through the tool
— Up to 194.5 kN (44,000 lb) clamping force
— Large gauge diameter provides optimal taper contact and permits use of long tools
— Secure and sturdy tooling connection for heavy-duty cutting and use of boring bars and attachments



Long Boring Bars and Various Tool Holders



Wide-Body Tool Holder



Turning Adapter and Modular Tooling

Tool magazines and attachment storage

CONVENIENT TOOL STORAGE

A floor-mounted, 26-position tool storage disk is standard.

— Several disk configurations are available
— The storage disk handles attachments, long boring bars and proprietary tools
— The floor-mounted system puts the height of the magazine at a convenient level for tool loading/unloading and maintenance
— Optional chain-type magazines expand tool capacity to maximum 200 tools. Any tool in the chain-type magazine may be used vertically or horizontally in attachments
— Tool drawers provide storage for attachments, long heavy tools, and modular tools



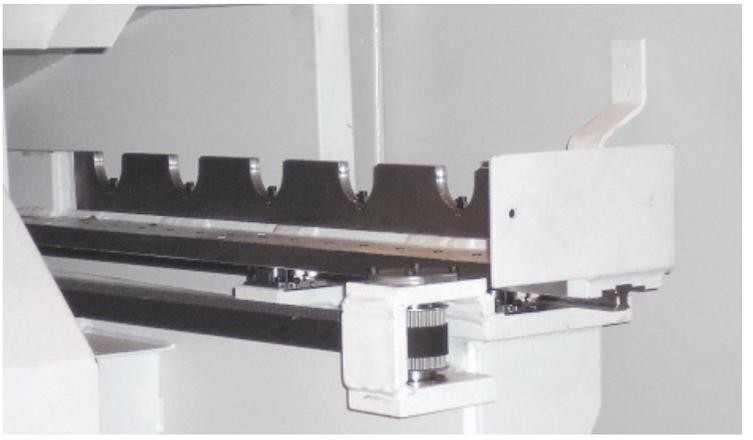
Large Capacity Chain-Type Tool Magazine



Drawers for heavy attachments and large tools

MASSIVE TOOL CAPACITIES

— Maximum tool length 750 mm (27.6 in)
— Maximum tool diameter 250 mm (9.8 in)
— Maximum tool offset left and right of center 205 mm (8.1 in)
— Maximum tool weight 115 kg (253 lb)



Modular Tool Drawer



Disk tool magazines support attachments and modular tools

Live spindles adds machining versatility



Live Spindle Attachment

LIVE SPINDLE

Live spindles increase machining versatility. Mill, drill and tap vertically or horizontally with the live spindle or right angle live spindle attachments.

- The field-replaceable cartridge design has isolated bearings for better reliability and reduced maintenance
- Spindle bearings are located at the extreme end of the housing to provide maximum cutting stiffness
- Live spindle works with modular tool systems
- Productivity-enhancing processes such as plunge milling and helical interpolation are possible with a live spindle

Live Spindle Specifications		
Max spindle speed vertical	rpm	4000
Power continuous /duty cycle	kW	25 / 37.5
	hp	34 / 50
Torque continuous	Nm	1066
	ft lb	787



Y-Axis Attachment

Y-AXIS ATTACHMENT

Improve cycle time and part quality with the Giddings & Lewis Y-axis attachment. The attachment allows milling, drilling, and tapping of off-center part features on the side of the part.

- Automatic tool changing
- 2200 rpm max
- C-axis rotation ± 90 degrees
- Flood and through-tool coolant
- Machining range ± table radius

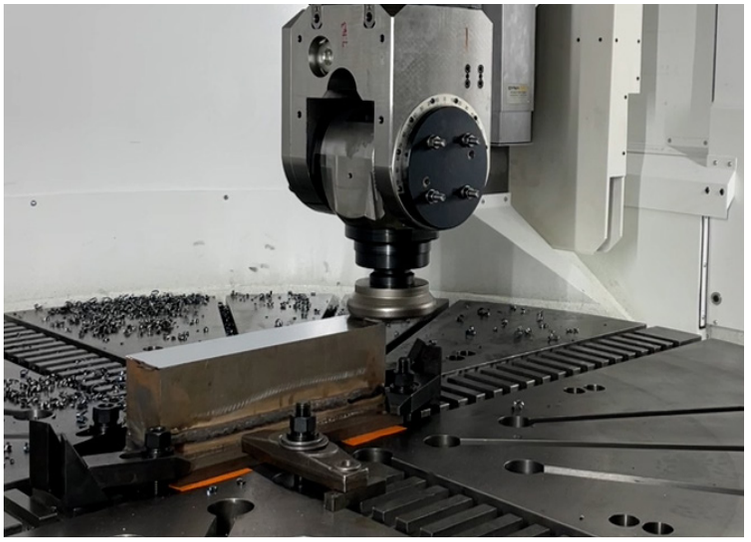
Improve cycle time and part quality with the Giddings & Lewis Y-axis attachment

Attachments add multi-functional capabilities

ANGULAR INDEXING HEAD

Machine part features at varying angles with the manually adjustable angular indexing head.

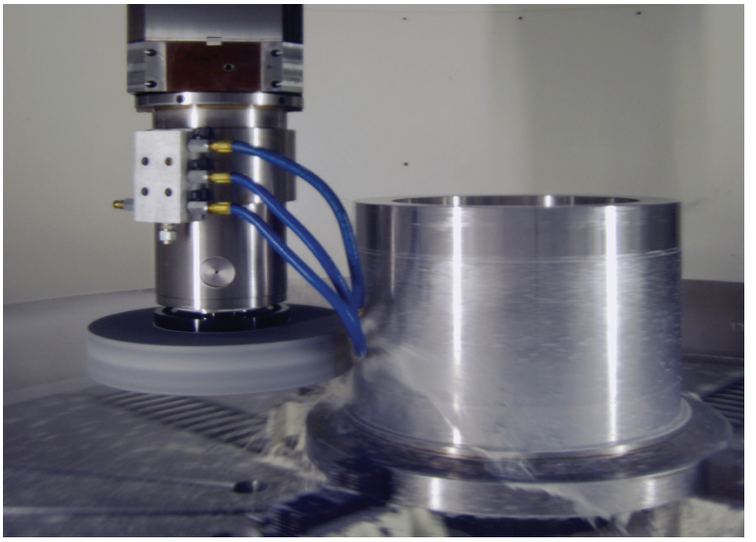
— Indexing ± 100 degrees
— 1500 rpm max
— Flood and through-tool coolant



GRINDING ATTACHMENT

Reduce setups and cycle time by performing ID, OD and face grinding operations on a Giddings & Lewis vertical turning center. A grinding wheel dressing station is mounted to the cross rail near the X-axis travel limit.

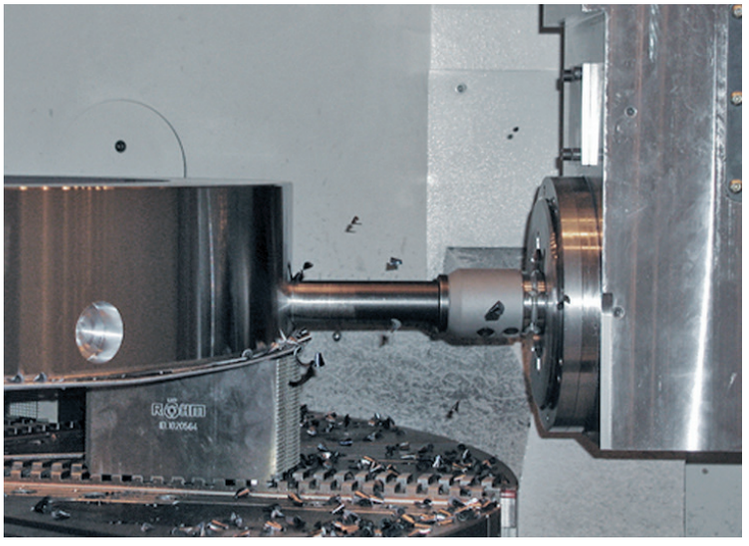
— 3000 rpm max
— Maximum diameter wheel 400 mm (15.7 in)
— Flood coolant



HORIZONTAL LIVE SPINDLE

The horizontal live spindle attachment reduces machining time and cost. Perform milling, drilling and tapping on the side of the part.

— 2200 rpm max
— Automatic tool changing
— Flood and through-tool coolant



HORIZONTAL TURNING ADAPTER

The horizontal turning adapter provides extended reach for turning, facing and back facing of part features such as flanges.

— Automatic tool changing
— Adapter length variable based on application
— Flood coolant

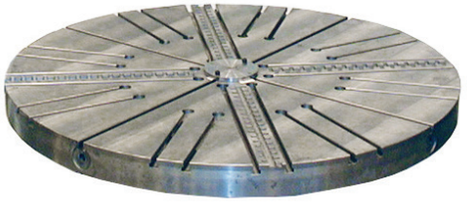


Variety of workholding options

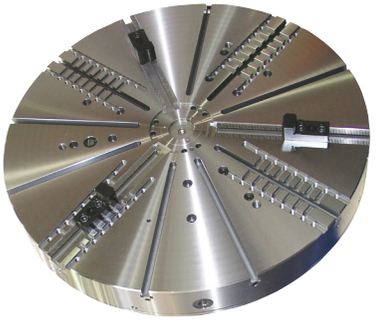
CHOOSE THE TABLE / CHUCK TO SUIT THE APPLICATION

A variety of chucks are available including:

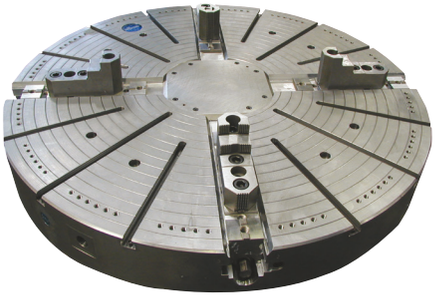
— Manual, power or a combination
— Three, four or six jaw configurations
— Hydraulic
— Magnetic
— Special applications



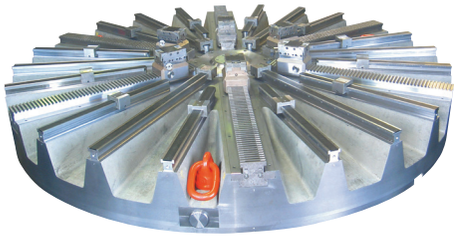
Plain table



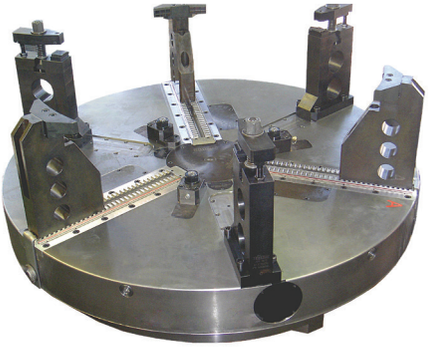
Three-jaw combination chuck



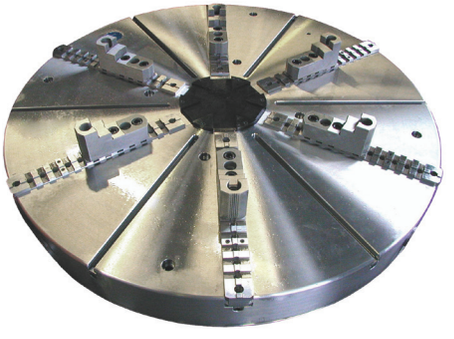
Four-jaw manual chuck



Six-jaw hydraulic chuck



Six-jaw power chuck



Six-jaw manual

Probing options





TOOL PROBE

Tool probes increase machine utilization and provide precision from the first cut. The tool probe corrects and modifies tool lengths. Tools can be qualified to 0.050 mm (0.002 in).

PART PROBE

Part probes update offsets and measures surfaces, diameters, lengths and angles to insure part quality. Probing on both sides of center provides up to four times the probe accuracy compared to probing the radius. The probe is stored in the tool changer.

Controls and equipment monitoring

AVAILABLE CONTROLS



Fanuc 31i-B

- 54.6 cm (21.5 in) Touch Display
- iHMI Applications
- Windows 10 Operating System
- OEE Dashboard



Siemens Sinumerik One

- 54.6 cm (21.5 in) Touch Display
- Sinumerik Operate
- Windows 10 Operating System
- OEE Dashboard

GIDDINGS & LEWIS PRODUCTIVITY FEATURES

SPINDLE LOAD MONITORING SOFTWARE

Giddings & Lewis spindle load monitoring software provides a simple operator interface and application. The operator sets cutting operation acceptance values and activates or deactivates load monitoring usings M codes. Available on Siemens or Fanuc, the control retracts the tool or uses feed hold when the trip point is exceeded protecting the machine, tooling and part from damage.

SPINDLE SPEED OSCILLATION SOFTWARE

Spindle Speed Oscillation Control provides a means of varying the spindle speed override from the part program. Varying the spindle speed can reduce or eliminate tool chatter.

INDUSTRY 4.0

In today's machining environment Industry 4.0 and the digital world is predominant in our every day activities. Whether monitoring the status of the equipment, providing the throughput of parts, equipment uptime, or even daily reporting of efficiencies of energy usage. Giddings & Lewis will provide real-time data for you to monitor in order to make the best possible decisions in your manufacturing process.



OFFER LEVELS

Base Level
Fives Giddings & Lewis OEE

Level 2
CortX Advanced Monitoring I w/ OEE

Level 3
CortX Advanced Monitoring II w/ OEE

FIVES CORTX

4-Axis VTCs & automated large part production

SIDEHEAD 4-AXIS VTC

The sidehead option is ideal for pinch turning or machining of tall or flanged parts. Cutting capabilities are enhanced with the integrated Giddings & Lewis damping system.

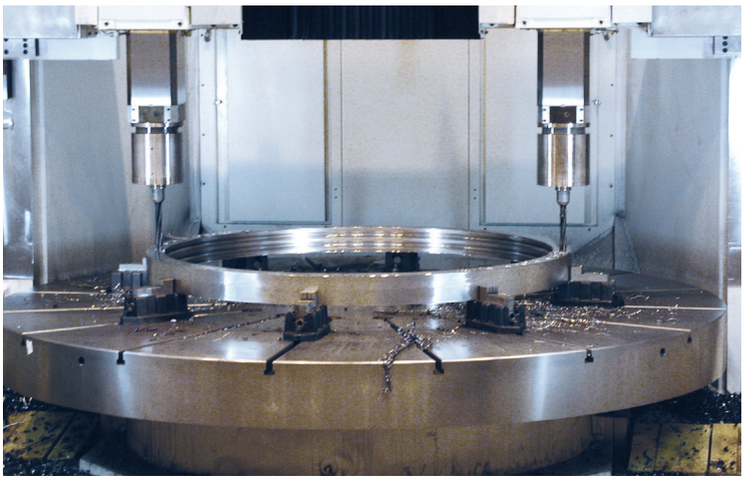
— Substantial 250 mm (9.8 in) square ram
— Delivers 34,000 N (7,600 lb) of thrust
— Side head travels:
  - X travel - 1250 mm (49.2 in)
  - Z travel - 1500, 2000 or 2500 mm (59, 78.7 or 98.4 in)
— Automatic tool change from 40 position tool changer
— Available on VTC 1250 through 2500



VERTICAL 4-AXIS VTC

Two heads provide twice the productivity. The four-axis VTC model features two heads and two rams for simultaneous cutting of large diameter parts including bearings, disks and pulleys.

— Rough with one head and finish with the other
— Perform OD and ID cutting at the same time
— Available on VTC 2000 through 4500



Two heads provide twice the productivity

AUTOMATION ADDS PRODUCTIVITY

For higher volume jobs, addition of an automated material handling system optimizes production time. Operators are able to set up additional parts while the machine is cutting.

— Pallet shuttle systems are equipped with one precision, power-assisted rotating set-up station, one rotating load/unload station and park stands. Configurations with up to three park stands are available
— Giddings & Lewis vertical turning centers may be linked with additional VTCs or horizontal boring mills. The machines may be connected with shuttle systems or linear transports





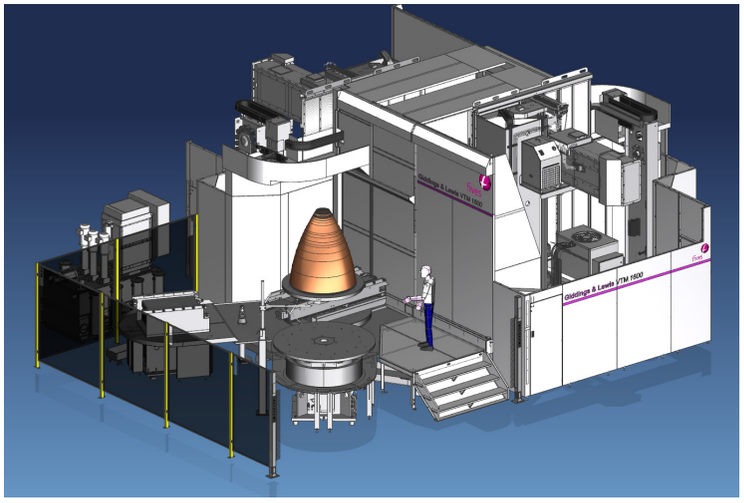
Pallet Load Capacity		
VTC 1250 / 1600	kg	7000
	lb	15,400
VTC 2000 / 2500	kg	15,000
	lb	33,000

Automated machining solutions

ROCKET NOZZLE MACHINING

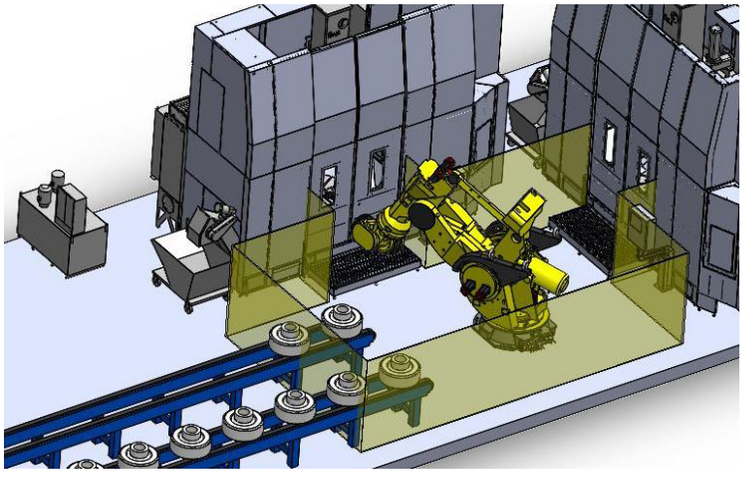
Vertical Mill / Turn Dual Headed Machining Center

— Mill/turn machining solution with precision rotary setup stand and material handling system eliminates setup and reduces changeover time
— Dual hydrostatic rams simultaneously turn part OD to provide increased throughput
— High speed milling spindles efficiently slot features
— Dual machining center optimizes process flow and reduces foundation requirement and footprint compared to a two machine solutions
— Solution provides twice the throughput of conventional machines



TRACK ROLLER MACHINING

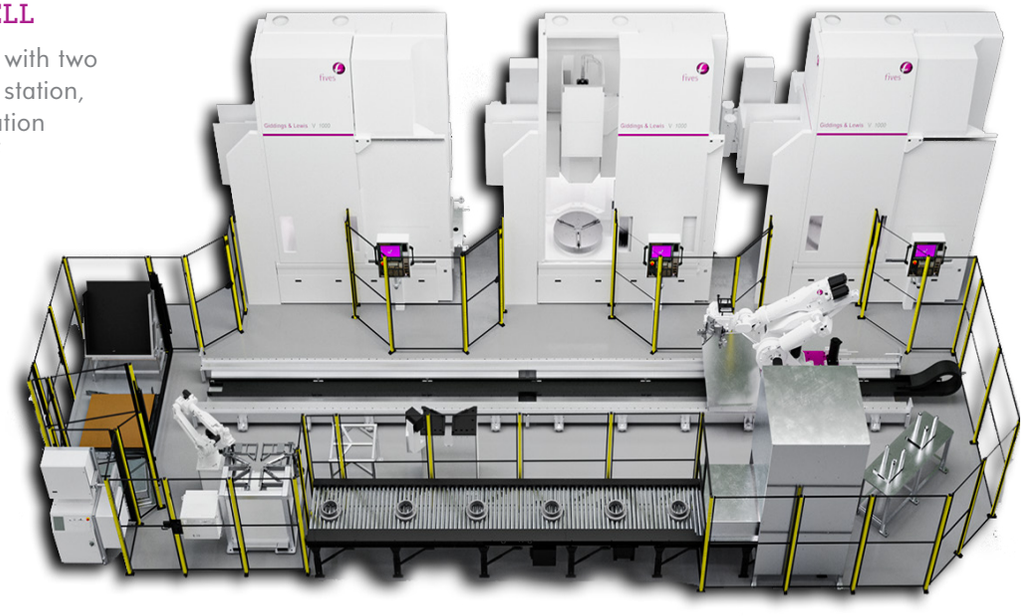
— Robotic two-machine cell provides complete machining of components for construction and mining industry equipment
— Two VTC 1250 vertical turning centers paired with heavy-duty robot can handle family of parts weighing up to 2300 kg (5000 lb)
— Cell provides two rough turning operations and finished hard turning operations on center bores, OD and work piece faces



Automated solutions allow one machine operator to maintain multiple machines and cell system

AUTOMATED ROBOTIC MACHINING CELL

— Three V1000 vertical turning machines along with two robots, vision system, rollover station, deburr station, final inspection location and packaging operation provide one-stop manufacturing for family of forged steel flanges
— Turning and drilling features on all three machines provide redundant capabilities to keep the cell running non-stop
— New automated process eliminates manual material handling between operations and automates workpiece loading and finish part palletizing thereby improving ergonomics



Technical data

				1000 FX	1250 FX	1250	1600	2000	2500	3000	3500	4500
Capacities	Table size		mm	1000	1250	1250	1600	2000	2500	3000	3500	4500
			in	39.4	49.2	49.2	63.0	78.7	98.4	118.1	137.8	177.2
	Max swing and facing capacity		mm	1200	1300	1700	2000	2400	2700	3400	3700	4700
			in	47.2	51.2	66.9	78.7	94.5	106.3	133.9	145.7	185.0
	Min/max height table top to ram bottom	Standard	mm	1180		1000 / 1500						
			in	46.5		39.4 / 59.0						
		Optional	mm	1680		1000 / 2000, 1000 / 2500, 1800 / 3300						
			in	66.1		39.4 / 78.7, 39.4 / 98.4, 70.9 / 129.9						
	X-axis horizontal travel (R/L of center)		mm	+840 / -370		±1060	±1210	±1410	±1560	±1910	±2060	+2560 / -1560
			in	+33.0 / -14.6		±41.6	±47.6	±55.5	±61.4	±75.2	±81.1	+100.8 / -61.4
Ram Head	Ram Size		mm	250 x 250								
			in	9.8 x 9.8								
	Z-axis vertical travel	Standard	mm	750		1250						
			in	29.5		49.2						
		Optional	mm	1250		1750						
			in	49.2		68.9						
Feeds / Traverse	Rapid traverse X and Z		mmpm	20,000								
			ipm	787								
	Feed thrust X and Z		N	34,000								
			lb	7,600								
Table	Table speed		rpm	1-630		1-500	1-400	1-250	1-200	1-150	1-130	1-100
	AC dual drive motors Intermitent / Continous	Standard	kW	93 / 62		123 / 82				132 / 88		
			hp	125 / 83		165 / 110				177 / 118		
	Maximum torque Continuous		Nm	19,328		24,320		62,016		93,440		116,800
			ft lb	14,256		17,938		45,743		68,921		86,152
	AC dual drive motors Intermitent / Continous	Optional High Power	kW							174 / 116		
			hp							233 / 155		
	Maximum torque Continuous		Nm							123,392		154,240
			ft lb							91,014		113,767
	Thrust bearing load capacity		kg	82,200				113,400		199,600		
			lb	181,200				250,000		440,000		
	Table load capacity*		kg	7,500		15,000		30,000		60,000		
			lb	16,500		33,000		66,000		132,000		
Accuracies (ISO 230-2-97)	X & Z Axes	Bidirectional accuracy (A)	mm	0.015								
			in	0.0006								
		Bidirectional repeatability (R)	mm	0.010								
			in	0.0004								
		Reversal (B)	mm	0.005								
			in	0.0002								
	C Axis	Bidirectional accuracy	arc sec	10								
		Bidirectional repeatability	arc sec	5								
Tool Magazine	Number of positions		std	25		26						
			opt	28		60, 100, 200						
Power				60 hertz, 3 phase, 480 volts								
Machine Dimensions	L x W x H		m	4.4 x 4.2 x 5		6 x 4 x 5.7		7 x 5.5 x 5.7		12 x 5.7 x 6.45		13 x 5.7 x 6.45
			ft	14.4 x 13.8 x 16.4		19.7 x 13 x 18.7		23 x 18 x 18.7		36 x 18.7 x 21.2		42.3 x 18.7 x 21.2
	Weight		kg	25,000		42,000		57,000		77,000	84,000	100,000
			lb	55,000		93,000		125,000		169,500	185,000	220,000

Technical data subject to change without notice

**Table load capacity varies depending on workholding and workpiece balance conditions.*

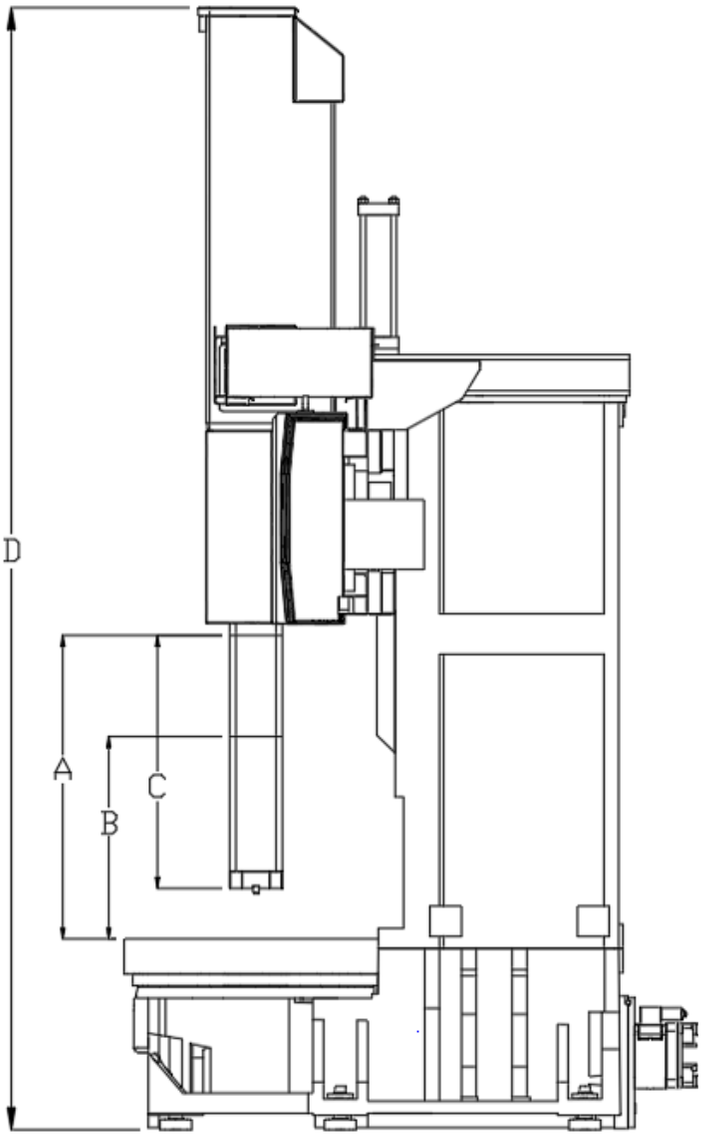
Dimensions and travel

INSTALLATION AND CLEARANCES

- Machine installation is flat floor on VTC 1000 through 2500
- Machine installation is 475 mm (18.7 in) pit on VTC 3000 through 4500
- Adjustable pit depth foundations available for facilities with height restrictions

Machine Dimensions

Height under rail max. (A)		mm	1056	1556	1500	2000	2000	2500
		in	42	61	59	79	79	98
Height under rail min. (B)		mm	1056	1556	1000	1000	1000	1000
		in	42	61	39	39	39	39
Ram travel (C)		mm	750	1250	1250	1250	1750	1750
		in	29	49	49	49	69	69
Overall height (D)	VTC 1000FX / 1250FX	mm	4822	5822				
		in	190	229				
	VTC 1250 / 1600	mm			5546	6046	6546	7046
		in			218	238	258	277
	VTC 2000 / 2500	mm			5546	6046	6546	7046
		in			218	238	258	277
	VTC 3000 / 3500	mm			5803	6303	6803	7303
		in			229	248	268	288
	VTC 4500	mm			5803	6303	6803	7303
		in			229	248	268	288



Note: The live spindle option will increase machine heights by 105.5 mm (4.2 in)

CONTACT
Fives Giddings & Lewis
fivesmsi-sales@fivesgroup.com
T +1 (920) 921 9400

Fives Machining Systems, Inc
142 Doty Street | Fond du Lac , WI 54935
www.fivesgroup.com

fives
Industry can do it

Copyright © 2023 Fives – All rights reserved. v26(03152023)AM