

VERTICAL TURN-MILLING CENTERS

VTM

Precise Combined Machining for Large Workpieces

With the vertical turning-milling machining centers of the VTM series ELHA sets a new standard for multi-tasking machining of large rotary and cubic workpieces with respect to precision, dynamics and flexibility as well as space and energy efficiency thanks to the use of innovative technologies.

The VTM machine is the ideal problem solver for demanding machining tasks with a broad application range and therefore interesting for job-shops as well as OEM users.

Convince yourself on the following pages of the new dimension for highly productive machining of large workpieces.



Industries



Energy



Large bearings



Mechanical engineering



Aerospace

VTM Highlights

The VTM series presents a range of highlights, which directly translate into productivity, flexibility and reliability advantages for your production:

- ELHA SDD – the patented table segment direct drive with the highest positional accuracy and dynamics
- Rigid, FEM-optimized and space efficient machine foundation made from composite material
- Hydrostatic guides and bearings on all linear and rotational axes
- Consequent modular system with flexible and individual configuration possibilities
- Strong and powerful RAM concept with innovative drive and interchangeable head interface technology
- Large variety of tool and interchangeable head magazines
- Precise 5-sides/5-axes simultaneous machining with the double C-axes function
- High thermal stability and energy efficiency with a new cooling concept using controlled heat dissipation and the possibility of thermal energy reuse



Processes and Interchangeable Heads



Turning



Drilling, tapping



Milling, gear cutting



Grinding

The Modular System

The VTM modules enable the configuration of the machine into a multi-functional turning-milling machining center for economical combined machining with a rotary table range from 2500 – 8000 mm and workpiece heights up to 5000 mm. All machines are equipped with two columns and one or two RAM work units. All sizes can be delivered with an adjustable cross-rail (W-axis). Additional advantages of this concept are its reliability and availability combined with cost advantages of proven and standardized machine components.

ELHA SDD Table as a Retrofit-Set

Because of the modular character of the VTM the ELHA SDD rotary table can be used as a stand-alone unit, for example as part of a retrofit or maintenance of existing machines. This presents the possibility to use the extraordinary precision, dynamics and technology of this rotary table design in your existing machine park to achieve significant quality and productivity improvements.

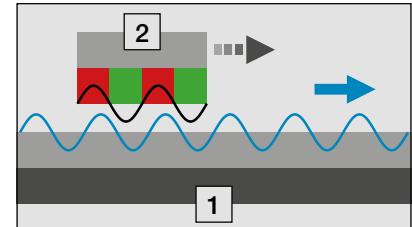


VTM base type		25	30	35	40	45	50	55	60	70	80
table diameter	mm	2500	3000	3500	4000	4500	5000	5500	6000	7000	8000
swing diameter	mm	2800	3300	3800	4300	4800	5500	6000	6500	7500	8500
max. workpiece weight	t	15	20	30	40	50	60	70	85	110	140
max. turning height	mm	5000									
tool spindle drive	kW	37 / 60 / 70									
ram size	mm	360x400 / 500x500 / 600x600									
power table drive (S1)	kW	100	120	150	180	210	240	240	240	240	240
table torque (S1)	kNm	31	44	70	100	130	177	185	233	296	333
max. table speed	min ⁻¹	175	145	115	100	85	70	70	60	55	50

ELHA Segment Direct Drive (SDD) Patented Rotary Table Direct Drive

The table drive is the heart of the vertical multi-tasking machine and its performance in machining quality and dynamics directly influences the ultimate workpiece quality and economy of the machine. ELHA sets new standard with the patented SDD (Segment Direct Drive) table direct drive using the following features:

- Extremely high control stiffness and positional accuracy of approx. $\pm 1''$
- High acceleration and positioning dynamics (VTM 402: 0 – 80 min⁻¹ in 6 sec with approx. 40 t moving mass)
- Optimal machining quality without any influence of engaging gear frequencies
- Broad power-, torque- and rpm spectrum with proven standard components based on linear drive technology
- Optimal run-out because of elimination of radial drive forces and use of a radial hydrostatic bearing
- Very low noise emission
- No wear of drive components with minimal maintenance, continued use of the rotary table after failure of individual motor segments
- Excellent thermo-symmetrical temperature control of the entire rotary table foundation with minimal deformation



[1] Stator segment
(primary part)
[2] Permanent magnet
(secondary part)
~ Magnetic field

Hydrostatic Guides for all Linear and Rotary Axes



Rotary table radial bearing



Rotary table axial bearing



Hydrostatic X/Z-axes

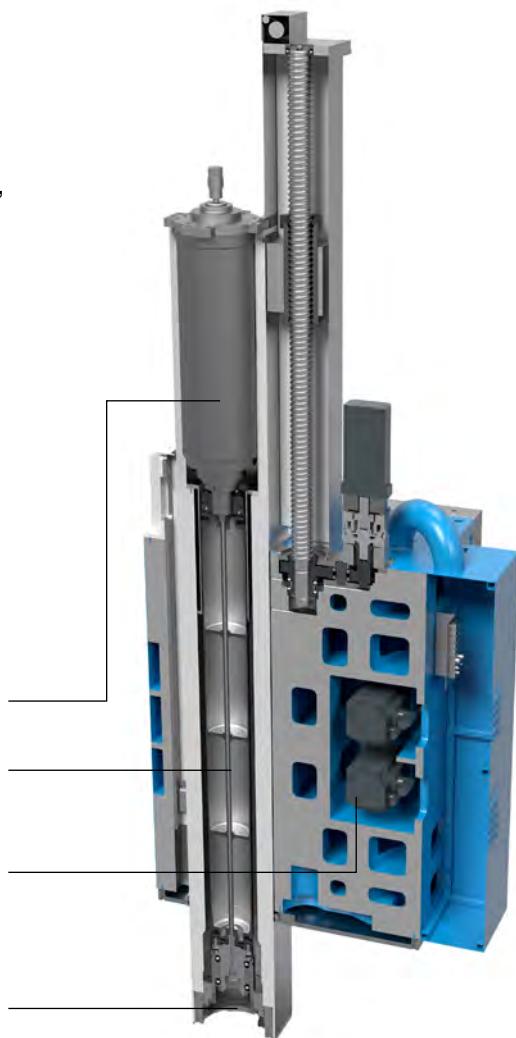
Powerful RAM Concept

The RAM work units of the VTM series offer a range of innovative technologies for robust and accurate high precision machining as well as very flexible options for the different requirements in turning, drilling and milling operations.

- Broad selection of configurations for power, cross section and RAM length:

RAM mm	power / kW (S1)			RAM stroke / mm				
	37	60	70	1250	1600	2000	2500	3000
360x400	■	□		■	□	□		
500x500	■	□		■	□	□	□	
600x600	■	□	□		■	□	□	□

- Spindle drive with 2-stage transmission integrated in the RAM
- CFK shaft minimize drive wear and optimize dynamics
- Electrically braced master-slave rack&pinion drive with high dynamics and positional accuracy in the X-axis for fast drilling and tapping
- Rigid interface with Hirth coupling and energy supply to adapt different interchangeable heads including self recognition



Tool and Interchangeable Head Magazines

Next to standard magazines for tools and interchangeable heads ELHA offers individual solutions for your manufacturing needs in a variety of sizes. Additionally a wide range of compatible interchangeable heads is available for various machining applications.



Tool Arena with tool change robot

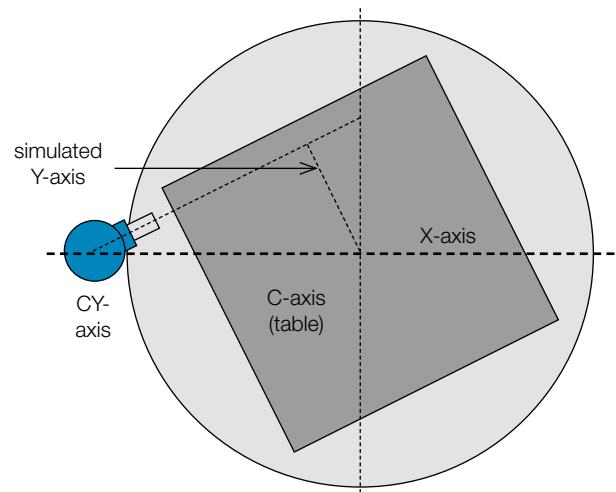


ELHA standard magazine

5-sides/5-axes Simultaneous Machining

The VTM machine is characterized by an additional unique technology: The double C-axes interpolation. Using this technology a linear Y-axis functionality is realized by the simultaneous interpolation of the rotary table C-axis and an axis-parallel CY-axis integrated in the tool adapter of the RAM unit. This technology has the following advantages:

- Flexible 5-sides/5-axes machining in combination with an ELHA HV swivel milling head
- Extremely space efficient because of the elimination of an Y-axis
- Extremely accurate with the precise SDD rotary table C-axis drive and the CY-axis drive directly integrated into the RAM.



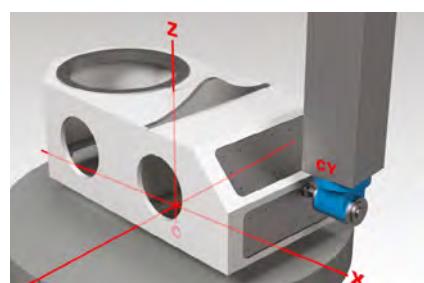
HV Swivel Milling Head

For the VTM series ELHA offers a horizontal-vertical swivel head with modern drive technology. The two available sizes can be used for various applications:

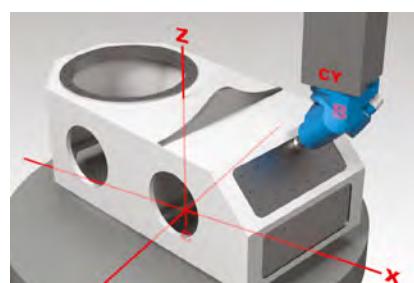
- 500x500 for light- and medium-duty cubic machining
- 600x600 for heavy-duty cubic machining

RAM	power	spindle speed	spindle torque
mm	kW (S1)	min ⁻¹	Nm
500x500	37	8000	875
600x600	37	8000	875
600x600	60	4000	2000

Applications



Vertical surface machining with horizontal milling head



Sloping surface machining with HV milling head, fixed B-axis



5-axes simultaneous machining with HV head, dynamic B-axis

Industries & Products



Automotive



FM
Production Modules



FM SMART
Transfer Centers



Energy

Large bearings



VTM
Vertical Turn-Milling Centers

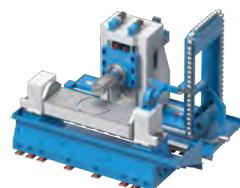


RTX
Rotary Table Machining Centers

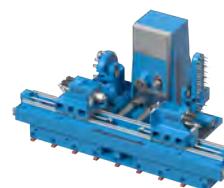


Aerospace

General machining



SMX
Special Machining Centers



SPX
Special Purpose Machines

ELHA-MASCHINENBAU Liemke GmbH & Co. KG

ELHA is a family-owned company known for customized machine tools and process solutions. Many industries in the metalworking industry trust ELHA's experience and competence in the development and realisation of highly productive machining processes as well as the design and manufacture of cutting machine tools and turn-key solutions.

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