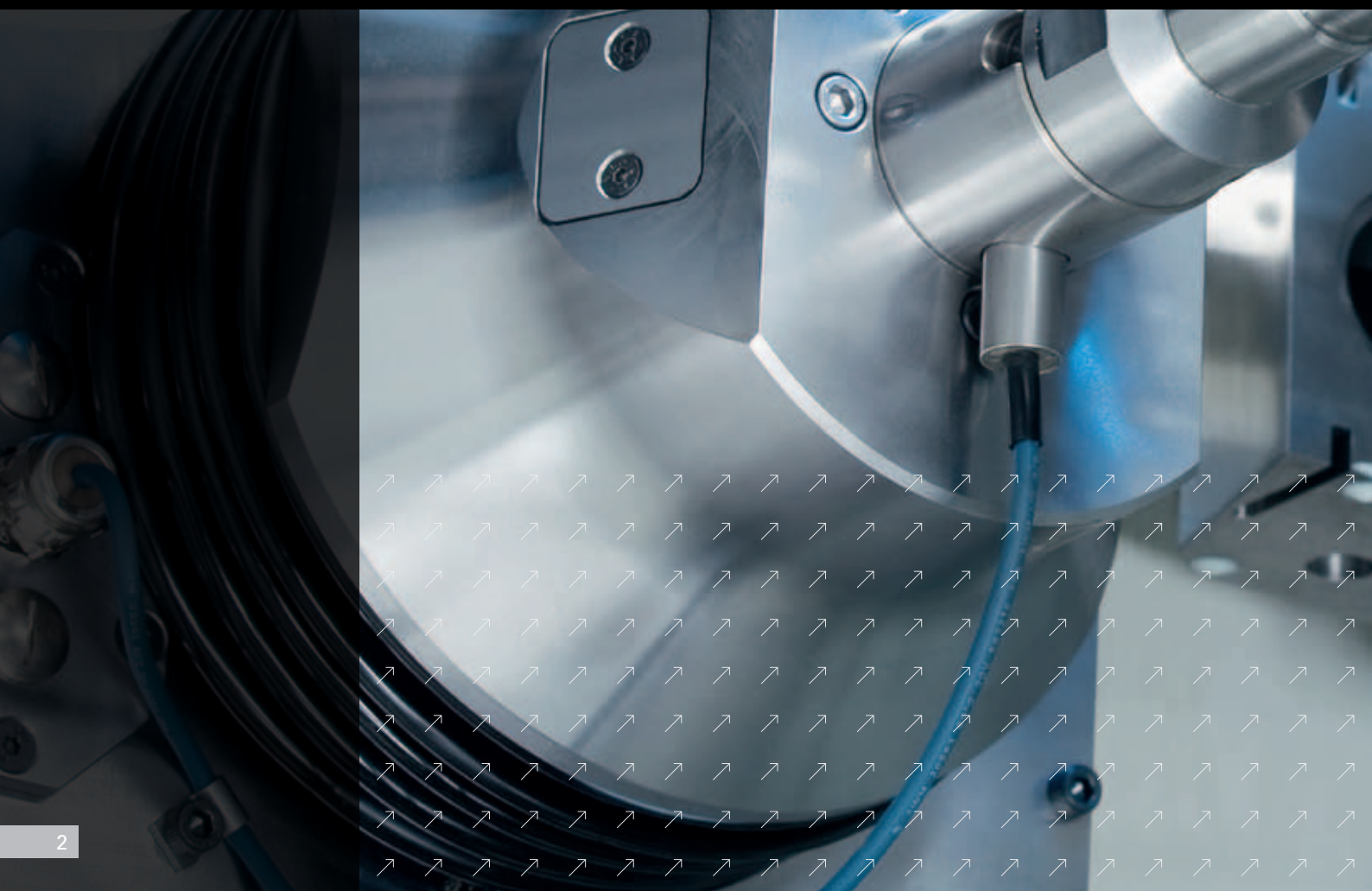
Vertical Shaft Machining
VTC 315 DS

VTC 315 DS – the hard machining system for shafts. For the first time, all the shaft machining processes can be completed by a single vertical machine (CBN grinding, hard turning and scroll-free turning). The VTC 315 DS is perfect for complex production processes. The VTC series makes it possible to complete almost all cutting production processes, even if you have a high volume of chips produced by turning and milling or by grinding operations!

V T C 3 1 5 D S



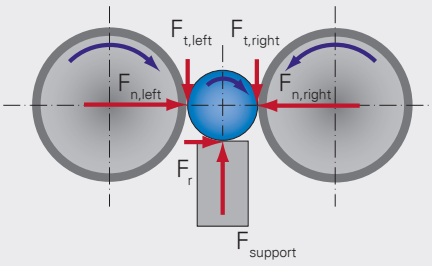
VERTICAL SHAFT MACHINING

VTC 315 DS – simultaneous and synchronous support grinding.

The EMAG VTC 315 DS makes vertical and simultaneous grinding of shafts possible. The difference between this and the traditional grinding processes is that the workpiece is vertically clamped and machined simultaneously by two opposite grinding spindles in four axes. This balances the normal forces and the grinding times, for example, on transmission shafts with multiple bearing seats, grinding times can be reduced drastically.

During synchronous support grinding the resulting tangential forces on the shaft are offset by a support that can be moved as an axis which means that even thin workpieces can be machined at high supply rates.

The principle



Normal forces $F_{n,left}$ and $F_{n,right}$ balance each other out

Tangential forces $F_{t,left}$ and $F_{t,right}$ are compensated by $F_{support}$

The benefits

- Machining time reduced by over 70% (compared to traditional grinding machines)
- Easy access to the workpiece and grinding wheel
- Perfect for machining thin shafts
- Quick, easy retooling
- Changing the grinding wheel is simple
- High productivity rates and suitable for universal use

VTC platform – multi-functionality.

The VTC series is perfect for complex production processes. The VTC series makes it possible to complete almost all cutting production processes even if you have a high volume of chips produced by turning and milling or grinding operations. This allows for the implementation of complete production lines for soft and hard machining. One benefit is that the machines can be equipped with new production technologies easily when machining tasks change. Since these technologies can also be combined with each other, this guarantees flexible use and a wide range of applications. The manufacturing system is customized to fit your specific job requirements!

V T C 3 1 5 D S

VTC series technology modules:

- Soft turning
- Milling
- Drilling
- Hob cutting
- Hard turning
- Scroll-free turning
- Grinding / Simultaneous grinding
- Synchronous support grinding
- Non-circular grinding
- Camshaft grinding

MILLING / DRILLING / TURNING

SCROLL-FREE TURNING

4-AXIS TURNING

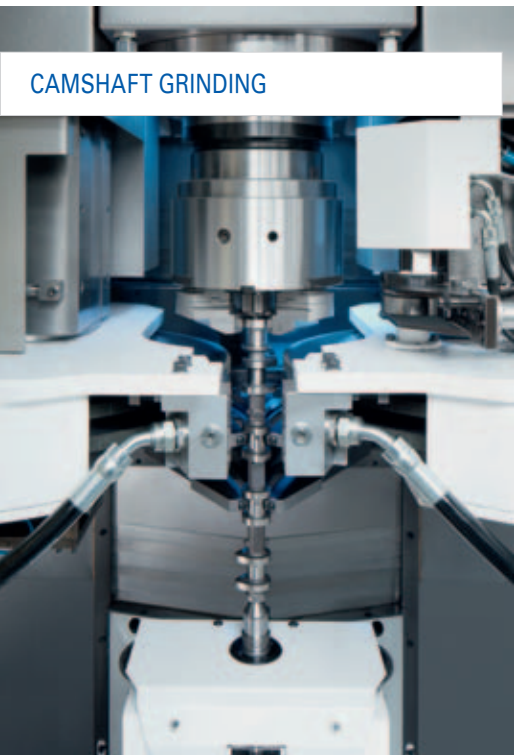
MILLING

HARD TURN / GRINDING

TURNING / FINISHING

SIMULTANEOUS GRINDING

CAMSHAFT GRINDING



SYNCHRONOUS SUPPORT GRINDING

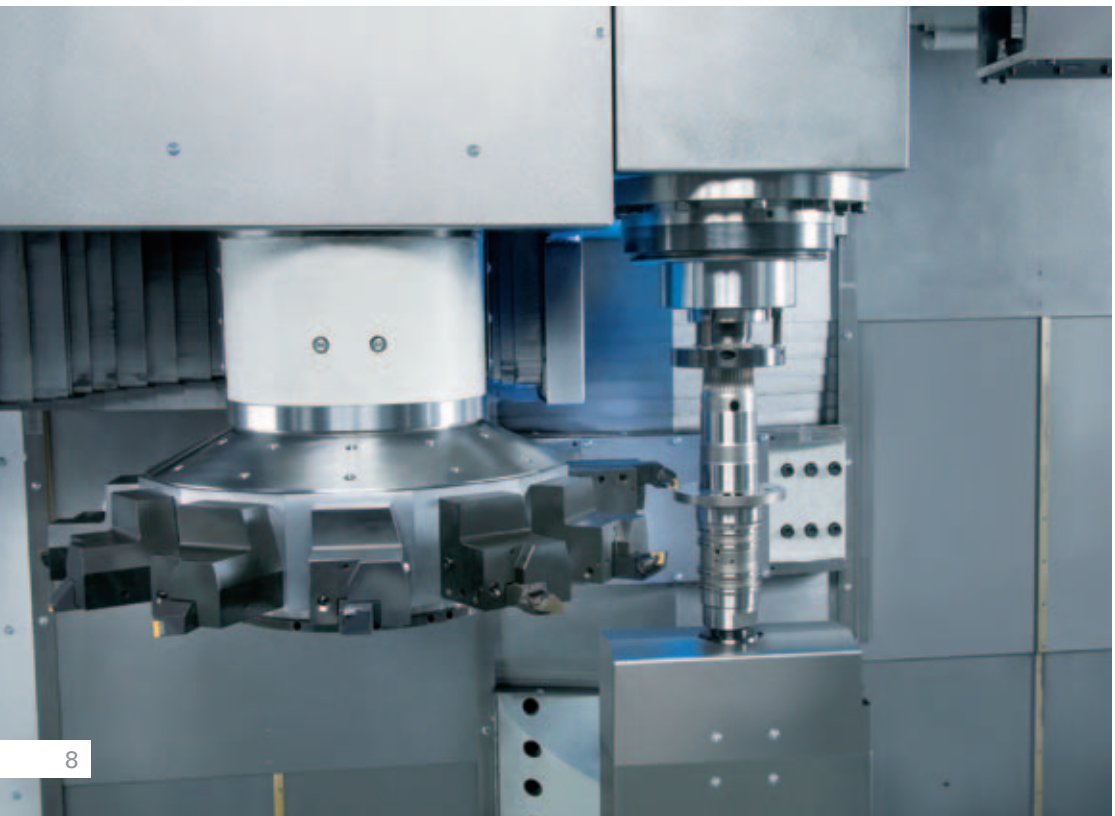
NON-CIRCULAR GRINDING

VTC 315 DS – turning, milling and grinding on a single machine.

Both turning and grinding technologies can be used on the VTC 315 DS. The turret can complete turning and milling operations while the second station completes the grinding. This allows shafts to be produced completely – machining the cylindrical bearing seats, the shoulders and the grooves – all in a single clamping operation. This drastically reduces true running errors when compared to machining in separate clamping operations.

EMAG scroll-free turning is an extremely fast hard machining process which ensures maximum productivity for workpieces up to 700 mm in length. The lack of twisting which is achievable using scroll-free turning is particularly useful for machining gasket seats. Dry machining is also an option.

Turning and milling operations are carried out by the turret

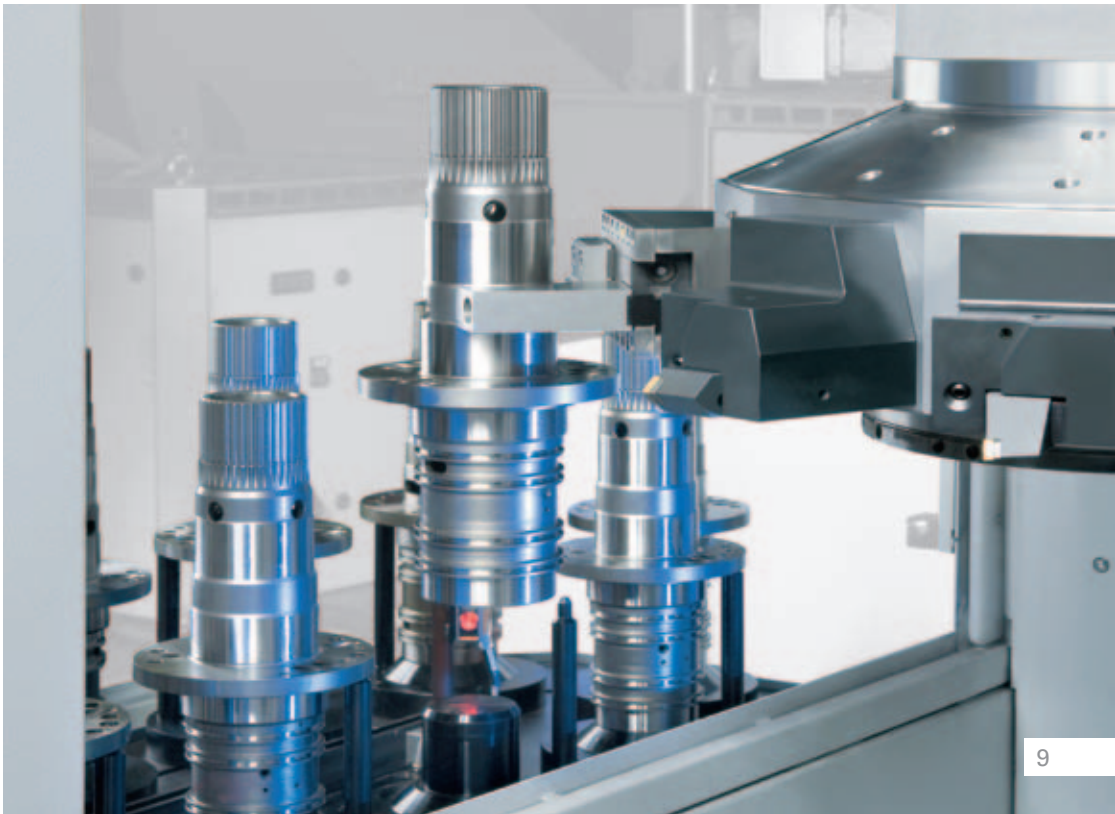


Benefits of the VTC 315 DS:

- All the hard machining processes are completed on a single machine: CBN grinding, hard turning and scroll-free turning.
- Integrated loading and unloading: The EMAG tool turret reduces automation and peripheral costs. Raw and finished parts storage areas form an integral part of the machine.
- The tailstock and steadies can be moved under the control of the CNC unit, thus reducing tooling and retooling times.
- Complete hard machining of shafts, which eliminates clamping errors.
- The vertical design of the machine ensures the free flow of chips and prevents the build-up of chip clusters.
- Smaller footprint due to compact, vertical design.
- Short tooling and retooling times thanks to excellent accessibility and ease of operation.

Scroll-free turning by swinging the turret

Integrated automation. A gripper in the turret enables the VTC 315 DS to load itself

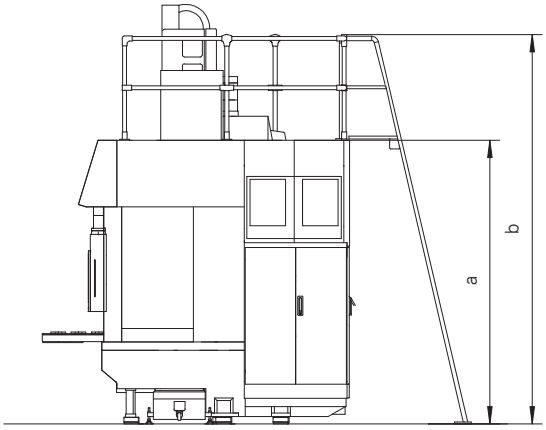


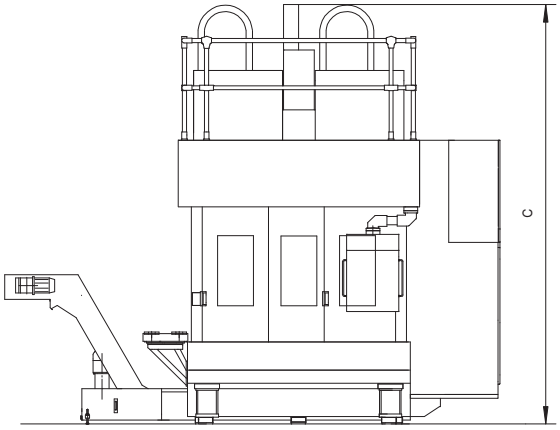
Technical data.

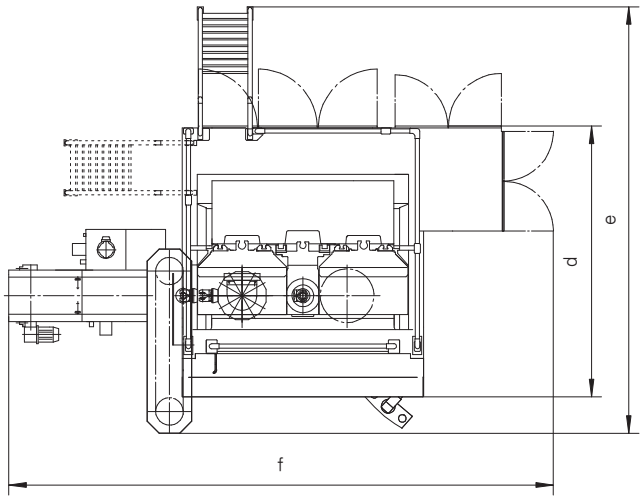
Capacity		VTC 315 DS
Chuck diameter	mm in	315 12.4
Workpiece diameter	mm in	240 9.4
X-axis / Z-axis travel	mm in	390 / 950 15.4 / 37.4
Workpiece		
Length, max.	mm in	700* 27.6*
Spindle nose – quill distance (from spindle to tailstock stop)	mm in	988 39
Weight, max.	kg lb	30 66
Main spindle		
Spindle nose to DIN 55 026-A	Size	8
Spindle bearing, front	dia. in mm dia. in inch	120 4.7
Speed, max.	rpm	4,000
Main drive		
Power rating, 40% / 100% duty cycle	kW hp	38 / 30 51 / 40
Full power at a spindle speed of	rpm	660
Torque, 40% / 100% duty cycle	Nm ft-lb	650 / 425 479 / 313
Feed drive		
Rapid-traverse rate X / Z	m/min ipm	30 / 40 1,181 / 1,574
Feed force X / Z	kN lbf	14 / 10 3,147 / 2,248
Ball screw X / Z	dia. in mm dia. in inch	40 / 50 1.6 / 2.0
Tool carrier		
EMAG disc-type turret	Quantity	1
Tool receptors per turret		
for cylindrical shanks to DIN 69 880	Quantity	11
Shank diameter	mm in	50 2.0
Loading gripper / unloading gripper	Quantity	1
Grinding unit		
Grinding wheel diameter	mm in	540 21.3
Grinding wheel width	mm in	80 3.2

* including the height of the chuck

Aufstellplan VTC 315 DS







Dimensions and weights		VTC 315 DS
Dimension a	mm in	2,850 112.2
Dimension b	mm in	3,900 153.5
Dimension c	mm in	4,200 165.4
Dimension d	mm in	2,700 106.3
Dimension e	mm in	4,300 169.3
Dimension f	mm in	5,500 216.5
Weight	kg lb	16,000 35,274

Subject to technical modifications

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