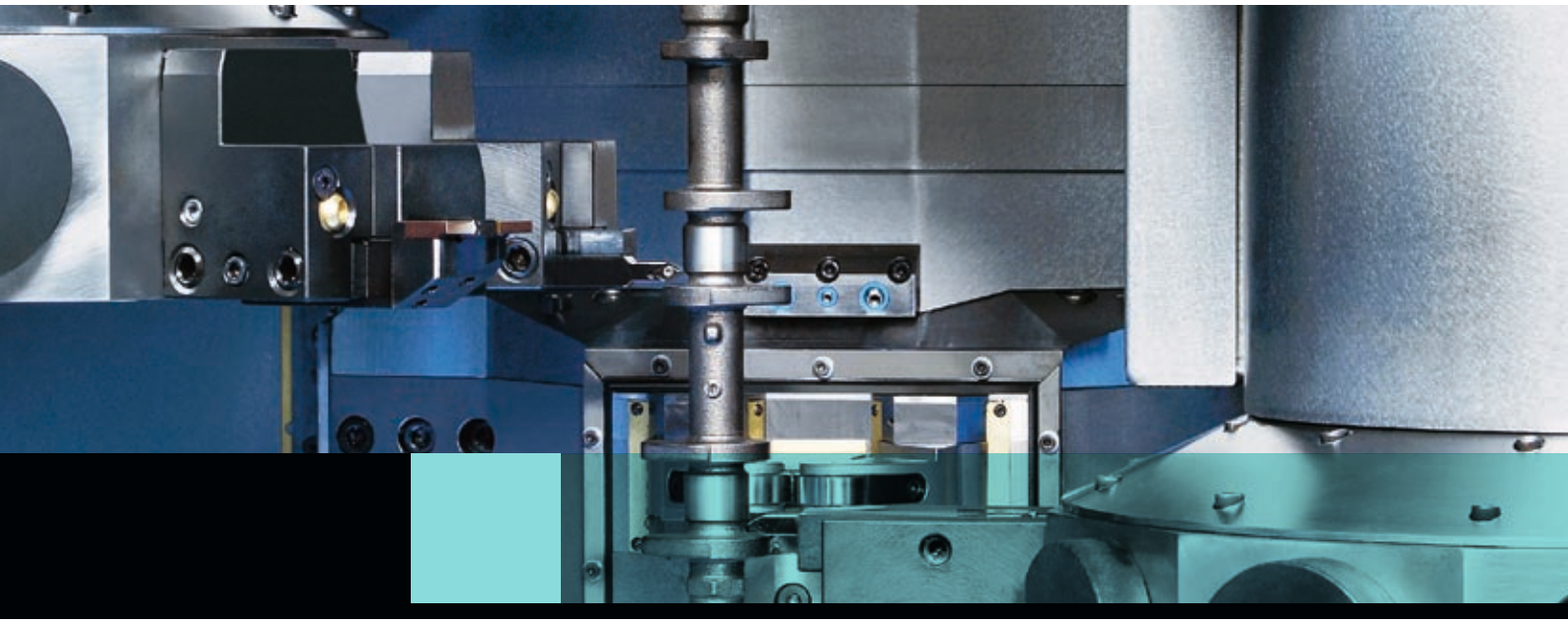
Vertical shaft machining

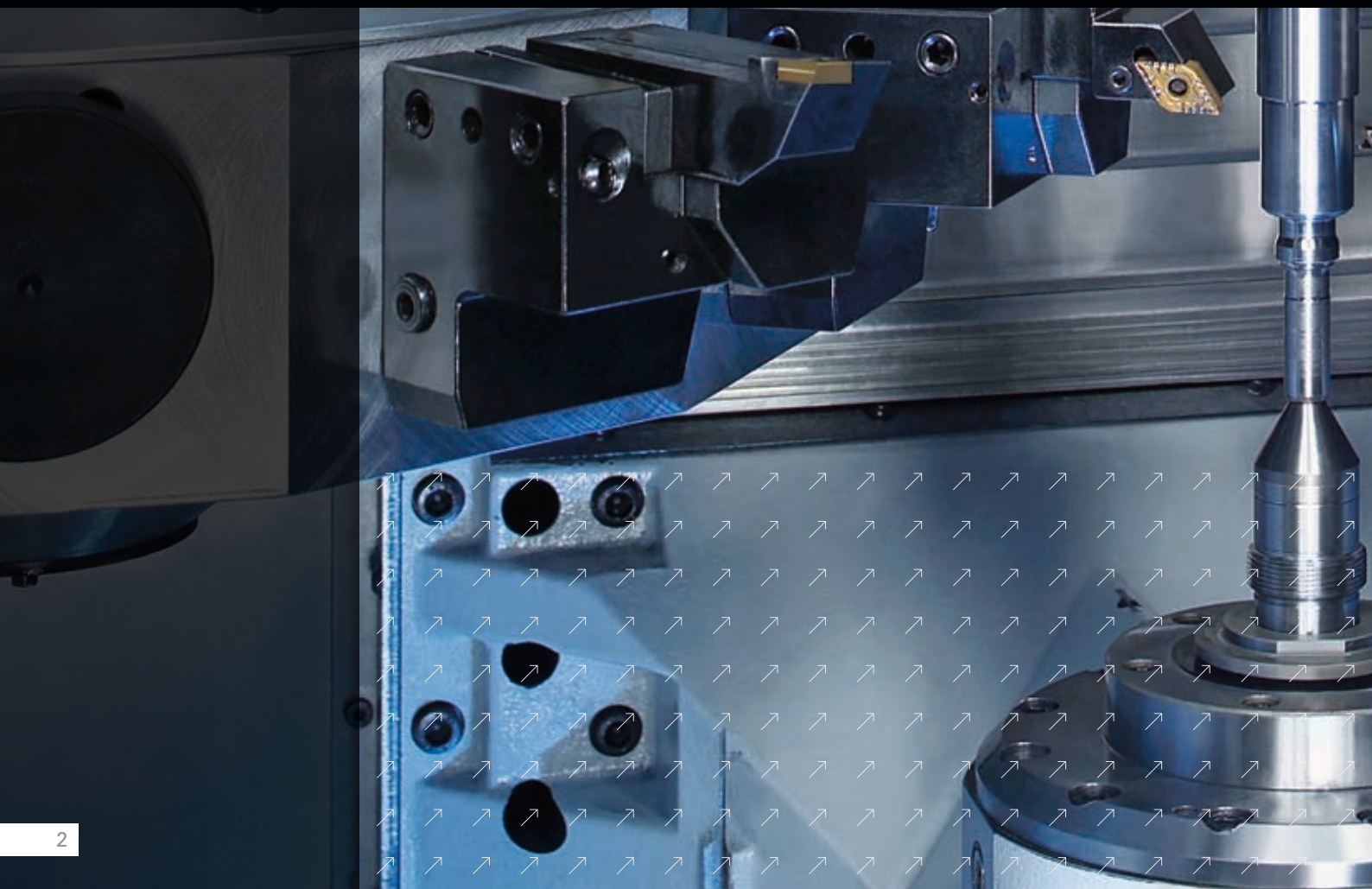
VTC 250 / 250 DUO
VTC 315 / 315 DUO
VTC 250 L

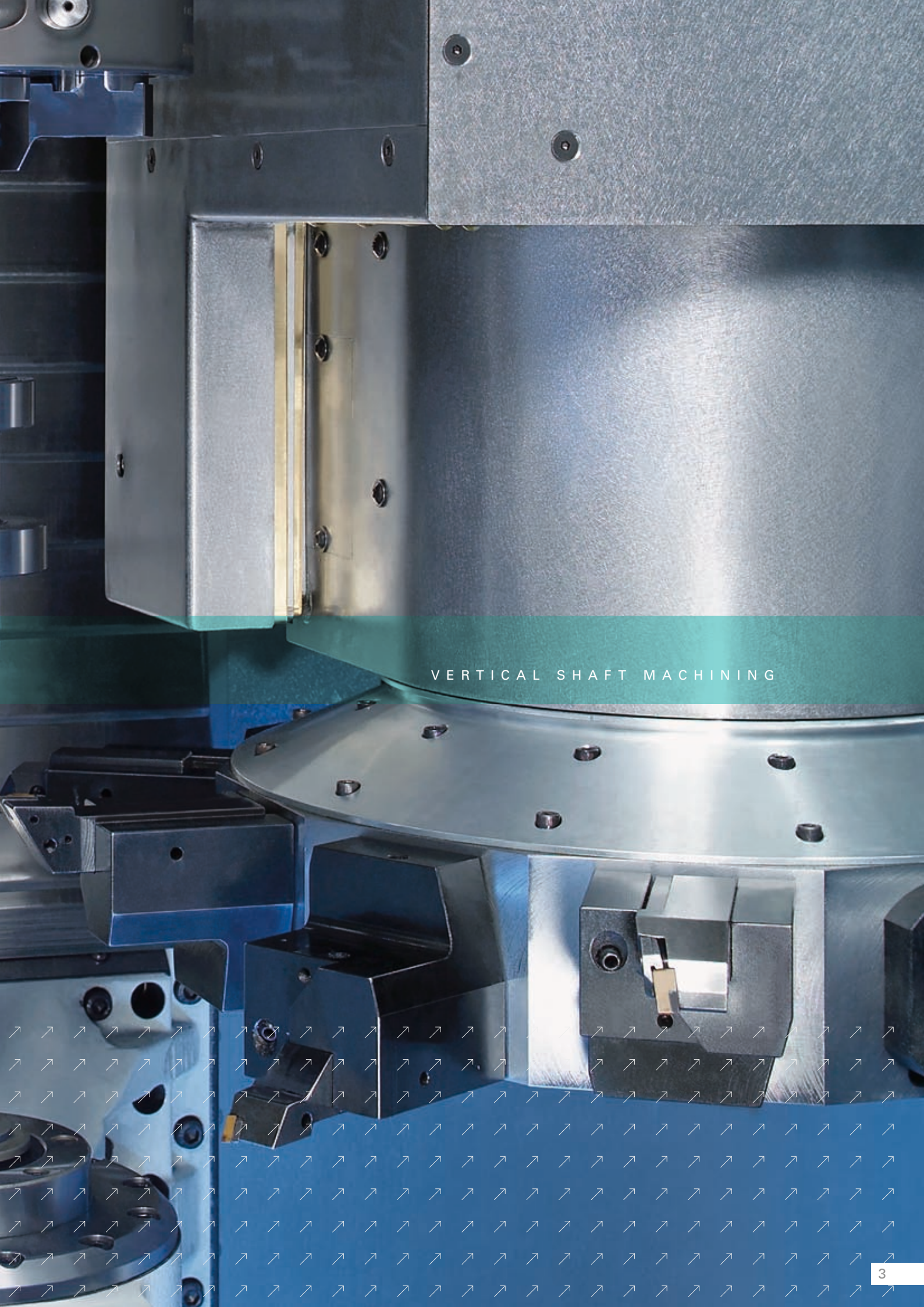


EMAG

The VTC series of machines is specially designed for the vertical machining of shaft-type components. And thus, yet another classical horizontal machining process has been turned on its head. Users of these vertical turning centers profit from minimal throughput times, true process capability and outstanding precision. Complete-machining of shafts on a single machine – automation included. Technology modules ensure the VTC machines can be tailored to suit individual machining requirements.

V T C 2 5 0
V T C 2 5 0 D U O
V T C 3 1 5
V T C 3 1 5 D U O





VERTICAL SHAFT MACHINING

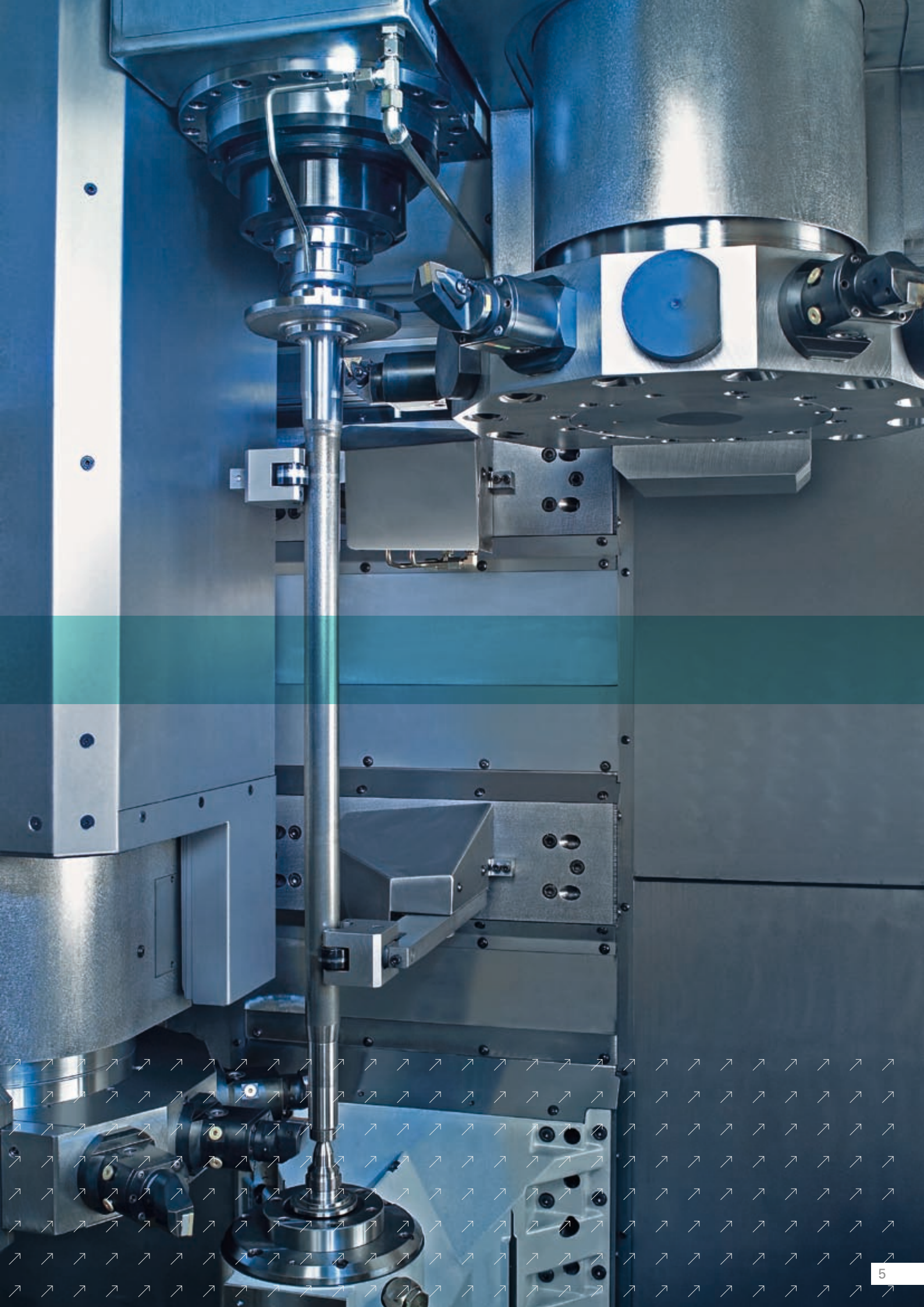
VTC – machining shafts to perfection.

The development of the VTC series of machines followed the same governing principle that led to the success of the EMAG chuckers. As with all EMAG turning and production centers, the cornerstone of the design is the sturdy machine base in MINERALIT®. The vibration damping properties of this polymer granite are eight times better than those of cast iron, making it the infinitely superior material, especially when it comes to the more demanding machining processes. Its excellent damping properties lead to a better surface finish and a much extended tool life.

The vertical construction guarantees unimpeded chip flow, making it hardly ever necessary to remove chips manually. This is of particular importance in soft-machining, as the process frequently produces great volumes of chips. Spindle motor, main spindle, turret and electrical cabinet are all fluid-cooled. With their great power, high spindle speeds and sturdy turrets the machines of the VTC series are highly productive turning centers for the machining in four axes. Tailstock and steadies are CNC-controlled. In addition to workpiece grippers, every turret can be equipped with stationary turning tools or driven drilling and milling tools.

V T C 2 5 0
V T C 2 5 0 D U O
V T C 3 1 5
V T C 3 1 5 D U O

The VTC 250 turns components of up to 180 mm diameter and 630 mm in length (optionally 1,000 mm). The maximum workpiece weight is 20 kg. The larger VTC 315 machines workpieces of up to 315 mm diameter and 700 mm length, weighing up to 40 kg.



Complete-machining shafts.

The VTC is available with a single spindle or in its DUO version. The latter combines the functions of two four-axis turning machines and offers different machining technologies on its two stations.
These machines are increasingly converted into multi-functional production centers that include, for instance, end-working operations such as cutting to length and centring, as preparation for the subsequent four-axis turning or as a down-stream process. And everything is carried out in a fully automated cycle on a single machine, of course.

Advantages of the VTC series:

- Four-axis machining reduces cycle times
- Cycle time-concurrent loading and unloading of the workpieces reduces idle times
- The compact design makes for a small footprint
- Lower capital outlay for automation and peripherals (raw-part and finished component storage sectors form an integral part of the machine)
- Less manual intervention (tailstock and steadies are CNC-controlled; the operator has direct access to the turrets)

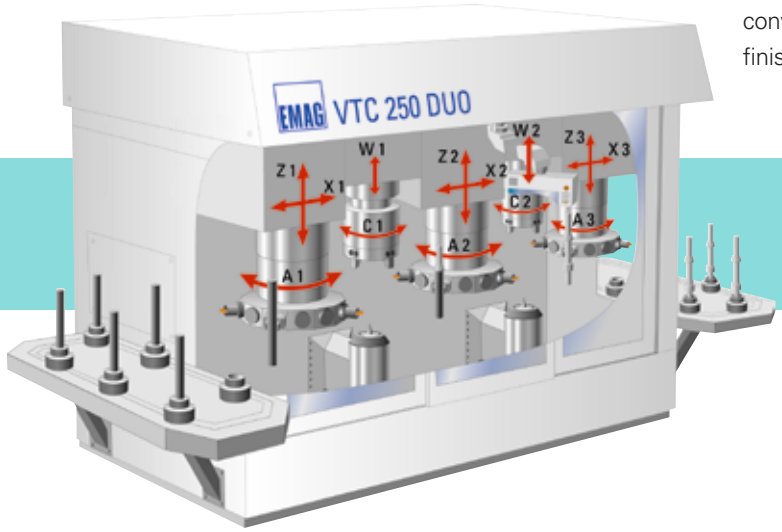
V T C 2 5 0
V T C 2 5 0 D U O
V T C 3 1 5
V T C 3 1 5 D U O

Shaft machining:
centring and end machining

Machining a steel piston:
plunge-cutting the grooves

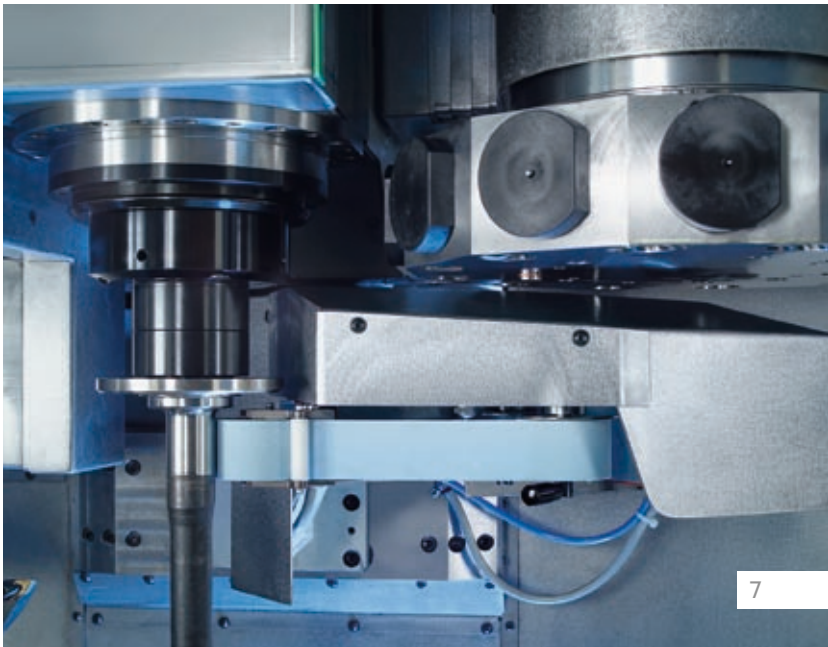
- Short set-up and resetting times
- Less capital outlay for sensory equipment thanks to direct driven machine axes and modern control technology
- A smaller number of set-ups and a better component quality through complete-machining

The cycle time-concurrent loading and unloading is accomplished by the turrets.
Example: automation on the VTC 250 DUO
The gripper in turret 1 collects the workpiece from raw-part storage and conveys it into the first clamping position.
The gripper in turret 2 removes – cycle time-concurrent – the machined component from the first clamping position and conveys it to the second one.
The gripper in turret 3 simultaneously removes the component from the second clamping position and conveys it to the storage sector for finish-machined components.



Component changeover: the finished component is removed and taken to its storage place; the new raw-part is loaded (sequence from right to left)

Rear wheel axle being super-finished



VTC production lines.

The VTC series of machines is ideally suited to handle complex manufacturing processes. Whether the job includes the high metal removal rates of turning and milling or a grinding process – the machines offer the possibility to integrate most metal cutting processes. This makes them perfect for the formation of complete production lines for soft- and hard-machining. Applications that include turning, milling, drilling, grinding and gear cutting operations have already been realised on this machine platform.

When production requirements change, the machines of the VTC series can easily be equipped with different technology modules to suit the new workpieces.

VTC 250
VTC 250 DUO
VTC 315
VTC 315 DUO

OP 10 + 20
Cutting to length, centring, turning
(VTC 250 DUO)

OP 30
milling the pin bearing
(VTC 250 F)

The following technologies are available:

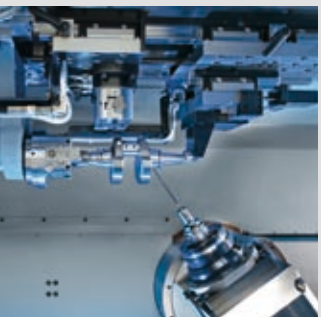
- Soft-turning
- Milling (side-and-face cutter)
- Drilling
- Gear hobbing
- Hard-turning
- Scroll-free turning
- Grinding / simultaneous grinding
- Out-of-round turning

This guarantees flexible use of the machine and provides access to a wide range of applications, as the technologies can also be used in a variety of combinations.

OP 40
oil hole drilling
(EMAG HSC 800)

OP 50
centric
turning
(VTC 250)

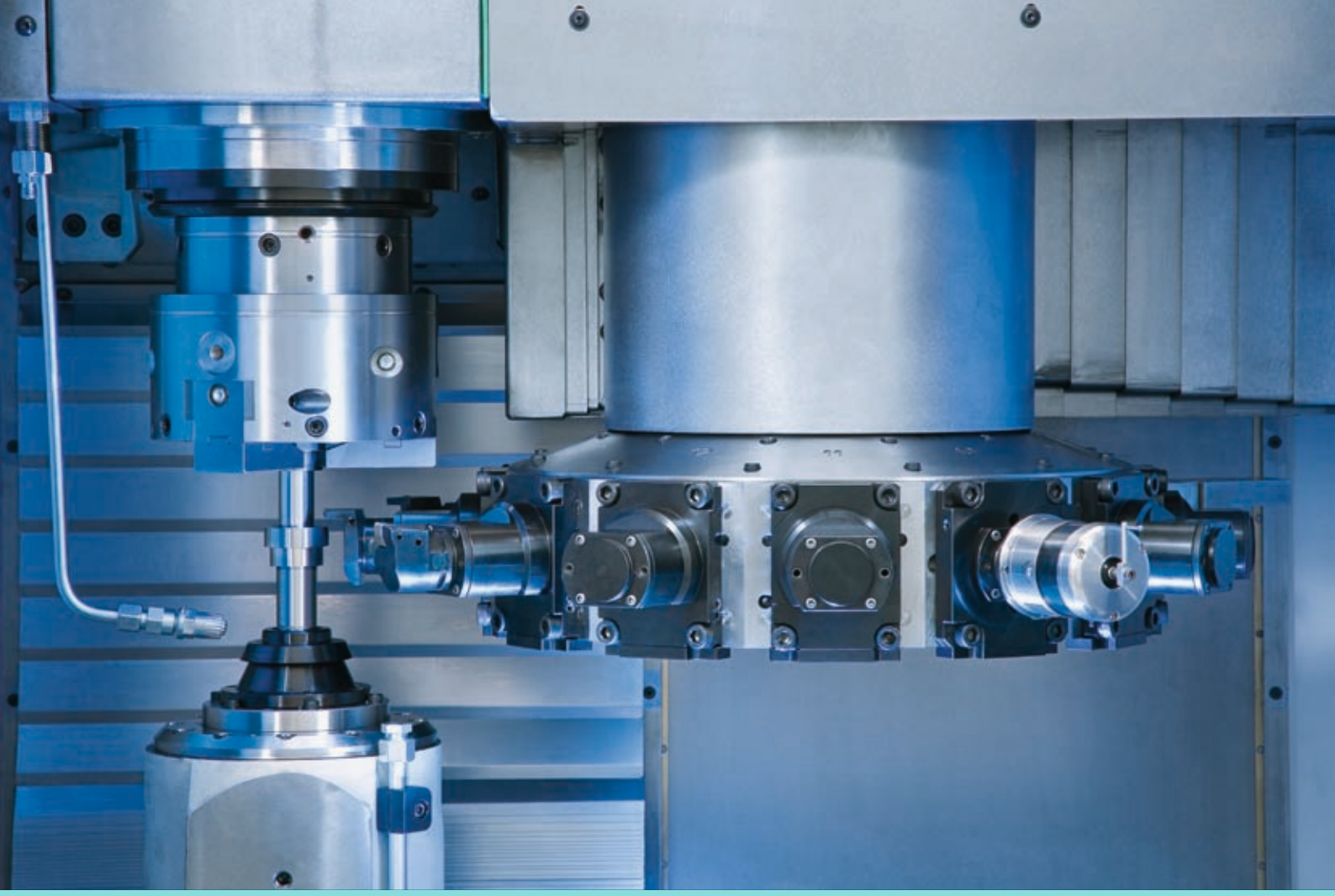
OP 60
eccentric
turning
(VTC 250)



VTC 250 L – Shaft by shaft …

The VTC 250 L is a lean-design vertical shaft machining center. The machine is specially designed to serve as a standalone or as part of a production line based on the chaku-chaku principle. As all VTC machines, the VTC 250 L also incorporates integral automation. That means the machine always does what it does best: PRODUCE – regardless of whether its operator is there or is taking a well deserved break or there is a shift change.

The vertical design of the machine also offers a footprint that is up to 50% less than that of a horizontal turning machine.



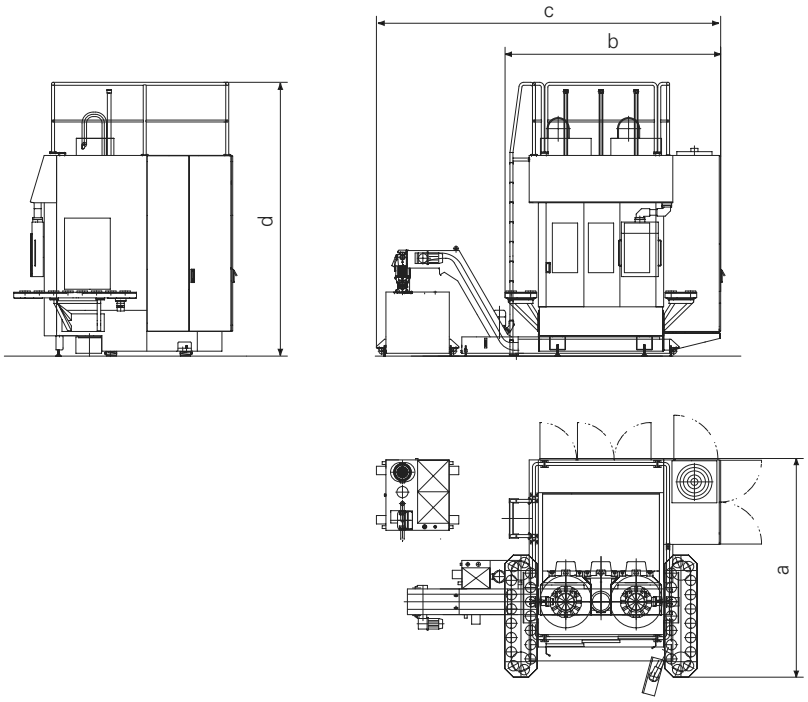
The advantages of the VTC 250 L:

- Used as standalone or part of a production cell based on the chaku-chaku principle
- Integrated workhandling: The EMAG turret reduces the cost of automation equipment and peripherals
- Raw-part and finished component storage areas form an integral part of the machine
- Tailstock and steadies are CNC-controlled, reducing setting and resetting times
- The vertical design of the machine ensures the unimpeded flow of chips and prevents the build-up of chip clusters
- The compact vertical design makes for a smaller footprint
- Great accessibility and operator friendliness ensure short setting and resetting times
- Direct-driven machine axes and modern control systems reduce the need for sensors

Technical data.

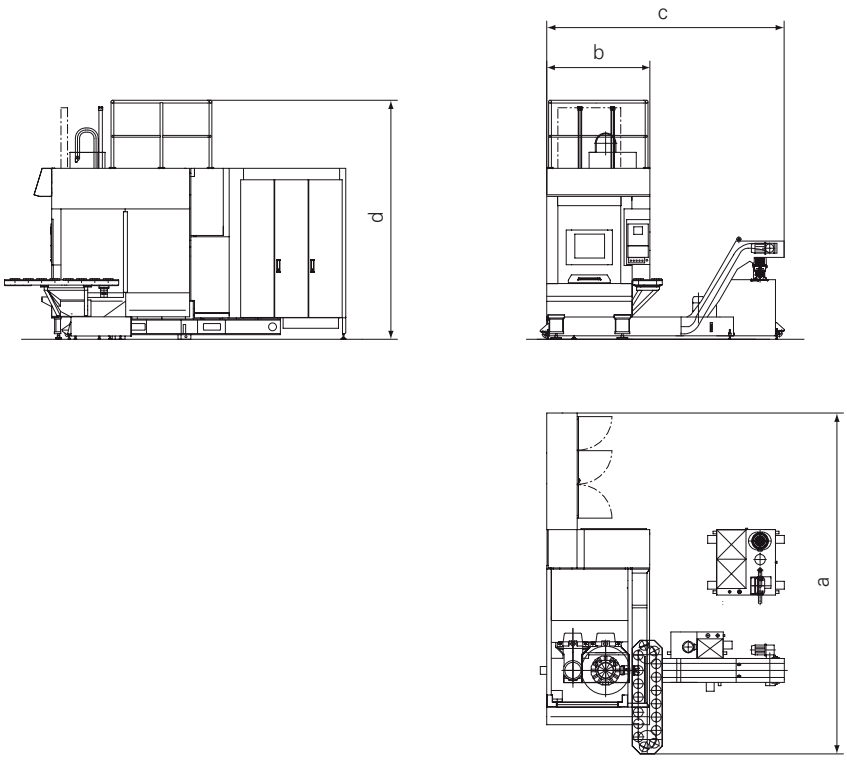
Floor plan VTC 250 / 315

Dimensions in mm



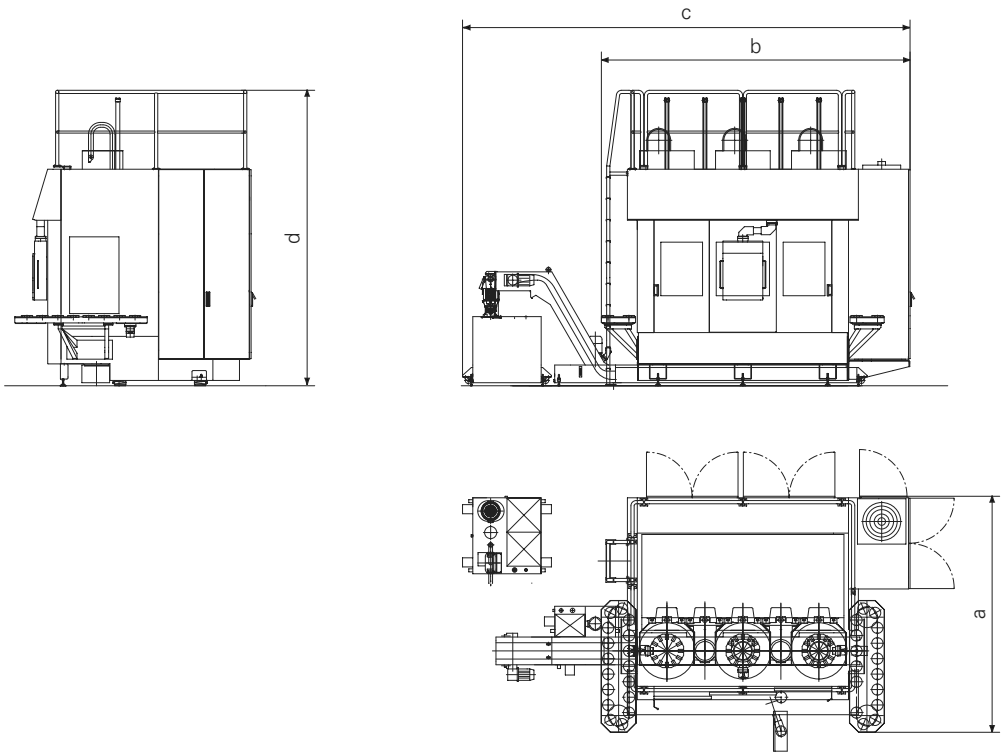
Floor plan VTC 250 L

Dimensions in mm



Floor plan VTC 250 DUO / 315 DUO

Dimensions in mm



Weights and measurements		VTC 250 (630 / 1000)	VTC 315	VTC 250 DUO (630 / 1000)	VTC 315 DUO	VTC 250 L
Length a	mm	3,100	3,100	3,100	3,100	5,200
Width b	mm	3,100	3,100	4,100	4,200	1,575
Width c	mm	4,900	4,900	5,900	6,000	3,600
Height d	mm	3,900 / 4,300	3,900	3,900 / 4,300	3,900	3,900
Weight	approx. kg	14,000 / 16,000	16,000	21,000 / 24,000	24,000	12,500

Subject to technical changes

Technical data.

Capacity			VTC 250	VTC 315	VTC 250 L
Chuck diameter		mm	250	315	250
Workpiece diameter, max.		mm	140	250	140
Travel in X/Z		mm	300 / 740	390 / 950	300 / 700
Workpiece					
Length, max.		mm	630 / 1,000*	700	630
Weight, max.		kg	20	40	20
Loading time, depending on workpiece and clamping mode		s	4 - 5	6 - 8	8
Chip-to-chip time depending on workpiece, clamping mode and machining cycle		s	6 - 7	8 - 10	10
Main spindle					
Main spindle		Qty	1	1	1
Spindle nose to DIN 55 026-A		Size	6	8	6
Spindle bearing, front		dia. in mm	110	140	110
Speed, max.		rpm	5,000	4,000	5,000
Main drive					
Power rating at 40 / 100 % duty cycle		kW	38 / 29	38 / 29	38 / 29
full power at spindle speed of		rpm	1,400	660	1,400
Torque at 40 / 100 % duty cycle		Nm	250 / 200	650 / 425	250 / 200
or					
Power rating at 40 / 100 % duty cycle		kW	48 / 38	48 / 38	–
full power at spindle speed of		rpm	1,200	600	–
Torque at 40 / 100 % duty cycle		Nm	380 / 300	800 / 500	–
Feed drives					
Rapid traverse speed	X / Z	m/min	30 / 40	30 / 40	30 / 40
Feed force	X / Z	kN	9,4 / 10	14 / 10	9,4 / 10
Ball screw	X / Z	dia. in mm	32 / 40	40 / 50	32 / 40
Tooling system					
EMAG disc-type turret		Qty	2	2	1
Tool receptors per turret for cylindrical shanks to DIN 69 880		Qty	11	11	11
Shank diameter		mm	40	50	40
Loading gripper / unloading gripper		Qty	1	1	1

Subject to technical changes

*special length 1,000 mm

Capacity			VTC 250 DUO	VTC 315 DUO
Chuck diameter		mm	250	315
Workpiece diameter, max.		mm	140	250
Travel in X/Z	X / Z	mm	300 / 740	390 / 950
Workpiece				
Length, max.		mm	630 / 1,000*	700
Weight, max.		kg	20	40
Loading time, depending on workpiece and clamping mode		s	4 - 5	6 - 8
Chip-to-chip time depending on workpiece, clamping mode and machining cycle		s	6 - 7	8 - 10
Main spindle				
Main spindle		Qty	2**	2**
Spindle nose to DIN 55 026-A		Size	6	8
Spindle bearing, front		dia. in mm	110	140
Speed, max.		rpm	5,000	4,000
Main drive				
Power rating at 40 / 100 % duty cycle		kW	38 / 29	38 / 29
full power at spindle speed of		rpm	1,400	660
Torque at 40 / 100 % duty cycle		Nm	250 / 200	650 / 425
or				
Power rating at 40 / 100 % duty cycle		kW	48 / 38	48 / 38
full power at spindle speed of		rpm	1,200	600
Torque at 40 / 100 % duty cycle		Nm	380 / 300	800 / 500
Feed drives				
Rapid traverse speed	X / Z	m/min	30 / 40	30 / 40
Feed force	X / Z	kN	9,4 / 10	14 / 10
Ball screw	X / Z	dia. in mm	32 / 40	40 / 50
Tooling system				
EMAG disc-type turret		Qty	2 - 3	2 - 3
Tool receptors per turret for cylindrical shanks to DIN 69 880		Qty	11	11
Shank diameter		mm	40	50
Loading gripper / unloading gripper		Qty	3	3

** 1 main spindle when end machining

At home in the world.

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Subject to technical changes.

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