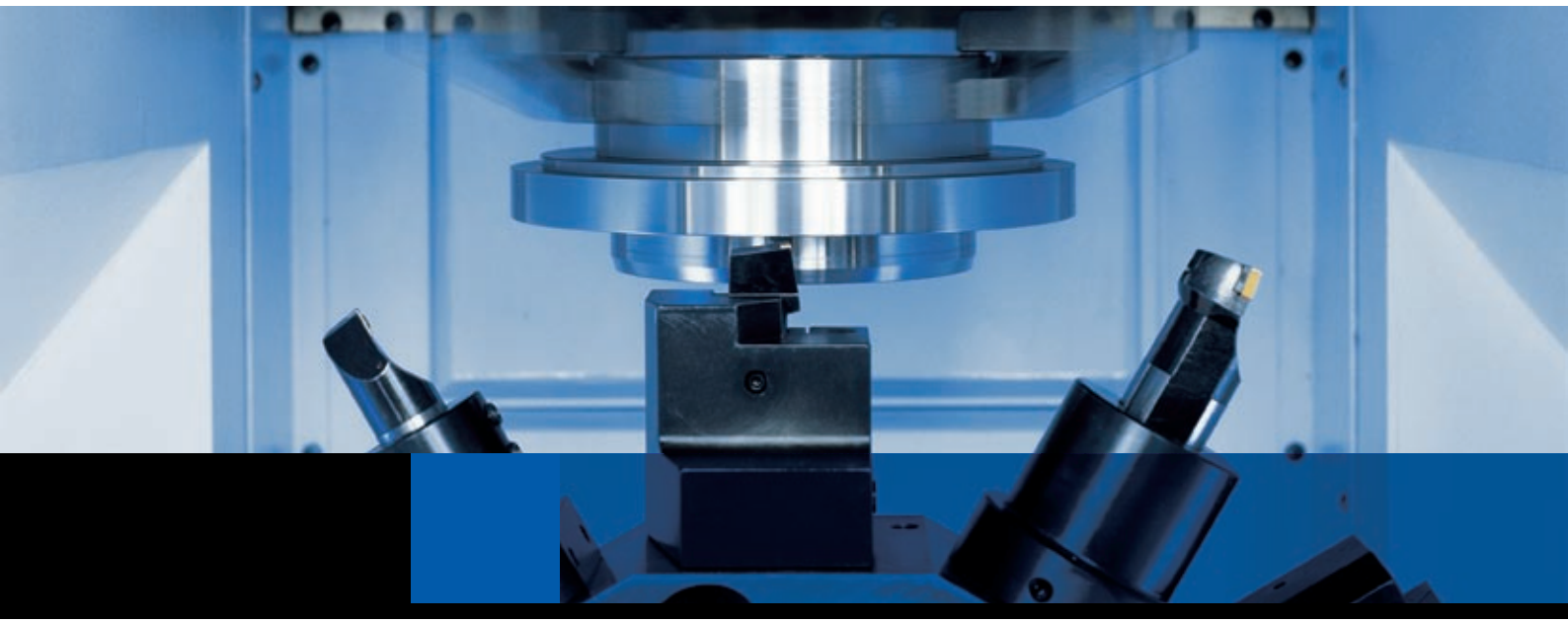
Vertical multi-functional production centers

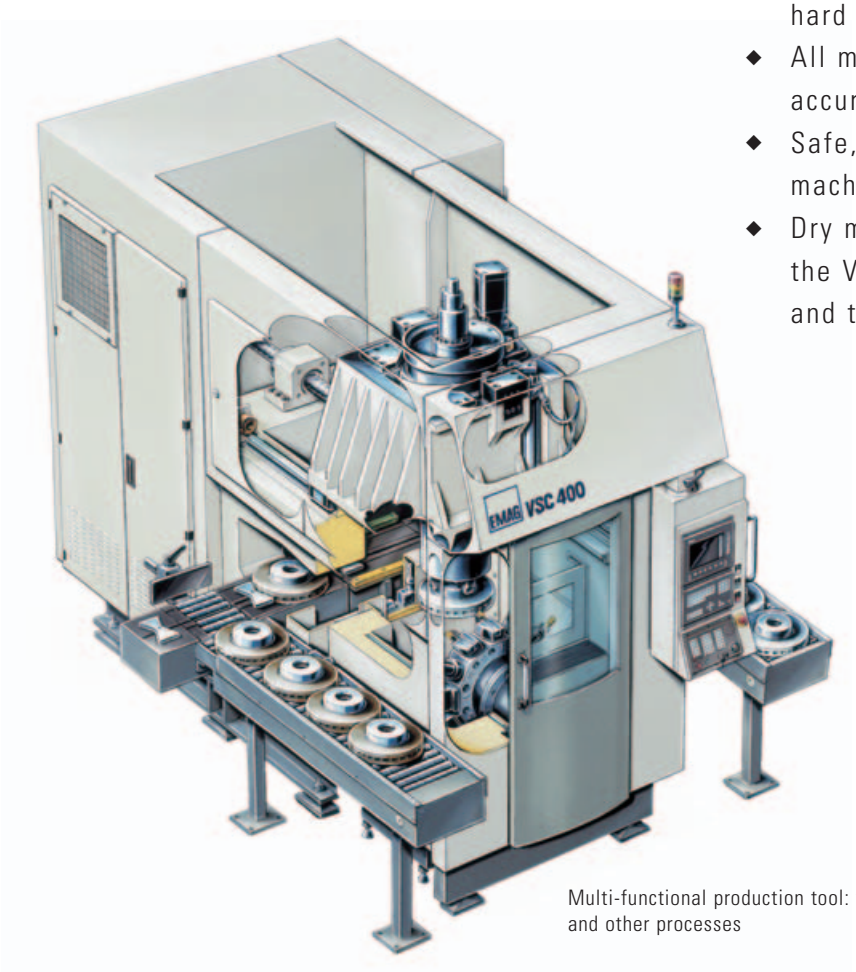
VSC 250/400/500



The machine of the decade – Tried and tested 6000 times

Some of the reasons for its success:

- Every VSC is a manufacturing cell, where the pick-up spindle ensures that the machine loads itself.
- Extremely short loading and unloading traverses result in correspondingly short loading and unloading times.
- Multi-functional production tool: turning, drilling, milling, grinding and other processes.
- The workpiece carries out all axis movements, while the tooling systems remain stationary.
- Ideal chip flow conditions, as the cutting tools are located below the workpiece.
- The hydrostatic guideway that supports the work spindle's Z-axis traverse movement offers excellent surface finish and extended tool life in soft and hard machining.
- All machine elements that influence its accuracy are fluid-cooled.
- Safe, maintenance free, no-wear machining area guarding.
- Dry machining presents no problem on the VSC, as the layout of work spindle and tools is ideal for the purpose.



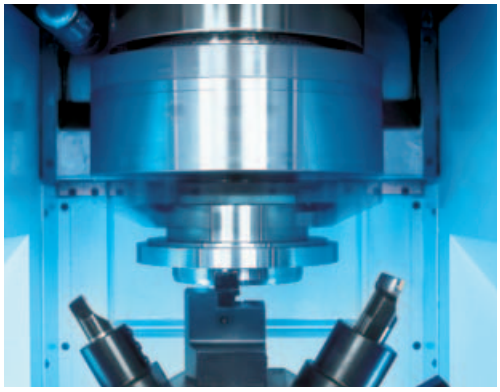
Multi-functional production tool: turning, drilling, milling, grinding and other processes

A SINGLE CONCEPT FOR WORKPIECES WITHIN A RANGE OF 20 TO 500 MM DIAMETER

All machine components are of sturdy and vibration resistant design

As the work spindle carrying the workpiece traverses in the main axes X, Y and Z - and not the tool - it is possible to use very sturdy tooling systems that can be optimised to suit the relevant machining requirements.

The tooling systems form an integral part of the machine base. This offers high static and dynamic rigidity.

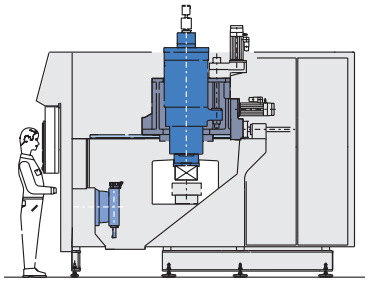


The VSC concept: exceptionally sturdy machine components, high chip capacity, unimpeded chip flow

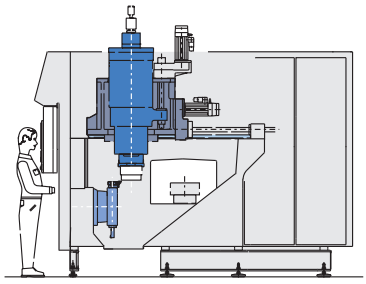
Ideal chip flow conditions

The overhead inverted work spindle, with the workpiece positioned over the cutting tools, offers ideal chip flow conditions.

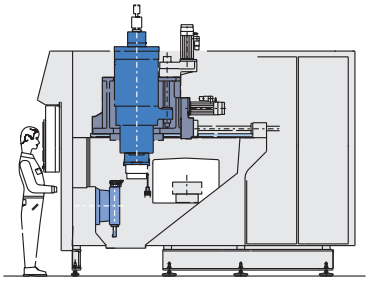
Three main functions carried out on a minimum footprint



Pick-up position:
automatic loading and unloading of workpiece



Machining position:
turning, drilling, milling, grinding, ...



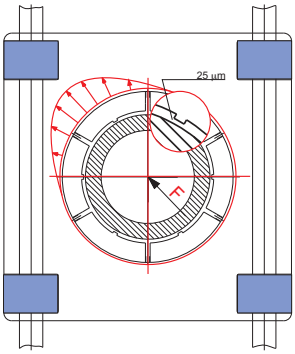
Gauging position:
The workpiece is measured and the necessary offsets executed

SYMMETRICAL FORCE DISTRIBUTION AND HYDROSTATICS – FOR THE BENEFIT OF WORKPIECE QUALITY

The aim is workpiece quality

The overhead slide unit that carries out the X-axis traverse movements – also that of the Y-axis on the 3D version – carries the quill with the integral work spindle.

The Z-axis quill unit traverses in play free oil filled pockets of the frictionless, no-wear hydrostatic guideway. The thin oil

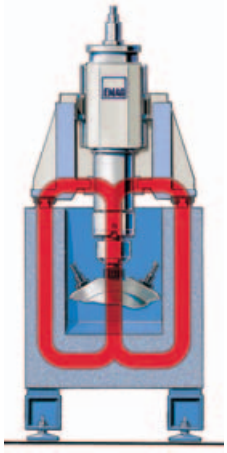


Hydro-static guideway system

film provides the best possible damping effect, a condition for outstanding surface finish and extended tool life, even during interrupted cuts.

Absolute position feedback systems ensure constantly maintained accuracy and save the need for machine referencing.

The basis of the VSC series, from the smallest to the largest machine, is a very sturdy machine base of high-quality polymer cast granite MINERALIT®.

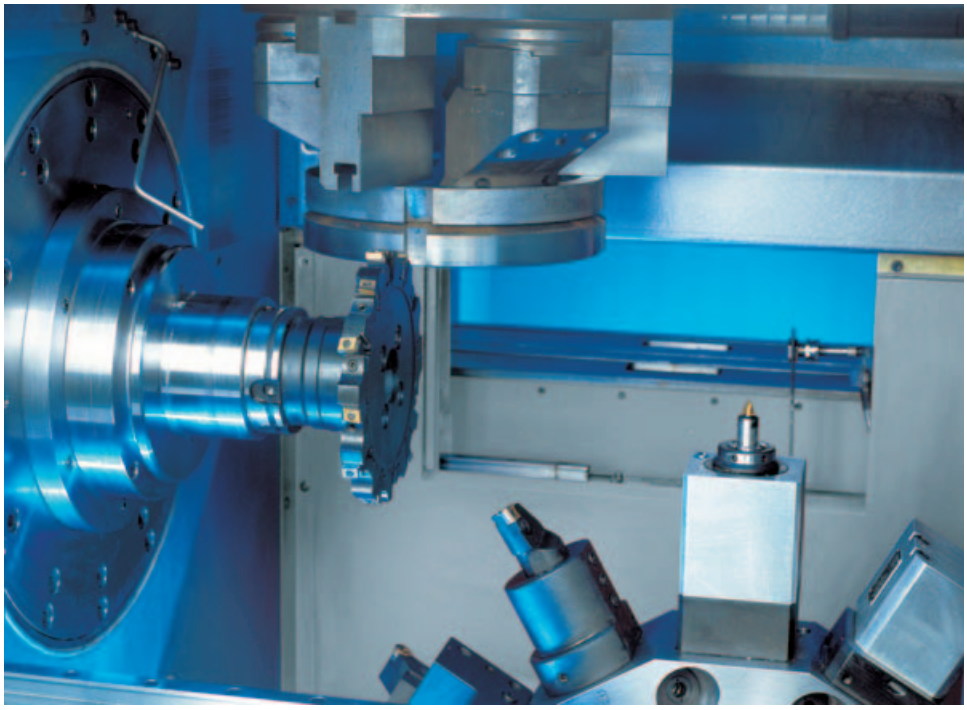


The closed-loop design with its extremely sturdy U-shaped machine base are preconditions for a short, symmetrical, closed-loop distribution of forces and, consequently, for high static and dynamic rigidity.

EMAG's chosen design and the superior vibration damping properties of the polymer granite machine base – so much better than that of conventional materials – result in excellent surface finish and longer tool life.

VSC 400 machine base with overhead spindle slide unit – the basis for high performance and workpiece quality

NOTHING IS TOO MUCH FOR US WHEN IT COMES TO WORKPIECE QUALITY

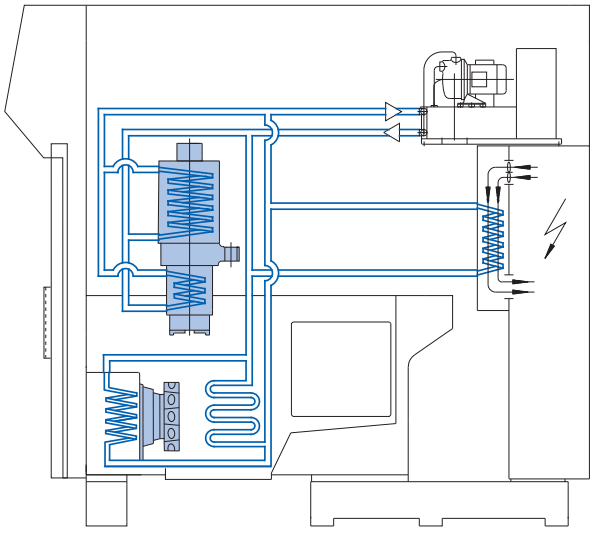


Even where such difficult jobs are concerned, the VSC for multi-functional use can be relied on to serve the user faithfully: soft and hard machining, interrupted cuts, turning, drilling and robust milling

Constant temperature: a precondition for constant quality

The spindle motor, the work spindle and quill, the turret, the electrical cabinet and the machine base are all fluid-cooled.

A twin-circuit cooling system keeps the machine temperature within tight limits of the ambient temperature.



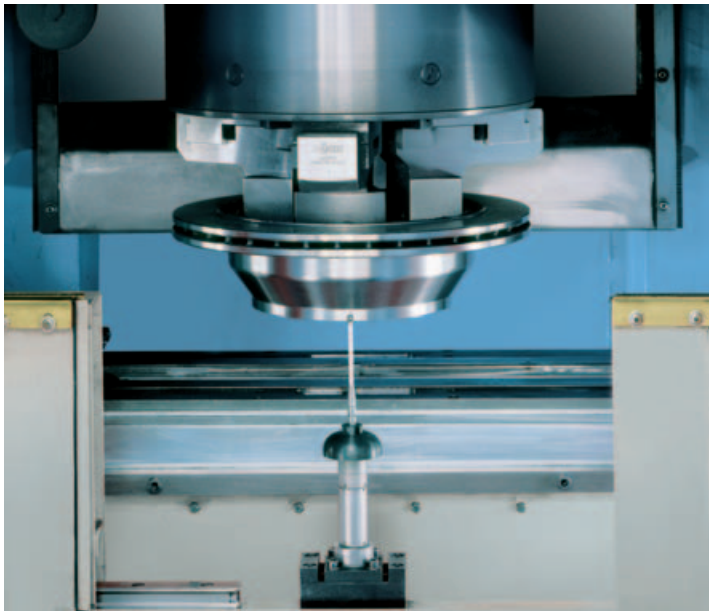
All machine elements that influence its accuracy are connected to the fluid cooling system

Exemplary production integrity

Fast, precise workpiece gauging, achieved without detours

Gauging is an integral part of the VSC design principle.

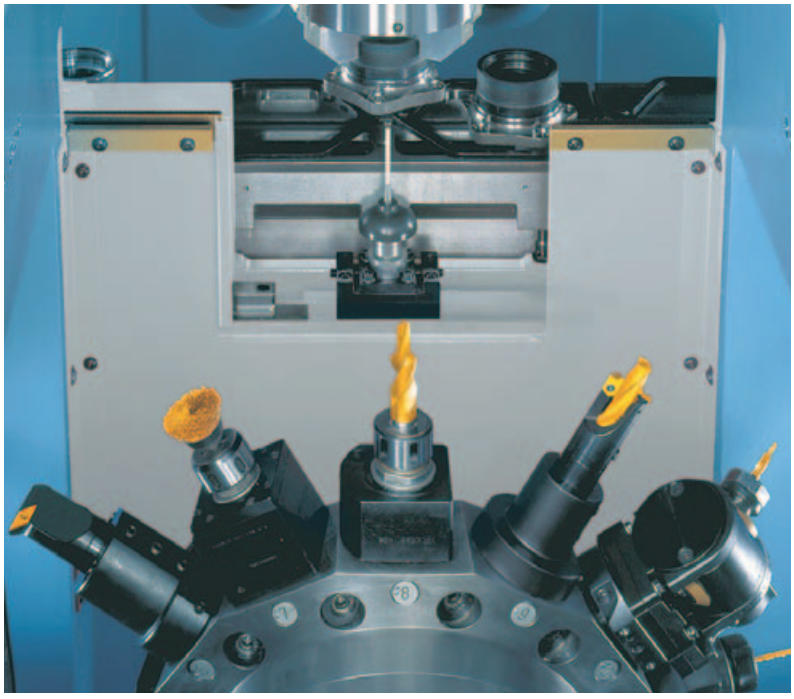
On its way from the machining to the unloading position the workpiece is conveyed to the static measuring probe or plug gauge outside the machining area, whereby the gauging results are not adversely affected by chip or dirt particles.



The workpiece is gauged by measuring probe.
(Door between probe and machining area open)

Gauging takes place with the part still in the machining set-up. High-precision components are conveyed back into the machining area after gauging, where they – and all following workpieces – are machined to size, taking account of any possible tool compensation.

Measuring a bore with a plug gauge
(Door between plug gauge and machining area open)



EMAG disk-type turret

EMAG disc-type turret

The EMAG disc-type turret is fluid-cooled, thus increasing process integrity.

It is a very sturdy, rapid-indexing tooling system. Every turret station accepts stationary turning tools or live drilling and milling tools with shank diameters of 40 or 50 mm, depending on machine size.

Outstandingly safe and maintenance friendly

The large front window offers complete safety, with a clear view of the machining area and the overhead slide unit.

For visual checks and cleaning, service and maintenance work all supply systems (hydraulics, fluid cooling system, cutting oil supply circuits, central lubrication system) are in clear view and easy to access.

On removal of the side panels the overhead slide unit and its integral components can also be easily accessed.

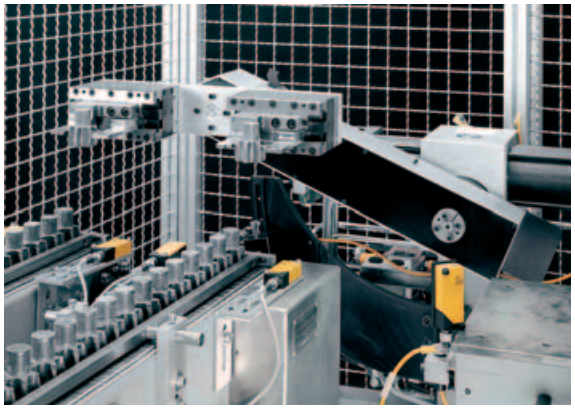
For automation too:

The workpiece reaches the correct clamping position safely and with speed

The design of the VSC series allows for fast, space saving, technically simple (therefore safe and cost-effective) workpiece changeover and transport.

Whether large workpieces are to be transported, like this gear on a VSC 500, or two small ones simultaneously, as on a VSC 160 TWIN; whether two machines are linked up to form a small manufacturing system, or a number of machines to create a complete production line: the VSC concept offers the right solution.

The workpieces are conveyed to the pick-up station and clamped by the spindle chuck



The twin-gripper collects a workpiece from each of the two roller conveyors and deposits them on the shuttle conveyor

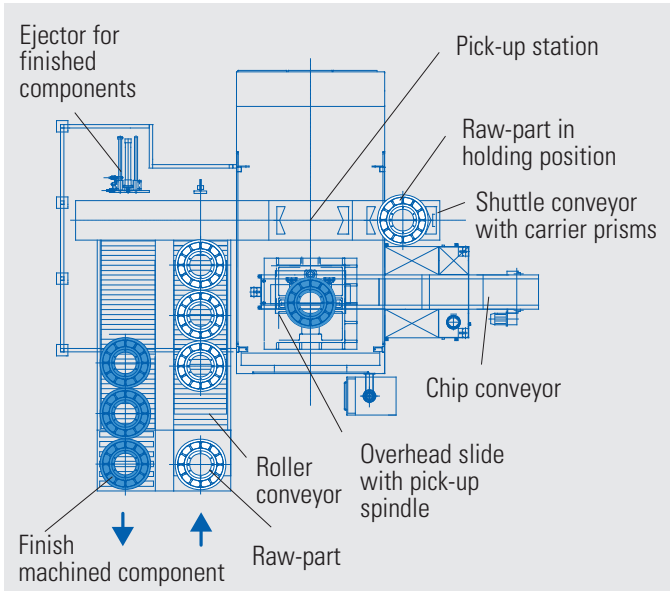
Multi-functional VSC production centers are frequently integrated into production lines, which then complete machine certain workpieces in the most sophisticated way. The picture shows 8 interlinked machines for the production of brake discs.

Twin-track load/unload for rapid workpiece changeover

THE BEST SOLUTION FROM A MODULAR SYSTEM

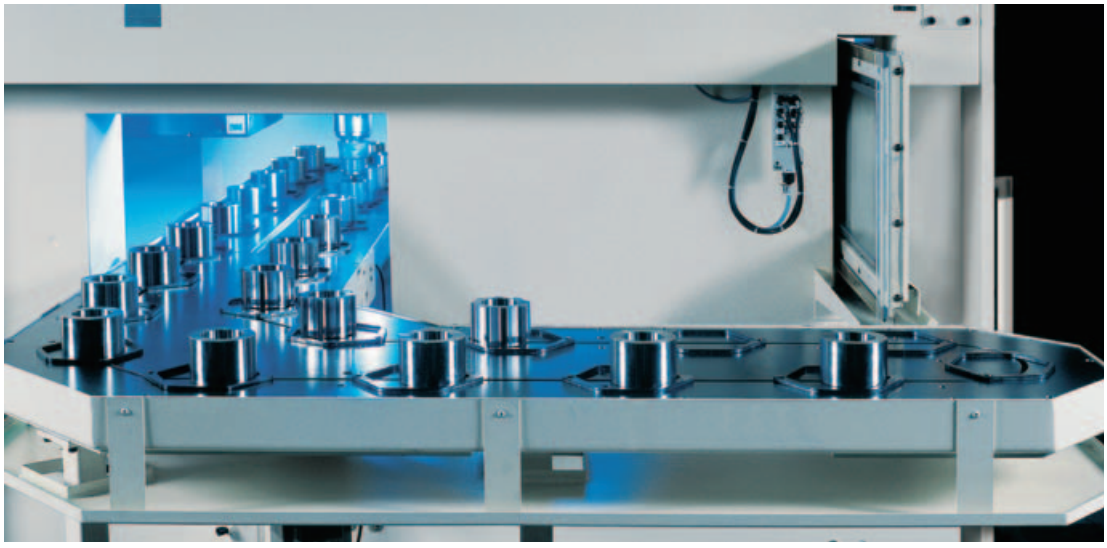
Flexible workpiece handling reduces footprint and costs

Whether the workpiece is loaded/unloaded from the left or the right the workpiece flow, and therefore the position of the machines in the production line, can be freely chosen. Advantage:
Both floor space requirements and costs for interlinking are reduced considerably.



There is no simpler way to automate the flow of large, heavy components.

The VSC series is not only used to machine disc-type workpieces



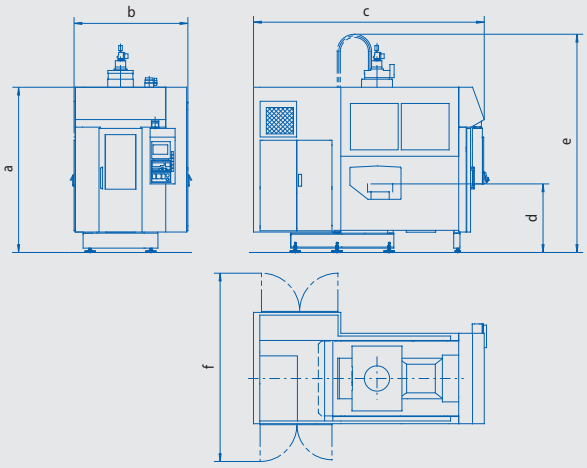
L-automation for stand-alone machines: The workpieces are conveyed to the pick-up station and the finish machined components removed

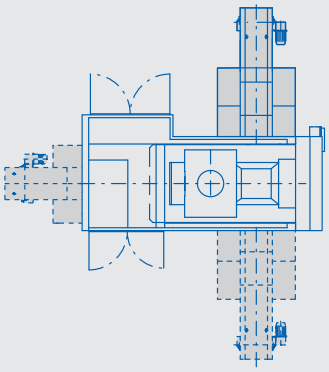
Technical data

		VSC 250	VSC 400	VSC 500
Capacity				
Chuck diameter	mm	200 / 250	315 / 400	400 / 500
Swing diameter	mm	260	420	520
Nominal workpiece diameter	mm	200	340	440
Traverse in X/Z	mm	850 / 200	850 / 315	1000 / 400
Traverse in X/Y/Z (VSC DD)	mm	850 / 315 / 200	850 / 315 / 315	
Loading time				
dependent on workpiece and chucking mode	s	2 - 4	4 - 6	5 - 7
Chip-to-chip time (to VDI 2852, page 2)				
dependent on workpiece, chucking mode and machining process	s	5 - 7	8 - 10	10 - 12
Work spindles				
Spindle nose to DIN 55 026	Size	6	11	11
Front spindle bearing	mm dia.	100	140	160
Max. spindle speed	rpm	6000	4000	3400
Main drive				
Max. power rating	kW	39	58	71
Full power at spindle speed of	rpm	800	900	900
Max. torque	Nm	460	620	750
Feed drive				
Rapid traverse speed in X/Z	m/min	45 / 30	45 / 30	45 / 30
Rapid traverse speed in X/Y/Z (VSC DD)	m/min	45 / 30 / 30	45 / 30 / 30	
Feed force in X/Z	kN	5,5 / 11	11	11
Ball screw in X/Z	mm dia.	40	50 / 40	50
Tooling systems				
EMAG disc-type turret				
Tool registers	Qty	12	12	12
for cylindrical shanks to DIN 69 880				
of which for live tools	Qty	12	12	12
Shank diameter	mm	40	50	50
Other tooling systems			dependent on application	
Weight				
VSC	approx. kg	7800	9900	13500
VSC DD	approx. kg	12500	12500	

Subject to change without prior notice

VSC 250/400/500





Chip conveyor locations

Floor plan
Dimensions in mm

	VSC250	VSC250 DD	VSC400	VSC400 DD	VSC500
a	2450	2650	2650	2650	3200
b	1700	2000	1825	2000	1960
c	3200	3990	3700	3990	4050
d	1020	1100	1100	1100	1100
e	approx. 3000	approx. 3300	approx. 3300	approx. 3300	approx. 3800
f	approx. 2900	approx. 3300	approx. 3100	approx. 3300	approx. 3250

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