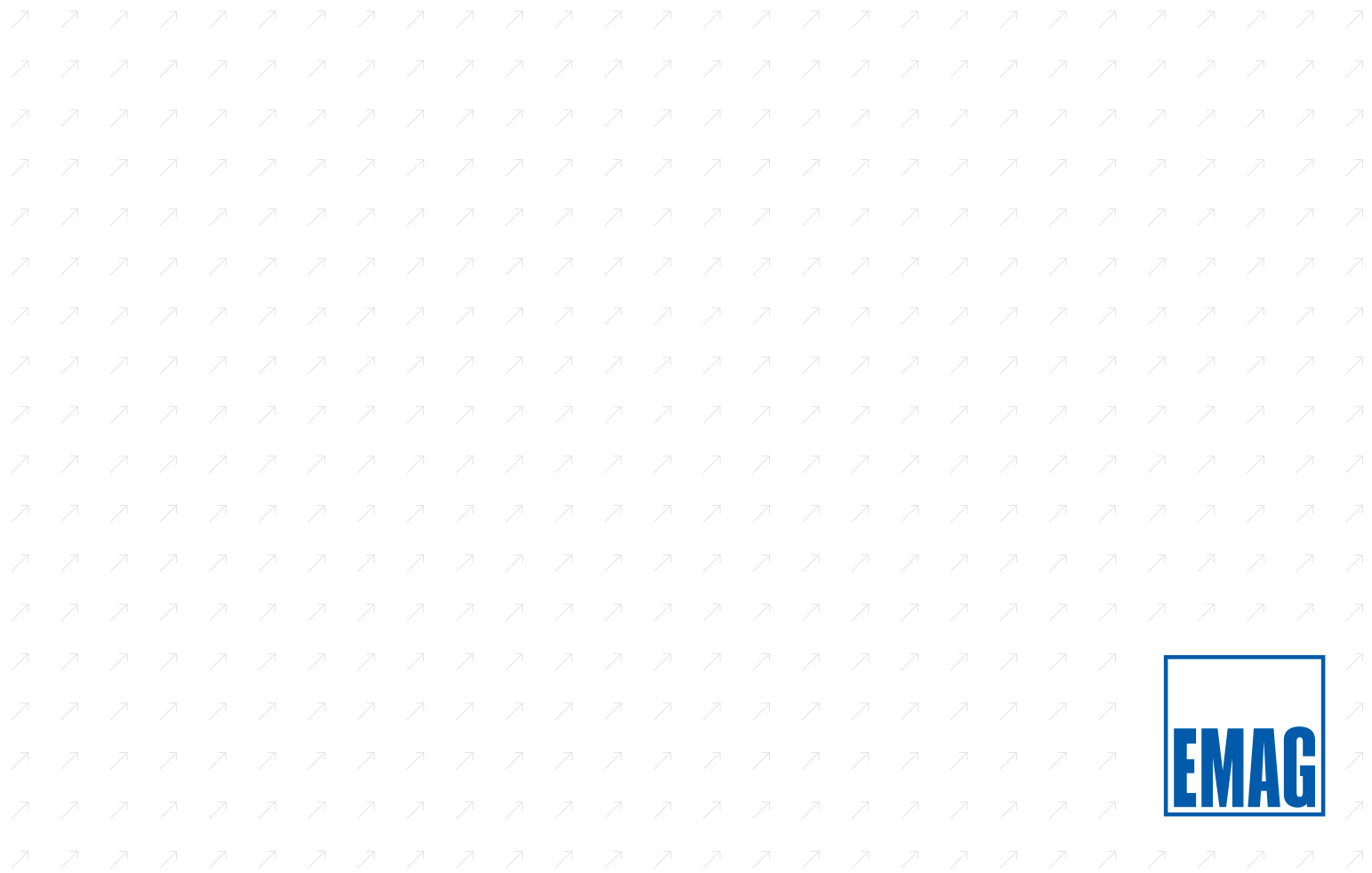
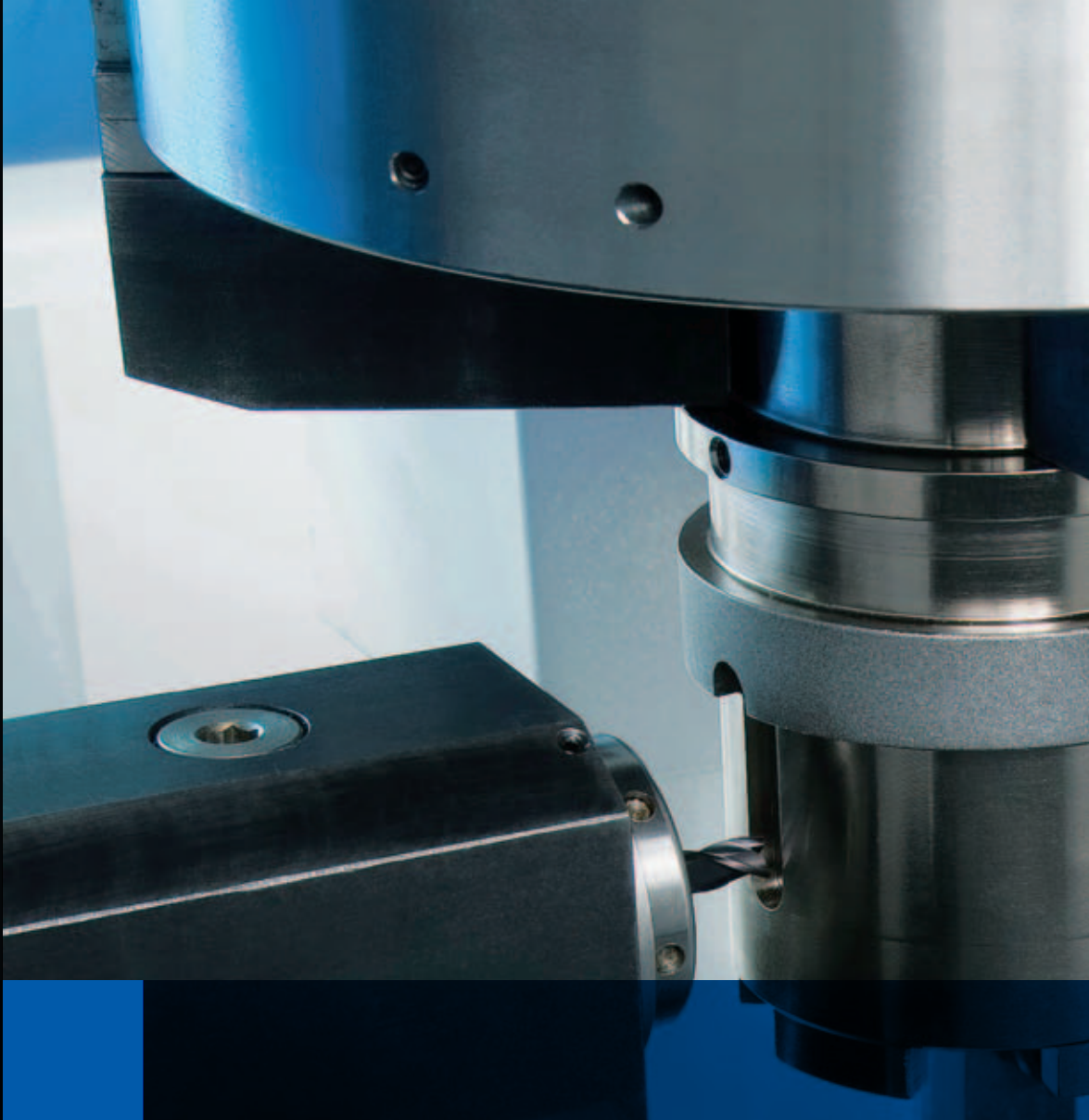


Vertical Multifunctional Production Machines VLC 250



The VLC 250 has been designed for the application of different manufacturing technologies. A high degree of flexibility and powerful technology modules ensure that the manufacture different workpieces remains cost effective. Whether the high chip removal volumes of turning and milling work are required or gentle grinding operations, the VLC 250 allows the application of almost any machining technology.



V L C 2 5 0





VERTICAL MULTIFUNCTIONAL PRODUCTION MACHINES



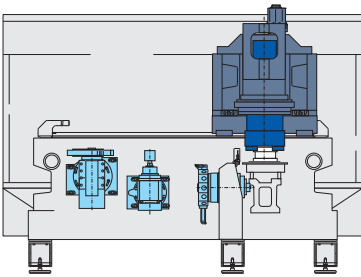
VLC 250 – universal application and great flexibility.

From simple to highly complex – the VLC 250 covers all possibilities in the universal machining of workpieces.

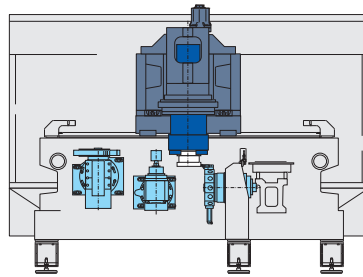
As with all vertical EMAG machines, automation is an integral part of the system. In the VLC 250 a circulating conveyor belt transports the workpieces to the pick-up position where they are clamped in the spindle chuck, guaranteeing fast and reliable workpiece exchanges.

Depending on the machining requirement, the VLC 250 can be equipped with turning, milling, drilling, grinding or multi-technology modules – the latter complete with tool changer. Decisions for technology is made based on the customers needs. The final choice will always represent the best technology for the machining of the workpiece involved.

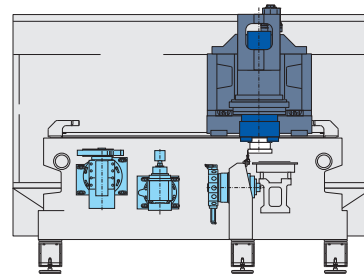
V L C 2 5 0



Pick-up position:
workpiece automatically picked up
and put down



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



Measuring position:
workpiece being measured



The advantages offered by the VLC 250

- Multi-functional production system: turning, drilling, milling, grinding, ...
- Operator comfort and accessibility
- Complete-machining in a single setup, therefore, eliminating clamping errors
- Vibration damping effect on EMAG machine bases in MINERALIT® polymer concrete
- High degree of process integrity due to integrated component measuring
- Standardized automation modules for increased flexibility
- Ideal chip flow conditions – chips fall unhindered to the bottom
- The compact design provides for a small footprint



VLC 250 DS – combination turning & grinding.

The VLC 250 DS has been designed for the process-capable, low-cost, precision manufacture of medium and large component batches. Typical workpieces are gearwheels, sprockets, sliding sleeves, components for CVTs, link pins, con-rods, rocker arms, bearing rings and piston rings.

The machining process is chosen based on the workpiece and its quality requirements. The advantage for the customer is the flexibility of the machine. The machining process is chosen based on the requirements for the workpiece: hard turning, scroll-free turning or grinding – all on one machine.

The VLC 250 DS combines the advantages of vertical hard turning and grinding – on one machine and in one setup. This combination leads to considerable process chain consolidation, demands less investment, lowers unit production costs, makes for shorter throughput times, higher component quality, greater process integrity and a smaller footprint, and reduces the maintenance requirement.

V L C 2 5 0





The advantages of the VLC 250 DS

- Vertical hard turning and finish-grinding in one setup on one machine
- Any workpiece feature which allows for hard turning due to process reliability precedes features which require grinding
- Improved component quality and higher output rates because the workpiece is machined in a single setup
- The grinding process removes a small amount of material, which means that there is not much wear to the grinding wheel and it does not have to be dressed very often. This leads to considerable cycle time advantages
- The grinding wheel specification can be chosen based on the desired finish-machining quality of the component, because only a small amount has to be ground away
- The grinding operation can produce scroll-free surfaces
- The grinding wheel makes rear end faces hard to reach. This can easily be solved with hard turning
- The VLC 250 DS can also be used as a grinder (internal and external grinding with corundum and CBN). To suit prevailing machining requirements the machining area can, dependent on the project, be complemented by external and internal grinding spindles

VLC 250 WF – turning, gear hobbing & deburring.

The VLC 250 WF is designed for the manufacture of wheel-shaped workpieces with a diameter of up to 220 mm and gear module 4. The VLC 250 WF offers the user the most flexibility, because it can be used as a single-spindle turning machine, a gear hobbing machine or a combination of both. In other words, the user gets two machines, which can change with component demands.

If an additional operation becomes necessary– such as roller burring, for instance – this can be integrated in a separate machining station.

The main application, however, is the precision machining of gear profiles on medium and large batches of components.

V L C 2 5 0





The advantages offered by the VLC 250 WF

- The second side of the component can be turned and the gear profile hobbled in a single setup
- Auxiliary operations, such as deburring of the gears with a turning or a roller deburring tool, are easy to integrate
- Automation concepts are available with directed component flow – such as the EMAG InLine System – as well as standard circulating component conveyors
- Compared to the traditional solution of a combined turning & gear hobbing machine the VLC 250 WF offers a great price-performance ratio



VLC 250 – individual configuration of the automation equipment.

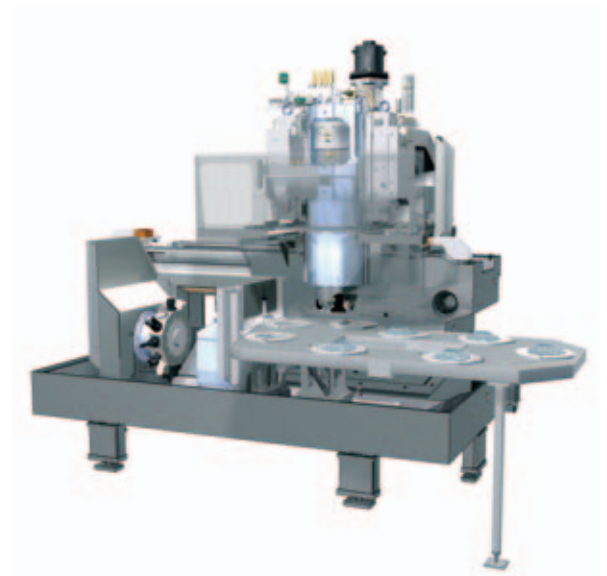
The VLC 250 can be automated in different ways, with the equipment content configured according to customer requirements and designed to keep travel and idle times as short as possible. The EMAG ILS (InLine System) allows for the machines to be positioned close to each other, forming a straight line. Maintenance and service doors located at the back of the machine were designed so the individual machines can be easily accessed.

This arrangement is great for a batch production, because it allows “in-line” component flow between two or three machines. The interface points between machines can then be utilized with the insertion of optional component buffers or docking stations. This is how ILS makes it possible to create the manufacturing system with the smallest footprint.

V L C 2 5 0



Twin-track automation



Recirculating automation

Manufacturing system for precision gears.

The VLC production line is designed for the mass production of wheel-shaped workpieces, featuring gearings, and covers the complete process chain for workpieces of up to 200 mm in diameter and gear module 4.



Line speed – 42 seconds
Gear for a manual gearbox in passenger cars



Line speed – 24 seconds
Gears for speed reducers

The EMAG turret.

The fast acting 12-station disc turret is distinguished by its very short indexing times. All 12 stations can be equipped with driven drilling and milling tools. The EMAG turret's gearbox combines high speed with high performance and minimal space requirement.

- Very high speed
 - Very fast indexing time of 0.3 s
 - High speeds for driven tools: max 6,000 rpm
- Very high capacity
 - Small size, with a high torque rate: 12 stations, 360 mm dia., torque rate max. 40 Nm
- High precision
 - High degree of rigidity
 - Highest degree of repeat accuracy when indexing from tool position to tool position
- Maximum availability
 - Inured to collisions, due to the use of torque motors
 - The turret does not lift up during indexing, which prevents the dirt and chips from entering

V L C 2 5 0

Essential machine quality management.

Measuring is also an important part of the VLC 250. As the workpiece makes its way from machining to the unloading position, the workpiece is measured by a probe located outside the machining area. This ensures the results are not affected by the presence of dirt particles or chips. Furthermore, all measurements are taken with the component remaining in the chuck.



Complete operator comfort.

The design engineers of the VLC 250 focused on the importance of operator comfort and ease of access. Large doors ensure the operator has easy access to the machining area. This allows for tools, chuck and chuck jaws to be changed quickly and easily. Another improvement is the new EMAG operator console. Totally independent of the control system, the user interface remains unchanged. This simplifies the setting of the EMAG machines and reduces training needs.



Energy efficiency is standard at EMAG.

Energy efficiency is very important and received special attention during the development of the VLC 250. Many different steps were taken to achieve noticeable savings, such as:

- Through-hole technology for drives
- A reduction in air seals
- Frequency-controlled auxiliary drives
- Optimization of the cooling system
- Accumulator charging system for the hydraulics

This has allowed EMAG to achieve a total energy saving of up to 20% for the VLC 250.



Energy-saving through-hole principle: On the VLC 250 EMAG pushes amplifiers through the back of the electrical cabinet and cools them with a fan pointing into the machine shop. This avoids using an air conditioning unit.

Technical Data.

Capacity		VLC 250	VLC 250 DS	VLC 250 WF
Chuck diameter, max.	mm	250 / 315	250 / 315	250
	in	9.8 / 12.4	9.8 / 12.4	9.8
Swing diameter	mm	350	350	350
	in	13.8	13.8	13.8
Workpiece diameter max.	mm	250	220	250
	in	9.8	8.7	9.8
Travel in X, max.	mm	1,400 / 1,600	1,400 / 1,600	1,600
	in	55.1 / 63.0	55.1 / 63.0	63.0
Travel in X ₂ , max.	mm	–	–	–
	in	–	–	–
Travel in Y	mm	± 100*	± 100	± 100*
	in	± 3.9*	± 3.9*	± 3.9*
Travel in Z	mm	300	300	300
	in	11.8	11.8	11.8
Loading time				
Depending on workpiece	s	4 – 6	4 – 6	4 – 6
Main spindle				
Qty		1	1	1
Spindle flange to DIN 55 026	Size	6	6	6
	Spindle bearing, front	dia. in mm	110	110
		dia. in inch	4.3	4.3
Speed, max.	rpm	5,500	3,000	3,000
Main drive				
Asynchronous motor				
Power rating, 40% / 100% duty cycle	kW	38 / 28	38 / 28	38 / 28
	hp	51 / 38	51 / 38	51 / 38
Torque, 40% / 100% duty cycle	Nm	460 / 330	460 / 330	460 / 330
	ft-lb	339 / 243	339 / 243	339 / 243
Full power at speed of	rpm	800	800	800
Feed drive				
Rapid traverse speed X	m/min	60	60	60
	ipm	2,362	2,362	2,362
Rapid traverse speed in X ₂	m/min	–	–	–
	ipm	–	–	–
Rapid traverse speed in Y (optional)	m/min	30	30	30
	ipm	1,181	1,181	1,181
Rapid traverse speed Z	m/min	30	30	30
	ipm	1,181	1,181	1,181
Feed force X / Y / Z	kN	10 / 10 / 10	10 / 10 / 10	10 / 10 / 10
	lbf	2,248 / 2,248 / 2,248	2,248 / 2,248 / 2,248	2,248 / 2,248 / 2,248
Feed force in X ₂	kN	–	–	–
	lbf	–	–	–
Ball screw X / Y / Z	dia. in mm	40 / 40 / 40	40 / 40 / 40	40 / 40 / 40
	dia. in inch	1.6 / 1.6 / 1.6	1.6 / 1.6 / 1.6	1.6 / 1.6 / 1.6
Ball screw in X ₂	dia. in mm	–	–	–
	dia. in inch	–	–	–

*optional

Disc-type turret		VLC 250	VLC 250 DS	VLC 250 WF
Qty		1 – 2	1	1
Tool receptors for cylindrical shanks to DIN 69 880	Qty	12	12	12
Shank diameter	mm	40	40	40
	in	1.6	1.6	1.6
Driven tools:				
Power rating, max.	kW	8.5	8.5	8.5
	hp	11	11	11
Speed, max.	rpm	6,000	6,000	6,000
Torque, max.	Nm	40	40	40
	ft-lb	30	30	30
Full power at speed of	rpm	3,000	3,000	3,000
Turret indexing time	s	0.3	0.3	0.3
Grinding unit				
Motorized grinding spindle for internal diameters	Qty	–	1 – 2	–
	Speed, max.	rpm	18,000 – 90,000	–
External grinding spindle	Qty	–	1	–
	Speed, max.	rpm	7,200	–
Grinding wheel diameter, max.	mm	–	400	–
	in	–	15.8	–
Gear hobbing unit				
Power rating, 40% / 100% duty cycle	kW	–	–	28 / 21
	hp	–	–	38 / 28
Torque, 40% / 100% duty cycle	Nm	–	–	152 / 114
	ft-lb	–	–	112 / 84
Standard module, max.	mm	–	–	4
	in	–	–	0.2

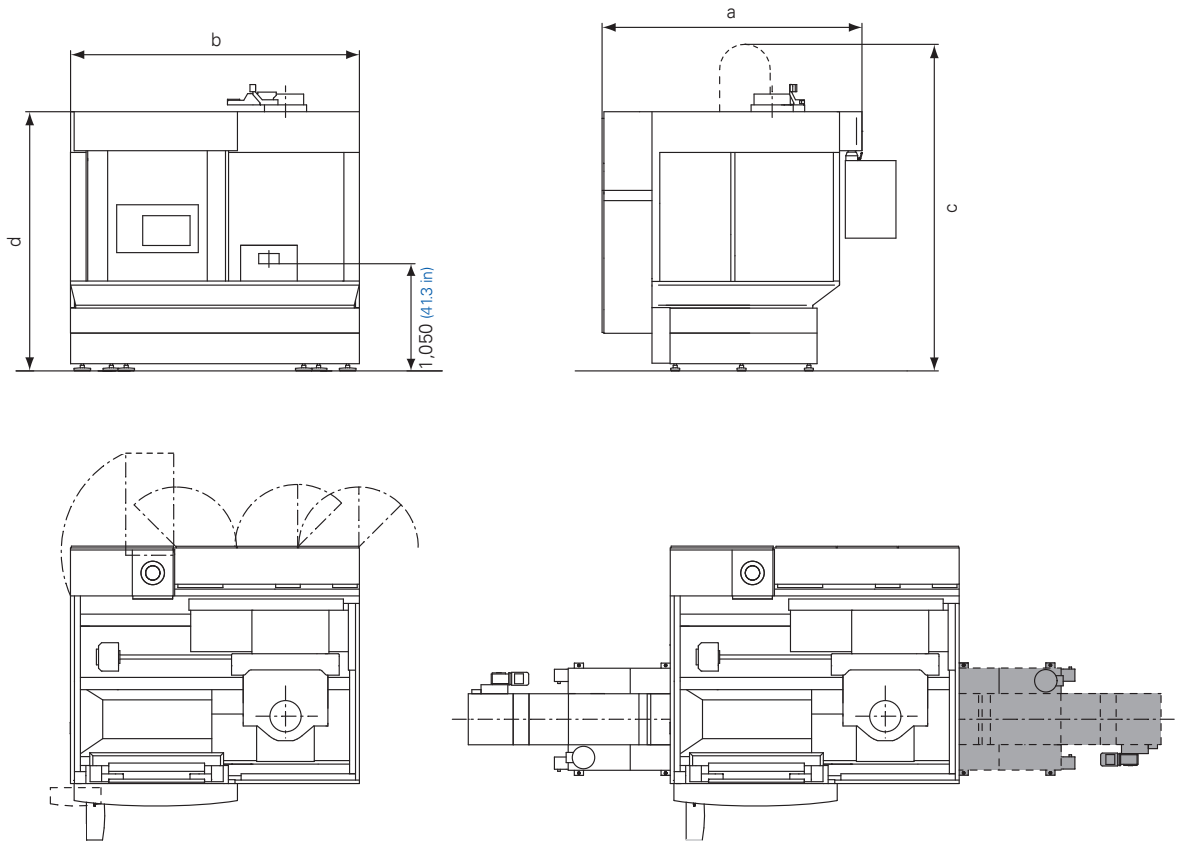
*Modules for turning or grinding possible

Technical Data.

Electrical equipment		VLC 250	VLC 250 DS	VLC 250 WF
Operating voltage	V	400	400	400
Control voltage DC	V	24	24	24
Control voltage AC	V	230	230	230
Frequency	Hz	50	50	50
Power consumption				
Min. equipment specification	kW	40	40	–
	hp	54	54	–
Max. equipment specification	kW	60	60	60
	hp	80	80	80
Lead fuse, min. / max.	A	80 / 125	80 / 125	– / 125
Electrics to		VDE 0113	VDE 0113	VDE 0113
Control system				
FANUC 31i / 32i		yes	–	–
SIEMENS SINUMERIK 840 Dsl		yes	yes	yes
Bosch Rexroth MTX		yes	–	–
Dimensions and weights				
Depth (a)	mm	2,350	2,350	–
	in	92.5	92.5	–
Depth with Y-axis (a)	mm	2,550	2,550	3,100
	in	100.4	100.4	122.1
Width with X-stroke 1,400 (b)	mm	2,830	2,830	–
	in	111.4	111.4	–
Width with X-stroke 1,600 (b)	mm	3,530	3,530	3,530
	in	139.0	139.0	139.0
Height (c)	approx. mm	3,600	3,600	3,600
	approx. in	141.7	141.7	141.7
Height (d)	approx. mm	2,540	2,540	2,540
	approx. in	100	100	100
Weight, max.	approx. kg	12,500	12,500	12,500
	approx. lb	27,558	27,558	27,558

Floor plan

Dimensions in mm



Subject to technical changes

At home in the world.

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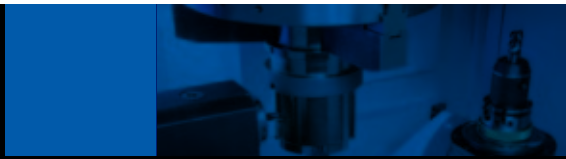
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