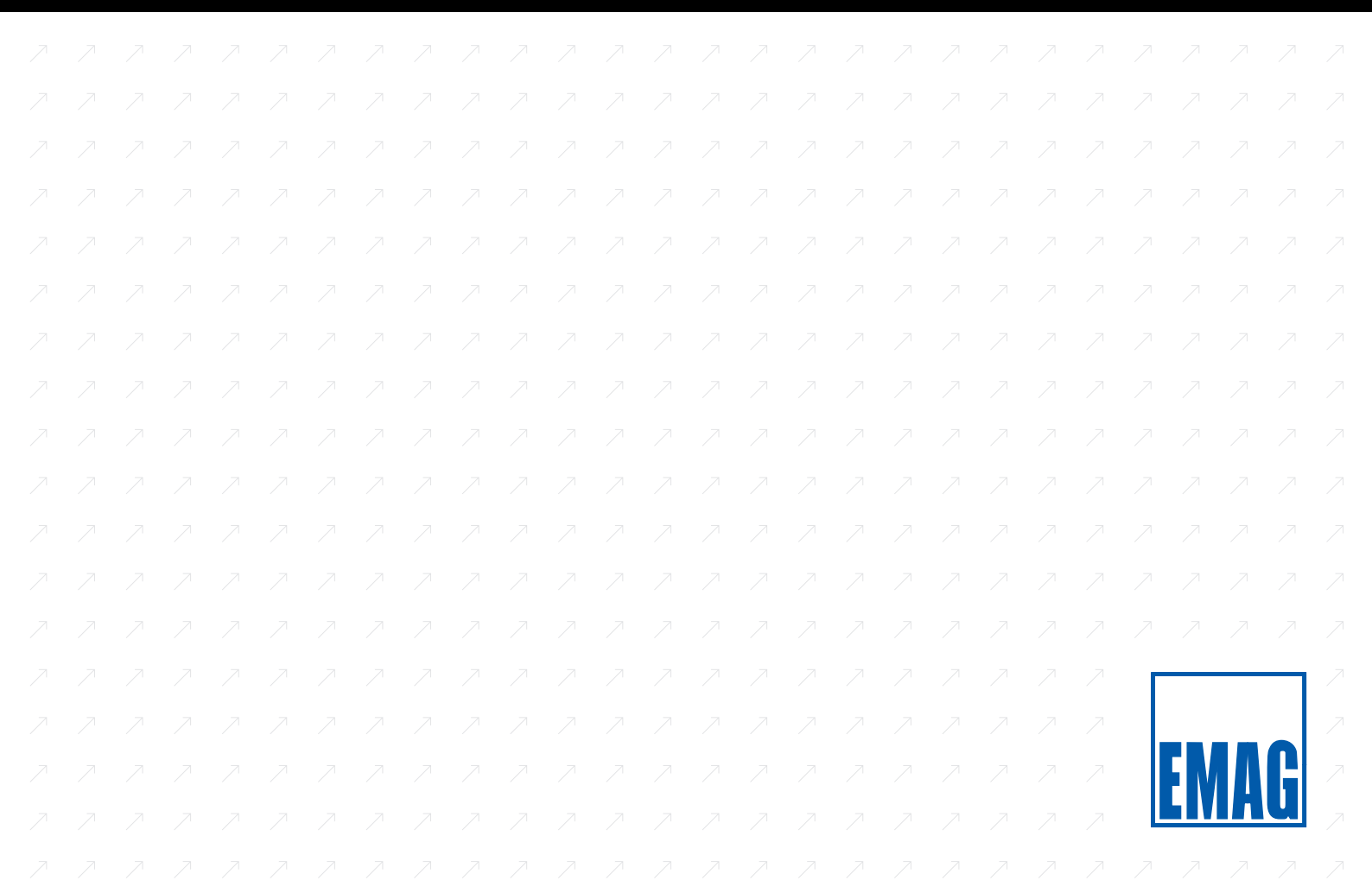


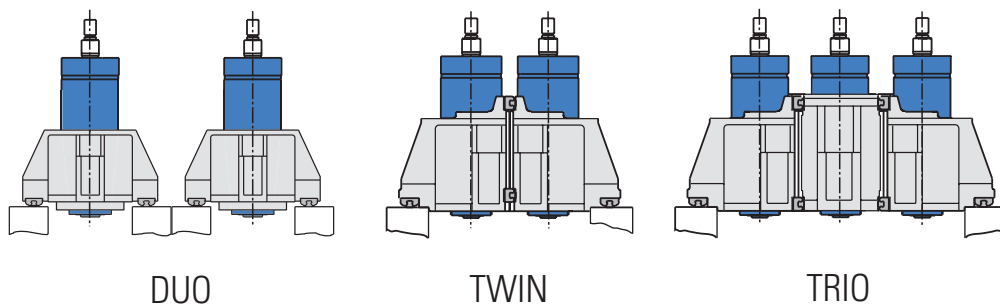
Vertical Multi-Spindle
Automatics
VSC 250/400 DUO
VSC 160/250 TWIN
VSC 200 TRIO



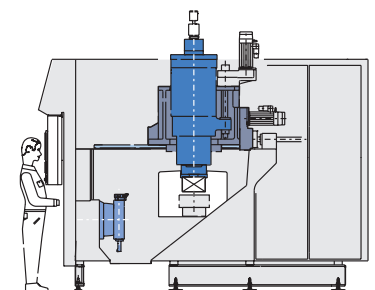
THE RIGHT MACHINE, CREATED FROM A MODULAR DESIGN: THE VSC MULTI-SPINDLE AUTOMATIC

With the DUO, TWIN and TRIO series the VSC concept offers you a production tool to suit your component batch sizes.

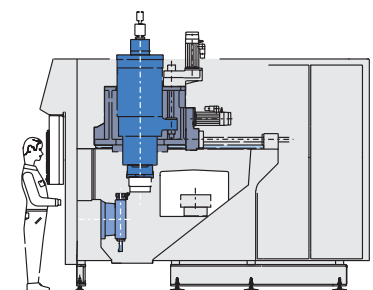
VSC ...



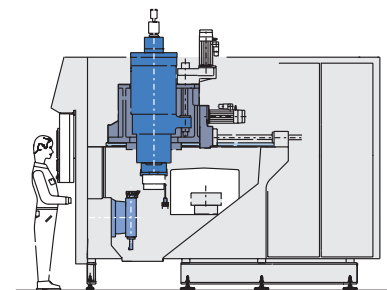
Three major functions carried out on the minimum footprint



Loading
Automatic loading and unloading of the workpiece.



Machining
Turning, drilling, milling, grinding, laser applications...

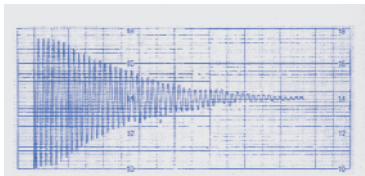


Gauging
The workpiece is gauged and necessary offsets are executed.

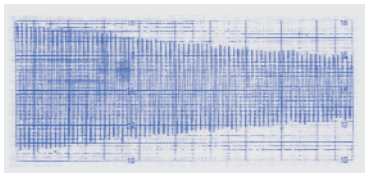
FOR THE SAKE OF WORKPIECE QUALITY ...

Symmetry and vibration damping

The basis of all VSC machines - and that includes the multi-spindle series - is a very sturdy machine base in vibration resistant MINERALIT® polymer cast granite.

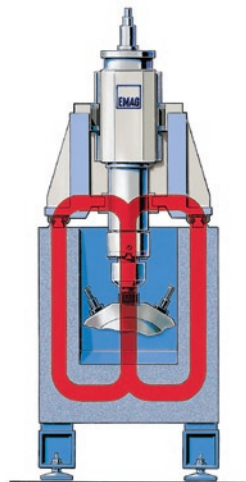


The great vibration damping effect of MINERALIT®



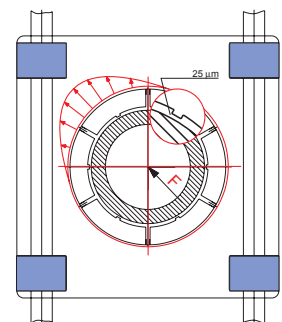
Vibration damping effect of cast iron

The closed-loop machine design with its extremely sturdy, U-shaped base is the precondition for short, symmetrical, closed-loop force distribution and, consequently, for a high degree of static and dynamic rigidity.



The no-wear hydrostatic guideways minimise even minute misalignments and dampen resultant cutting forces.

The thin oil film has an excellent damping effect - a precondition for a good surface finish and extended tool life, even where interrupted cuts are applied.

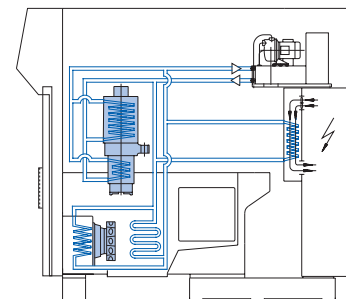


Hydrostatic guideway design

Constant temperature: a precondition for constant quality

The fluid-cooled spindle motors, turrets, electrical cabinet and machine base, combined with the thermo-symmetrical machine design, increase precision.

A twin-circuit cooling system keeps the machine temperature within tight limits of the ambient temperature. The electrical cabinet is kept at a constant temperature.



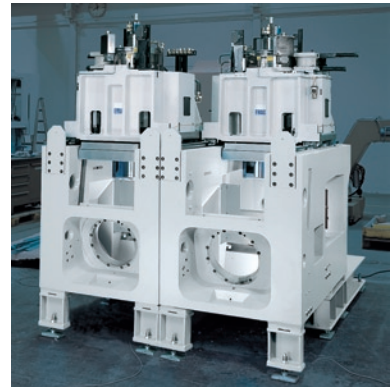
DUO: THE HIGHLY FLEXIBLE TWO-SPINDLE MACHINE, PRIMARILY FOR MACHINING IN TWO SEQUENTIAL OPERATIONS

Separate machining areas for different operations

The DUO two-spindle machines provide a very economical production tool where small and medium size components have to be manufactured in larger quantities.

The DUO is also the machine with the smallest footprint for first and second operation work.

VSC 250 DUO:
Separate, very sturdy machine bases in MINERALIT® polymer cast granite. The two overhead slide units are independently programmable.



The DUO machines feature two separate machining areas with independently programmable overhead slide units. Each machining area also contains an independently programmable EMAG disc-type turret, mounted to the front wall of the machine base.

Both turrets can accommodate turning tools and live tools for drilling and milling.

This enables the spindle to carry out either identical or different machining cycles, for example:

- ◆ immediately following the first operation the component is turned over and transferred to the second spindle for machining of the rear side; or:
- ◆ after the first operation the component is transferred to the second spindle for further machining in the same clamping position; or:
- ◆ two components with identical machining cycles are processed simultaneously; or, or, ...

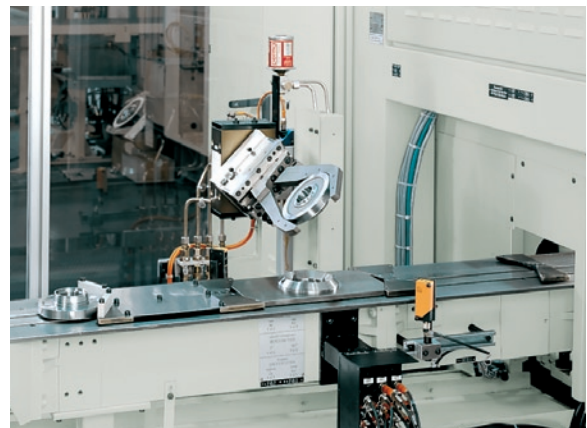
REQUIREMENT-ORIENTATED WORKPIECE HANDLING EQUIPMENT OF MODULAR DESIGN

Simple, flexible workpiece handling

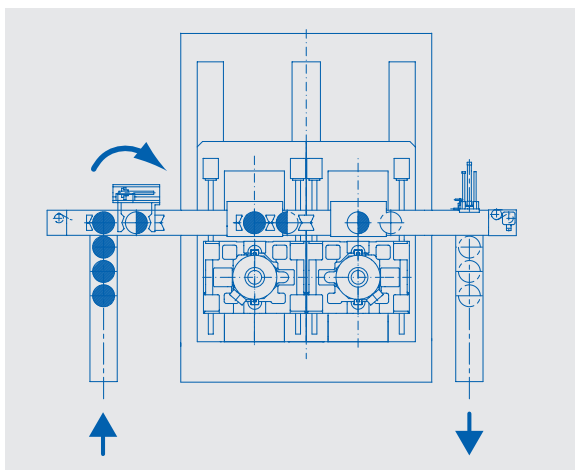
As on all VSC series machines, the two-spindle machines also allow loading and unloading from either the right or the left.

Another advantage can be seen when it comes to the turning over of the workpiece for second operation work. It takes place outside the machining area and is therefore easy to access and to monitor.

Depending on the machine specification, at component changeover the automation equipment can also be adjusted through the software program, rather than manually.



Example: VSC 250 DUO. The turn-over station turns the component ready for subsequent machining of the rear side in second operation.



Example: VSC 250 DUO. Where components requiring two operations have to be machined in larger quantities, the DUO two-spindle machine does this on a minimal footprint.

The machine can be integrated and freely positioned in production lines, thus saving on footprint and reducing linkup costs.

VERTICAL TWIN-SPINDLE MACHINES ...

For large batch sizes ...



The VSC 250 TWIN is equipped with two side-mounted turrets that also accommodate live tools for drilling and milling.

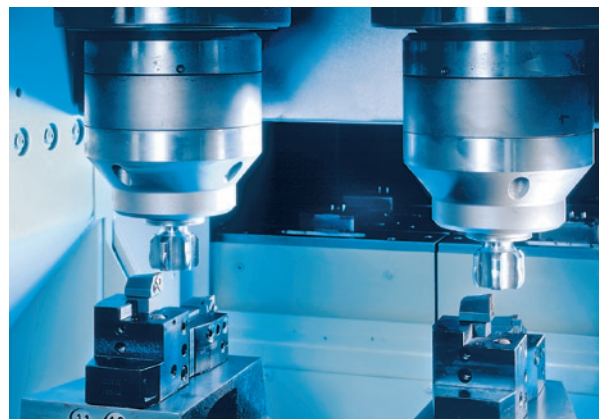
TWIN machines simultaneously produce two components with identical machining cycles.

The VSC TWIN allows you to machine large batches of components on the smallest possible footprint. This also applies to workpieces on which the rear section too has to be machined. This would be done on a second TWIN, linked to the first one by a turn-over station.

... and highest precision

The two overhead slide units are separate entities. This means that slides and spindles have separate X- and Z-axis drives, with separate linear measuring systems in all axes.

The TWIN-machines thus offer individual diameter and length compensation for each spindle - a precondition to fulfilling today's ever increasing demands for precision machining.

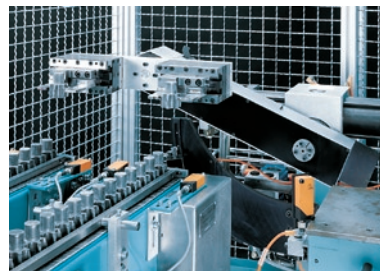


VSC 160 TWIN: Identically tooled-up twin-spindle machine

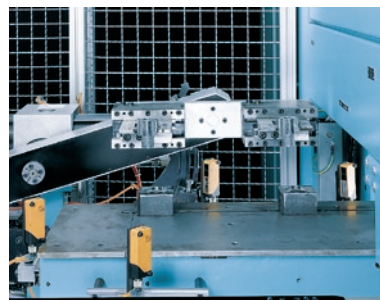
... TYPE VSC 160/250 TWIN

Double the output rate with the same footprint

The TWIN version too allows for the workpiece to be loaded and unloaded either from the left or the right. An external turn-over station positions the components for single- or double-sided machining.



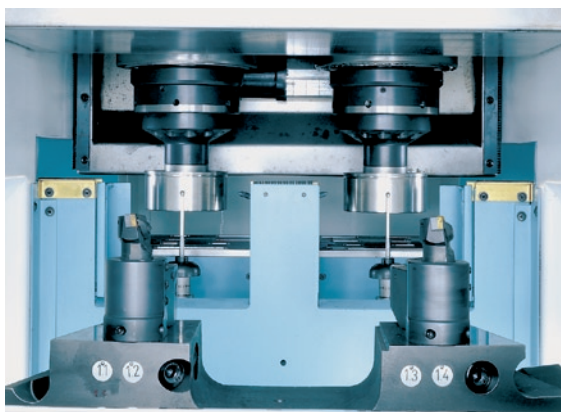
Just one example of many: two raw-parts are collected simultaneously from the workpiece magazine,



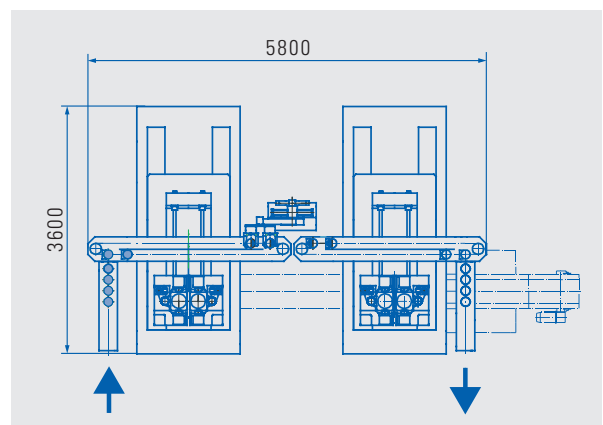
... deposited on the conveyor belt and transported to the pick-up position of the two spindles on the VSC 160 TWIN.

The TWIN design includes two separate probes, which are well protected against the ingress of chips and dirt during machining.

Where a gauging process has to be included the guard doors open and the finish machined workpieces approach the two probes.



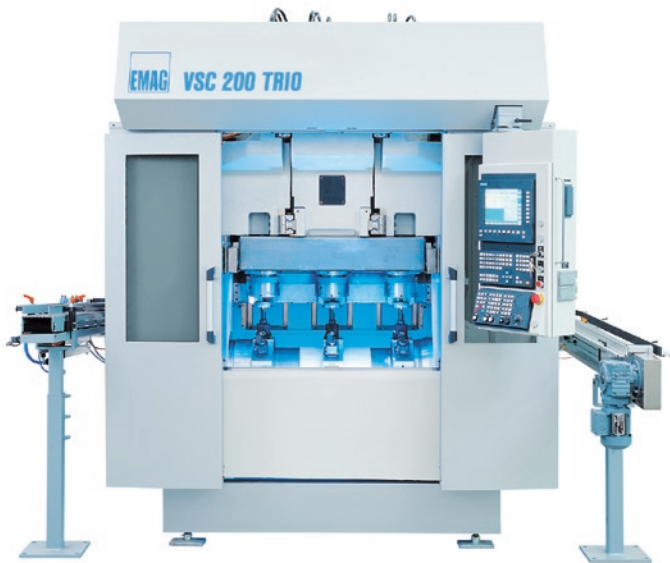
Timesaving gauging process covering two workpieces simultaneously. However, diameter and length compensation are carried out individually for each workpiece spindle. (Guard door between probe and machining area shown open)



Two VSC 160 TWIN, linked by a workpiece turn-over station - an example of a highly efficient piece of production equipment. Four spindles machine the front and rear of the workpiece. The result: large batch production at lowest possible manufacturing cost.

VSC TRIO – WORKING WITH MULTIPLE SPINDLES...

For even larger batch sizes



The VSC 200 TRIO is the most efficient solution where workpieces have to be machined in large batches on the smallest possible footprint.

The twin-track loading system considerably reduces loading times.

Three vertical spindles collect the raw parts from conveyor 1 and deposit the finish-machined components on conveyor 2 for removal from the machine.

Programming in single-spindle mode - manufacturing in multi-spindle mode.

The VSC 200 TRIO Turning Center is therefore a multi-spindle auto that can be adapted to include further developments in metal cutting technology, allowing technological advances to be realised in full.

The VSC 200 TRIO is an interesting stand-alone solution, but it can also be integrated, without difficulties, into existing manufacturing concepts.

The machining area

The turret accommodates 8 tools for each of the 3 work spindles. It is firmly anchored in both sides of the machine base. Servomotors quickly index to the various turret stations.



... ON VERY LARGE BATCH SIZES



Messen mit drei Meßtastern

High quality

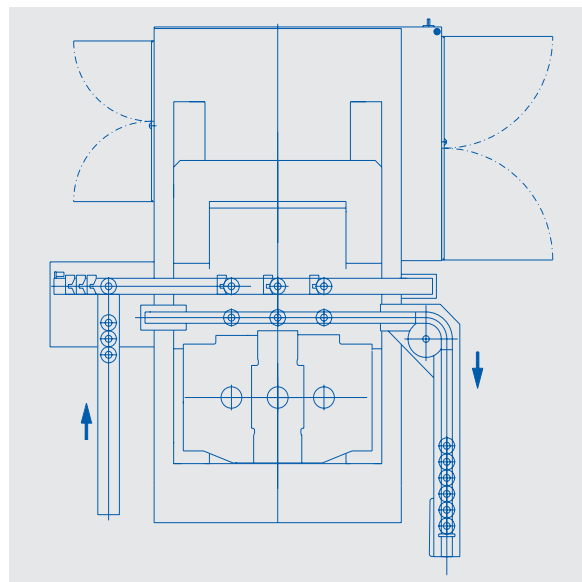
On the VSC TRIO it is the control system that corrects all tool positions individually. The machine features direct position feedback systems in all axes, a necessary requirement where tolerances in the μ -range are demanded.

The VSC TRIO can be retooled in a very short time. Conventional multi-spindle autos take infinitely longer.

This is the first multi-spindle automatic that can be used for dry machining. Its design allows the unhindered flow of chips into a large chip chamber.

Highest productivity ...

... on only approx. 15 m²



Twin-track loading of a VSC 200 TRIO

TECHNICAL DATA

VSC DUO

		VSC 250 DUO	VSC 400 DUO
CAPACITY PER SPINDLE			
Chuck diameter	mm	200 / 250	315 / 400
Swing diameter	mm	260	420
Nominal workpiece diameter	mm	200	340
Traverse in X/Z	mm	850 / 200	850 / 315
LOADING TIME			
dependent on workpiece and chucking mode	s	2 - 4	4 - 6
CHIP-TO-CHIP TIME			
(to VDI 2852, page 2; incl. loading time) depending on workpiece, chucking mode and machining process	s	5 - 7	8 - 10
		Qty	2
MAIN SPINDLES		Size	11
Spindle nose to DIN 55 026-A	Ø in mm	100	140
Front spindle bearing	rpm	6000	4000
Max. spindle speed			
MAIN DRIVE PER SPINDLE		kW	39
Max. power rating	rpm	800	900
Full power at speed of Max. torque	Nm	460	620
FEED DRIVES			
Rapid traverse speed	X/Z	m/min	45 / 30
Feed force in	X/Z	kN	11
Ball screw in	X/Z	Ø in mm	50 / 40
TOOLING SYSTEMS			
EMAG disk-type turrets	Qty	2	2
Tool holders for cylindrical shanks to DIN 69 880	Qty	2 x 12	2 x 12
of which for live tools	Qty	2 x 12	2 x 12
Shank diameter	mm	40	50
Other tooling systems		dependent on application	
WEIGHT	approx. kg	18500	20000

Subject to change without prior notice.

TECHNICAL DATA

VSC TWIN

		VSC 160 TWIN	VSC 250 TWIN
CAPACITY PER SPINDLE			
Chuck diameter	mm	130 / 160	200 / 250
Swing diameter	mm	180	260
Nominal workpiece diameter	mm	130	200
Traverse in X/Z	mm	850 / 160	850 / 200
LOADING TIME			
dependent on workpiece and chucking mode	s	2 - 4	2 - 4
CHIP-TO-CHIP TIME (to VDI 2852, page 2; incl. loading time) depending on workpiece, chucking mode and machining process			
	s	4 - 6	5 - 7
MAIN SPINDLES			
	Qty	2	2
Spindle nose to DIN 55 026-A	Size	5	6
Front spindle bearing	Ø in mm	80	100
Max. spindle speed	rpm	6500	6000
MAIN DRIVE PER SPINDLE			
Max. power rating	kW	39	39
Full power at speed of	rpm	3000	800
Max. torque	Nm	124	460
FEED DRIVES			
Rapid traverse speed	X/Z m/min	45 / 30	45 / 30
Feed force in	X/Z kN	11	11
Ball screw in	X/Z Ø in mm	50/40	50 / 40
TOOLING SYSTEMS			
EMAG disk-type turrets	Qty	1	2
Tool holders for cylindrical shanks to DIN 69 880	Qty	2 x 8	2 x 8
of which for live tools	Qty	-	2 x 8
Shank diameter	mm	30	40
Other tooling systems		dependent on application	
WEIGHT	approx. kg	9600	12000

Subject to change without prior notice.

TECHNICAL DATA

VSC 200 TRIO

CAPACITY PER SPINDLE

Chuck diameter	200 mm
Workpiece diameter (nominal)	160 mm
Traverse in X / Z	850/200 mm
Swing diameter	210 mm

LOADING TIME

depending on workpiece and chucking mode	2 - 4 s
--	---------

CHIP-TO-CHIP TIME

(to VDI 2852, page 2), depending on workpiece, chucking mode and machining process	5 - 7 s
--	---------

MAIN SPINDLE

Qty	3
Spindle nose to DIN 55 026-A	Size 5
Front spindle bearing	80 mm dia.
Max. spindle speed	6500 rpm

WEIGHT

12000 kg

MAIN DRIVE PER SPINDLE

Max. power rating	24 kW
Full power at spindle speed of	1500 rpm
Max. torque	153 Nm

FEED DRIVE

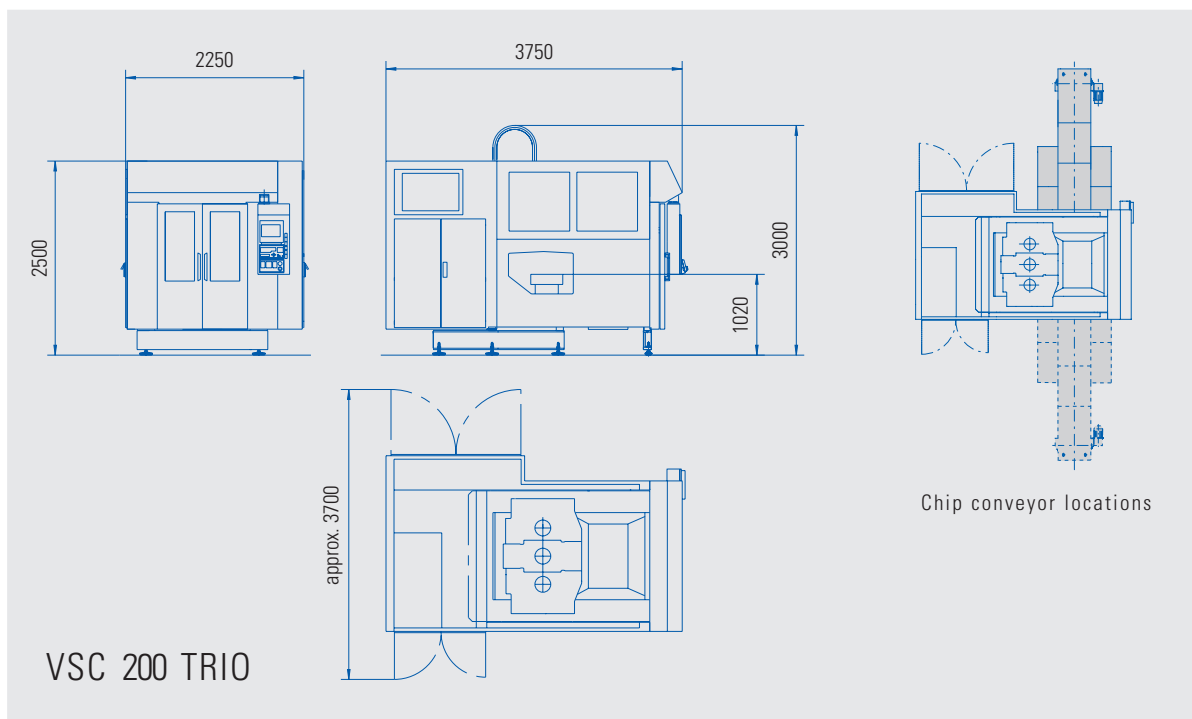
Rapid traverse speed	X / Z	45/30 m/min
Feed force in	X / Z	5.5/11 kN

BALL SCREW IN X / Z

50/40 mmØ

TOOLING SYSTEMS

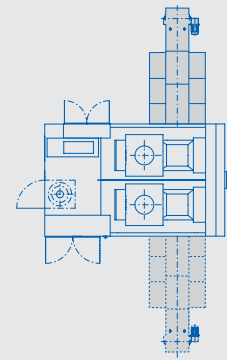
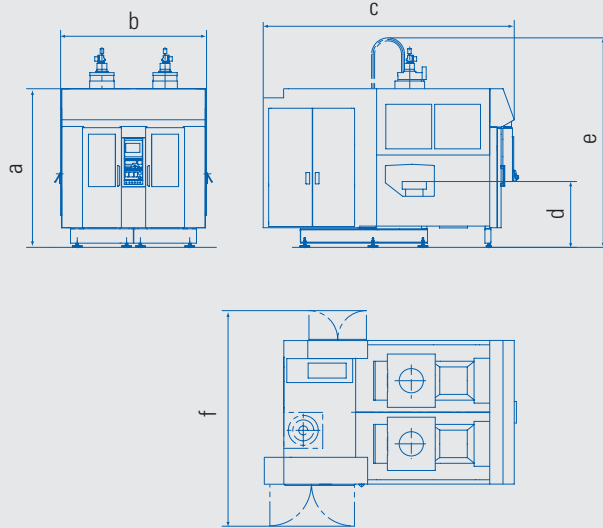
EMAG disc-type turret	Qty 1
Tool registers	Qty 3 x 8
for cylindrical shanks to DIN 69 880	
Shank diameter	40 mm
Other tooling systems dependent on application	



Subject to change without notice.

Dimensions in mm

VSC DUO

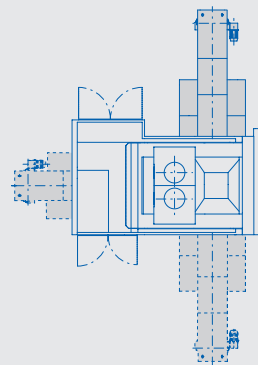
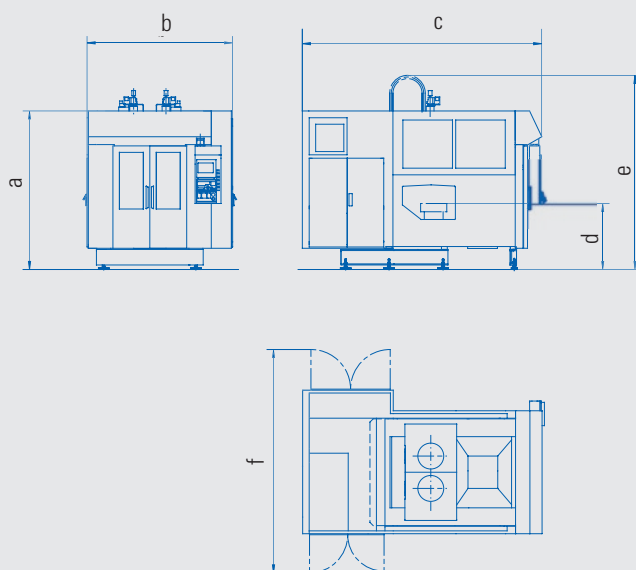


Chip conveyor locations

	VSC 250 DUO	VSC 400 DUO
--	-------------	-------------

a	2700	2700
b	2440	2440
c	4100	4300
d	1020	1100
e	approx. 3100	approx. 3300
f	approx. 3900	approx. 3700

VSC TWIN



Chip conveyor locations

	VSC 160 TWIN	VSC 250 TWIN
--	--------------	--------------

a	2950	2600
b	1500	2250
c	3600	3700
d	1100	1020
e	-	approx. 3000
f	approx. 2700	approx. 3500

At home in the world.

EMAG

Gruppen-Vertriebs- und Service GmbH

Salach

Austrasse 24
73084 Salach
Germany
Phone: +49 (0)7162 17 0
Fax: +49 (0)7162 17 820
E-mail: info@salach.emag.com

Köln

Robert-Perthel-Strasse 79
50739 Köln
Germany
Phone: +49 (0)221 126152 0
Fax: +49 (0)221 126152 19
E-mail: info@koeln.emag.com

Herford

Arndtstrasse 8
32052 Herford
Germany
Phone: +49 (0)5221 9333 0
Fax: +49 (0)5221 9333 25
E-mail: info@herford.emag.com

Frankfurt

Orber Strasse 8
60386 Frankfurt/Main
Germany
Phone: +49 (0)69 40802 0
Fax: +49 (0)69 40802 412
E-mail: info@frankfurt.emag.com

Leipzig

Pittlerstrasse 26
04159 Leipzig
Germany
Phone: +49 (0)341 4666 0
Fax: +49 (0)341 4666 114
E-mail: info@leipzig.emag.com

München

Zamdorferstrasse 100
81677 München
Germany
Phone: +49 (0)89 99886 250
Fax: +49 (0)89 99886 160
E-mail: info@muenchen.emag.com

WORLDWIDE

NODIER EMAG INDUSTRIE S.A.

Service commercial:
38, rue André Lebourblanc - B.P. 26
78592 Noisy le Roi
France
Phone: +33 1 30 80 47 70
Fax: +33 1 30 80 47 69
E-mail: info@nodier.emag.com

EMAG MAQUINAS HERRAMIENTA S.L.

Pasaje Arrahona, No.18
Centro Industrial Santigua
08210 Barberà del Vallès (Barcelona)
Spain
Phone: +34 93 719 5080
Fax: +34 93 729 7107
E-mail: info@emh.emag.com

ZETA EMAG SpA

Viale Longarone 41/A
20080 Zibido S.Giacomo (MI)
Italy
Phone: +39 02 905942 1
Fax: +39 02 905942 21
E-mail: info@zeta.emag.com

EMAG (UK) Ltd.

Chestnut House,
Kingswood Business Park
Holyhead Road
Albrighton
Wolverhampton WV7 3AU
Great Britain
Phone: +44 1902 376090
Fax: +44 1902 376091
E-mail: info@uk.emag.com

KP-EMAG

ul. Butlerova 17
117342 Moskau
Russia
Phone: +07 495 3302574
Fax: +07 495 3302574
E-mail: info@kp.emag.com

EMAG L.L.C. USA

38800 Grand River Avenue
Farmington Hills, MI 48335,
USA
Phone: +1 248 442 6584
Fax: +1 248 442 6706
E-mail: info@usa.emag.com

EMAG MEXICO

Colina de la Umbria 10
53140 Boulevares
Naucalpan Edo. de México
Mexico
Phone: +52 55 5 3742665
Fax: +52 55 5 3742664
E-mail: info@mexico.emag.com

EMAG DO BRASIL Ltda.

Rua Ricardo Abed, 114
Pirituba
05171-030 São Paulo
SP, Brazil
Phone: +55(0)11 3906 9238
Fax: +55(0)11 3906 9238
E-mail: info@brasil.emag.com

**Dänemark**

Horsvangen 31
7120 Vejle Ø
Denmark
Phone: +45 75 854 854
Fax: +45 75 816 276
E-mail: info@daenemark.emag.com

Schweden

Munkvägen 5
73170 Köping
Sweden
Phone: +46 (0)221 40305
Mobile: +49 (0)70 65 00 997
E-mail: info@sweden.emag.com

Österreich

Dorfstrasse 343
5423 St. Koloman
Austria
Phone: +43 (0)6241 640
Fax: +43 (0)6241 26204
E-mail: info@austria.emag.com

EMAG Machine Tools (Taicang) Co., Ltd.

Room 2315 B, Far East International Plaza
No. 317 Xianxia Road
200051 Shanghai,
P.R. China
Phone: +86 21 62 35 15 20
Fax: +86 21 62 35 01 18
E-mail: info@china.emag.com

EMAG KOREA Ltd.

Lotte IT Castle 1st B/D, Rm 806
550-1, Kasan-dong
Kamchun-gu
153-803 Seoul
South Korea
Phone: +82 2 2026 7660
Fax: +82 2 2026 7670
E-mail: info@korea.emag.com

EMAG INDIA Private Limited

#12, 12th Main Street, 17th Cross
Malleswaram
Bangalore - 560 055,
India
Phone: +91 80 2344 7498
Fax: +91 80 2344 7498
E-mail: info@india.emag.com

TAKAMAZ EMAG Ltd.

1-8 Asahigaoka Hakusan-City
Ishikawa Japan, 924-0004
Japan
Phone: +81 76 274 1409
Fax: +81 76 274 8530
E-mail: info@takamaz.emag.com

EMAG SOUTH AFRICA

P.O. Box 2900
Kempton Park 1620
Rep. South Afrika
Phone: +27 11 3935070
Fax: +27 11 3935064
E-mail: info@southafrica.emag.com

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