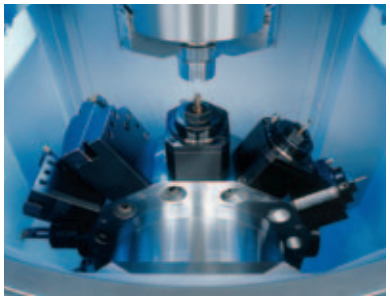
# PRODUCT SUMMARY

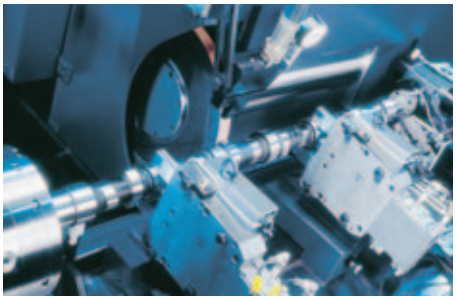

EMAG

Manufacturing Systems
for Precision Metal
Components.

EMAG GROUP

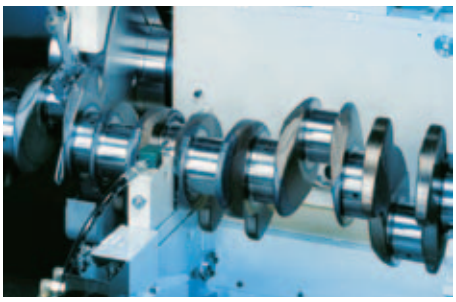


VL-Series
Standard vertical turning machines
Machining of chucked components

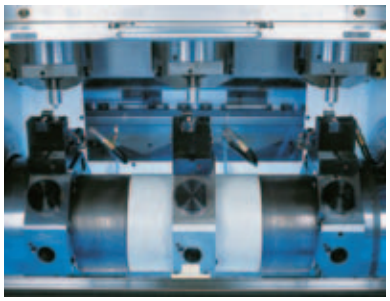


SN-Series
Camshaft grinders

VSC TWIN-Series
Vertical multi-spindle machines, simultaneous
machining of two chucked components



PM-Series
Crankshaft grinders

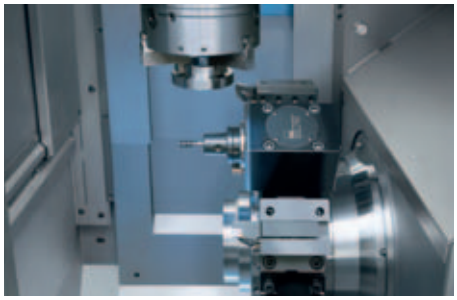


VSC 200 TRIO
Vertical multi-spindle machines, simultaneous
machining of three chucked components

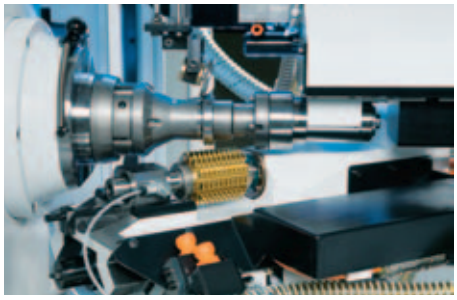
VT- / VTC-Series
Vertical 4-axis machining of shafts

VLC 100 GT / VSC DS-Series
Vertical turning and grinding machines
for chucked components

VTC 100 GT / VTC 315 DS-Series
Vertical turning and grinding machines
for shafts

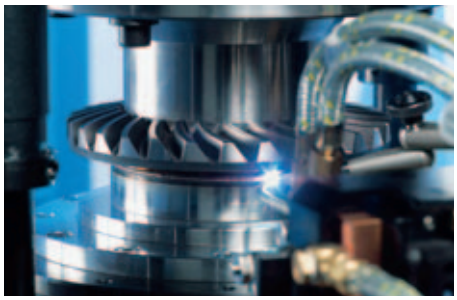


VL- / VLC-Series
Vertical pick-up turning machines
Modular Standard
Modular Customized



K-Series
Gear cutting machines

VLC 200 H / VSC 400 WF-Series
Hobbing / turning + hobbing of gear wheels



ELC-Series
Laser welding of chucked and
shaft-type components

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# EMAG VL 2 · VL 4 · VL 6 · VL 8
# Modular Standard

The machines of the VL-series are space-saving vertical turning machines with integrated automation. Maximum performance at low costs per piece. This performance is based on high-quality components: the machine body is made of MINERALIT® polymer concrete with dampening


CHUCKED COMPONENTS

properties, a pick-up working spindle moves in the X- and Z-axes with minimum response times and the tool turret guarantees short swiveling times. Furthermore, the machines can be fitted with a Y-axis in the turret to allow for the machining of complex geometries. The possible fields of applications for the machines are thus increased massively.

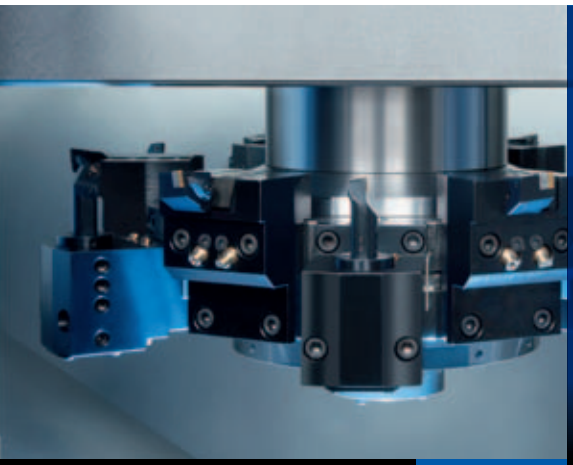
| Capacity | | VL 2 | VL 4 |
|---|---|---|---|
| Chuck dia., max. | mm | 160 | 260 |
| | in | 6.3 | 10.2 |
| Swing dia. | mm | 210 | 280 |
| | in | 8.3 | 11.0 |
| Workpiece dia., max. | mm | 100 | 200 |
| | in | 3.9 | 7.9 |
| Workpiece length, max. | mm | 150 | 200 |
| | in | 5.9 | 7.9 |
| X-axis travel | mm | 700 | 740 |
| | in | 27.6 | 29.1 |
| Y-axis travel | mm | ±50 | ±30 |
| | in | ±2.0 | ±1.2 |
| Z-axis travel | mm | 375 | 400 |
| | in | 14.8 | 15.7 |


| Capacity | | VL 6 |
|---|---|---|
| Chuck dia., max. | mm | 400 |
| | in | 15.7 |
| Swing dia. | mm | 420 |
| | in | 16.5 |
| Workpiece dia., max. | mm | 300 |
| | in | 11.8 |
| Workpiece length, max. | mm | 200 |
| | in | 7.9 |
| X-axis travel | mm | 880 |
| | in | 34.6 |
| Y-axis travel | mm | ±30 |
| | in | ±1.2 |
| Z-axis travel | mm | 480 |
| | in | 18.9 |

| Capacity | | VL 8 |
|---|---|---|
| Chuck dia., max. | mm | 500 |
| | in | 19.7 |
| Swing dia. | mm | 520 |
| | in | 20.5 |
| Workpiece dia., max. | mm | 400 |
| | in | 15.7 |
| Workpiece length, max. | mm | 300 |
| | in | 11.8 |
| X-axis travel | mm | 995 |
| | in | 39.2 |
| Y-axis travel | mm | ±30 |
| | in | ±1.2 |
| Z-axis travel | mm | 580 |
| | in | 22.8 |

# EMAG VLC 100-P

Five axes + turret with up to twelve tools + automation + optional OP 10 / OP 20 flip-over station. The VLC 100-P is a twin-spindle vertical turning machine with pendulum technology for parts with a diameter of up to 100 mm.



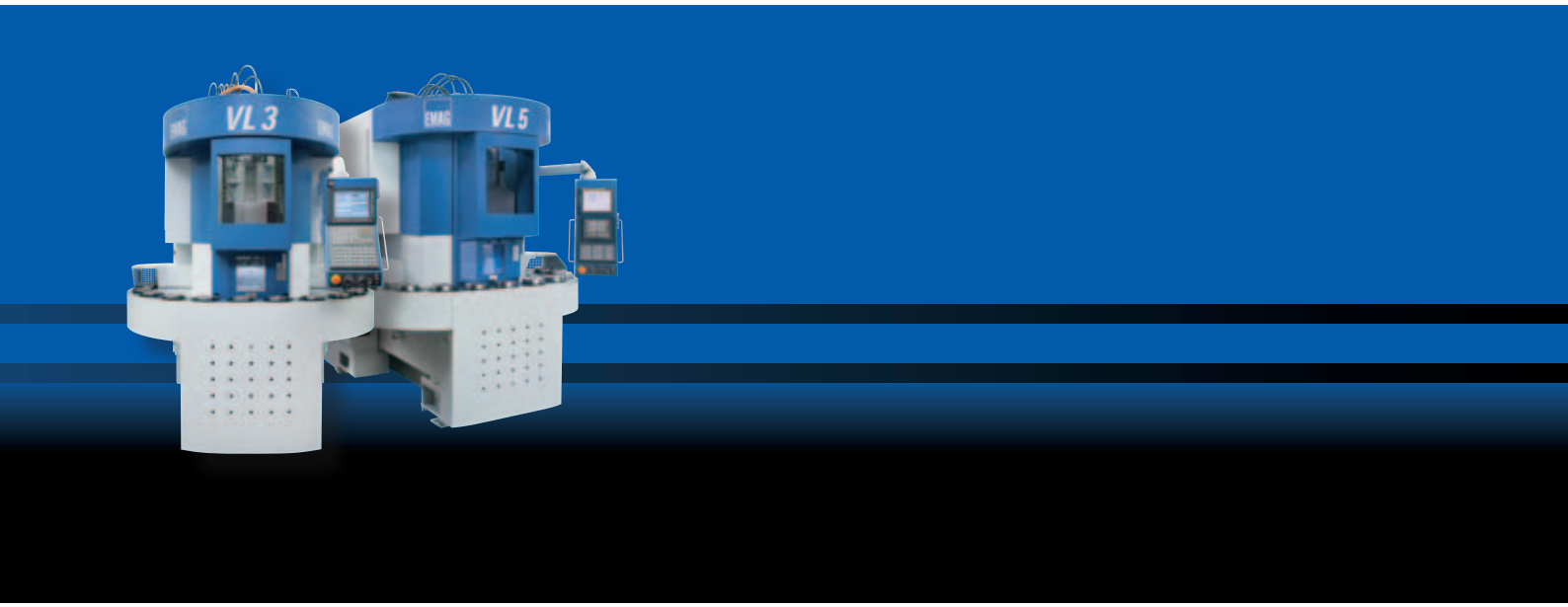

CHUCKED
COMPONENTS

The main focus during the design of the VLC 100-P was on reducing idle times. Non-productive times in the machine due to loading and unloading have been almost completely eliminated. The machine is ideal for workpieces with short machining times since the ratio of machining time to idle time is vital for cost efficiency.

| Capacity | | VLC 100-P |
|---|---|---|
| Chuck dia., max. | mm | 160 |
| | in | 6.3 |
| Swing dia. | mm | 200 |
| | in | 7.9 |
| X-axis travel | mm | 380 |
| | in | 15.0 |
| Z-axis travel | mm | 660 |
| | in | 26.0 |

# EMAG VL 3 / VL 5

The VL 3 / VL 5 standard vertical turning machines feature maximum productivity, extremely high long-term accuracy, excellent operational safety and user-friendliness.




The pick-up spindle is part of the overhead slide and executes the gripping and depositing of the parts. Short distances and the compact design result in extremely short loading and cycle times.

| Capacity | | VL 3 | VL 5 |
|---|---|---|---|
| Chuck dia., max. | mm | 200 | 250 |
| | in | 7.9 | 9.8 |
| Swing dia. | mm | 210 | 260 |
| | in | 8.3 | 10.2 |
| X-axis travel | mm | 400 | 570 |
| | in | 15.7 | 22.4 |
| Y-axis travel | mm | – | – |
| | in | – | – |
| Z-axis travel | mm | 200 | 200 |
| | in | 7.9 | 7.9 |

# EMAG VL 5i

Single spindle, vertical pickup turning machine: machining + automation. Now also with measuring integrated in a single machine with a small footprint.

CHUCKED COMPONENTS


The machine base and compound slide are made of MINERALIT® polymer concrete and are standard components on the VL 5i. This results in excellent damping and optimal conditions for hard turning. Another advantage is that these machines have very short lead times.

| Capacity | | VL 5i |
|---|---|---|
| Chuck dia., max. | mm | 250 |
| | in | 9.8 |
| Swing dia. | mm | 270 |
| | in | 10.6 |
| X-axis travel | mm | 660 |
| | in | 26.0 |
| Y-axis travel | mm | – |
| | in | – |
| Z-axis travel | mm | 300 |
| | in | 11.8 |

# EMAG VL 7

The VL 7 (chuck dia. 400 mm) is a vertical pick-up turning machine for heavy workpieces of up to 340 mm in diameter. The machine is equipped with a workpiece storage conveyor.

# EMAG VL Y

As the name suggests, the VL Y features a Y-axis. The Y-axis makes it possible to machine extremely complex geometries.


The machine is loaded and unloaded by the pick-up spindle. The machine base is made of MINERALIT® polymer concrete which is characterized by excellent vibration damping properties. This guarantees long tool service lives and high surface quality. The overhead slide has an integrated vertical spindle and is located on the main body.

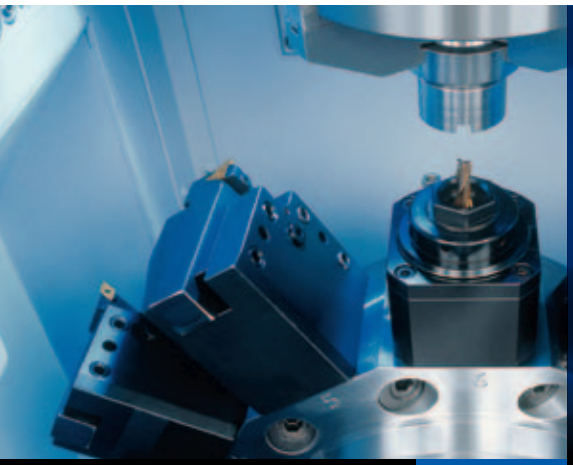
| Capacity | | VL 7 |
|---|---|---|
| Chuck dia., max. | mm | 400 |
| | in | 15.7 |
| Swing dia. | mm | 420 |
| | in | 16.5 |
| X-axis travel | mm | 850 |
| | in | 33.5 |
| Y-axis travel | mm | – |
| | in | – |
| Z-axis travel | mm | 315 |
| | in | 12.4 |

Thanks to the Y-axis, off-center milling and drilling can be done without special tools, increasing the versatility of the machine.

| Capacity | | VL Y |
|---|---|---|
| Chuck dia., max. | mm | 200 |
| | in | 7.9 |
| Swing dia. | mm | 210 |
| | in | 8.3 |
| X-axis travel | mm | 570 |
| | in | 22.4 |
| Y-axis travel | mm | ±25 |
| | in | ±1.0 |
| Z-axis travel | mm | 200 |
| | in | 7.9 |

# EMAG VSC 250 / 400 / 500

This vertical pick-up turning machine is for the machining of chucked components with a diameter of up to 500 mm. The optimal use of the VSC-series is through technology integration for soft and hard machining.



CHUCKED
COMPONENTS

Turning, drilling, grinding, milling, gear profiling and honing – all on a single machine. Measuring of workpieces is done with a probe or plug gauge and is fast and accurate as part of the machine setup.

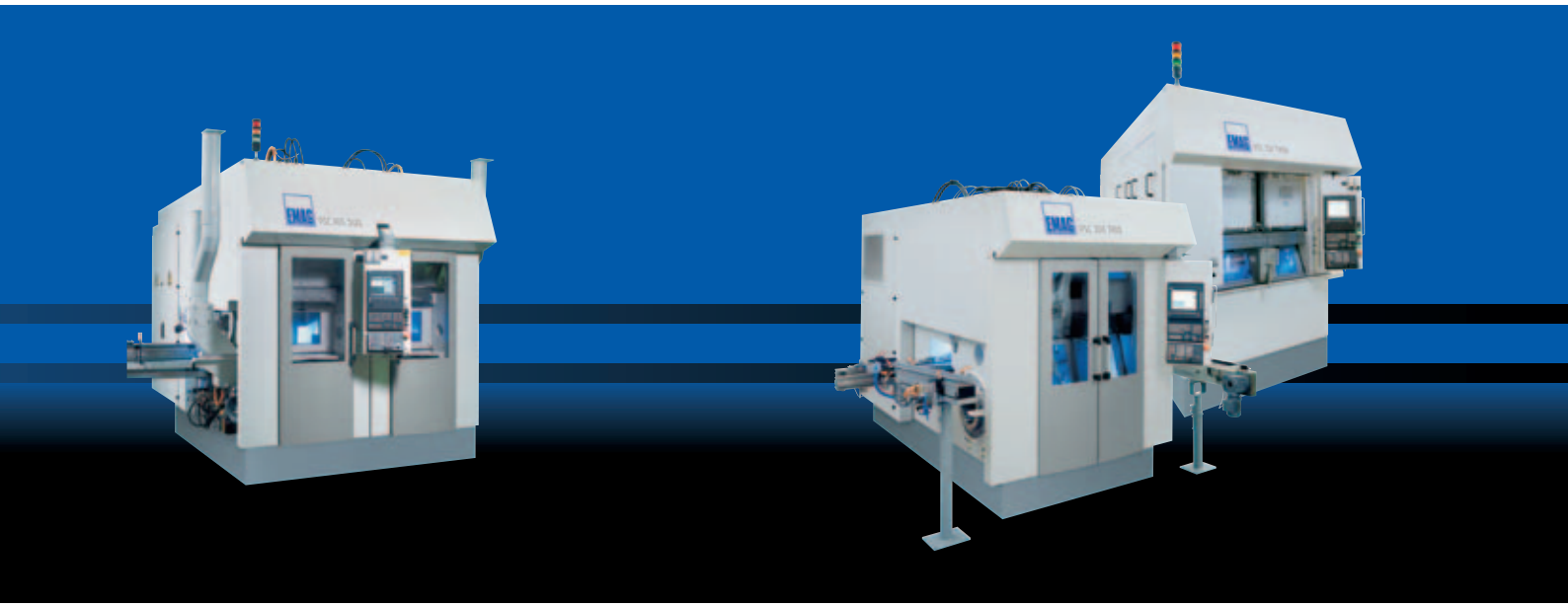
| Capacity | | | | VSC |
|---|---|---|---|---|
| Chuck dia. | mm | 250 | to | 500 |
| | in | 9.8 | to | 19.7 |
| Swing dia. | mm | 350 | to | 520 |
| | in | 13.8 | to | 20.5 |
| Workpiece dia. (nominal) | mm | 250 | to | 440 |
| | in | 9.8 | to | 17.3 |
| X-axis travel | mm | 745 | to | 1,000 |
| | in | 29.3 | to | 39.4 |
| Z-axis travel | mm | 300 | to | 400 |
| | in | 11.8 | to | 15.7 |

# EMAG VSC 250 / 400 DUO

The cost effective solution to the machining of small and medium size components in two operations.

# EMAG VSC 160 / 250 TWIN
# EMAG VSC 200 TRIO

These are high-performance, high-precision machines for mass production – the vertical multi-spindle process allows for the simultaneous machining of two or three workpieces.



The DUO design has two separate machining areas which means that it has overhead slides which can be programmed independently. Each machining area has an EMAG disk-type turret at the end which can also be programmed independently.

| Capacity | | VSC 250 DUO | VSC 400 DUO |
|---|---|---|---|
| Chuck dia. | mm | 200 / 250 | 315 / 400 |
| | in | 7.9 / 9.8 | 12.4 / 15.7 |
| Swing dia. | mm | 260 | 420 |
| | in | 10.2 | 16.5 |
| Workpiece dia. (nominal) | mm | 200 | 340 |
| | in | 7.9 | 13.4 |
| X-axis travel | mm | 850 | 850 |
| | in | 33.5 | 33.5 |
| Z-axis travel | mm | 200 | 315 |
| | in | 7.9 | 12.4 |

The VSC TWIN- and VSC TRIO-series combine high-yield production with a small footprint.

| Capacity | | VSC 160 / 250 TWIN | | |
|---|---|---|---|---|
| Chuck dia. | mm | 130 / 160 | to | 200 / 250 |
| | in | 5.1 / 6.3 | to | 7.9 / 9.8 |
| Swing dia. | mm | 180 | to | 260 |
| | in | 7.1 | to | 10.2 |
| Workpiece dia. (nominal) | mm | 130 | to | 200 |
| | in | 5.1 | to | 7.9 |
| X-axis travel | mm | | | 850 |
| | in | | | 33.5 |
| Z-axis travel | mm | 160 | to | 200 |
| | in | 6.3 | to | 7.9 |

| Capacity | | VSC 200 TRIO |
|---|---|---|
| Chuck dia. | mm | 160 / 200 |
| | in | 6.3 / 7.9 |
| Swing dia. | mm | 210 |
| | in | 8.3 |
| Workpiece dia. (nominal) | mm | 160 |
| | in | 6.3 |
| X-axis travel | mm | 850 |
| | in | 33.5 |
| Z-axis travel | mm | 200 |
| | in | 7.9 |

# VLC 100 · VLC 200 · VLC 300 · VLC 400
# Modular Customized

Individual manufacturing solution
The VLC machines offer a broad spectrum of technology modules and can thus be individually adjusted to the machining requirements:


CHUCKED
COMPONENTS

turning tools, milling and grinding spindles as well as multi-spindle drill head modules are available.

| Capacity | | VLC 100 | VLC 200 |
|---|---|---|---|
| Chuck dia., max. | mm | 160 | 260 |
| | in | 6.3 | 10.2 |
| Swing dia. | mm | 210 | 280 |
| | in | 8.3 | 11.0 |
| Workpiece dia., max. | mm | 100 | 200 |
| | in | 3.9 | 7.9 |
| Workpiece length, max. | mm | 150 | 200 |
| | in | 5.9 | 7.9 |
| X-axis travel | mm | 700 | 740 |
| | in | 27.6 | 29.1 |
| Y-axis travel | mm | ±50 | ±30 |
| | in | ±2.0 | ±1.2 |
| Z-axis travel | mm | 375 | 400 |
| | in | 14.8 | 15.7 |

Configuration options

Tool turret

Hard turning
(tool block holder)

Combination of hard turning + external grinding

Combination of hard turning + internal / external grinding


| Capacity | | VLC 300 |
|---|---|---|
| Chuck dia., max. | mm | 400 |
| | in | 15.7 |
| Swing dia. | mm | 420 |
| | in | 16.5 |
| Workpiece dia., max. | mm | 300 |
| | in | 11.8 |
| Workpiece length, max. | mm | 200 |
| | in | 7.9 |
| X-axis travel | mm | 880 |
| | in | 34.6 |
| Y-axis travel | mm | ±30 |
| | in | ±1.2 |
| Z-axis travel | mm | 480 |
| | in | 18.9 |

| Capacity | | VLC 400 |
|---|---|---|
| Chuck dia., max. | mm | 500 |
| | in | 19.7 |
| Swing dia. | mm | 520 |
| | in | 20.5 |
| Workpiece dia., max. | mm | 400 |
| | in | 15.7 |
| Workpiece length, max. | mm | 300 |
| | in | 11.8 |
| X-axis travel | mm | 995 |
| | in | 39.2 |
| Y-axis travel | mm | ±30 |
| | in | ±1.2 |
| Z-axis travel | mm | 580 |
| | in | 22.8 |


External grinding

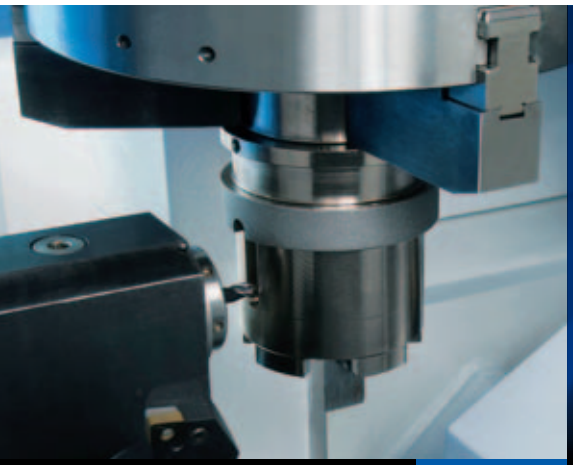

Internal grinding with a grinding spindle


Internal grinding with two grinding spindles

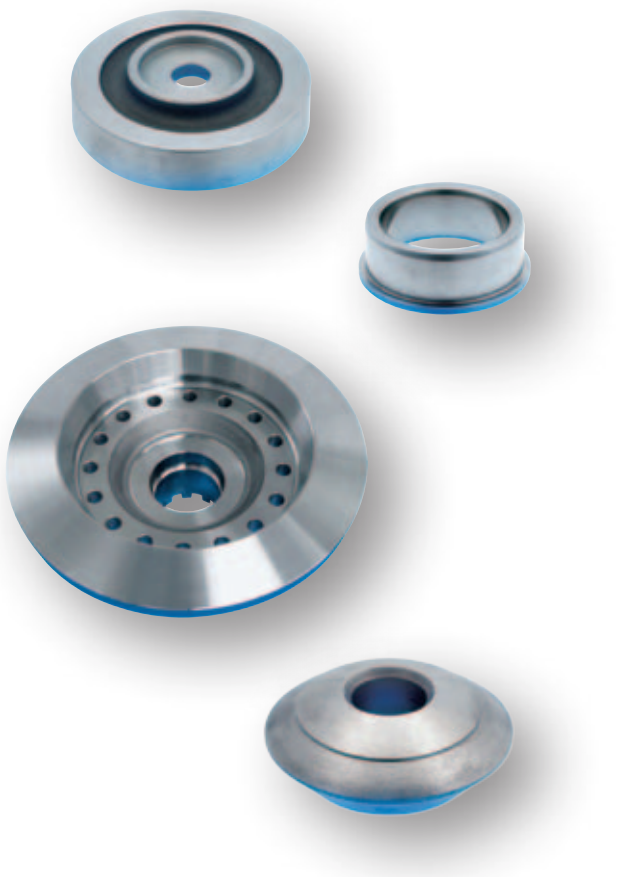

Multi-spindle drill head

# EMAG VLC 250

The VLC 250 is a vertical manufacturing system, with a main benefit being universal application.




CHUCKED COMPONENTS



The application dictates the number and position of turrets and the kind of automation needed. The machine concept accommodates different machining technologies, such as turning, drilling, grinding, milling and the use of multi-technology units with tool changer.

| Capacity | | VLC 250 |
|---|---|---|
| Chuck dia., max. | mm<br>in | 250 / 315<br>9.8 / 12.4 |
| Swing dia. | mm<br>in | 350<br>13.8 |
| Workpiece dia. (nominal) | mm<br>in | 250<br>9.8 |
| X-axis travel | mm<br>in | 1,600<br>63.0 |
| Y-axis travel (optional) | mm<br>in | ±100<br>±3.9 |
| Z-axis travel | mm<br>in | 300<br>11.8 |

# EMAG VLC 500 / 800 / 1200

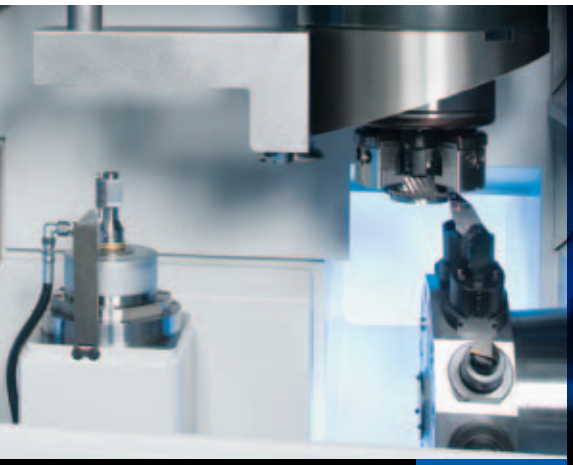
These multi-functional production centers in gantry design have a high chip capacity and are ideal for the complete machining of large workpieces.

Technology integration allows for complete machining in a single setup. Soft and hard machining, interrupted cuts, turning, drilling, milling, grinding and heavy-duty machining with excellent precision.

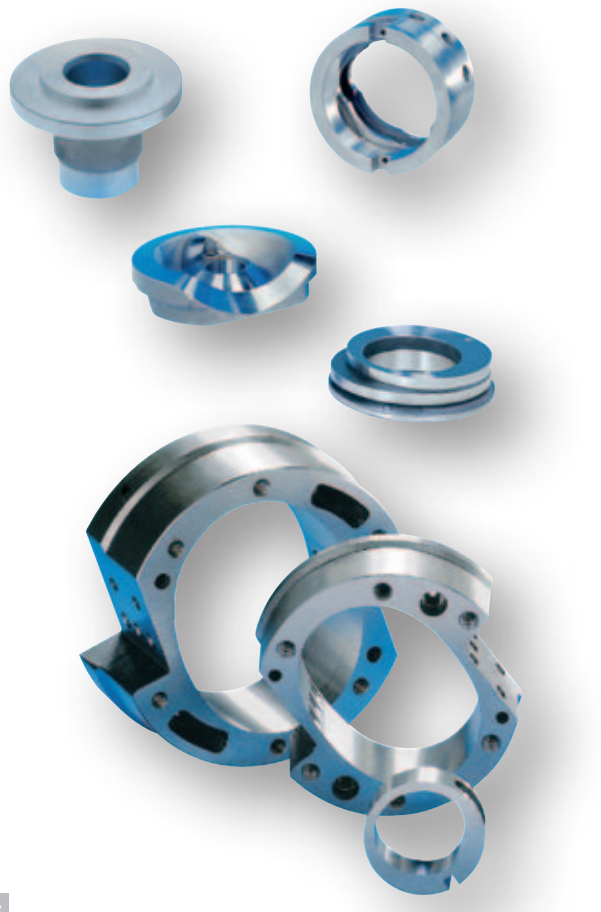
| Capacity | | | | VLC |
|---|---|---|---|---|
| Chuck dia. | mm | 500 | to | 1,250 |
| | in | 19.7 | to | 49.2 |
| Swing dia. | mm | 820 | to | 1,500 |
| | in | 32.3 | to | 59.1 |
| X-axis travel | mm | 2,350 | to | 2,960 |
| | in | 92.5 | to | 116.5 |
| Z-axis travel | mm | 700 | to | 1,000 |
| | in | 27.6 | to | 39.4 |

# REINECKER VSC 250 DS
# REINECKER VSC 400 DS / DDS

These turning and grinding centers combine the advantages of vertical hard turning and grinding – on a single machine, in a single setup.



CHUCKED COMPONENTS

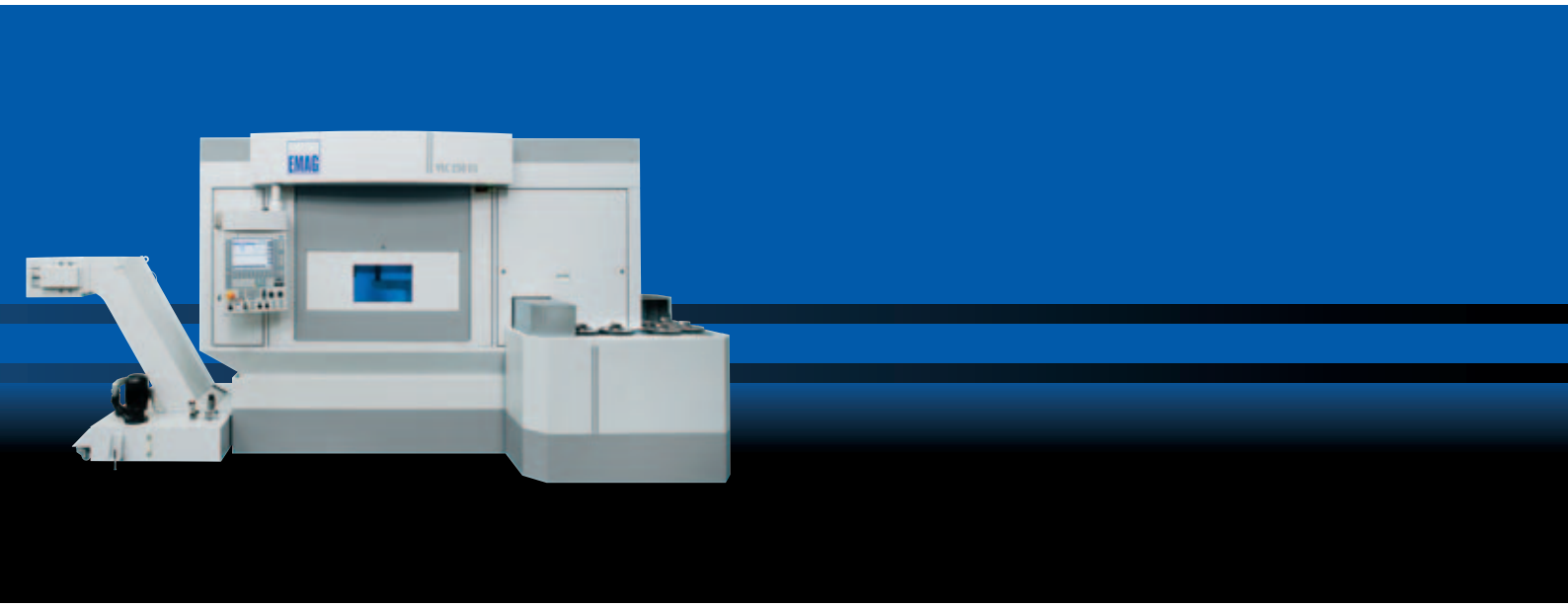


This is a great machine for process stream consolidation. The machine offers the user many advantages: low capital outlay, low unit production costs, reduced throughput times, improved component quality and a high degree of process integrity.

| Capacity | | VSC 250 DS | VSC 400 DS / DDS |
|---|---|---|---|
| Chuck dia., max. | mm | 250 | 400 |
| | in | 9.8 | 15.7 |
| Swing dia., max. | mm | 260 | 420 |
| | in | 10.2 | 16.5 |
| X-axis travel | mm | 680 | 850 |
| | in | 26.8 | 33.5 |
| Z-axis travel | mm | 200 | 315 |
| | in | 7.9 | 12.4 |
| Y-axis travel | mm | – | 315 |
| | in | – | 12.4 |

# EMAG VLC 250 DS

The VLC 250 DS combines the advantages of vertical hard turning and of grinding – on a single machine, in a single setup.




The process in use is always that one that is best for the quality requirements of the workpiece – offering the greatest economic advantage. Another advantage for the customer is the flexibility to be able to choose the best technology for every job: hard turning, scroll-free turning or grinding – are all available on one machine.

| Capacity | | VLC 250 DS |
|---|---|---|
| Chuck dia., max. | mm<br>in | 250 / 315<br>9.8 / 12.4 |
| Swing dia. | mm<br>in | 350<br>13.8 |
| Workpiece dia. (nominal) | mm<br>in | 250<br>9.8 |
| X-axis travel | mm<br>in | 1,400 / 1,600<br>55.1 / 63.0 |
| Y-axis travel (optional) | mm<br>in | ±100<br>±3.9 |
| Z-axis travel | mm<br>in | 300<br>11.8 |

# KOPP VG 110

The vertical machine for small chuck parts has hard pre-turning, internal and external grinding, measuring, loading and unloading in a single machine. It is flexible or workpiece specific.

CHUCKED
COMPONENTS

VG 110 – For classic combined internal machining with:

- one or two grinding spindles which grind and hone,
- one grinding spindle and one turning tool

| Capacity | | | | VG 110 |
|---|---|---|---|---|
| Chuck dia. | mm<br>in | 100<br>3.9 | to<br>to | 190<br>7.5 |
| Max. internal machining dia. | mm<br>in | | | 60<br>2.4 |
| Grinding length, max. | mm<br>in | | | 40<br>1.6 |
| X-axis travel | mm<br>in | | | 460<br>18.1 |
| Z-axis travel | mm<br>in | | | 225<br>8.9 |

# KOPP SK 204

The all-rounder for the grinding of round and out-of-round workpieces.

# EMAG VLC 100 G / VLC 100 GT Modular Customized

The production of small chucked components often involves very large quantities. In particular, gearbox wheels, planetary gears, sprocket wheels and flange parts are required in millions of units for passenger cars, for example.


With the SK-series you can carry out internal as well as external grinding work: out-of-round grinding, cylindrical grinding (internal and external) and polishing.

| Capacity | | SK 204 |
|---|---|---|
| Workpiece dia., max. | mm | 250 |
| | in | 9.8 |
| X-axis travel | mm | 1,000 |
| | in | 39.4 |
| Z-axis travel | mm | 360 |
| | in | 14.2 |

The VLC 100 G / VLC 100 GT have been specially developed for the productive and high precision manufacturing of these components. The machines load themselves with a pick-up system and while one component is being ground, the operator or an automation system can place the next raw part on the revolving transport belt. This considerably reduces the machine's downtimes.

| Capacity | | VLC 100 G / VLC 100 GT |
|---|---|---|
| Chuck dia. | mm | 160 |
| | in | 6.3 |
| Machining dia., max. | mm | 100 |
| | in | 3.9 |
| Grinding length, max. | mm | 150 |
| | in | 5.9 |
| X-axis travel | mm | 900 |
| | in | 35.4 |
| Z-axis travel | mm | 375 |
| | in | 14.8 |

# EMAG VT 2-4 / VT 4-4
# Modular Standard

Fast processes are required for machining large quantities of shafts. Both the machining process and the loading and unloading processes must be completed extremely quickly. The VT 2-4 and VT 4-4 machines guarantee the maximum performance you require.


SHAFT
COMPONENTS

Four axes, short distances and a powerful main spindle – these are the strengths of the VT-series. The full effect of these can be felt in particular when machining large quantities. A key factor here is the machining of parts from two sides. This greatly reduces the machining time. Two tool turrets, each with eleven tool positions which can be equipped with turning tools or driven tools, ensure machine flexibility.

| Capacity | | VT 2-4 | VT 4-4 |
|---|---|---|---|
| Chuck dia. | mm | 160 | 250 |
| | in | 6.3 | 9.8 |
| Part dia., max. | | | |
| » Gripper dia. | mm | 63 | 133 |
| | in | 2.5 | 5.2 |
| » Workpiece dia. | mm | 100 | 200 |
| | in | 3.9 | 7.9 |
| Workpiece length, max. | mm | 400 | 630 / 1,050 |
| | in | 15.7 | 24.8 / 41.3 |
| X-axis travel | mm | 340 | 395 |
| | in | 13.4 | 15.6 |
| Z-axis travel | mm | 625 | 810 / 1,230 |
| | in | 24.6 | 31.9 / 48.4 |

# EMAG VTC 100-4 / VTC 200-4 Modular Customized

The strength of the VTC Machines is their 4-axis machining of large quantities of shafts up to 400 mm in length. Since the machine concept comprises a fully integrated automated loading and unloading system, a manufacturing system can be created which features very short transport distances.


The machines are loaded and unloaded by the two turrets which ensures that the process is fast and straightforward. In addition, it has a powerful main spindle. For the machining process, there are two turrets with eleven tool positions which can be equipped with either turning tools or driven tools. The 12th station is for the gripper which handles the parts in the machine. There are closed transport belts on both sides of the machining area. This is where the raw and finished parts are stored.

| Capacity | | VTC 100-4 | VTC 200-4 |
|---|---|---|---|
| Chuck dia. | mm | 160 | 250 |
| | in | 6.3 | 9.8 |
| Part dia., max. | | | |
| » Gripper dia. | mm | 63 | 133 |
| | in | 2.5 | 5.2 |
| » Workpiece dia. | mm | 100 | 200 |
| | in | 3.9 | 7.9 |
| Workpiece length, max. | mm | 400 | 630 / 1,050 |
| | in | 15.7 | 24.8 / 41.3 |
| X-axis travel | mm | 340 | 395 |
| | in | 13.4 | 15.6 |
| Y-axis travel | mm | ±25 | ±25 |
| | in | ±1.0 | ±1.0 |
| Z-axis travel | mm | 625 | 810 / 1,230 |
| | in | 24.6 | 31.9 / 48.4 |

# EMAG VTC 250 / VTC 250 DUO
# EMAG VTC 315 / VTC 315 DUO

Complete-machining of shafts and shaft-type workpieces on a single machine, including automation.

SHAFT
COMPONENTS

High drive power, high speeds and sturdy turrets make the machines of the VTC-series high-yield turning centers for 4-axis machining, which include loading and unloading.

| Capacity | | VTC 250 | VTC 315 |
|---|---|---|---|
| Chuck dia. | mm | 250 | 315 |
| | in | 9.8 | 12.4 |
| Workpiece dia., max. | mm | 140 | 250 |
| | in | 5.5 | 9.8 |
| Workpiece length, max. | mm | 630 / 1,000* | 700 |
| | in | 24.8 / 39.4* | 27.6 |
| X-axis travel | mm | 300 | 390 |
| | in | 11.8 | 15.4 |
| Z-axis travel | mm | 740 / 1,100* | 950 |
| | in | 29.1 / 43.3* | 37.4 |

| Capacity | | VTC 250 DUO | / 315 DUO |
|---|---|---|---|
| Chuck dia. | mm | 250 | 315 |
| | in | 9.8 | 12.4 |
| Workpiece dia., max. | mm | 140 | 250 |
| | in | 5.5 | 9.8 |
| Workpiece length, max. | mm | 630 / 1,000* | 700 |
| | in | 24.8 / 39.4* | 27.6 |
| X-axis travel | mm | 300 | 390 |
| | in | 11.8 | 15.4 |
| Z-axis travel | mm | 740 / 1,100* | 950 |
| | in | 29.1 / 43.3* | 37.4 |

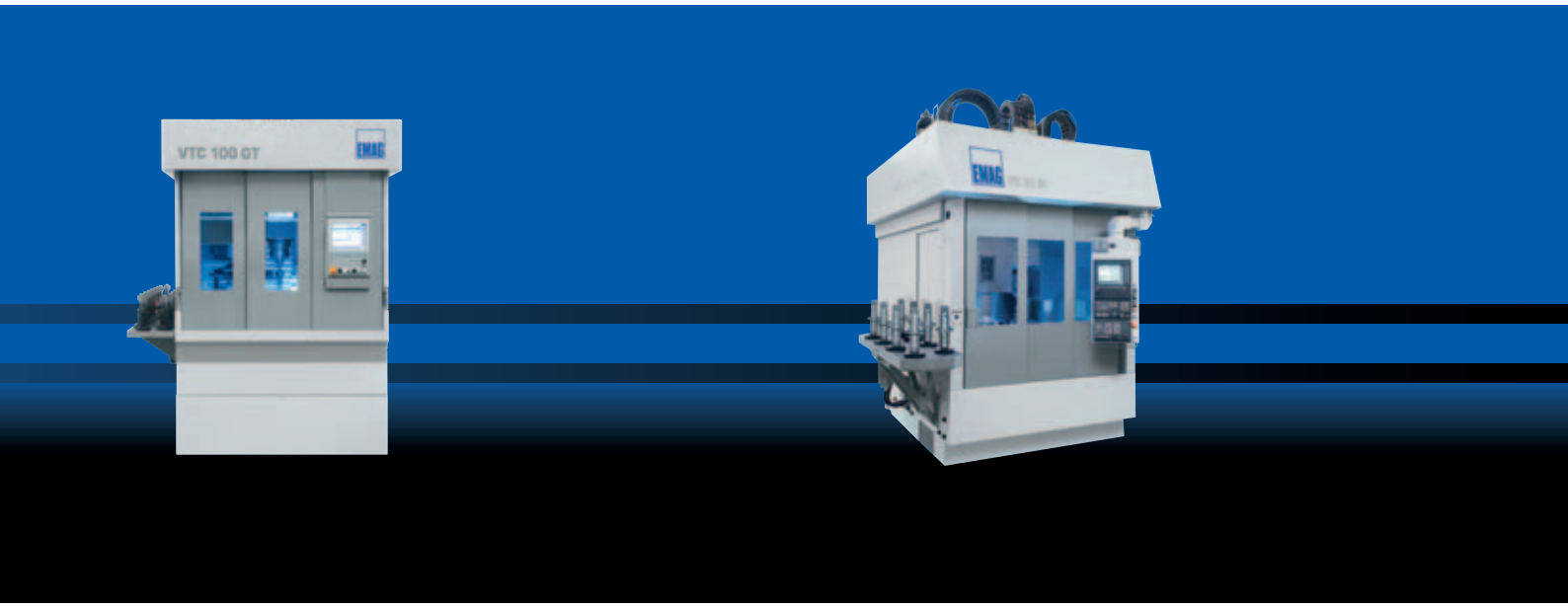
*Special length

# EMAG VTC 100 GT
# Modular Customized

All-round solutions for shafts: the VTC 100 GT ensures a quick process for hard turning and grinding. The tool turret completes all turning operations, while the grinding then starts at the second station.

# EMAG VTC 315 DS

The production tool for the machining of difficult shaft workpieces. Turning and grinding vertically.




The production tool for the complete machining of e.g. cylindrical bearing seats, shoulders and grooves in a single clamping operation. True running errors (as with separate clamping operations) are reduced.

| Capacity | | VTC 100 GT |
|---|---|---|
| Chuck dia., max. | mm | 160 |
| | in | 6.3 |
| Workpiece dia., max. | mm | 100 |
| | in | 3.9 |
| Workpiece length, max. | mm | 400 |
| | in | 15.7 |
| X-axis travel | mm | 340 |
| | in | 13.4 |
| Z-axis travel | mm | 660 |
| | in | 26.0 |

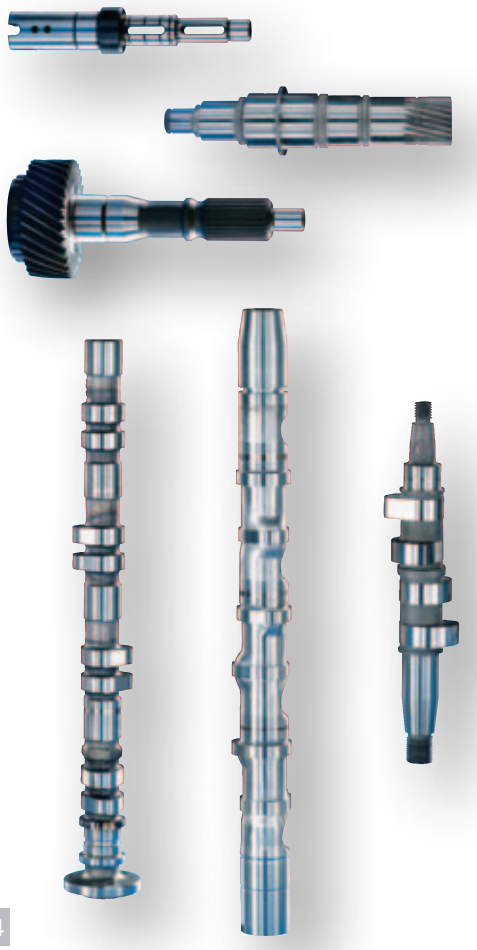
Whether turning, drilling, milling, grinding, synchronous support grinding or combination turning + grinding – the VTC caters to all the variantions of process integration in the machining of shaft components.

| Capacity | | VTC 315 DS |
|---|---|---|
| Chuck dia. | mm | 315 |
| | in | 12.4 |
| Workpiece dia., max. | mm | 240 |
| | in | 9.4 |
| Workpiece length, max. (incl. workholding unit) | mm | 700 |
| | in | 27.6 |
| X-axis travel | mm | 390 |
| | in | 15.4 |
| Z-axis travel | mm | 950 |
| | in | 37.4 |

# KARSTENS HG 2
# KARSTENS HG 204
# KARSTENS HG 208

The machine platform for the external cylindrical grinding of precision shaft components.

SHAFT
COMPONENTS



The grinding machine series is designed for the external circular grinding of shaft type parts. On the HG 208 there is an optional center drive that allows for the simultaneous machining of shafts or hollow shafts on the inside and outside.

| Capacity | | HG 2 | HG 204 | HG 208 |
|---|---|---|---|---|
| Workpiece dia., max. | mm | 200 | 200 | 200 |
| | in | 7.9 | 7.9 | 7.9 |
| Workpiece length, max. | mm | 400 | 650 | 1,200 |
| | in | 15.7 | 25.6 | 47.2 |
| X-axis travel | mm | 360 | 360 | 360 |
| | in | 14.2 | 14.2 | 14.2 |
| Z-axis travel | mm | 1,000 | 1,000 | 1,600 |
| | in | 39.4 | 39.4 | 63.0 |

# KOPP SN 204 / 208
# KOPP SN 310 / 320

The machine series for all the requirements in the out-of-round grinding of camshafts and external contours in both prototype and batch production.

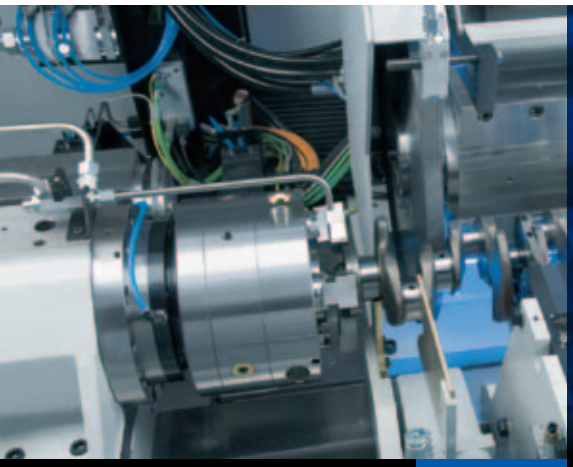
The machines of the SN-series are adapted to suit the requirements of individual component geometries. They can be equipped with one, two or three wheels for external cylindrical and/or external out-of-round grinding.

| Capacity | | SN 204 / 208 | SN 310 / 320 |
|---|---|---|---|
| Workpiece dia., max. | mm | 380 / 380 | 380 / 620 |
| | in | 15.0 / 15.0 | 15.0 / 25.2 |
| Workpiece length, max. | mm | 600 / 950 | 1,000 / 2,000 |
| | in | 23.6 / 37.4 | 39.4 / 78.7 |
| X-axis travel | mm | 360 / 360 | 500 / 500 |
| | in | 14.2 / 14.2 | 19.7 / 19.7 |
| Z-axis travel | mm | 1,000 / 1,600 | 1,700 / 2,700 |
| | in | 39.4 / 63.0 | 66.9 / 106.3 |

# PM-Series

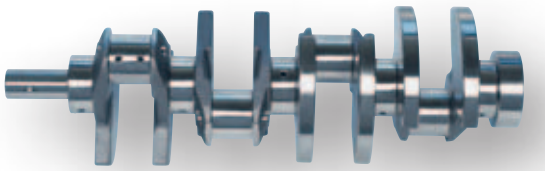
# NAXOS-UNION PM 2

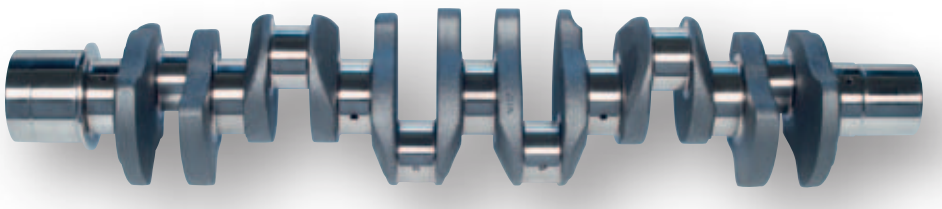
Crankshaft grinders with CBN technology are traditionally equipped either in single-wheel configuration with one spindle, with two wheel heads and two spindles, or as an angular infeed grinder.

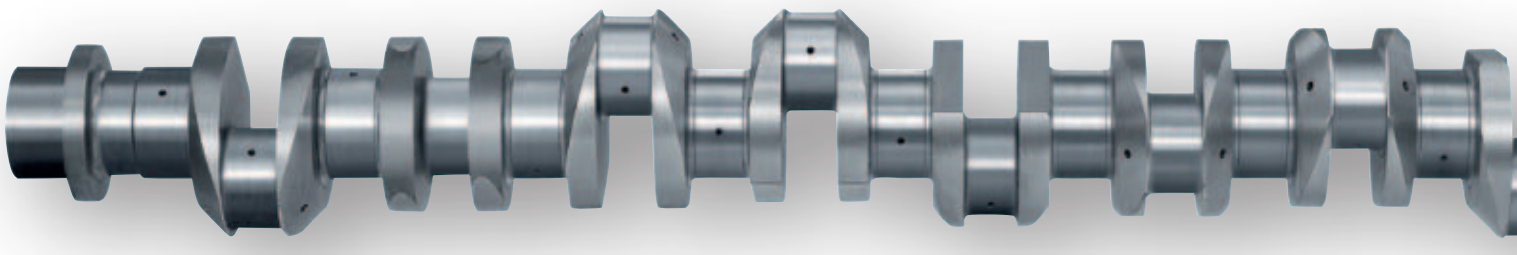


SHAFT
COMPONENTS

| Capacity | | PM 2 |
|---|---|---|
| Swing dia., max. | mm | 200 |
| | in | 7.9 |
| Workpiece length, max. | mm | 700 |
| | in | 27.6 |
| Grinding wheel dia. | mm | 500 |
| | in | 19.7 |
| Workpiece weight, max. | kg | 30 |
| | lb | 66 |





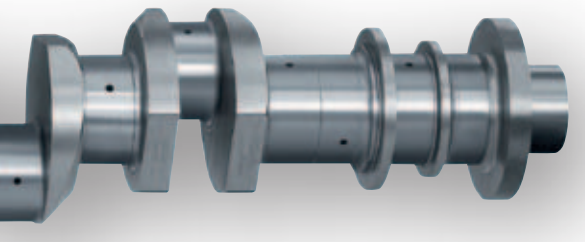


# NAXOS-UNION PM 310 / 320

# NAXOS-UNION PM 430 / 460

| Capacity | | PM 310 | PM 320 |
|---|---|---|---|
| Swing dia., max. | mm | 320 | 320 |
| | in | 12.6 | 12.6 |
| Workpiece length, max. | mm | 1,000 | 1,500 |
| | in | 39.4 | 59.1 |
| Grinding wheel dia. | mm | 650 | 650 / 700 |
| | in | 25.6 | 25.6 / 27.6 |
| Workpiece weight, max. | kg | 80 | 150 |
| | lb | 176 | 331 |

| Capacity | | PM 430 | PM 460 |
|---|---|---|---|
| Swing dia., max. | mm | 750 | 750 |
| | in | 29.5 | 29.5 |
| Workpiece length, max. | mm | 3,000 | 6,800 |
| | in | 118.1 | 267.7 |
| Grinding wheel dia. | mm | 900 / 1,400 | 1,400 |
| | in | 35.4 / 55.1 | 55.1 |
| Workpiece weight, max. | kg | 3,000 | 5,000 |
| | lb | 6,614 | 11,023 |



# EMAG RD 430
# EMAG RD 460

The RD 430 / 460, NAXOS-UNION double-head grinding machine now offers state-of-the-art technology for the grinding of large printing cylinders.

SHAFT
COMPONENTS

With this machine concept, maximum productivity, the integration of different processes into a single clamping operation and compliance with limited tolerances are possible. Linear motor technology allows for highly dynamic non-circular grinding of leading edges. CBN grinding wheels ensure a significantly faster removal of material in roughing-down mode.

| Capacity | | RD 430 | RD 460 |
|---|---|---|---|
| Workpiece length, max. | mm | 2,000 | 4,000 |
| | in | 78.7 | 157.5 |
| Workpiece dia. | mm | 550 | 550 |
| | in | 21.7 | 21.7 |
| X-axis travel | mm | 900 | 900 |
| | in | 35.4 | 35.4 |
| Z-axis travel | mm | 5,000 | 5,000 |
| | in | 196.9 | 196.9 |

# KOEPFER
# Gear Hobbing Machine 160

The gear hobbing machine 160 is equipped with the latest generation eight-axis control system and offers high speeds for both the hobbing head and main spindle.

SHAFT
AND CHUCKED
COMPONENTS

In conjunction with a fast loading device, the 160 ensures that even shafts and pinions with a minimal number of teeth can be machined at high cutting speeds and correspondingly short cycle times.

| Capacity | | KOEPFER 160 |
|---|---|---|
| Module, max. | mm<br>in | 2.5<br>0.1 |
| Workpiece dia., max. | mm<br>in | 90 / 140<br>3.5 / 5.5 |
| Hobbing length, max. | mm<br>in | 200 / 480<br>7.9 / 18.9 |
| Workpiece length, max. | mm<br>in | 300 / 1,000<br>11.8 / 39.4 |
| Hob width, max. | mm<br>in | 250<br>9.8 |
| Shift travel | mm<br>in | 160<br>6.3 |
| Main spindle speed | rpm | 4,000 |
| Hob speed | rpm | 5,000 |

# KOEPFER
# Gear Hobbing Machine 200

The machine combines cutting edge technology with versatility and flexibility in both machining and automation.

# KOEPFER
# Gear Hobbing Machine 300

The fully automated KOEPFER 300 Gear Hobbing Machine features nine activated CNC axes and can machine gears up to module 4 with great flexibility.

The production tool to machine a large range of modules and diameters of pinions and gears, worms and worm gears.

| Capacity | | KOEPFER 200 |
|---|---|---|
| Module, max. | mm | 3 |
| | in | 0.1 |
| Workpiece dia., max. | mm | 120 / 180 |
| | in | 4.7 / 7.1 |
| Hobbing length, max. | mm | 200 |
| | in | 7.9 |
| Workpiece length, max. | mm | 300 |
| | in | 11.8 |
| Hob width, max. | mm | 130 / 100 |
| | in | 5.1 / 3.9 |
| Shift travel | mm | 100 / 70 |
| | in | 3.9 / 2.8 |
| Main spindle speed | rpm | 450 / 1,000 |
| Hob speed | rpm | 2,400 / 3,000 / 5,000 |

The combination of slant bed design and closed-loop framework construction offers the highest degree of stability for both dry and wet machining.

| Capacity | | KOEPFER 300 |
|---|---|---|
| Module, max. | mm | 4 |
| | in | 0.2 |
| Workpiece dia., max. | mm | 140 / 195 |
| | in | 5.5 / 7.7 |
| Hobbing length, max. | mm | 300 |
| | in | 11.8 |
| Workpiece length, max. | mm | 300 / 800 |
| | in | 11.8 / 31.5 |
| Hob width, max. | mm | 200 |
| | in | 7.9 |
| Shift travel | mm | 160 |
| | in | 6.3 |
| Main spindle speed | rpm | 800 |
| Hob speed | rpm | 2,500 / 4,000 |

# KOEPFER VLC 200 H
# Modular Customized

The VLC 200 H is designed for wheel-shaped workpieces with a diameter of up to 200 mm and module 4. The machine is thus loaded and unloaded via the pick-up working spindle.

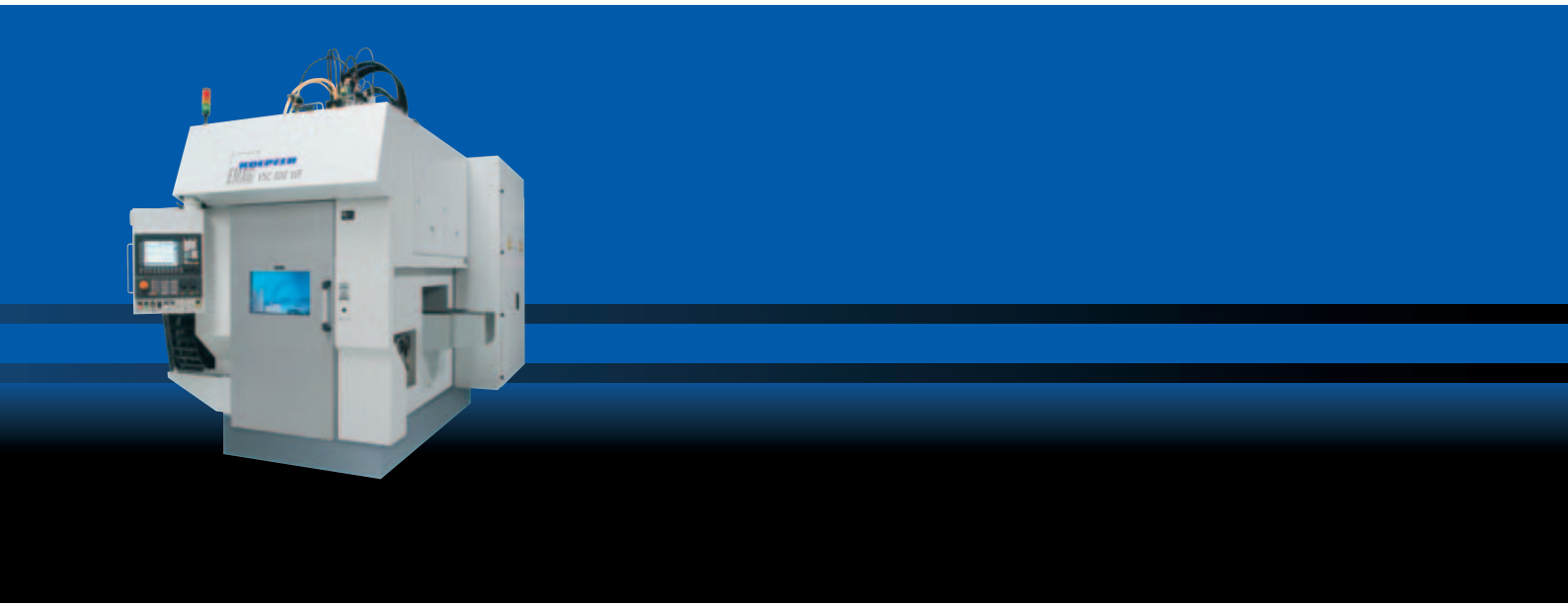

CHUCKED
COMPONENTS

This intelligent system drastically improves productivity for gear cutting on wheel-shaped workpieces – with EMAG's typical design being the main reason.

| Capacity | | VLC 200 H |
|---|---|---|
| Workpiece dia., max. | mm | 200 |
| | in | 7.9 |
| Workpiece length, max. | mm | 350 |
| | in | 13.8 |
| Cutting distance | mm | 150 |
| | in | 5.9 |
| X-axis travel | mm | 790 |
| | in | 31.1 |
| Y-axis travel | mm | 120 |
| | in | 4.7 |
| Z-axis travel | mm | 400 |
| | in | 15.7 |
| Angle of inclination | degrees | ±35 |
| Module, max. | | 4 |

# KOEPFER VSC 400 WF

This gear profiling center, based on the design of the VSC-series, is used to soft finish the gearing complete, employing turning, hobbing and deburring operations.



| Capacity | | VSC 400 WF |
|---|---|---|
| Workpiece dia., max. | mm | 230 |
| | in | 9.1 |
| X-axis travel | mm | 930 |
| | in | 36.6 |
| Y-axis travel | mm | 315 |
| | in | 12.4 |
| Z-axis travel | mm | 315 |
| | in | 12.4 |
| Angle of inclination | degrees | ±35 |
| Speed, max. | rpm | 3,000 |
| Standard module, max. | | 4 |

# KOEPFER VLC 100 C
# Modular Customized

The VLC 100 C is an automated deburring machine which loads and unloads itself via the pick-up spindle.


CHUCKED
COMPONENTS

This machine is an ideal supplement to the vertical gear hobbing machine VLC 200 H for the deburring / chamfering of internal / external gears, helical gears and similar geometries.

| Capacity | | VLC 100 C |
|---|---|---|
| Workpiece dia., max. | mm | 100 |
| | in | 3.9 |
| Workpiece length, max. | mm | 150 |
| | in | 5.9 |
| X-axis travel | mm | 340 |
| | in | 13.4 |
| Z-axis travel | mm | 660 |
| | in | 26.0 |

# KOEPFER KCS 200

The KCS 200 is used for the beveling of chucked components with a maximum diameter of 200 mm. For the machining of medium size and large component batches, robots can be used to load the gear hobbing machine; while smaller batches can be manually loaded into a stand-alone version. The KCS 200 is equipped with two machining stations, each of which features two NC axes and a swivel table. Einmitt sensors ensure the generation of contour-preserving, very accurate geometries. The five axes of the machine are capable of handling complex tooth forms.

| Capacity | | KCS 200 |
|---|---|---|
| Simultaneous beveling of two workpieces | | |
| NC axes | Qty | 4 |
| Manually adjustable axes | Qty | 4 |
| High-speed milling spindles n = 25,000 rpm | Qty | 2 |
| Tool clamping dia., max. | mm<br>in | 7<br>0.3 |
| Workpiece dia. | mm<br>in | 200<br>7.9 |
| Workpiece length, max. | mm<br>in | 100<br>3.9 |
| Workpiece weight, max. | kg<br>lb | 10<br>22 |
| Chamfer, max. | mm<br>in | 0.5 x 0.5<br>0.02 x 0.02 |

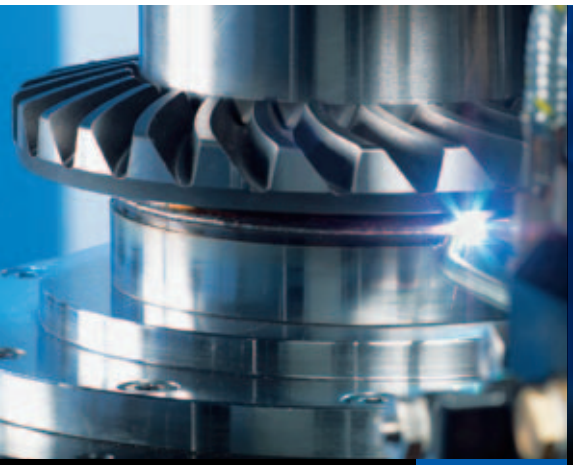
# KOEPFER Hob Sharpener KFS 100 / 250

The KFS-series is designed for sharpening straight-grooved or spiral-grooved hob cutters made of HSS or carbide metal.

| Capacity | | KFS 100 / 250 |
|---|---|---|
| Hob dia., max. | mm<br>in | 100 / 250<br>3.9 / 9.8 |
| Hob length, max. | mm<br>in | 200 / 300<br>7.9 / 11.8 |
| Grinding wheel dia., min. | mm<br>in | 50 / 50<br>2.0 / 2.0 |
| Grinding wheel dia., max. | mm<br>in | 150 / 300<br>5.9 / 11.8 |

# EMAG ELC 160

The ELC 160 is a modular system concept which can be configured for a wide range of tasks. The ELC 160 can be fitted with all laser technologies. Whether you are using a CO2 laser or fiber-guided systems (fiber, discs) – anything

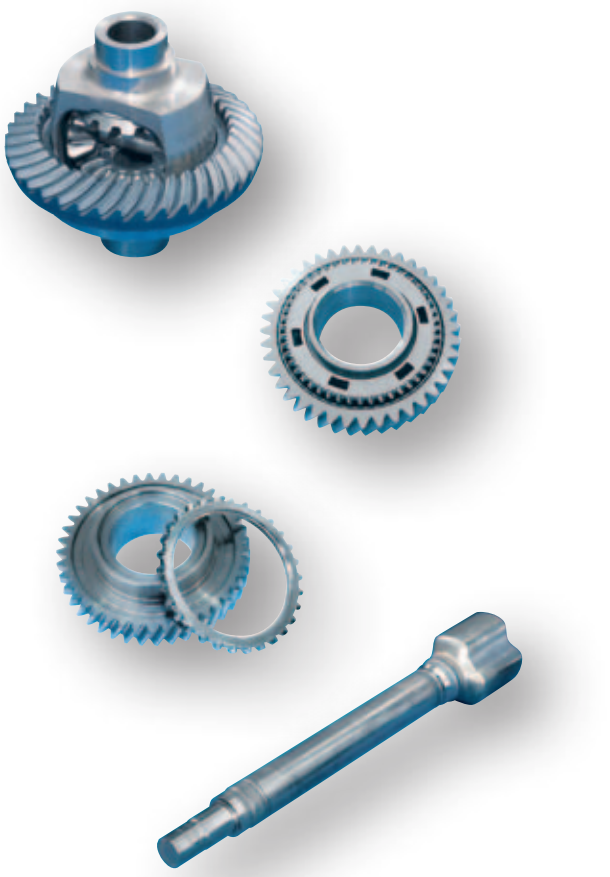


CHUCKED
AND SHAFT
COMPONENTS

is possible. The ELC 160 is suitable for both manual and automated loading. The ELC 160 can easily be adapted to different manufacturing concepts and logistics.

Expansion stages / Additional functions

- Joining / Pressing of single components
- Inductive preheating / postheating
- Brushing the weld seam
- Laser marking
- Workpiece measurement



# EMAG ELC 250 DUO

The ELC 250 DUO uses the pick-up principle – its spindle loads itself using the pick-up method and positions the workpiece for the welding lens or other process modules. The ELC 250 DUO has two independent machining stations which "share" a laser source, in other words the laser beam switches between the two stations. This increases productivity (loading and unloading parallel to machining), different workpieces can be machined simultaneously or complex follow-up machining can be carried out (e.g. laser cleaning / joining / welding / brushing / inspection).
This provides maximum technological flexibility. The compact design with integrated energy and refrigerated container ensures minimum floor space is required in the production hall.

# EMAG ELC 200 H

The ELC 200 H is designed for workpieces such as drive shafts, propeller shafts and steering shafts. It allows lasers to be used even for applications which have previously been the sole domain of welding methods such as friction welding or magnetic arc welding. The horizontal spindle and NC tailstock can flexibly machine parts of varying lengths. Retooling can be performed in the shortest possible time.

# EMAG HA 700 P

Compact, horizontal joining machine for the assembly of round pressed parts and shrinkage parts to large workpieces (e.g. crankshafts, long drive shafts, etc.) in the horizontal position.

SHAFT
AND CHUCKED
COMPONENTS

Combined assembly process with additional external or internal warming for stress-free and power-assisted joining. Force and distance-controlled process using NC joining modules.

| Capacity | | HA 700 P |
|---|---|---|
| Workpiece length, max. | mm<br>in | 700<br>27.6 |
| Joining parts dia., max. | mm<br>in | 200<br>7.9 |
| Joining parts individual weight, max. | kg<br>lb | 10<br>22 |
| Total component weight, max. | kg<br>lb | 100<br>220 |
| Pressing force, max. | kN<br>lbf | 100<br>22,480 |

# EMAG VA 700 P

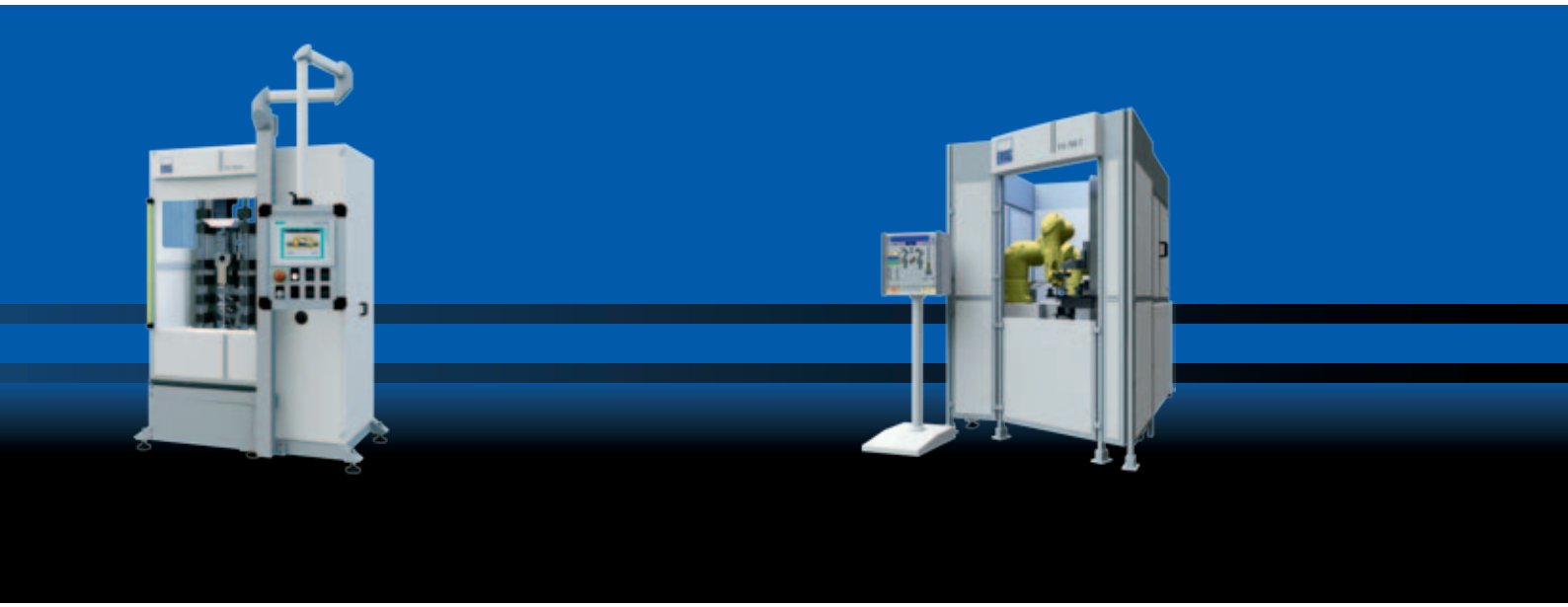
Compact, vertical joining machine for the assembly of round pressed parts and shrinkage parts on and in shafts. High precision and continuous accuracy of the joining position due to rigidity and use of absolute path-measuring system. High flexibility due to simple programming of joining force, path and speed. Support for stress-free or reduced stress joining / pressing thanks to integrated warming.

| Capacity | | VA 700 P |
|---|---|---|
| Workpiece length, max. | mm<br>in | 700<br>27.6 |
| Joining parts dia., max. | mm<br>in | 200<br>7.9 |
| Joining parts individual weight, max. | kg<br>lb | 5<br>11 |
| Total component weight, max. | kg<br>lb | 50<br>110 |
| Pressing force, max. | kN<br>lbf | 100<br>22,480 |

# EMAG VA 700 T

The camshaft joining machine VA 700 T features our patented thermal, stress-free joining process combining precision and flexibility for the heat shrink assembly of components (cams, bearing rings, sensor wheels, etc.) onto camshafts. Cost efficiency is achieved due to the modular design with short cycle times and quick retooling times.

| Capacity | | VA 700 T |
|---|---|---|
| Workpiece length, max. | mm<br>in | 1,050<br>41.3 |
| Joining parts dia., max. | mm<br>in | 100<br>3.9 |
| Joining parts individual weight, max. | kg<br>lb | 0.5<br>1.1 |
| Total component weight, max. | kg<br>lb | 20<br>44 |



# EMAG ECM System BI smart

On the ECM Standard Machining System "Basic Standard / Basic Integrated" the operator loads and removes the workpieces from the ECM unit by hand.

CHUCKED
COMPONENTS

A two-handed control button operation activates the ECM process that carries out the deburring operation.

| Capacity | | BI smart |
|---|---|---|
| Machining area | mm<br>in | 900 x 700<br>35.4 x 27.6 |
| Power rating / equipment specification | | |
| DC | V / A | 30–60 / 200–5,000 |
| Pulsed | A | max. 20,000 |
| Electrolyte | | $NaNO_3$ / NaCl |
| Operating pressure | bar | 10 |

# EMAG ECM System CS / CI

The Comfort Standard / Comfort Integrated is the best introduction to automation for the ECM processes. The Comfort stand-alone machine forms the base of a modular automation concept.

# EMAG PECM System PT smart

PECM system with modularly upgradeable tool concept for sophisticated 2D and 3D structures.

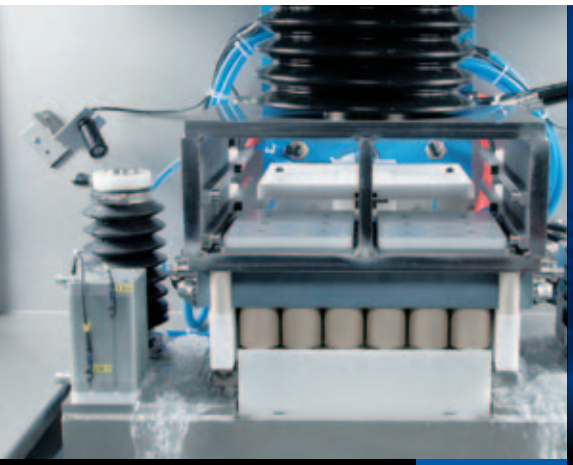
The ECM process reduces investment costs because it is only necessary to invest in interlinking (automation) of several processes (e.g. pre-washing, ECM station 1, ECM station 2, follow-up treatment) once production increases.

| Capacity | | CS / CI |
|---|---|---|
| Machining area | mm<br>in | 1,150 x 950<br>45.3 x 37.4 |
| Vertical travel | mm<br>in | 300<br>11.8 |
| Power rating / equipment specification | | |
| DC | V / A | 30–60 / 200–5,000 |
| Pulsed | A | max. 20,000 |
| Electrolyte | | $NaNO_3$ / NaCl |
| Operating pressure | bar | 10 |

- Machine base made of steel / natural stone design
- Machining area: 500 x 500 x 500 mm (W x D x H)
- Clamping plate: 250 x 250 mm
- Footprint: 1,200 x 1,200 x 2,200 mm (W x D x H)
- Clamping range with M10 thread hole grid
- High degree of positioning accuracy
- Precision oscillator
- Optional: XY table
- Optional rotary table (C-axis)
- Graphic visualization with ergonomic operator interface
- Scalable generator technology with up to 5,000 A pulsed power
- Pulse duration from 50 ms DC
- Electrolyte management adjusted to machining task

# EMAG PECM System PT

PECM system with modularly upgradeable tool concept for sophisticated 2D and 3D structures.

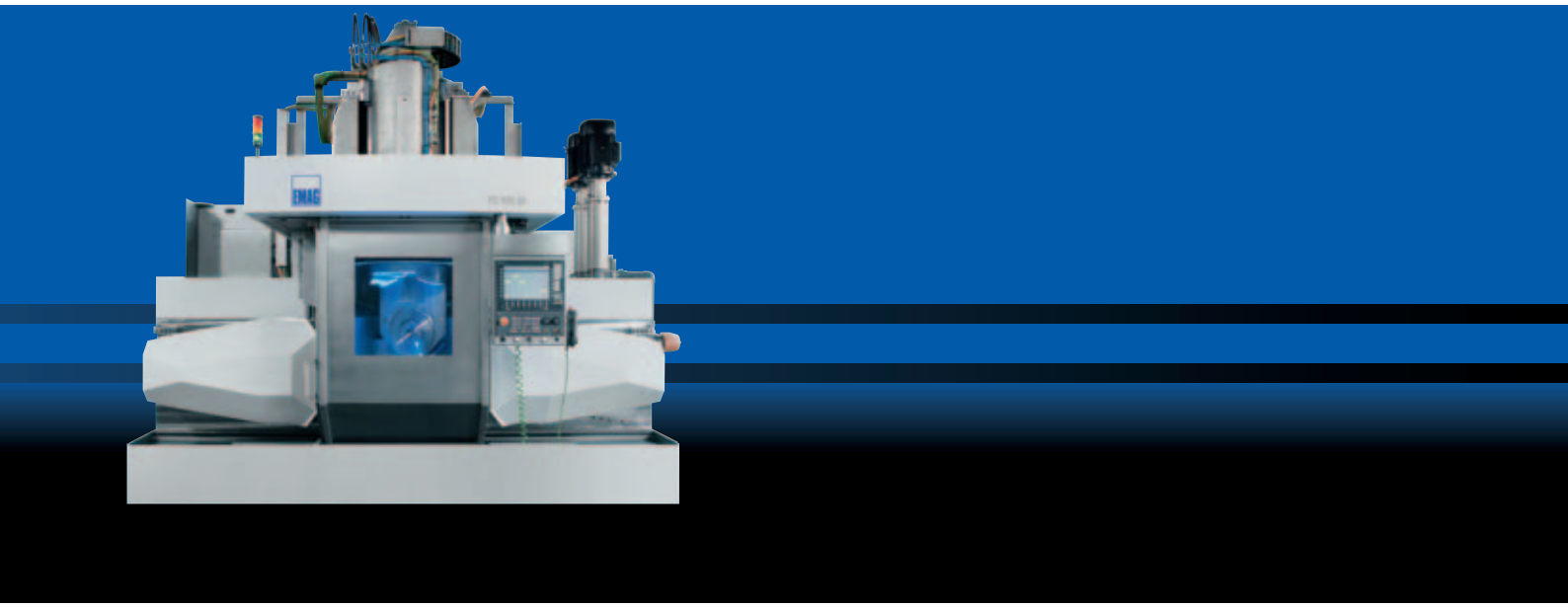


CHUCKED
COMPONENTS

- Machine base made of MINERALIT® polymer concrete
- Clamping surface: 800 x 450 x 660 mm (W x D x H)
- Machining area: 1,250 x 800 mm (W x D)
- Footprint: 1,500 x 2,200 x 3,500 mm (W x D x H)
- High degree of positioning accuracy
- Precision oscillator
- Optional: XY table
- Optional rotary table (C-axis)
- Graphic visualization with ergonomic operator interface
- Scalable generator technology with up to 20,000 A pulsed power
- Pulse duration from 50 ms DC
- Electrolyte management adjusted to machining task

# EMAG PO 900 BF

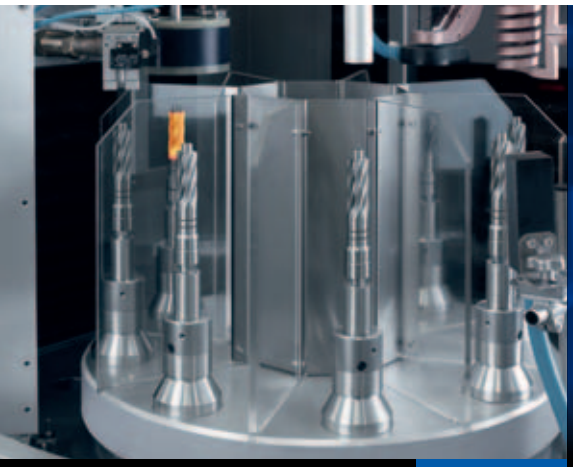
PECM system for complex metalworking applications.



- Machine base made of MINERALIT® polymer concrete
- Compound slide with adapter for paddle wheel with Z-, Y-, B- and C-axes
- Machine cover panels in stainless steel
- Component diameters of up to 900 mm
- Workpiece weight: max. 300 kg
- High degree of positioning accuracy
- Freely programmable precision oscillator
- Graphic visualization with ergonomic operator interface
- Scalable generator technology with up to 30,000 A pulsed power
- Pulse duration from 50 ms DC
- Electrolyte management adjusted to machining task

# eldec MIND

Modular systems for hardening chucked parts and shafts up to a diameter of 1,200 mm.



INDUCTION
HARDENING

Depending on the workpiece dimensions, desired hardness profile and requirements in terms of flexibility and lot size, an eldec MIND system is configured from the main components of base machine, energy source, automation components, cooling system, workholding and tooling.

| Capacity | | MIND |
|---|---|---|
| Workpiece dia., max. | mm<br>in | 600 / 1,200*<br>23.6 / 47.2 |
| Workpiece length, max. | mm<br>in | 1,500<br>59.1 |
| X-axis travel | mm<br>in | 200<br>7.9 |
| Y-axis travel | mm<br>in | 300<br>11.8 |
| Z-axis travel | mm<br>in | 750 / 1,500<br>29.5 / 59.1 |
| $f_{max.:}$ X / Y / Z | m/min<br>ipm | 3 / 12 / 24<br>118 / 472 / 945 |
| $a_{max.:}$ X / Y / Z | m/s²<br>in/s² | 2.5 / 10 / 10<br>98 / 394 / 394 |
| Workpiece weight, max. | kg<br>lb | 500*<br>1102* |

* with work table on request 1,200 mm

# eldec MIND-M

Compact hardening systems for simple heat treatment tasks.

# eldec MIND-S

Compact systems for induction hardening or any other induction heat treating of small parts.

Heat treatment tasks with a maximum power requirement of 30 kW at high frequency (HF) applications or 100 kW at medium frequency (MF) applications can be processed with the MIND-M.

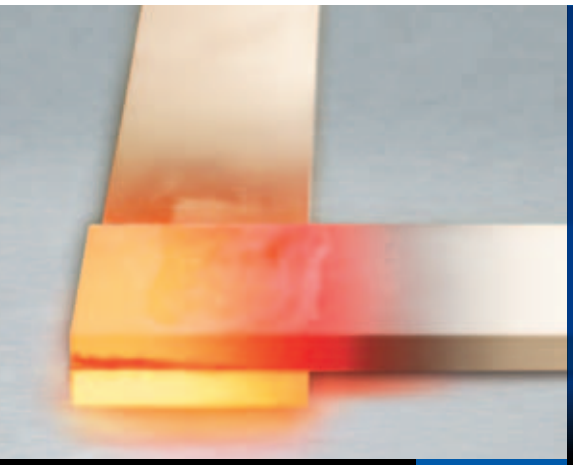
The eldec MIND-S is the compact, "smaller sibling" of our full-featured MIND hardening machine series.
Effective for low, medium and high volume production for hardening, tempering, brazing, fitting or melting in the smallest possible space.
This makes MIND-S a complete space-saving and crane-ready system with a maximum power requirement of 15 kW at high frequency (HF) applications or 30 kW at medium frequency (MF) applications.

| Capacity | | MIND-M 250 | MIND-M 1000 |
|---|---|---|---|
| Workpiece dia., max. | mm<br>in | 350<br>13.8 | 350<br>13.8 |
| Workpiece length, max. | mm<br>in | 285<br>11.2 | 1,000*<br>39.4* |
| X-axis travel | mm<br>in | 10<br>0.4 | 10<br>0.4 |
| Y-axis travel | mm<br>in | 50<br>2.0 | 50<br>2.0 |
| Z-axis travel | mm<br>in | 430<br>16.9 | 1,145<br>45.0 |
| $v_{max.:}$ Y / Z | m/min<br>ipm | 5 / 12<br>197 / 472 | 5 / 12<br>197 / 472 |
| $a_{max.:}$ Y / Z | $m/s^2$<br>$in/s^2$ | 5 / 5<br>197 / 197 | 5 / 5<br>197 / 197 |
| Workpiece weight, max. | kg<br>lb | 10<br>22 | 10<br>22 |

* work table adjustable in height

# eldec Generators

Energy sources for induction heating.
eldec generators create the basis for efficient and reliable induction heating systems, with the necessary plant-engineering environment if required.



INDUCTION
HEATING

The optimally tiered range of eldec generators comprises medium-frequency and high-frequency generators from 1.5 to 1,500 kW and SDF® generators from 50 to 3,000 kW. Depending on the system design, eldec generators can be built with or without cooling systems.

| | | |
|---|---|---|
| **MF (medium frequency)** | | |
| Typical heating depths | approx. mm<br>approx. in | 1.5 – 5.5<br>0.06 – 0.22 |
| Frequency | kHz | 8 – 40 |
| » on request | kHz | 2 – 5 |
| Power rating | kW<br>hp | 5 – 1,500<br>7 – 2,012 |
| **HF (high frequency)** | | |
| Typical heating depths | approx. mm<br>approx. in | 0.2 – 2.5<br>0.008 – 0.1 |
| Frequency | kHz | 80 – 450 |
| Power rating | kW<br>hp | 1.5 – 1,500<br>2 – 2,012 |
| **SDF® (Simultaneous Dual Frequency):** | | |
| Typical effective hardening depths (true-contour) | approx. mm<br>approx. in | 0.2 – 6<br>0.008 – 0.2 |
| Frequencies | | |
| » MF | kHz | 8 – 40 |
| » HF | kHz | 80 – 450 |
| Power rating | kW<br>hp | 50 – 3,000<br>67 – 4,023 |

# eldec MICO

Energy source and cooling system integrated in one for induction heating.
The integration of frequency converters and a cooling system in a single housing creates multiple application possibilities.

This means maximum flexibility for your heating task, making processes like inductive brazing, annealing and cutting-edge hardening as well as coating and stripping both practical and uncomplicated.
In S, M or L: the MICO product line is offered in a wide range of power ratings (from 5 kW to 70 kW) and can be both stationary or mobile.

| | | |
|---|---|---|
| Power rating | | |
| » HF | kW<br>hp | 15 – 30<br>20 – 40 |
| » MF | kW<br>hp | 18 – 70<br>24 – 94 |
| Tube package length | | up to 15 m |
| Touch screen operation | | |
| » Multiple outputs on request | | Dual output or twin |
| Dimensions (W x H x D) | | |
| » MICO-S | mm<br>in | 800 x 1,665 x 866<br>31.5 x 65.5 x 34.1 |
| » MICO-M | mm<br>in | 750 x 900 x 1,500<br>29.5 x 35.4 x 59.0 |
| » MICO-L | mm<br>in | 750 x 1,520 x 1,500<br>29.5 x 59.8 x 59.0 |

# At home in the world.

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200-1-GB/02.2014 · Printed in Germany · 