



# Modular Solutions

**2** VL 1 TWIN AND VL 3 DUO:  
MULTI-SPINDLE MACHINES FROM  
EMAG DELIVER SPEED

**4** MORE PRECISE  
The VL 4 creates  
perfect processes at  
Humbel

**8** FASTER  
VT Series: Modular  
solutions for shaft  
machining

**10** SIMPLER  
E-mobility: Efficient  
production of rotor  
blades

# VL 1 TWIN AND VL 3 DUO: MULTI-SPINDLE MACHINES FROM EMAG DELIVER SPEED

High price pressure? Increasing production demands? Get both under control with the VL 1 TWIN and the VL 3 DUO.

## VL 1 TWIN

### AT A GLANCE

- Simultaneous machining doubles your production output. The diameter and length (X / Z-direction) of components can be adjusted independently of one another.
- Linking to other EMAG machines is simple using the TrackMotion automation system.
- Precision is guaranteed by the MINERALIT® vibration damping machine base, size 45 linear roller guides, and a direct position measuring system in the X-axis.

### TECHNICAL DATA

#### HIGHLIGHTS OF THE VL 1 TWIN

Max. workpiece diameter	mm inch	75 30
Workpiece weight	kg lb	1 2
Main spindle		
» Power rating at 40% / 100% duty cycle	kW hp	10 / 9 13 / 12
» Torque at 40% / 100% duty cycle	Nm ft-lb	139 / 95 103 / 70
» Max. speed	rpm	6,000

All technical data is available at:  
[www.emag.com](http://www.emag.com) Machines



### THE TWIN CONCEPT

The VL 1 TWIN has two pick-up spindles in one machining area that can machine two identical workpieces, simultaneously – including planetary gears and sun wheels, cam parts, flanges, sleeves, etc. This doubles output quantities and lowers overall cost per piece.

The components are picked up



and machined simultaneously.



## AT A GLANCE

- OP 10 and OP 20 are completed in a single machine. The pick-up spindles load and unload both machining areas.
- The TrackMotion automation system quickly transports parts and turns them over between the storage and machining areas.
- Short distances to turrets and working spindles guarantee easy accessibility.
- The overall machine footprint (including automation and chip conveyor) is just 25 sqm (270 sq. ft.).

## TECHNICAL DATA

### HIGHLIGHTS OF THE VL 3 DUO

Max. workpiece diameter	mm	150
	inch	6
Max. workpiece length	mm	110
	inch	4
Main spindle		
» Power rating at 40% / 100% duty cycle	kW	18/15
	hp	24/21
» Torque at 40% / 100% duty cycle	Nm	144/99
	ft-lb	106/72
» Max. speed	rpm	6,000

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[www.emag.com](http://www.emag.com) » Machines

## THE DUO CONCEPT

The VL 3 DUO has two separate machining areas, both with a high performance pick-up spindle and tool turret. This guarantees the highly productive manufacturing of chucked parts with a maximum diameter of 150 mm (6 in).

OP 10 and OP 20 in a single machine.



### EMAG VIDEO



See all the machine's features in action.

## WORKPIECES

Chucked parts are produced with increased precision and reliability.

### VL 1 TWIN



Flange

Planetary gear

Cam

### VL 3 DUO



Pulley

Sprocket

Gears



### » HIGH PRECISION CHUCKED PARTS

Manufacture flanges, cams, or gear wheels in a cycle per second.

# VL SERIES

## AT A GLANCE

Vertical pick-up turning machines for the production of high precision chucked parts – available in a variety of configurations for parts with component diameters ranging from 10 mm (0.4 in) – 400 mm (16 in).

- » Complete automation, including parts storage area
- » MINIMUM FOOTPRINT
- » Simple handling
- » Direct position-measuring systems
- » EMAG turrets



## VL SERIES: EMAG'S BEST SELLER LOWERS COSTS PER PIECE

Customized production solutions are essential for the efficient creation of high quality components – and that is exactly what we offer with our cost-effective “modular solutions”.

**T**he application area for this innovative modular system is huge: these machines can be used for the production of transmission, powertrain, or e-mobility components and much more. EMAG experts using the Modular Solution system create every machine and production line specifically for the required task. This method allows us to guarantee process reliability and precision, all the time.



The machines feature an efficient turret with 12 tool positions.

### WORKPIECES

A wide range of components can be precisely machined with VL machines.



Piston



Brake disk



Flange



### » ADJUSTABLE

The raw and finished parts storage areas can be adjusted for different chucked and shaft parts.



### » COMPLETE

The TransLift can replace both pick-and-place and changer units.



### » VARIABLE

There are two gripper sizes each with two jaw sets.



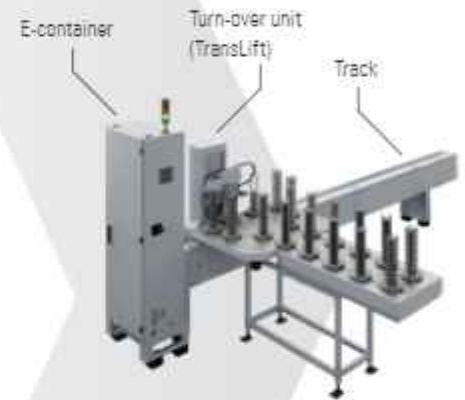
### » ECONOMICAL

The belts which act as parts storage areas can be designed in three-dimensional form to act as stackers - saving space.

## TRACKMOTION: HIGH SPEED ON RAILS

150 meters (492 ft) per minute – the TransLift moves at high speeds between the machine and parts storage area on the TrackMotion automation system.

**O**verall, this complete system creates the perfect line process. The pick-up system grabs the raw part from the parts storage area and transports it to the machine, placing it in the machining area. When the machining process is complete, the TransLift unit will then turn the component over if necessary, and transport it to the next machine, or if it is completed, place it in the finished part storage area.



### » MODULAR DESIGN

The TrackMotion automation system has a completely modular design: the rail, gripper, and parts storage area can all be adjusted.



CYCLE TIME  
**28**  
SECONDS

### » APPLICATION EXAMPLE: GEAR LINE

After turning the blank on a VL 3 DUO, the gear cutting process starts on the EMAG VL 4 H gear hobbing machine. The final deburring is then performed by a VLC 2 RC.



## “THE MACHINE’S PERFORMANCE WAS A PLEASANT SURPRISE”

Humbel Gear Technology produces high precision components for the motorsport and electric motor industries. With a new VL 4 from EMAG, Humbel is able to achieve the perfect machining process for these components.

**T**his Swiss company specializes in creating challenging gear wheels and transmission components. “Precision is everything to us,” says Humbel Managing Director, Alex Humbel. “Our customers really do demand the best component quality.”

This specialized company recently invested in several EMAG machines, including a VL 4 for its headquarters in Kradolf. The VL 4 is used in high precision processes for soft machining. The machines integrated automation guarantees high productivity, even for small volumes and with frequent component changes. Overall, the VL 4 provides the perfect base for all other processes.



## AT A GLANCE

# VL 4

The VL 4 can be customized to fit a variety of applications, while maintaining a very compact design. Including high performance drives and pick-up automation.



- 1 The **pick-up spindle** enables the machines to load themselves.
- 2 The **machine base** made of MINERALIT® polymer concrete ensures high strength and excellent vibration damping.
- 3 The **tool turret with 12 tool positions** is also suitable for driven tools.
- 4 All the **service units** are easily accessible and easy to reach.

## WHAT DOES HUMBEL GEAR TECHNOLOGY SAY ABOUT THE VL 4?

### » PRODUCTIVITY

"The pick-up automation increases productivity because the whole machining process requires just a few personnel and is completed quickly."

### » AUTOMATION

"The integrated automation has a relatively simple design. That is important to us because we wanted to avoid automation systems that were susceptible to faults."

### » STRENGTH

"Overall, the machine's performance was a pleasant surprise. We can operate at higher feed rates and speeds than we previously expected."

### EMAG VIDEO



Why the VL 4 from EMAG? Watch a film about how Humbel uses the machine.

### EMAG BLOG



Read an interview with Alex Humbel: [www.emag.com/blog](http://www.emag.com/blog)

## MORE ABOUT THE VL 4

The VL 4 can machine workpieces with a maximum diameter of 200 mm (8 in).

All technical data is available at: [www.emag.com](http://www.emag.com) » Machines



### FAST

After loading with workpiece grippers, the machining process is performed from two sides.

## VT 2/VT 4 AT A GLANCE

The vertical shaft turning machines of the VT series are equipped with four-axes for the two sided, fast machining of shafts. The maximum workpiece lengths are 400 mm/16 in for the VT 2-4 and 630 mm/25 in for the VT 4-4.

- ▶ Two tool turrets, each with eleven tool positions
- ▶ Simultaneous loading and unloading
- ▶ Integrated automation
- ▶ Easy accessibility



### TECHNICAL DATA

		VT 2	VT 4
Chuck diameter	mm	160	260
	inch	6	10
Swing diameter	mm	210	270
	inch	8	11
Workpiece length, max.	mm	400	630
	inch	16	25
Main spindle			
» Power rating at 40% / 100 %	kW	18/14	38/29
		hp	24/19
» Torque at 40% / 100 %	Nm	142/90	250/200
		ft-lb	105/66
» Max. speed	rpm	6,000	4,500

All technical data is available at:  
[www.emag.com](http://www.emag.com) ▶ Machines

## VT SERIES: DOUBLE SIDED SHAFT MACHINING

High speeds during both the machining and loading/unloading processes are essential to achieve the high volumes required for shaft machining. Achieve your desired performance with the VT 2 and VT 4 machines.

The benefits of this machine platform are obvious when the machine is required to produce high part volumes. Since this platform can machine the workpiece from two sides, the production time is dramatically reduced allowing for more parts to be machined, quicker. The machines flexibility is also guaranteed by the two tool turrets each with eleven tool stations that can be equipped with turning or driven tools.

### WORKPIECES

VT machines for shaft machining



Transmission shaft



Shaft



Transmission shaft





#### FLEXIBLE

The VM 9 can be loaded quickly by hand or automatically.

## VM 9 TURNING CENTER: FLEXIBLE MACHINING OF LARGE CHUCKED PARTS

The modular VM 9 combines turning, milling and drilling technologies on one machine – covering a wide range of applications for the machining of large chucked components. The machine can be loaded manually or automatically.

**F**ive performance criteria stand out on these multi-functional turning machines: An extraordinarily powerful main spindle ensures short machining times, the extensive tool turret guarantees flexible changing between turning and milling processes, the ergonomic design simplifies many handling processes, the integrated probe assures the machining quality – and finally, the flexibility to change between automatic and manual loading quickly, at any time.

### AT A GLANCE

The modular VM 9 turning center produces workpieces with a maximum diameter of 450 mm (18 in). This technology guarantees efficient production processes with a variety of design details.

- ▶ Powerful main spindle
- ▶ EMAG turret for twelve tools
- ▶ Quality management using a probe
- ▶ Easily accessible control units

# VM 9



### TECHNICAL DATA

#### VM 9

Chuck diameter	mm	450
	inch	18
Swing diameter over base	mm	650
	inch	26
Spindle flange to ISO 702-1		Size 8
Max. turning diameter	mm	450
	inch	18

All technical data is available at:  
[www.emag.com](http://www.emag.com) ▶ Machines

### WORKPIECES

Large chucked parts – high speed processes.  
That is what the VM 9 is all about.



Flange



Brake disk



Housing



## MODULAR SOLUTIONS FOR E-MOBILITY: ELECTRICITY IS THE RAGE!

The increasing demand for electric vehicles requires new, highly efficient, manufacturing solutions for many primary components of the powertrain. EMAG modular solutions are perfect to meet this demand!

**W**hether you are manufacturing rotor shafts, gear wheels, differentials, or rotor covers – EMAG develops a range of solutions customized for the unique component geometry and your production needs. This includes perfectly automated production systems, or stand-alone machines. The “built” rotor shaft is a particularly impressive example of this.

The multi-stage manufacturing system combines soft machining, laser welding, hardening and hard machining. A finished rotor shaft is completed in approximately 45 seconds – minimizing idle times.



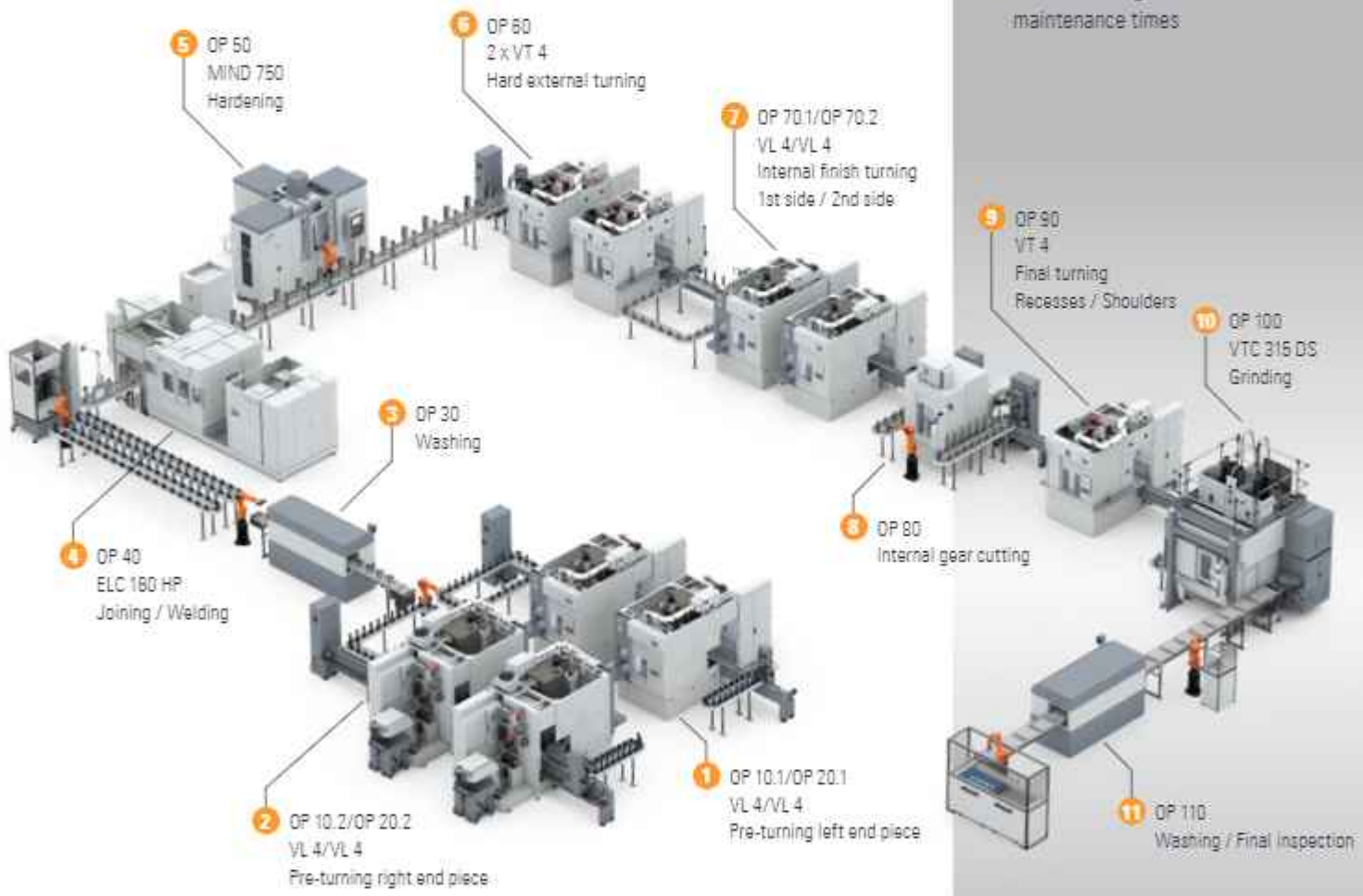
## AT A GLANCE

The line includes modular turning machines from the VL and VT Series, ELC laser welding machines, induction hardening machines from the MIND Series as well as grinding machines from the VTC DS Series.

- Technology and process development from a single source
- Everything perfectly coordinated
- Simple TrackMotion automation system
- Short retooling and maintenance times

### CUSTOMIZED

The "built" rotor shaft is produced in just ten operations.



## WORKPIECES

A variety of components for electric drive systems can be efficiently manufactured using EMAG machines. Some examples include:



Gear wheels    Gear wheels    Transmission shafts    Differential    Rotor    Rotor    Rotor cover    Rotor cover

# GO LIVE!

VISIT THE EMAG APPEARANCES ON THE WEB.



## » EMAG.COM

emag.com contains presentations of all our machines, technologies, and applications.



## » EMAG YOUTUBE

The EMAG YouTube channel shows manufacturing systems in action. Experts also explain lots of details and animations show the processes clearly.



## » EMAG BLOG

In the EMAG BLOG, we report on general market and technology developments, among other things.



## » SOCIAL MEDIA

We also have a presence on Facebook, Twitter, and Instagram – with very the latest information.

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