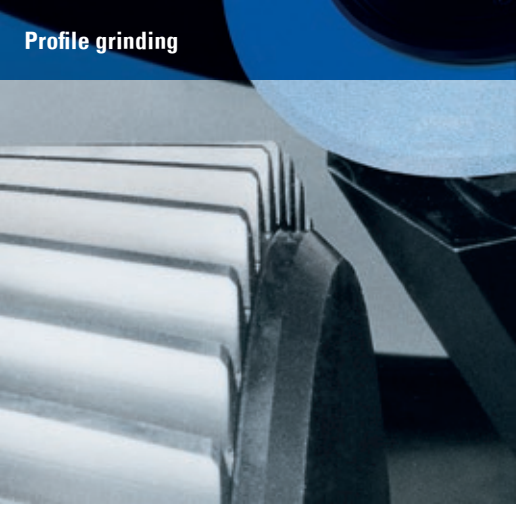
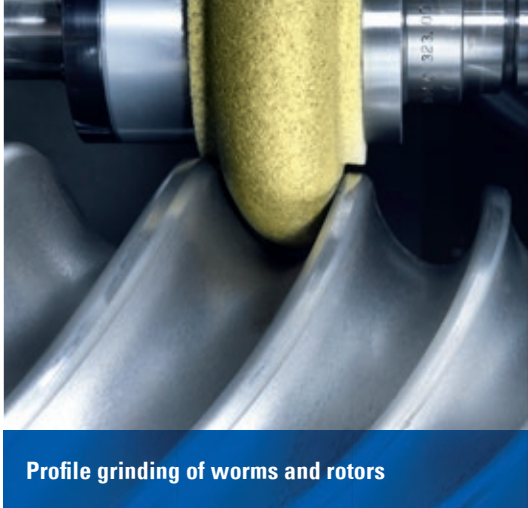


# PRODUCT OVERVIEW

EMAG SU



# EMAG SU VERTICAL AND HORIZONTAL GEAR HOBBING MACHINES

## VERTICAL HOBBING MACHINE



## HORIZONTAL HOBBING MACHINE



### CLC SERIES

Hob shafts, worm wheels and gear wheels on this innovative and flexible machine. Having a stable structure with hand-scraped tangential axes, these machines include a table and milling head equipped with direct-drive axes. Process using oil, emulsion or run dry. On request, optional equipment for skiving, single-part milling, measuring on the machine, as well as deburring and chamfering is available.

### VERTICAL HOBBING MACHINES:

Produce gear wheels, gear shafts and worm gears inexpensively with machines equipped with NC-controlled 2-station or 4-station ring loaders. Loading with the help of a robot is also planned and adding a deburring and chamfering unit is an option as well.

### HORIZONTAL HOBBING MACHINES:

Its horizontal configuration allows machining of gear wheels, worm gears and long-toothed shafts with excellent results. Setup and changeover from one workpiece to the next is easy, making these machines suitable for individual parts and small series. In addition, machine options include automation and a steady rest that can be moved to the appropriate position on an additional NC axis.

An optional spindle attachment installed on the milling head of the CLC 260H horizontal hobbing machine enables worm shafts milling.

TECHNICAL DATA	Max. module range (mm/in)	Axial travel (mm/in)	Max. diameter (mm/in)
<b>CLC 200</b>	5 (7)	400 16	200 8
<b>CLC 300</b>	8	400 (600) 16 (24)	350 14
<b>CLC 500</b>	10	600 24	500 20
<b>CLC 600 W</b>	24	1,000 39	800 32
<b>CLC 900 W</b>	24	1,000 39	1,000 39

TECHNICAL DATA	Max. module range (mm/in)	Axial travel <sup>2)</sup> (mm/in)	Max. diameter (mm/in)
<b>CLC 260 H<sup>1)</sup></b>	6	1,500/2,000 59/79	260 10
<b>CLC 500 H</b>	22/26/30	2,000/3,000 <sup>2)</sup> 79/118	500 20

1) Worm milling

2) Longer versions on request

# EMAG SU GEAR SHAPING MACHINES

## GEAR SHAPING MACHINES



### CLC SZ SERIES

Thanks to an innovative modular system, this series is extremely flexible and can be easily configured for any machining task involving gear wheels and shafts. It includes a number of different options such as an electronic inclined guideway for shaping gears with an angle of inclination, shuttle shaping, shaping of keyways and the introduction of crowning/ tapering via the CNC controller.

The machines are available with and without a retainer and with automation.

As an option, the machine can be equipped with a tool changer so that roughing and finishing tools can be exchanged, which means that process and tool costs can be reduced.

TECHNICAL DATA	Max. module range (mm/in)	Axial travel (mm/in)	Max. diameter (mm/in)	Gearing width (mm/in)
<b>CLC 200 SZ</b>	6	400 16	200 8	150 6
<b>CLC 300 SZ</b>	7	400 16	300 12	200 8
<b>CLC 500 SZ</b>	10	500 20	500 20	150 (200) 6 (8)
<b>CLC 750 SZ</b>	10	600 24	800 31	200 (250) 8 (10)
<b>CLC 1000 SZ</b>	12	600 24	1,000 39	250 (300) 10 (12)
<b>CLC 1500 SZ</b>	12	700 27	1,500 59	250 (300) 10 (12)



# EMAG SU GEAR SHAVING MACHINES AND SHAVING CUTTERS

## GEAR SHAVING



### RASO 200 – RASO 400

When it comes to gear shaving, the entire manufacturing process must be considered: Machines, cycles, tools that include a provision for the hardening process, fixtures, automation, etc. With our shaving machines, developed by the experts at EMAG SU, we can significantly improve the performance and quality of your shaving process.

Gear shaving takes place before the hardening process and produces low-noise gears. This makes it a cost-effective alternative to gear grinding. The EMAG SU machines have a modular structure and can be configured as 3, 4 or 5 NC axis machines.

Deburring, oil slinging, marking and optical component recognition can be offered as options. All common shaving processes such as plunge, parallel, underpass, diagonal and combined cycles can be used.

TECHNICAL DATA		RASO 200	RASO 400
Max. external diameter	mm in	200 8	400 16
Module range		0.5/5	1/8
Max. face width (plunge)	mm in	100 (42) 4 (1.5)	160 6.5
Number of CNC axes (optional)		3 (5, 7)	5 (7)

## GRINDING & SHARPENING SHAVING TOOLS



### GS 400

The GS 400 tool grinding machine sets new standards in terms of accuracy, reliability and productivity when sharpening shaving cutters and grinding master wheels.

Shaving cutters or high-precision test wheels can be ground on the shaving cutter grinding machine. Through the point contact of the grinding wheel and the workpiece, all conceivable modifications can be made to the gear wheel. The machine concept, with its linear motors and direct drives, is state-of-the-art; all axes are NC axes.

TECHNICAL DATA		GS 400
Min./Max. workpiece diameter	mm in	68 – 400 2-16
Max. module range		0.5/15
Max. face width	mm in	70 (90) 3 (3.5)

# EMAG SU HORIZONTAL PROFILE GRINDING MACHINES

## UNIVERSAL HORIZONTAL PROFILE GRINDING MACHINES



### G SERIES

The G Series is a highly flexible production machine that can be equipped with or without a tangential axis (GP). These machines have interchangeable spindles for grinding wheels of different sizes so that components with collision points can also be processed. Linear motors in the main axes ensure long, low-wear operation for years.

The profile grinding machines of the G Series are ideal for the profile grinding of straight and angled internal and external gears, trapezoidal screws, ball screws, crown wheels, extruder shafts, hydraulic pumps, worms, small rotors and screw-like workpieces. As an option, straight or angled internal gears can also be ground with very small grinding wheels. The software on the machine is able to dress involute and non-involute profiles according to XY coordinates. The profile is automatically corrected by measuring on the machine or in a closed loop to the external measuring machine.

The profile grinding machines of the GW Series from EMAG SU were specially developed for high-precision grinding of long screw-like profiles, such as single-shaft extruder shafts for plastic injection molding or recirculating ball screws. Optionally, these machines can be equipped with a tool changer (TC) and automatically moving steady rests.

TECHNICAL DATA		G 375 H	G 500 H/HL	GP 500 H/HL	GW 3600 H/TC
Max. workpiece diameter	mm in	375 15	500 20	500 20	500 20
Max. module range		15	0.5 – 22	0.5 – 15	10
Max. workpiece length	mm in	870 34	1,250 (2,100) 49 (83)	1,250 (2,100) 49 (83)	3,200 126
Dia. of vitrified-bonded grinding wheels	mm in	12/300 1/2 / 12	12/360 1/2 / 14	12/300 1/2 / 12	240/360 9 / 14
Max. workpiece weight	kg lb	350 771.5	350 771.5	350 771.5	500 1.102
Number of axes		4	4	5	4 (5)
Internal grinding head		✓	✓	✓	

# EMAG SU GENERATING GRINDING MACHINES

## VERTICAL GENERATING GRINDING MACHINES



### G1 60 – G 250 – G 400

EMAG SU offers a range of generating grinding machines for the machining of gears and shafts from small series to large series production. Customer-oriented solutions, such as topological grinding and fine or polishing grinding, are paramount.

Due to its innovative axis concept with a chip-to-chip time of less than 2 seconds, the G 160 is one of the fastest generating grinding machines on the market and is ideal for large series.

On the larger generating grinding machines (G 250/G 400), components can be profile-ground and generating-ground, which also makes them interesting for smaller series.

The G 250 HS is equipped with a high-speed head. Here, components with collision points can be profile-ground and generating-ground on the main spindle, even with very small grinding wheels.

All machines can be operated using automation.

TECHNICAL DATA		G 160	G 250	G 400	G 250 HS
Max. workpiece diameter	mm in	160 6	250 10	400 16	250 10
Module range		0.5 – 3	0.5 – 7.0	0.5 – 7.0	0.5/5
Max. workpiece length	mm in	300 12	550 21	750 30	550 21
Max. face width	mm in	180 7	380 15	380 15	380 15
Max./Min. grinding wheel dia.	mm in	275/210 11/8	250/160 10/6	300/220 12/8	160/70 6/3
Number of workpiece benches		2	2	1	2
Profile grinding		x	✓	✓	✓

## GRINDING WITHOUT OIL/DRY GRINDING SKIVING/GRINDING



### SG 160 SKYGRIND

The SG 160 SKYGRIND is the first generating grinding machine in the world that can be used to generate gears without cooling lubricant. The machine enables very short grinding times for machining gears, as required by the automotive industry, for example.

The advantage of this concept is that no cooling lubricant has to be used in the production of gears. This leads to significant cost savings in production.

With dry grinding, gear roughing is replaced by skiving, gear finishing is then carried out with the generating grinding process.

TECHNICAL DATA		SG 160 SKYGRIND
Max. workpiece diameter	mm in	160 6
Module range		0.5 – 3.0
Max. face width	mm in	180 7
Max. grinding wheel diameter	mm in	250 10

# EMAG SU PROCESSING OF WORMS AND ROTORS

## HORIZONTAL MILLING CUTTER FOR ROTORS AND WORMS



### CLC 260 H-FR (W) AND CLC 500 H-FR

The CLC milling machines are heavy rotor milling machines with high performance. Rotors, rotary piston shafts and worms can be machined with single-part cutters on these machines. The tool table is equipped with direct drives. Cutters with large diameters and lengths can be accommodated.

Optionally, the machine can be equipped for dry milling and with a measuring system.

## PROFILE GRINDING OF ROTORS AND WORMS



### G 375 H – GR 500 HL – GRX 500 H – GW 3600 HD

Profile grinding machines with 4 and 5 NC axes are available for profile grinding of rotors and rotary pistons.

#### 4-axis concept:

- » These machines have a dressing device for grinding with vitrified-bonded grinding wheels (G 375 H, GR 500 HL and GW 3600 HD).
- » The 4-axis machines are suitable for a large variety of individual parts and for medium batch sizes.

#### 5 axes:

- » Tangential axis for grinding with roughing (CBN) and finish grinding wheel (CBN or ceramic grinding wheel; GRX 500 H and GW 3600 HD).
- » The 5-axis machines are highly productive, but can also be used for prototypes or uncommon rotor types (optional dressing device).

#### CBN grinding wheels:

- » EMAG SU also offers CBN profile grinding wheels for the grinding of rotors, worms and gear wheels.

TECHNICAL DATA		CLC 260 H-FR	CLC 500 H-FR
Max. profile height	mm in	30 1	80 2.3
Axial travel	mm in	1,500/2,000 59/79	2,000/3,000 79/118
Max. diameter	mm in	200 8	500 20
Swivel angle	°	+/- 60	+90/-60

TECHNICAL DATA		G 375 H	GR 500 HL	GRX 500 H	GW 3600 HD
Max. workpiece diameter	mm in	250 10	400 16	350 14	100 4
Max. profile height	mm in	30 1	80 3	80 (100) 3(4)	100 4
Max. workpiece length	mm in	870 34	1,300 51	1,600 63	2,500 63
Number of axes		4	4	5	4(5)
CBN		x	x	✓	✓
Ceramic grinding wheel		✓	✓	✓ (optional)	✓ (optional)

# EMAG SU HIGHLY PRODUCTIVE WORM PROCESSING MACHINES

## WORM MILLING



The milling machine has been developed for milling worm shafts with a milling head designed for holding milling cutters. The CLC 200 FR has a vertical workpiece axis and can be equipped with a 2-station or 4-station NC ring loader. As an option, an additional process can be integrated at the 90° position of the ring loader.

## PROFILE GRINDING OF WORMS



### GR 250 AND GW 250

These profile grinding machines are equipped with a double table, which greatly reduces the chip-to-chip time. The position of the gearing and the allowance are measured at the loading and unloading position, making this machine highly productive.

A measuring system can be installed as an option.

### GR 250

The GR 250 has a grinding head for a dressable ceramic grinding wheel.

### GW 250

The GW 250 has 2 parallel grinding spindles for grinding worms, one for the CBN roughing wheel and one for a CBN finish grinding wheel. As an option, this machine can be equipped with a tangential slide, so that rotors can be machined with a CBN roughing and finish grinding wheel.

Loading and unloading processes, as well as the measurement of components, are carried out parallel to the machining process. Due to the short workpiece changeover time, the spindle remains in operation almost continuously.

TECHNICAL DATA		CLC 200 FR
Max. workpiece diameter	mm in	200 8
Worm production		✓
Diameter of milling cutter	mm in	240/275 9/11
Tooth depth	mm in	22 7/8
Number of workpiece benches		1
Swivel angle	°	+/- 60

TECHNICAL DATA		GW 250	GR 250
Max. workpiece diameter	mm in	150 6	250 10
Module range		0.7/7	0.7/7
Max. workpiece length	mm in	550 21	550 21
Number of axes		5	4
Number of workpiece spindles		2	2



# EMAG SU TOOL GRINDING MACHINE AND DE-BURRING MACHINE

## TOOL GRINDING MACHINES



### HRG 350

The HRG 350 profile grinding machine is suitable for reprofiling and producing hobs and form cutters. These can be helical or threaded hobs.

As an option, worm gear cutters and milling cutters can be ground.

The tools to be ground can have involute and non-involute profiles.

Ceramic grinding wheels are used. A dressing unit is incorporated into the machine.

### TECHNICAL DATA

#### HRG 350

Max. cutter diameter	mm in	300 12
Max. module range		0.6 – 10 (25 optional)
Max. grinding length	mm in	450 17.5
Grinding wheel diameter (profile + relief grinding)	mm in	30/100 1.5/4

## CHAMFERING AND DEBURRING



### CLC 350 CH

The chamfering and deburring machine CLC 350 CH from EMAG SU is equipped with two milling units and can deburr and chamfer the top and bottom of the gearing with end mills. Loading and unloading is done by a robot.

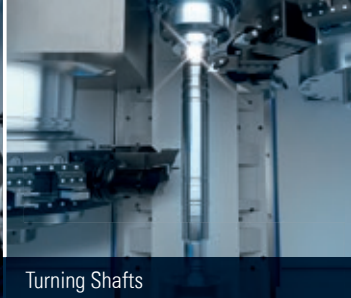
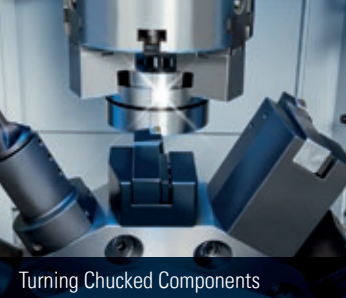
### SCT 3

On the SCT 3 chamfering and deburring machine, the component is chamfered and deburred with the help of a roller deburring tool. The material is pressed to the flat surfaces via a forming process and removed with secondary deburring disks.

### TECHNICAL DATA

#### CLC 350 CH

Max. external diameter	mm in	25/350 1/14
Max. workpiece length	mm in	500/750 20/30
Max. gearing length	mm in	200 8
Module range		1/8
Number of tool heads		2



Turning Chucked Components

Turning Shafts

Milling

Gear Hobbing

Gear Grinding

# AT HOME, AROUND THE WORLD.

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Cylindrical Grinding



Out-of-round Grinding



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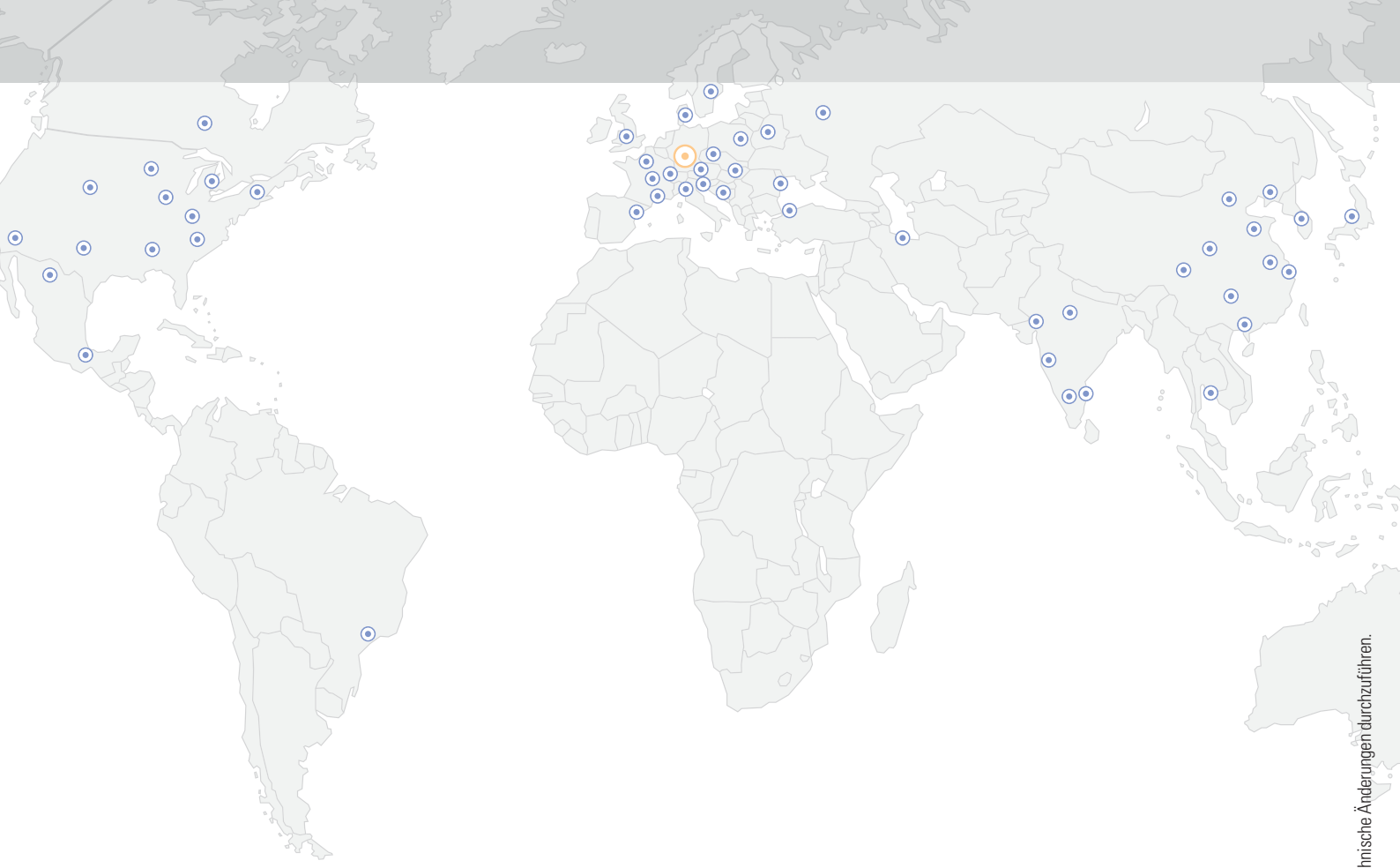
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