



# Solutions for precision machining

## UNITED GRINDING Group

The UNITED GRINDING Group is one of the leading manufacturers of precision machines for grinding, eroding, lasering, measuring and combination machining. We offer our customers comprehensive services worldwide.



# UNITED GRINDING Group

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With a turnover of around EUR 700 million, the UNITED GRINDING Group is one of the world's leading manufacturers of precision grinding, eroding, laser cutting, measuring and combination machining equipment. With about 2,500 employees at more than 20 production, service and sales locations, the Group combines optimum efficiency with customer proximity.

With its eight corporate brands MÄGERLE, BLOHM, JUNG, STUDER, SCHAUDT, MIKROSA, WALTER and EWAG, UNITED GRINDING offers a broad range of application knowledge, a large product portfolio and comprehensive services for flat and profile grinding, cylindrical grinding and tool machining.

The history of the Group companies stretches back over one hundred years, during which over 150 000 machines have been manufactured and delivered worldwide. Many years of experience and broad technological expertise make the UNITED GRINDING Group a reliable and competent solution provider for demanding production tasks.

The innovative technologies developed by the companies of the UNITED GRINDING Group have a wide range of applications, from single-item production to mass production, from small businesses to large corporations, and are in use across a wide range of industries. We focus on the automotive and automotive supply industries as well as medicine, aerospace, tools, tool and mould making, transport and heavy industry, mechanical engineering, energy and precision mechanics.

Our ultimate goal in everything we do is to make a contribution to the success of our customers.

Under the "UNITED GRINDING Digital Solutions™" brand we supply products and services for Industry 4.0 applications. UNITED GRINDING Digital Solutions™ services streamline and simplify processes, help prevent unplanned machine downtime and ensure efficient use of resources.

### Market

- A global market leader
- Close to our customers worldwide
- Strong global brands

### Finance

- Independent
- Reliable partner
- Entrepreneurial focus

### Product

- Wide-ranging application expertise
- Wide-ranging product portfolio
- Wide-ranging service portfolio

### Employees

- Most valuable asset
- At home all over the world
- Experts

## Our customers



### Automotive & suppliers

A small technical revolution is taking place in automotive engineering. Vehicles of the future must be considerably more economical, safer and more reliable. Machine tools that guarantee cost-effective machining of increasingly more complex components are essential in production. Our extensive know-how guarantees tailor-made production solutions.

Typical applications:

- Engine: crankshafts, camshafts, balance shafts, piston pins, bushings

- Valve train: valves, valve guides, rocker arms shafts, tappets
- Injection system needles, pump pistons, shafts
- Turbocharger: rotor shafts
- Transmission: shafts, shanks, differential components
- Chassis: shock absorbers, journals, brake system
- Steering: steering racks, pistons, worms, pinions, shafts
- Auxiliary units: starters, water pumps, generators, air-conditioning compressors, hydraulic pumps

### Medical



The highest machining quality is a natural prerequisite for the production of surgical instruments or prostheses. We draw on our vast experience to develop the required mechanical engineering technology for the high-precision machining of these parts. Our engineers always attach great importance to process reliability, detailed accuracy and cost effectiveness.

Typical applications:

- Surgical tools
- Dentistry
- Motors for surgical instruments
- Knee prostheses
- Hip prostheses
- Medical drills, bone drills

### Aerospace

The aerospace industry is an innovation driver: many central aircraft components are continually being further developed. With their reliability and long working life, our grinding machines score highly in the manufacture of such components. These are crucial competitive advantages, particularly in complex production processes for sophisticated components.

Typical applications:

- Engine components
- Hydraulic pumps, pistons and pinions
- Hydraulic control valves
- Control engineering for control systems
- Chassis components
- Transmission components
- Rivets
- Bolts
- Bearings

### Tooling

High-performance precision tools are the key to cost-effective production processes. Precision, speed and safety are essential aspects of their manufacture – especially with extremely hard substrates. Our experts in tool machining develop highly accurate mechanical engineering components for grinding, eroding, lasering and measuring – for any application.

Typical applications:

- Cutting tools made from HSS, HM, CBN, etc. for milling, turning and drilling
- Screw taps
- Tool holders
- Collet chucks
- Step drills
- PCD drills
- PCD mills
- Carbide end mills
- Indexable inserts
- Tools for woodworking



### Dies & moulds

The manufacture of dies and tools is a job for specialists – the process is characterised by small batch sizes and short changeover times. At the same time, moulds are becoming ever more complex and their materials ever harder. We have a wide range of machines available for this demanding task. Our tailor-made production solutions guarantee flexibility and cost effectiveness.

Typical applications:

- Injection moulds of PET bottles
- Moulds for beverage cans
- Biotechnology equipment
- Punches for tablet production
- Injection needles and cannula injection moulds
- Ejector tools



### Transportation & heavy industry

Precise and efficient machining of large components – this is the central production challenge of transportation and heavy industry. When manufacturing components for high-speed trains, construction machinery or railway axles, our machines guarantee extremely precise results despite an extremely “harsh environment”.

Typical applications:

- Engine components for marine, railway and construction vehicles
- Transmission components for marine, railway and construction vehicles
- Hydraulic motors and components
- Hydraulic valves for heavy-duty vehicles
- Transmission pumps
- Railway axles



### Machine manufacturers

Competition from new markets, plus the demand for ever more efficient production solutions – the general machine tool industry is constantly facing new challenges. We offer our customers crucial competitive advantages with innovative, efficient and cost-effective grinding machines for manufacturing various components and tools.

Typical applications:

- Spindles for machine tools
- Clamping systems
- Roller bearings
- Engine shafts
- Rolling mills
- Pumps
- Print rolls
- Chain pins
- Eccentrics

### Energy

Whether wind turbine, compressor or rotor shaft: every micrometre counts in component production for the energy industry. This determines the efficiency of the entire technology. Extreme precision machining is therefore a feature of our machines. They also stand for energy efficiency: we design sustainable solutions for sustainable energy technology.

Typical applications:

- Components for wind turbines (shafts, actuating gears)
- Components for large motors for power generation
- Compressor components
- Rotor shafts
- Heavy-duty transmissions for energy installations



### Precision engineering

The special importance of the concepts “Precision” and “Surface quality” in precision mechanics is self-explanatory. What is more, extremely exacting materials are used in applications such as clock production. We engineer efficient and reliable grinding machines for precision mechanics – maximum quality is always guaranteed for minimum sized components.

Typical applications:

- Watch cases
- Measuring instruments
- Thread gauges
- Micrometer gauges



# Our brands

Surface and profile    Cylindrical    Tooling    Service and additive manufacturing

MÄGERLE

STUDER

WALTER

IRPD

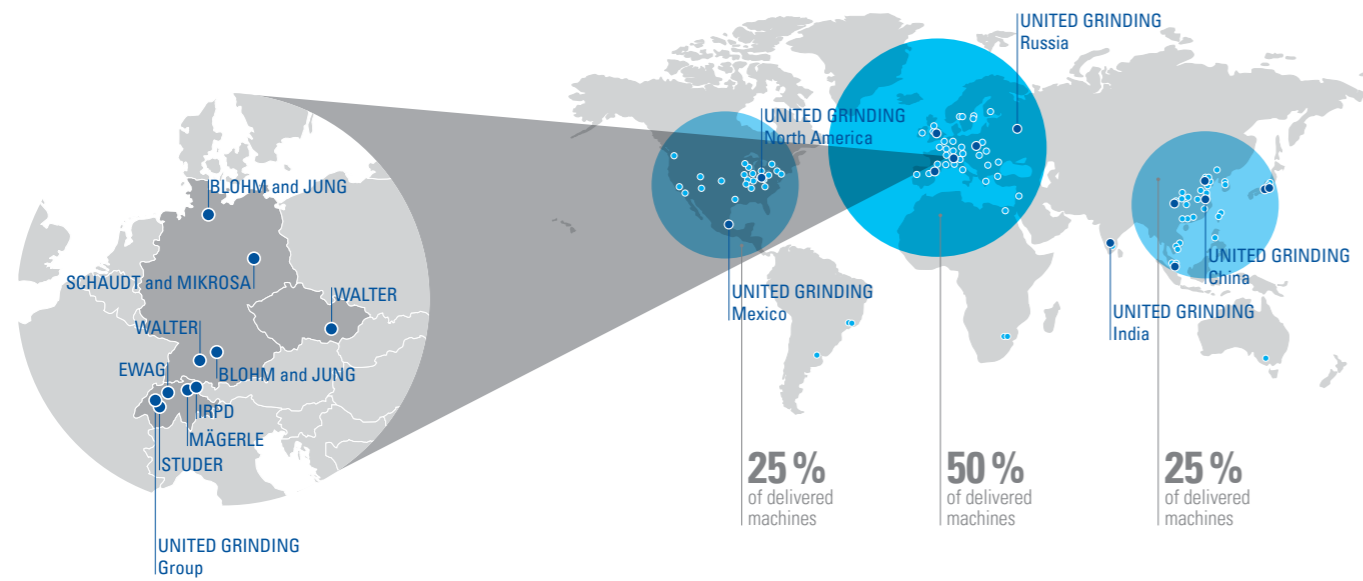
BLOHM

SCHAUDT

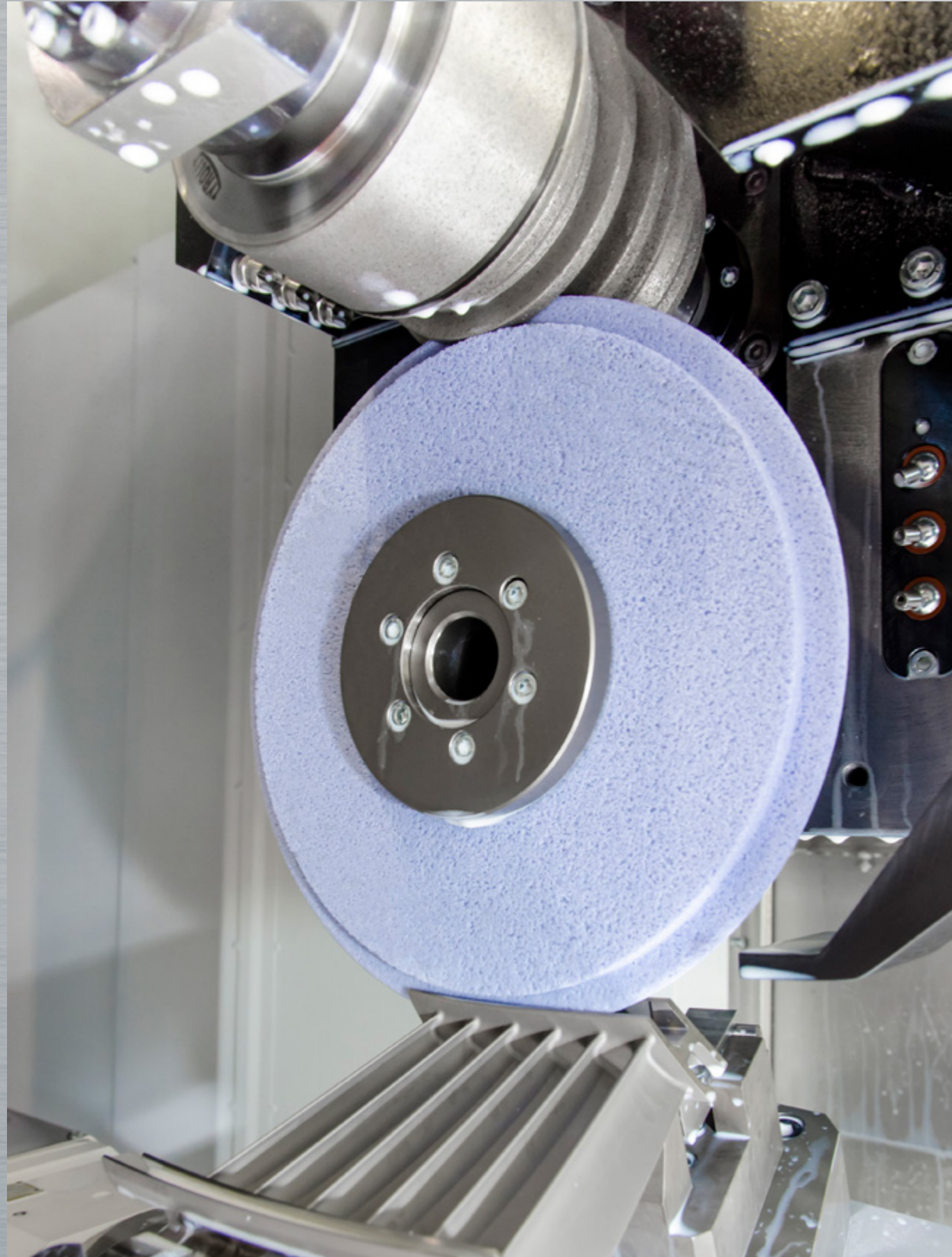
EWAG

JUNG

MIKROSA



## Surface and profile grinding expertise



MÄGERLE

BLOHM

JUNG

The MÄGERLE, BLOHM and JUNG brands, with their extensive range of high-precision surface and profile grinding machines, offer the prerequisite for delivering an optimal and cost-effective solution for your production tasks.

You can benefit from the extensive know-how gained from system solutions implemented throughout the world and the systematic implementation of goals and visions. Synergies from the collaboration between the three brands will give you an edge over your international competitors. Market-oriented innovations with added value, which you can use to your advantage.

## MÄGERLE embodies the coexistence of tradition and progress



Mägerle AG Maschinenfabrik, established in 1929, builds high-performance grinding systems for handling simple and complex surface and profile grinding tasks. As a turnkey supplier, MÄGERLE is a technology leader in highly efficient special applications. Great emphasis is placed on customer individuality and flexibility. The stable machine design, geared towards high

performance and longevity, is a distinctive feature of MÄGERLE grinding machines. In all MÄGERLE series emphasis is placed on low-maintenance, heat-resistant and water-cooled spindle drives.

They demonstrate their performance and versatility daily in demanding applications in the turbine industry, aerospace, the hydraulics industry and the energy sector, as well as for

machine manufacturers and toolmaking. All industries that make the highest demands in respect of mechanical, ergonomic and operational qualities.

## MÄGERLE MFP 30 Compact solution for high productivity



### MÄGERLE MFP 30

The compact 5-axis grinding centre MFP 30 from Mägerle is ideally suitable for grinding complex geometries, as typically in the guide vanes and rotor blades or heat shields of aircraft turbines. The workpieces to be machined are loaded ergonomically into the workspace directly from the front. The powerful drive of the high-performance spindle enables a combination of different grinding processes. Broad machining contours with high rates of removal can be realised with sturdy tool holders.

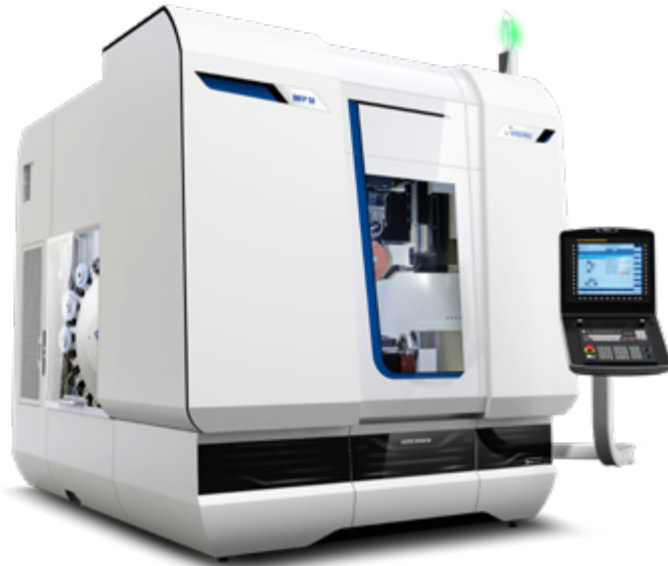
- Suitable for multiple-side and complete machining
- 12-piece or 24-piece tool changer
- Table dresser
- Grinding, milling, drilling and measuring in a single clamping
- Opt. Tool internal cooling
- 5/6-axis grinding centre

### MFP 30

X-axis	Longitudinal stroke	mm	500
	Travel speed	mm/min	0...50 000
Y-axis	Vertical stroke	mm	450
	Travel speed	mm/min	0...30 000
Z-axis	Transverse stroke	mm	500
	Travel speed	mm/min	0...30 000
Power of grinding wheel spindle drive S6-40% ED		kW	26
Rpm range max.		rpm	0...12 000
Number and type of quick-release spindles		n × type	1 × HSK-B80
Profile rolling device, roll width, max.		mm	307
Tool changer positions		n/pos	12/24
Grinding wheel dimensions (outer Ø × B × hole Ø)		mm	300 × 60 × 76.2
Tool length max.		mm	180
NC combination – rotary/swivel axes		n/axes	2/3

# MÄGERLE MFP 50

## High flexibility for demanding applications



### MÄGERLE MFP 50

The MÄGERLE MFP-50 combines flexibility and performance in a compact design. As a 5 or 6-axis system, this CD grinding and machining centre shows its top form when dealing with challenging workpieces. The intelligent design principle takes production quality, safety and cost efficiency to a new level. The coolant nozzle, controllable via two axes, allows unrestricted freedom of movement and precise positioning of the coolant jet.

- Suitable for multiple-side and complete machining
- 24-position tool changer
- 2-axis overhead dresser
- Grinding, milling, drilling and measuring in a single clamping
- Opt. Tool internal cooling
- 5/6-axis grinding centre

### MFP 50

X-axis	Longitudinal stroke	mm	500
	Travel speed	mm/min	0...30 000
Y-axis	Vertical stroke	mm	650
	Travel speed	mm/min	0...20 000
Z-axis	Transverse stroke	mm	650
	Travel speed	mm/min	0...20 000
Maximum continuous power of grinding spindle drive		kW	25/50
Rpm range max.		rpm	0...10 000
Number and type of quick-release spindles		n×type	1×HSK-B80
V-axis profile crushing device, roll width, max.		mm	215
Tool changer positions		n/pos	24
Grinding wheel dimensions (Ø×W×ø)		mm	300×60×76.2
Tool length max.		mm	200
NC combination – rotary/swivel axes		n/axes	2/3

# MÄGERLE MFP 51

## High flexibility for demanding applications



### MÄGERLE MFP 51

The sturdy grinding centre features an integrated tool changer in portal design with 66 positions. The magazine is loaded flexibly with different grinding wheels, diamond rollers, measuring probes and tools for drilling and milling. The large capacity of the tool changer enables efficient machining of several different workpieces without having to intervene in the tooling.

- Suitable for multiple-side and complete machining
- 66-position tool changer
- Automatic tool and dressing roller change
- Grinding, milling, drilling and measuring in a single clamping
- Opt. Tool internal cooling
- Opt. automatic nozzle changer
- 5/6-axis grinding centre

### MFP 51

X-axis	Longitudinal stroke	mm	500
	Travel speed	mm/min	0...50 000
Y-axis	Vertical stroke	mm	650
	Travel speed	mm/min	0...30 000
Z-axis	Transverse stroke	mm	650
	Travel speed	mm/min	0...30 000
Maximum continuous power of grinding spindle drive		kW	25/50
Rpm range max.		rpm	0...12 000
Number and type of quick-release spindles		n×type	2×HSK-B80
V-axis profile crushing device, roll width, max.		mm	60
Tool changer positions		n/pos	66
Grinding wheel dimensions (Ø×W×ø)		mm	300×60×76.2
Tool length max.		mm	250
Nozzle changer positions (optional)		n/pos	6
NC combination – rotary/swivel axes		n/axes	2/3

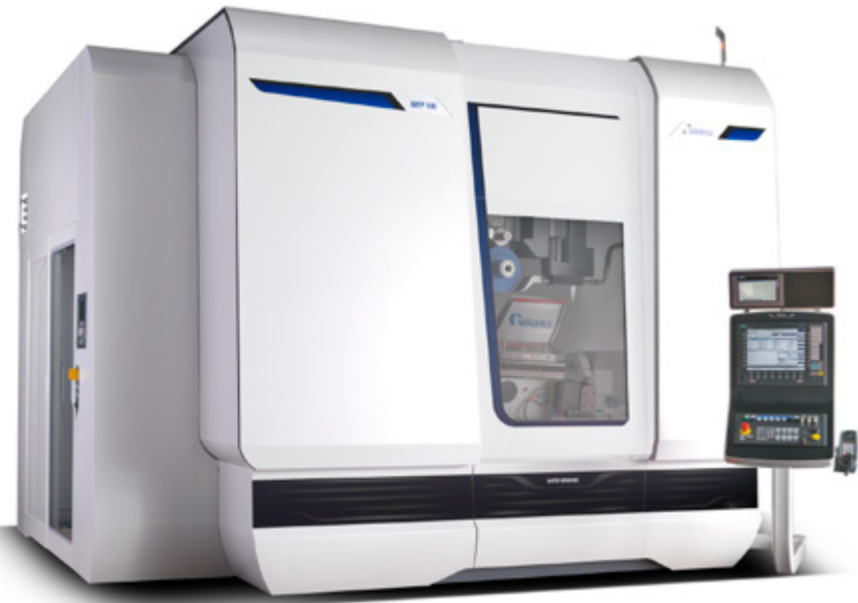
# MÄGERLE MFP 100

## Fully automatic complete machining of complex workpieces

### MÄGERLE MFP 100

With the MFP 100 Mägerle AG Maschinenfabrik is expanding the MFP series with an extremely flexible variant. The new grinding centre is distinguished by its high working speed, quick tool change and extendible tool changer. MÄGERLE designed the MFP 100 especially for markets that require cost-effective and precise multiple-side machining of heavy and complex workpieces in a single clamping. With a spindle power of 50 kW and its generously designed work area, the new MÄGERLE grinding centre is ideal for machining turbine stator and rotor vanes as well as heat shields in the aviation and energy industries.

- Suitable for multiside and complete machining
- Tool magazine with 30/60 positions
- Dual double gripper tool change system
- Automatic nozzle changer
- Tool internal cooling
- Tool database



			MFP 100
X-axis	Longitudinal stroke	mm	1 000
	Travel speed	mm/min	0...40 000
Y-axis	Vertical stroke	mm	900
	Travel speed	mm/min	0...30 000
Z-axis	Transverse stroke	mm	750
	Travel speed	mm/min	0...30 000
Grinding wheel spindle drive – max. power		kW	50
Rpm range max.		rpm	0...10 000
Anzahl und Typ Schnellspannspindeln		n × Typ	2 × HSK-B80
V-axis profile crushing device, roll width, max.		mm	100
Tool changer positions		n/pos	30/60
Grinding wheel dimensions (Ø×W×ø)		mm	300×100×76.2
Werkzeuglänge max.		mm	280
Nozzle changer positions (optional)		n/pos	8
NC dividing device swivel axes		n/axes	2/3

# MÄGERLE MFP surface and profile grinding machine

### MÄGERLE MFP series

With the MFP series, Mägerle comprehensively covers the requirements for surface and profile grinding machines. These machines specialize in creep feed grinding as well as profile and surface grinding operations using the pendulum method. They demonstrate their full performance potential in applications where workpieces must be produced in large batches and with high stock removal volumes in the customary high MÄGERLE precision. Thanks to their robust construction, the machines in the MFP series also master these requirements in hard 24/7 continuous operation. THE Mägerle MFP series has a modular design. Table lengths and vertical strokes across a large range can be freely combined with different additional axes and special components. This flexible modular system enables diverse machine configurations, which are precisely geared to the specific user requirements.

- High removal volume with high precision
- Demanding continuous operation 24/7
- Modular system for different table sizes and vertical strokes
- Configurable (user-specific)
- Optional additional spindle/swivelling spindle



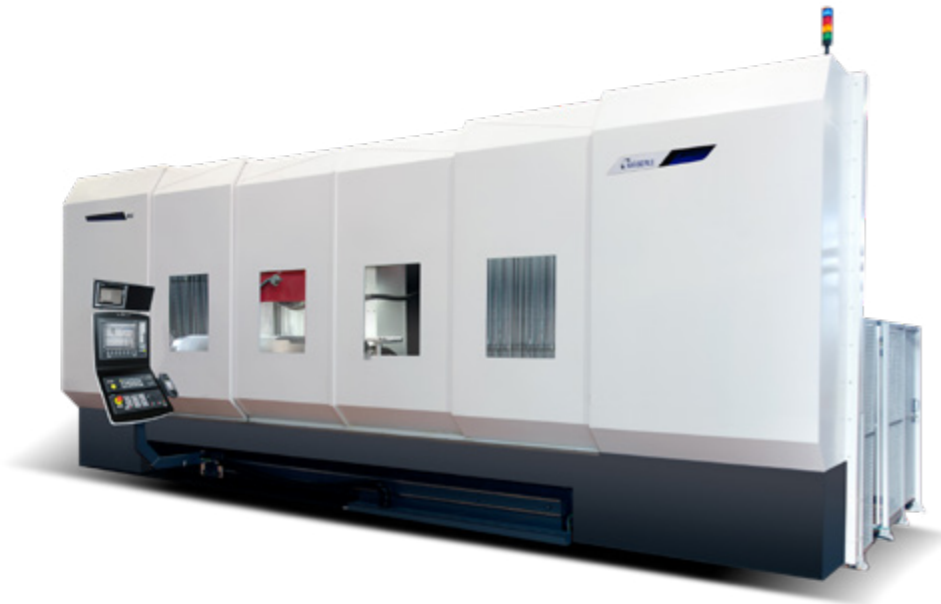
MFP			080	125	160	220	260
X-axis	Longitudinal stroke	mm	800	1,250	1,600	2,200	2,600
	Travel speed	mm/min	0...30 000	0...30 000	0...30 000	0...30 000	0...30 000
Y-axis	Vertical stroke	450 mm	■	■	■	■	■
		650 mm	■	■	■	■	■
		750 mm	–	■	■	■	■
	Travel speed	mm/min	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>
Z-axis	Transverse stroke	350 mm	■	■	■	■	■
		500 mm	■	■	■	■	■
		750 mm	–	■	■	■	■
	900 mm	–	–	■	■	■	
Travel speed	mm/min	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	
Grinding wheel spindle drive – power	25 kW		■	■	■	■	■
	50 kW		■	■	■	■	■
	75 kW		■	■	■	■	■
	115 kW		–	■ <sup>2)</sup>	■ <sup>2)</sup>	■ <sup>2)</sup>	■ <sup>2)</sup>
Rpm range	rpm	5 000 (8 000)	5 000 (8 000)	5 000 (8 000)	5 000 (8 000)	5 000 (8 000)	

<sup>1)</sup> optionally 20 m/min <sup>2)</sup> dependent on size



# MÄGERLE MGC FT with stationary workpiece carrier

## Highest load bearing capacity for large and heavy workpieces



### MÄGERLE MGC FT

The MGC grinding centre with stationary table is designed for the high-precision processing of large and heavy workpieces. With a broad range of different table sizes and vertical strokes, this machine meets the highest requirements in respect of load bearing capacity. Like all models in the MGC series, this grinding centre is also based on the proven modular concept. Thanks to its variety of configurations with one or several spindles in a horizontal or vertical arrangement as well as a multitude of additional components, the MGC with fixed console is also one of the front-runners in its category with regard to flexibility.

MGC FT			080	130	140	210
X-axis	Longitudinal stroke	mm	800	1,300	1,400	2,100
	Travel speed	mm/min	0...20 000	0...20 000	0...20 000	0...20 000
Y-axis	Vertical stroke:	450 mm	■	■	—	—
		650 mm	■	■	■	■
		900 mm	■	—	■	—
	Travel speed	mm/min	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>
Z-axis	Transverse stroke	mm	500/750	350/500	500/750	500/750
	Travel speed	mm/min	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>
Grinding wheel spindle drive – power		kW	25/50/75/115 <sup>2)</sup>	25/50/75	50/75/115 <sup>2)</sup>	50/75/115 <sup>2)</sup>
Rpm range		rpm	5 000 (8 000)	5 000 (8 000)	5 000 (8 000)	5 000 (8 000)
Fixed table (L x W)		mm	800x500/750	1 300x500	1 400x500/750	2 100x500/750

MGC FT			260	330	440	550
X-axis	Longitudinal stroke	mm	2,600	3,300	4,400	5,500
	Travel speed	mm/min	0...20 000	0...20 000	0...30 000	0...30 000
Y-axis	Vertical stroke:	450 mm	—	—	—	—
		650 mm	■	■	■	■
		900 mm	■	■	—	—
	Travel speed	mm/min	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>
Z-axis	Transverse stroke	mm	500/750	500/750	750	750
	Travel speed	mm/min	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>
Grinding wheel spindle drive – power		kW	50/75/115 <sup>2)</sup>	50/75/115 <sup>2)</sup>	50/75/115 <sup>2)</sup>	50/75/115 <sup>2)</sup>
Rpm range		rpm	5 000 (8 000)	5 000 (8 000)	5 000 (8 000)	5 000 (8 000)
Fixed table (L x W)		mm	2 600x500/750	3 300x750	4 400x750	5 500x750

<sup>1)</sup> optionally 20 m/min <sup>2)</sup> dependent on size

# MÄGERLE MGC ST with swivelling table

## Maximum productivity in batch production



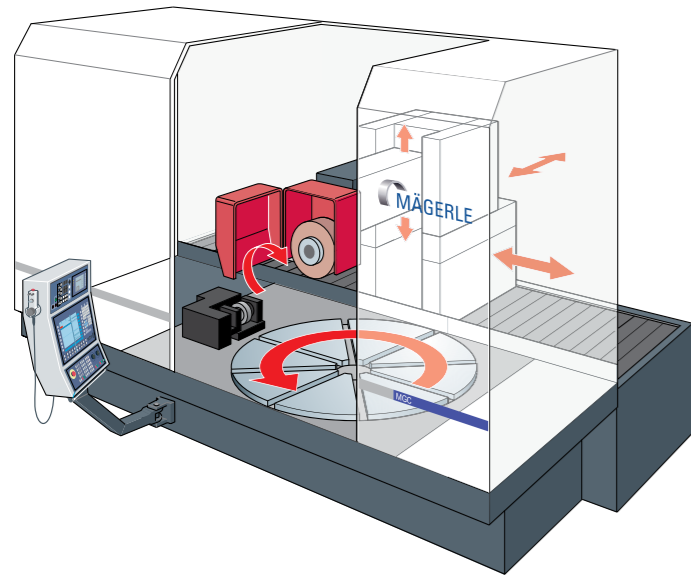
### MÄGERLE MGC ST

Like its sister systems in the MFP series, the MÄGERLE Grinding Center delivers superb results for creep feed grinding with high removal capacities as well as for profile and surface grinding. In its swivelling table version, the MGC is also designed with the maximum ejection capacity. The 180° swivelling table allows loading and unloading of workpieces while machining is in operation. Non-productive times for workpiece change are thus largely eliminated. This results in maximum productivity for small and large batches, as well as in special applications. The MGC with swivelling table, in conjunction with the automatic loading and unloading system, frees up additional reserves. The openly accessible swivelling table also provides the ideal interface.

MGC ST			130	140	210	260	330
X-axis	Longitudinal stroke	mm	1,300	1,400	2,100	2,600	3,300
	Travel speed	mm/min	0...20 000	0...20 000	0...20 000	0...20 000	0...20 000
Y-axis	Vertical stroke:	450 mm	■	—	■	—	—
		650 mm	■	■	■	■	■
		900 mm	—	■	■	■	■
	Travel speed	mm/min	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>
Z-axis	Transverse stroke	mm	350/500	500/750	500/750	500/750	500/750
	Travel speed	mm/min	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>
V-axis profile crushing device, roll width, max.		mm	167	207	247	307	—
			■	■	■	■	■
			—	■ <sup>2)</sup>	■ <sup>2)</sup>	■ <sup>2)</sup>	■ <sup>2)</sup>
Roll diameter max.		mm	160	160	160	160	160
Roll drive AC drive, max.		rpm	6 000	6 000	6 000	6 000	6 000
Grinding wheel spindle drive – power		kW	25/50/75	50/75/115 <sup>2)</sup>	50/75/115 <sup>2)</sup>	50/75/115 <sup>2)</sup>	50/75/115 <sup>2)</sup>
Rpm range		rpm	5 000 (8 000)	5 000 (8 000)	5 000 (8 000)	5 000 (8 000)	5 000 (8 000)
Grinding wheel peripheral speed		m/s	35	35	35	35	35
– switchable with key-operated switch		m/s	50	50	50	50	50
– with additional flange monitoring switchable up to		m/s	63	63	63	63	63
Grinding wheel dimensions (Ø x width)		mm					
– diameter		mm	400/500/600 <sup>2)</sup>	400/500/600 <sup>2)</sup>	400/500/600 <sup>2)</sup>	400/500/600 <sup>2)</sup>	400/500/600 <sup>2)</sup>
– width		mm	160/200/240/300 <sup>2)</sup>	160/200/240/300 <sup>2)</sup>	160/200/240/300 <sup>2)</sup>	160/200/240/300 <sup>2)</sup>	160/200/240/300 <sup>2)</sup>
Swivelling table ± 180° with 2 clamping surfaces (L x W)		mm	760x325	760x325	1 000x440	1 000x440	1 150x600

<sup>1)</sup> optionally 20 m/min <sup>2)</sup> dependent on size

## MÄGERLE MGC RH with rotary table and horizontal spindle First-class results for Hirth gears and curvic couplings



### MÄGERLE MGC RH

With table diameters of up to 2.5 metres and a maximum load-bearing capacity of 12 tons, the MGC rotary table grinding centre is unequalled throughout the world. Well-known companies in the power turbine industry rely on this powerful concept. This grinding centre is unrivalled, particularly when it comes to machining turbine blades with Hirth gears and curvic couplings of the highest quality. The direct-drive rotary table mounted on hydrostatic bearings ensures the necessary precision, with a positioning accuracy of less than three angular seconds.

- Rotary table with load bearing capacity of up to 12 tons
- Hirth gears and curvic couplings of the highest quality

MGC RH		140	210	260	
X-axis	Longitudinal stroke	mm	1,400	2,100	2,600
	Travel speed	mm/min	0...20 000	0...20 000	0...20 000
Y-axis	Vertical stroke	450 mm	■	■	–
		650 mm	■	■	■
		900 mm	■	–	■
		1,200 mm	■	■	–
	Travel speed	mm/min	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>
Z-axis	Transverse stroke	mm	500/750	500/750	500/750
	Travel speed	mm/min	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>
V-axis profile crushing device, roll width, max.	167 mm	■	■	■	
	207 mm	■	■	■	
	247 mm	■	■	■	
	307 mm	■	■	■	
Roll diameter max.	mm	160	160	160	
Roll drive AC drive, max.	rpm	6 000	6 000	6 000	
Grinding wheel spindle drive – power	kW	50/75/115 <sup>2)</sup>	50/75/115 <sup>2)</sup>	50/75/115 <sup>2)</sup>	
Rpm range	rpm	5 000 (8 000)	5 000 (8 000)	5 000 (8 000)	
Grinding wheel peripheral speed	m/s	35	35	35	
	– switchable with key-operated switch	m/s	50	50	50
	– with additional flange monitoring switchable up to	m/s	63	63	63
Grinding wheel dimensions (Ø×W)	– diameter	mm	400/500/600 <sup>2)</sup>		
	– width	mm	160/200/240/300 <sup>2)</sup>		
Rotary table diameter	mm	800/1 000/1,200	800/1 000/1,200	1,200/1,500/2 000/2,500	

<sup>1)</sup> optionally 20 m/min <sup>2)</sup> dependent on size

## MÄGERLE MGC RV with rotary table and vertical spindle Huge versatility at the highest performance level



### MÄGERLE MGC RV

Versatility with the highest production quality level is the outstanding strength of this vertical grinding machine. It demonstrates its capabilities particularly in the manufacture of bearing rings, where optimum runout characteristics are required for maximum smooth running. Equipped with rotary table and fully automatic tool changer, this vertical grinding machine can master other functions in addition to grinding. Whether turning, milling, drilling, reaming or boring, this system delivers the same impressive results. The vertically arranged spindle swivelling in the range of ± 50° offers plenty of space for machining a wide variety of workpieces. An interchangeable spindle measuring probe guarantees that each individual workpiece is machined in a single clamping with consistently high perfection.

- Suitable for multi-process machining
- Fully automatic tool changer
- Turning, milling, drilling or drill-finishing in a single clamping
- Interchangeable spindle measuring probe

MGC RV		140	210	260	
X-axis	Longitudinal stroke	mm	1,400	2,100	2,600
	Travel speed	mm/min	0...20 000	0...20 000	0...20 000
Y-axis	Vertical stroke	650 mm	■	■	■
		900 mm	■	■	■
		1,200 mm	■	■	■
	Travel speed	mm/min	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>
Z-axis	Transverse stroke	mm	500	500	500
	Travel speed	mm/min	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>	0...10 000 <sup>1)</sup>
Grinding wheel spindle drive – power	kW	30	30	30	
Rpm range	rpm	8 000/...15 000	8 000/...15 000	8 000/...15 000	
Grinding wheel peripheral speed	m/s	35	35	35	
	– switchable with key-operated switch	m/s	50	50	50
Tool change fixtures	n/pos	8/16   12/24			
Tool length	mm	300	300	300	
Grinding wheel dimensions (Ø×W×ø)	mm	300×150×76.2	300×150×76.2	300×150×76.2	
Rotary table diameter	mm	800/1 000/1,200	1,200/1,500	1,500/2 000	

<sup>1)</sup> optionally up to 20 m/min

# MÄGERLE MGC Special

## Tailor-made grinding centres for user-specific requirements



### MÄGERLE MGC Special

The standardised MÄGERLE modular concept can be freely configured to provide individual solutions. Grinding centres which are completely tailored to specific customer requirements are developed within the scope of a proven product range. Single and multiple spindle systems with a horizontal or vertical arrangement can be combined as desired with stationary workpiece carriers, swivelling table or rotary table, in any dimensions. The result in all cases is a made-to-measure machine which meets the demanding requirements for manufacturing quality in the automotive, aviation and hydraulic sectors, in turbine construction and mechanical engineering, as well as in the roller bearing and tool industry, while ensuring optimal cost effectiveness.

- Single and multiple spindle systems
- Optimum cost effectiveness and manufacturing quality in a wide range of applications
- Round/swivel/stationary table variants

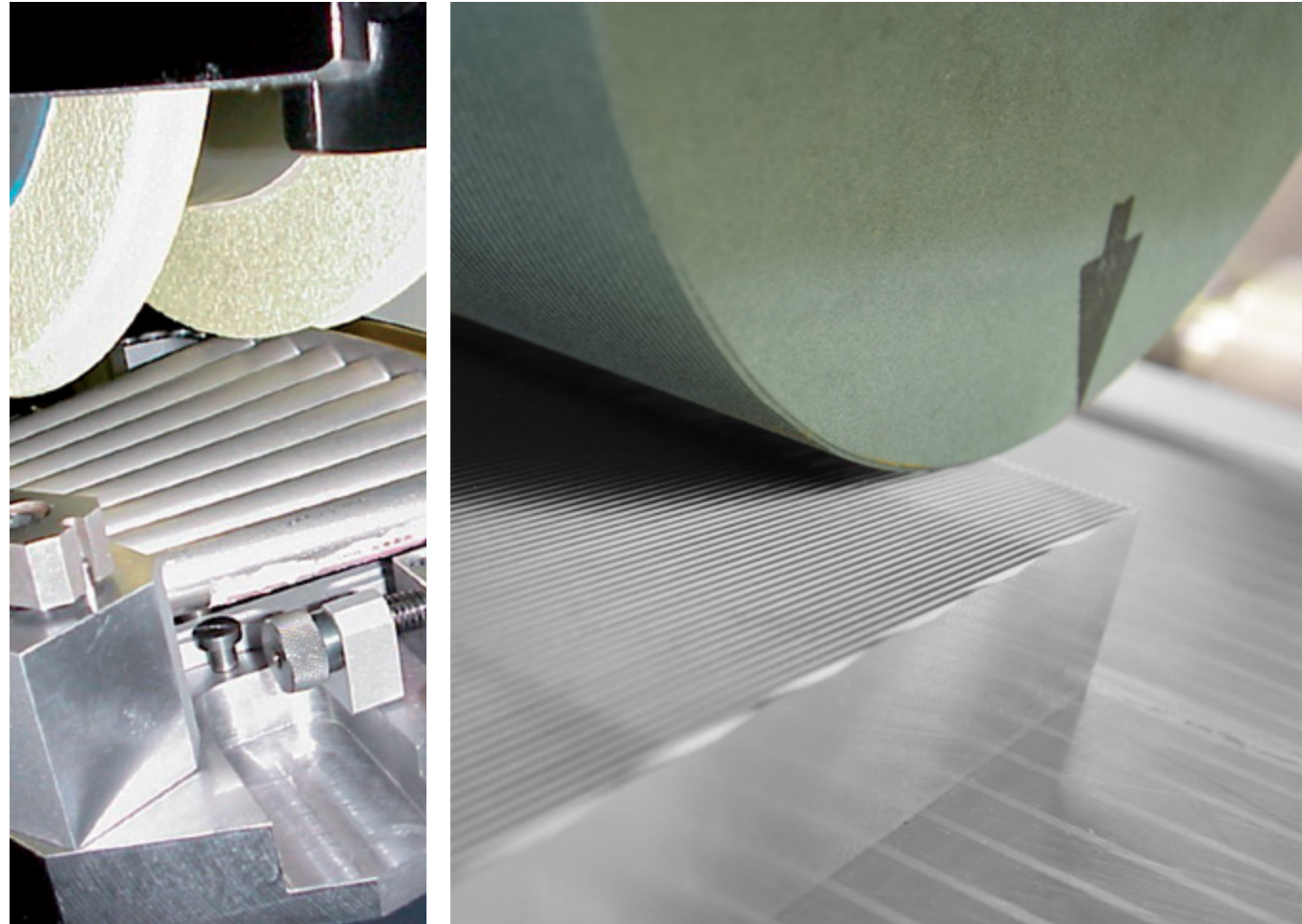
## MGC Special

### MGC with extended machine configurations

X-axis	Longitudinal stroke max.	mm	5,500
	Travel speed	mm/min	0...10 000 <sup>1)</sup>
Y-axis	Vertical stroke	mm	450/650/900/1,200
	Travel speed	mm/min	0...10 000 <sup>1)</sup>
Z-axis	Transverse stroke	mm	500 – 900
	Travel speed	mm/min	0...10 000 <sup>1)</sup>
V-axis profile device, roll width		mm	167 – 307
Grinding wheel spindle drive - power		kW	25 – 115
Rpm range		rpm	0...24 000
Grinding wheel dimensions (Ø)		mm	30 – 1,150
Rotary table diameter		mm	1 000 – 2,500
Rotary table variants	Rotary indexing table, rotary table with hydrostatic bearings and direct drive		
Spindle configurations	Horizontal, vertical, swivelling spindle(s), special spindles Multiple spindle configurations		

<sup>1)</sup> optionally up to 20 m/min and dependent on size

## BLOHM and JUNG – two brands, one philosophy



BLOHM grinding machines have been used worldwide since 1924, wherever productivity, performance and precision are required. They are developed in Hamburg and produced in a modern manufacturing facility to high quality standards. More than 15000 delivered machines reflect the international recognition of the BLOHM brand. This accumulated experience and ongoing collaboration with colleges as well as in European research projects form the basis for the company's special grinding expertise in the area of surface and profile grinding. The product range includes stand-

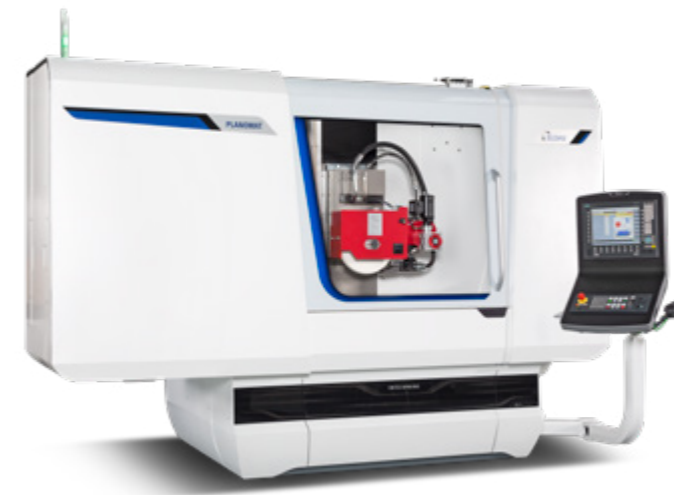
ard machines for individual and small batch production, as well as customised production machines.

The JUNG brand has been considered one of the top names worldwide for highest precision and surface quality in surface and profile grinding since 1919. More than 19000 machines delivered internationally have established a high standard in grinding operations and form the basis for the company's outstanding reputation for precision, durability and reliability.

JUNG machines are small and medium-sized grinding machines for fine finishing of precision parts for industry sectors such as die & mould, automotive or general machine manufacturers.

The management of both established brands under the umbrella of Blohm Jung GmbH combines their extensive know-how, whilst constantly enabling new, higher standards in precision, quality and cost effectiveness.

## BLOHM PLANOMAT HP Cutting-edge technology for surface and profile grinding



### BLOHM PLANOMAT HP

High infeed speeds and accelerations and the use of high-precision re-circulating ball screws with digital drives distinguish the PLANOMAT HP series. Virtually maintenance-free linear guideways, linear scales for the Y and Z-axis and a powerful grinding wheel spindle drive with 15 kW (optionally 24.5 kW) complete the concept. The machine bed, travelling column, table and grinding head of the PLANOMAT HP are made of grey cast iron, guaranteeing excellent rigidity and damping. The rigidity and weight have been further optimised using 3D-CAD with finite element calculations. This design principle guarantees high precision and a long working life.

- Modular system
- High quality components made from grey cast iron
- Thermal and vibration engineering characteristics optimised via finite element calculation
- Precision linear guideways
- High quality, ground ball-type linear drives

### BLOHM PLANOMAT HP CNC

The BLOHM PLANOMAT HP CNC is available with the SIEMENS 840D solution line. A wide range of grinding and dressing programs opens up all surface and profile grinding options.

Accessories such as table-mounted dressing devices, single-axis dividing devices, horizontal grinding arms, vertical grinding spindles, internal grinding attachments and measuring probes enable a wide range of application for the PLANOMAT HP.

PLANOMAT HP			408	412	608	612	616	620
Grinding range	mm		400 x 800	400 x 1,200	600 x 800	600 x 1,200	600 x 1,600	600 x 2,000
Table clamping surface with additional areas	mm		400 x 1,200	400 x 1,600	600 x 1,200	600 x 1,600	600 x 2,000	600 x 2,400
Distance between table and spindle centre	mm		150...700 (optionally 950)					
X-axis	Table longitudinal travel, max.	mm	900	1,300	900	1,300	1,700	2 100
	Infeed speed	mm/min	30...40 000					
Y-axis	Grinding head vertical travel	mm	550 (optionally 800)					
	Infeed speed	mm/min	4...6 000					
Z-axis	Column transverse travel	mm	360	360	560	560	560	560
	Infeed speed	mm/min	4...6 000					
Grinding wheel spindle drive, variable	kW/rpm		15/1000 (optionally 24.5/1250)					
Grinding wheel dimensions (Ø x W x ø)	mm		400 x 30...100 x 127					

# BLOHM PROFIMAT MC

## The compact production solution



### BLOHM PROFIMAT MC

The PROFIMAT MC is an exceptionally compact and high-performance production machine for flexible technological applications. Machine-specific accessories open up a broad field of application.

Different spindle variants enable a wide range of application. The six-axis CNC profile grinding machines can be equipped with a horizontal spindle for drive capacities up to 62 kW, and alternatively with a stationary or an NC-swivelling vertical spindle with grinding spindle speeds of up to 120 000 revolutions per minute.

- Travelling column design
- Rigid machine structure thanks to generous guide spacings
- High infeed speeds and accelerations
- RazorTec®, the new grinding wheel cleaning process

PROFIMAT		MC 607	MC 610	MC 610 VS
Grinding range	mm	600×700	600×1 000	600×1 000
Table diameter	mm	–	–	600...1,200
X-axis column longitudinal travel, max.	mm	700	1 000	1 000
Y-axis grinding head vertical travel	mm	650	550 <sup>1)</sup>	800
Z-axis column transverse travel	mm	520	520	320
A-axis, dividing device, swivelling range (opt.)	degrees	+ 105 / - 90	+ 105 / - 90	
C-axis, dividing device, swivelling range (opt.)	degrees	360	360	
V-axis, stroke of head dressing device (opt.)	mm	127	127	–
Grinding wheel spindle drive, variable	kW/rpm	up to 62/8 000		
Grinding wheel dimensions (Ø×W×ø max.)	mm	500×200×127	500×200×127	500×100×127

<sup>1)</sup>Optional: 800 mm

# BLOHM PROFIMAT RT

## The compact production solution



### BLOHM PROFIMAT RT

The high-performance PROFIMAT RT is the perfect grinding solution for the production of large batch sizes and for series production. Equipped with a rotary indexing table, it reduces auxiliary times thanks to loading and unloading during the grinding process. Low set-up costs combined with high efficiency and the possibility of simple adaptation of automatic workpiece change systems set benchmarks in modern and cost-effective production.

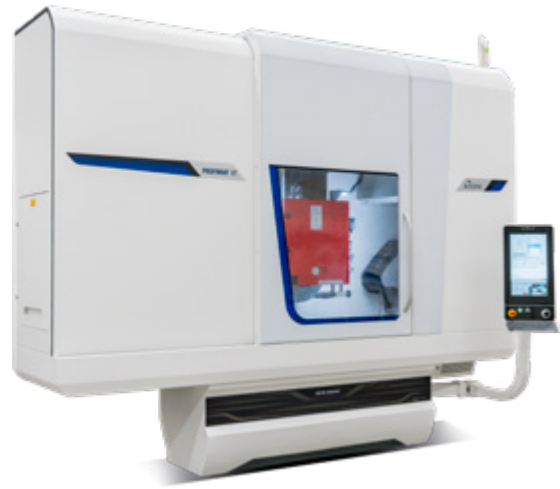
- Rotary indexing table diameter 1 000 mm
- Travelling column design
- Rigid machine structure thanks to generous guide spacings
- High infeed speeds and accelerations

PROFIMAT		RT 1000
Grinding range	mm	–
Table diameter	mm	1 000
X-axis column longitudinal travel, max.	mm	1 000
Y-axis grinding head vertical travel	mm	550
Z-axis column transverse travel	mm	520
A-axis, dividing device, swivelling range (opt.)	degrees	
C-axis, dividing device, swivelling range (opt.)	degrees	
V-axis, stroke of head dressing device (opt.)	mm	127
Grinding wheel spindle drive, variable	kW/rpm	up to 62/8 000
Grinding wheel dimensions (Ø×W×ø max.)	mm	500×200×127

<sup>1)</sup>Optional: 800 mm

# BLOHM PROFIMAT XT

## The benchmark for efficiency in profile grinding

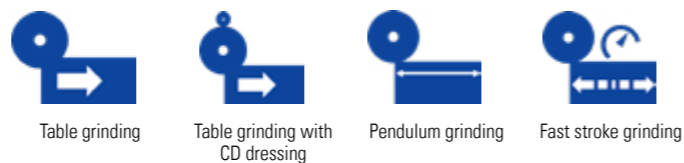


### BLOHM PROFIMAT XT

The PROFIMAT XT builds on the experience and quality of the hugely successful PROFIMAT MT. Higher axis speeds, higher accelerations and increased system rigidity – the combination of enhanced influential factors inevitably results in greater productivity with higher component quality at the same time. These properties distinguish the PROFIMAT XT as a sturdy and powerful production grinding machine. With an extensive range of accessories, the PROFIMAT XT can be optimally adapted to all customer requirements.

- Modular system
- High-quality components made from ductile cast
- Thermal and vibration engineering characteristics optimised via finite element calculation
- Precision linear guideways
- High quality, ground ball-type linear drives

### FIT – Four integrated technologies



PROFIMAT XT		408	412	608	612	620
Grinding range (W x L)	mm	400x800	400x1 200	600x800	600x1 200	600x2 000
Table clamping surface with additional areas	mm	400x1 300	400x1 700	600x1 300	600x1 700	2 500
Distance between table and spindle centre	mm	970				
X-axis						
Table longitudinal travel, max.	mm	1 100	1 500	1 100	1 500	2 300
Infeed speed	mm/min	30...40 000				
Y-axis						
Grinding head vertical travel	mm	800				
Infeed speed	mm/min	4...10 000				
Z-axis						
Column transverse travel	mm	360	360	560	560	560
Infeed speed	mm/min	4...10 000				
V-axis, stroke of head dressing device (opt.)	mm	160				
Grinding wheel spindle drive, variable	kW/rpm	44/8 000 (option 62/8 000)				
Grinding wheel dimensions (Ø x W x ø)	mm	400x160x127 (option 500x200x203.2)				

# BLOHM PROFIMAT MT

## The benchmark for efficiency in profile grinding



### BLOHM PROFIMAT MT

The PROFIMAT MT has been systematically developed as a robust, high-performance profile grinding machine for flexible technological applications. The PROFIMAT MT flexible powerhouse is the right choice for applications where the production process requires high metal removal rates.

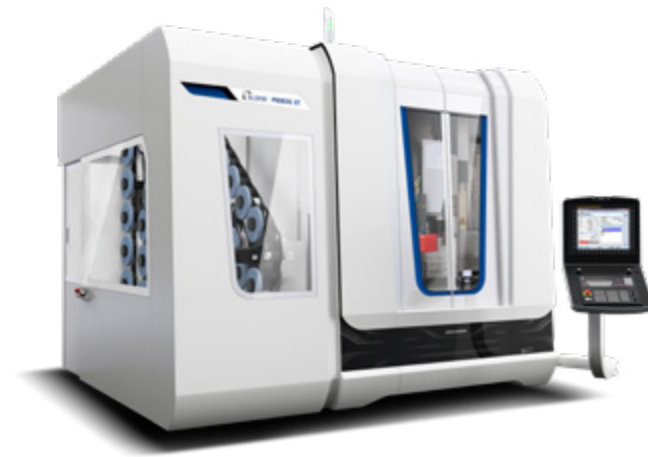
High speeds and varied applications characterise this machine. With an extensive range of accessories, the PROFIMAT MT can be optimally adapted to all customer requirements. CD, IPD and all CBN grinding processes are easily possible on the PROFIMAT MT.

- Modular system
- High-quality components made from ductile cast
- Thermal and vibration engineering characteristics optimised via finite element calculation
- Precision linear guideways
- High quality, ground ball-type linear drives

PROFIMAT MT		408	412	608	612	616	620
Grinding range (W x L)	mm	400 x 800	400 x 1,200	600 x 800	600 x 1,200	600 x 1,600	600 x 2 000
Table clamping surface with additional areas	mm	400 x 1,200	400 x 1,600	600 x 1,200	600 x 1,600	600 x 2 000	600 x 2,400
Distance between table and spindle centre	mm	150...700 (option 950)					
X-axis							
Table longitudinal travel, max.	mm	900	1 300	900	1 300	1 700	2 100
Infeed speed	mm/min	15...25 000					
Y-axis							
Grinding head vertical travel	mm	550 (option 800)					
Infeed speed	mm/min	4...3,750					
Z-axis							
Column transverse travel	mm	320	320	520	520	520	520
Infeed speed	mm/min	4...4 000					
V-axis, stroke of head dressing device (opt.)	mm	130					
Grinding wheel spindle drive, variable	kW/rpm	60/8 000					
Grinding wheel dimensions (Ø x W x ø)	mm	500 x 200 x 127 (203.2)					

# BLOHM PROKOS XT

## Higher productivity combined with lower costs



### BLOHM PROKOS XT

The PROKOS XT is the ideal grinding machine for the automated machining of complex workpieces. This multiple-axis grinding centre can also execute drilling and milling operations, in addition to grinding. A special highlight: the unique SmartCAM software ensures complete CAD consistency, from the planning phase through to the NC program.

- Complete machining in a single clamping
- Significantly shorter processing times
- Maximum productivity
- Reduced thermal loading of the workpiece through speed stroke grinding
- Tool changer with 24 positions
- Collision testing through prior simulation (SmartCAM)
- Can also be used as a fully automated cell with robot, loading, cleaning and measuring station

### PROKOS XT

Workpiece size	mm	300×300×300	
X-axis	Table longitudinal travel	mm	450
	Infeed	mm/min	120 000
Y-axis	Grinding head vertical travel	mm	450
	Infeed	mm/min	20 000
Z-axis	Grinding head transverse travel	mm	900
	Infeed	mm/min	50 000
Grinding wheel spindle drive, variable	kW/rpm		35/4,300
Speed, max.	rpm		12 000
A-axis	Swivelling grinding spindle	degrees	130
	Indexing speed	rpm	20
B-axis	Indexing table on machine table	degrees	∞
	Indexing speed	rpm	140
Grinding wheel dimensions (Ø×W×ø)	mm		300×50×76.2

# JUNG J600

## Unique precision and surface quality for the perfect result



### JUNG J600

With the J600 JUNG presents a modern surface and profile grinding machine for the highest precision and surface quality in production. This machine offers a host of potential applications - from individual component production through to small batch production in all industries. The machine realises its full potential particularly when grinding demanding die and mould applications.

The design principle is oriented towards a modular system, so that the J600 can be optimally tailored to individual customer requirements. The J600 owes its outstanding damping characteristics not least to the EasySlide hydrodynamic guideways in the table axis. High-precision ball-type linear drives also ensure high accelerations and infeed speeds.

In conjunction with the second handwheel for the X- and Z-axis, an additional highlight – EasyMode – enables semi-automatic, manual grinding. This function ensures increased utilisation of the machine capacity.

- All important elements are made from grey cast iron
- Proven cross-slide design
- X-axis with hydrodynamic EasySlide guideway
- Additional electronic handwheel in the area of the work area door for the X, Y and Z-axis
- Polygon grinding
- Unique head-mounted dresser PA-K37

### J600

Grinding range	mm	300×600	
Magnetic clamping plate	mm	300×600	
Table clamping surface with additional areas	mm	300×1 000	
Distance between table and spindle centre	mm	150...580	
Table loading with magnetic clamping plate, max.	kg	400	
Table height above floor	mm	925	
X-axis	Table longitudinal travel, max.	mm	700
	Infeed speed	mm/min	30...50 000
Y-axis	Grinding head vertical travel, max.	mm	450
	Infeed speed	mm/min	4...3,750
Z-axis	Cross slide transverse travel, max.	mm	345
	Infeed speed	mm/min	4...4 000
Grinding wheel spindle drive, variable	kW/rpm		8.5/1,500
Speed, max.	rpm		5 000
Grinding wheel dimensions (Ø×W×ø)	mm		150...300×14...50×76.2

# BLOHM and JUNG software

## Production software

BLOHM production software is optimally aligned with the requirements of series production. It enables customised workpiece programs to be created quickly and easily. The software is also perfectly suited to small batches, thanks to its simple and quick-to-learn programming.

The modular software can be adapted to your specific requirements through additional cycles. We offer optimised program packages for different technologies, such as broaching, for example.

Your advantages:

- User-friendly with high level of programming convenience
- Flexible and open to adaptations
- Simple set-up with mobile manual control unit
- SIEMENS 840D solution line CNC control system

## Tailor-made die and mould solutions

The CNC control system is a combination of the proven SIEMENS 840D solution line and the program modules developed by JUNG for the die and mould industry. The software is especially suitable for individual component and small batch production on the J600 or the PLANOMAT HP.

Your advantages:

- Cost-effective and flexible
- User-friendly and flexible
- Various optional grinding programs: Rough machining, plunge grinding, guideway grinding Z/Y and X/Y, Z-axis transverse positioning, face grinding, punch grinding with foot

## EasyProfile

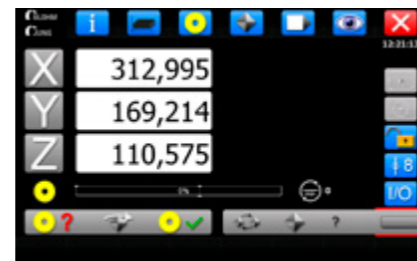
The EasyProfile control system is a combination of the SIEMENS 840D solution line and the innovative operator interface developed by BLOHM. The clear, menu-guided structure of the software is simple and self-explanatory.

Your advantages:

- Optimised operator guidance using smart keys
- Intuitive operation
- Quick adaptation of dressing and grinding cycles through parameters with graphic support
- No NC knowledge required
- Fixed programs for workshop-compliant handling by skilled workers
- 12" touch screen colour display

## GripsProfile

GripsProfile is a software extension for all BLOHM and JUNG machines. With the help of this option, users can quickly and easily create the contours for a grinding wheel to be profiled. 13 standard profiles are available in the basic version of the software. Any profiles can be created with the full version and the additional CAD tool. Guideway grinding tasks in the longitudinal and transverse direction can also be easily handled. All that is needed to do this is a CAD drawing. The optional distortion of profiles, e.g. for relief grinding of broaches and broach plates, is possible with this software.



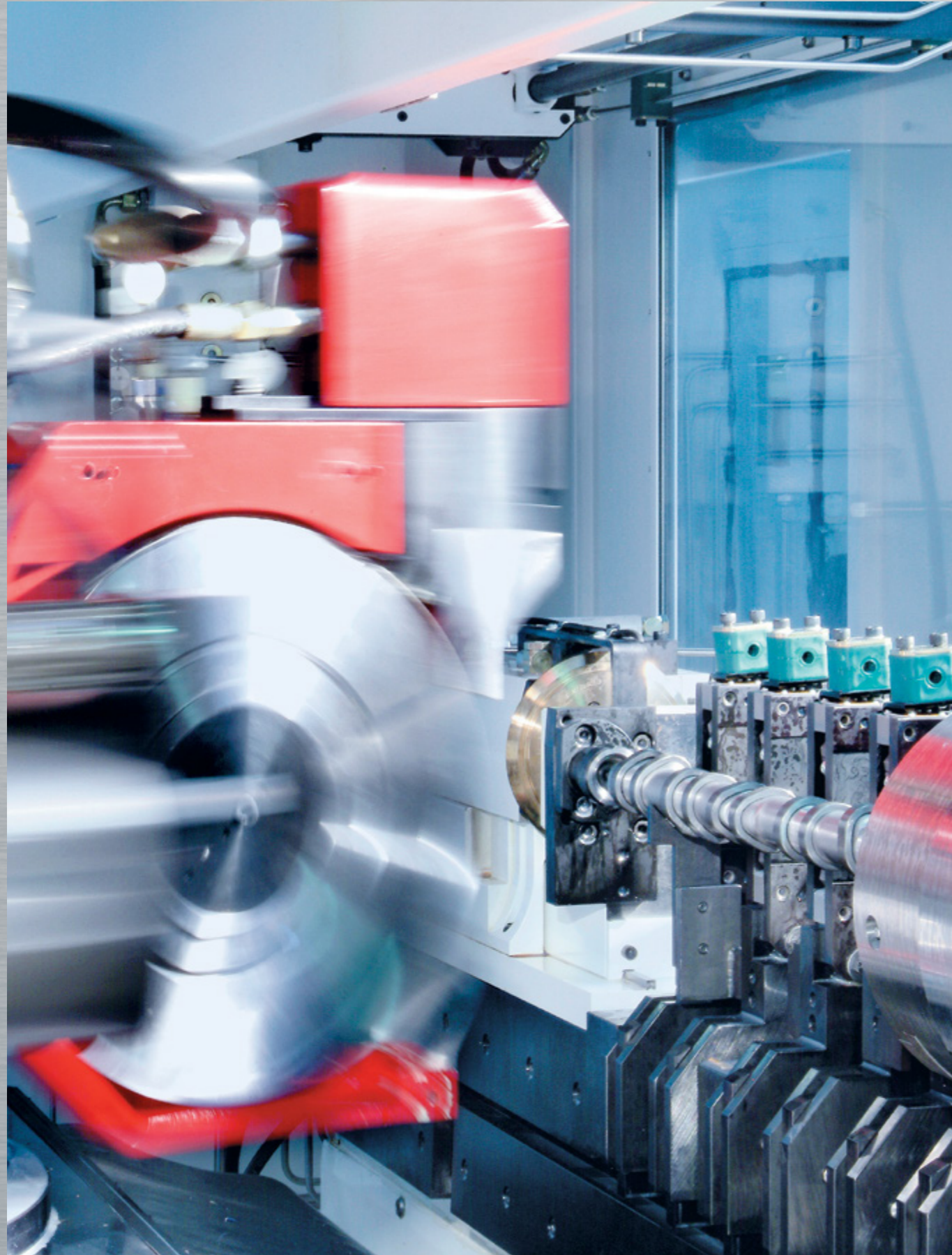
EasyProfile control system



Work plan editor



## Cylindrical grinding expertise



 **STUDER**

 **SCHAUDT**

 **MIKROSA**

Core competence, three strong brands: STUDER, SCHAUDT and MIKROSA combine very sound knowledge regarding all aspects of technology and the user benefits of cylindrical grinding. The innovative power of the three brands is reflected in a body of knowledge of unique quality. Whatever the specific requirements, an expert partner is always at your side, consistently taking care of your application tasks.

# STUDER has been cultivating the Art of Grinding since 1912



The name STUDER stands for more than 100 years of experience in the development and production of precision cylindrical grinding machines. "The Art of Grinding" is our passion, maximum precision our claim, and unrivalled Swiss quality our standard.

Our product line includes both standard machines, as well as complex system solutions in high-precision cylindrical grinding for machining small and medium-sized workpieces.

In addition we offer software, system integration and a wide range of services. As well as receiving a complete tailor-made solution the customer also benefits from our 100 years of know-how in relation to the grinding process. Our customers include companies from the machine tool industry, automotive engineering, die and mould, the aerospace industry, pneumatics/hydraulics, electronics/electrical engineering, medical technology, the watch industry and job order production. They value

maximum precision, safety, productivity and longevity. 24 000 manufactured and delivered systems make us both the market and technology leader in universal, external, internal and non-circular grinding. Around 800 employees, including 80 apprentices, work day in, day out to ensure that "The Art of Grinding" will continue to remain closely linked to the name STUDER in the future.

# STUDER conventional cylindrical grinding machines S20 | S30



### STUDER S20

is the compact universal cylindrical grinding machine with electro-mechanical drives for the production of small, precise workpieces in individual and small batch production.

- Cross slide with wheelhead for external grinding with right grinding wheel and mounting surface for internal grinding attachment
- Automatic grinding cycles for plunge and traverse grinding
- Machine table with swivelling range of 30° and 15°

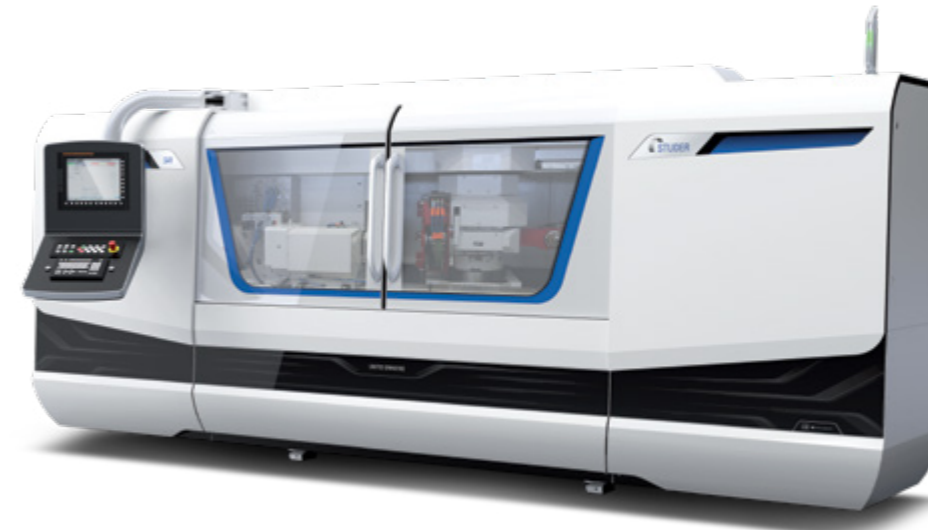
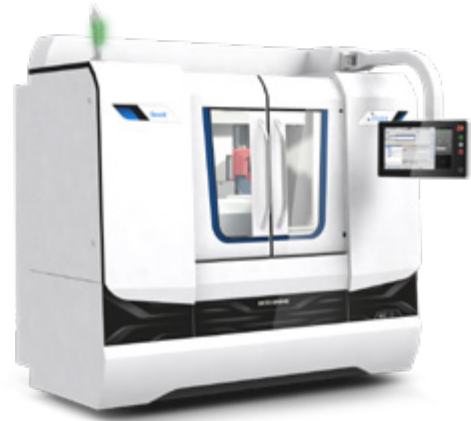
### STUDER S30

is the universal cylindrical grinding machine with hydraulic drives for the production of medium-sized, precise workpieces in individual and small batch production.

- Turret wheelhead for external and internal grinding
- Automatic grinding cycles for plunge and traverse grinding
- Swivelling machine table
- Machine bed made of Granitan®

		S20	S30
Distance between centres	mm	400/650	650/1 000
Grinding length	mm	400/650	650/1 000
Height of centres	mm	100	125/175/225
Workpiece weight	kg	20	130
X-axis track system	mm	25	260
Z-axis track system	mm	420/650	700/1,050
Grinding wheel dimensions (Ø × W × ø)	mm	350 × 32 (50) × 127	400 × 63 (80) × 127
Grinding wheel spindle drive	kW	3	5.5/7.5

# STUDER universal cylindrical grinding machines favorit | S33 | S31 | S41



### STUDER favorit

This CNC universal cylindrical grinding machine is designed for the individual and batch production of short to long workpieces. Various options such as measuring control, balancing system, ground face detection and longitudinal positioning allow it to be adapted subsequently to other grinding tasks.

- Distance between centres 400 / 650 / 1000 / 1600 mm
- Wheelhead selectable:
- Turret wheelhead with wheel on right or left and an internal grinder. Automatic swivelling with 3° Hirth serration.
- External wheelhead with wheel on the right, 0° / 15° / 30°
- External and internal grinding in a single clamping
- Mineral casting machine bed made of Granitan® S103

### STUDER S33

Universal and flexible: You can retool the S33 from grinding between centres to live grinding in record time. Even complex workpieces can be ground in just one clamping. The grinding head with two motor spindles makes this possible. You can also benefit from a large selection of wheelhead variants.

- Distance between centres 400 / 650 / 1000 / 1600 mm
- Wheelhead selectable:
- Turret wheelhead with up to 2 external grinding spindles and 1 internal grinding spindle. Automatic swivelling with 1° Hirth serration.

- External wheelhead with wheel on the right, 0° / 15° / 30°
- C-axis for the workhead, enabling form and thread grinding
- Short setup and conversion times with STUDER Quick-Set
- Standardised interfaces for loader and peripheral devices

### STUDER S31

A machine for complex and flexible grinding tasks. With a high-resolution B-axis of 0.00005°, the swivelling wheelhead enables external, internal and surface grinding in a single clamping. Experience the revolutionary StuderGuide® guide system with its damping components in the direction of movement.

- Distance between centres 400 / 650 / 1000 / 1600 mm
- Wheelhead selectable with:
- Infinite B-axis
- B-axis with 1° Hirth serration
- Dual T-groove integrated in the worktable for dresser
- Thermal stability thanks to innovative column temperature control
- StuderWIN software with StuderTechnology

### favorit

### S33

Distance between centres	mm	400/650/1000/1600	400/650/1000/1600
Grinding length	mm	400/650/1000/1600	400/650/1000/1600
Height of centres	mm	175	175
Workpiece weight	kg	150	150
X-axis track system	mm	370	370
Z-axis track system	mm	500/800/1150/1750	500/800/1150/1750
Grinding wheel dimensions (Ø×W×ø)	mm	500×63 (80)×203	500×63 (80)×203
Grinding wheel spindle drive	kW	7.5	7.5

### STUDER S41

The S41 CNC universal cylindrical grinding machine is designed for grinding of complex workpieces in individual component, small batch and large batch production systems. It has fast, high-precision linear drives in the X and Z-axis. The direct drive of the B-axis reduces the swivelling time and increases positioning accuracy.

### Features of the STUDER S41:

- StuderGuide® guide system in X and Z-axis with linear drive
- Large selection of grinding head variants with direct drive and 0.00005° resolution
- A variety of workpiece spindle heads are available for different grinding tasks
- Machine bed made of Granitan® S103
- Ergonomically arranged controls
- The StuderWIN operator interface creates a stable programming environment and contributes to efficient use of the machine

### S31

### S41

Distance between centres	mm	400/650/1000/1600	1000/1600
Grinding length	mm	400/650/1000/1600	1000/1600
Height of centres	mm	175	225/275
Workpiece weight	kg	150	250
X-axis track system	mm	370	350
Z-axis track system	mm	500/800/1150/1750	1150/1750
Grinding wheel dimensions (Ø×W×ø)	mm	500×63 (80)×203	500×80 (100)×203
Grinding wheel spindle drive	kW	7.5	15

# STUDER production external cylindrical grinding machines

## S11 | S22



### STUDER S11

The production external cylindrical grinding machine for small parts. With a mounting area of less than 1.8 m<sup>2</sup>, it is extremely compact and will fit in any workshop. The StuderWIN*focus* operator interface creates a stable programming environment and contributes to efficient use of the machine.

- Grinding wheel arrangement 0° or 20°
- X and Z-axis are designed as a cross slide
- The workpiece table is bolted permanently to the machine
- High-speed grinding option (HSG) with peripheral speeds up to 140 m/s

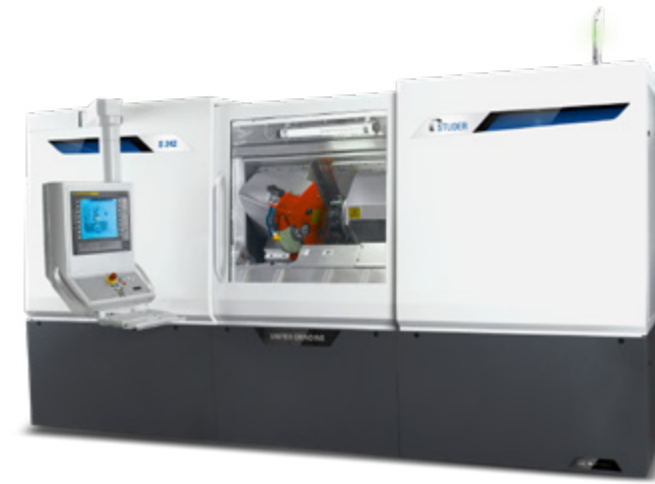
### STUDER S22

The S22 is a production platform which is precisely configured for individual grinding tasks. The S22 can be perfectly integrated into a production line. It allows medium-sized workpieces to be machined with different technologies – from conventional cylindrical grinding through form and thread grinding to high speed grinding (HSG) with peripheral speeds up to 140m/s.

- Cross slide X: Pre-tensioned hydrostatics with linear motor or anti-friction guideways with ball-type linear drive
- Longitudinal slide Z: Hydrostatics with linear motor or guideway with patented surface structure and ball-type linear drive
- Additional NC-axis for profiling the grinding wheel
- Integrated loading unit or load cells for loading and unloading from left, right or above

		S11	S22
Distance between centres	mm	200	650 (1,100)
Grinding length	mm	80 – 150	800
Height of centres	mm	125	175/225
Workpiece weight	kg	3	150
X-axis track system	mm	210	310
Z-axis track system	mm	210	850
Grinding wheel dimensions (Ø×W×ø)	mm	500×63×203	bis 610×160×305
Grinding wheel spindle drive	kW	4.5	15

# S242 fine machining centre



### STUDER S242

The S242 combined machine tool ideally combines the technologies of cylindrical grinding and hard turning. The S242 produces small to medium-sized workpieces. External/internal grinding and hard turning in a single clamping reduce primary processing and auxiliary times. This machine enables highly efficient precision machining of shafts and chuck components with a high manufacturing quality and production reliability, and is therefore the most cost-effective production method for machining high-precision hardened workpieces.

- Two or three cross slides with the option of an external grinding wheel, up to three internal grinding spindles or a turret
- Turret: 8|12 tool positions; optional: powered tools for drilling and milling
- Workhead: synchronous motor spindle
- Tailstock slide, optional: synchronous motor spindle
- In-process gauging: length positioning, length and diameter measurements

		S242
Distance between centres, max.	mm	400/1 000
Grinding length, max.	mm	1 000
Height of centres	mm	90/125
Workpiece weight	kg	60
X-axis track system	mm	220
Z-axis track system	mm	850 ... 1,600
Grinding wheel dimensions (Ø×W×ø)	mm	400×50 (63)×127
Grinding wheel spindle drive	kW	8/12

# STUDER internal cylindrical grinding machines S121 | S131 | S141 | S151

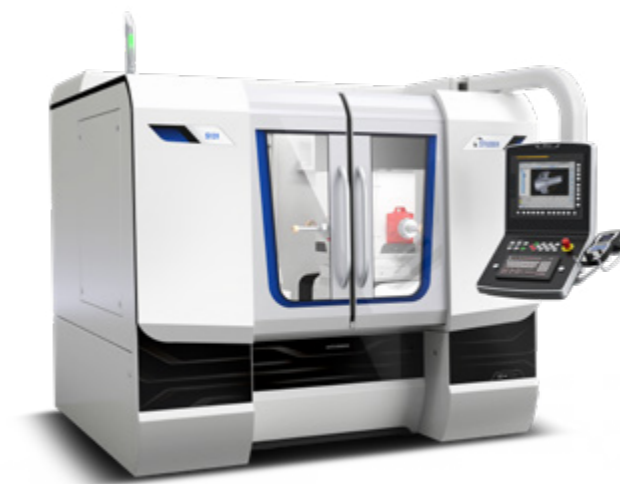


## STUDER S121

The S121 universal internal cylindrical grinding machine with an exceptional price/performance ratio is the ideal machine for internal, surface and external grinding of chuck components. It is equipped either with a fixed grinding spindle or with two spindles on a turret.

- Spindle turret with two grinding spindles or one fixed spindle
- One grinding spindle can be equipped with an external grinding wheel
- External and internal grinding in a single clamping
- Taper corrections on the workhead
- Compact machine
- Good accessibility

			S121
Length of parts, max.	mm		300
Grinding length, internal max.	mm		175
Grinding length, external max.	mm		100
Swing diameter above table	mm		400
Spindles on turret up to max.			2
HF spindle Ø	mm		100/120/140
External grinding wheel Ø max.	mm		300
X-axis track system	mm		350
Z-axis track system	mm		350
Taper corrections on workhead	°		manual
Load on spindle nose	Nm		300
Machine weight	kg		4,400



## STUDER S131 | 141 | 151

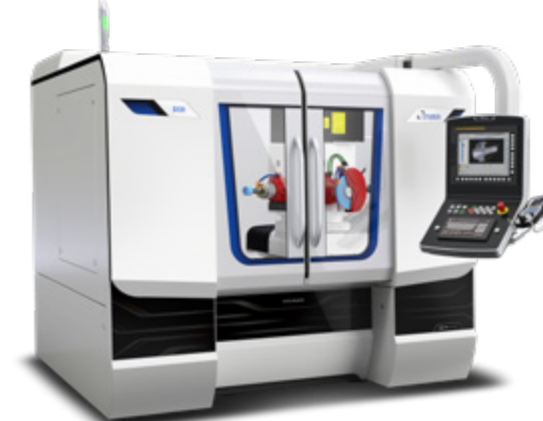
The S131/S141/S151 CNC universal internal cylindrical grinding machines include a host of sophisticated technical features, such as the revolutionary StuderGuide® guideway system, high-precision axis drives with linear motors, extremely fast direct drive of the grinding spindle turret and automatic swivelling of the workpiece table.

Short changeover times and quick reprogramming of the control help to reduce auxiliary times, making the machines an attractive solution for the production of individual components as well as small and large batches. Great attention has been paid to ergonomics.

The S131 is the ideal machine for grinding flange parts. The S141 is suitable for grinding spindle shafts, spindle housings, rotor shafts, axes or flange parts. Many workpieces are in the areas of machine tools, drive elements, aerospace and toolmaking.

					S131	S141	S151
Length of parts including clamping device max.	mm		300		300	300/700/1,300	700/1,300
Grinding length, internal max.	mm		160		160	250	390
Grinding length, external max.	mm		125		125	250	250
Swing diameter above table	mm		250		250	400	550
Spindles on turret up to max.			4		4	4	4
Speed / HF spindle Ø	mm		24 000 – 120 000		24 000 – 120 000	6 000 – 120 000	6 000 – 120 000
External grinding wheel Ø max.	mm		250		250	300	300
X-axis track system	mm		350		350	425	500
Z-axis track system	mm		400		400	500/700	500/700
Workpiece table swivelling range	°		-10/+20		-10/+20	-10/+20 (+15)	-10/+20 (+15)
Load on spindle nose	Nm		300		300	400/500	400/500
Machine weight	kg		5 200		5 200	7 000/9 000/12 000	9 000/12 000

# STUDER radius internal cylindrical grinding machines S121 | S131 | S141



## STUDER S121

The internal cylindrical grinding machines with interpolating B-axis in the segment of internal, external, taper and radius grinding for extremely flexible machining of chuck components. Thanks to offline simulation programming and the sophisticated set-up philosophy, set-up time is significantly reduced.

- Spindle turret with two grinding spindles or one fixed spindle or two parallel spindles
- B-axis with automatic swivel
- C-axis for the workhead, enabling form and thread grinding

## S121

Swing diameter above table	mm	300
Grinding length, max.	mm	165/250
Swing diameter above table	mm	120/150
Linear spindles up to max.		2
Spindles on turret up to max.		2
HF spindle Ø	mm	100/120
External grinding wheel Ø max.	mm	250 / 50×25
X-axis track system	mm	350
Z-axis track system	mm	400
B-axis track system	°	-20 to +91
Load on spindle nose	Nm	300
Machine weight	kg	5 050

## STUDER S131 | S141

The S131/S141 are especially suitable for grinding complex workpieces from very hard materials such as tungsten carbide, ceramic and sapphire as well as for general grinding tasks. Their optimal stability and stiffness makes it possible to grind diameters, cones and transitional radii (in the pendulum process by interpolation of the B and X/Z axes) in polished surface quality. The machines are ideal for the production of dies, especially in the packaging industry, in which primarily hard metal and ceramics are processed. Furthermore, hydraulic components can be produced, such as axial pump pistons, guide plates, and housings made from hardened steel, cast iron and copper. In addition, the production of complex workpieces with several cones larger than 20° to 90° is possible in a single clamping. The primary application areas here include watchmaking and medical technology

using extracted materials, such as industrial ceramics, sapphire and carbide, as well as the production of human implants made from ceramic and titanium for the shoulder, knee and hip.

- Spindle turret with up to four grinding spindles
- Fully automatic B-axis with direct drive
- Swivel range from -60° to +91°
- C-axis for the workhead enables form and thread grinding
- It can be configured for any conceivable internal grinding task

## S131

## S141

Swing diameter above table	mm	300	400
Grinding length/diameter, internal max.	mm	165/300	205/400
Grinding length/diameter, external max.	mm	120/160	120/160
Spindles on turret up to max.		4	4
HF spindle Ø	mm	100/120	100/120
External grinding wheel Ø max.	mm	250 / 50×25	250 / 50×25
X-axis track system	mm	350	500
Z-axis track system	mm	400	500
B-axis track system	°	-20 to +91	-20 to +91
Load on spindle nose	Nm	300	300
Machine weight	kg	5 700	7 400

# STUDER production internal cylindrical grinding machines S110 | S122



STUDER production internal grinding machines set new standards in the internal, surface and external grinding of chucking components. The modular, flexible spindle arrangement enables optimal dimensioning of the machines for individual component production through to large-scale production. Both integrated and autonomous loading systems are possible.

### STUDER S110

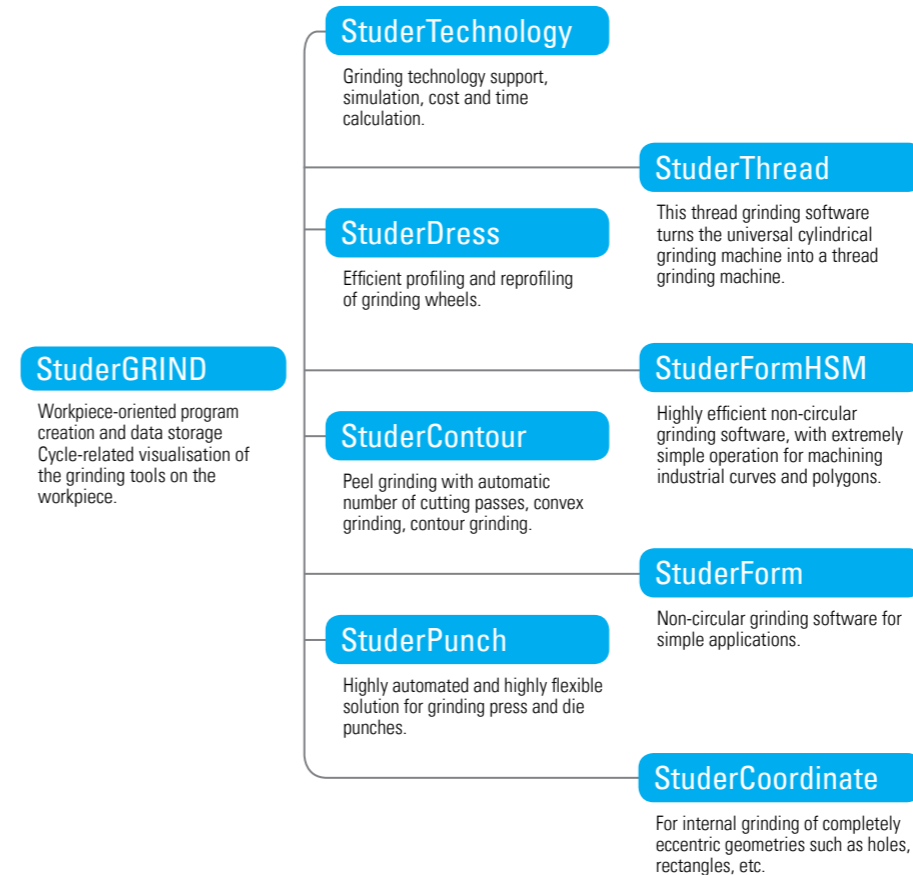
- HF or belt-driven spindles
- One grinding spindle can be equipped with an external grinding wheel
- External and internal grinding in a single clamping
- StuderSIM simulation software can be used for the creation and simulation of grinding programs on the machine control or on a PC
- Integrated or autonomous loading systems

### STUDER S122

- StuderGuide® guide system with linear drive
- Up to three HF grinding spindles in a linear arrangement (for internal or external machining)
- Arbour deflection compensation
- C-axis for the workhead, enabling form and thread grinding
- Automatic taper corrections on the workhead

		S110	S122
Length of parts, max.	mm	230	120
Grinding length, max.	mm	120	110
Swing diameter above table	mm	204	220
Linear spindles up to max.		3	3
HF spindle Ø	mm	45/60/80/100/120	100/120
Belt-driven spindle Ø	mm	80	–
External grinding wheel Ø max.	mm	305	150
X-axis track system	mm	450	350
Z-axis track system	mm	200	350
B-axis setting angle (manual)	°	±2 (opt. +21)	0.1 (opt. automatic)
Load on spindle nose	Nm	150	25/300
Machine weight	kg	2 600	4 400

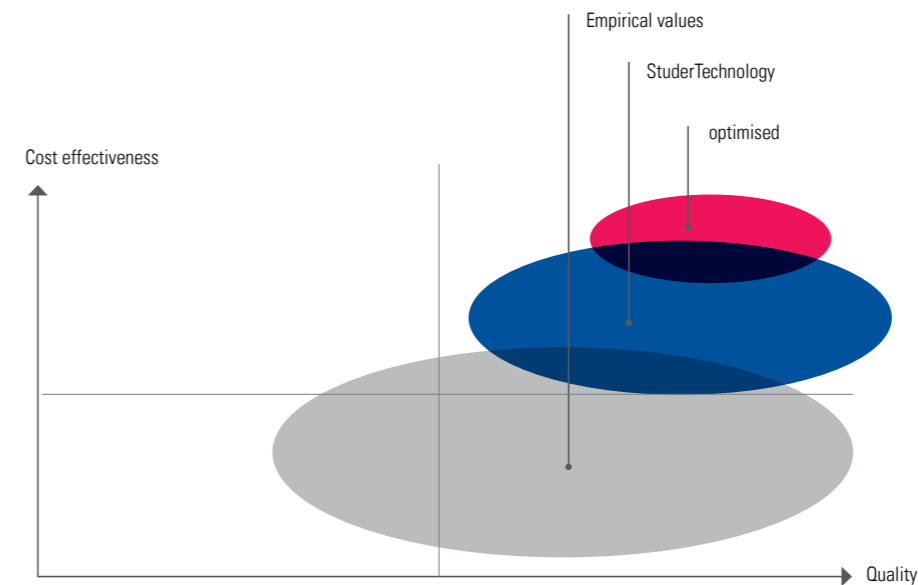
# STUDER Software



### StuderWIN

The StuderWIN operating system is designed in such a way that the operator can set up the machine efficiently and achieve cost-effective production without having to go into the menus in depth. The most important information is available at first glance.

- Economical set-up times thanks to quick and reliable set-up
- Move simply and quickly to the workpiece program



With StuderTechnology, the grinding process is far more efficient and higher quality than with "empirical values".

### Studer Quick-Set (option)

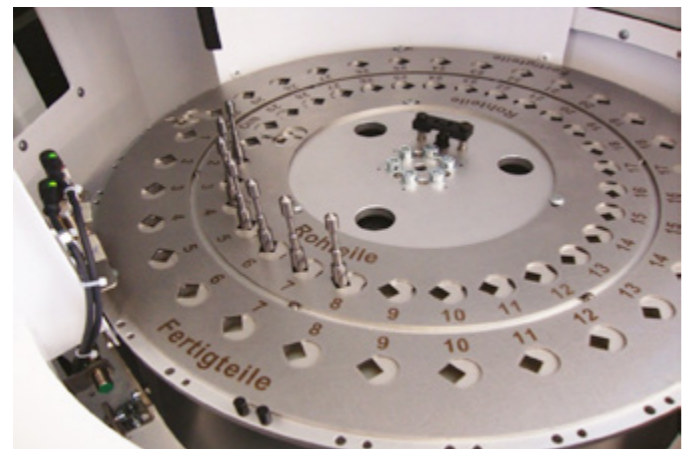
The "Studer Quick-Set" function allows the machine to be reset in extremely short times with the help of an electronic measuring probe. All relevant points are registered using the teach-in procedure in a guided set-up process. The operator simply needs to touch the workpiece briefly with the probe, and all of the grinding wheels are immediately ready for use again.

regardless of the angle at which they are being used. "Quick-Set" precisely converts all grinding wheel reference points. The repetitive, time-consuming touching of all grinding wheels is eliminated. As a result, set-up times and the associated unproductive dwell times can be reduced by up to 90%.

## STUDER Automation



STUDER offers the easy-Load and easyLoadNC standard loaders for external and universal cylindrical grinding machines. Thanks to their modular design, they can be precisely adapted to the respective machine application and machining processes. Indexed conveyors or pallets can be used for the part infeed and outfeed.

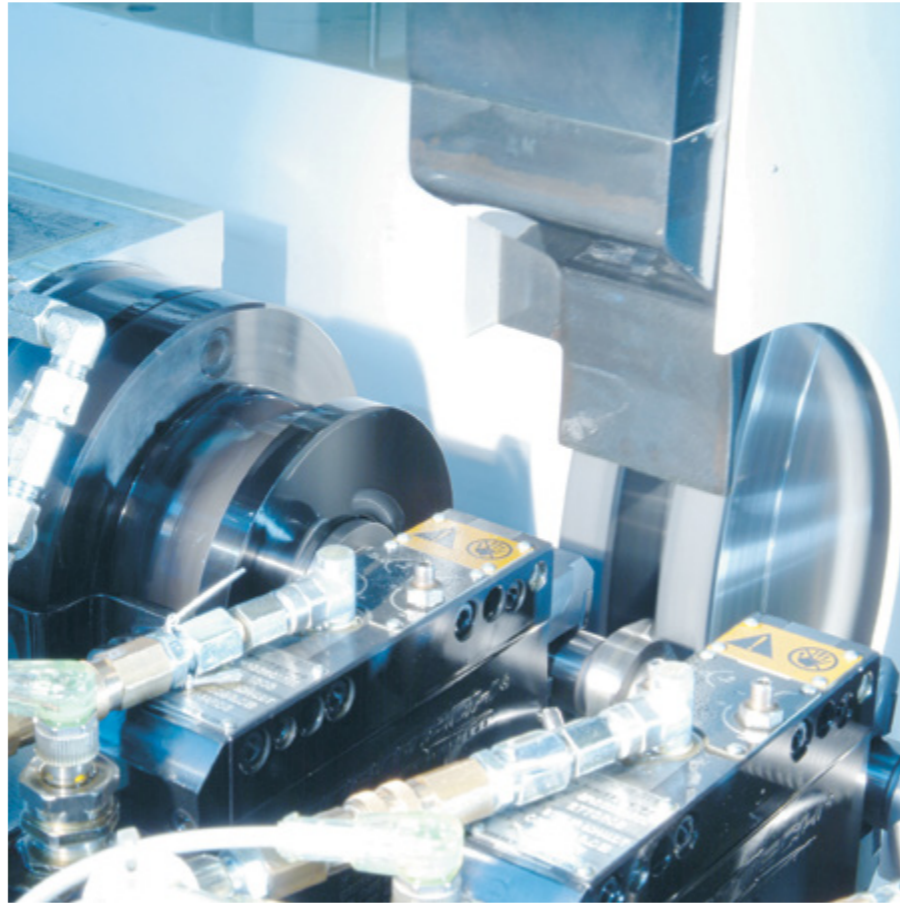


ecoLoad is an integrated handling concept for the S22 production cylindrical grinding machine. Depending on the application, the workpieces are provided on a rotary table or are transferred by means of a shuttle to the integrated loader with V-grippers.

The smartLoad is an integrated loader for the S11, which picks up the parts outside the machine, loads them into the clamping system and places the parts outside the machine again. This function can be combined with various peripherals and offers a wide range of possible applications.



## SCHAUDT – cylindrical, non-circular and cam form grinding made to measure



Since 1906 SCHAUDT has been the brand for the automotive and suppliers industry. It offers sophisticated technological solutions for cylindrical, non-circular and eccentric grinding. Our highly experienced experts also have unparalleled expertise in the high-precision grinding of long and heavy workpieces like

they are required, for example, for roll grinding. Within this broad application range you obtain everything from a single source from SCHAUDT – application development, technology, assembly and sales.

A long tradition and cutting-edge precision and quality place Schaudt Mikrosa GmbH among today's global market and technology leaders.

## SCHAUDT high productivity CBN grinding machines CamGrind



### SCHAUDT CamGrind series

The high productivity external cylindrical grinding machines CamGrind S, CamGrind L and CamGrind XL are specially designed for grinding camshafts, gear shafts and other shaft-type workpieces. The machine configuration is optimally tailored to your requirements, depending on the production task and production conditions. Bores, shoulders, cones, chamfers, grooves, polygons, multifaceted parts, cams, eccentrics, etc. can all be machined highly efficiently – in timed production, in conjunction with other grinding machines or in a single clamping. The machines are designed for grinding with CBN wheels and can be operated with emulsion or oil as cooling lubricant.

- Modular precision machines for circular and non-circular grinding of shaft-type parts up to 2 000 mm in length
- Swivel-in spindle technology for grinding concave profiles
- High productivity multiwheel technology
- The consistent use of CBN grinding wheels results in extremely short grinding times, a long workpiece service life and optimum grinding results.
- Proven WOP-S programming software for grinding cylindrical and non-circular workpiece contours with user-oriented set-up interface
- Robot automation

		S	L1	L2	XL
Number of machining slides		1	1	2	2
Grinding length	mm	650	650/1/100/2 000	650	1,050 – 1,600
Height of centres	mm	175	220	220	220
Workpiece weight, max.	kg	50	50	50	50
Grinding wheel dimensions (Ø×W)	mm	480×80	340 – 480×80	400 – 480×80	70 – 650×80
Grinding wheel spindle drive	kW	40	40	40	52

## SCHAUDT high-precision CBN grinding machines ShaftGrind



### SCHAUDT ShaftGrind series

The high productivity external cylindrical grinding machines ShaftGrind S and ShaftGrind L are specially designed for the precise and highly productive grinding of shaft-type workpieces. The smallest machine in the series is the ShaftGrind S. This versatile production grinding machine is equipped with a compact cross slide and is ideal for grinding smaller workpieces such as cam tubes with a length of up to 650 mm. The ShaftGrind L is available as a one or two-slide machine and works with shaft-type parts with a length of up to 1,100 or 650 mm. This high productivity grinding machine offers completely new design possibilities for cylindrical machining in medium to large series production. The machines are designed for grinding with CBN wheels and can be operated with emulsion or oil as cooling lubricant.

- Compact cross slide machine
- Modular precision machines for cylindrical grinding of shaft-type parts up to 2,000 mm in length
- High productivity multiwheel technology
- The use of CBN grinding wheels results in extremely short grinding times, increased workpiece durability and optimum grinding results.
- Proven WOP-S programming software for grinding cylindrical workpiece contours with user-oriented set-up interface
- Robot automation

		S	L1	L2
Number of machining slides		1	1	2
Grinding length	mm	650	650/1,100	650
Height of centres	mm	175	220	220
Workpiece weight, max.	kg	50	50	50
Grinding wheel dimensions (Ø×W)	mm	480×80	340 – 480×80	400 – 480×80
Grinding wheel spindle drive	kW	40	40	40

## SCHAUDT FlexGrind universal cylindrical grinding machines



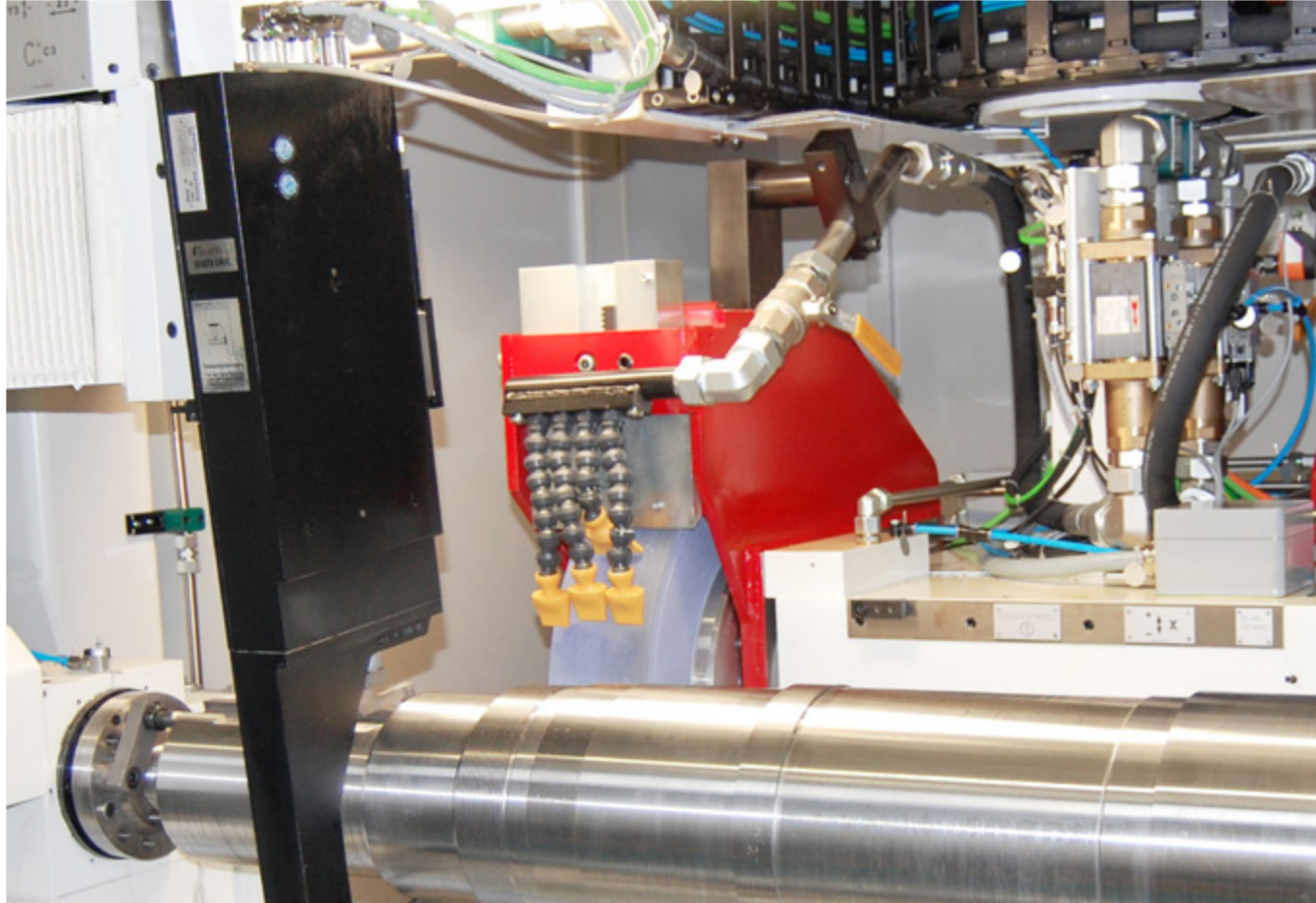
### SCHAUDT FlexGrind series

Thanks to its modular design, the FlexGrind is the ideal universal cylindrical grinding machine for the high-precision production of long and heavy workpieces. A variety of grinding operations, such as external and internal cylindrical grinding, cylindrical and non-circular grinding, thread grinding and traverse grinding, are available for complete machining of different workpiece geometries. The DIATRONIC absolute measuring head makes the FlexGrind unique in this machine class. It enables in-process gauging for different diameters during grinding.

- Table slide machine
- 9 wheelhead variants
- High-precision B-axis
- Workhead with maximum rigidity and suitable for heavy workpieces
- Constant rigidity for long, slender workpieces thanks to bridge type steady rest

		FlexGrind M
Grinding length	mm	2 000/3 000/4 000
Height of centres	mm	260/310/355
Workpiece weight, max.	kg	500/1,200
Grinding wheel dimensions (Ø×W×ø)	mm	600/750/900×125/200/300×304.
Grinding wheel spindle drive	kW	30

## DIATRONIC



### Your advantages

- Higher accuracies
- Direct measurement during the process at the grinding positions (depending on grinding angle of the spindles)
- Automatic operation possible without manual corrections
- Compensation of error sources such as temperature fluctuations

The FlexGrind features a diameter and length measuring system DI-ATRONIC 22. This automatic measuring head allows enables flexibility and quality assurance to be increased decisively during automatic machining. The measurement of different diameters during the grinding process is unique for this class of machine. The measuring range extends from 160 or 200 mm/Ø over the entire grinding length here. That means the measuring head controls the grinding process.

Programming is really easy, as the DIATRONIC measuring system is integrated directly in the user interface. The FlexGrind therefore enables high-precision production of large, heavy workpieces, as resultant thermal, static and dynamic influences are corrected immediately during grinding.

## MIKROSA – Top quality in centerless external cylindrical grinding

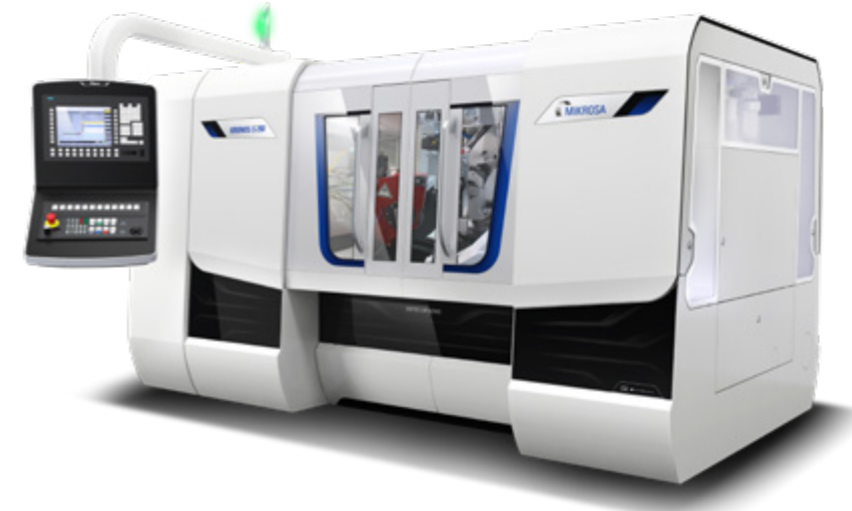


The MIKROSA brand has been synonymous worldwide with centerless external cylindrical grinding in the premium range with the German seal of quality since 1878. For over 130 years, MIKROSA has custom-built machines that deliver the highest precision and reliability. Due to the modular design of

the machine you obtain a solution with handling and automation individually tailored to your grinding task. The technology spectrum extends from precision plunge grinding in many different variations to high-productivity through grinding. Our unique strength lies in combining machine units, automation compo-

nents and process technology to create high productivity grinding systems. This allows you to machine a large variety of workpieces, from small jet needles through to large shafts.

## MIKROSA centerless external cylindrical grinding machines KRONOS



### MIKROSA KRONOS S 125 | S 250

The name stands for the highest precision for small workpieces. Special features include mass production, synchronization of workpieces or grinding wheel offset. The cross-slide systems for the grinding and regulating wheel side enable huge flexibility during grinding. The KRONOS S is specifically designed for the use of corundum and CBN grinding technology.

- Compact design with integrated control cabinet
- Mineral casting machine bed made of Granitan® S103
- Cross slide system on grinding and regulating wheel side
- Infeed and throughfeed grinding
- 15°/6° angled infeed grinding
- Infeed grinding in mass production
- Oscillation grinding
- Grinding of several operations in one cycle by offsetting the workpiece or grinding spindle

### KRONOS S 125

### KRONOS S 250

Workpiece diameter Ø	mm	0.5...30	1.5...35
Max. workpiece length, max. for infeed grinding	mm	120	245
Grinding wheel dimensions (Ø×W×ø)	mm	400×125×203.2	450×250×203.2
Grinding wheel spindle drive	kW	11/15	15
Regulating wheel (Ø×W×ø)	mm	250×125×127	250×250×127
Regulating spindle drive	kW	5	5
Rpm range, continuously adjustable	rpm	5...500	5...500
Dressing speed	rpm	1 000	1 000

# MIKROSA centerless external cylindrical grinding machines KRONOS



## MIKROSA KRONOS M 250

The KRONOS M can be perfectly adapted to any grinding task, thanks to its modular design with 6 (optionally 7) CNC axes. The machine can be equipped with an overhung grinding spindle. The high-precision grinding spindles mounted on roller bearings or hydrodynamic bearings achieve grinding wheel peripheral speeds of 63 m/s as standard, with optional CBN technology of 120 m/s. In combination with the CBN high-speed technology the cycle time of the machine is thus significantly reduced and the cost effectiveness considerably increased.

- 3-slide system
- Patented arrangement of swivel-type and upper slide on one guide system for high system rigidity
- NC functionality for simple and reducible generation of the hyperbolic profile of the regulating wheel
- Modular dressing system for stationary and rotating dressing tools
- MIKROSA software with special operator interface for centerless grinding. Optional additional software modules such as HEUREEKA for optimising the grinding zone geometry
- Special solution: Special machine for grinding tapered rollers

### KRONOS M 250

		KRONOS M 250	KRONOS K
Workpiece diameter Ø	mm	1.5...100	4.5...35
Max. workpiece length, max. for infeed grinding	mm	245	50
Grinding wheel dimensions (Ø×W×ø)	mm	610×250×304.8	610×400×304.8
Grinding wheel spindle drive	kW	22	37
Regulating wheel (Ø×W×ø)	mm	350×250×127/152	310×420×204.5
Regulating spindle drive	kW	5.7	5.7
Rpm range, continuously adjustable	rpm	5...600	5...600
Dressing speed	rpm	600	600



## MIKROSA KRONOS L 660

Strong, dynamic and flexible are typical attributes of this machine, which was developed especially for machining large workpieces. It features a host of technical improvements such as optimised coolant return, an inner lining inside the full housing to encapsulate the work area and optional hydrodynamic grinding and regulating spindles. The infeed of both slides is enabled by servo drive, via a pre-tensioned and backlash-free recirculating ball screw. Exact positioning of the infeed axes is ensured by linear measuring systems installed as standard.

- Mineral casting machine bed made of Granitan® S103
- 2-slide system
- Grinding and regulating wheel width up to 660 mm
- Modular dressing system for stationary and rotating dressing tools, optionally also with acoustic touch sensor
- Standardised interfaces for loader and peripheral devices

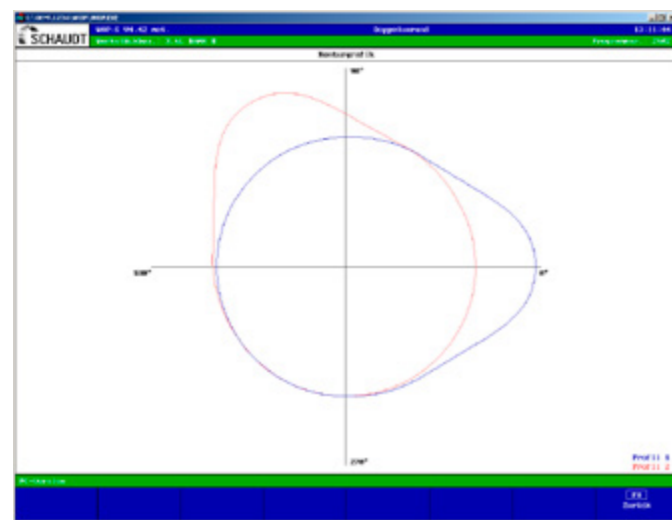
### KRONOS L 660

		KRONOS L 660
Workpiece diameter Ø	mm	5...250
Max. workpiece length, max. for infeed grinding	mm	655
Grinding wheel dimensions (Ø×W×ø)	mm	660×660×304.8
Grinding wheel spindle drive	kW	51/95
Regulating wheel (Ø×W×ø)	mm	400×660×203.2
Regulating spindle drive	kW	12
Rpm range, continuously adjustable	rpm	5...300
Dressing speed	rpm	700

# SCHAUDT and MIKROSA software

## SCHAUDT WOP-S programming interface

Programming cylindrical and non-circular workpiece contours is quick and easy with the WOP-S programming system from SCHAUDT. From just a few inputs WOP-S creates harmonic speed profiles, which can be variably adapted. Combination machining of concave and convex profiles in a single clamping with the highest precision is therefore possible.

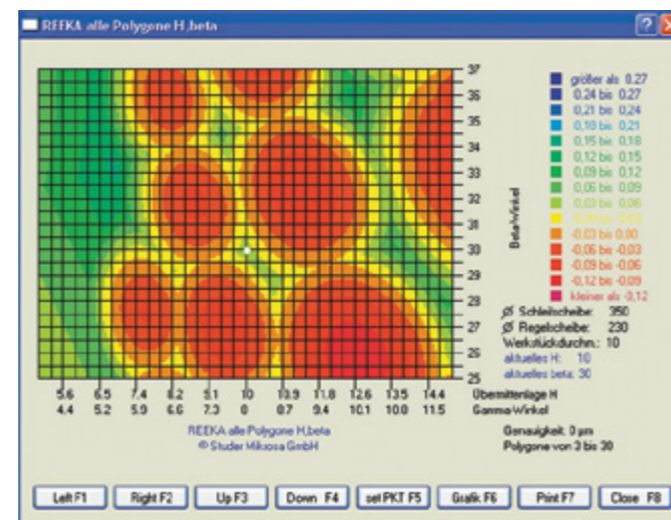


Graphic representation of cam profiles with WOP-S

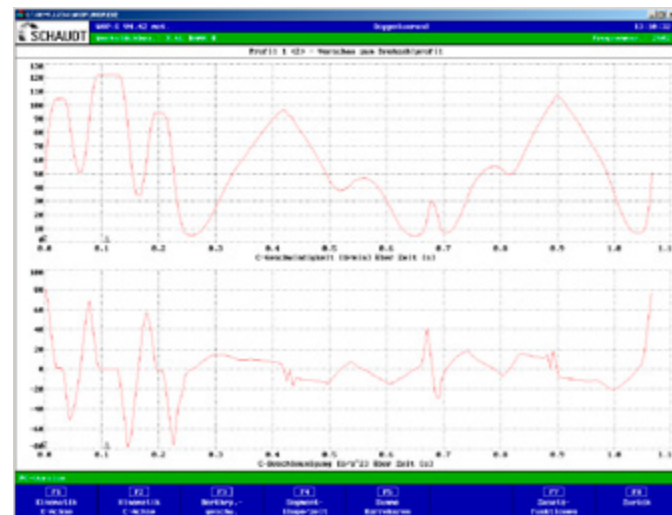
## MIKROSA HEUREEKA:

### Software for optimisation of the grinding zone geometry

- Software for calculation of the optimum machine or grinding slot geometry, e.g. for optimisation of the circularity and cylindricity
- Helpful tool for analysis and planning of the grinding process
- HEUREEKA can optionally be integrated into the KRONOS machine control system

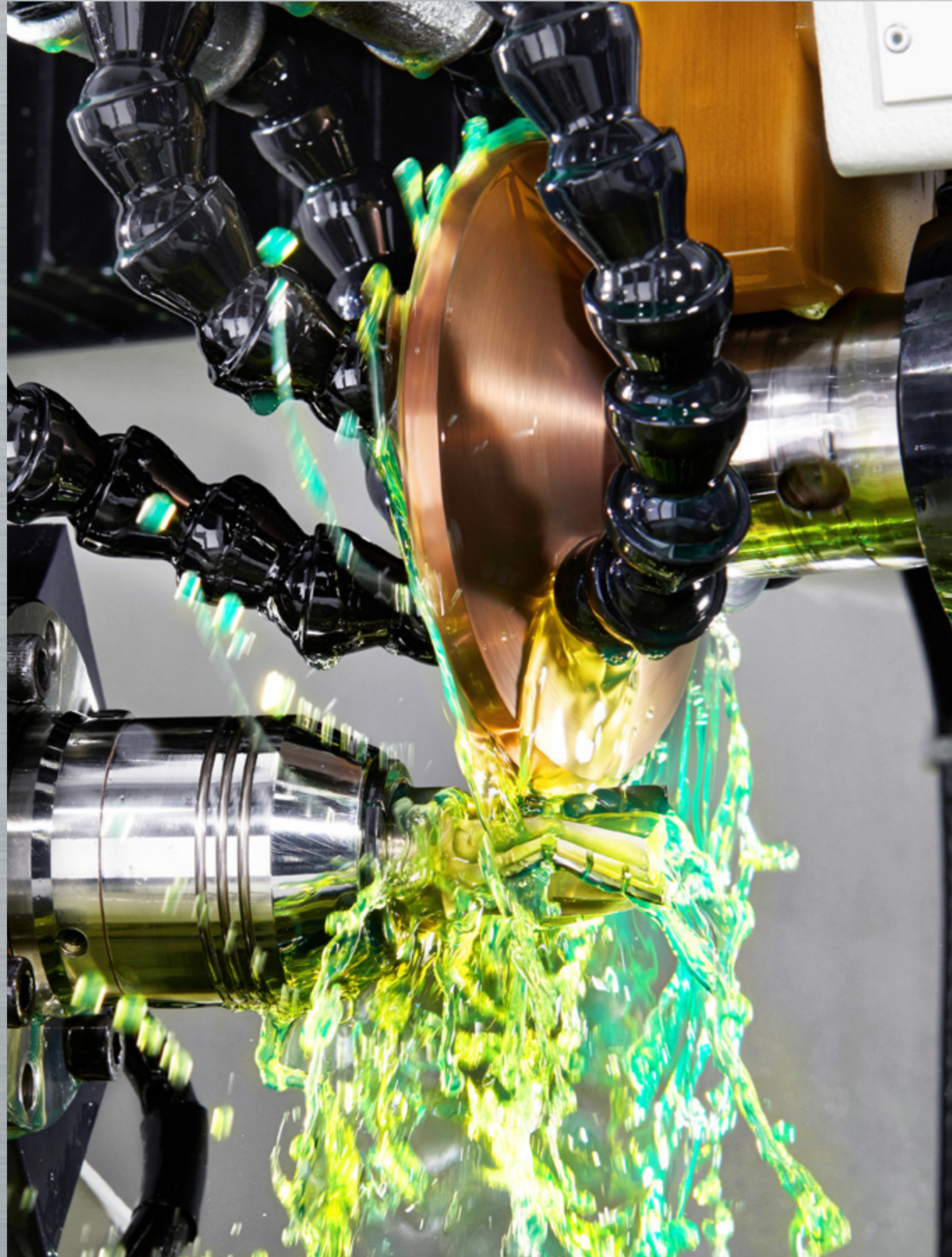


HEUREEKA software for planning and analysis of the grinding zone geometry



Speed profiles for synchronous machining of two cams

## Tool machining expertise



 WALTER

 EWAG

The constant development of new, increasingly complex and more precise tools for different sectors of industry presents a challenge for the manufacturers of tool processing machines. The close synergetic cooperation between the WALTER and EWAG brands rises to this challenge. It ensures a competitive technological edge thanks to the implementation of innovative machine concepts with cutting-edge operating software.

# WALTER tool grinding and eroding machines Optical CNC measuring machines and measuring equipment



Since 1919, Walter Maschinenbau GmbH has ranked among the world's leading manufacturers of CNC machines for grinding and/or eroding, tools for the metal and wood industries, as well as rotationally symmetrical production parts. The production range is supplemented by CNC measuring machines for complete, non-contact measurement of complex precision tools and rotationally sym-

metrical parts with recorded accuracy in a single clamping. Our grinding and measuring expertise is incorporated into the development of our own software. We also offer comprehensive "tool machining" services. Together with our sister company Ewag AG and its broad product range for the production of indexable inserts, including innovative la-

ser machine tools, we see ourselves as a system and solution provider for tool machining. Our customer orientation and our global sales and service network with its own branches and staff have been valued by our customers for decades.



### WALTER HELITRONIC VISION DIAMOND 400 L

The high-end solution for the eroding of CBN/PCD tools and the alternating grinding of HSS/HM tools in volume production. Based on a low-vibration gantry design which includes mineral castings and linear drives in X, Y and Z axes as well as torque motors in A and C axes. Belt spindles with one or two spindle ends or motor spindle with a spindle end are optionally available. Various loader types and grinding wheel/electrode changers are also optionally available.

### WALTER HELITRONIC POWER DIAMOND 400

Within the HELITRONIC family, the HELITRONIC POWER DIAMOND 400 with wheel/electrode changer has a particular strength – eroding of PCD/CBN tools and grinding of HM/HSS tools with step-switching as desired. Tool diameter from 3 to 380 mm, machining length up to 520 mm, workpiece weight up to 50 kg. The new generation of our "two-in-one" all-rounder: With electrode or wheel changer and motor spindle for up to 8 electrodes/grinding wheel sets. High productivity with the flexibility to meet individual customer requirements – these are the hallmarks of the HELITRONIC POWER DIAMOND 400. In combination with our FINE PULSE TECHNOLOGY, it is setting new standards for surface quality and precision with a wide range of materials.

### WALTER HELITRONIC DIAMOND EVOLUTION

The HELITRONIC DIAMOND EVOLUTION is a highly efficient solution from our portfolio for eroding PCD/CBN tools and grinding HM/HSS tools in one clamping – and with a minimal footprint.

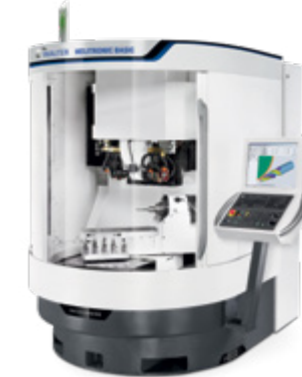
**With the new "FINE PULSE TECHNOLOGY" eroding concept, new standards are being set for PCD tools in terms of surface quality, edge flexibility and process reliability. It is now installed as standard in all two-in-one eroding and grinding machines.**

## VISION DIAMOND 400 L    POWER DIAMOND 400    DIAMOND EVOLUTION

X-axis	mm	500	650	350
Y-axis	mm	350	350	200
Z-axis	mm	700	720	470
Fast feed X, Y, Z	m/min	30/20/50	15	15
Workpiece, max.	mm	320/400	315	165 vertical
Workpiece length, max. diameter	mm	370	520	255
Workpiece length, max.	mm	300	380	185
Face grinding				
Workpiece weight, max.	kg	50	50	30
Grinding wheel diameter, max.	mm	254	254	150
Rotation electrode, diameter	mm	6 – 200		up to 150
Two-spindle drive, max.	kW	30	26	9
Grinding spindle, speed	rpm	0 – 10,500	0 – 10,500	0 – 10,500



# WALTER HELITRONIC tool grinding machines



## WALTER HELITRONIC MICRO

The HELITRONIC MICRO achieves high-precision grinding results for tools in the diameter range from 0.1 to 12.7 mm in production and from 3 to 12.7 mm in reshaping. As an automatic 5-axis CNC machine it is ideal for the complete machining of complex geometries of micro tools in a single clamping. All axes are equipped with linear or torque drives and are controlled by integrated, high-resolution measuring systems. These generate precise movements, combined with high dynamics. The high speed workpiece A-axis with a max. speed of 1 000 rpm gives the HELITRONIC MICRO a precise cylindrical grinding capacity, particularly for step tools.

- Low-vibration, solid mineral casting gantry design
- Linear axes X, Y, Z with linear drives
- Linear axis X, with ball-type linear drive
- Rotating axes A, C with torque motors
- Motor spindle with three spindle ends
- Up to three grinding wheels per spindle end
- Production and/or reshaping
- Fully automated complete machining in a single clamping
- Integrated robot loader

## WALTER HELITRONIC MINI POWER

With an identical machine design to the HELITRONIC POWER, the HELITRONIC MINI POWER ensures cost-effective machining for small tool diameters, thanks to minimal travel and its small space requirement. It is the first choice when it comes to the flexible production and reshaping of rotationally symmetrical tools and production parts from a diameter of 1 mm.

- Low-vibration, solid cast iron gantry design
- Linear axes X, Y, Z with ball-type linear drives
- Rotation axes A, C with worm drives
- Belt-driven spindle with two spindle ends
- Up to three grinding wheels per spindle end
- Production and/or reshaping
- Complete machining in a single clamping
- Glass scales
- Various loader types and grinding wheel changers optionally available

## WALTER HELITRONIC MINI AUTOMATION

Tool grinding machine with 5 CNC-controlled axes, specially developed for the high-volume production of cutters, drills, step drills, woodworking tools, profile tools, etc. made of tungsten carbide, HSS, ceramic, cermet or CBN with diameter between 1 and 16 mm.

- Machine base in solid grey cast iron gantry design
- Belt-driven spindle with 2 spindle ends, NCT cone with flat face
- Up to 3 grinding wheels per spindle end
- Robot loader for max. 1,500 tools (pallets not included)
- Automatic clamping cylinder
- Automation table top
- Glass scales
- Torque motor

## WALTER HELITRONIC BASIC

With 5 CNC axes, the HELITRONIC BASIC sharpens and grinds a broad range of precision tools for the metal and wood industries with the highest precision and quality. Short set-up and auxiliary times ensure cost effectiveness from a lot size of 1, even in minimally manned multi-shift operation. There is virtually no task that cannot be efficiently produced with this machine. It is therefore the first choice for reshaping companies and newcomers to the world of premium tools. Its field of application includes all rotationally symmetrical tools for machining tools for metal and wood industries, special tools and parts with complex geometries.

- Grinding of rotationally symmetrical tools for the metal and wood industry
- Reshaping and/or production
- Complete machining in a single clamping
- Materials: HSS, HM, cermet, ceramic
- Optional eco-loader

## WALTER HELITRONIC ESSENTIAL

The HELITRONIC ESSENTIAL 5-axis CNC tool grinding machine is the best choice within the HELITRONIC family when it comes to the flexible reshaping and production of rotationally symmetrical tools and production parts in the dimension range specified below. The machine guarantees cost-effective tool grinding for a diameter from 1–100 mm and up to a total length of 255 mm.

- Machine bed in solid grey cast iron gantry design
- Ball-type linear drives in X, Y, Z
- Worm gear drives in A, C
- Infinitely variable grinding wheel spindle drive with digital AC servo motor
- Optional top-loader

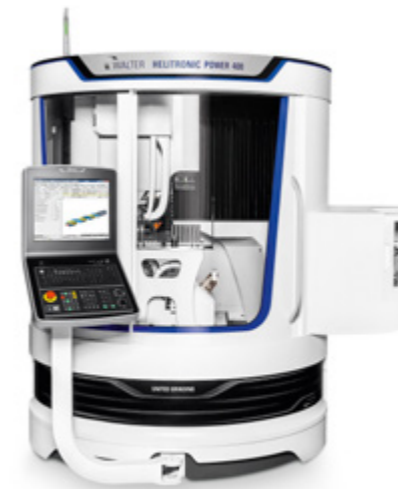
	MICRO	MINI POWER
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X-axis	mm	400	350
Y-axis	mm	320	200
Z-axis	mm	320	470
Fast feed X, Y, Z	m/min	30	15
Workpiece, max. diameter	mm	12.7	100
Workpiece length, max. peripheral grinding	mm	120 (300)	255
Workpiece length, max. face grinding	mm	120 (300)	185
Workpiece weight, max.	kg	12	30
Grinding wheel diameter, max.	mm	150	150
Two-spindle drive, max.	kW	2×4./1×6.	9
Grinding spindle, speed	rpm	0 – 10,500	0 – 10,500

	MINI AUTOMATION	BASIC	ESSENTIAL
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X-axis	mm	350	460	350
Y-axis	mm	200	320	200
Z-axis	mm	470	660	470
Fast feed X, Y, Z	m/min	15	15	15
Workpiece, max. diameter	mm	100	290/320	100
Workpiece length, max. peripheral grinding	mm	255	350	255
Workpiece length, max. face grinding	mm	185	280	185
Workpiece weight, max.	kg	30	50	30
Grinding wheel diameter, max.	mm	150	150	150
Two-spindle drive, max.	kW	9	9	9
Grinding spindle, speed	rpm	0 – 10,500	0 – 10,500	0 – 10,500

# WALTER HELITRONIC tool grinding machines



## WALTER HELITRONIC VISION 700 L

The HELITRONIC VISION 700 L is a high-performance tool grinding machine with 5 CNC-controlled axes and grinding wheel changer for tools up to a total length of 700 mm (up to 550 mm machining length) and max. 200 mm diameter. The application range encompasses the efficient production of cutters, drills, step tools, woodworking tools, profiling cutters or profiling tools in all standard materials such as HM, HSS, ceramic, cermet and CBN. The machine is particularly suitable for machining long drills and tools clamped between centres, such as e.g. large hob cutters. With the "Automation table top" option, which has up to two independently moveable slides, tools can be supported and precisely guided along their entire length.

- Highly flexible solution for tool application ranges of max. 700 mm total tool length
- Grinding wheels up to a diameter of max. 254 mm possible
- Highly efficient linear technology and mineral casting gantry design for optimal rigidity, damping and precision

## WALTER HELITRONIC VISION 400 L

The HELITRONIC VISION has been a global benchmark for the production of precision tools for metal and wood applications. This success story is continued with the HELITRONIC VISION 400 L. Its linear technology makes it an efficient and very productive companion and its robust gantry construction in mineral cast concrete guarantees perfect tool surfaces and shape accuracy. The machine's range of applications encompasses all rotationally symmetrical tools for machining tools for metal and wood industries, special tools and the machining of complex geometries in a single clamping.

- Grinding of rotationally symmetrical tools for the metal and wood industry
- Production and/or resharpening
- Also for high-volume production in resharpening companies
- Fully automated complete machining in a single clamping
- Materials: HSS, HM, cermet, ceramic
- Linear axes X, Y, Z with linear drives
- Rotating axes A, C with torque motors
- Available with a ball-type linear drive
- Various loader types and grinding wheel changers optionally available

	VISION 700 L	VISION 400 L	
X-axis	mm	675	500
Y-axis	mm	255	350
Z-axis	mm	700	700
Fast feed X, Y, Z	m/min	50	50
Workpiece, max. diameter	mm	200	315
Workpiece length max., peripheral grinding	mm	580	370
Workpiece length max., face grinding	mm	550	300
Workpiece weight, max.	kg	50	50
Grinding wheel diameter, max.	mm	254	254
Two-spindle drive, max.	kW	35	24
Grinding spindle, speed	rpm	0 – 10,500	0 – 10,500

## WALTER HELITRONIC POWER 400

The HELITRONIC POWER 400 with wheel changer is the powerful top version with maximum flexibility for medium to large series. It stands for top quality worldwide for the production and resharpening of rotationally symmetrical tools in one clamping, even with complex geometries. Diameter range from 3 to 315 mm, machining length up to 520 mm, workpiece weight up to 50 kg. In combination with the grinding wheel changer, a wide variety of loading systems and the motor spindle, it sets new standards in terms of productivity and flexibility.

## WALTER HELITRONIC POWER

The HELITRONIC POWER is the worldwide industry leader in the production or resharpening of precision tools for the metal and wood industries. Decades of tried and tested WALTER expertise in hardware, software and application knowledge come together in this machine. It offers numerous advantages for cost reduction and is also an ideal CNC machine for newcomers to the tool machining business. Users will love its safe and easy operation. This is what makes the world's best selling WALTER tool grinding machine a real all-rounder that is held in very high esteem. Its field of application encompasses all rotationally symmetrical tools for machining metal and wood, including special tools. Complex geometries can also be machined in a single clamping.

- Grinding of rotationally symmetrical tools for the metal and wood industry.
- Production and/or resharpening
- Fully automated complete machining in a single clamping
- Materials: HSS, HM, cermet, ceramic
- Various loader types and grinding wheel changers optionally available
- Available with a ball-type linear drive

	POWER 400	POWER	
X-axis	mm	650	460
Y-axis	mm	350	320
Z-axis	mm	750	660
Fast feed X, Y, Z	m/min	15	15
Workpiece, max. diameter	mm	315	290/320
Workpiece length max., peripheral grinding	mm	520	350
Workpiece length max., face grinding	mm	380	280
Workpiece weight, max.	kg	50	50
Grinding wheel diameter, max.	mm	254	200
Two-spindle drive, max.	kW	26	11.5/14.5/24
Grinding spindle, speed	rpm	0 – 10,500	0 – 10,500

# WALTER HELICHECK optical CNC measuring machines

## Manual tool measuring devices HELISET and HELISET PLUS



### WALTER HELICHECK PRO | PRO L | PLUS | PLUS L

When it comes to the fully automatic complete measurement of complex geometries, the HELICHECK PRO | PRO L CNC and HELICHECK PLUS | PLUS L measuring machines are the global benchmark in the macro and micro ranges respectively. With certified accuracy, they set standards in productivity, quality and precision in modern tool production for a tool diameter from 1 to 150 mm in the macro range and 0.1 to 100 mm in the micro range, a tool length up to 330 or 730 mm for the L versions and a tool weight of up to

35 kg. The 4-axis CNC measuring machines are suitable for non-contact complete measurement of precision tools, grinding wheels, rotationally symmetrical parts and flat parts.

- Optional robot loader

### WALTER HELICHECK PRECISION | ADVANCED

Fully automatic measuring machines HELICHECK PRECISION | ADVANCED for rotationally symmetrical tools in a diameter range from 2 to 320 mm, a tool length up to 420 mm and a tool weight up to 25 kg. The HELICHECK PRECISION and HELICHECK ADVANCED measure even complex geometries on rotationally symmetrical tools with a repeatability precision of 1.5 µm in a fully automatic, non-contact, non-wearing and precise process. Both machines offer added value with the measurement of production equipment such as grinding wheels and diamond dressing rolls.



### WALTER HELICHECK 3D

Scan the tool. Create a 3D model. Measure. Compare. The generation of 3D models of tools and production parts has never been easier, quicker or better. The new HELICHECK 3D with state-of-the-art laser technology is the first choice when time is a factor in scanning and digitising. Whether your requirement is the measurement of key parameters or comparison with the master model: HELICHECK 3D is the solution!



### WALTER HELISET PLUS

Manual measuring instrument that is ideal for optimising the processing time by up to 30% when machining complex tools. For this purpose, the HELISET PLUS is integrated into the production process, allowing measurement operations that were previously carried out during tool preparation or in the eroding machine to be carried out during machining operation on the HELISET PLUS measuring instrument.

- Clear user interface
- Intuitive touch screen operation
- Real-time image using reflected light for fast positioning of the measuring points
- Representation of the previously measured tool blades
- Can be operated by every user immediately and without programming
- Integrated data output via XML to the Walter WindowMode of the eroding machine or the HELICHECK measuring machine
- Measuring of grinding wheels



### WALTER HELISET

Manual measuring device for the measurement of grinding wheel sets. Measure grinding wheels conveniently, quickly and precisely, thereby reducing machine downtime. While the grinder is producing tools, the next grinding wheel set can be prepared offline.

- Fast manual measurement of grinding wheels and tools
- No programming effort
- Minimal training requirement
- Single-handed quick adjustment
- Manual fine adjustment
- All wheel shapes selectable and measurable via drop-down menu
- Intuitive user interface
- 22" colour monitor

		PRO   PLUS	PRO L   PLUS L	PRECISION	ADVANCED
X-axis	mm	260	260	—	270
Y-axis	mm	330	795	455	455
Z-axis	mm	250	250	325	325
A-axis	degrees	360	360	360	360
Workpiece Ø, min.   max.	mm	0.1 PLS/200	200	320	320
Workpiece length, max.	mm	300	730	420	420
Workpiece weight, max.	kg	25	25	25	25
Measuring accuracy as per VDI/VDE 2617		E1=1.4+L/300	E1= 1.4+L/300	E1= 1.8+L/300	E1= 1.8+L/300
Length measurement, repeatability precision	µm	± 1	± 1	± 1.5	± 1.5
Measuring system total resolution	µm	0.25	0.25	0.25	0.25
Glass scales for linear axes	µm	0.004	0.004	0.05	0.05
Rotary encoder for rotation axis A	degrees	0.0025	0.0025	0.0025	0.0025

		HELICHECK 3D	HELISET PLUS	HELISET
X-axis	mm	270	—	115
Y-axis	mm	455	—	370
Z-axis	mm	325	—	—
A-axis	degrees	360	—	—
Workpiece Ø, max.	mm	295	350	up to 350
Workpiece length, max.	mm	420	400	400
Workpiece weight, max.	kg	25	—	—
Measuring accuracy as per VDI/VDE 2617	µm	E1 = (1.8 + L/300)	—	—
Position resolution of linear axes	µm	0.02	—	—
Measuring system total resolution	µm	0.25	—	—
Length measurement, repeatability precision	µm	—	—	4

## WALTER Software

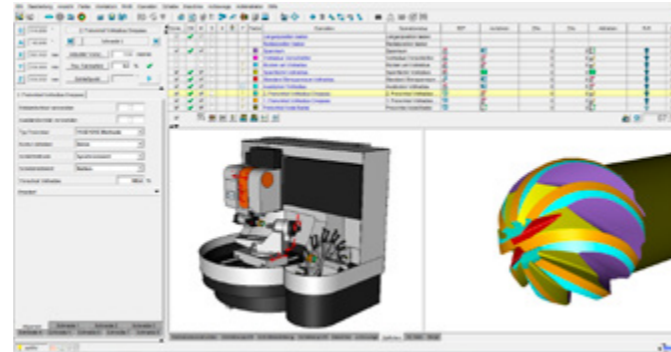
### WALTER HELITRONIC TOOL STUDIO

Software for the production and resharping of tools

HELITRONIC TOOL STUDIO is one of the most modern and flexible software systems in the field of tool grinding. More than 30 years of software experience are continually incorporated into its further development. All knowledge gained from grinding trials is used directly for development of the software.

#### Now also available: Eroding in HELITRONIC TOOL STUDIO

- Greater clarity
- Maximum flexibility
- Collision-free grinding
- Click & Edit
- Integrated measuring function
- Free scaling

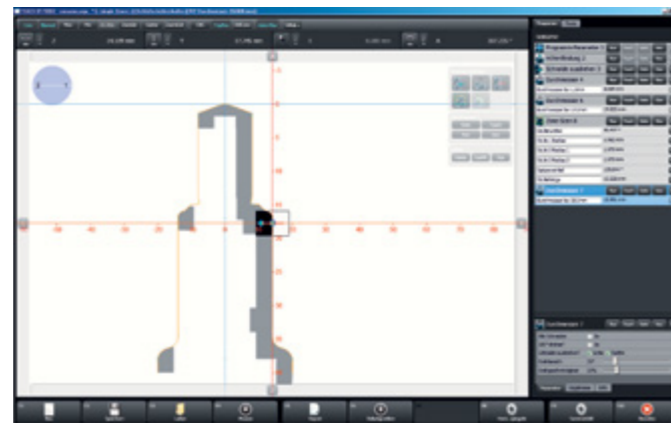


### WALTER MEASUREMENT TECHNOLOGY SOFTWARE

For fully automatic measurement of rotationally symmetrical tools, production equipment such as grinding wheels, dressing rollers as well as indexable inserts and profiling cutters.

The precision and productivity of modern tool processing are closely intertwined with tool expertise on the one hand and special measuring technology on the other. WALTER HELICHECK CNC measuring machines are renowned for their precise measuring results and are used worldwide by leading machine manufacturers. They provide reliable data in certified accuracy for the optimisation of production processes. The software has been developed in collaboration with the world's leading machine manufacturers.

- Quick Check Modular – the standard flexible, intelligent WALTER software
- Quick Check Grinding Wheels – for perfect grinding results
- TEACH-IN MODE – for extended inspection tasks
- EASY CHECK – innovative tool measurement technology with fully automatic profile recognition
- Viascan – for accurate contour detection
- Viafit – target/actual comparison enables fast profile control
- DXF Generator – create DXF files for unknown contours
- Form Tool Compensation (FTC) – correction software



# EWAG manual and CNC-controlled tool grinding machines and laser processing machines



The origins of Ewag AG can be traced back to the year 1946. As supplier to the Swiss watch and clock industry, EWAG has always given priority to the associated high precision requirements in the development of its tool grinding machines. Today, EWAG machines are used in more than forty countries worldwide, in fields of application such as the watch and clock industry, the dental, electrical, automotive and aviation industries, as well as in the manufacture of precision micro-components. EWAG is considered one of the world's leading manufacturers of high-precision tool grinding machines.

Our product portfolio includes manual machines for grinding and re-grinding tools, CNC machines for grinding tungsten carbide, CBN and PCD and for machining rotational and indexable insert geometries, as well as our new laser technology. Together with our sister company Walter Maschinenbau GmbH in Tübingen, Germany, we see ourselves as a system and solution provider for complete tool machining, and are able to offer an extensive product range which includes grinding, eroding, lasering, measuring and software. Our customer orientation and our global sales and service network with its own branches and staff have been valued by our customers for decades.



### EWAG WS 11 / WS 11-SP

The EWAG WS 11 is particularly suitable for the manufacture and regrinding of high-precision micro tools and production parts made of tungsten carbide, steel or other materials. The unique kinematics of the machine enables the manual machining of a wide variety of geometries. The grinding process can be observed and monitored with the optical measuring system in a single clamping. The EWAG WS 11-SP is a further development of the well proven WS 11. Its kinematics allows cylindrical and conical tools with straight and helical toothing to be ground and measured in a single clamping.

- Linear axes X, Y, (V), Z
  - Rotary axes A, B, C, D
  - Optical measuring system for visible metal removal process and control measurements
- Option: video measurement system



### EWAG RS 15

A precision tool grinding machine for the efficient manufacture and sharpening of cutting tools made of tungsten carbide, cermet, ceramic, PCB, PCD and other materials. The wide variety of accessories enables problem-free grinding of indexable inserts and/or rotational tools.

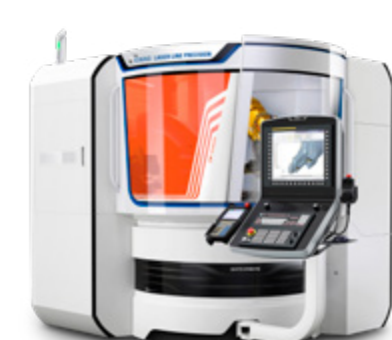
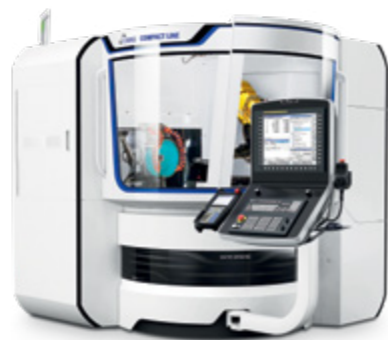
- Linear axes X, Y, Z
  - Rotary axes A, B, C
  - Measurement in the production process with projector and digital display
  - Grinding and measuring in a single clamping
  - Integrated dressing of grinding wheels
  - Adjustable contact pressure for super-hard materials
  - Rotationally symmetrical tools up to 200 mm in diameter
  - Indexable inserts
- Option: video measurement system

		WS 11	WS 11-SP	RS 15
A-axis, spindle inclination	degrees	-135 to +30	380	300
B-axis, swivel angle, max.	degrees	∞	∞	∞
D-axis	degrees	–	± 35	–
X-axis transverse adjustment	mm	100	100	490
Oscillation factor	mm	–	–	0 to 70
Y-axis height adjustment	mm	100	100	130
V-axis, grinding stroke position axis	mm	–	184	–
Z-axis, infeed stroke horizontal	mm	100	100	120
Cross slide, clamping area	mm	–	–	280×170
Cross-slide U	mm	–	–	100
Cross-slide W	mm	–	–	100
Grinding wheel spindle drive	kW	0.3	0.3	2.2
Speeds, continuously adjustable	rpm	2,500 to 8 000	2,500 to 8 000	1 000 to 6 000
Workhead spindle drive	kW	0.37	0.37	–
Speed, continuously adjustable	rpm	100 to 1,300	100 to 1,300	–
Grinding wheel diameter, max.	mm	75	75	150

# EWAG production machine tools

## PROFILE LINE | COMPACT LINE | EWAMATIC LINEAR

## INSERT LINE | LASER LINE ULTRA | LASER LINE PRECISION



### EWAG PROFILE LINE

The PROFILE LINE is the grinding centre for the efficient production of highly complex interchangeable cutting insert geometries, preferably from pre-sintered carbide blanks. High efficiency and autonomous multi-shift operation of the machine are ensured by the smart and flexible integrated FANUC 6-axis robot. The compact design of the grinding centre enables optimal utilisation of production areas in which space is usually at a premium.

- For exchangeable cutting inserts
- Smart integrated 6-way wheel changer
- Compatible with custom pallets
- Vision system for part recognition
- Innovative ProGrind and HELITRONIC TOOL STUDIO software
- EWAG tooling expertise (smart chucks)
- Proven gantry design

### EWAG COMPACT LINE

The COMPACT LINE is the tool grinding machine for indexable inserts such as plunging, milling, turning, profile and peripheral grinding plates in materials such as HSS, HM, ceramic, cermet, PCBN, PCD, i.e. all common cutting materials. A multitude of clamping systems, which can be docked onto the machine via a plug & play interface, offers complete freedom in the choice of tools, their sequence, flexible lot sizes and minimal setup times.

- 6 CNC-axis tool grinding machine
- ProGrind software
- Linear axes with glass scales
- Linear axes with glass scales
- "Three-in-one" sharpening unit for dressing, regeneration and crush dressing
- Plug & Play clamping systems
- Grinding force module for super-hard materials

### EWAG EWAMATIC LINEAR

The EWAMATIC LINEAR focuses on users' individual requirements and challenges. It can perform a large variety of grinding operations in a single clamping. Its flexibility in terms of tool types, tool geometry and cutting edge material in the specified dimension range is virtually unparalleled. The star-shaped grinding spindle support with up to 12 grinding wheels is used, depending on the tool's complexity.

- 6 CNC-axis tool grinding machine
- ProGrind & NUMROTO software
- Linear axes with glass scales
- Linear axes with glass scales
- ATC wheel changer with 6 grinding spindles
- Modular tool clamping systems
- Grinding force module for super-hard materials

### EWAG INSERT LINE

The INSERT LINE represents a new class of performance in the peripheral grinding of indexable inserts. Thanks to the latest drive and control technology as well as the High Speed Machining (HSM) grinding function, peripheral grinding of indexable inserts has become a commercial reality for the first time. This process results in a significantly increased removal capacity, an improved surface quality as well as improved cutting edge roughness, in comparison with the conventional cup wheel grinding process.

- 4 CNC-axis peripheral grinding machine
- ProGrind & HSM software
- Vibration-damping Granitan®
- Hydrostatic guideways
- Torque/direct drives
- Dressing-Plus system for dressing cycles during loading
- Twin stacker for up to 40 pallets

### EWAG LASER LINE ULTRA

Cutting-edge ultra-short-pulse laser technology with pulses in the picosecond range is used in this machine. This enables the machining of virtually all materials, with an extremely small heat input (cold ablation). For example, solid carbide tools can typically be coated after laser machining, as the minimal thermal load does not cause any changes in the surface of the material.

- 5-CNC-axis machine tool plus superimposed 3-CNC-axis laser beam guidance
- Direct drives in the linear axes
- Torque motors for B and C-axis
- EWAG LaserSoft combines laser and machine control
- Direct 3D CAD/CAM interface
- Fastest programming from envelope contour (e.g. DXF)

### EWAG LASER LINE PRECISION

This machine is for focused laser beginners. The beam source is based on robust fibre laser technology. Ultra-hard cutting materials in particular (e.g. CVD, PCD, etc.) have a far higher absorption of green laser light (532 nm), in comparison with conventional infrared laser light (1064 nm), as the photon energy is doubled. The highly efficient complete machining process occurs in one clamping.

- 5-CNC-axis machine tool plus superimposed 2-CNC-axis laser beam guidance
- Direct drives in the linear axes
- Torque motors for B and C-axis
- EWAG LaserSoft combines laser and machine control
- Direct 3D CAD/CAM interface

			PROFILE LINE	COMPACT LINE	EWAMATIC LINEAR	INSERT LINE
X-axis	Transverse adjustment	mm	330	450	380	300
Y-axis	Height adjustment	mm	200	180	245	–
Z-axis	Infeed stroke	mm	470	150	240	350
B/C-axis	Swivel range	degrees	+/- 200	∞	±135	+45° to -210°
	Axis resolution	degrees	0.0001	0.0001	0.0001	–
C/A-axis	Rotation	degrees	∞	∞	∞	∞
	Axis resolution	degrees	0.0001	0.0001	0.0001	–
Inclination axis		degrees	–	-15...+25	-15...+25	–
Grinding wheel spindle drive		kW	9	5.5	7.5	12.5
Variable speeds		rpm	0...10,500	0...7,000	0...9,000	1,400 – 3,200
Grinding wheel diameter, max.		mm	150	250	300	500

### Linear axes

		ULTRA	PRECISION
X-axis	mm	440	440
Y-axis	mm	140	140
Z-axis	mm	170	170
Positioning speed max.	m/min.	10	10

### Rotation axes

B-axis	degrees	±110	±110
C-axis	degrees	∞	∞
Tool diameter, max.	mm	200	200

### Laser unit

Shaft length	nm	1 064	532
Pulse frequency	kHz	400...1 000	10...300

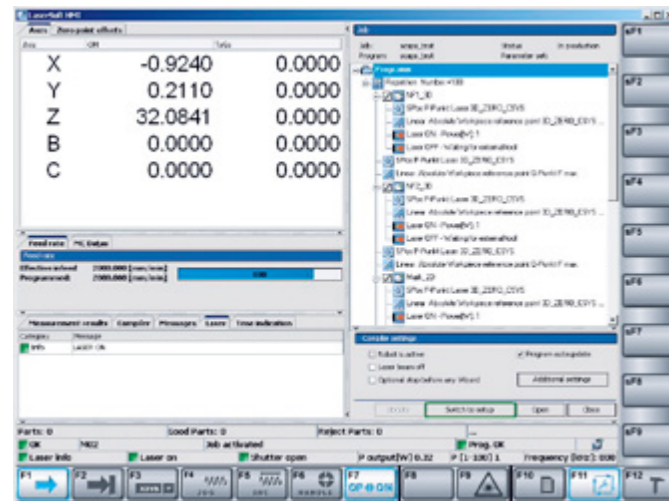
# EWAG Software

## EWAG Standard Application Framework

### ProGrind – more than just software

Innovation calls for innovative software. ProGrind and LaserSoft customer-oriented software from the EWAG company will completely fulfil your highest expectations. Programs can be created quickly and easily on all EWAG CNC machines according to a standardised philosophy. The input masks are supported by 3D graphics. Thanks to Ethernet, the machines can be integrated into your company network. Our specialists also have access for diagnosis and maintenance.

### ProGrind and LaserSoft – Complete solutions for all grinding and laser tasks with integrated automation tool



## Highlights:

- 3D simulation on the COMPACT LINE**  
 From a 3D simulation of the programmed tool, the operator can immediately see the possible consequences of a parameter change. This means that errors can be avoided in advance and productivity increased.
- NUMROTOplus on the EWAMATIC LINEAR**  
 The optional NUMROTO software is an extensive software program for the production and resharping of different tools. Its combination with ProGrind leaves virtually nothing to be desired in the production of complex tools.
- ISO standard shapes on the INSERT LINE**  
 Programming of ISO geometries with the associated variable and constant clearance angles can be easily selected using input masks. The set-up effort is thus reduced to a minimum.
- 3D model programming on the LASER LINE ULTRA and LASER LINE PRECISION**  
 For machining complex 3D structures, the tool geometry is imported in an established 3D data format and deconstructed into the individual erosion layers. Machining strategy and scanner parameters for the layer removal can be defined and stored in a machining file.

# IRPD Centre of Excellence in Additive Manufacturing







Flexibility and cost-efficiency during development are key competitive factors. Irpd AG is a leader in methods and technologies that lead to a reduction in the development time of new products. The use and further development of additive production processes, so-called “lay-

er manufacturing technologies”, are among our core competencies. For 20 years we have manufactured finished components in St. Gallen, Switzerland. In the early days of the company's history, the focus was on research and development of additive technologies.

In 2015, inspire AG (ETH Zurich) and the UNITED GRINDING Group co-founded the joint venture IRPD. IRPD is the competence centre for additive manufacturing of the UNITED GRINDING Group.



 <p><b>Consulting &amp; engineering</b> Engineering Think Additive® workshops Modeling Surface analyses</p>	<p><b>Processes &amp; Technologies</b> Selective Laser Sintering (SLS) Selective Laser Melting (SLM) 3D Printing (3DP) Stereo lithography (SLA) Vacuum Casting (VC) Vacuum Differential Pressure Casting (VDPC) Fused Deposition Modeling (FDM)</p>	<p><b>Materials</b> Polyamide Duraform HST Duraform Flex Elastomers iCoPP (polypropylene)</p> <p>Stainless steel Hot working steel Ti-alloy Al-alloy CoCr-alloy Bronze, Ni-base alloy</p>	 <p><b>Reworking</b> Deburring Barrel finishing Shot blasting Heat treatment</p>
 <p><b>Reverse engineering</b> 3D scanning CT/MRI 3D volume construction</p>			 <p><b>Finishing</b> Painting, coloring, powder, coating, plasma polishing, chrome plating, custom specific requests</p>

## Additive Manufacturing Technologies

A wide variety of generative production processes are available covering an extraordinary range of performance and application areas. The guidelines presented in this brochure provide an insight into the possibilities and requirements of additive manufacturing and make it clear how and when these technologies can be put to good use.

We focus on the production of industrial metal or plastic prototypes as well as (small) series manufacturing of complex and individualised components. We focus on additive production processes, in particular Selective Laser Sintering (SLS), Selective Laser Melting (SLM) and 3D printing.

We also offer individual technology and process consulting, reverse engineering, 3D scanning and services for the design and production of sophisticated components.

## Our customers

IRPD's customers include both investment and consumer goods companies, such as:

### Industry

From prototypes to small series – our partners include automotive, energy, aerospace, transportation & heavy industry, tool and mould making, precision mechanics and mechanical engineering.

### Marketing & communication

Sustainably integrate your corporate values into your individual advertising and POS solutions.

### Architecture & art

Your new home – tangible within just a few days. Imagined art becomes reality.

### Medicine & orthopaedics

Models for pre-operative planning, drilling jigs, training models, orthoses and prostheses, implants and implant preparation.



# ThinkAdditive®

## Do you Think Additive®?

Are you interested in additive manufacturing and would you like to take advantage of the numerous advantages of these new methods for your company? IRPD offers modular workshops. Our experts will guide you and your team step by step into tomorrow's world of

additive manufacturing. On an individual basis, the courses can also be adapted to match your company's existing or planned projects. More information about Think Additive® workshops is available here: [www.irpd.ch/Workshop](http://www.irpd.ch/Workshop)

<p><b>4. STRATEGY WORKSHOP</b> Construction and design – first part produced</p>	<p>DAYS 4-6</p>	<p>+ Voucher Development Cost effectiveness Implementation Coaching IRPD</p>
<p><b>3. IDEATION WORKSHOP</b> Participants suggest parts; evaluation of the ideas</p>	<p>DAY 3</p>	<p>+ Production Coaching IRPD</p>
<p><b>2. BASICS+</b> AM Basics &amp; Research – ready for AM construction</p>	<p>DAY 2</p>	<p>+ Ideas competition Discussion Research Coaching IRPD</p>
<p><b>1. BASICS</b> AM basics – possibilities and limits</p>	<p>DAY 1</p>	<p>Technologies Possibilities Limits</p>

# Customer Care



UNITED GRINDING machines are designed to fulfil customer requirements for as long as possible, operate cost-effectively, function reliably and be constantly available. From "Start up" through to "Retrofit" – our Customer Care is there for you throughout the working life of your machine. Over 50 professional HelpLines and more than 300 service technicians are available in your area, wherever you are in the world.

- We will provide you with fast, uncomplicated support.
- We will help to increase your productivity.
- We work professionally, reliably and transparently.
- We will provide a professional solution to your problems.



## Prevention

### Maintenance – Your advantages:

- Increased machine availability thanks to reduced downtime
- Higher and more constant production quality
- Well-founded statements on the machine condition
- Cost transparency thanks to flat rate

### Inspection – Your advantages:

- Early identification of defects
- Service tasks easier to schedule
- Increased machine availability thanks to reduced downtime

## Qualification



### Training – Your advantages:

- Learning of processes under real conditions
- Trained and motivated staff
- Increased productivity
- Lower risk of a machine failure due to incorrect operation

### Production support – Your advantages:

- Increase in your company's know-how
- Support of your production team by our specialists
- Increased productivity



## Start up

### Commissioning – Your advantages:

- Smooth start to production
- Optimal basic knowledge
- Trained staff

### Warranty extension – Your advantages:

- Ability to plan
- Financial security at low additional costs



## Service

### Customer service – Your advantages:

- Fast response times thanks to locally based service technicians
- Rapid troubleshooting
- Quick and effective problem solving

### Customer consultation – Your advantages:

- Quick and effective problem solving
- Individual consultation free of charge

### HelpLine – Your advantages:

- Personal contact
- Increased machine availability thanks to fast response times



## Digital Solutions™

### Remote Service

- Service request at the touch of a button
- Increased availability of your system
- Minimise downtimes

### Service Monitor

- Structured maintenance planning
- Easier maintenance thanks to guides and instructions
- Maintenance documentation available online

### Production Monitor

- Information and key data about your machines – around the clock
- Support for your planners and production staff
- Data for optimisation of availability and utilisation



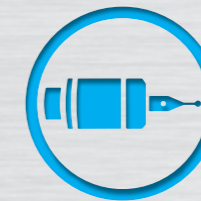
## Rebuild

### Machine overhaul – Your advantages:

- Same precision and productivity as a new machine
- Extended service life of your machine
- Retraining of employees on a new machine unnecessary

### Assembly overhaul – Your advantages:

- You receive an assembly that's as good as new
- Extended service life of the machine
- Rectification of geometry problems



## Material

### Spare parts – Your advantages:

- Fast and flexible response to your requirements
- Fitting accuracy and process reliability thanks to original spare parts
- High precision is maintained

### Replacement parts – Your advantages:

- Lower costs when purchasing replacement parts
- Fast problem-solving
- Replacement parts that are a perfect fit

### Accessories – Your advantages:

- Customisation of your machine
- Accessories that are a perfect fit



## Retrofit

### Conversions – Your advantages:

- Use your machine for new applications
- Extended service life of the machine
- Retraining of employees on a new machine unnecessary

### Retrofits – Your advantages:

- Retrofitting of components to the current state of the art
- Preservation of your machine's value
- Your machine remains in situ

### Machine trade-in – Your advantages:

- No disposal costs
- Use of the latest technology through replacement acquisition
- Free assessment of the old machine
- The old machine is taken away when the new machine is delivered
- We cover the cost of the return shipping

# Digital Solutions™ – Digital Solutions™ allows you to keep everything under control – no matter what the application.



## Remote Service

Highly efficient: the UNITED GRINDING Remote Service Package. Remote Service offers prompt, system-specific support by Service experts: efficient and with the utmost safety.

Your machines and systems are your capital. For your company to operate economically, the value added chain must function smoothly. Faster, system-specific support by specialists is nowadays more important than ever: Complex systems and rising cost pressures call for optimal availability and rapid service. With Remote Service, we offer you an integral solution enabling optimal support for your machinery. Secure internet connections allow expert support with just a click – all without travel times. Remote Service lets you boost the efficiency of your production.



## Service Monitor

The UNITED GRINDING Service Monitor knows when recommended maintenance work is due in the operating log, and points this out to you reliably and promptly.

The Service Monitor utilises a clear traffic light system to indicate when maintenance is due (operationally dependent and fixed maintenance intervals according to operating manual) for all connected machines. You can see in the Service Monitor when what maintenance work needs to be carried out, while providing extensive information concerning required tools, replacement and wearing parts as well as instructions for each machine.



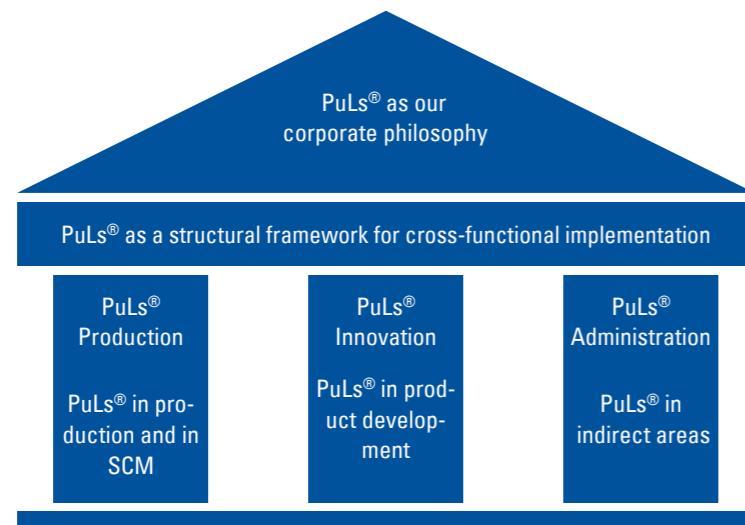
## Production Monitor

Everything under control: The UNITED GRINDING Production Monitor gives you an instant overview of the current situation in your production – irrespective of time and place.

The Production Monitor assists you as a reliable 24/7 monitoring service. Operating times and non-productive times, unit numbers or malfunction times are typically shown in real time. The Production Monitor is both an ideal aid for experts in their specific field as well as for planners or production managers focused on a global overview. You simply call up the most important data for each machine directly via the app on your smartphone and report the fault directly via a service request to the corresponding UNITED GRINDING employee.



## Precision and passion for your success!



We offer you the best quality in products and services – this is the claim of all company brands of the UNITED GRINDING Group.

To ensure that we fulfil this claim, we work according to our corporate philosophy, PuLs®. PuLs® stands for precision and passion.

In all that we do, our focus is on you and your needs. The goal of PuLs® is to ensure that we work with the utmost efficiency internally, so that we can offer you the best quality service. Waiting times, surpluses, unnecessary movement of materials and superfluous processes – these are classic examples of inefficient organisation. With the aid of PuLs® we avoid all kinds of waste and continuously optimise our products, services and processes. PuLs® uses various lean methods based on the principles of Lean Six Sigma. PuLs® is a customised program and not an off-the-peg concept. All processes are geared towards your requirements. Our top corporate goal is to make you, our customers, even more successful.

A number of examples illustrate this: Thanks to PuLs®, we handle orders efficiently and effectively for our customers. We have reduced machine downtimes to a minimum with PuLs®. We have also reduced processing times in production. You therefore receive your machine earlier and can start your own value creation process more quickly.

We live precision and passion! PuLs® is anchored into all aspects of our business and used in all companies of the UNITED GRINDING Group. “How can it be done better and with less expense?” Thanks to PuLs®, this challenge is not restricted to production, but extends through all areas of the company, including research and development, sales, administration and Customer Care. The programme’s success lies in the fact that it includes all parties involved – both our employees and you, as our customers.

# PuLs®

# UNITED GRINDING Group worldwide

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The information given is based on the technical levels of our machine at the time of this brochure going to print. We reserve the right to further develop our machines technically and make design modifications. This means that the dimensions, weights, colours, etc. of the machines supplied can differ. The diverse application possibilities of our machines depend on

the technical equipment specifically requested by our customers. The equipment specifically agreed with the customer is therefore exclusively definitive for the equipping of the machines, and not any general data, information or illustrations.



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