MFP 100

FULLY AUTOMATIC COMPLETE MACHINING OF
COMPLEX WORKPIECES

C.O.R.E.®

MÄGERLE

A member of UNITED MACHINING SOLUTIONS

MFP 100

HARDWARE

- Tool changer with 68 positions
- Simultaneous tool and dressing roll changer
- Automatic nozzle changer
- Tool identification system
- Continuous spindle power 50 kW
- Spindle speeds up to 12,000 rpm
- 5-axis system
- Grinding, milling and drilling in a single clamping
- C.O.R.E. panel

SOFTWARE

- Pre-programmed grinding and dressing cycles
- Intuitive operation
- Focus on work and production safety
- C.O.R.E. OS operating system

DIMENSIONS

- X-axis – longitudinal stroke: 1.000 mm
- Y-axis – vertical stroke: 900 mm
- Z-axis – transverse stroke: 750 mm

The largest grinding center of the MÄGERLE 5-axis series is equipped with an integrated tool changer in a gantry design with 68 positions.

The MFP 100 is considered specifically for those markets where multi-face machining of heavy and complex workpieces is demanded. The high-performance spindle, which allows speeds of up to 12,000 rpm, and the large working area make the grinding center ideal for applications such as turbine vanes and rotor blades for use in the energy industry.

The grinding wheels and diamond dressing rolls are exchanged simultaneously or individually with a double gripper for the individual machining steps. The compact tool holding fixtures allow an efficient grinding process and the continuously dressed grinding wheel enables high removal rates with high profile accuracy over long cuts.

The overhead dresser integrates the dressing process into the grinding cycle to reduce overall process cycle time.

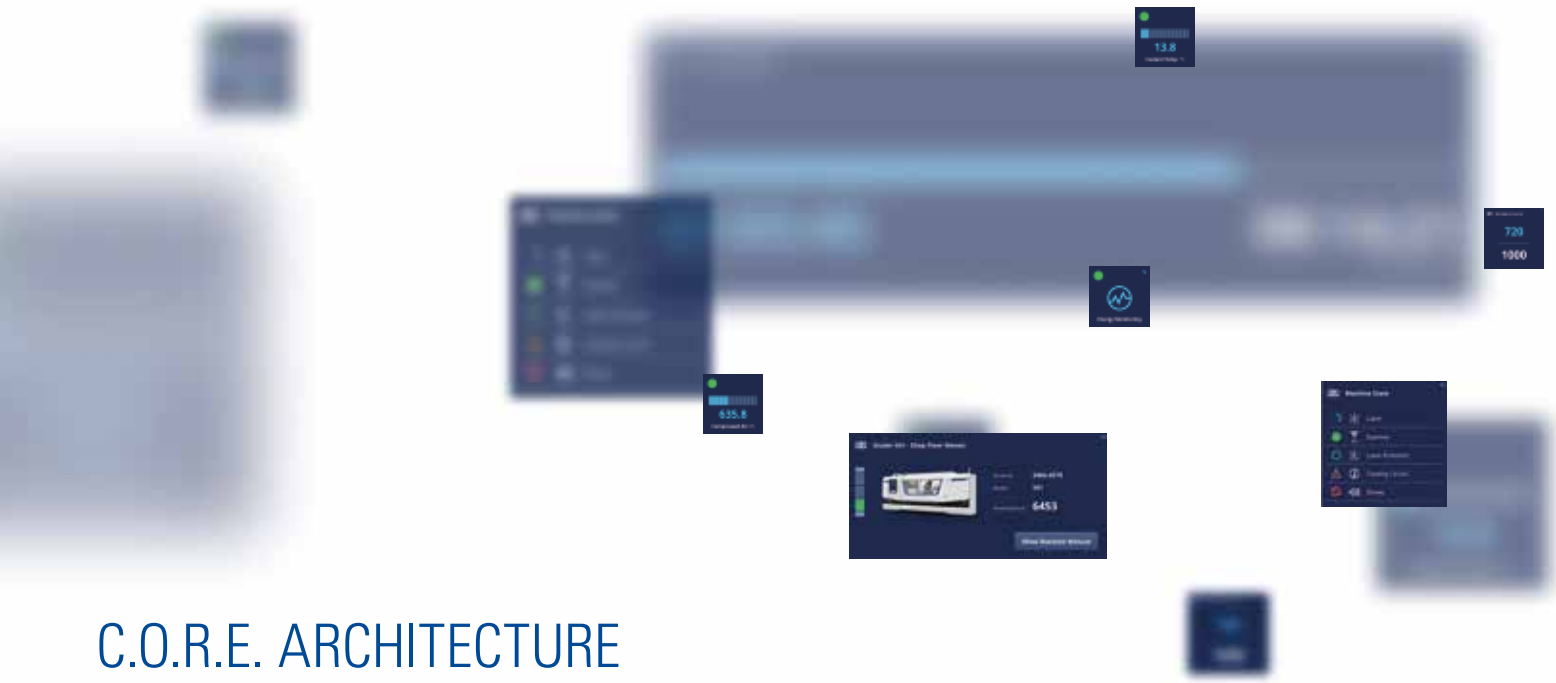
Despite its performance characteristics, the MFP 100's compact design is sure to impress. With a width of 3.8 m width and a depth of 4.3m, the footprint for a grinding machine of this category is incredibly small.
The simple rear and side access points for servicing and maintenance work supports the exceptional ergonomics of the MÄGERLE grinding center.

YOUR BENEFIT

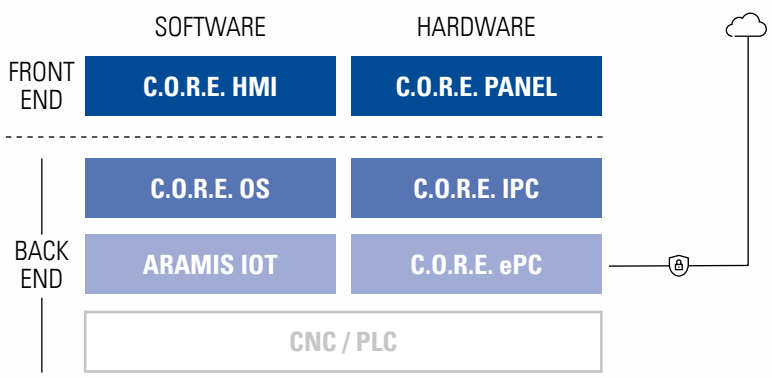
- Large magazine for tools
- Automatic tool and dressing roll changer
- Process-optimized coolant supply with automatic nozzle changer
- Tool identification system
- Hydrostatic guideways
- Maintenance-friendly design
- Intuitive, user-friendly, and efficient operation
- Access to important information directly at the control panel (e.g. production progress, task details, etc.)
- Use of UNITED GRINDING Digital Solutions™ products directly on the machine
- Fast support thanks to direct interaction with our Customer Care team on the machine

C.O.R.E. – CUSTOMER ORIENTED REVOLUTION

With C.O.R.E., we make your production fit for the digital future.
The C.O.R.E. system from UNITED GRINDING is a future-oriented hardware and software platform that takes the operation, networking and digitalization of machine tools to a new level.
C.O.R.E. was developed to make our machines and your production environment fit for the digital industry of tomorrow. Operation is simple and intuitive via the multi-touch display, with a modern and customizable user interface. Thanks to the standardized hardware and software architecture, all UNITED GRINDING machines equipped with C.O.R.E. technology are network-compatible and can be easily integrated into digital factories. All common interface formats are supported. C.O.R.E.'s modern IoT technology core also enables data-based value-added services and integration and communication with cloud-based customer platforms.



C.O.R.E. ARCHITECTURE



C.O.R.E. PANEL & HMI – NEXT-GENERATION MACHINE OPERATION

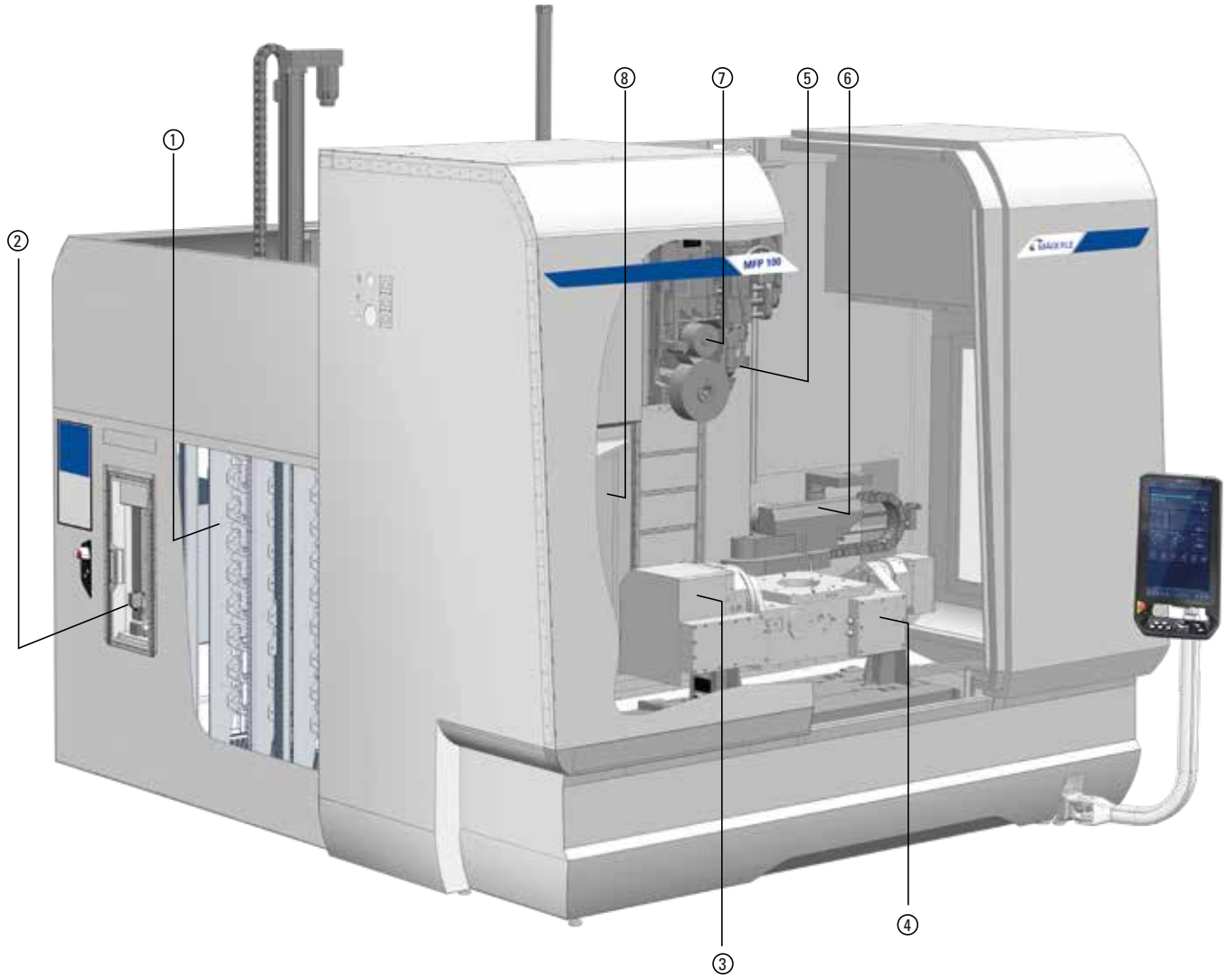
Like a large smartphone
With C.O.R.E., UNITED GRINDING has redefined the interaction between man and machine tool. Modern design combined with the most advanced technology to meet the operator requirements of tomorrow. The 24» multi-touch display enables navigation by touch and swipe gestures, similar to a smartphone. The uniform HMI for all UNITED GRINDING machines facilitates set-up, operation and general maintenance. Customizable user roles enable the display and restriction to role-relevant information and thus increase user-friendliness and safety. With the integrated front camera on the panel, assistance can be provided directly at the machine via Remote Service.

Future-proof
The digital capabilities of your machine with C.O.R.E. technology continue to grow. The C.O.R.E. HMI is continuously being expanded with new functionalities, widgets and apps to make it even more user-friendly and personalizable. The arrangement, type and size of the tiles on the HMI can be customized so that every machine operator always has the information that is important to him or her at a glance.

In future, new software updates and functionalities will be easy to install via the customer portal, so you will always be up to date.

Technical data
- 24" Full HD multi-touch display
- Override rotary switch with cycle start
- Standardized function keys
- Integrated 2-hand start
- Electronic key system (RFID)
- Integrated front camera
- Tilt adjustment

MACHINE CONCEPT



① Tool magazine
② Loading station with optional tool identification
③ NC indexing head
④ Optional dressing device
⑤ 2-Axis NC coolant nozzle
⑥ Optional coolant nozzle changer
⑦ Overhead dresser
⑧ Tool and dressing roll changer

LARGE MAGAZINE FOR TOOLS

Efficient machining of a variety of workpieces

The tool magazine for grinding wheels, diamond rolls and tools comes in a gantry design with 68 positions. All tools are transferred to the magazine safely and ergonomically by means of a loading station. Change over is carried out in just a few steps and can easily be performed during production. The large tool capacity makes it possible to machine recurring lot sizes without long downtimes. The 68 positions can be flexibly equipped with different variants.

- Example 1:
  - 24 grinding wheels
  - 24 dressing rolls
- Example 2:
  - 28 grinding wheels including sister tools
  - 14 dressing rolls
  - 3 tools
- Example 3:
  - 30 CBN grinding wheels with maximum diameter
  - 14 tools

Flexible loading options

APPLICATION EXAMPLES AND MACHINING CAPABILITIES

Turbine vanes
Turbine vanes are ground on the MFP 100 with minimal downtimes and a high degree of autonomy. The combination of automatic tool changer and CD overhead dresser enables several profiles to be ground in a single workpiece clamping, as well as ensuring dimensional stability.

Turbine blades
The high capacity of the tool changer allows the machine to be prepared for several types of turbine blades. As a result changeover times can be significantly reduced. The compact tool holders enable wide machining contours together with high removal rates.

LARGE WORKING AREA

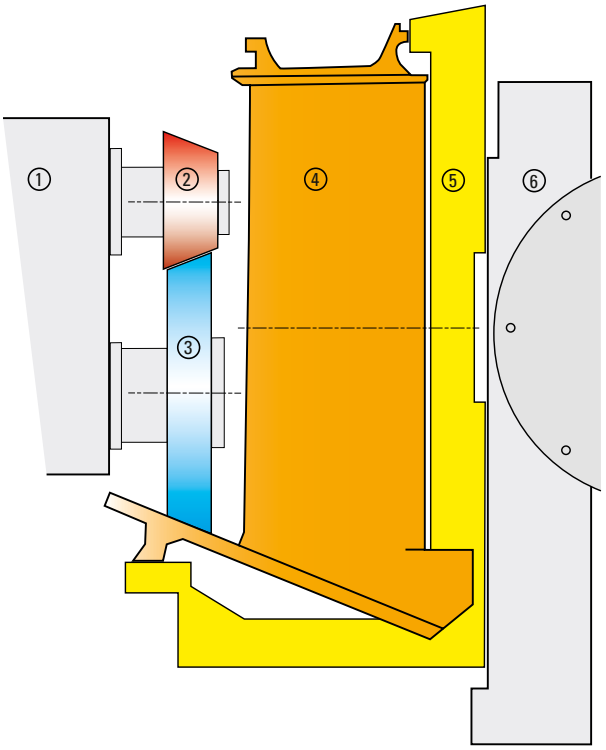
Operation and loading
The machine is operated using the swivel-mounted control panel with a view into the machining area on the front or right-hand side.

The large working area of the MFP 100 enables multi-sided machining of large workpieces.

The heavy workpieces with the clamping device are loaded onto the horizontal NC table. Loading takes place either from above or from the front, by crane or robot.

THE RIGHT DRESSING METHOD

Dressing system
The dressing of grinding wheels is a crucial factor for the cost effectiveness of a grinding process. With overhead and table dressing devices MÄGERLE offers professional solutions for the various requirements that can be placed on the process step. The overhead principle realizes its potential particularly in continuous dressing (CD). MÄGERLE uses servo motors for the drive; these can be freely programmed across the entire rpm range. The compact tool holding fixtures significantly reduce susceptibility to vibrations and the continuously dressed grinding wheel enables high removal rates with high profile accuracy over long cuts.



① Grinding support with 2 quick-clamping spindles
② Diamond dressing roll
③ Grinding wheel
④ Workpiece
⑤ Fixture
⑥ NC indexing head

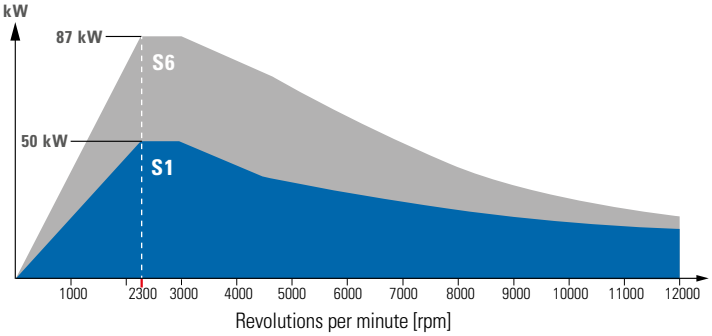
Simultaneous tool & dresser roll changer
The grinding wheels and diamond dressing rolls are exchanged simultaneously or individually with a double gripper for the individual machining steps. This results in a significant reduction in auxiliary times.

POWERFUL DRIVES AND HYDROSTATIC SYSTEM

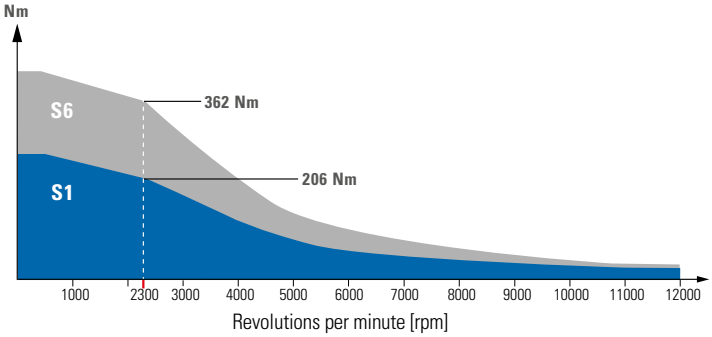
High performance and high torque

The water-cooled direct drive motor for the grinding spindle enables high performance and torque in continuous operation across the entire speed range. This leads to outstanding results in terms of removal rates. The HSK flange mountings guarantee high rigidity, attributed to the generous support on the tool holding fixture via the collar. They are also the key to enabling quick tooling changes with absolute repeatability precision. An optional balancing system dynamically balances unequal forces in the rotating grinding wheel.

Spindle capacity



Torque



S6 = 40% duty cycle

Wear-free guide concept

The unique design principle of MÄGERLE machining centers forms the basis for the overall machine quality. The vertical axis is supported by hydrostatic wrap-around guideways on a thin oil film and is completely separated from the column upper section. This principle enables the machines to withstand very high stresses free of wear, even in long-term use. The oil film also has a vibration-damping effect and guarantees high-precision machining of simple or complex workpieces.

COOLING INTELLIGENCE

Optimal grinding and machining results
The NC controls of the MÄGERLE grinding centers enable precise positioning of the coolant supply, taking into account the respective grinding wheel geometry. Nozzles are available on the grinding support for drilling and milling tools, and a coolant supply can be optionally provided through the spindle. Additional separate nozzles for the dressing process and cleaning of the grinding wheels ensure that optimal grinding results are achieved. Labyrinth seals with a sealing air arrangement protect all bearings in the machining area from impurities and contribute to the long working life of the overall system.

Process-optimized coolant supply
The MFP 51 can be optionally equipped with an automatic nozzle changer with up to 6 process-optimized coolant nozzles. This substantially optimizes the grinding conditions for different profiles.

COOLANT FILTRATION SYSTEMS

The optimal solution for every application

MÄGERLE considers the grinding process as a system of different components and thus creates the necessary conditions for a high cost effectiveness. The system concept for coolant supply and cleaning is of central importance. Correct design is essential to utilize the full coolant potential. Taking account of these aspects, MÄGERLE in conjunction with the coolant system supplier matches integrated solutions to the customer-specific requirements.

SAFE AND AUTONOMOUS OPERATION

Automation and machining cells

The MFP 100 is ideally suited for automatic loading and unloading. Flexible and efficient automation solutions are possible with a robot and linear system. The workpiece handling with robot technology is a quick and reliable step for increasing the capacity utilization and productivity of the MFP 100.

The integration of additional process steps such as cleaning and measuring is possible. MÄGERLE's expertise and experience with implemented automation solutions guarantee the highest productivity and quality and ensure your long-term competitiveness.

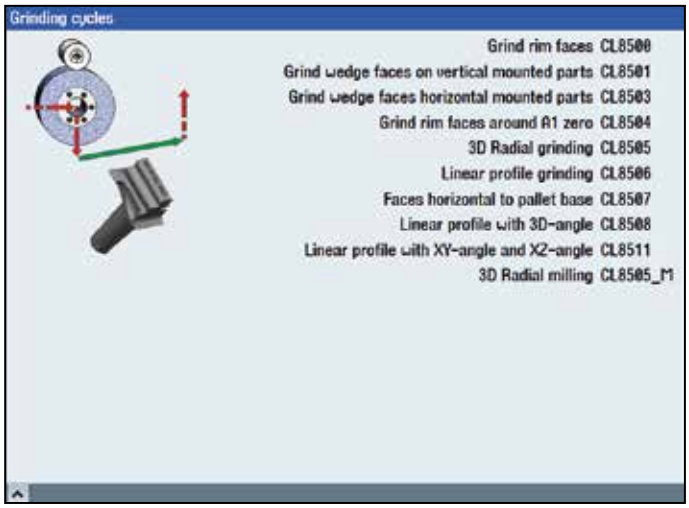
Tool identification

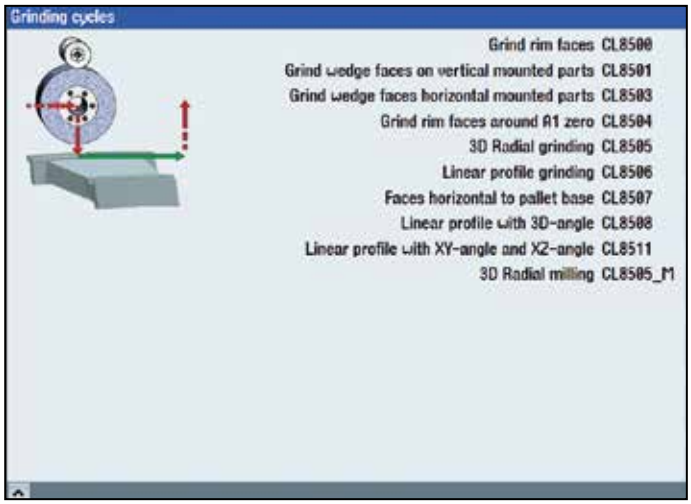
The MFP 100 can optionally be equipped with an identification system for grinding wheels and tools. The tool is inserted in the loading station of the tool changer. The data stored on an RFID chip is securely imported prior to the loading process. When the grinding wheel is removed from the tool magazine, the system updates the chip with the current tool data. This eliminates the probability of errors when entering the tool data on the machine and consequently also the risk of downtime.

Strato Ultra
Strato Ultra
Strato Ultra

PROGRAMMING

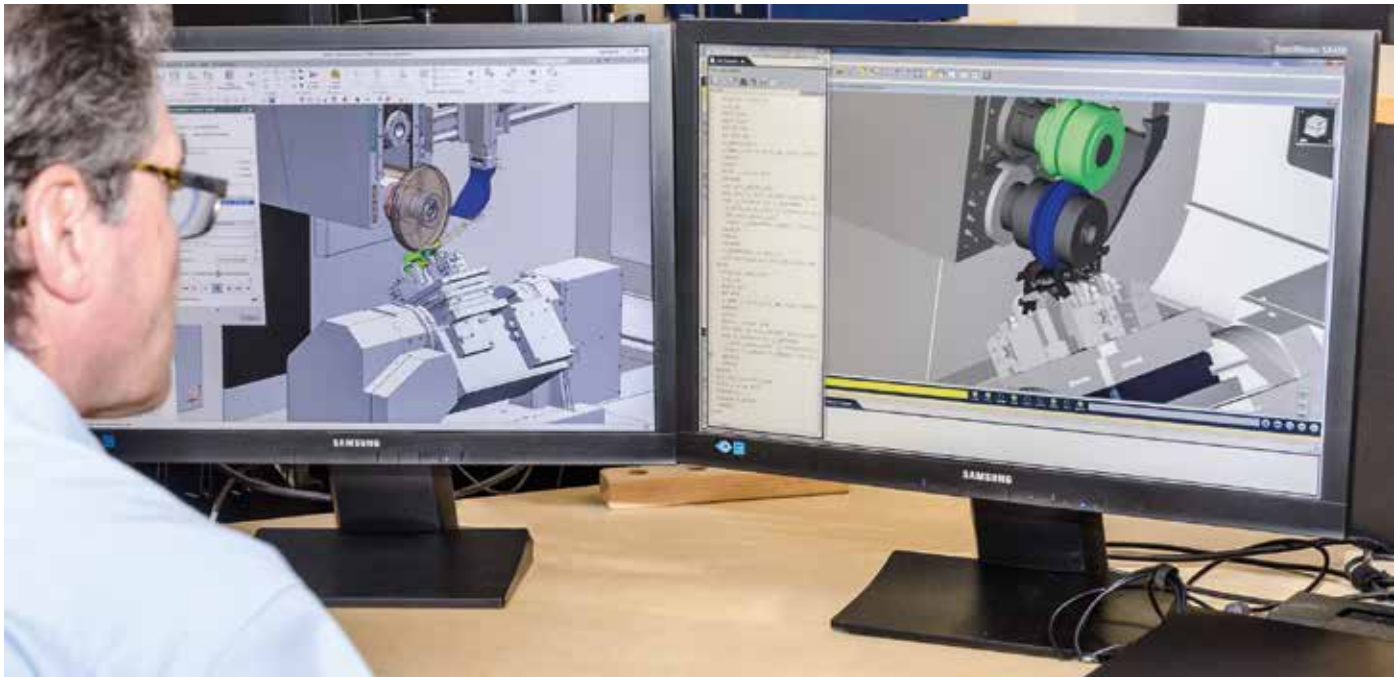
The grinding center is equipped with the SIEMENS SINUMERIK ONE control. Specially visualised and parameterisable grinding and dressing cycles are available for efficient programming of the workpieces. In 5-axis machining, 3D grinding and auxiliary cycles can be programmed for milling and drilling operations.





CAD/CAM CONNECTION

A SIEMENS NX postprocessor is available for CAM process development. The generated NC programs take account of the MÄGERLE grinding cycles. As a result the programs can be easily edited on the machine control unit via operator guidance. MÄGERLE provides a Vericut package for simulating and checking the programs.



WE ARE HERE FOR YOU!

Our products are designed to meet customer demands for as long as possible, they are intended to operate efficiently, reliably, and be available at any time.

From «Start up» through to «Retrofit» – our Customer Care is there for you throughout the working life of your machine. For this reason, you can rely on competent HelpLines worldwide and Service Engineers near you:

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

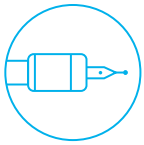
Start up
Commissioning
Warranty extension

Qualification
Training
Product support

Prevention
Maintenance
Inspection

Service
Customer service
Customer consultation
HelpLine

Digital solutions
Remote Service



Material
Spare parts
Replacement parts
Accessories

Rebuild
Machine overhaul
Assembly overhaul

Retrofit
Modifications
Retrofits

DIGITAL SOLUTIONS

Digital Solutions stand for products and services that open up the data space of your machine through IoT-based networking, enable seamless integration across the entire store floor in digital value-added networks and provide data-based value-added services and digital services – for greater efficiency, productivity and competitiveness.
You can find out more about the services of Digital Solutions on our website under the Customer Care section.

CUSTOMER CARE

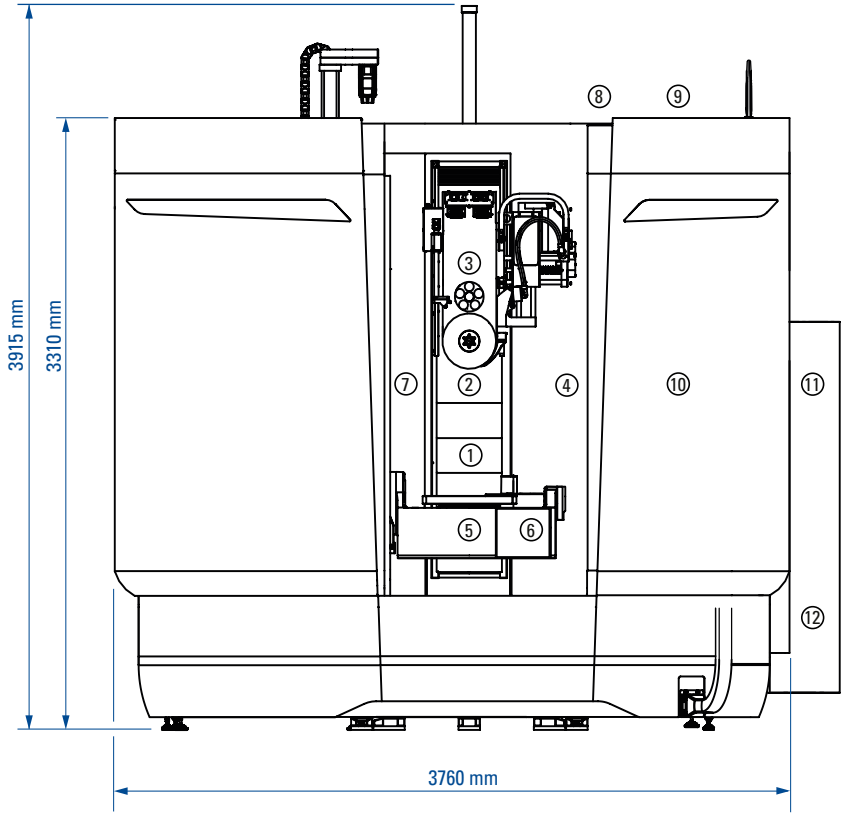
EASE OF MAINTENANCE

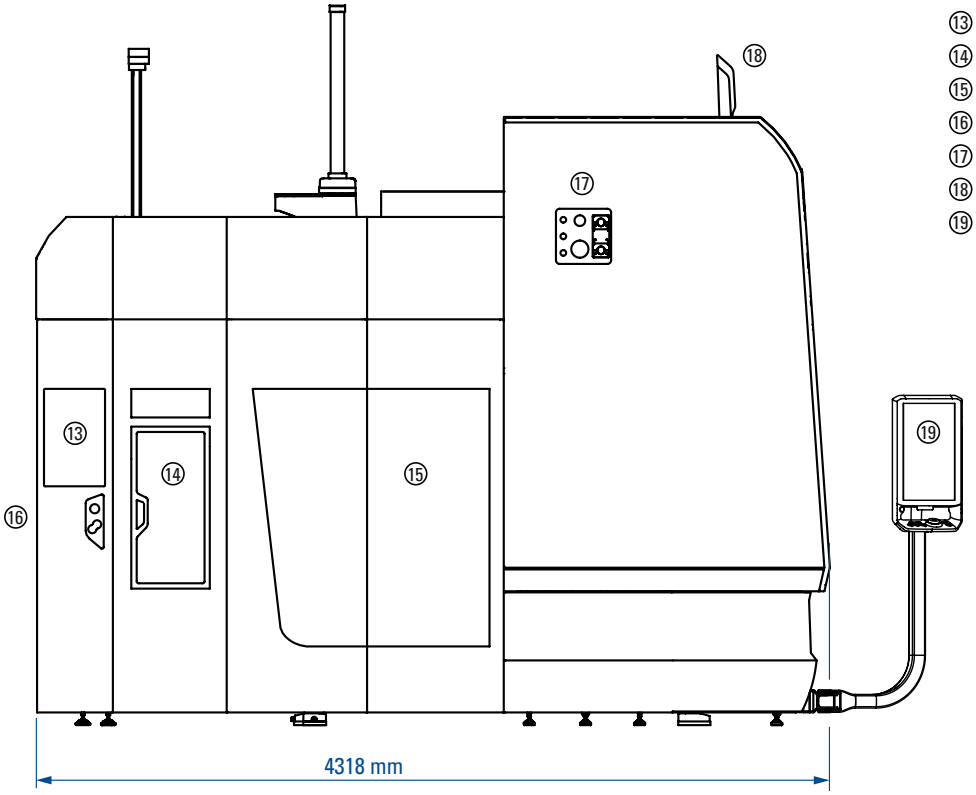
Access for maintenance of the respective units and components of the entire machine is centrally positioned and designed to make maintenance easy. Periodic maintenance activities can thus be efficiently performed.

① Service access for tool magazine
② Central lubrication
③ Electric cabinet
④ Fluidics and pneumatics

LAYOUT

① MFP 100 Working area
② Quick-change spindle for machining tools
③ Quick-change spindle for diamond dressing rolls
④ Automatic coolant nozzles
⑤ NC indexin
⑥ Dressing device
⑦ Dual gripper
⑧ Automatic door drive
⑨ Mist extractor (interface)
⑩ Safety splash guard cabin
⑪ Electrical cabinet
⑫ Hydrostatic/Hydraulic unit





⑬ Input station for tool management
⑭ Tool loading station with tool identification
⑮ Tool change magazine
⑯ Centralized lubricating system
⑰ Interface to coolant processing system
⑱ Machine status lamp
⑲ Operating panel

TECHNICAL DATA FOR MFP 100

X-axis	longitudinal stroke	mm	1.000
	travel speed	mm/min	0...50.000
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
Maximum continuous power grinding wheel drive		kW	50
Rpm range max.		min^{-1}	0...12.000
V-axis profile dressing device, roll width, max.		mm	100
Tool changer positions		n/pos	68
Nozzle changer positions (optional)		n/pos	6
Quick-clamping spindles		n	2 x HSK-B80
Tool length max.		mm	250
Grinding wheel dimensions (D x T x H)		mm	300 x 100 x 76,2
Integrated additional swiveling dressing device (optional)			
Measuring system with measuring probe (optional)			

We reserve the right to make technical changes

MÄGERLE AG MASCHINENFABRIK

Precision, quality and flexibility are key attributes of the products manufactured by Mägerle AG Maschinenfabrik. A technology leader for high-performance surface and profile grinding systems, the company founded in 1929 primarily specializes in customized solutions.

At the heart of the international success of our high-quality Swiss machinery is the unique design principle of the MÄGERLE modular system. Thanks to state-of-the-art technology, MÄGERLE can offer customers from many branches of industry reliable grinding centers. The high machining precision of the custom special-purpose machines ensures that our customers remain competitive.

Alongside decades of accumulated expertise, our highly motivated and dedicated employees play a key role in the success of the company.
As part of the UNITED MACHINING SOLUTIONS, MÄGERLE is a strong member of the group of globally leading machinery engineering companies for grinding machines. All over the world, this gives MÄGERLE customers access to an extensive network of experienced service and engineering technicians.

ABOUT US

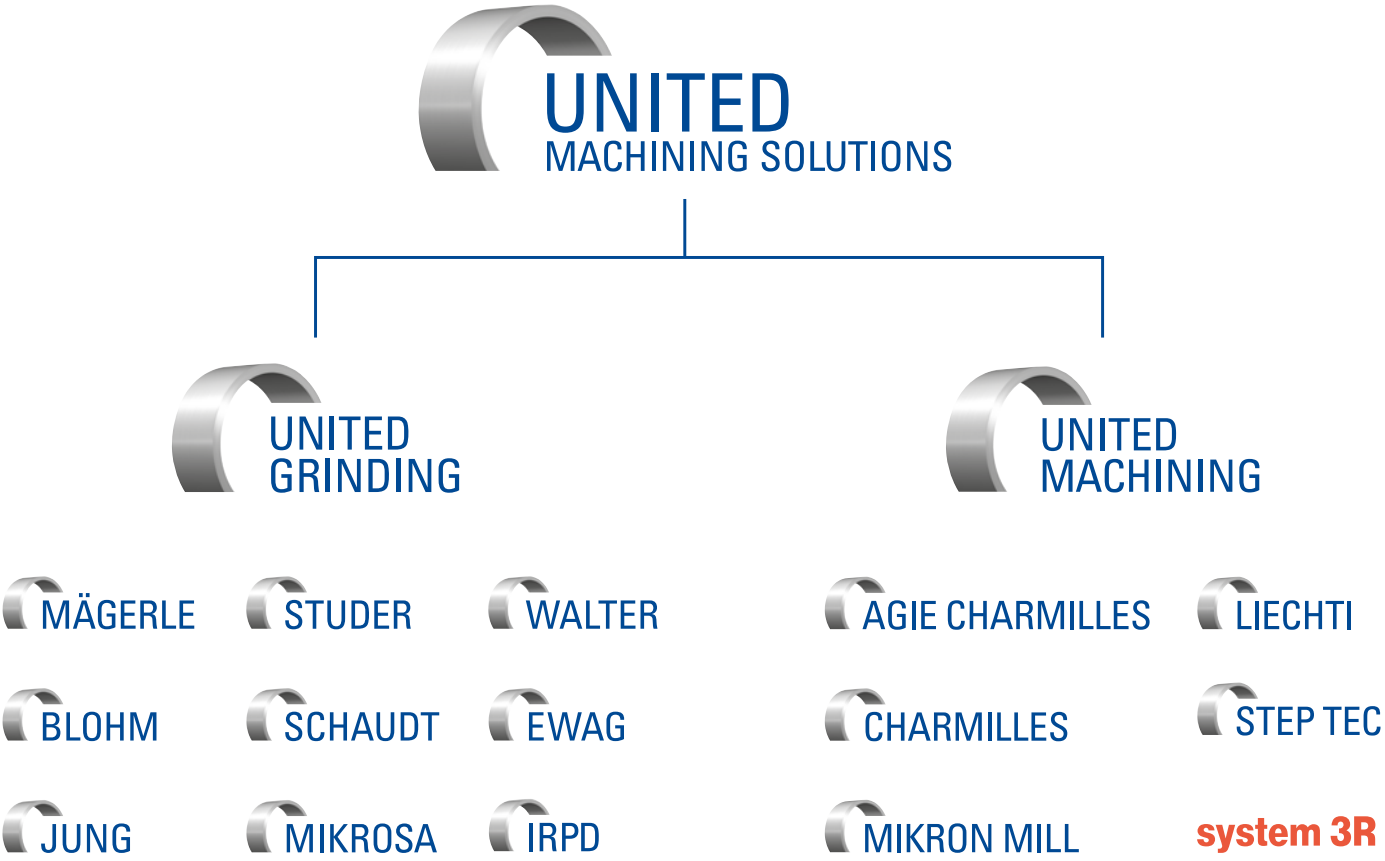
UNITED MACHINING SOLUTIONS

UNITED MACHINING SOLUTIONS is one of the largest machine tool manufacturers in the world. With around 5,000 employees at over 50 global production, service and sales locations, UNITED MACHINING SOLUTIONS is close to its customers and highly efficient. The group is organized into two divisions: UNITED GRINDING and UNITED MACHINING.

UNITED GRINDING includes the brands MÄGERLE, BLOHM, JUNG, STUDER, SCHAUDT, MIKROSA, WALTER, EWAG and IRPD. Its technologies include surface and profile grinding machines, cylindrical grinding machines, machines for tool machining and machine tools for additive manufacturing.

The UNITED MACHINING division includes the brands AGIE CHARMILLES, CHARMILLES, MIKRON MILL, LIECHTI, STEP TEC and SYSTEM 3R. It includes machines for EDM (Electrical Discharge Machining), high-speed milling and laser technology as well as spindle production and automation solutions.

«We want to make our customers even more successful»



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