

Mikron

MILL P 500 U

MILL P 800 U



GF Machining Solutions: all about you

When all you need is everything, it's good to know that there is one company that you can count on to deliver complete solutions and services. From world-class electrical discharge machines (EDM), Laser texturing and Additive Manufacturing through to first-class Milling and Spindles, Tooling, Automation and software systems — all backed by unrivalled customer service and support — we, through our AgieCharmilles, Microlution, Mikron Mill, Liechti, Step-Tec and System 3R technologies, help you raise your game and increase your competitive edge.

Passion for Precision

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The Mikron MILL P 500 U / 800 U are 5-Axis high performance machines for both precision part manufacturers active in the aerospace, machinery and defence industries, general mechanic industries and precision mold makers active in industries such as automotive and home appliance.

Based on the extra heavy duty machine bed, this gantry type delivers best stiffness. Fitted with robust and high precision axis and Spindle as well as a dual drive rotary swivel table, it delivers a high removal rate while achieving unequal high precision on parts. Demanding round or flow parts appli-

cations can benefit from Milling and Turning on the same machine, reaching the next level in terms of quality and productivity.

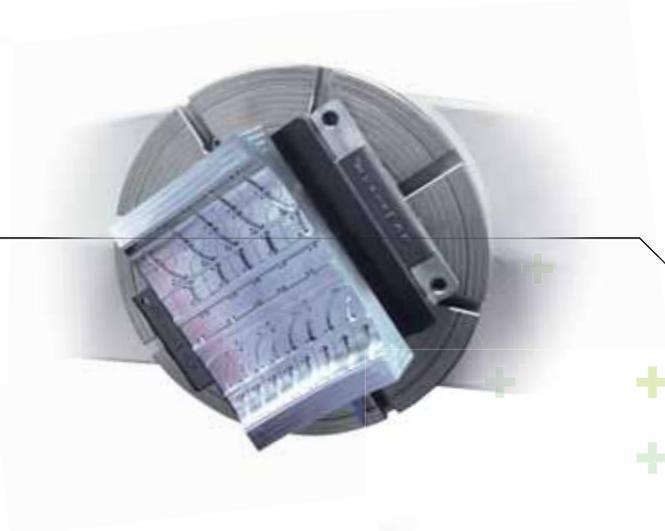
It presents a highly compact footprint enabling its installation in the most compact job shops, while offering an integrated automation providing long lasting autonomy. Thanks to the patented and unique automation through the center this machine allows a perfect integration in established and advanced workshop layout.

Market segments and applications

Mold and Die



Automotive



Home appliances



Part production



General machinery



Aeronautics and
Power generation



Technology

High-Performance Milling: Powerful parts and tools machining

- + High material removal rate
- + Performant with tough materials
- + Dynamic Milling of heavy duty parts
- + Meant for productive purpose



**Accurate parts
achieved
with dynamic
performance**



Productive and accurate machining of parts up to 800 kg

- + Gantry concept with shortest force flow which results in outstanding machining stability
- + Solid, vibration-damping machine bed
- + Thermo-symmetrical design and water-cooled components for long-term accuracy
- + Extremely compact construction
- + Big work area with user-friendly access
- + Step-Tec Spindle with powerful and flexible power/speed range characteristics
- + Wide range of compact tool magazines
- + Machine and Spindle Protection (MSP) along all axis
- + Integrated or third-party Automation in smallest footprint
- + Siemens or Heidenhain control enhanced by GF's smart machine
- + Integral connectivity opening the path to Internet of Things integrations
- + Ready for modular digital services

- Ensures best-in-class accuracy on parts and process reliability
- Provides highest business efficiency from multiple setups to automated production, through dynamic machining
- Achieves state-of-the-art productivity by maximizing uptime, from setup to maintenance through process control



MSP

Machine and Spindle Protection



The world's only Spindle protection that works in all directions

Collisions usually occur when a new computer numerical control (CNC) program is first executed. MSP offers the best security for this.

How it works

The Spindle is deflected when the force acting on the tool during a collision would damage the Spindle bearing. With this deflection, the axis drives gain the space required for automatic emergency braking. Braking distance depends on travel speed and is allowed within the clearance gained. Thus, damage-free braking is made possible up to 12 m/min. MSP works regardless of direction and with no impact on machining speed in most materials.

Use the M-function M304 to simply run the machine within the safe speed limits (e.g., first run of a machining program): up to 12 m/min. along X, Y, Z linear axes and up to 2,250°/min. respectively 3,150°/min along A- resp. C-rotary Axis. After it has successfully run through the process, the fast feed rate limitation can be disabled with M305.

The protection is always active even if the machine runs faster than 12 m/min., and the maintenance-free MSP system works without wear.

With the M304 function activated, the Spindle is damage-free during a tool or toolholder collision, and all crash events. M304/M305 events are duly recorded within the CNC.

Statements

Insurances company:

"In a machine lifetime there are in average 2-3 spindle crashes."

Finance department:

"The investment into MSP is paid off already with the first spindle crash."

Relaxed operators:

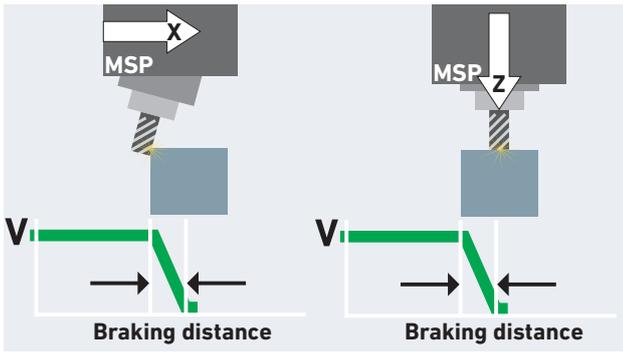
"It really works."

- Protected machine geometry
- Reduced machine downtime
- Full cost control
- Reduced machine-breakage insurance premium
- To restart after crash only 10 min production interruption

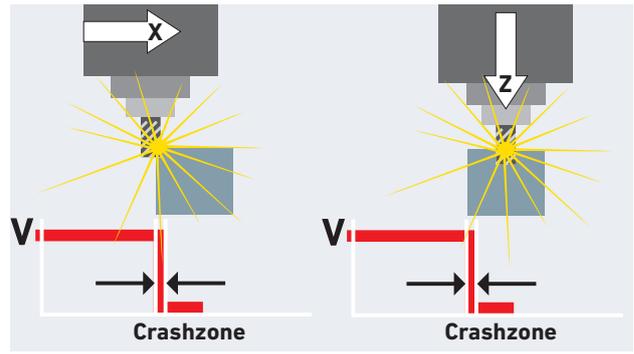
Facts

- + The protection is always active
- + Available on 20,000 min⁻¹ Spindle
- + Unlimited roughing performance
- + M304/305 safety speed limit
 - X/Y/Z axes up to 12 m/min./472 in/min
 - C axis up to 3,150°/min. (8.75 min⁻¹)
 - A axis up to 2,250°/min. (6.25 min⁻¹)

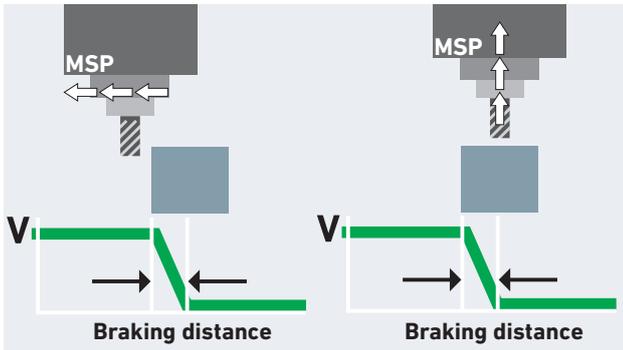
Crash protection by MSP
Machine and Spindle Protection in every direction



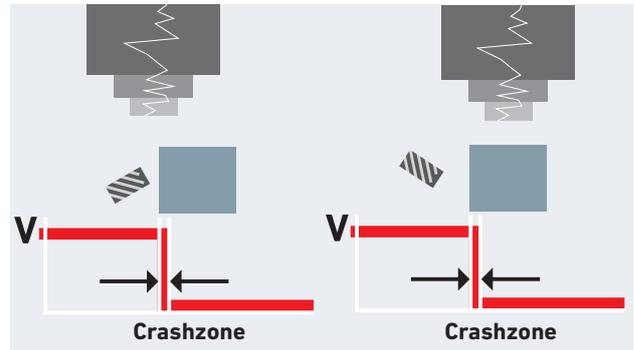
Crash



Software-supported tool retracting



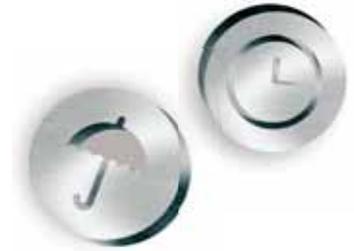
Spindle crash without braking activity



Verify geometrical accuracy with KinematicsOpt or other tools

- + Same Spindle without repairs
- + Without machine realignment
- + Without machine downtime

- Spindle damaged
- Machine geometry misaligned
- Machine downtime
- Significant costs



This part was machined after 200 crashes



smart machine

Enhance your process beyond program and machine setup

This includes a range of modules that are collectively referred to under the generic term "smart machine" and that fulfil various functions. For the Milling process to become intelligent, it must:

- ... establish comprehensive communication between man and machine, which makes available precise information that the operator requires to assess the Milling process.
- ... support the operator in the optimization of the process, which considerably improves the performance.
- ... optimize the Milling process, which improves process safety and workpiece quality—especially important in unmanned operation.

smart machine construction kit system

Each of the modules fulfills a specific task. Just like in a construction kit, the user can select the modules that fits best to improve his process.

The facts

- + Greater accuracy in shorter machining times
- + Increase in the workpiece surface quality as well as the surface and shape accuracy
- + Recognition of critical machining strategies
- + Improved process safety
- + Higher availability
- + Better operating comfort
- + Considerable increase in reliability in unmanned operation

- Produce your workpieces in a process-secure and precise manner
- Increase reliability in unmanned operation
- Boost the service life of the machine
- Significantly reduce production costs



Precision

ITC, OSS and KinematicsOpt support the precise base of your machining center to reach an even more precise final part down to 2 µm.



Protection

MSP, PFP or ISM protect and extend the lifetime of your machine and tools.



Time

OSS, ISM and software tools such as rConnect boost your productivity. OSS Extreme = Up to 24% faster with improved surface finish and accuracy.



Saving energy

Econowatt saving up to 50% energy, is a ecological necessity with attractive economic advantages.

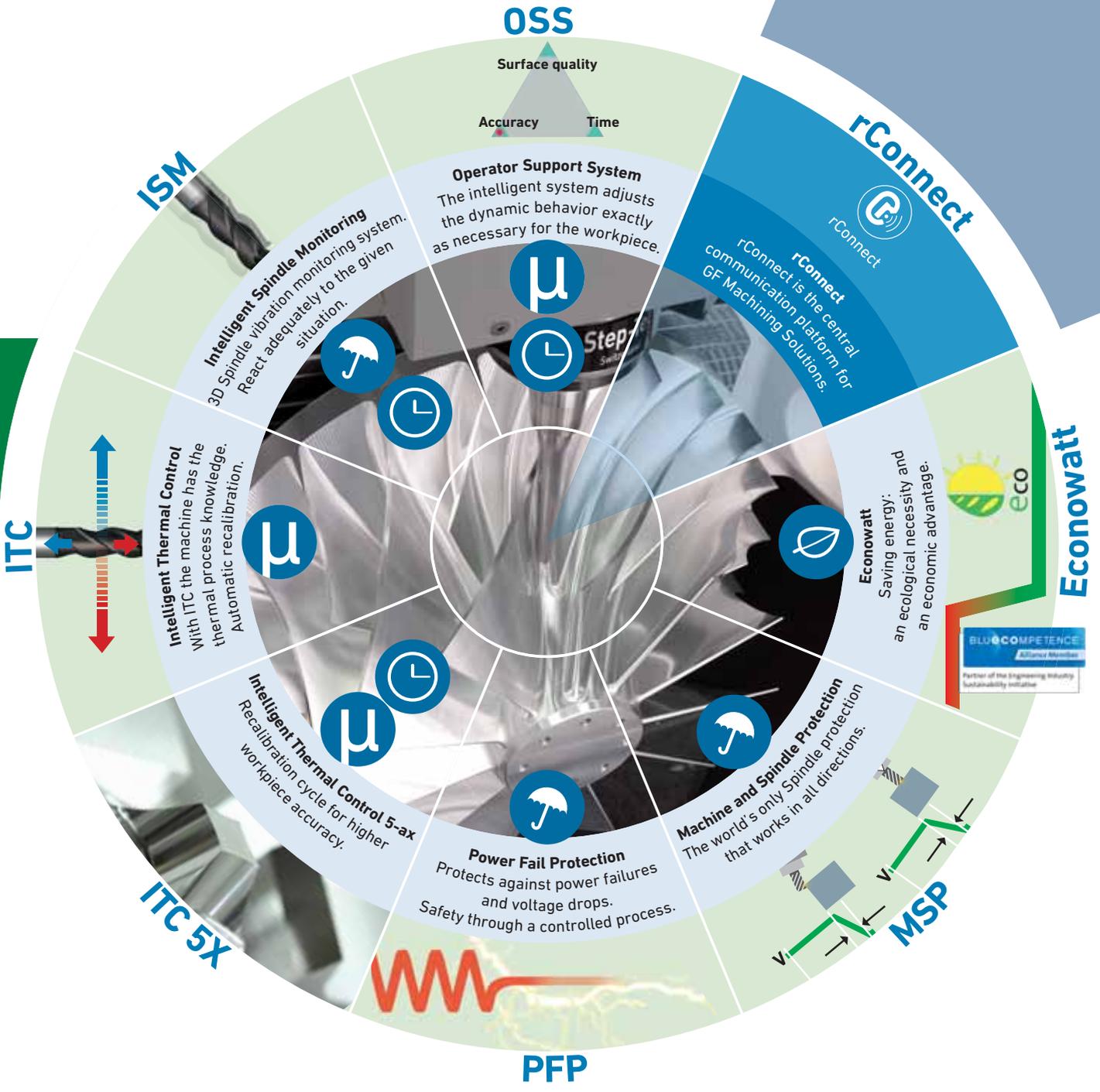
Also available in Heidenhain

KinematicsOpt, Power Fail Protection (PFP), Adaptive Feed Control (AFC), DXF file import, DNC remote network access on control

Included in Siemens control

MDynamics

Simply better results with the smart machine



Accuracy and productivity from base machine

The benchmark for precision machining and agile productivity

+ $\pm 2 \mu\text{m}/24\text{-hour}$ process reliability,

delivering precision on parts thanks to its thermostability and symmetrical machine design

+ 250% higher productivity

by integrating limitless Automation solutions from the back through a 12 m² machine



- Lower production costs through a reliable and dynamic machine on a small footprint

+ 365 days per year dynamic machining and flexibility

thanks to its 1.7 g acceleration, 36 kW Step-Tec Spindle power, and up to 800 kg and Ø860 mm rotary tilting table capacity

+ -98% downtime

(from hours to minutes), thanks to GF Machining Solutions' Industry 4.0 modules such as Machine Spindle Protection (MSP) as well as Live Remote Assistance (LRA).

+ Your most competitive business center

Automation

Automated pallet handling: ideal accessibility to the workpiece

The Mikron MILL P 500 U / 800 U machines have been designed to accommodate automated pallet handling.

In the loading station, the raw parts are set up on the pallet while the machine is machining the workpiece on the other pallet.

This greatly increases the productivity of the machine.

- + Very good access to the workpiece
- + The pallets in the loading station can be manually rotated 360 degrees.



- **Small footprint**
- **24/7 production**
- **Efficient machining for highest productivity**
- **Best total cost of integration and ownership**

To increase your autonomy, there are very compact pallet magazines available which can be loaded with up to 12 pallets with optimal ergonomics.

- + With every Automation solution the pallets can be loaded up to 500/600 kg
- + Multiple workpieces in the pallet magazine require multiple tools
- + The three pallet dimensions are available with thread holes
- + Additionally, the sizes 500 x 630 mm and 500 x 500 mm come with T-slots
- + Optionally, the pallet in the loading station can be hydraulically raised for manual rotation
- + 30 to 245 tools can be selected with this scalable solution

Standardized robot interface

The Mikron Mikron MILL P 500 U / 800 U can be linked to System 3R robot systems as well as operated with robot systems from other well-known suppliers.

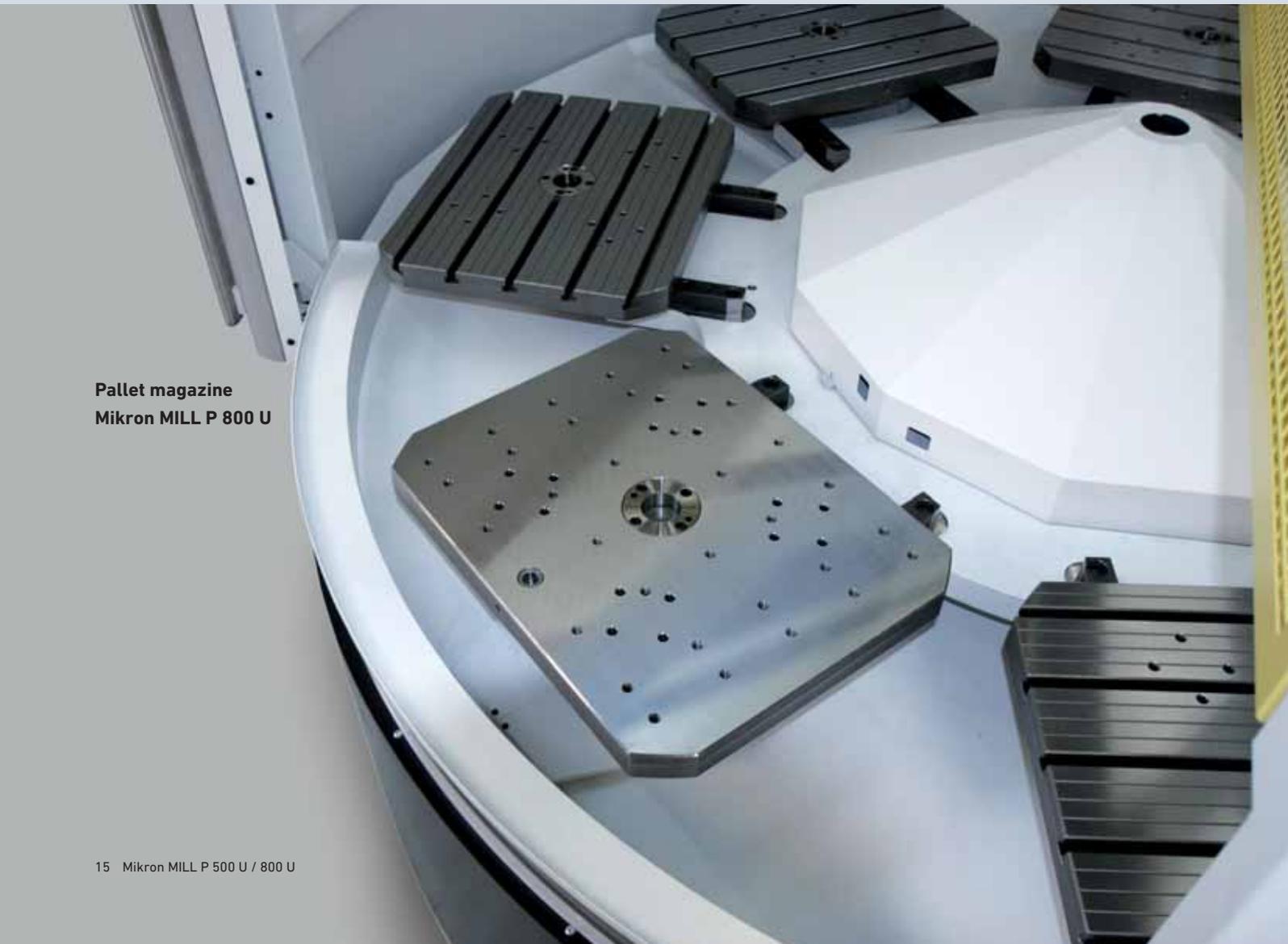
Regardless of the handling system used, the machine offers comfortable accessibility when integrated into a line.



Direct robot loading



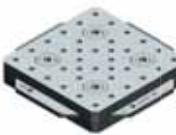
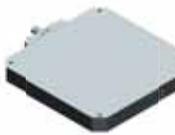
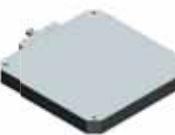
Loading station
Mikron MILL P 800 U

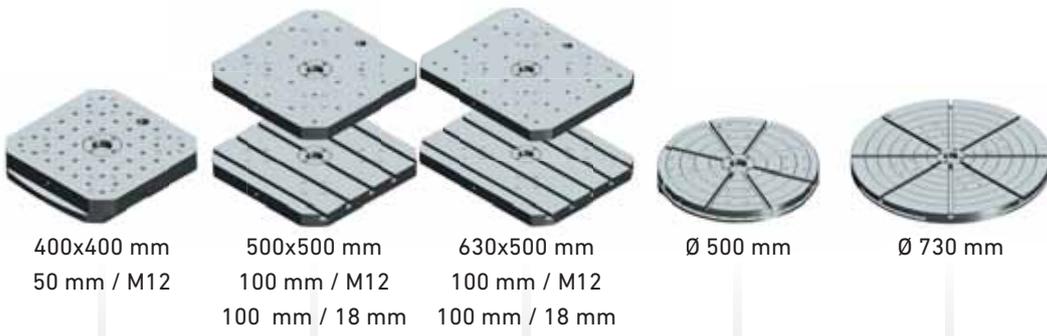


Pallet magazine
Mikron MILL P 800 U

Table variants, Tooling and Automation

As flexible as needed

	 System 3R GPS 240 240x240 mm	 EROWA UPC 320x320 mm	 System 3R Dynafix 280x280 mm 350x350 mm	 EROWA MTS 400x400 mm	 System 3R Delphin 400x400 mm
Mikron MILL P 500 U 200 kg 	7 Pallets	7 Pallets	7 Pallets	5 Pallets	5 Pallets
Mikron MILL P 500 U 400 / 600 kg 					
Mikron MILL P 500 U Table Ø 500 mm 					
Mikron MILL P 800 U 500 kg 					
Mikron MILL P 800 U ST 800 kg 					
Mikron MILL P 800 U Table Ø 500 mm Ø 631 mm 					



4
Pallets

4
Pallets

2
Pallets

2
Pallets

2
Pallets

2
Pallets

2
Pallets

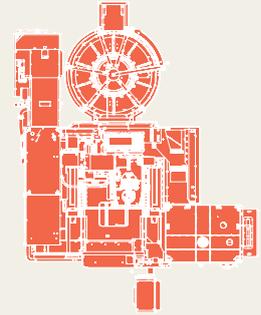
12
Pallets

9
Pallets

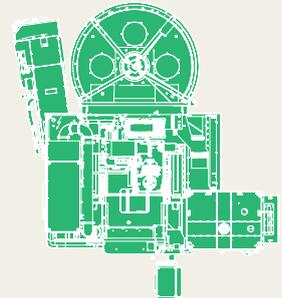
7
Pallets

9
Pallets

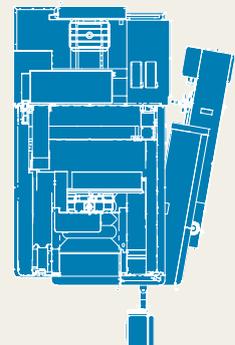
7
Pallets



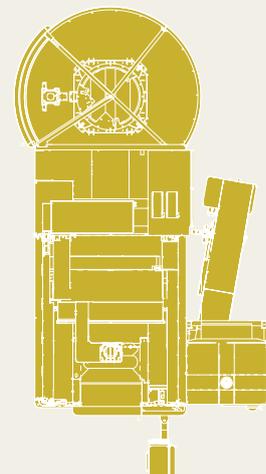
Mikron MILL P 500 U



Mikron MILL P 500 U



Mikron MILL P 800 U



Mikron MILL P 800 U

High-tech Spindles

Tool Spindles for demanding machining

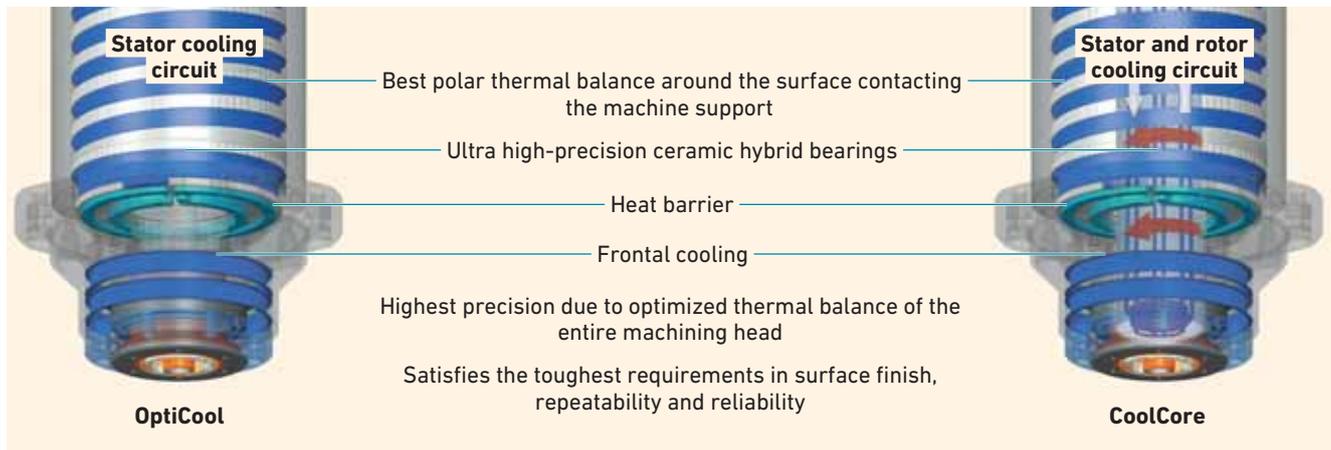
	20,000 min ⁻¹ HSK-A63	20,000 min ⁻¹ HSK-A63	28,000 min ⁻¹ HSK-A63 CoolCore	36,000 min ⁻¹ HSK-E50 OptiCool
Mikron MILL P 500 U	-	+	-	+
Mikron MILL P 500 U D	-	+	-	+
Mikron MILL P 800 U	-	+	+	+
Mikron MILL P 800 U D	-	+	+	+
Mikron MILL P 800 U ST	+	-	-	-

OptiCool

Step-Tec's OptiCool Spindle series ensures not only that the Spindle remains thermally stable, but that natural heat transfer to the Spindle support (e.g., Z-Axis) is limited to the lowest amount possible, in order to preserve the machine's geometry.

CoolCore

Where conventional stator cooling reaches its limits, Step-Tec's CoolCore Spindle goes beyond the ordinary to lower the temperature and minimize temperature fluctuations in the rotating shaft.



20,000 min⁻¹ / HSK-A63

- + Precise high-performance
- + Available with or without internal coolant supply
- + Compressed air blow through Spindle

28,000 min⁻¹ / HSK-A63

- + Water-cooled rotor shaft (CoolCore) which stabilizes the temperature and consequently the expansion in the rotor shaft
- + Very accurate machining, because it minimizes thermal influences of the Spindle
- + Through-tool coolant is an available option

36,000 min⁻¹ / HSK-E50

- + Precise high-performance for use in the tire mold field
- + Available with or without internal coolant supply (TSC)
- + Compressed air blow through Spindle

Additional advantages of CoolCore

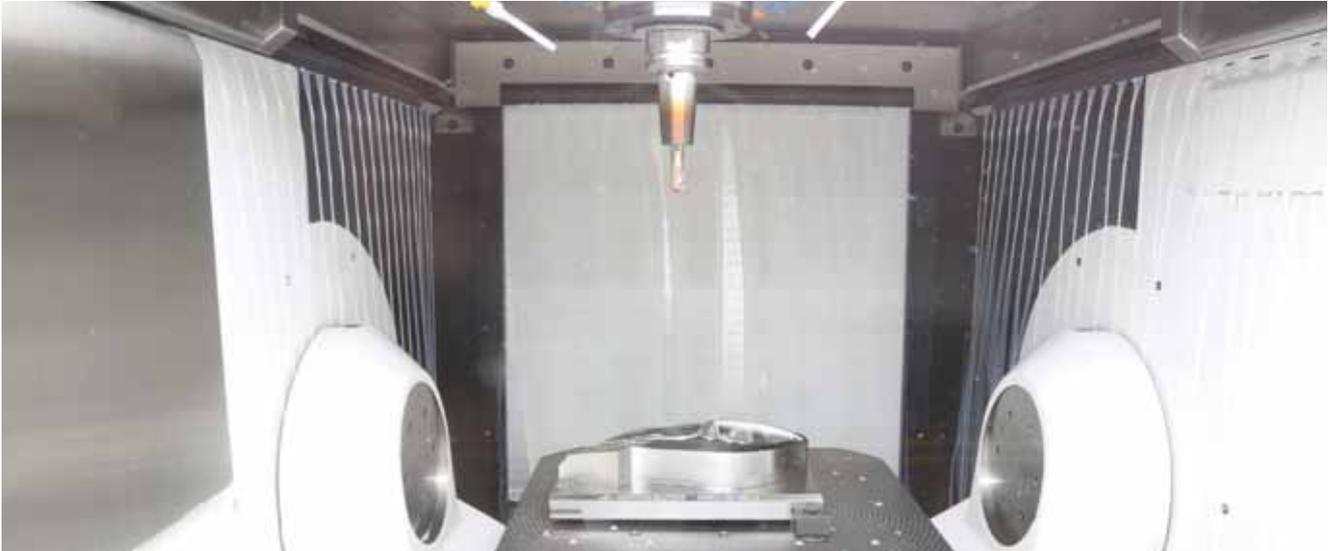
- + Cooled shaft reduces the natural thermal shaft growth by half
- + Greatest thermostability and highest precision due to lower temperature fluctuations down to the tool tip
- + Significant reduction of thermal recovery time resulting in a productivity gain



• **The Spindle is the heart of our machines. Beyond Step-Tec Spindle performance, we ensure a comprehensive set of services and maintenance options. Ask us. Check our website: www.step-tec.com**

Chip management

Clean machining, wet or dry



Optimum chip clearance due to steep, smooth cabin walls.
Washer jets prevent chip accumulation.

- **Reliable production process through a trouble-free chip flow**

Adapted chip management



- + Solution for high-volume aluminum Milling chips.
With slat band lift-up chip conveyor and coolant unit with fine filtration
- + Solution for high-volume steel Milling chips with scraper lift-up chip conveyor and coolant filtration unit

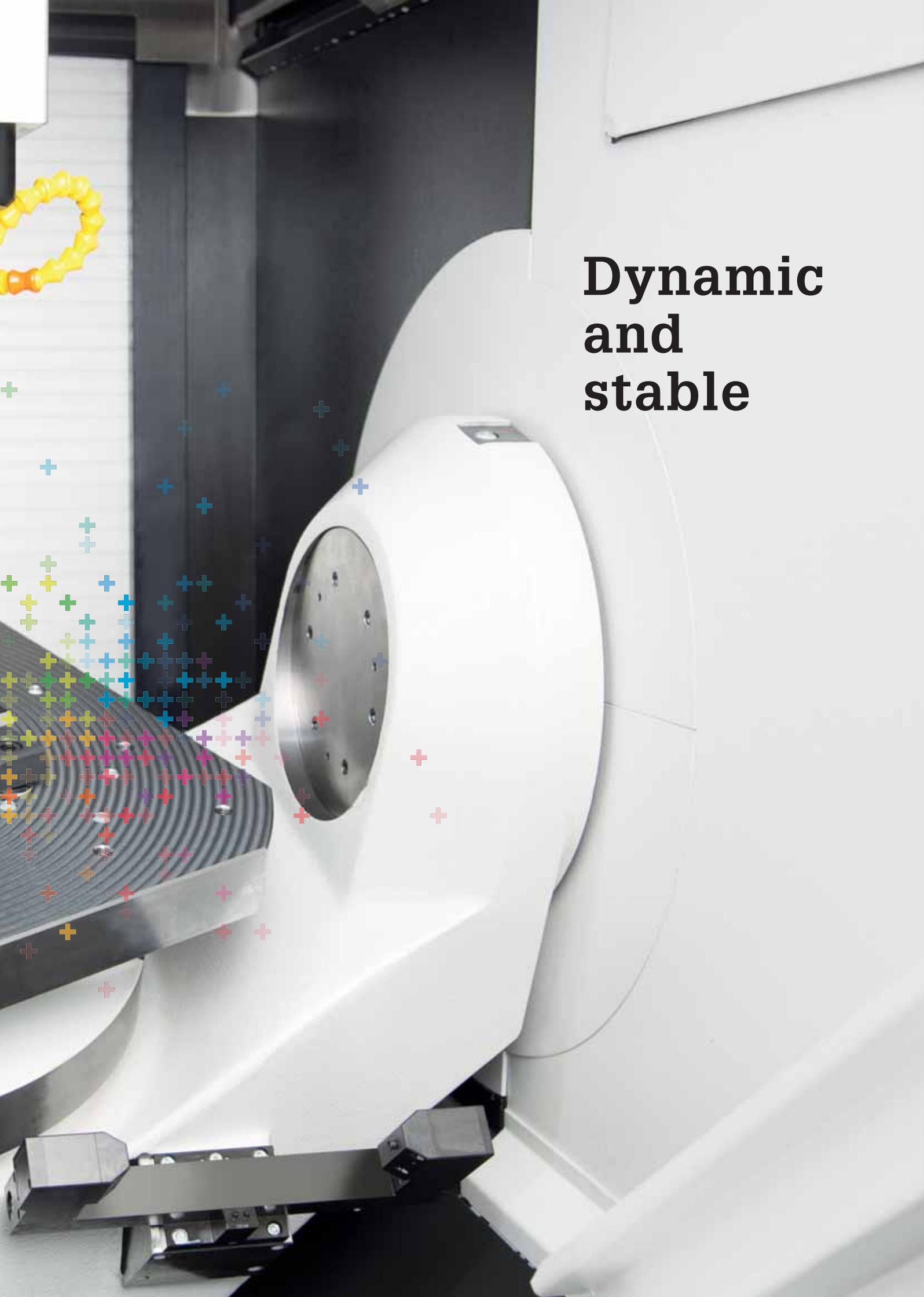


Options

- + Through-Spindle coolant
- + Wash down system
- + Coolant thermal control
- + Oil skimmer



Step-Tec
Switzerland



**Dynamic
and
stable**

Easy to use



Rapid tool provision



30 tools



60 tools

120 - 215 tools



- Better overview allows faster preparation and maintenance
- Whatever your requirement, the most suitable tool magazine is available

All tools visible

Tools are visible through a window on the front of the magazine. Damaged tools can be quickly identified and replaced. If tools are required on other machines, you can see straight away where each tool is.

Smooth and swift

The magazine chain (60 tools) is moved and positioned by a controlled drive. The tools therefore glide swiftly and smoothly to the changing position. This means that tools can be made available much more quickly.

Vibrations that could have a negative impact on the Milling process are also prevented.

HSK-A63

- + Up to 80/160 mm diameter (depending on magazine type)
- + Max. length 350 mm

245 tools



Ready for tire mold production

Better fit with tire mold parts and applications

Tires must be produced in narrower geometric tolerances in order to generate less friction and reduce fuel consumption and CO₂. To make that possible, the molds for these “green” tires must be made on a machine that fulfills the certain precision and surface quality requirements. The size of the machine in combination with high axis feed rate, a high-dynamic rotary tilting table and a high-speed Spindle give this machine the ability to deliver best surface finish on precise tire molds.

- + Slim shape tilt rotary table for small interfering contour when Milling slots on the edge of the mold segments with highest dynamic 75 / 120 rpm by 55 rad/s² / 130 rad/s²
- + Travel with 36,000 min⁻¹ Step-Tec-Spindle: 75-625 mm above table surface
- + Workpiece up to 150 kg and up to Ø 860mm, fitting for not only segments but also complete side walls machining in aluminum and steel
- + Heidenhain TNC 640 control in combination with a CAD/CAM system from OPEN MIND is an excellent solution

Improved productivity: one-touch strategy

Thanks to our Step-Tec Spindle, your process goes from roughing to finishing on the same machine, in a single process step.

- + 36,000 min⁻¹ / 21.3 Nm Step-Tec Spindle for performance machining up to high-speed applications
- + Fully automated tool changer with 30 positions up to 290 mm tool length

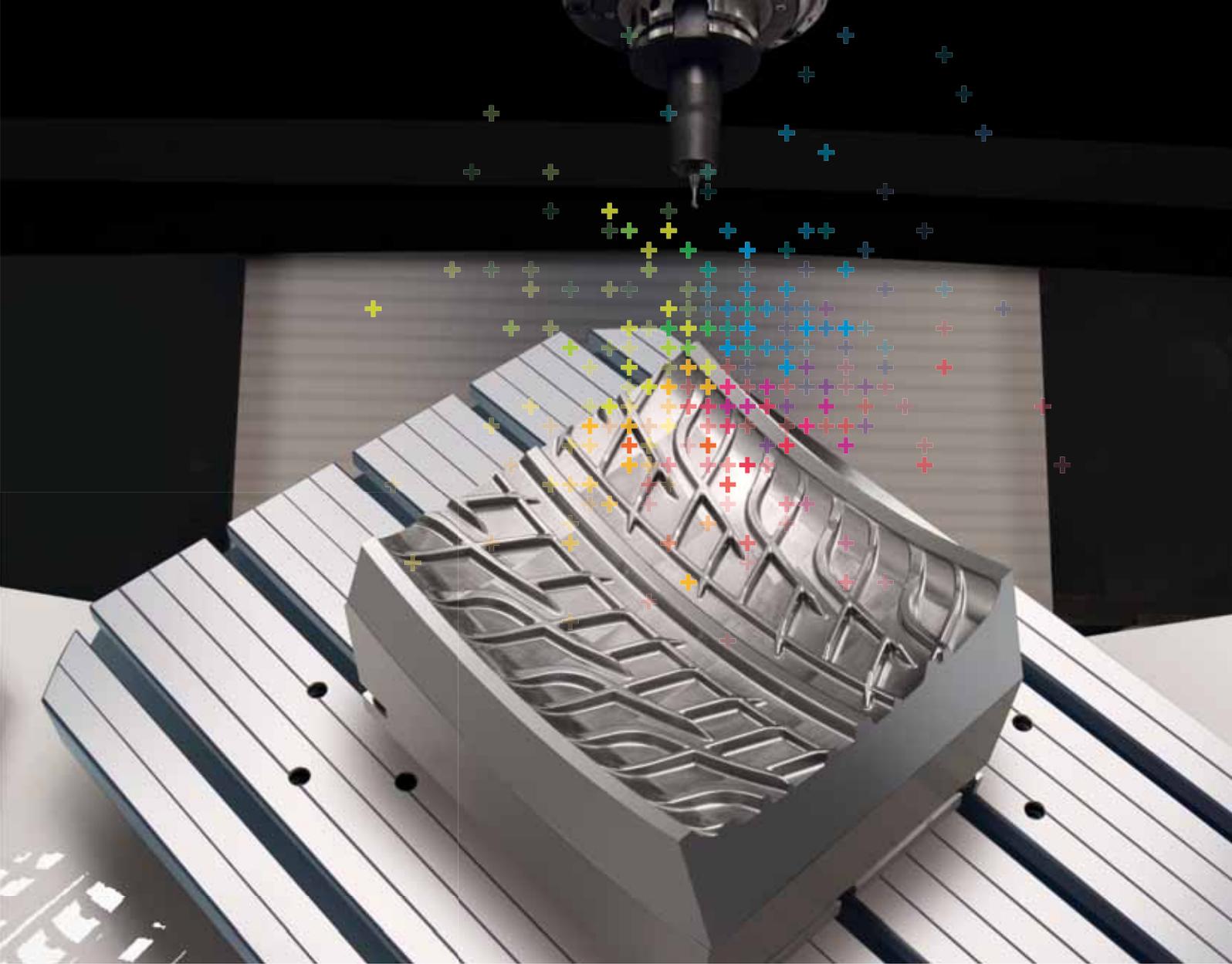
- The ideal solution answering to the latest tire performance regulatory requirements
- The only machine allowing a smooth evolution from indirect wood (resine) positive to direct aluminum/steel mold Milling
- The Milling dedicated package for tire mold production is part of GF Machining Solutions dedicated offer: From Laser to EDM, through Automation for above-average performances and profits

Dry or wet machining: dedicated environments

The integrated dust extraction system for resin machining and dedicated Knoll chip management provide a tire mold machining-ready environment.

- + High-efficiency dust extraction system for synthetic materials, with air return (closed loop system)
- + Slim Spindle nose shape for best access to the workpiece with dust extraction fully integrated in the Z sledge for best results
- + Reliable high-performance chip management for all steel/aluminum applications with lots of options

Complete solutions – for you



Dedicated option for perfect dust removal through the Z sledge

Closed loop suction system

- + The tire-mold-dedicated dust suction system collects the dust right at the source
- + Suction nozzle in plastic with pipe diameter of 200 mm surrounding the Spindle nose
It can be trimmed if necessary
- + Equipped with a clean air return and provides constant airflow in the work area



Version for coolant emulsion



Version for dust removal.
Nozzle in perfect position



Turning. Roughing. Finishing. One clamping operation.



Quick and precise

Complete machining on the Mikron MILL P 800 U ST quickly produces more accurate workpieces. Unnecessary rechucking results in a more precise runout, faster workpiece handling and setup time.

Most compact

Reduced investment and operating costs, thanks to space-saving, complete machining center.

Perfect Automation

Optimal integration into production thanks to various Automation solutions compatible with the Mikron MILL P 800 U series either from the front or from the back.

Quality

Simultaneous turning allows a permanent positioning of the tool in its optimal cutting position, perpendicular to the work piece surface. This ensures the best precision and surface quality.

Productivity

Automated pallet handling without restriction of access to work area.

The pallet changer passes through the machine.

Production service package

Specific services and maintenance options are to be considered for this solution, in relation to safety and continuous operation matters.

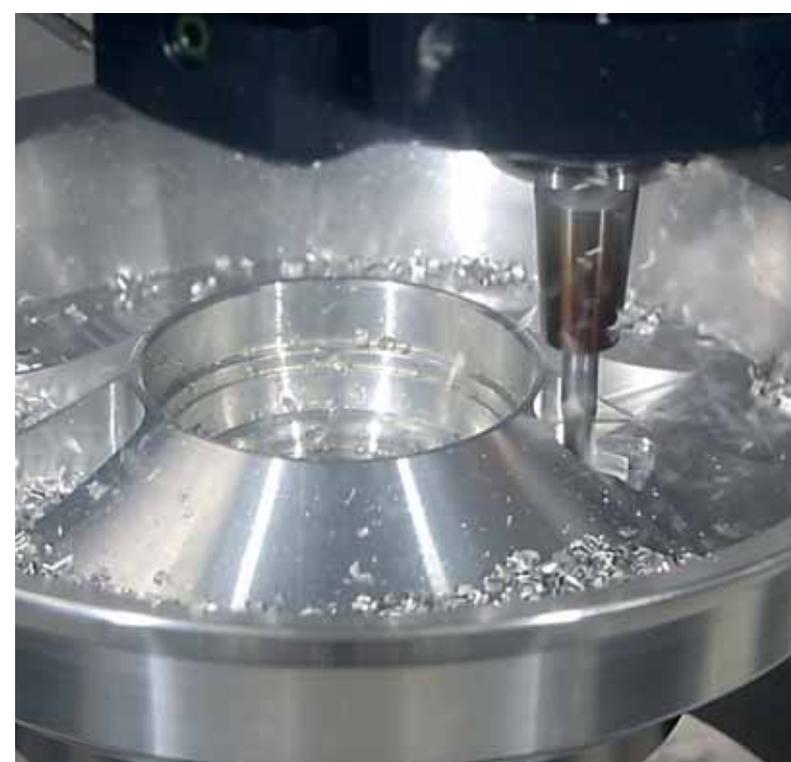
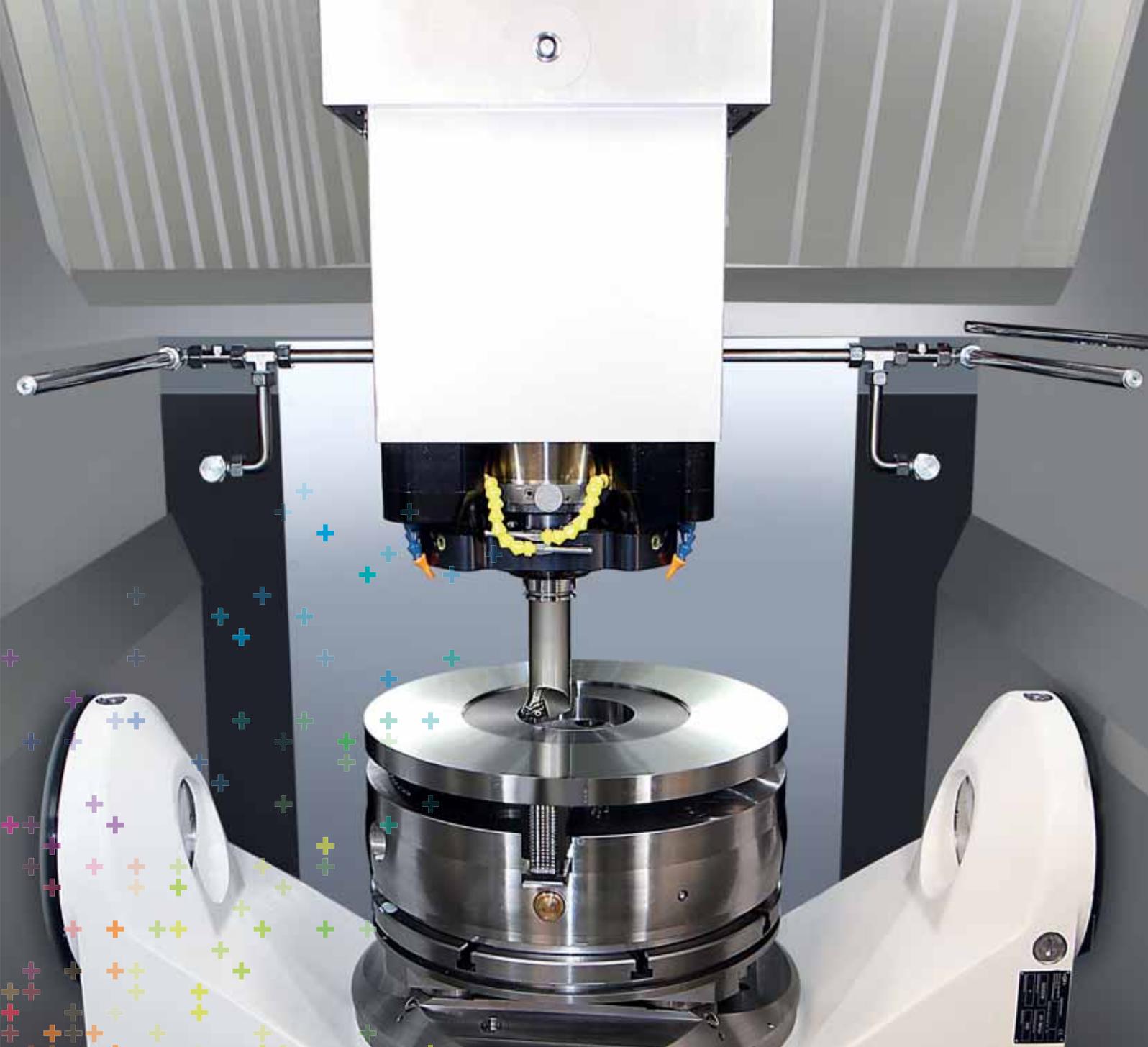
Ask us.

Visit our website: www.gfms.com

Complete and automated simultaneous machining in one setup

- Meet challenging requirements in an easier and faster manner: Reduce your setup hurdle by more than 50% and convert it into billable production time
- Reduce your cost: Rough faster by turning while achieving savings on tool cost with a ratio of 1/100
- No compromise on process productivity and precision: Our safe enclosure does not impact the axis motion performance: 1.7g all the way!





Options

Geared up for a multitude of options



Infrared touch probe



Laser measuring system



Minimum quantity cooling lubrication



Through-Spindle cooling



External coolant supply



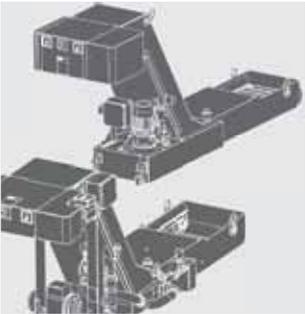
Optional nozzle ring



Flushing nozzle system



Band filter system



Lift-up slat band chip conveyor or lift-up scraper type chip conveyor



Coolant thermal control



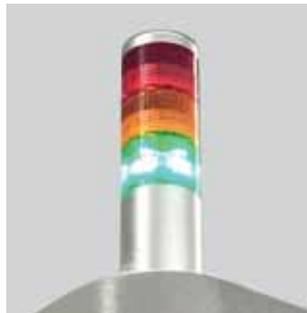
Mist extraction



Automatic cabin roof



Rotating viewing window



Signal light



MSP
Machine and Spindle Protection



smart machine

JTM JobToolManager

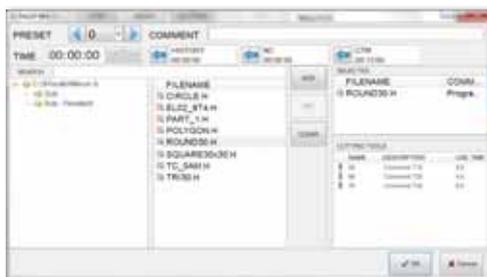
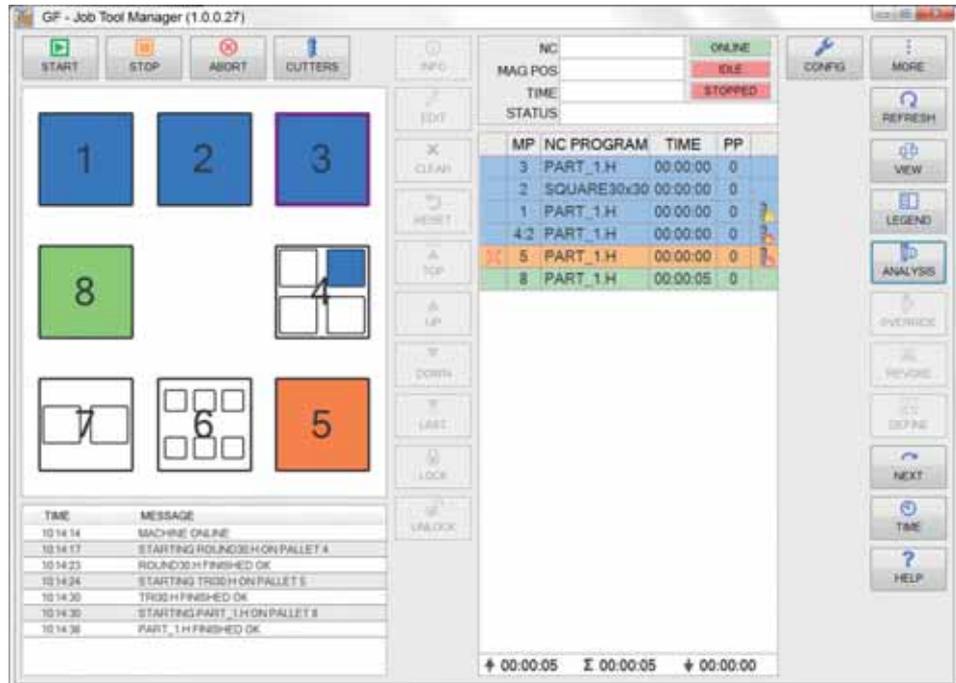


User friendly software for one machine with integrated pallet changer.

Assign NC programs to pallet position by drag and drop on a touch screen, close to the pallet changer.

Advantages

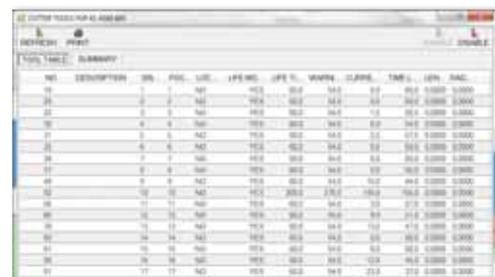
- + Easy to change priorities when the machine is working
- + Add or remove jobs while machining
- + Jobs where cutters are missing will not be started
- + Estimated and present machining time for the magazine content are calculated.



Assign NC file, check tool capacity, schedule

By selecting the NC program, JobToolManager register the tools used in the in the program. Time is stored if the NC program defines the time for the entire machining or if each tool has its use time.

If the program has been used earlier, it automatically displays the last recorded time.



Manage tools upon jobs to be done

Each time a new job is started, JobToolManager checks the machine tool table to see the availability of tools. If a tool is broken and no sister tool is available, will the job be blocked.

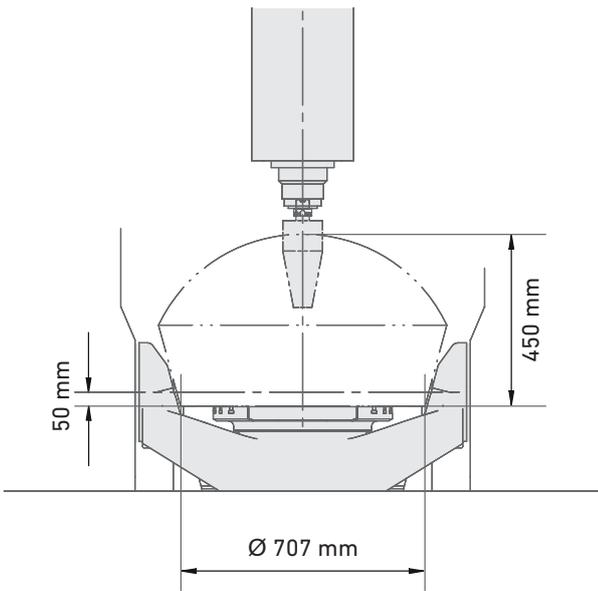
Technical data

Mikron MILL P 500 U Mikron MILL P 500 U D Mikron MILL P 800 U Mikron MILL P 800 U D Mikron MILL P 800 U ST

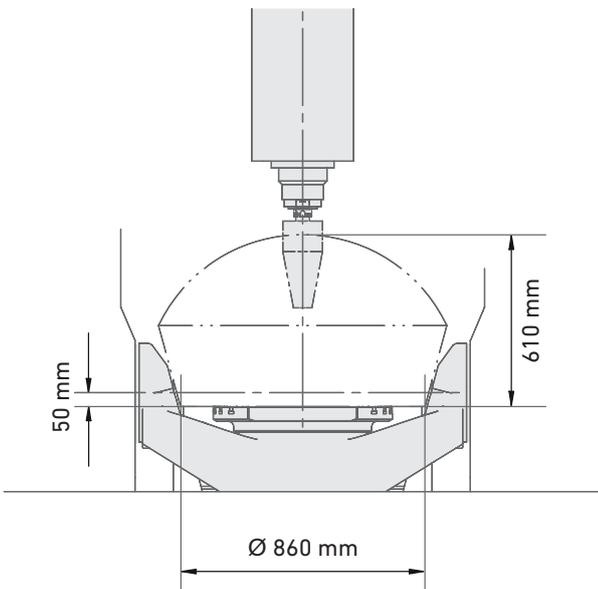


	Mikron MILL P 500 U	Mikron MILL P 800 U	Mikron MILL P 800 U ST
Working range			
Longitudinal / Cross / Vertical X x Y x Z	mm	500 x 600 x 450	800 x 800 x 550
A-Axis	°	+91/-121°	+91/-121°
C-Axis	°	n x 360°	n x 360°
Number of simultaneous axes	pce.	5/5 simultaneous	5/5 simultaneous
Feed Drives			
Feed rate / (D) Rapid traverse X, Y, Z	m/min	45 / (61)	45 / (61)
A, C	min ⁻¹	25, 35 / (50, 60)	25, 35 / (50, 60)
Working spindle (40% ED, S6)			
20,000 min ⁻¹ , HSK-A63 / HSK-T63	kW/ Nm	36 / 120	36 / 120
28,000 min ⁻¹ , HSK-A63	kW/ Nm	-	36 / 36
36,000 min ⁻¹ , HSK-E50	kW/ Nm	33 / 21	33 / 21
Accuracy XYZ ISO 230-2(97)			
Accuracy A	μ	8	8
Repeatability R	μ	5	5
Work table			
Clamping surface	∅ mm	500	500 / 631
Peak torque C-Axis	Nm	-	-
Max. workpiece weight	kg	200 / 400 / 600	500 / 800
Automation			
Tool magazine	Positions	30, 60, 120, 170, 215	30, 60, 120, 170, 215
Laser tool measurement		Option	Option
Infrared touch probe		Option	Option
Pallets (see page 16/17)	pce.	4, 5, 7	2, 7, 9, 12
Weight			
Machine weight (60 tools)	kg	11,100	15,500
Options			
MSP Machine and Spindle Protection		+	+
Coolant sump, chip conveyor		+	+
Minimum-quantity cooling lubrication		+	+
Mist extraction unit, etc.		+	+
Compressed air blow through Spindle		+	+
Ancillary services			
Programming courses		+	+
Technology courses		+	+
Service training courses		+	+
Control unit			
Heidenhain TNC 640		+	+
Siemens 840D sl		+	+

Mikron MILL P 500 U - Workarea

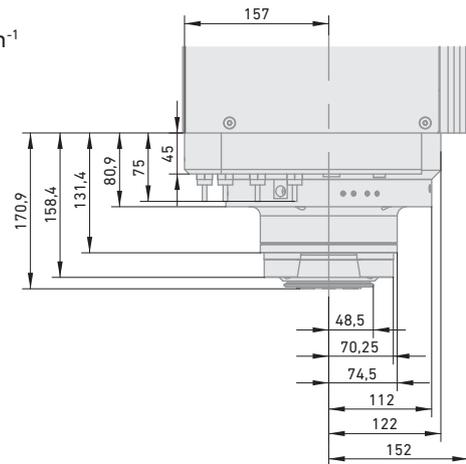


Mikron MILL P 800 U - Workarea

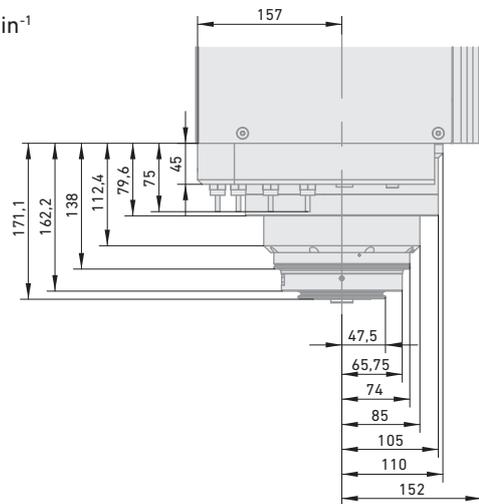


Spindles

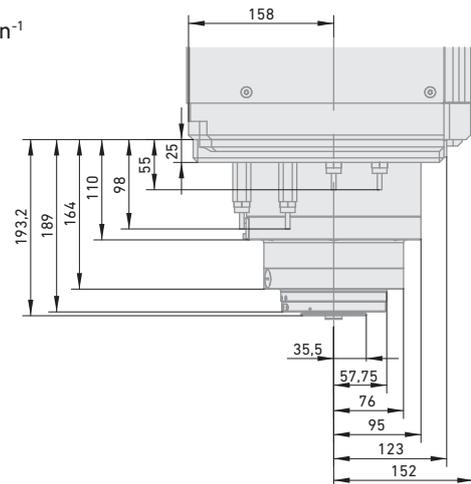
20,000 min⁻¹
 HSK-A63
 HSK-T63



28,000 min⁻¹
 HSK-A63



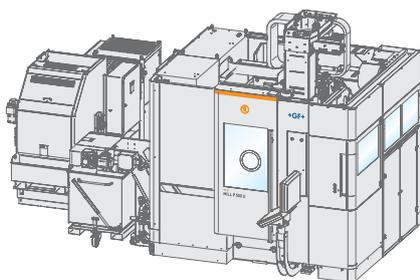
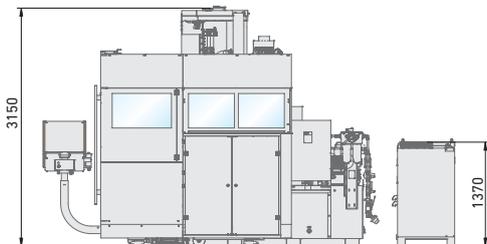
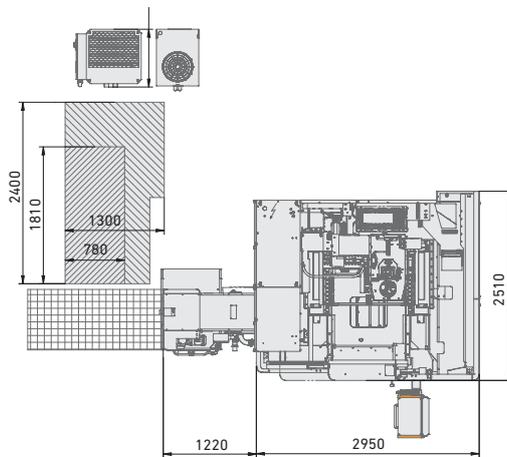
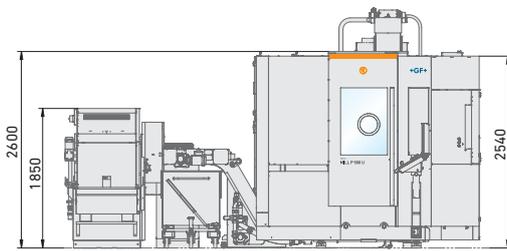
36,000 min⁻¹
 HSK-E50



Mikron MILL P 500 U / D

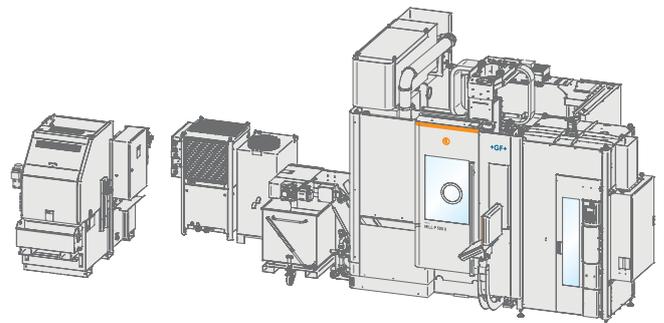
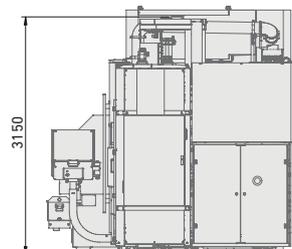
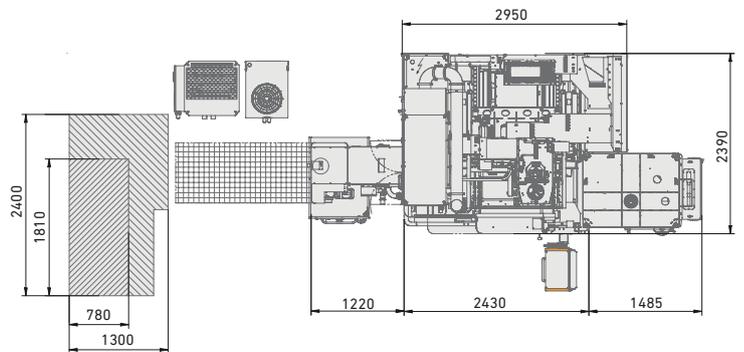
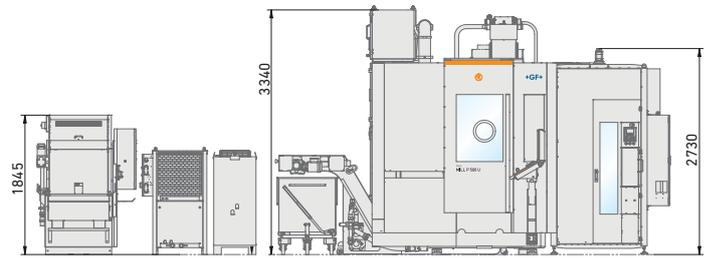
30 / 60 tools

Robot



Mikron MILL P 500 U

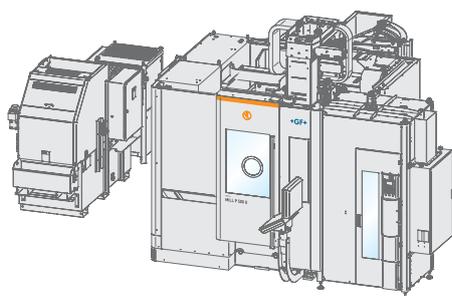
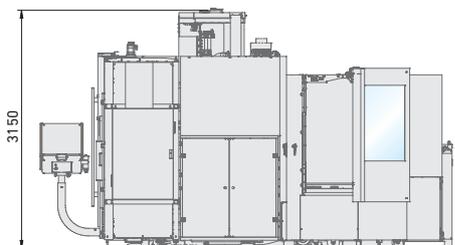
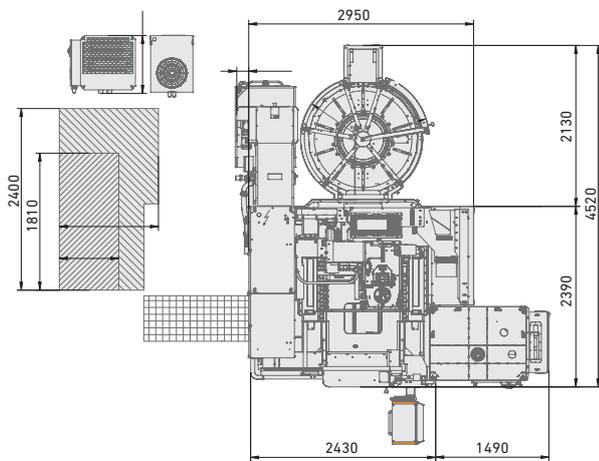
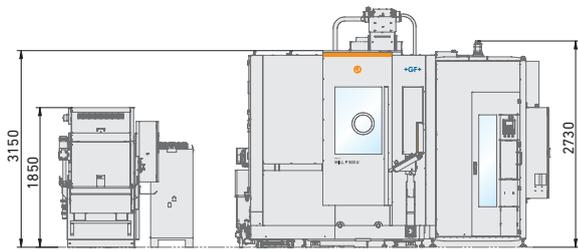
120-215 tools



Mikron MILL P 500 U

4 pallets

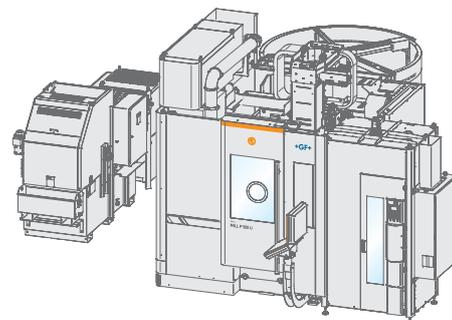
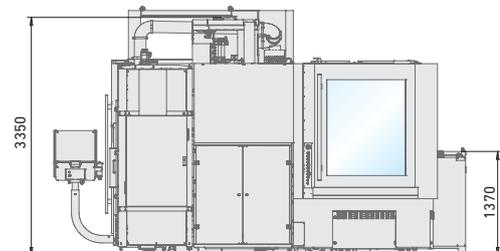
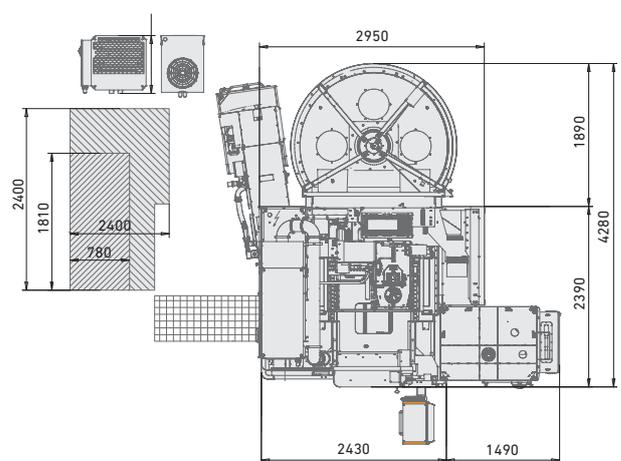
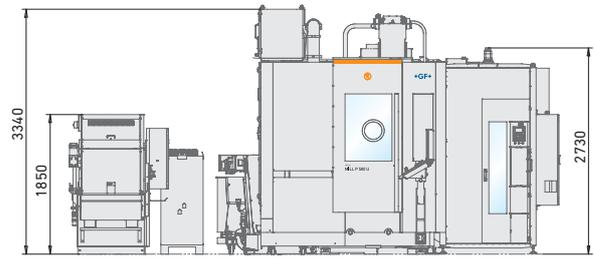
120 - 215 tools



Mikron MILL P 500 U

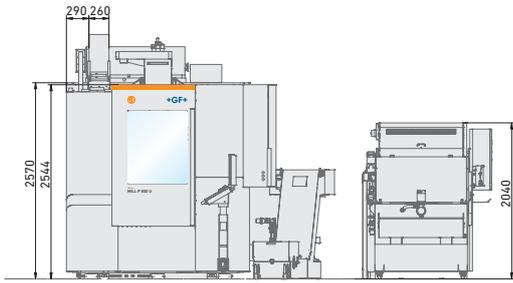
7 - 12 pallets

120 - 215 tools



Mikron MILL P 800 U

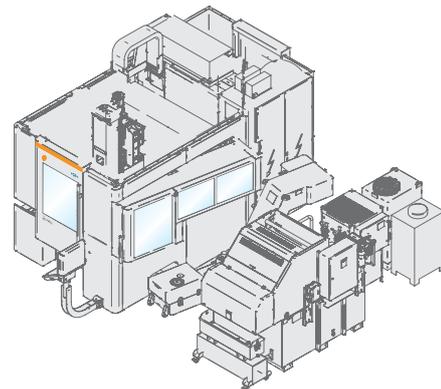
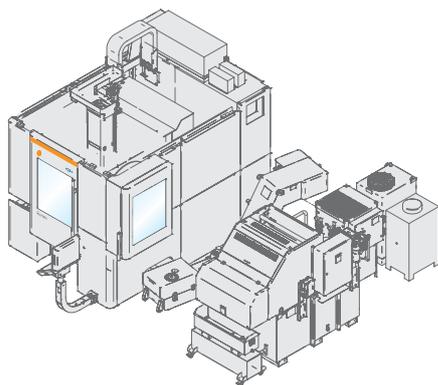
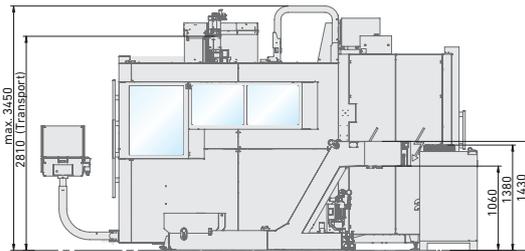
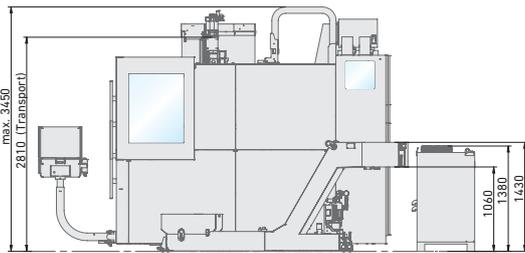
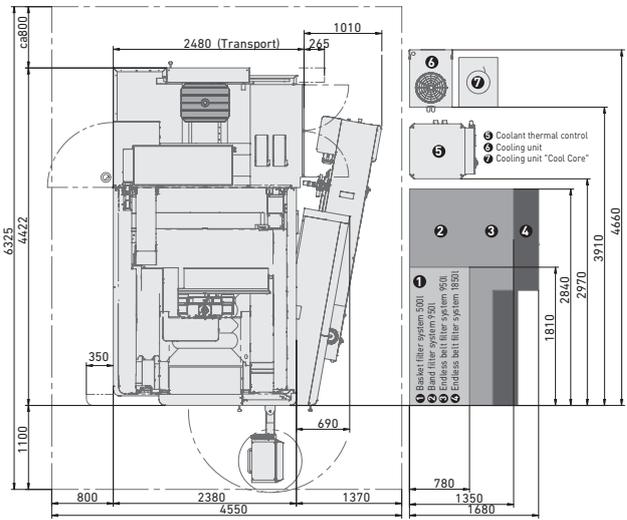
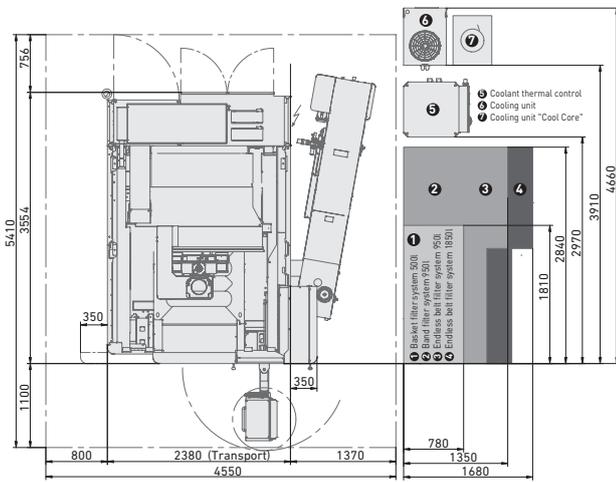
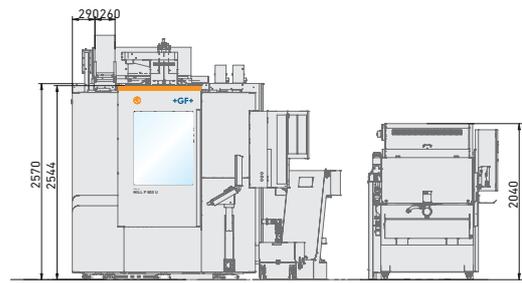
30 tools



Mikron MILL P 800 U

2 pallets

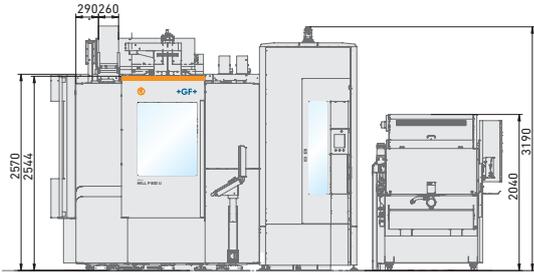
60 tools



Mikron MILL P 800 U

7-12 pallets

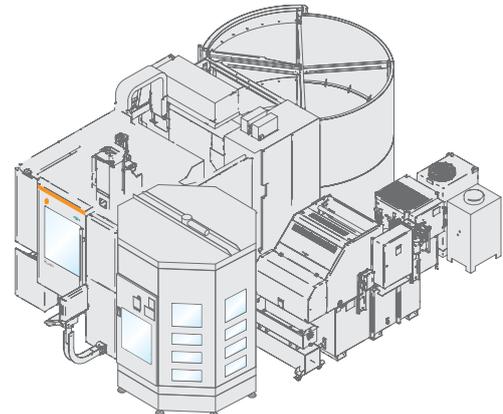
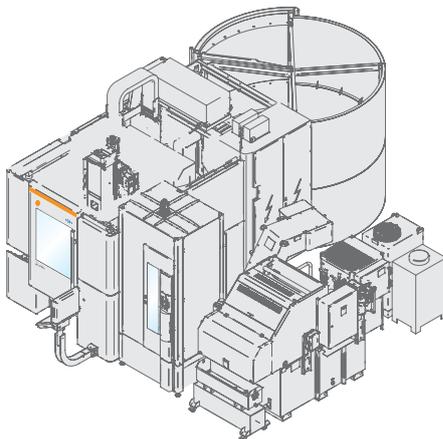
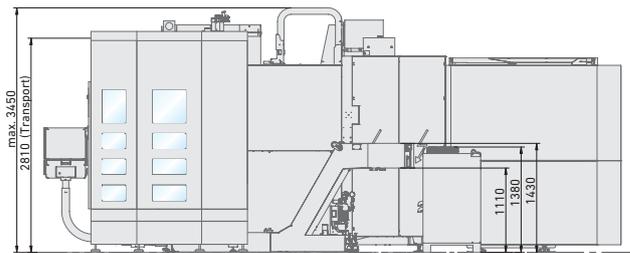
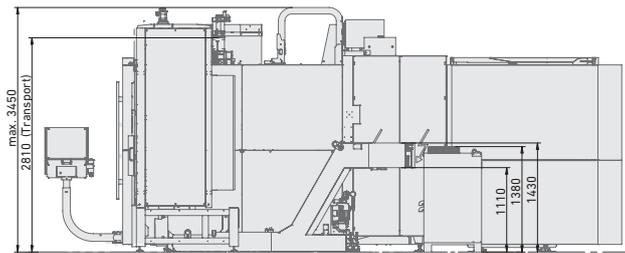
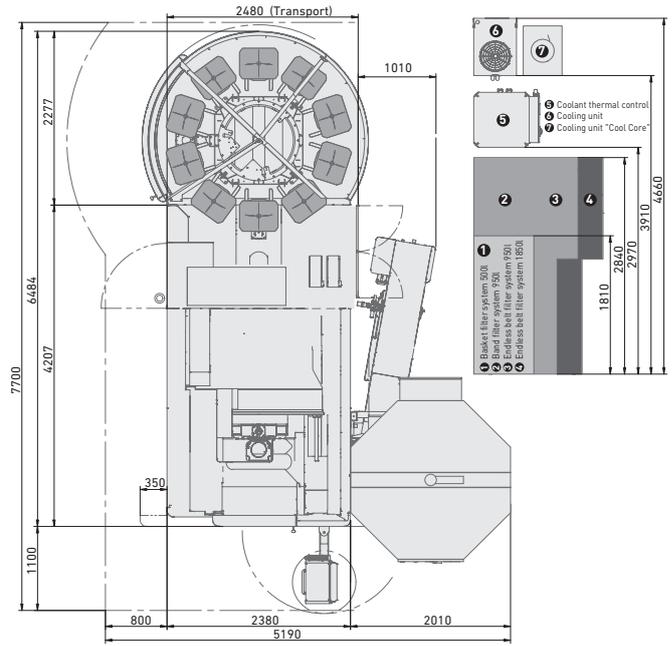
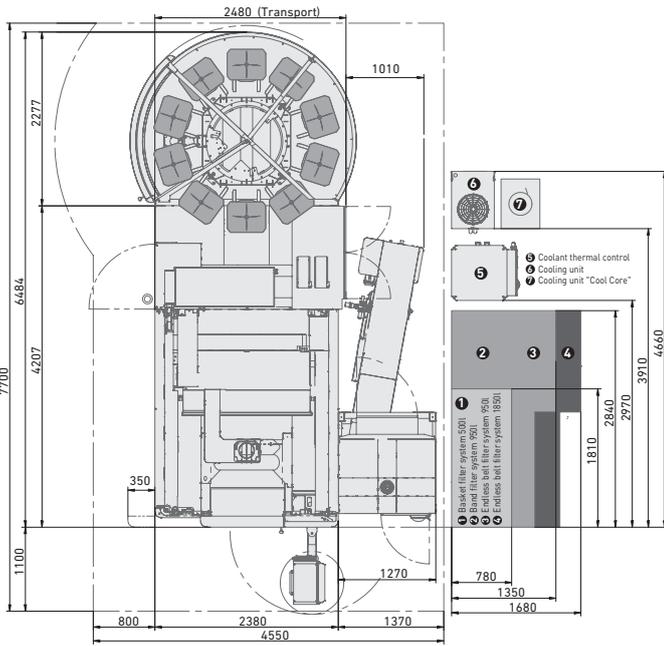
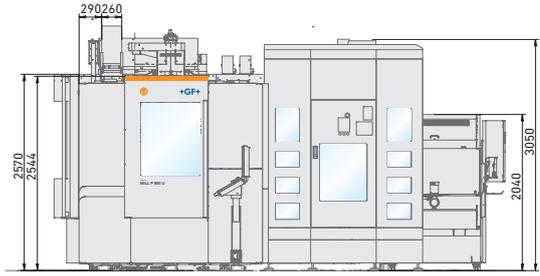
120 - 215 tools



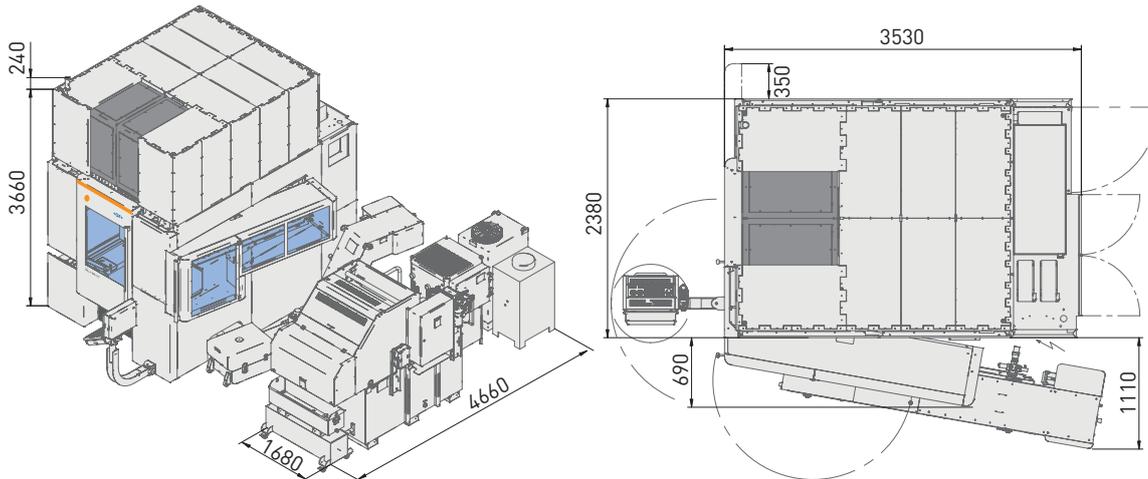
Mikron MILL P 800 U

7-12 pallets

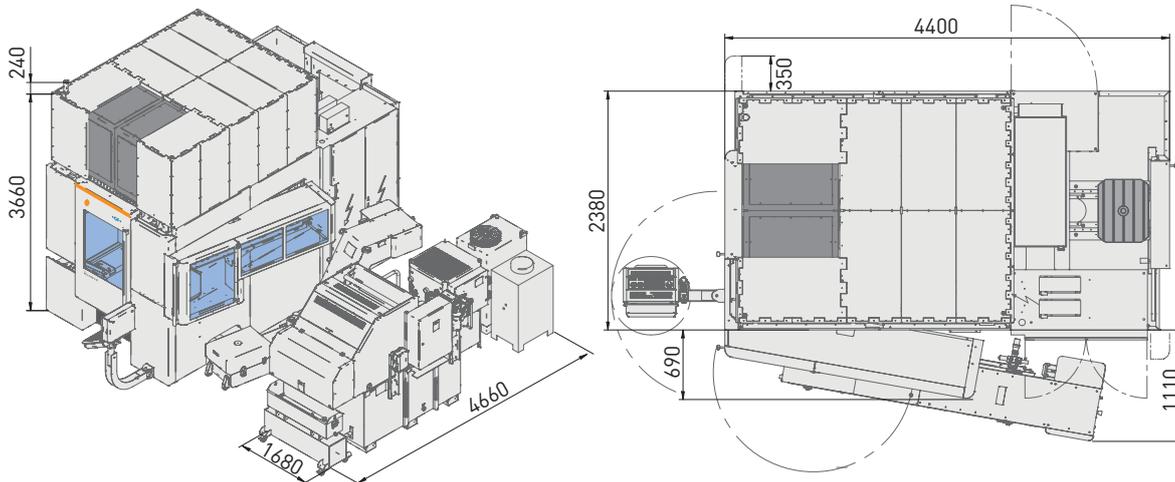
245 tools



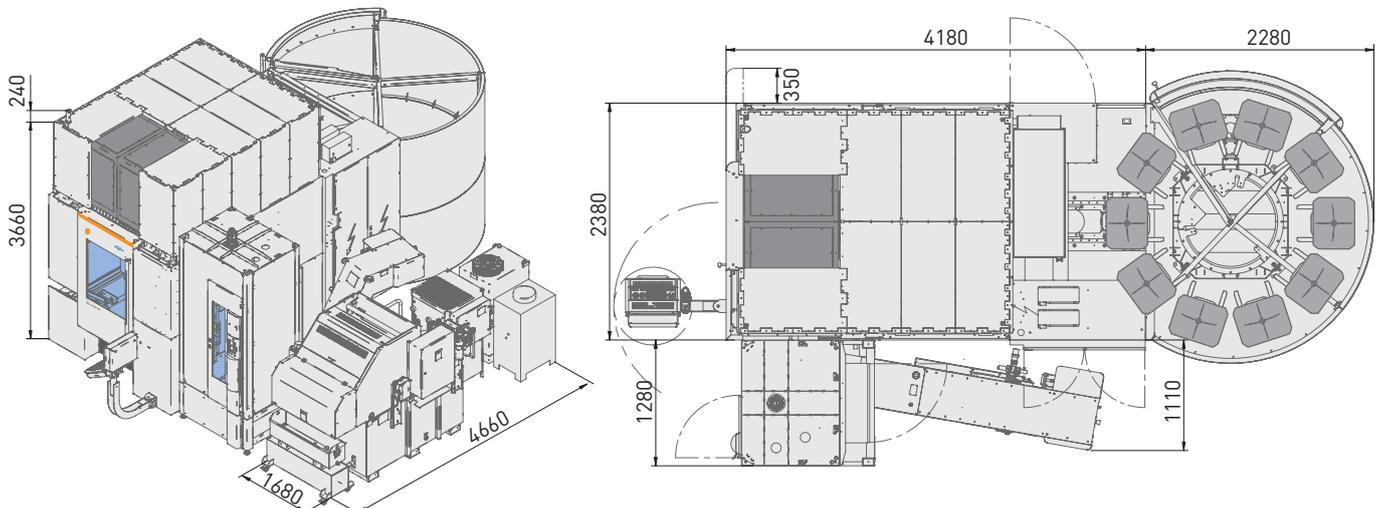
Mikron MILL P 800 U ST, 60 tools



Mikron MILL P 800 U ST, 60 tools, 2 pallets



Mikron MILL P 800 U ST, 120–215 tools, pallet magazine with 7–9 pallets



Customer Services

rConnect: Live Remote Assistance

rConnect comprises GF Machining Solutions modular digital services.

You stay connected with your machine park, at any time and wherever you are. Select the digital service that best fits your individual needs. Our Live Remote Assistance (LRA) supports you in keeping your commitments.



Certified by TÜViT Trusted Product

Maximize your uptime

Live Remote Assistance provides you direct access to our expert service engineers with the latest technology. The LRA features audio, video, chat, whiteboard, file transfer, system access and screen sharing by using a Windows tablet or your standard PC.

Increase your flexibility

Know the status of your machines in real time at any location. The **rConnect Cockpit** is the user interface for your machine operator, maintenance technician or operations manager. It provides the operator with support for daily machine-related activities.

Secure connection based on the latest technology

To ensure your security, an encrypted point-to-point connection is established between your machine and GF Machining Solutions only at your request. Our remote service product is certified with the TÜViT Trusted Product Certificate.



GF Machining Solutions



EDM (electrical discharge machining)

AgieCharmilles wire-cutting, die-sinking and hole-drilling machines

For over 60 years we have been at the forefront of every EDM development: designing and refining the EDM process and building machine tools that deliver peerless part accuracies, surface finishes, cutting speeds and process reliability. Today, our AgieCharmilles wire-cutting, die-sinking and hole-drilling machines are recognized throughout the world as the best in the business. Our continuous research and development in digital generator technology, control systems and integrated Automation systems are evidence of our commitment to keeping your EDM operations on the leading edge of technology.



Laser

AgieCharmilles Laser texturing machines

Laser texturing is a fully-digitized surface engineering process that has huge potential. The technology enables precise 2D and 3D textures or engravings to be machined accurately and directly onto complex parts or molds to improve and alter their aesthetic appeal, functionality and performance. The process is infinitely repeatable and offers many distinct environmental and economic advantages over conventional texturing processes.

Laser Additive Manufacturing (AM)

GF Machining Solutions has partnered with EOS, the global leader for high-end AM solutions, to integrate this innovative technology and further develop it into its current solutions to fully benefit the mold industry, by focusing on injection efficiency: optimized cooling design to reduce cycle time, lower energy consumption, higher quality of plastic parts.



Tooling and Automation

System 3R Tooling, Automation and software

Productivity is the key to manufacturing success, and automating a manufacturing process is a proven method of increasing its efficiency, effectiveness, quality and reliability. System 3R's integrated Tooling, Automation and software solutions ranging from simple workpiece pallet and electrode changers through to flexible manufacturing and robot handling systems are guaranteed to help you increase their competitive advantage.



Milling

Mikron MILL S (high-speed Milling), Mikron MILL P (high-performance Milling) and Mikron MILL E (high-efficiency Milling)

Customers operating in the mold, tool and die and precision component manufacturing sectors stake their reputations on being able to quickly and cost-competitively meet their customers' demands. That's why they invest in GF Mikron machines. Incorporating the latest and most advanced technologies and premium-performance components, Mikron MILL S, Mikron MILL P and Mikron MILL E machines help you increase your production capabilities and improve your productivity. Designed and built for speed, accuracy and reliability, the machines, like you, are proven performers.

Liechti dedicated aerospace and energy machining centers

Aerospace and power generation turbine manufacturers increasingly turn to Liechti dedicated five- and six-axis machining centers to machine complex, high-precision airfoils on blades, disks, blings, blisks/IBRs and impellers. It's easy to see why because these machines, with their specific profile machining technology, specialized CAD/CAM software and engineering competence for ultra-dynamic machining in titanium, Inconel, nimonic, titanium-aluminide and high-alloy steels, yield productivity gains as much as 30 percent, thanks to reduced machining times. In the globally competitive aerospace and power generation manufacturing sector, that's definitely worth shouting about.

Step-Tec Spindles

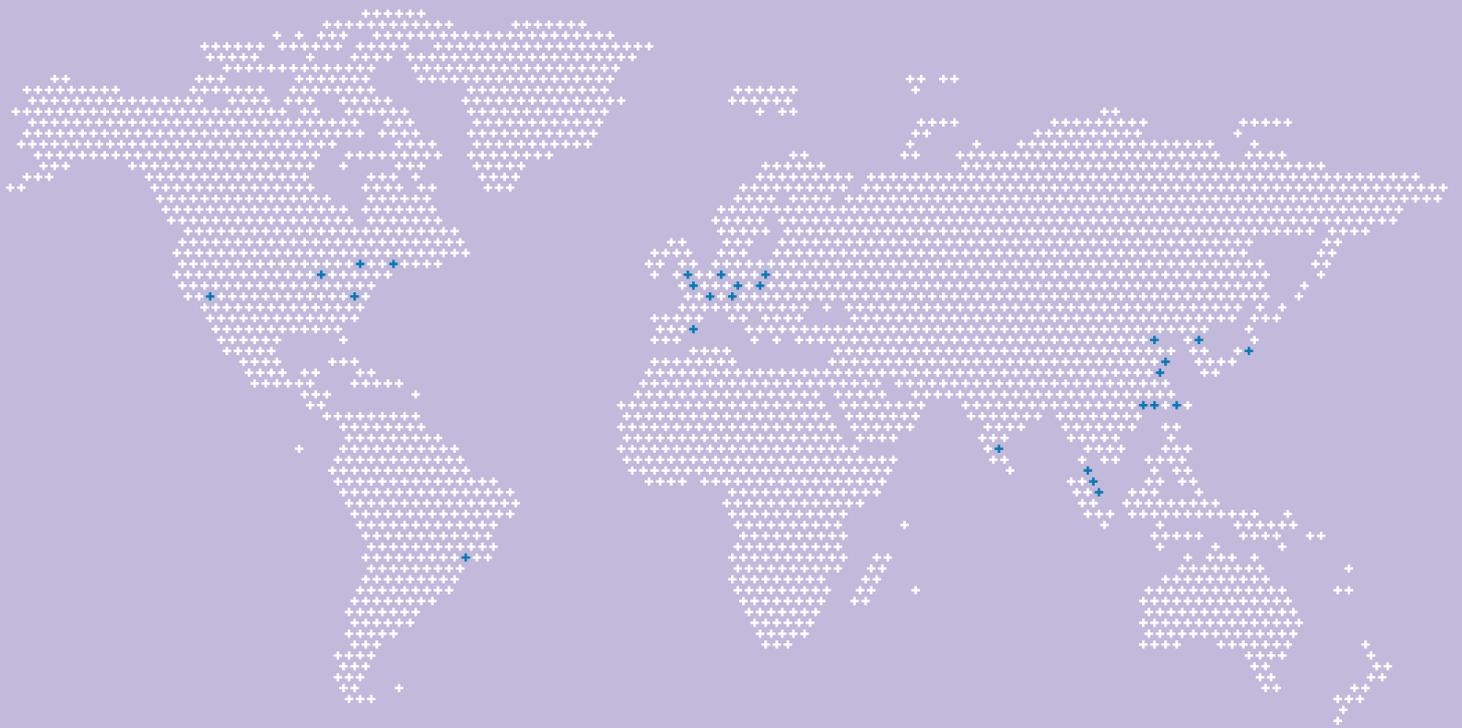
At the heart of every GF Mikron machining center is high-performance Step-Tec Spindle. Step-Tec Spindles are essential core components of our machining centers. Highly accurate and thermally stable Step-Tec Spindles ensure that our machines can handle everything from heavy-duty roughing to fine-finishing operations.



Customer Services

Operations Support, Machine Support and Business Support

To help you get the most and the best from your machine tools and equipment, we offer three levels of support. Operations Support covers our range of original wear parts and certified consumables (EDM wires, filters, resins, electrodes etc.) to ensure that your machines are performing at the highest levels. Machine Support maximizes, through our best-in-class technical support, preventive services and quality spare parts, your machine tool uptime. Business Support is designed to help you make a real step-change in your productivity and performance with solutions tailored to your specific needs.



At a glance

We enable our customers to run their businesses efficiently and effectively by offering innovative Milling, EDM, Laser, Additive Manufacturing, Spindle, Tooling and Automation solutions. A comprehensive package of Customer Services completes our proposition.

www.gfms.com

