

Mikron

HPM 600U

HPM 800U



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 Milling, electrical discharge machines (EDM) and Laser texturing machine tools through to first-class Automation, Tooling and software systems—all backed by unrivaled Customer service and support—we, through our Mikron, Liechti, AgieCharmilles and System 3R technologies help you raise your game and increase your competitive edge.

Swiss design and quality

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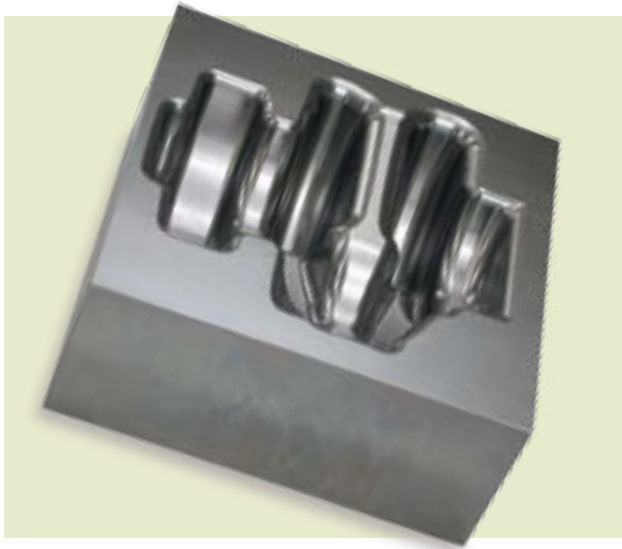
GF Machining Solutions

The HPM machines are intended for the universal production of highquality parts with 3, 4 or 5 axes.

State-of-the-art motor spindles, directly driven circular and swivelling axes and stable construction provide the ideal conditions for economical and accurate machining with modern tools.

Applications

Broad range of parts...



Forging die for crankshaft

Alloyed steel for tools.
Automotive industry

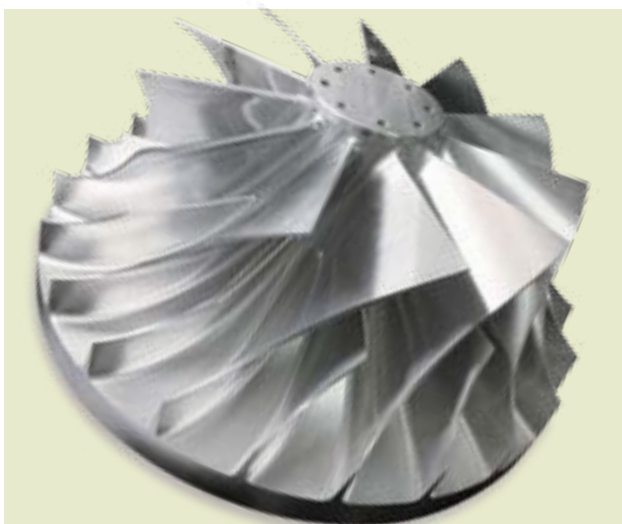
- + Material that is difficult to remove
- + Heavy tools
- + Molding accuracy
- + Outstanding machine stability
- + High-performance spindles



Bevel gear wheel

Hard machining
Gear

- + High stability and precision
- + Very good surface qualities
- + Absolute process consistency
- + Achieved quality Q3
- + Run out <math><6\mu\text{m}</math>

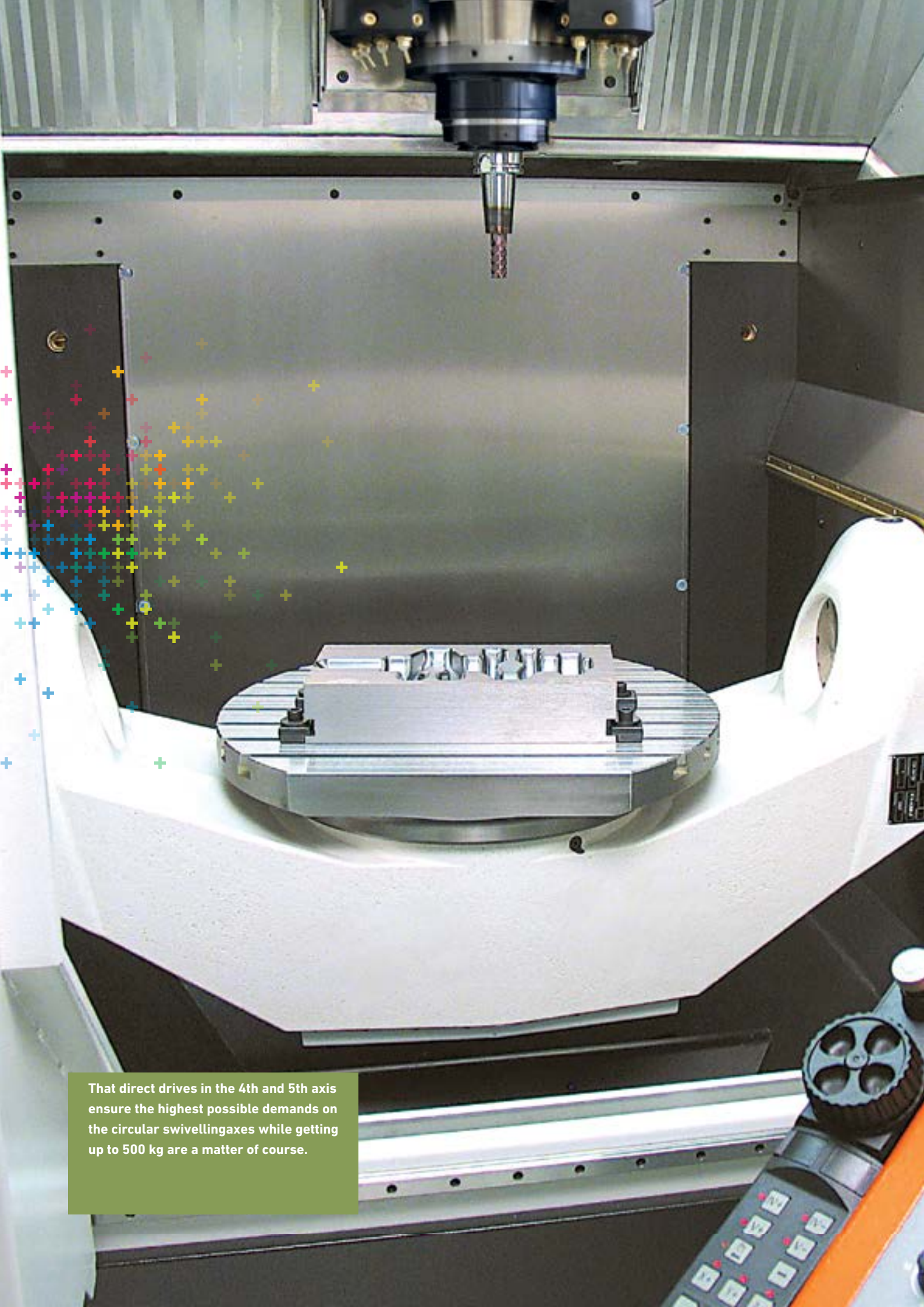


Impellers

Aluminum
Power generation

- + Dynamic 5 axis simultaneous processing
- + Quick and efficient control
- + Highly efficient at heavy roughing
- + Rapid finishing operations
- + Ø 660mm Machining time 6h20





That direct drives in the 4th and 5th axis ensure the highest possible demands on the circular swivelling axes while getting up to 500 kg are a matter of course.

Highlights

The Mikron HPM 600U and HPM 800U can be used for anything from heavy roughing to precise finishing operations

Extremely compact construction

Fully protective cabin for clean working conditions

Oil spray extraction for cleaner air

Dual drive in the Y-axis for dynamics and stability

Stainless steel axis covers

All axes with direct measuring systems

Double-walled safety door with large window

Scratch-resistant safety glass

Dynamic and stable. Circular swivelling table with water-cooled direct drives.

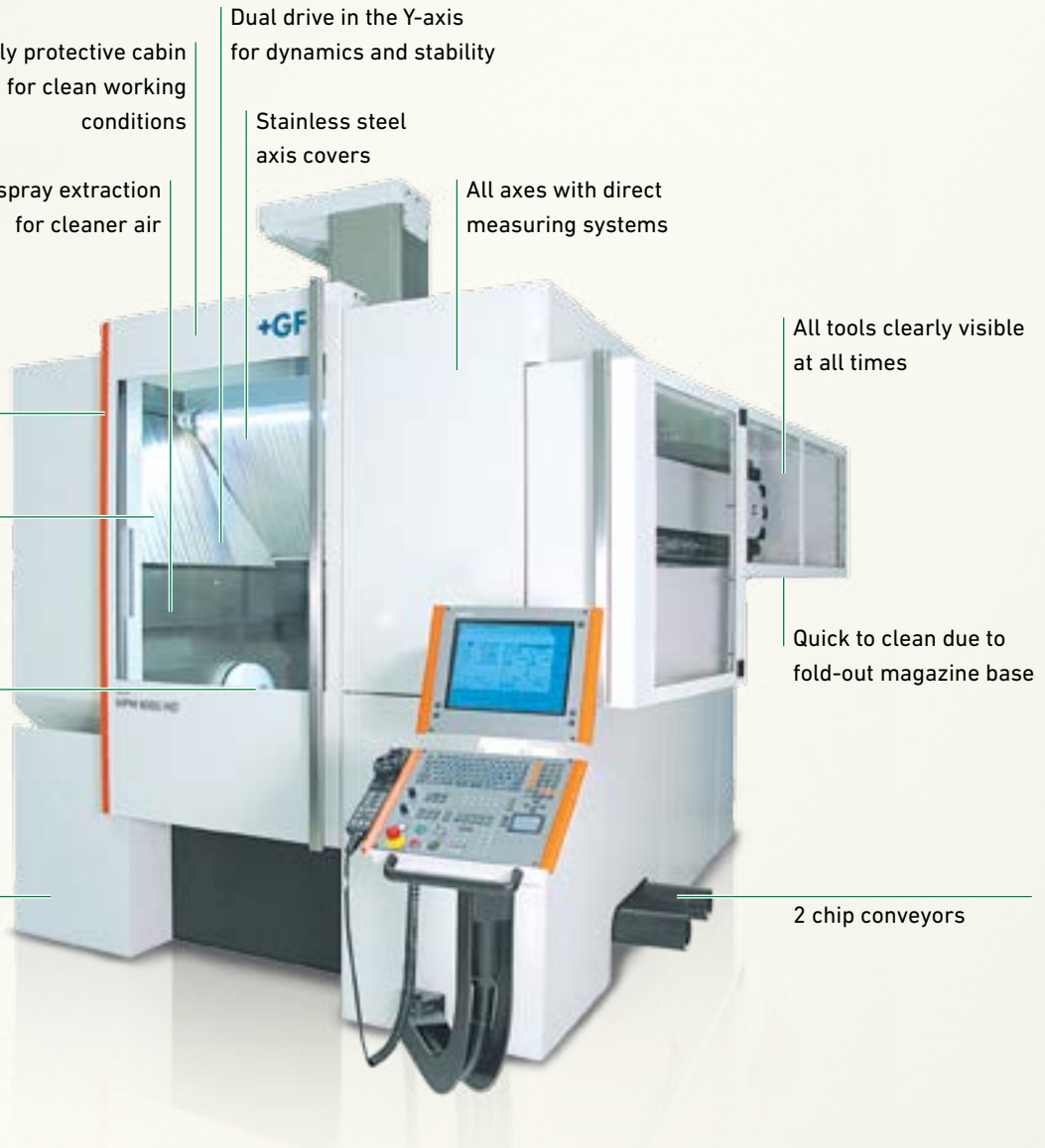
Increased stability for maximum tool life with 3 axis clamps.

Thermal insulation for constant precision

All tools clearly visible at all times

Quick to clean due to fold-out magazine base

2 chip conveyors

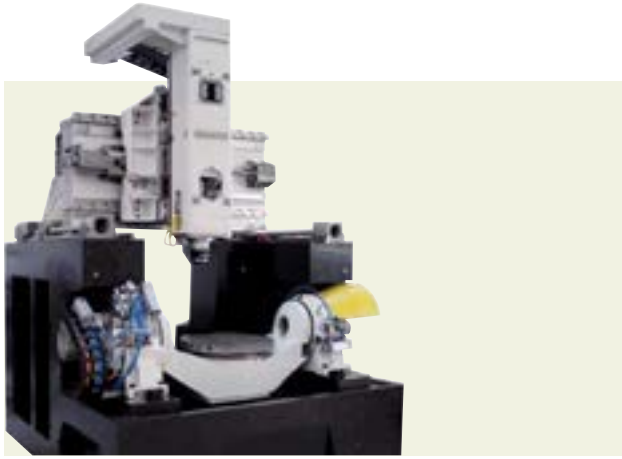


Other highlights

- + Optimum service access to all components due to easy-to-open side casings
- + Clear distinction between service and user access
- + The linear measuring systems are protected against soiling through excess air pressure.



Various modules of the smart machine modular system ensure an optimum process: increased accuracy, enhanced surface quality and molding precision as well as increased safety, which is particularly important for unmanned operations.



MSP

Machine and Spindle Protection

The world's only spindle protection that works in all directions!

Collisions usually occur when a new CNC program is first executed. MSP offers the best security for this.

Stability and damping

Primary prerequisites for maximum precision and best workpiece surface quality include damping and stability of the components.



Optimum chip management

Great attention has been paid to the flow of chips in the working area.

Sharply inclining side walls direct the chips reliably into the machine bed. The chips are then transported on two spiral chip conveyors to a highly efficient ascending conveyor with a fine filter.

Digital Heidenhain control system

With the latest generation of the Heidenhain iTNC 530 and a clearly laid out operator desk, the Mikron HPM 600U and HPM 800U are processconsistent and user-friendly machining centers:

- + Process consistency including rapid induction and safe operation of predefined work cycles
- + Ethernet connection for rapid CAM data flow
- + Easy dialog-controlled programming
- + Parallel programming, unrestricted contour programming, freely definable sub-programming



Facts

- + Unlimited roughing performance
- + The protection is always active
- + Spindle protection
 - X, Y, Z 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)

Benefits

- + Protected machine geometry
- + Reduced machine downtime
- + Full cost control
- + Reduced machine-breakage insurance premium
- + Calculable machine availability

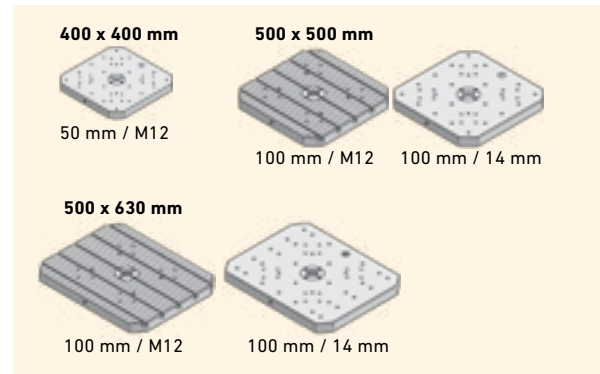
Automation with pallet changer

Automated pallet handling. The accessibility to the work piece is always ideal.

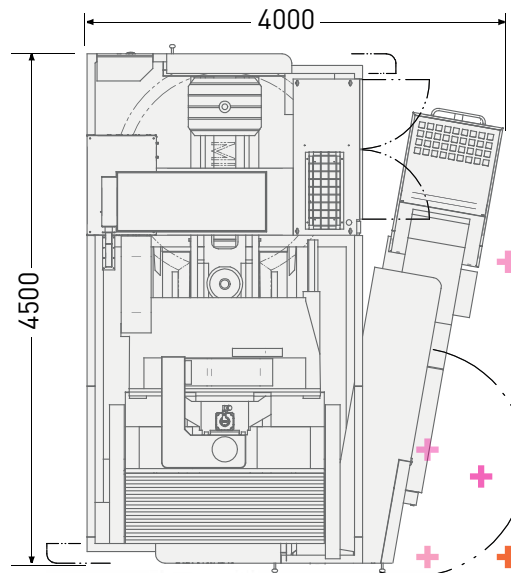
The Mikron HPM600U and Mikron HPM 800U machines have been designed in view of automated pallet handling. As the pallet changing system is integrated in the machine itself, the accessibility to the working room is always perfect, with or without automation.

In the loading station the raw parts will be set up on the pallet, while the machine is machining the work piece on the other pallet.

This greatly increases the productivity of the machine.



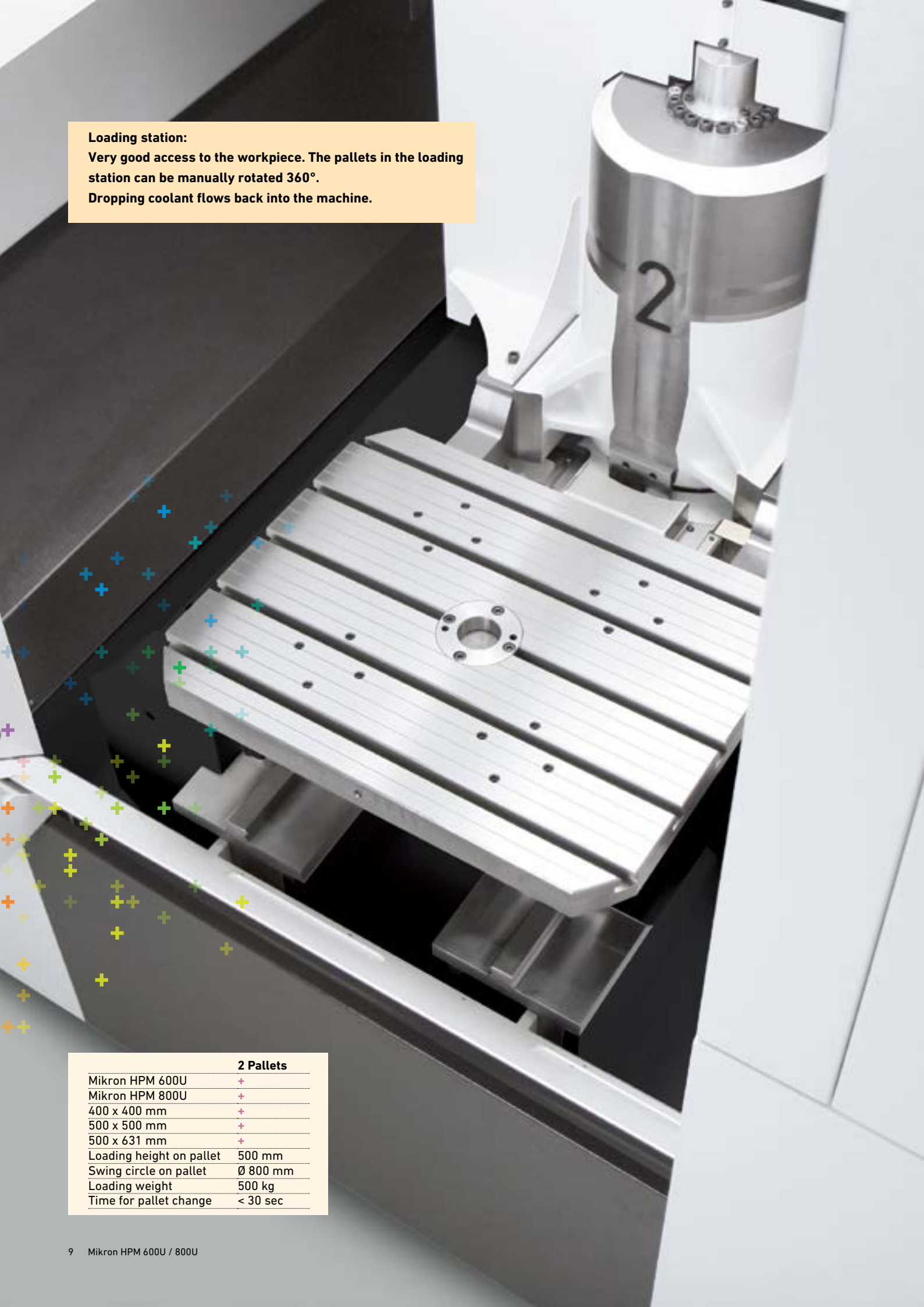
With the pallet changer the unproductive set-up time will be reduced to a pallet changing time of less than 30 seconds. For overall accessibility to the parts on the pallet, the loading station can be rotated manually.



Loading station:

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

Dropping coolant flows back into the machine.



2 Pallets

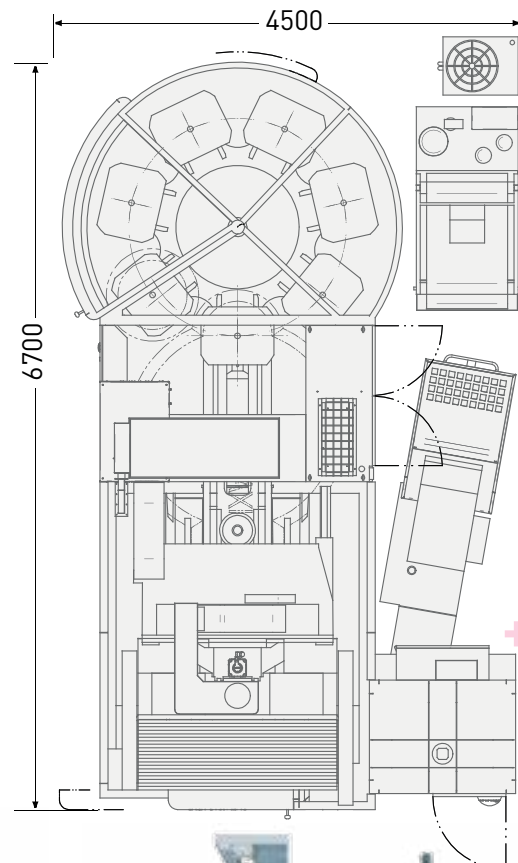
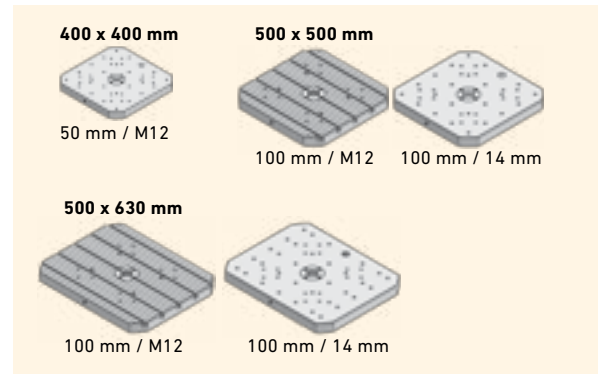
Mikron HPM 600U	+
Mikron HPM 800U	+
400 x 400 mm	+
500 x 500 mm	+
500 x 631 mm	+
Loading height on pallet	500 mm
Swing circle on pallet	Ø 800 mm
Loading weight	500 kg
Time for pallet change	< 30 sec

Automation with pallet magazine

Automated pallet handling. The accessibility to the work piece is always ideal.

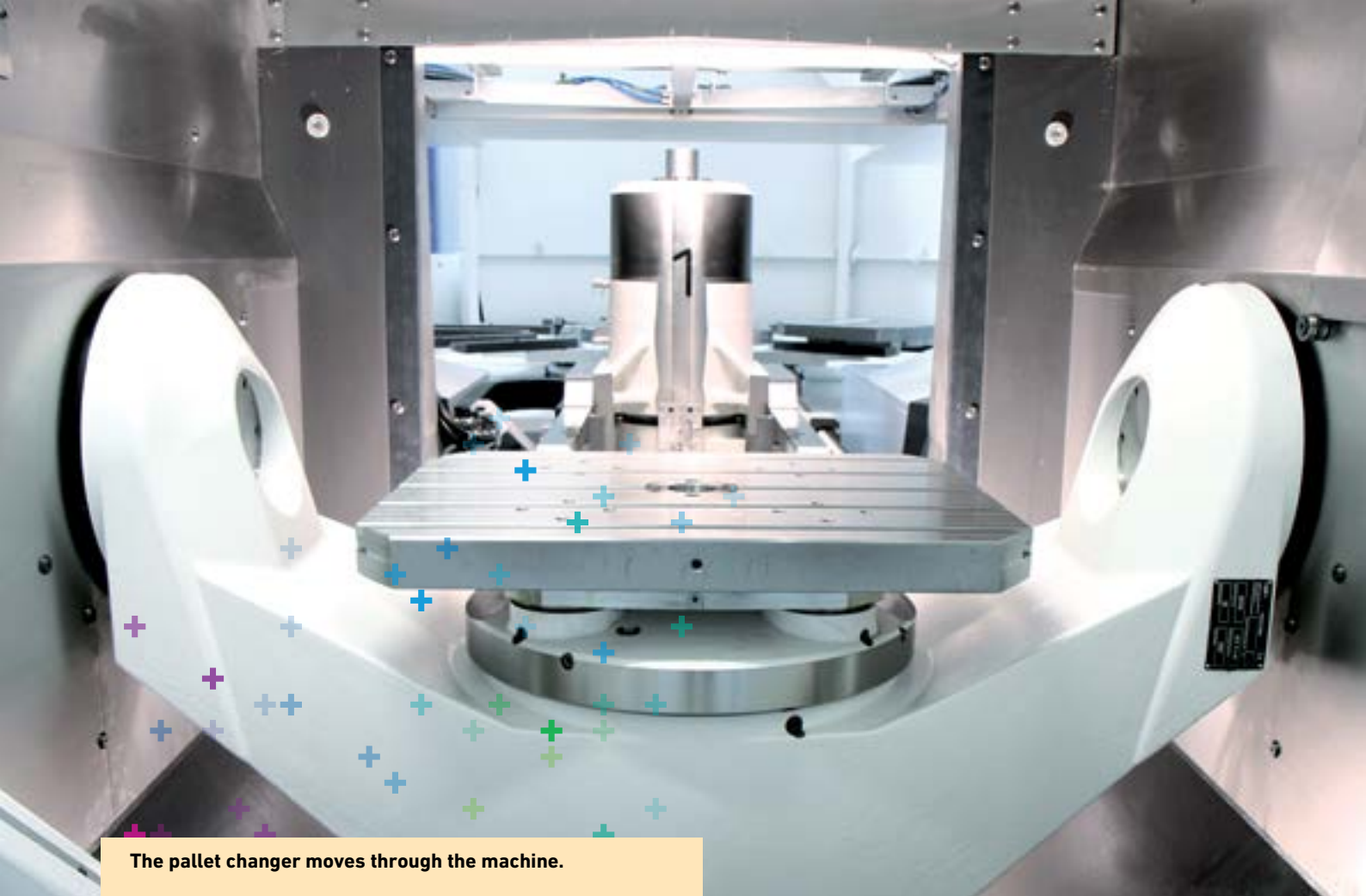
To increase the autonomy, there are very compact pallet magazines available which can be loaded with up to 12 pallets with optimal ergonomics.

- + With every automation solution the pallets can be loaded up to 500 kg.
- + Multiple workpieces in the pallet magazine require multiple tools.
- + The 3 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 in order to be rotated manually.
- + From 30 to 240 tools can be selected in different expansion stages.

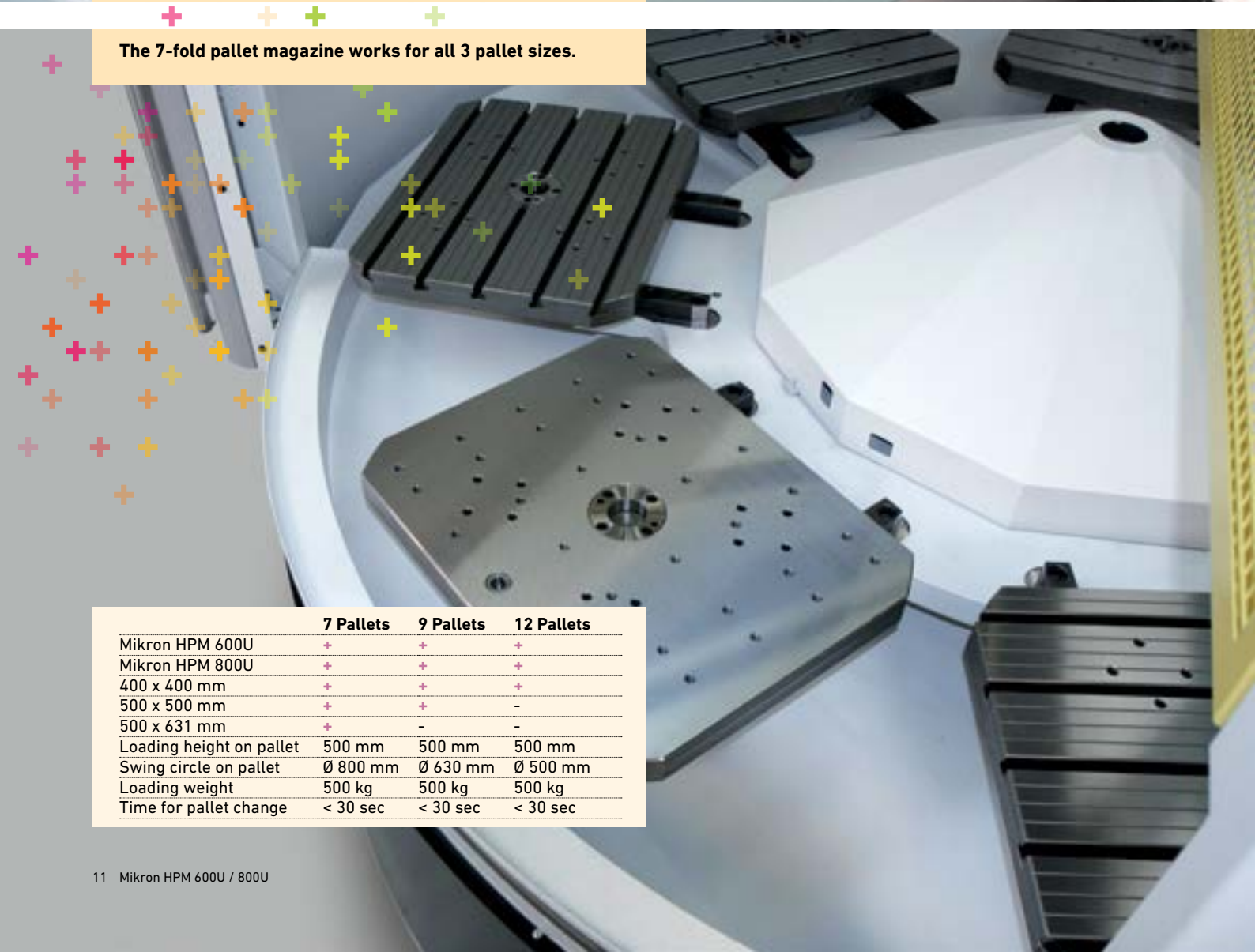


Workpieces can be cleaned with a wetvacuum cleaner. (Preparation).





The pallet changer moves through the machine.

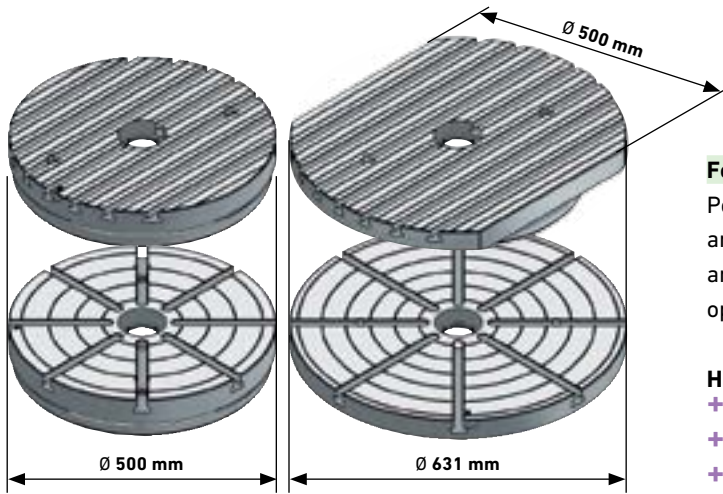


The 7-fold pallet magazine works for all 3 pallet sizes.

	7 Pallets	9 Pallets	12 Pallets
Mikron HPM 600U	+	+	+
Mikron HPM 800U	+	+	+
400 x 400 mm	+	+	+
500 x 500 mm	+	+	-
500 x 631 mm	+	-	-
Loading height on pallet	500 mm	500 mm	500 mm
Swing circle on pallet	Ø 800 mm	Ø 630 mm	Ø 500 mm
Loading weight	500 kg	500 kg	500 kg
Time for pallet change	< 30 sec	< 30 sec	< 30 sec

Table variants

Four different work tables

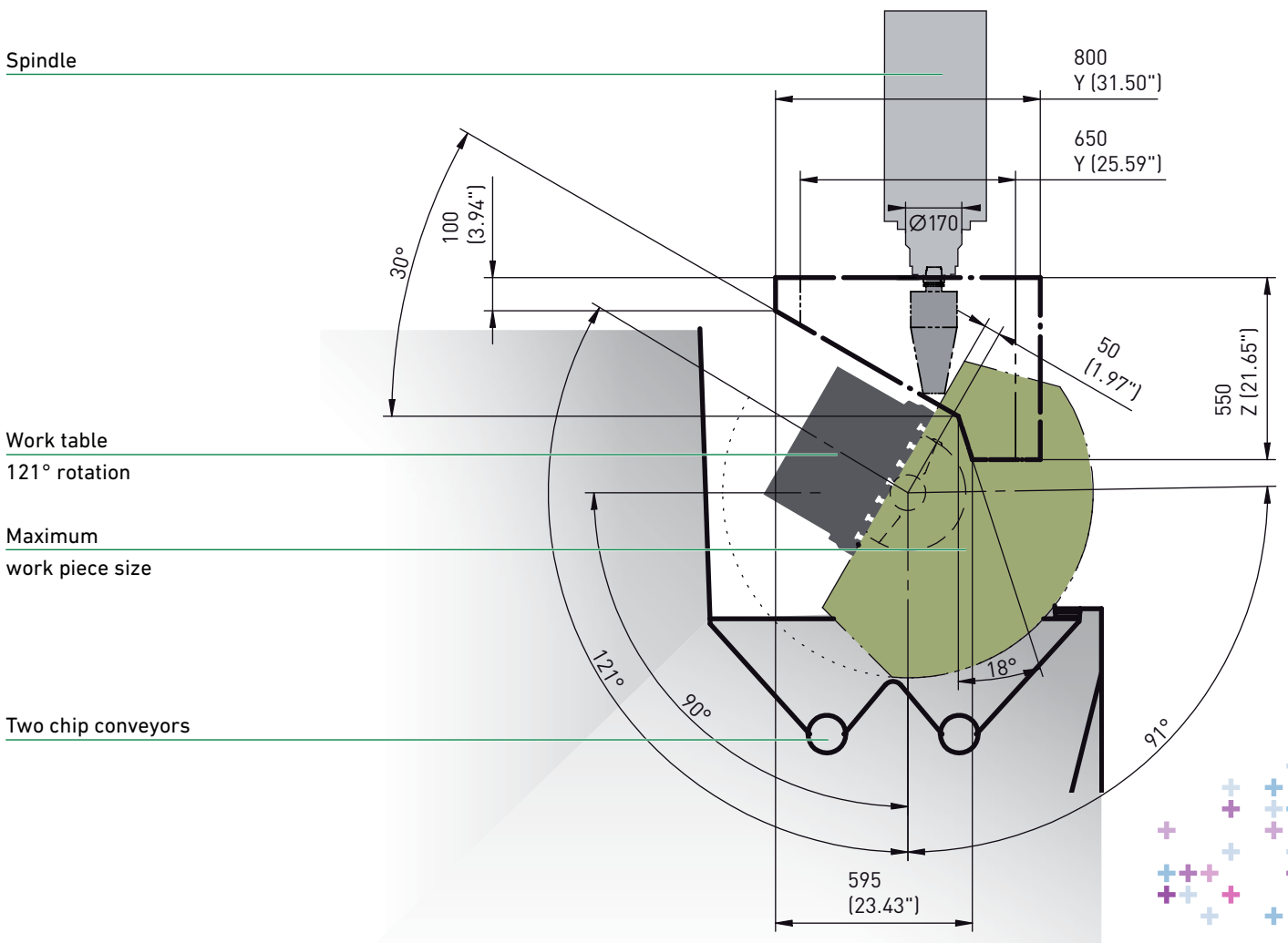


Four different work tables

Popular with users because of their outstanding flexibility and accessibility. Smaller parts can be effortlessly loaded and manually secured in place on the 100% simultaneously operable, circular swivelling table.

Highlights

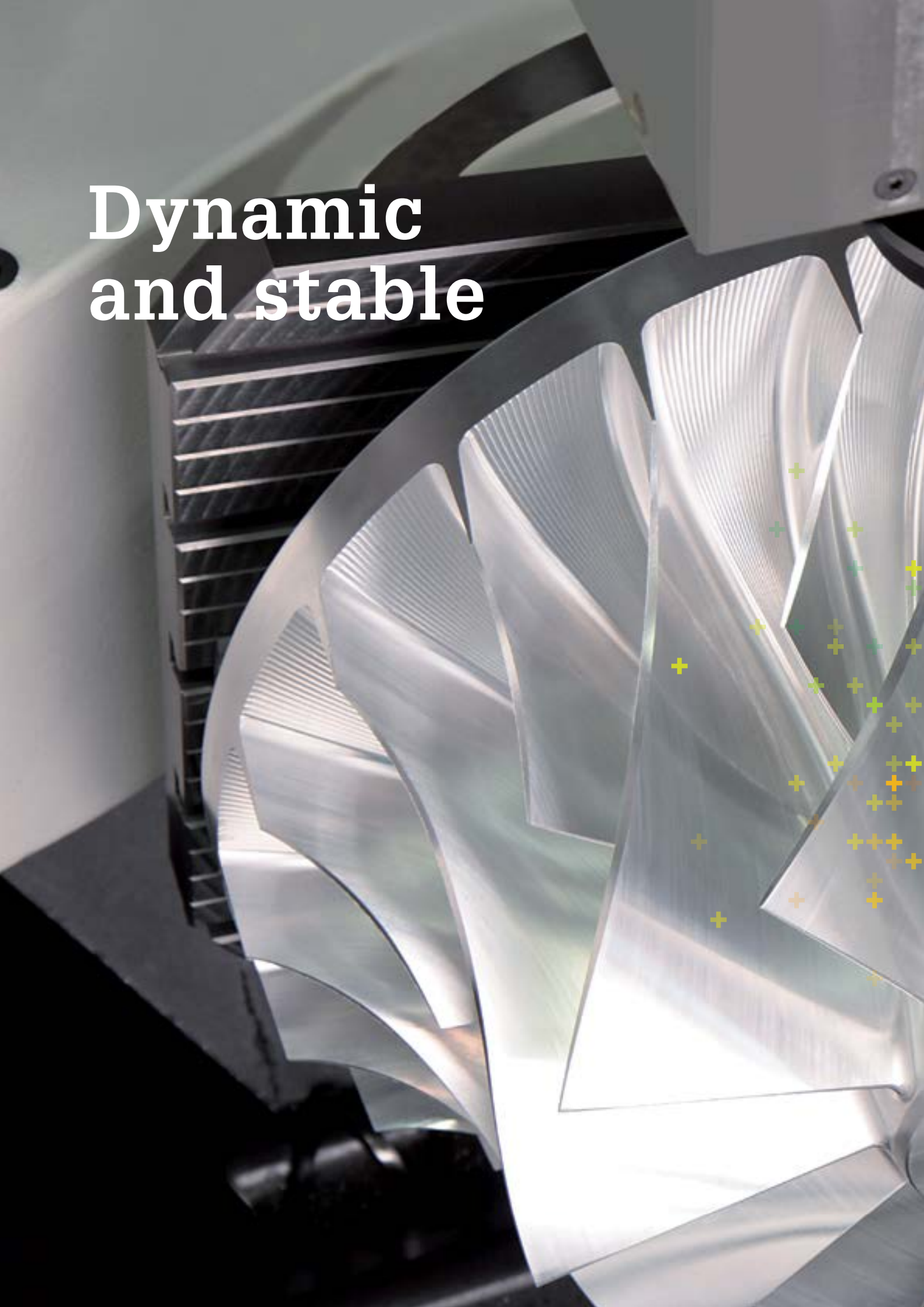
- + Direct and easily accessible measuring systems
- + A and C axis with water-cooled direct drives
- + A axis has clamps on both sides
- + C axis with clamps
- + Loads:
 - Vertical 800 kg (3 axis oper.)
 - Simultaneous 500 kg (5 axis oper.)

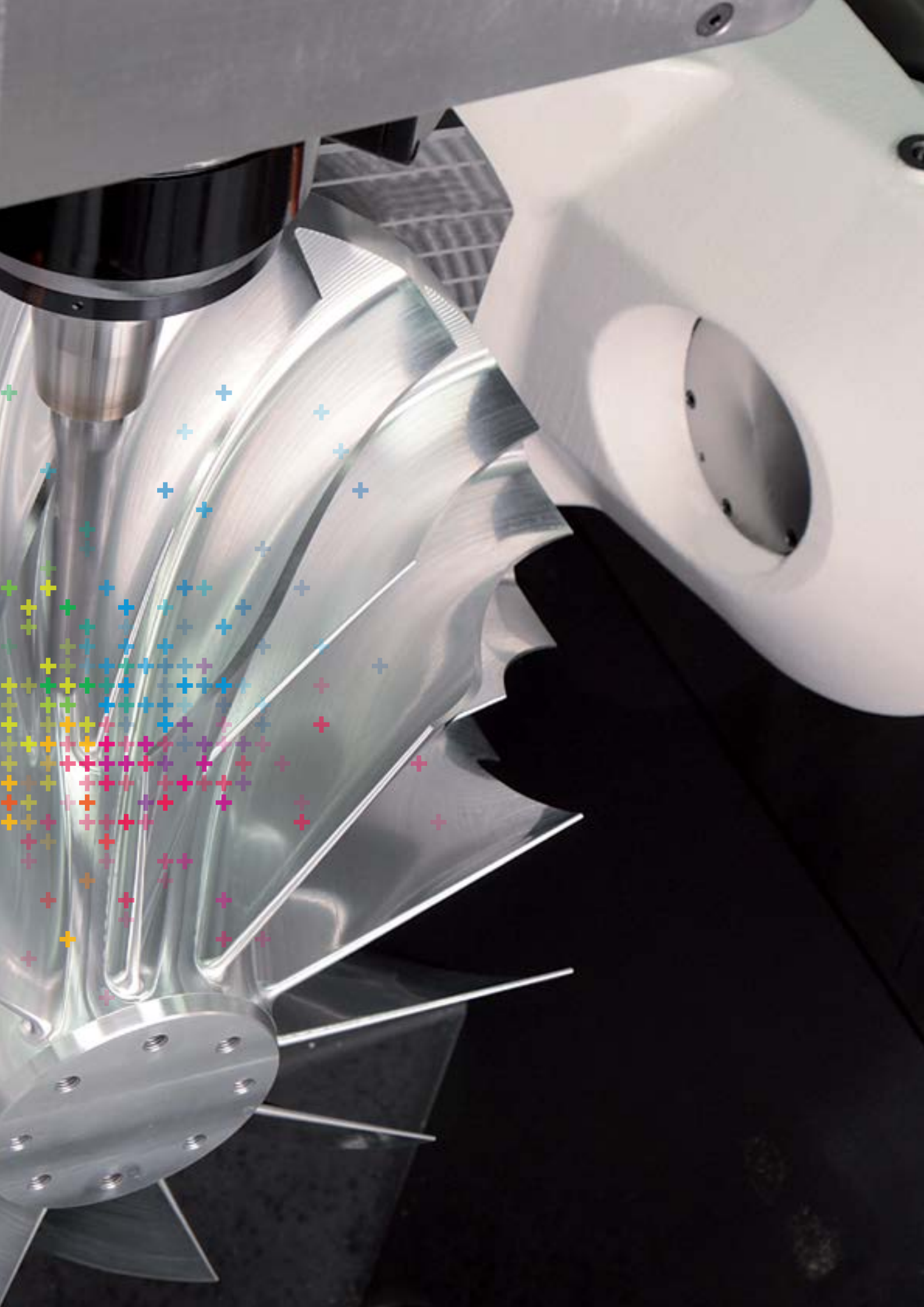


View from above into the working area of the Mikron HPM 800U.



**Dynamic
and stable**





Chip management

Wet or dry - clean machining



Optimum chip clearance due to steep, smooth cabin walls



Washer jets in all four corners prevent chip accumulation



Two chip conveyors for large chip volumes



Adapted chip management



- + Solution 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



Hightech spindles

Tool spindles for demanding machining

Whichever machine configuration you choose, with a Mikron HPM you get the most state-of-the-art tool spindle technology: vector control for full torque in the lower speed range, highly stable ceramic hybrid spindle bearing, and spindle casing cooling using a controlled coolant system for consistent temperatures for the entire duration of the work.

The complexly developed tool spindles from StepTec are designed with high torques for the removal of large chip volumes. This spindle particularly stands out due to its easy-to-maintain construction and automatically oil/air lubricated ceramic hybrid bearing system.

The tool spindles built into the Mikron HPM series have been purposefully designed to meet high performance expectations. The result is performance and torque even at high speeds.

20'000 min⁻¹ / HSK-A63

- + Precise high performance for use in the HPC field
- + Available with or without internal coolant supply
- + Compressed air blow through spindle
- + Spindle module and motor replaceable separately



smart machine APS (Advanced Processing System) for reliable measuring and display of milling vibrations and ITC (Intelligent Thermal Control) for higher workpiece precision.

28'000 min⁻¹ / HSK-A63

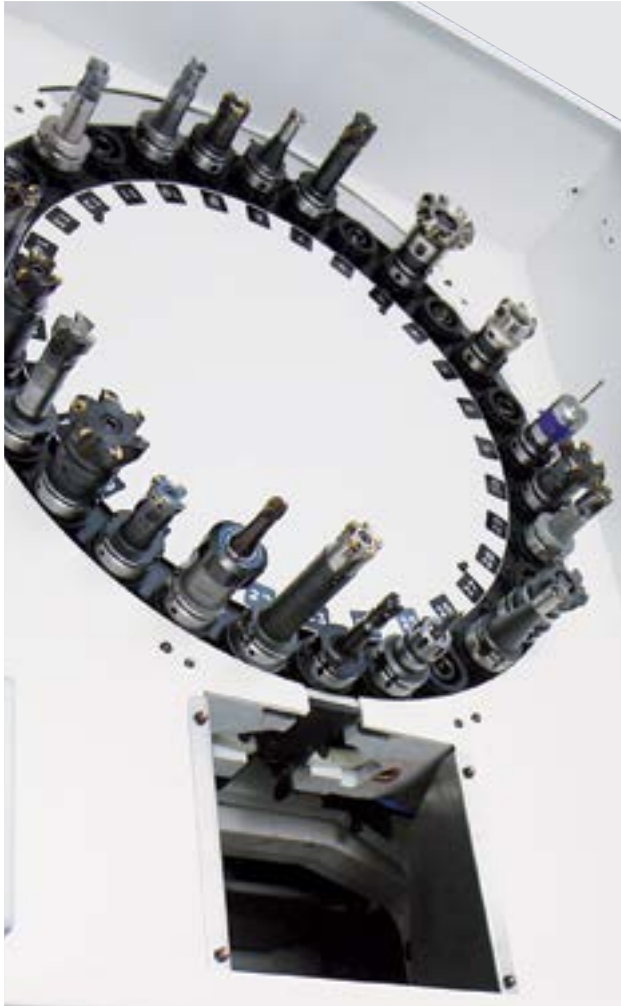
This spindle has a water cooled rotor shaft (CoolCore) which stabilizes the temperature and consequently the expansion in the rotor shaft. This feature allows very accurate machining, because it minimizes thermal influences of the spindle.

Through tool coolant is an available option.



Tool magazine

Rapid tool provision



30 tools

115, 165 or 210 tools

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





Tool magazine for 60 tools.
Simultaneous access to approx. 10 tool bags accelerates the rate at which tools are supplied.

Tools that are placed back in the tool magazine after the machining process are often coated with chips and emulsion. The residues collect on the magazine floor. This can be folded down for easy cleaning.



Options

Geared up for a multitude of options



Infrared touch probe



Laser measuring system



Minimum quantity cooling lubrication



Trough-spindle cooling



External coolant supply



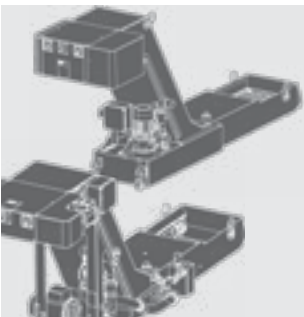
Optional nozzle ring



Flushing nozzles 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



APS
CAMplete
Econowatt
SIGMA FMC
ITC
ITC 5X
ITM
OSS
OSS extended
OSS extreme
PFP
RNS
smart machine

smart machine

The new dimension in modern production

Bringing intelligence into the milling process is the intended aim of “smart machine”.

This includes a range of modules that are collectively referred to under the generic term “smart machine” and that fulfil various functions. In order to make the milling process “intelligent”, various requirements have to be implemented. First of all, establishing comprehensive communication between man and machine, which makes precise information that the operator requires to assess the milling process available to him. Secondly, supporting the operator in the optimisation of the process, which considerably improves the performance. Thirdly, the machine optimises the milling process, which improves the process safety and the quality of the workpiece - above all in unmanned operation.

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
- + Improvement in the process safety
- + Reduction of the machine set due to longer service life
- + Higher availability
- + Better operating comfort
- + Considerable increase in reliability in unmanned operation

smart machine construction kit system

Each of the modules fulfils a specific task. Just like in a construction kit, the user can select the modules that seem to him to be the best option for improving his process.

Your benefit

Producing the workpieces in a process-secure and precise manner, increasing the reliability in unmanned operation, increasing the service life of the machine and significantly reducing production costs.



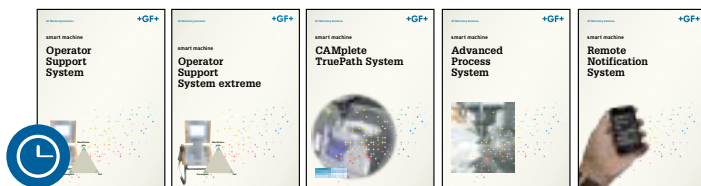
Saving energy



Protection



Precision



Productivity

The smart machine is constantly being further developed.
The currently available modules can be found at
www.gfms.com

Technical data

Mikron HPM 600U

Mikron HPM 600U HD

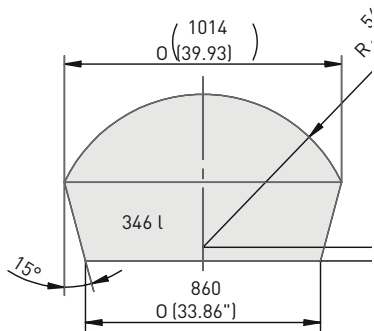
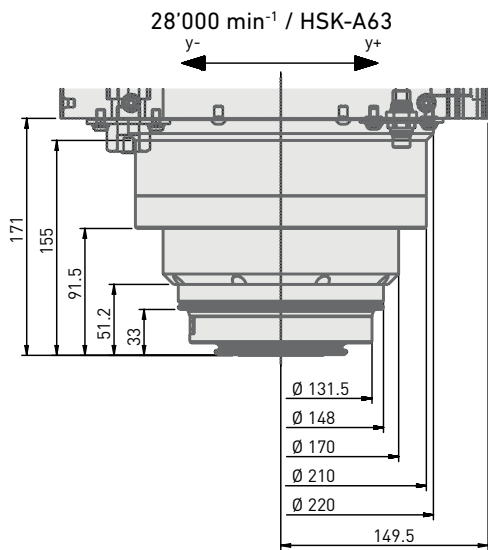
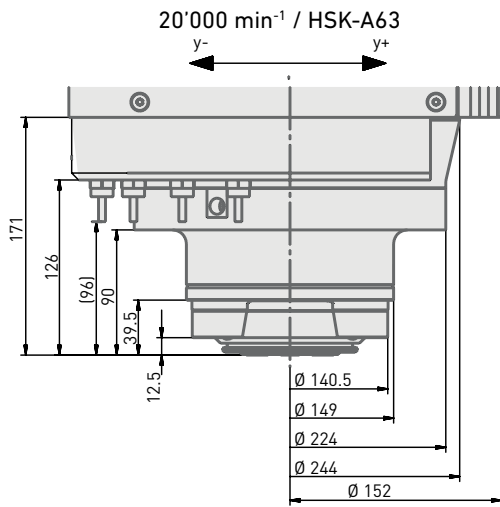
Mikron HPM 800U

Mikron HPM 800U HD

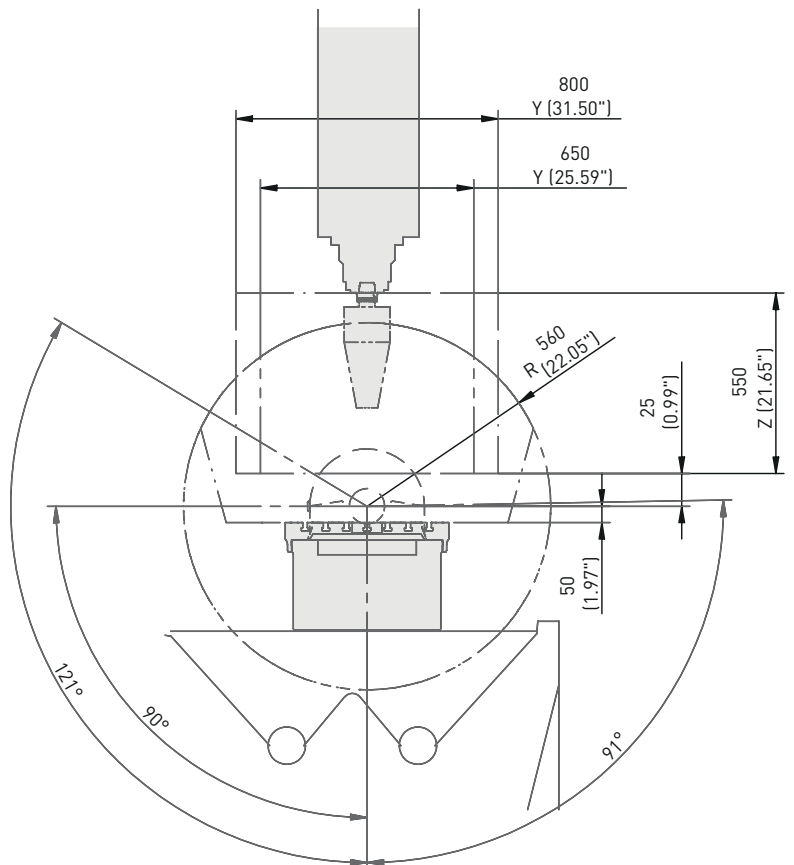
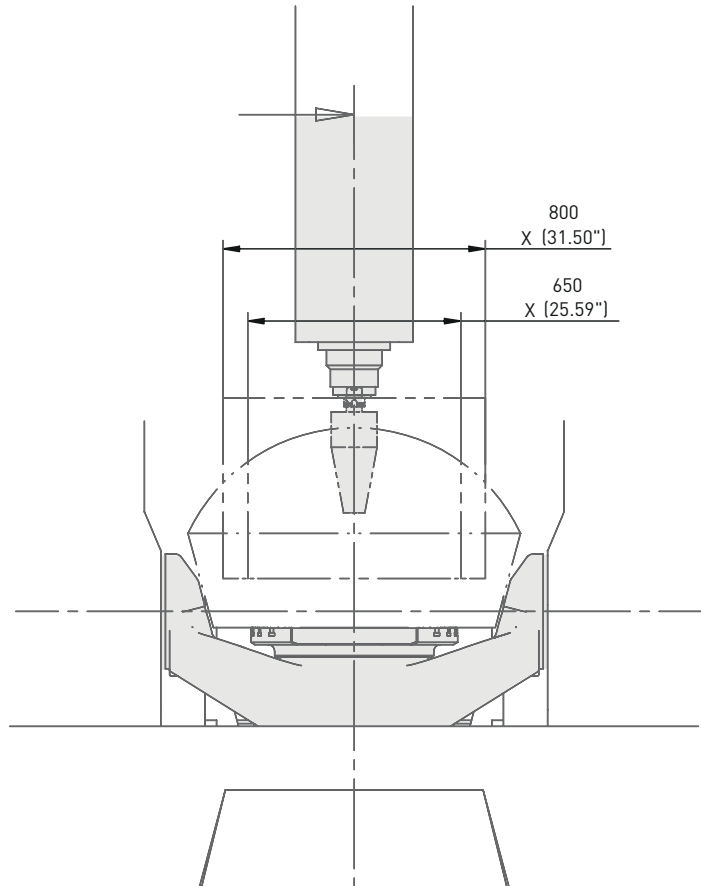


			Mikron HPM 600U	Mikron HPM 800U
Working range				
Longitudinal	X	mm	650	800
Cross	Y	mm	650	800
Vertical	Z	mm	550	550
A-axis		°	+91/-121°	+91/-121°
C-axis		°	n x 360°	n x 360°
Number of simultaneous axis		pce.	5/5 simultaneous	5/5 simultaneous
Feed Drives				
Feed rate / HD	Rapid traverse X, Y, Z	m/min	45 / 61	45 / 61
	A, C	min ⁻¹	25, 35 / 50, 60	25, 35 / 50, 60
Working spindle				
Working spindle 20'000	Spindle power 40% ED	kW	36	36
HSK-A63	Spindle torque 40% ED	Nm	120	120
Working spindle 28'000	Spindle power 40% ED	kW	36	36
HSK-A63	Spindle torque 40% ED	Nm	36	36
Accuracy XYZ ISO 230-2(97)				
Accuracy	A	μ	8	8
Repeatability	R	μ	5	5
Work table				
Clamping surface		∅ mm	500 / 631	500 / 631
Max. workpiece weight		kg	500 / 800	500 / 800
Automation				
Tool magazine		Positions	30, 60, 115, 165, 210, 245	30, 60, 115, 165, 210, 245
Laser tool measurement			Option	Option
Infrared touch probe			Option	Option
Weight				
Machine weight		kg	15,000	15,000
Options				
Automatical cabine roof			+	+
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			+	+
Siemens			+	+

Mikron HPM 600U
Mikron HPM 800U

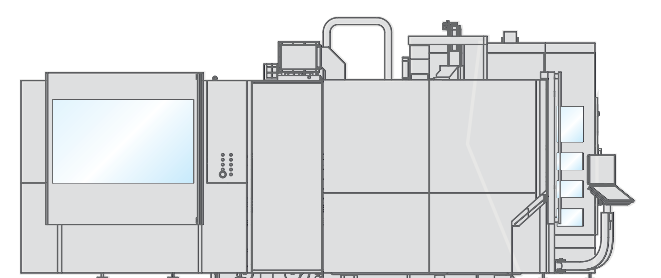
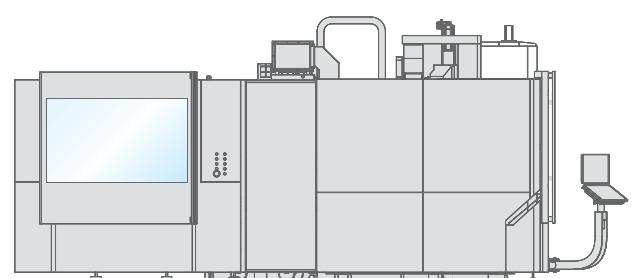
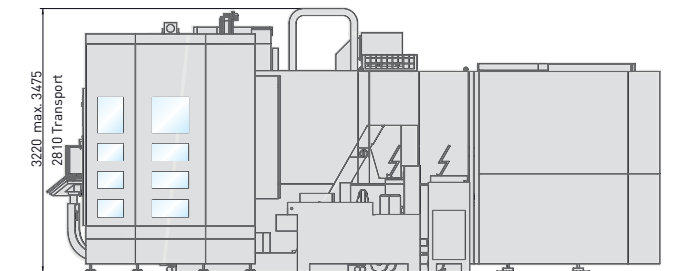
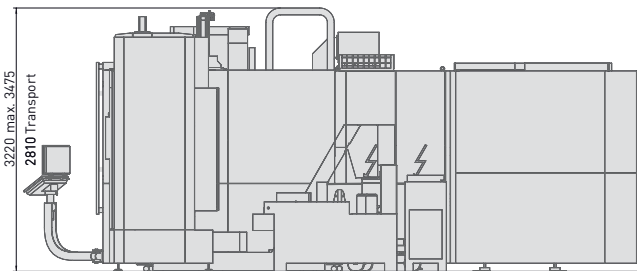
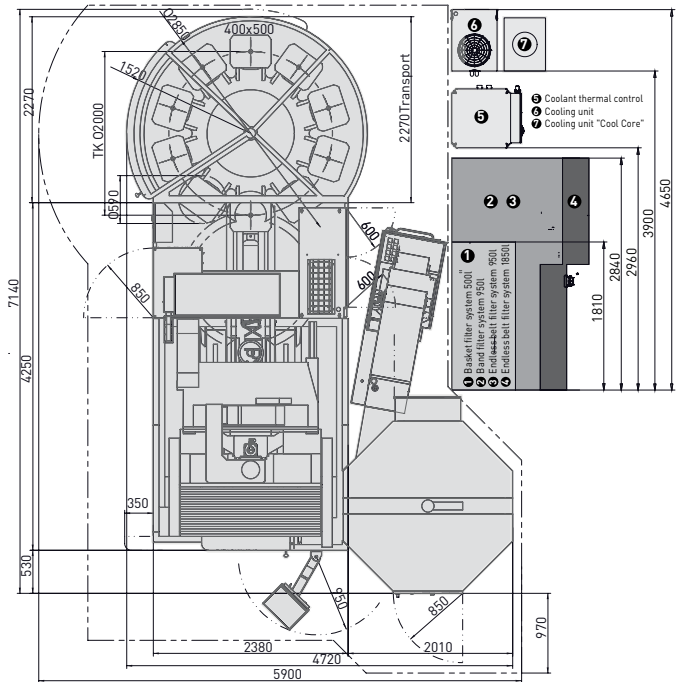
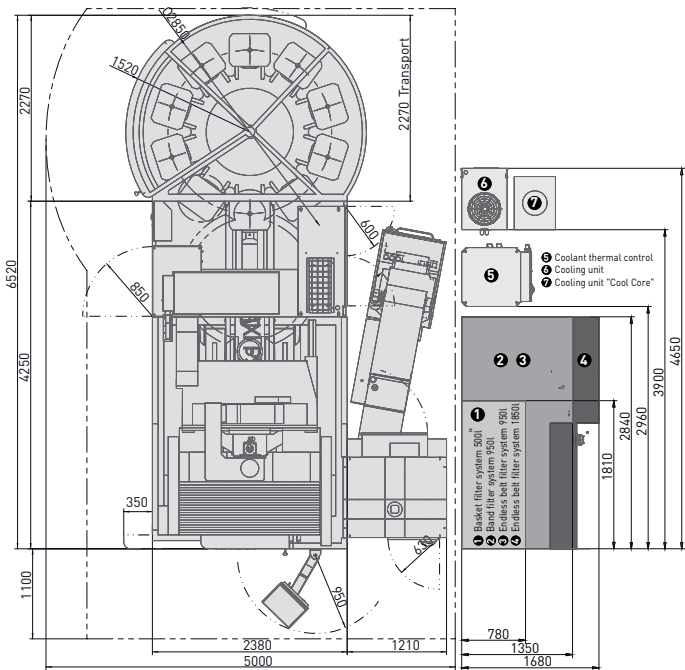
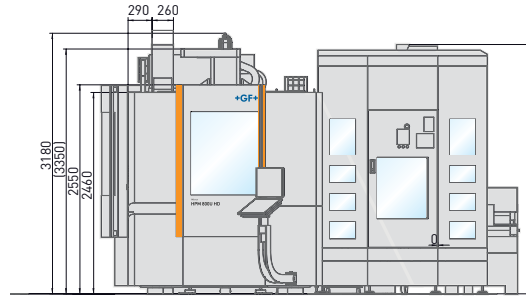
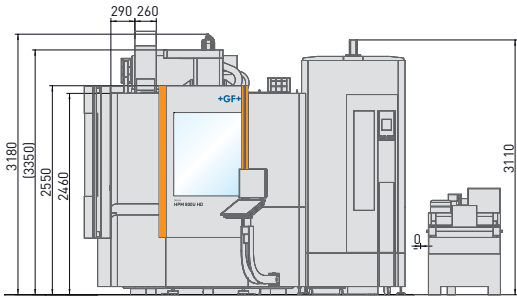


Max. Workpiece



Mikron HPM 600U
Mikron HPM 800U
7-12 pallets
115 - 210 tools

Mikron HPM 600U
Mikron HPM 800U
7-12 pallets
245 tools



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.



Automation

System 3R Automation, Tooling 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 Automation, Tooling and software solutions—simple workpiece pallet and electrode changers and flexible manufacturing and robot handling systems— increase your competitive advantage.



Milling

Mikron high-speed (HSM), high-performance (HPM) and high-efficiency (HEM) Milling centers.

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 Mikron machines. Incorporating the latest and most advanced technologies and premium-performance components, Mikron HSM, HPM and HEM 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, blisks, 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.

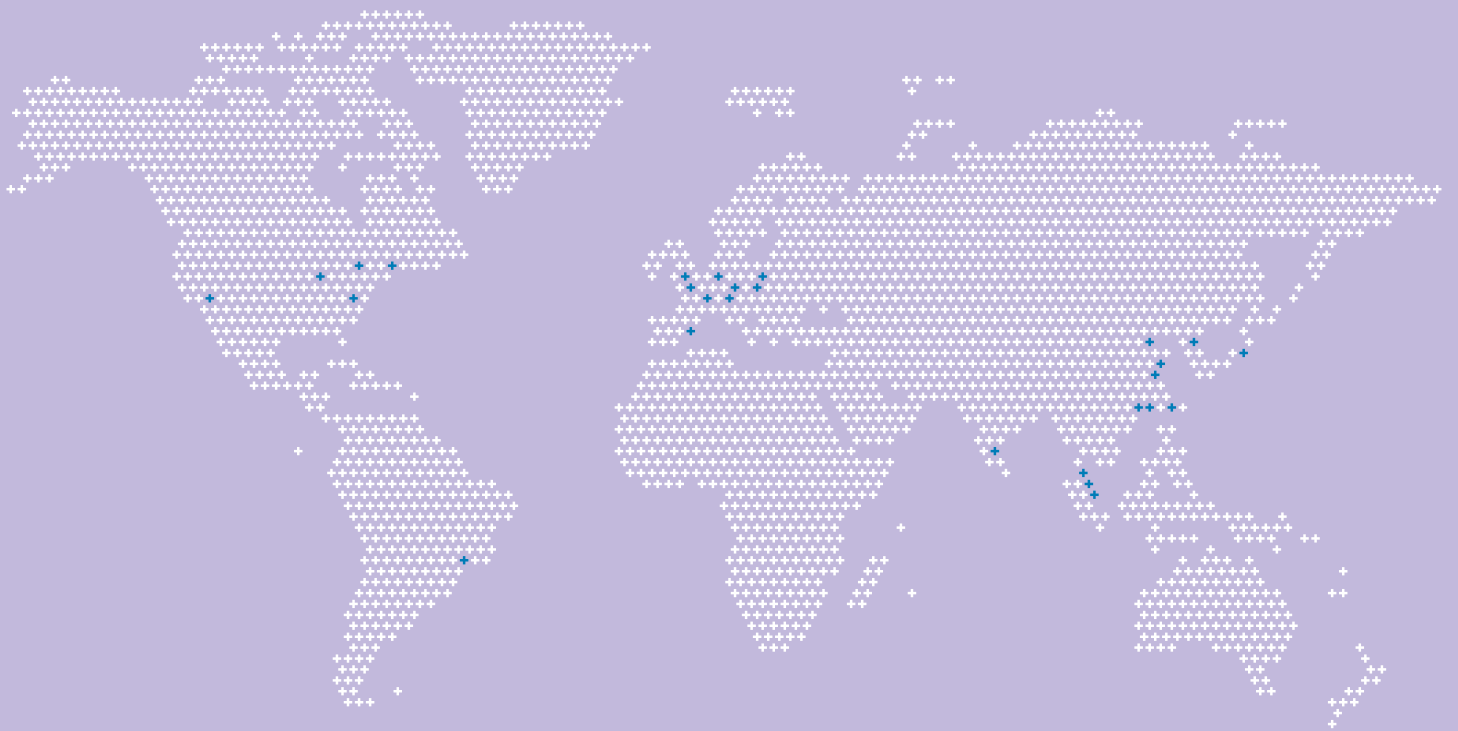
At the heart of every Mikron machining center is high-performance Step-Tec Spindle. Step-Tec Spindles are essential core components of our machining centers. Highly accurate and thermally stable Step-Tec Spindles ensure that our machines can handle everything from heavy-duty roughing to fine-finishing 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, Spindle, Automation and Tooling solutions. A comprehensive package of Customer Services completes our proposition.

www.gfms.com

