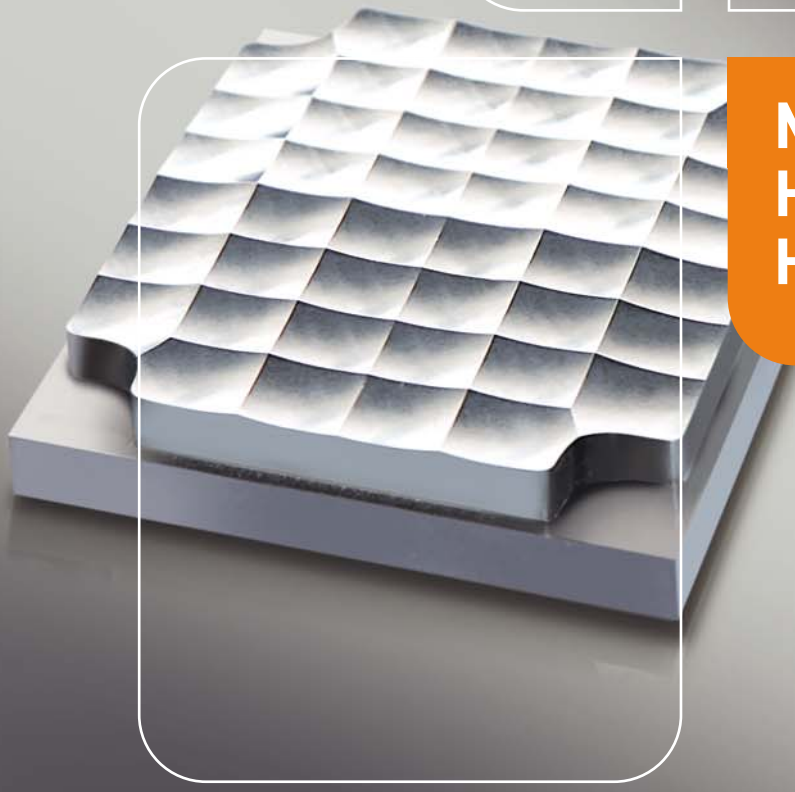


MIKRON
HSM 200 LP
HSM 200U LP

+GF+ AgieCharmilles

Contents

GF AgieCharmilles
The high-speed reference in the 3-axis and 5-axis range.

With the HSM 200(U) LP, the engineers from GF AgieCharmilles have developed an entirely new kind of machine concept.

It puts concentrated power in the smallest possible space.
The HSM 200(U) LP series has been designed for the highest precision and surface quality.

These vertical high-speed machining centers are therefore offered for both tool and mold-making and the production of high-quality parts.
They incorporate the full technical competence of the Swiss machine manufacturer.
GF AgieCharmilles

MIKRON HSM 200 LP / 200U LP

**Concentrated power in the smallest possible space –
Compact and powerful for our customers in production**

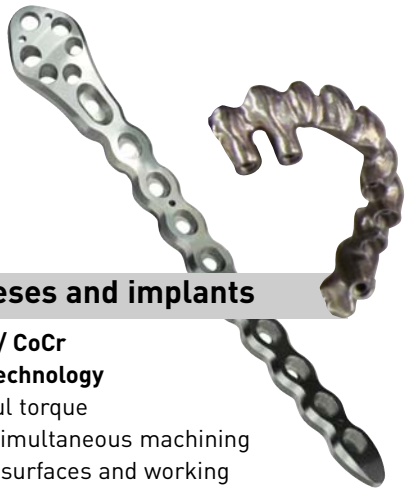
Applications

MIKRON HSM 200 LP
MIKRON HSM 200U LP

Complex parts

Various materials
Watch-making industry / micro mechanics

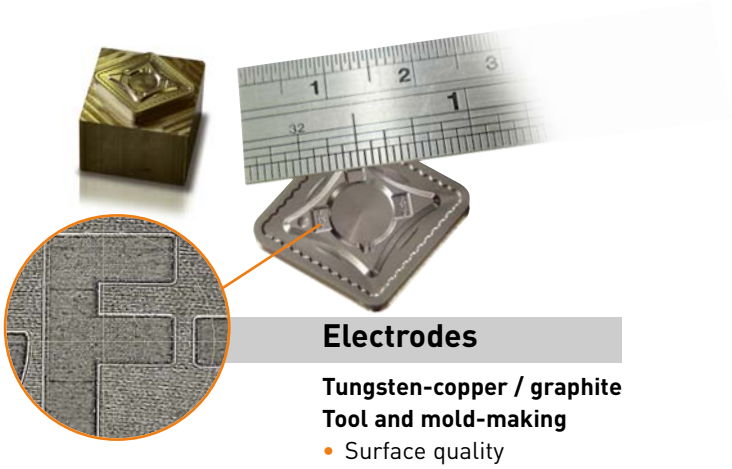
- Form and position accuracy
- Extremely small geometries
- Part-specific handling systems



Prostheses and implants

Titanium / CoCr
Medical technology

- Powerful torque
- 5-axis simultaneous machining
- Perfect surfaces and working accuracy



Electrodes

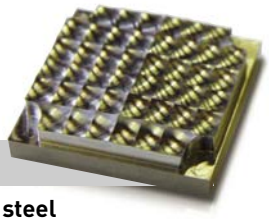
Tungsten-copper / graphite
Tool and mold-making

- Surface quality
- Dimensional accuracy
- Very small geometric features

Fluidics

Aluminum
Automobile industry

- 5-axis simultaneous machining
- Shortest machining time
- Excellent surface quality

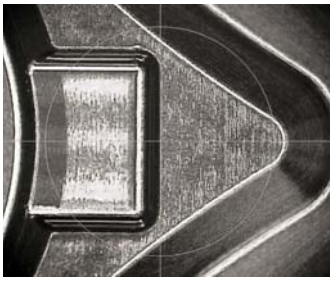


Reflectors

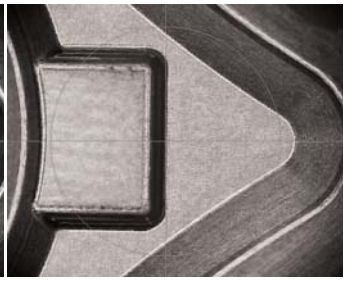
Powder-metallurgical tool steel
Tool and mold-making

- 5-axis machining
- Specular surface quality

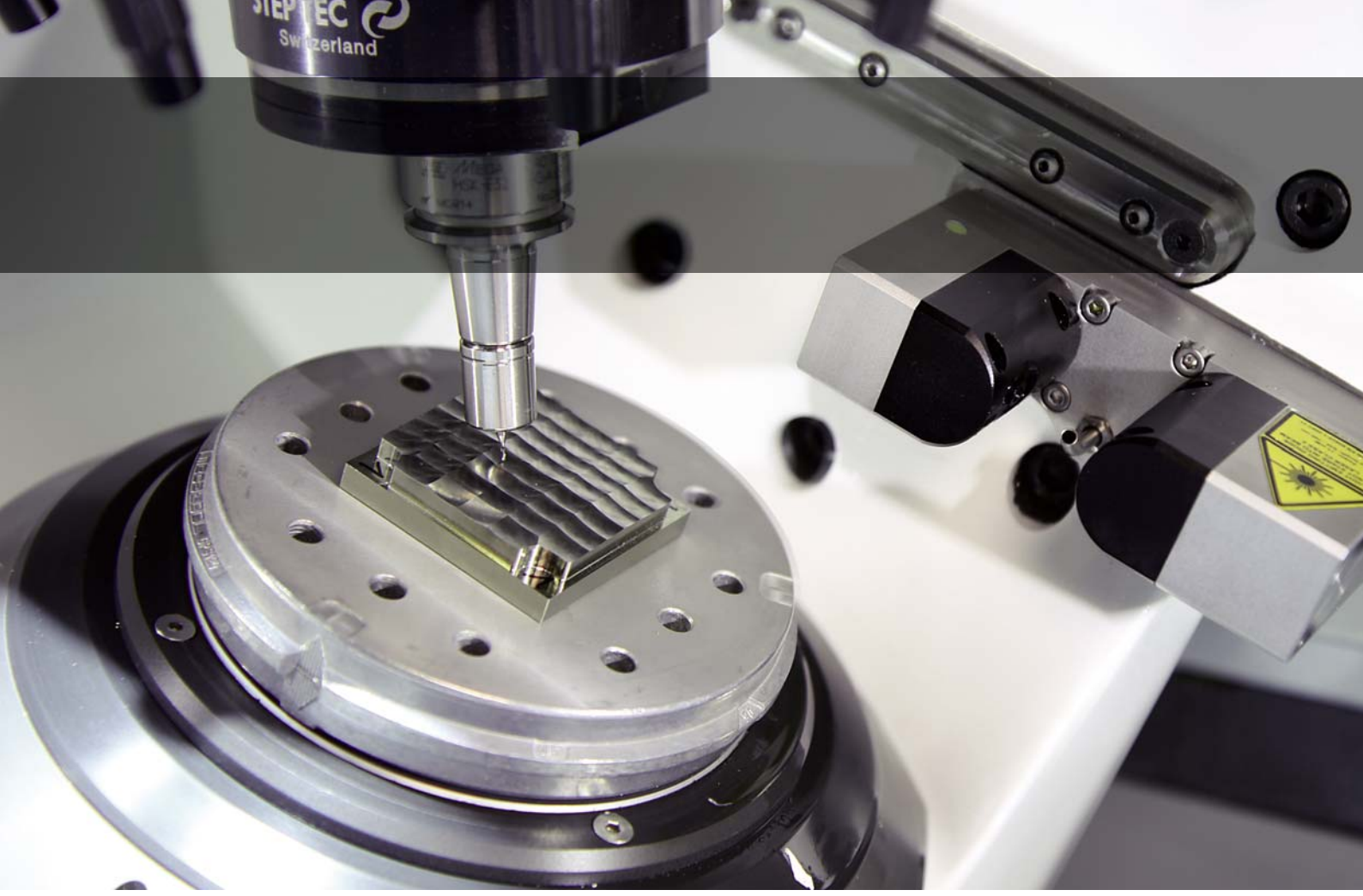
Drive with ball screw

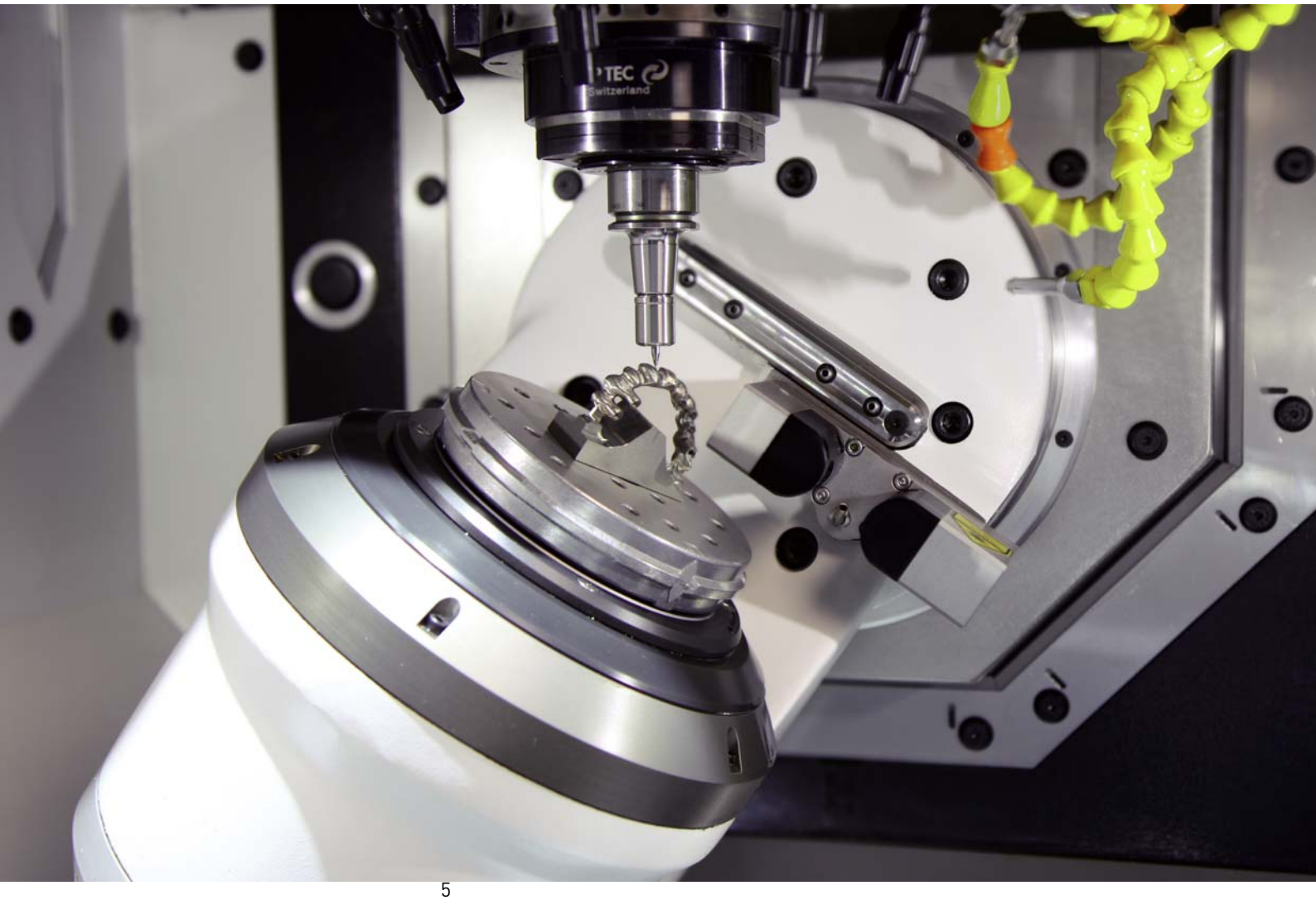


Drive with linear direct motor



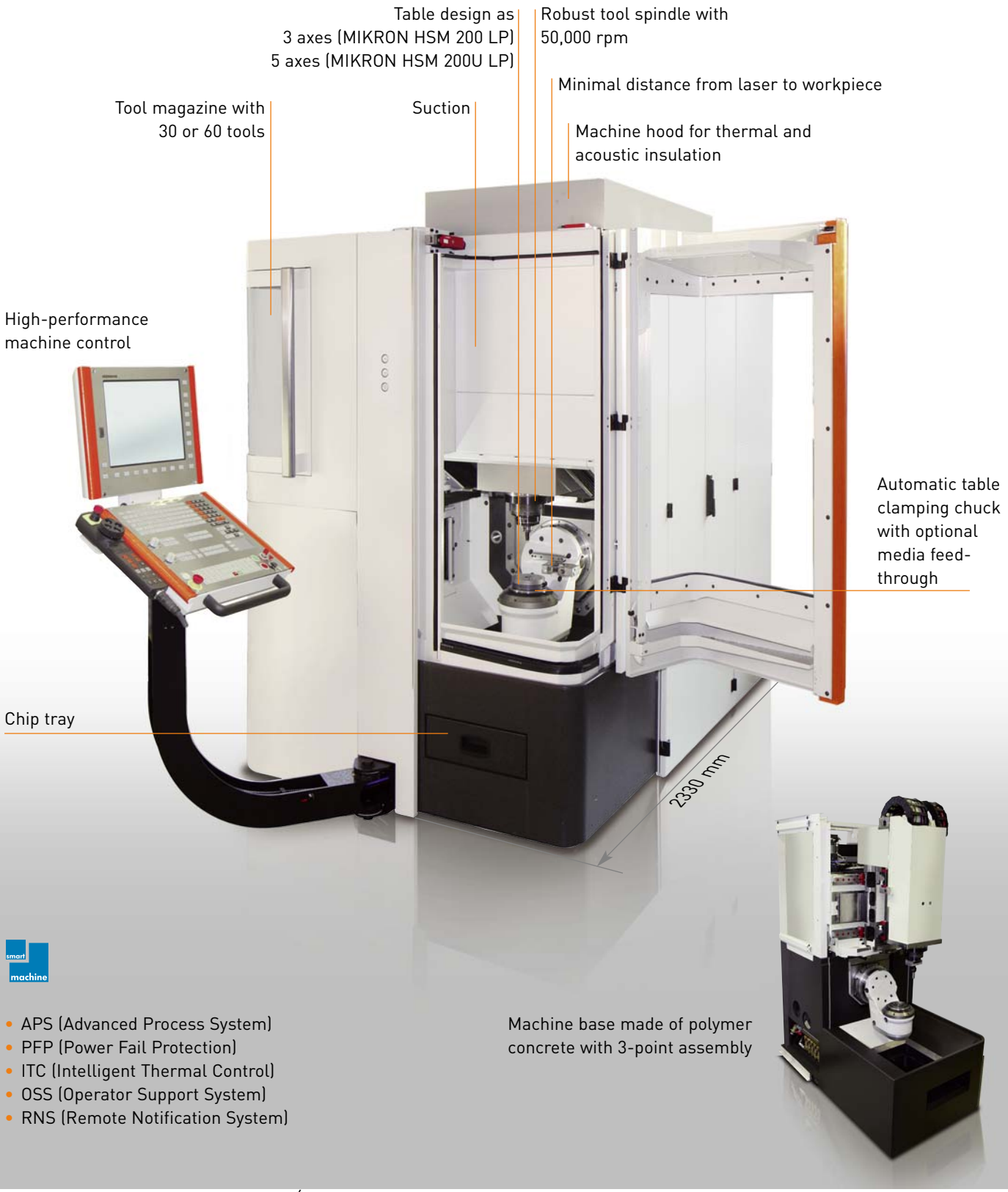
Perfect 5-axis machining without restriction.


Switzerland


Switzerland

Highlights
HSM 200 LP
HSM 200U LP

Precision and quality for tool- and mold-making, as well as exact parts production

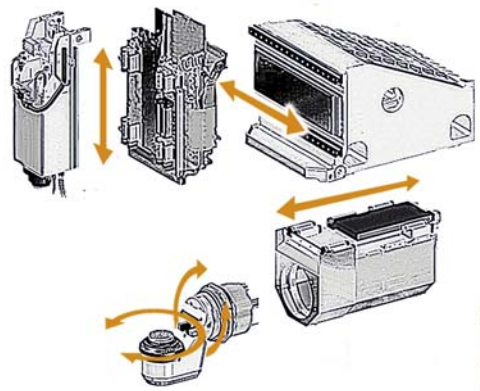


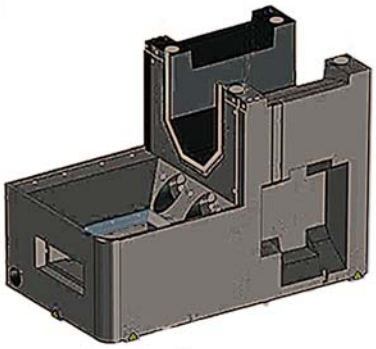
smart machine

- APS (Advanced Process System)
- PFP (Power Fail Protection)
- ITC (Intelligent Thermal Control)
- OSS (Operator Support System)
- RNS (Remote Notification System)

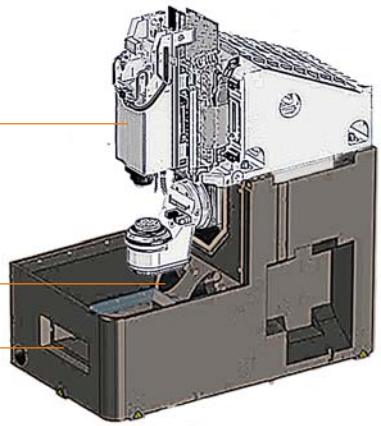
Machine base made of polymer concrete with 3-point assembly

For uncompromising demands
Dynamics and precision brought together in one unit





- Water-cooled direct drives in all axes: X, Y, Z, B, C
- Highly compact and extremely rigid axis assembly made of steel with thermal conductivity and expansion behavior
- All guides above the machining area



- Suction openings for graphite
- Chip drawer

Short power flow, short tolerance chain

With high-speed milling machines, considerable dynamic body forces arise during cutting. The most important prerequisites for very high precision and surface quality are damping and the stability of the machine structure. The revolutionary axis concept of the HSM 200(U) LP therefore consists of the following:

- Polymer concrete machine base with strong damping properties and heavy static weight
- Optimized force application and transmission within a slide construction
- Linear axes with recirculating roller guides 35 mm wide (X, Y, and Z axes)
- High dynamic rigidity of the linear direct drives

Ergonomics

The spacious work area door enables the quick changing of externally equipped workpieces.

Chip management

Machining chips fall into the central chip shaft below the machining table. With low chip volumes, chips are caught in a chip drawer. With high chip volumes, the chips are discharged via an external system together with the cooling lubricant.

Dust management

Machining dust is sucked away centrally below the machining point. Two suction shafts integrated into the machine bed enable a generously proportioned suction cross section.

Table variants

As flexible as required

Fully automatic production of small batches

Avoid unproductive periods during the production of small batches through

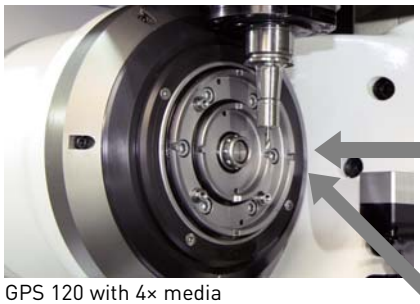
- Automated changing of pallets or pallet-bound, part-specific zero-point clamping systems
- Automated changing of customer-specific individual parts through the employment of part-specific, zero-point clamping systems

A solution for all automation projects

Wide selection of simple or complex pallet designs

- System 3R GPS 70
- System 3R GPS 70 with 3 additional media
- System 3R GPS 70 COCN (central lifting rod for automated collet changes)
- System 3R GPS 120
- System 3R GPS 120 with up to 4 additional media on the pallet surface (can be activated via the M function and the pressure adjusted variably via the cycle, e.g. for System 3R TwistLock)

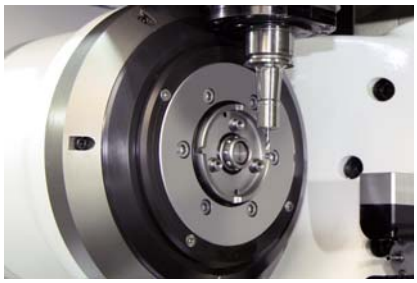
Automatic zero-point clamping system for pallets



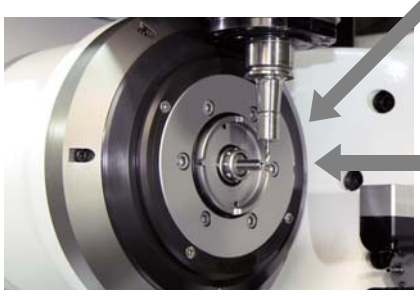
GPS 120 with 4× media

GPS 120

GPS 70



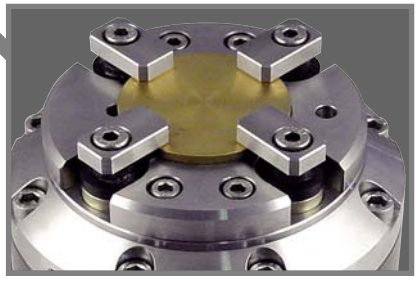
GPS 70 with 3× media



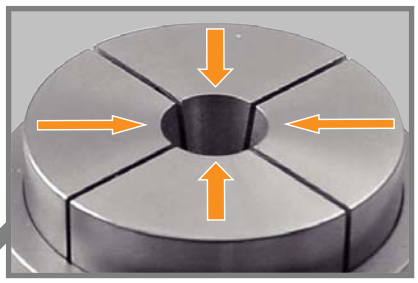
GPS 70 with COCN

Options for automatic zero-point clamping systems for customized parts

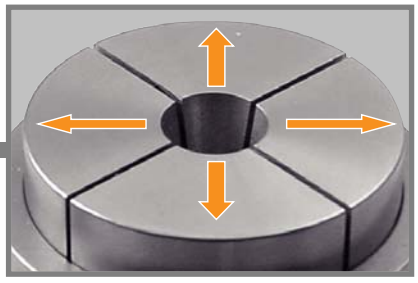
System 3R TwistLock



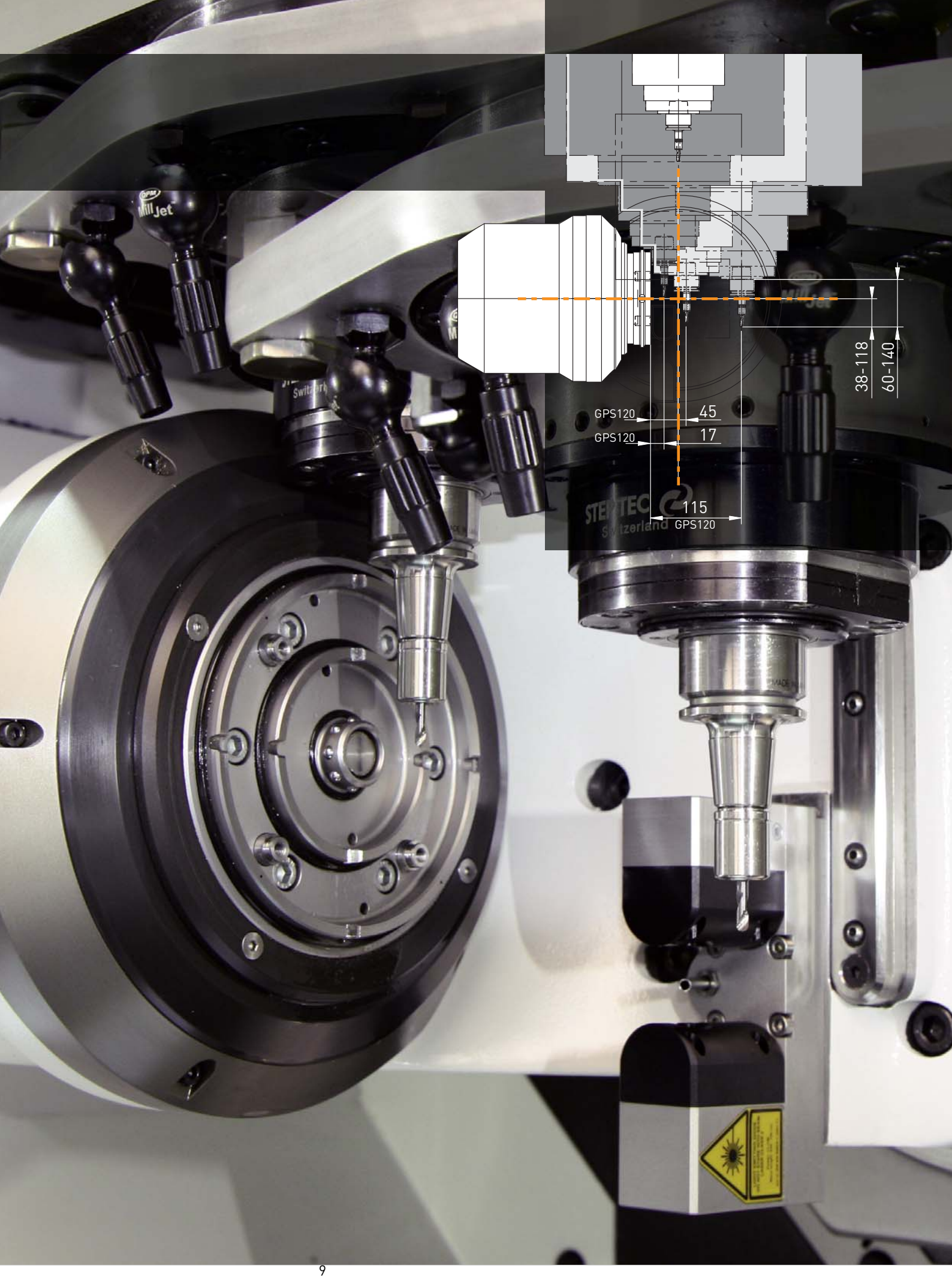
Watch plates



Automatically changeable collets



Automatically changeable expanding mandrel


38-118
60-140
GPS120
45
GPS120
17
115
GPS120

Precision

Core components: Static and dynamic precision

Static precision

Swiss thoroughness

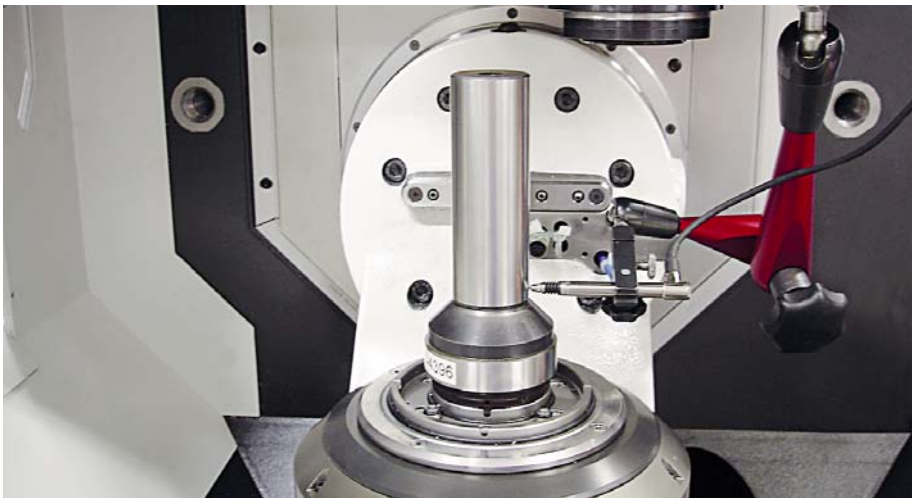
Prior to delivery, each MIKRON HSM LP machine undergoes a comprehensive quality inspection in our air-conditioned assembly hall according to GF Agie Charmilles acceptance guidelines.

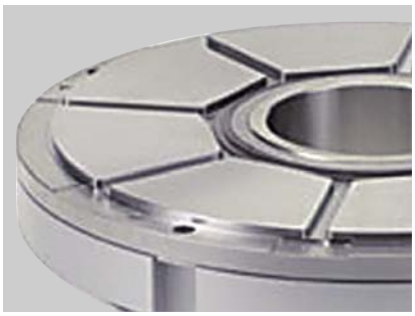
Dynamic precision

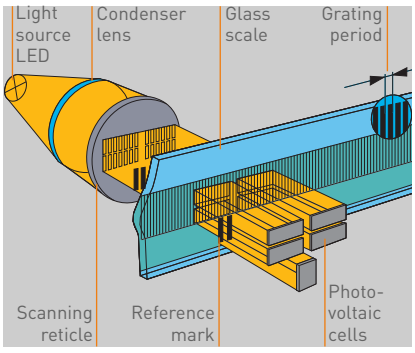
Position sensor systems

All MIKRON HSM 200(U) LP machines are equipped with direct position sensor systems in the linear and rotary axes as standard.

- Resolution in the nanometer range
- Protected by sealing air







Precision

Core components:
Thermal precision and component precision

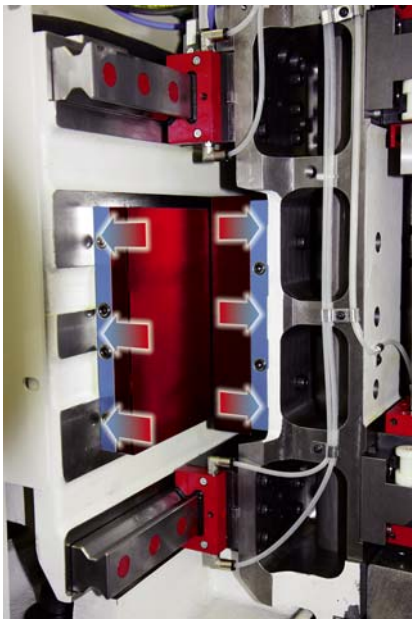
Thermal precision

Cooling concept and reserve capacity

The MIKRON HSM 200(U) LP range leads precision machining into a new era. Sophisticated cooling management for heat discharge of the electrical drive groups.
All linear axes and the circular-swivel unit feature a separate cooling circuit.

Five separate cooing circuits for the motors of the drives in the X, Y, Z, B/C axes, and the spindle motor.

Primary and secondary part mounted on a large cooling plate.

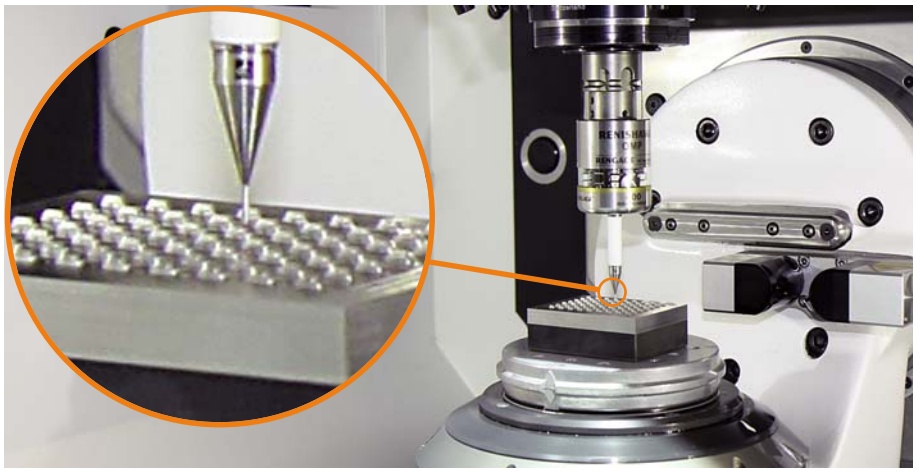


Component precision

Micro machining made easy

The workpiece and tool measuring systems are especially suited for micro machining.

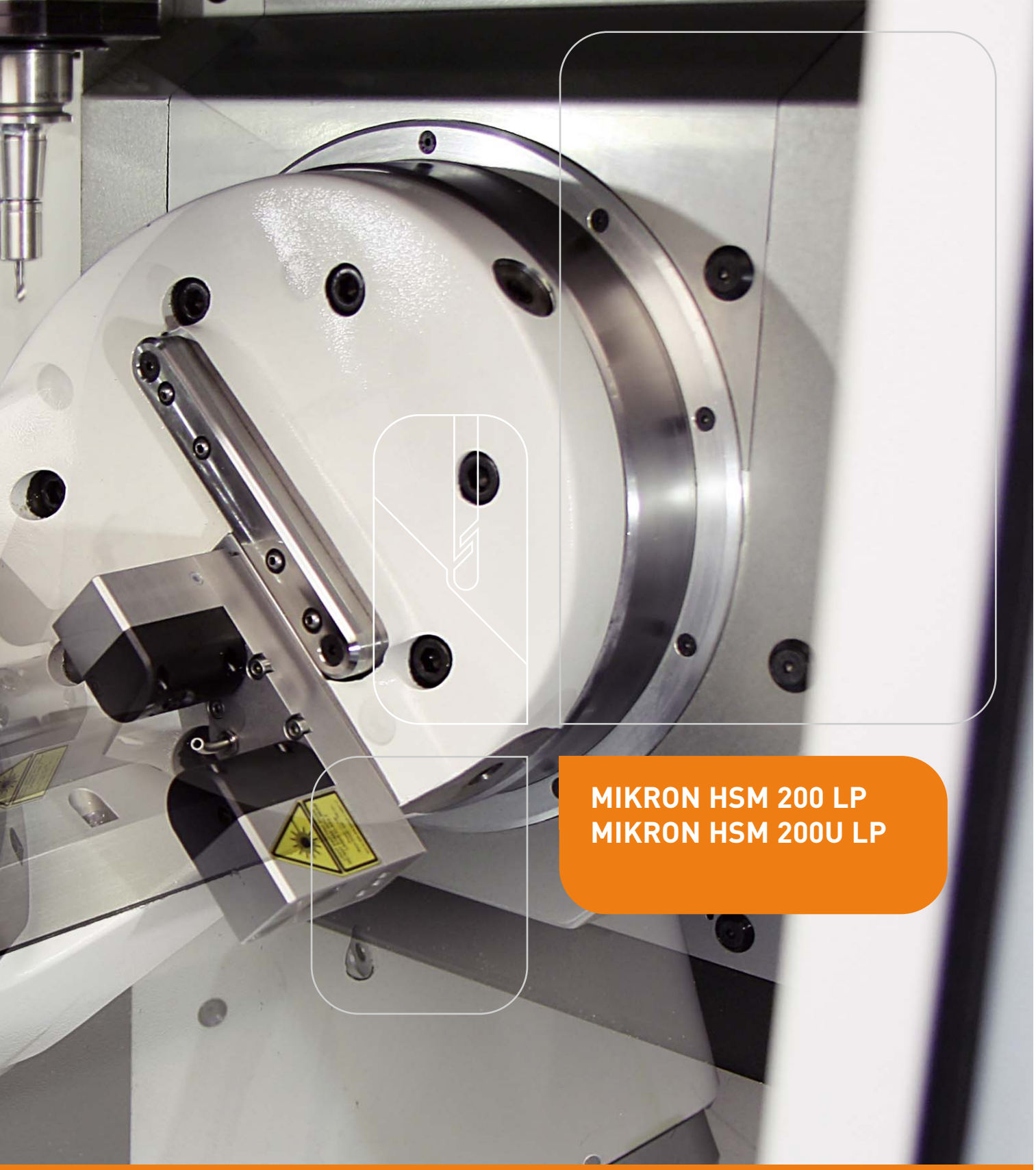
- Low tactile forces allow for damage-free and highly precise measurement of geometric features
- Precision laser optics for highly precise measurement of very small tool diameters



Low tactile forces and high temperature stability – 0.8 N of tactile force in the Z direction on thermo lock interface (hexagon / m&h)

Precise measurement of very small tool diameters from 25 µm to 20 mm

Achieve more...



MIKRON HSM 200 LP
MIKRON HSM 200U LP

+GF+ AgieCharmilles

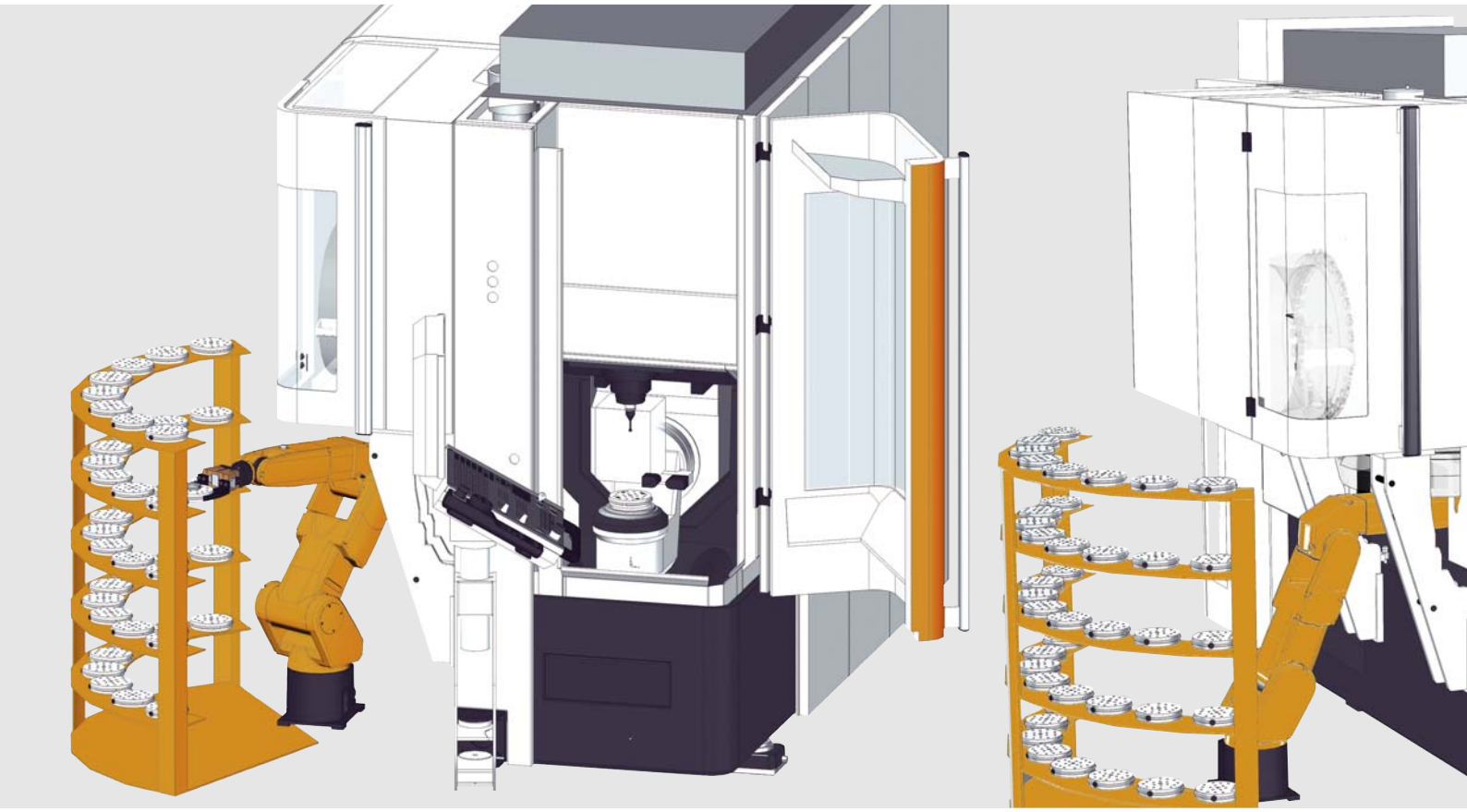
Automation Interfaces

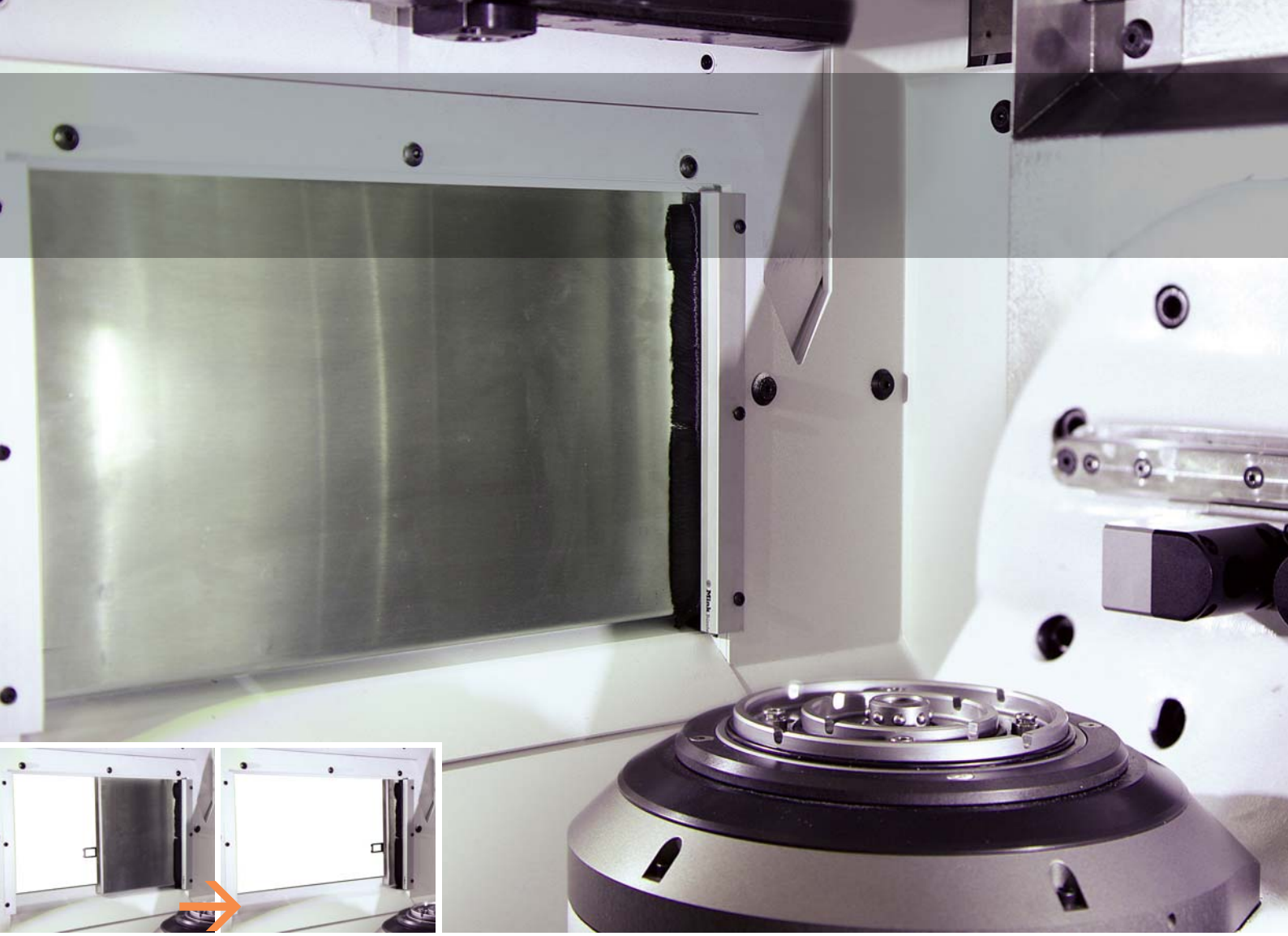
Customer-specific solutions – More parts in less time at lower costs

Thanks to a standardized robot interface, the MIKRON HSM 200(U) LP can be operated with a robotic articulated arm system.

Frontal accessibility remains guaranteed.

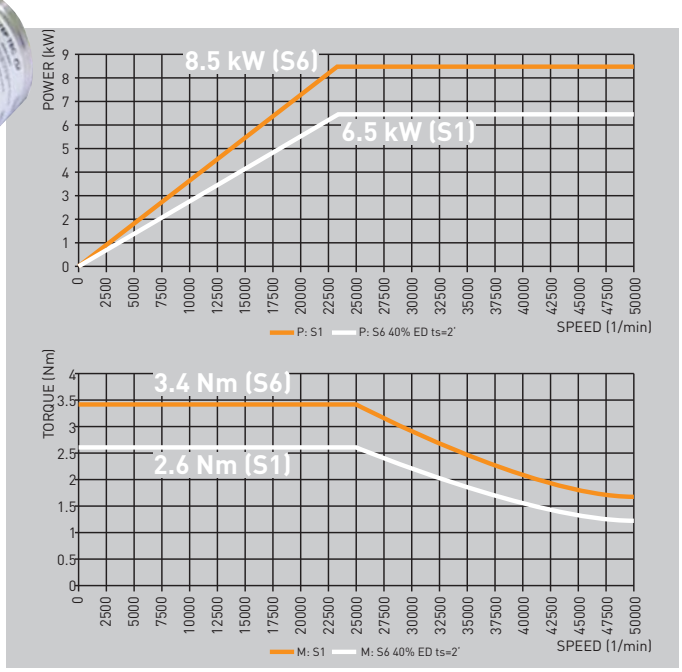
Loading and unloading is performed through automated side doors.





High-tech HSC spindle

	50,000 rpm HSK-E32
HSM 200 LP	•
HSM 200U LP	•

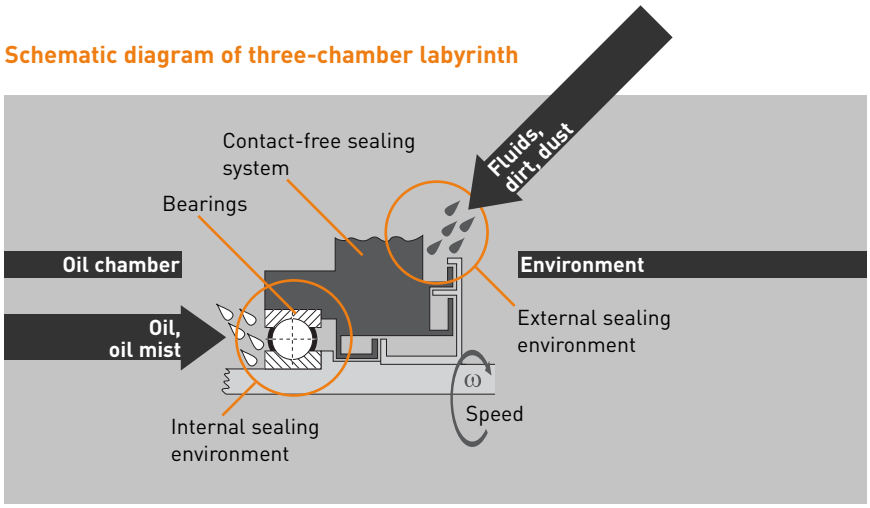


Tool spindles for demanding machining

With a MIKRON HSM 200(U) LP machine you get the latest tool spindle technology.

- 50,000 rpm HSK E-32
- High torque up to 20,000 rpm
- Low spindle heating increases working accuracy
- Highly stable double-ceramic hybrid bearings in an "O" configuration for very high radial capacity and rigidity during machining
- Contact-free 3-chamber labyrinth seal for optimum sealing of the spindle nose
- Vector control for full torque in the lower speed range
- Oil/air lubrication system with extraction of the consumed oil
- Very short acceleration time – 2 seconds from 0 to 50,000 rpm
- Thread cutting without compensating chuck in steel up to M6 (CK45)

Schematic diagram of three-chamber labyrinth



STEP TEC

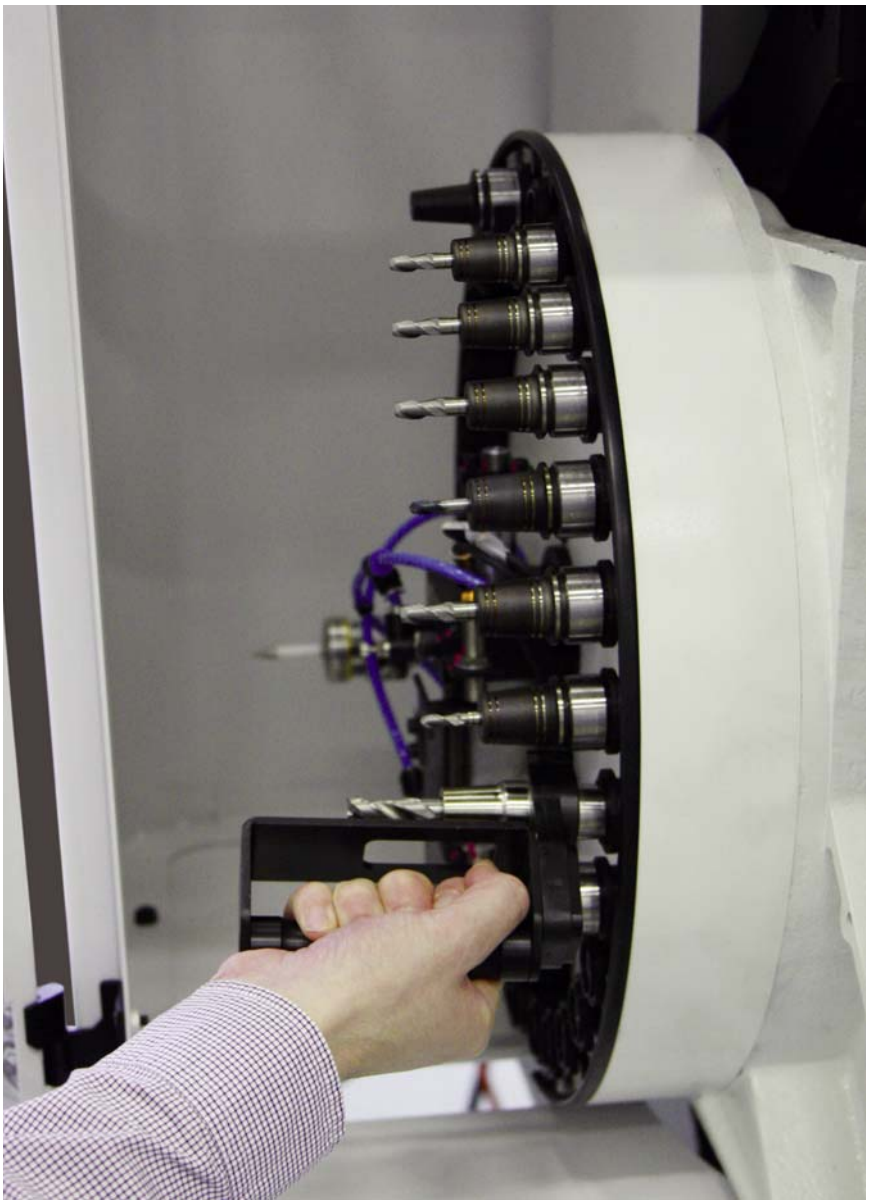
Since 1995, Step-Tec has been developing, producing, selling, and repairing precise, high-performance spindles for leading manufacturers of machining centers for milling and drilling applications.

smart machine

Supplied in the package is the APS (Advanced Processing System) smart machine module for the reliable recording and display of vibrations during the milling process.

Tool magazine

Tailored to your needs



Tool storage in many configurations

- Disk magazine with 30 or 60 tool positions
- Reliable and extremely quick double-gripper change system
- Chip-to-chip in 4.4 seconds
- Secure orientation of the measuring sensor through a firmly assigned magazine space

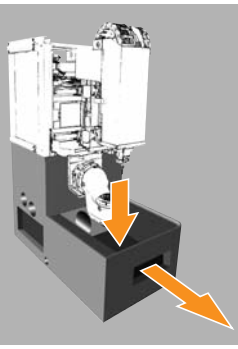
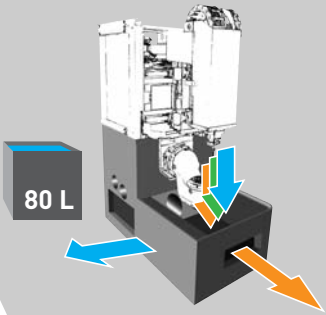
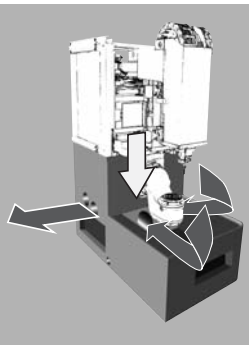
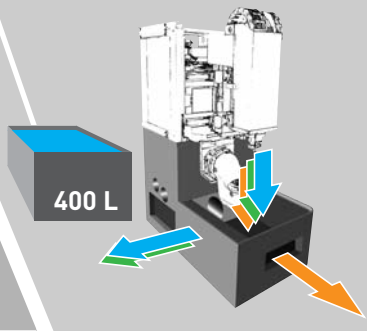
Productivity and process safety

- User-friendly tool feeding
- Simple feed monitoring through a large glass panel
- Secure access even during full automation
- Feeding during machining possible

Double-gripper change system

Chip and dust management

Customer requirements | **Configuration**

Cutting lubricant (Combination)	Autonomous chip volume	Chip management	Functional diagram
• Minimal quantity lubrication (MQL) • Air blow off external / dry	Small	• Chip drawer with closed bottom part	
• Emulsion	Small	• Coolant tank 80 l • Chip drawer with water-permeable bottom part and integrated fine filter	
• Dust extraction	Large	• Dust extraction with a suction performance of 1,900 m³ / h • Chip drawer with closed top layer	
• Emulsion	Large	• Band filter unit 400 l with chip container • Chip drawer with opened bottom part	
• Minimal quantity lubrication (MQL) • Air blow off external / dry	Small	• Chip drawer with closed bottom part	
			

Supply air | Chips with emulsion | Chips | Air with dust | Emulsion

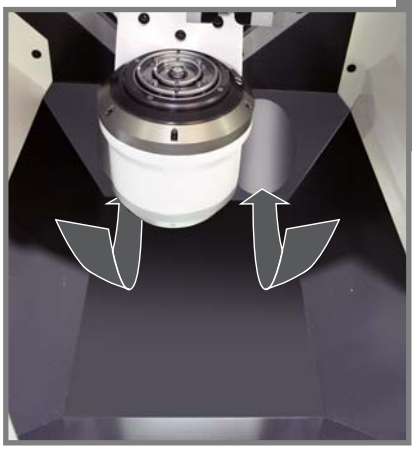
Chips, graphite, emulsion
Always a solution!

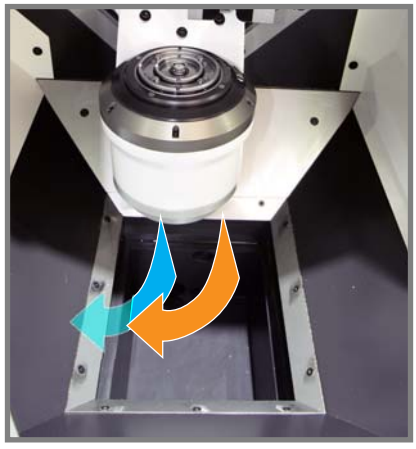
Supply air for dust extraction

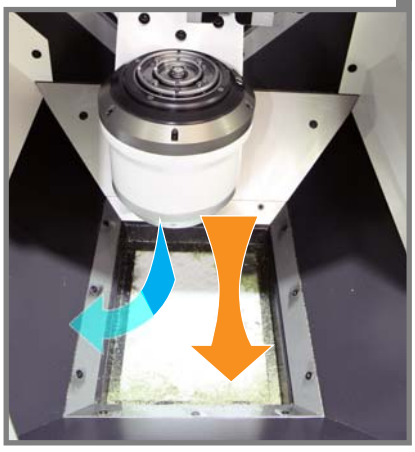
Chip drawer with water-permeable bottom part and integrated fine filter

Drawer with opened bottom part for emulsion operation with large chip volume

Suction openings for dust







Options

Tailor-made equipment

External coolant supply via two nozzles

Spray ring with up to nine individually adjustable nozzles

Coolant tank 80 l

Rotating window

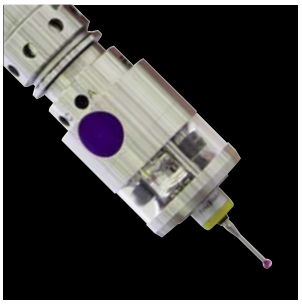
Mist extraction

Dust extraction

Air blow on C-axis positioned over laser system

Heidenhain iTNC530 HSCI FS

Automation interface



Touch probe m&h 40.40 LF/TI

Touch probe Renishaw OMP400

smart machine (www.gfac.com)

Further options:

- Beacon
- Air blow off external (on the spindle slide)

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.

Protection

Precision

Productivity

The smart machine is constantly being further developed.

The currently available modules can be found at **www.gfac.com**

About GF AgieCharmilles

Milling

High-Speed and High-Performance Milling Centers

In terms of cutting speed, HSM centers are 10 times faster than conventional milling machines. Greater accuracy and a better surface finish are also achieved. This means that even tempered materials can be machined to a condition where they are largely ready to use. One essential advantage of HSM is that with systematic integration, the process chain can be significantly shortened. HSM has developed alongside EDM into one of the key technologies in mold and tool making.

EDM

Electric Discharge Machines

EDM can be used to machine conductive materials of any hardness (for example steel or titanium) to an accuracy of up to one-thousandth of a millimeter with no mechanical action. By virtue of these properties, EDM is one of the key technologies in mold and tool making. There are two distinct processes – wire-cutting EDM and die-sinking EDM.

Laser

Laser ablation

Laser ablation supplements and extends the technologies offered by GF AgieCharmilles. With our laser technology we enable you to produce texturizing, engraving, microstructuring, marking and labeling of 2D geometries right through to complex 3D geometries. Laser ablation, compared to conventional surface treatment using manual etching processes, offers economic, ecological and design advantages.

Customer Services

Operations, Machine and Business Support

Customer Services provides with three levels of support all kind of services for GF AgieCharmilles machines.
Operations Support offers the complete range of original wear parts and certified consumables including wires, filters, electrodes, resin and many other materials.
Machine Support contains all services connected with spare parts, technical support and preventive services.
Business Support offers business solutions tailored to the customer's specific needs.

Automation

Tooling, Automation, Software

Tooling for fixing workpieces and tools; automation systems and system software for configuring machine tools and recording and exchanging data with the various system components.

259 805 482

Contact

www.gfac.com

© Agie Charmilles SA, 2012
The technical data and illustrations are not binding.
They are not warranted characteristics and are subject to change.

+GF+ AgieCharmilles

Achieve more...