

**Mikron**

# **HPM 600 HD**

# **HPM 1200 HD**



# Swiss design and quality

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## GF Machining Solutions

### Mikron HPM 600 HD and Mikron HPM 1200 HD - For efficient High Performance Milling

The three-axes machining centres Mikron HPM 600 HD and 1200 HD of the company GF Machining Solutions are extremely well suited for machining in the HPM (High Performance Cutting) area.

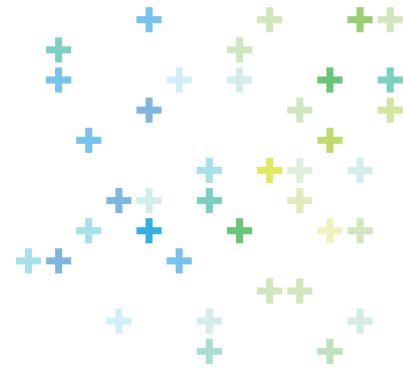
With modular design and rigid and robust construction, these machining centres are designed for every single application area: ranging from prototype production to tool

and mould making and right up to fully automated production; this is due to the large number of options and their combinability.

A choice of several automation options is available, as well as various swarf removal and coolant processing systems, and high-performance tool spindles. All machine components are logically synchronized with each other and enable very efficient machine use around the clock.

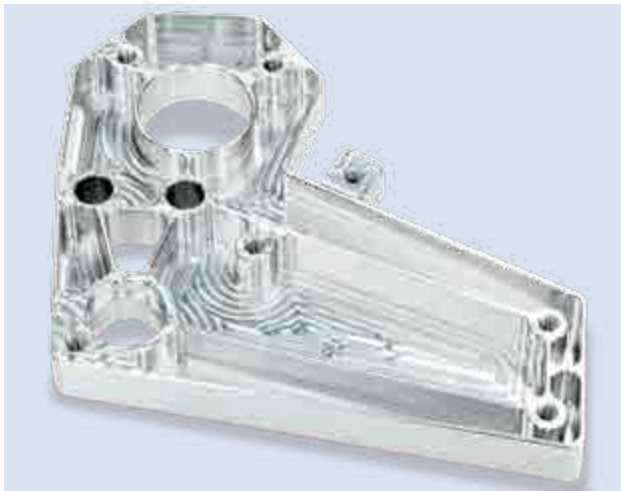
## Applications

# Wide range of parts - many application areas



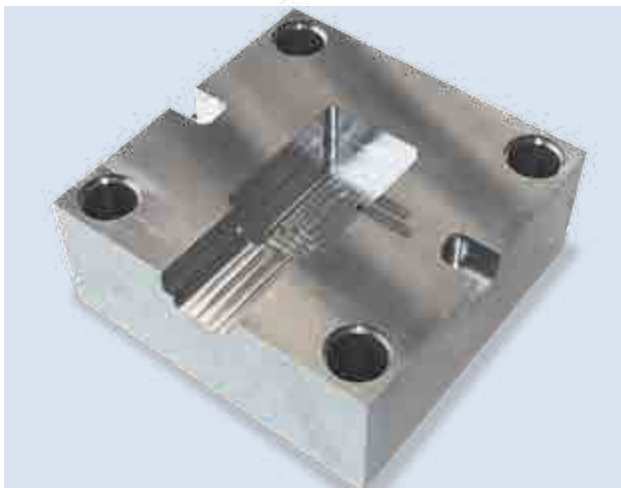
### Forging die for crankshaft

- Alloyed tool steel
- Automotive industry
- + Difficult to cut material
- + Heavy workpieces
- + Contouring accuracy
- + High machine stability
- + High spindle performance



### Light alloy component

- Aluminum
- Aircraft industry
- + Large chip volume
- + High spindle performance
- + High spindle speed
- + Shape and position accuracy
- + Reproducibility



### Precision mold making part

- Alloy steel
- Plastics industry
- + High material removal rate
- + Workpiece accuracy
- + High surface quality
- + High positioning accuracy
- + Short processing time
- + High spindle performance
- + Reproducibility

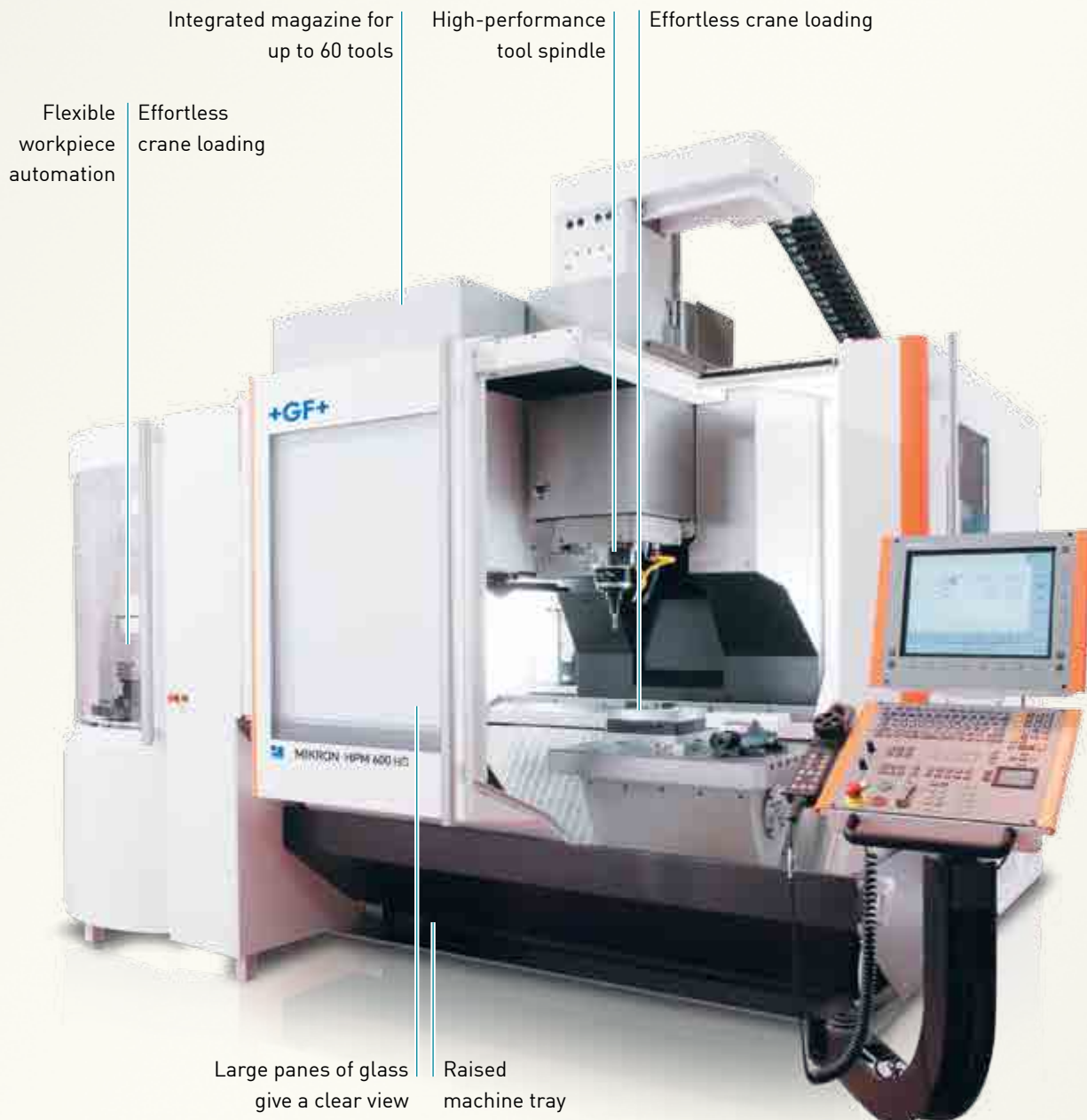


The stable and robust construction of the Mikron HPM 600 HD and HPC 1200 HD enables unlimited HPC machining (High Performance Cutting). Due to the tremendous spindle performance, a high material removal rate is guaranteed.



## Highlights

# The Mikron HPM 600 HD and HPM 1200 HD can be turned optimally to the customer's requirements



The outstanding feature of Mikron machining centers is their exceptional ergonomics. What is impressive about the HPM HD series is its unrivalled accessibility, which is not dependent on the machine's configuration.



### **Stable, robust, powerful**

The polymer concrete cube-shaped machine base of the Mikron HPM 600 HD and HPM 1200 HD is designed for high-performance and precision. Two linear movements are carried out with the tool and one with the workpiece. The optimally dimensioned two-axis unit on the machine base ensures high geometry precision and stability. The one-piece polymer base is the first prerequisite for high surface quality and low tool wear.

- + No special foundation required, ready for use immediately
- + Solid construction and high rigidity
- + Raised machine tray for complete leak tightness



Different modules of the smart machine modular design guarantee an optimum process: more precision, increased surface quality and contouring accuracy as well as improved safety, which is especially appreciated for unmanned machining.



### **Ergonomics**

The two light, waist-high doors that close above the corner, can be opened at a distance by the operator and enable free access to the working area. Large panes of glass give a clear view of the machining process.

Regardless of which options the Mikron HPM 600 HD and HPM 1200 HD are equipped with, perfect accessibility can always be taken for granted. The work table, pallet and tool magazine, as well as the swarf removal system can be reached just as easily as the maintenance units.

The work table and pallet magazine can of course be loaded using the crane.

### **Heidenhain digital control system**

The latest generation Heidenhain iTNC 530 digital control system and a clearly structured operating panel make the Mikron HPM 600 HD and HPM 1200 HD a reliable and user-friendly machining center:

- + Process reliability including quick installation and secure operation of predefined operating cycles
- + Ethernet connection for fast CAM data flow
- + Simple dialog-controlled programming
- + Parallel programming, free contour programming, freely definable subprogramming



## Automation

# Automatic workpiece change unit enables unmanned production

### The pallet changer shows its superiority

Automatic production is ensured by the cost-effective integration of the pallet changer on the three-axis Mikron HPM HD series. Retrofitted with the modular tool changer, the compact milling center becomes a highly productive and flexible manufacturing cell.

- + Repetitive machining is executed without interruption in multi-shift operation.
- + The machine's efficiency is increased with subsequent higher profit
- + The pallet magazine can be loaded during operation, and easily be operated using the CNC control.

The average daily operation time of the machine is increased through use of the pallet changer. Flexibility increases considerably, since special parts can be clamped and prepared at the same time as continuous series production.

Automated machines tend to be operated 24 hours per day, even when only one shift is worked in production. Compared to a machine without an automated pallet magazine, this essentially enables a longer operating period per day.



We recommend: RNS (Remote Notification System). These and other smart machine modules ensure still more flexibility and process reliability in the production of high-quality components.

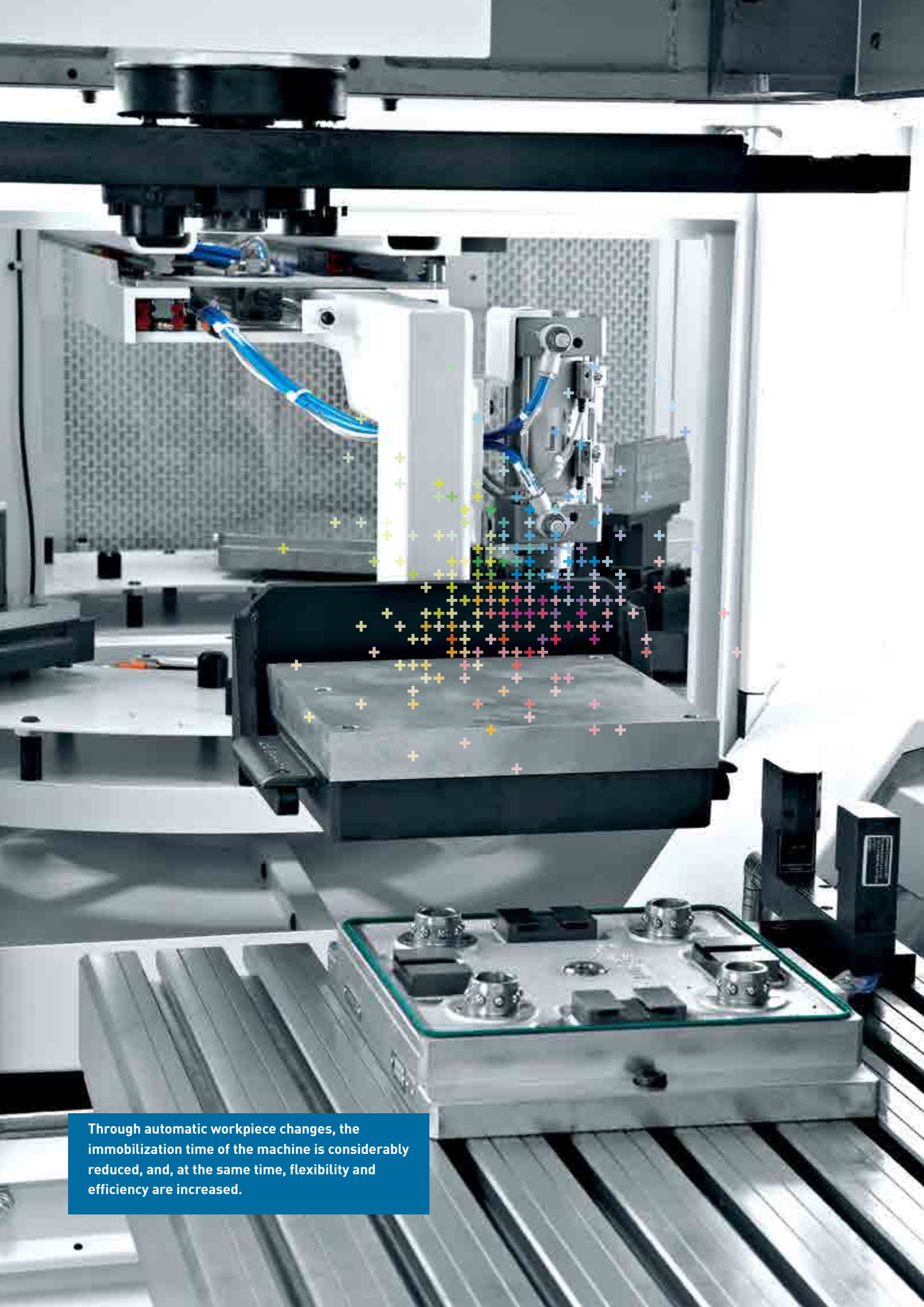


Mikron  
HPM 600 HD  
with magazine  
for 7 or 8 pallets.

Magazine for 4 large pallets







Through automatic workpiece changes, the immobilization time of the machine is considerably reduced, and, at the same time, flexibility and efficiency are increased.

# 3-axis machining at its best



## Work table with T-slots

On the Mikron HPM 600 HD and HPM 1200 HD there is an ideal division of torque between the workpiece and the tool. Simple loading and set-up of workpieces is ensured.

The heavily ribbed cast iron work table offers robust and universal clamping solutions. The axial (axially parallel to X) arranged T-slots enable diverse workpieces to be mounted.

The generously sized table enables an additional workpiece to be manually loaded in addition to the automatically changed pallet.

## Clamping systems for the slot table:

System 3R Dynafix	280 x 280 mm / 350 x 350 mm
Erowa UPC	320 x 320 mm
System 3R GPS	240 x 240 mm / 300 x 300 mm

## Work table with integrated clamping system:

Palette	600 x 600 mm / 800 x 600 mm
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## Dividing head

The optional dividing head performs rotary movements. This 4th axis can be rotated in both directions.

## Chip management

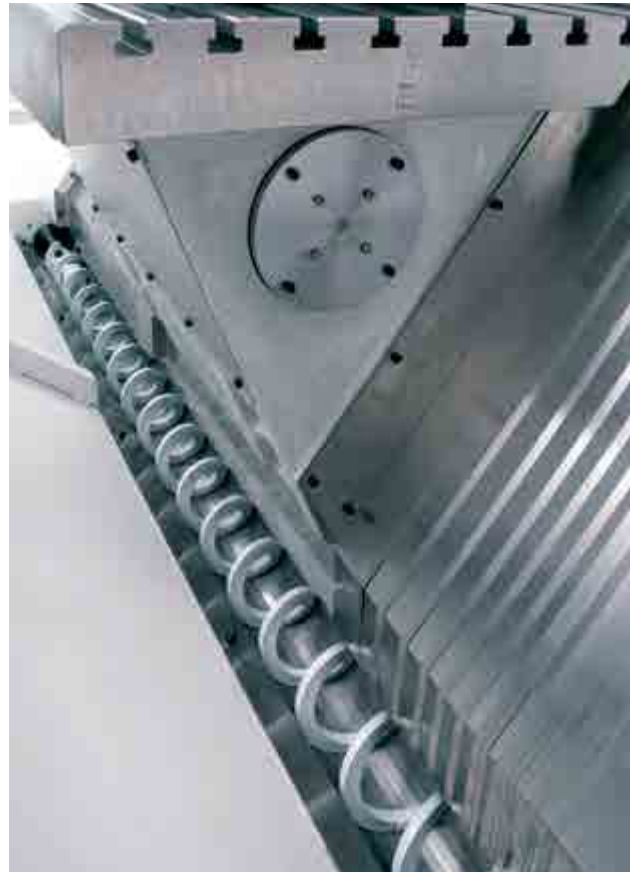
# Versatile solutions for many different sorts of applications

The accumulation of chips in the working area can consistently be avoided. With sophisticated detailed engineering of the raised machine tray, chip build-ups are avoided and the accrued chips are reliably and economically separated from the cooling lubricant and disposed of.

There are various construction variations available for this.

- + Chip chute for dry processing and manual chip removal
- + Spiral chip conveyor
- + Reservoir with 2 chip drawers
- + Lift-up chip conveyor for unmanned production
- + Oil separator
- + Various belt filter units
- + Internal and external cooling lubricant supply
- + Washing device

A reliable spiral chip conveyor combined with a lift-up chip conveyor takes care of automatic swarf removal, in automated mode amongst others.



### Cooling lubricant container with 2 chip baskets

The accrued chips are removed from the machine and conveyed into the chip baskets. The cooling lubricant runs through the basket into the cooling lubricant container. The filled basket is pushed up onto a slope, so that all the cooling lubricant can drain. At the same time, the second basket is laid under the chip ejection again.

In the container, the cooling lubricant is passed through sieves to separate it from further chips and is then pumped from the container through a filtering sieve to the belt filter unit or directly back to the cooling lubricant nozzles of the tool spindle. The cooling lubricant container stands on rollers and can be removed without being dismantled.





High-tech spindles

# Tool spindles for demanding machining

Whichever machine configuration you choose, with a Mikron HPM 600 HD and HPM 1200 HD you get the most up-to-date 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 inline 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.



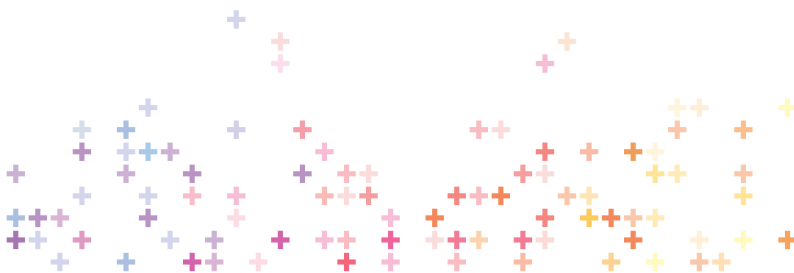
**15'000 rpm  
or 20'000 rpm**

- + Precise high performance for use in the HPC field
- + Available with or without internal coolant supply
- + ISO-40 spindle taper (15,000 rpm)
- + HSK-A63 spindle taper (20,000 rpm)
- + Spindle module and motor replaceable separately



The scope of supply includes:

Mikron Smart Machine APS (Advanced Processing System) module for reliable measuring and display of milling vibrations, and ITC (Intelligent Thermal Control) for higher workpiece precision.



## Tool magazine

# Compact storage for tools

The HPM HD series also wants for nothing with regard to tool quantities. The customer can choose between the two solutions integrated into the machine for either 30 or 60 tools.

The side-mounted magazines optimally protect the tools from pollution, and can be equipped at the same time.

### **Tool changer with double arm gripper for still shorter non-productive time**

Due to the double arm gripper, short tool change times of 2 seconds can be achieved. The double arm gripper can be used both with the 60-position, and with the 30-position tool magazine.



DT 30 tool magazine  
CT 60 tool magazine





## Options

# Our machines are prepared for a large number of options



Minimum quantity of cooling lubricant



Lift-up chip conveyor



Tool measuring probe system



High performance belt filter unit



Basic belt filter unit



Laser tool measurement



Infrared touch probe



Scratch-resistant viewing glass



Spray gun



Rotating clear screen



Indicating lamp



3+4 operating mode

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

### Further options:

- + Cooling lubricant container with 2 chip baskets
- + Spiral chip conveyor
- + TSC production device
- + Oil separator
- + Mist extraction system
- + Washing device
- + Programmable cooling lubricant nozzles
- + Direct position measuring system
- + Dividing head
- + Tool air blowing unit
- + Ground protection tray
- + Dividing head preparation
- + Increased precision
- + Pallets

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.



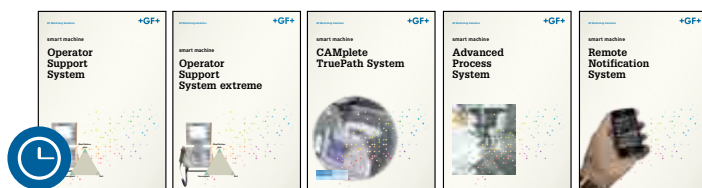
Saving energy



Protection



Precision



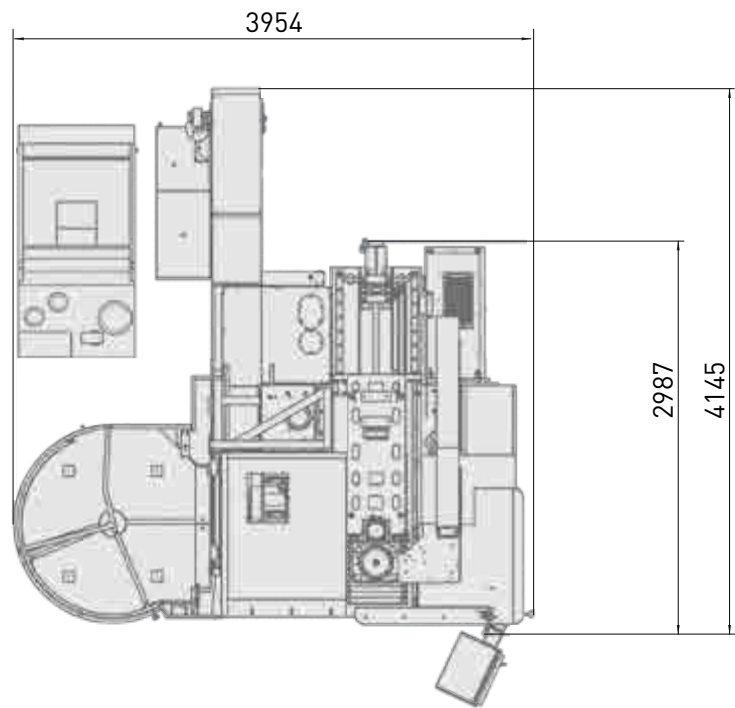
Productivity

The smart machine is constantly being further developed.  
The currently available modules can be found at  
[www.gfms.com](http://www.gfms.com)

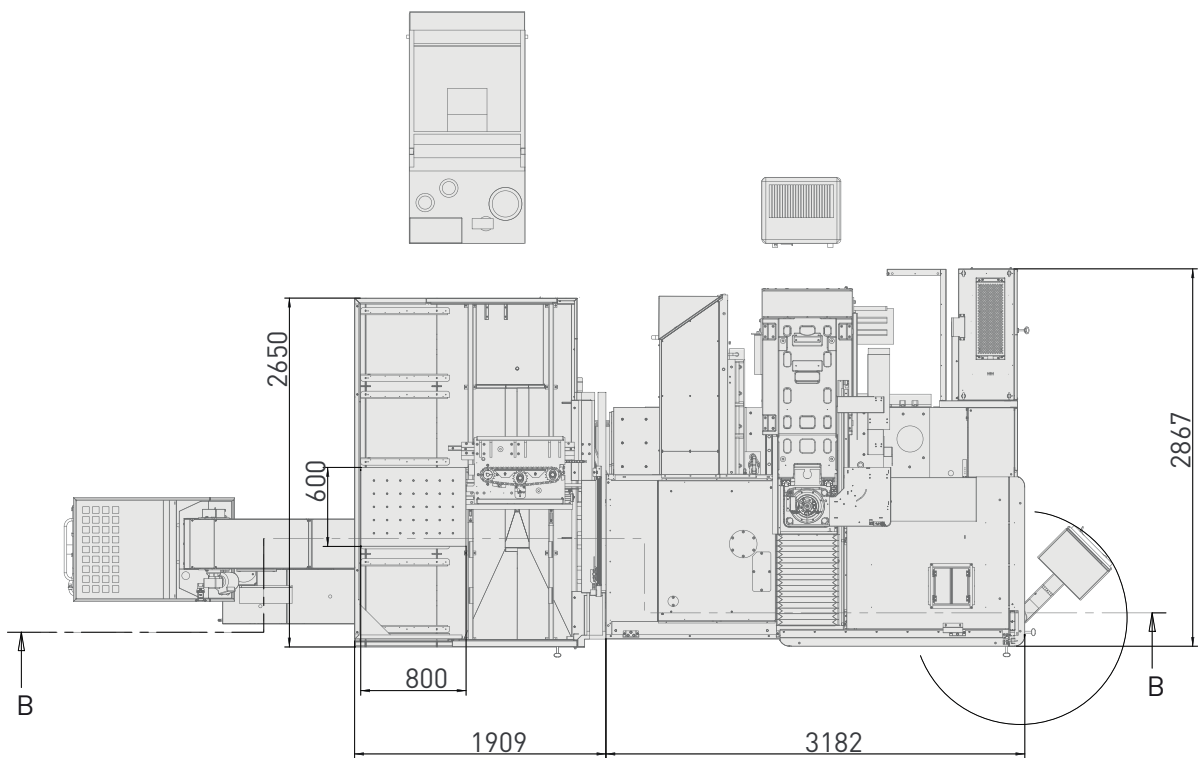
## Technical data



			Mikron HPM 600 HD	Mikron HPM 1200 HD
<b>Workarea</b>				
Longitudinal	X	mm	600	1200
Lateral	Y	mm	600	600
Vertical	Z	mm	500	500
<b>Working spindle (40% ED, S6)</b>				
15'000 rpm	ISO-SK40	kW / Nm	39/84	39/84
20'000 rpm	HSK-A63	kW / Nm	39/84	39/84
<b>Feed rate</b>				
Feed rate / Rapid traverse (X, Y)		m / min	40	40
Feed rate / Rapid traverse (Z)		m / min	30	30
<b>Work table</b>				
Clamping surface		mm	800 x 600	1400 x 600
Max table load		kg	500	1200
<b>Tool magazine</b>				
ISO-SK40	piece		30/60	60
HSK-A63	piece		30/60	60
<b>Automation</b>				
Pallet size / Number	- / piece		320 x 320 / 7 Erowa UPC	-
Pallet size / Number	- / piece		280 x 280 / 7 System 3R Dynafix	-
Pallet size / Number	- / piece		350 x 350 / 7 System 3R Dynafix	-
Pallet size / Number	- / piece		240 x 240 / 8 System 3R GPS	-
Pallet size / Number	- / piece		300 x 300 / 8 System 3R GPS	-
Pallet size / Number	- / piece		600 x 600 / 4	800 x 600 / 4
Max. load kg			80, 500	800, 1200
<b>Weight</b>				
	kg		11'000	15'000
<b>Control unit</b>				
Heidenhain			iTNC 530	iTNC 530
<b>smart machine</b>				
			APS, APS extended, ITC, RNS, OSS light, PFP, AFC	APS, APS extended, ITC, RNS, OSS light, PFP, AFC



**Mikron HPM 600 HD**



**Mikron HPM 1200 HD**

# GF Machining Solutions



## 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.



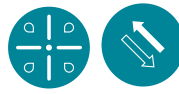
## EDM

**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 texturing.** Laser texturing supplements and extends the technologies offered by GF Machining Solutions. 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 texturing, compared to conventional surface treatment using manual etching processes, offers economic, ecological and design advantages.



## Automation

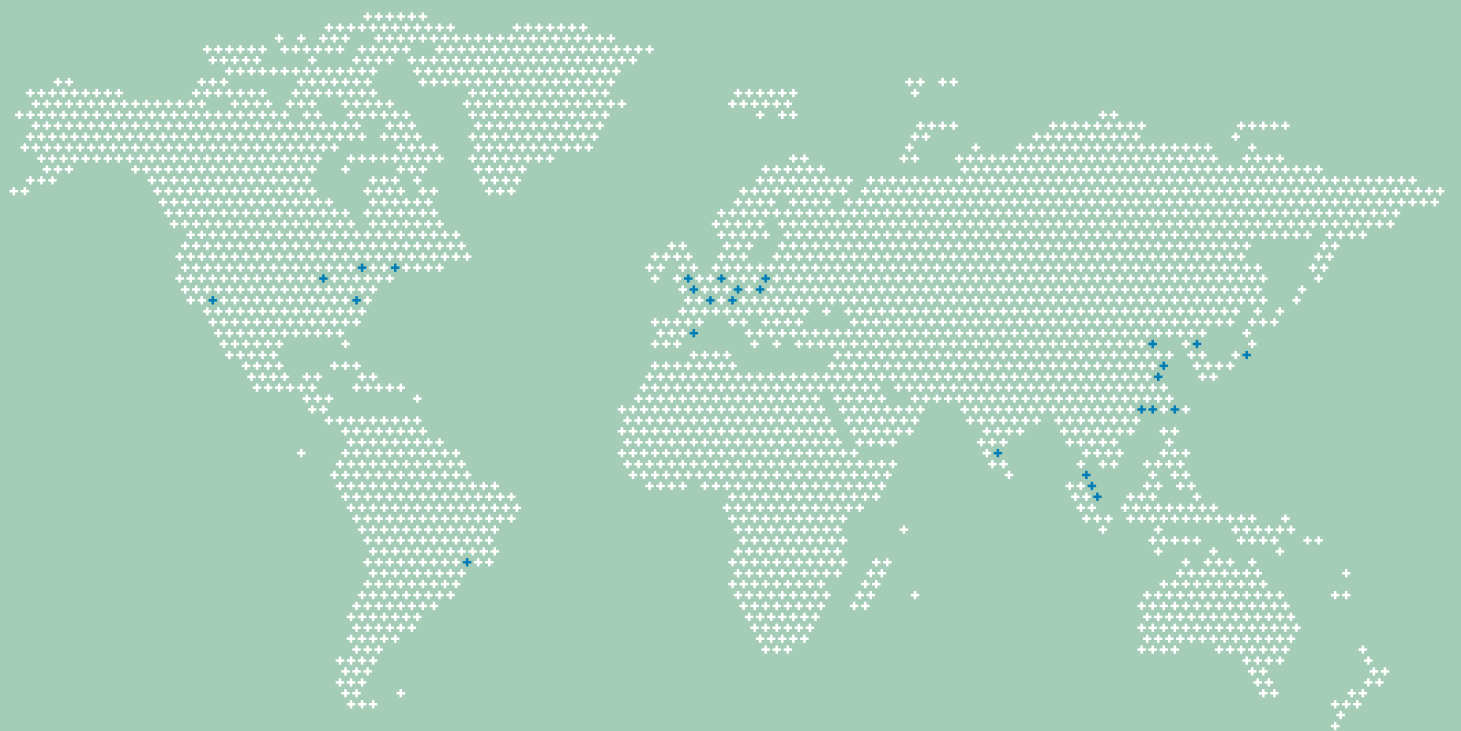
**Tooling, Automation, Software.** Tooling for fixing workpieces and tools; automation systems and system software for configuring machine tools and recording and exchanging data with the various system components and design advantages.



## Customer Services

**Operations, Machine and Business Support.** Customer Services provides with three levels of support all kind of services for GF Machining Solutions 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.

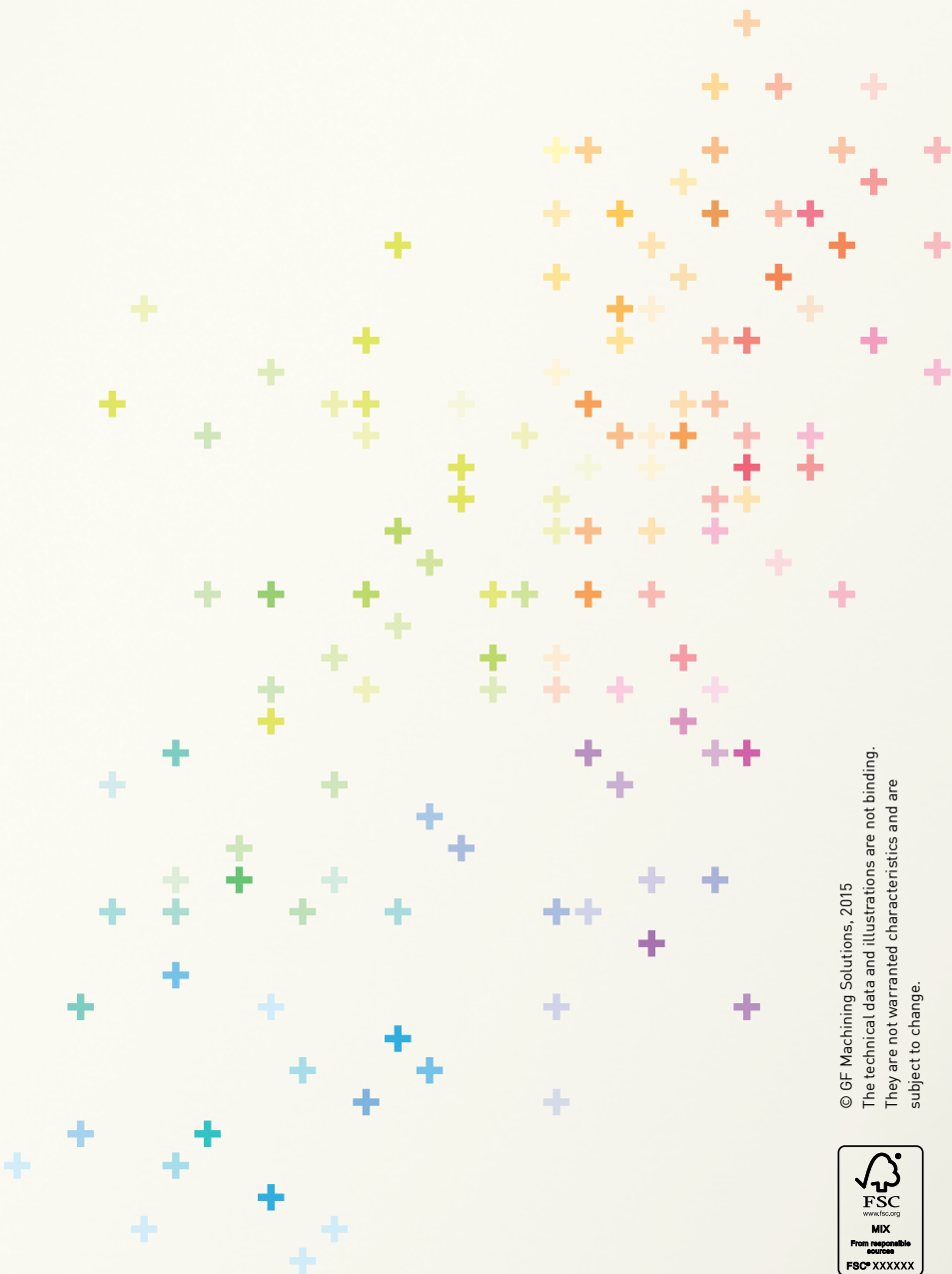




# At a glance

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

[www.gfms.com](http://www.gfms.com)



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