The new reference machines in the 3, 4 and 5-axis field for ultra-high speed milling: MIKRON XSM 400 and MIKRON XSM 400U. Quality and productivity with the highest dynamics and accuracy - the new XSM series sets new milestones in HSC production.
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MIKRON
XSM 400, XSM 400U
Applications

Economical production of complex and valuable components...

**Injection mold**
**Mold making steel**
**Electronics industry**
- Cost-effective combination of HSC and EDM
- High cutting volume
- High contouring accuracy

**Bone plate**
**Austenitic steel**
**Medical technology**
- Machining of high-alloyed steel
- 5-axis simultaneous machining
- Complete machining in one clamping position

**Blow mold**
**Aluminum**
**Packaging industry**
- High surface quality
- Series production
- High cutting volume

**Injection mold**
**Mold making steel**
**Electronics industry**
- Machining of deep cavities with large L/D ratio
- Tool diameter min. 0.2 mm
- Micro-machining of small details

**HSC hard material milling of a mold core (crosswise cutout using wire EDM). Components of a zinc die-casting die.**
**Highlights**

New dimensions in production through the highest dynamics and accuracy

**Machine control**
High performance latest generation computer numerical control unit. The iTNC 530 from Heidenhain is a versatile, flexible workshop-oriented machine control, which takes all requirements into account.

- Efficient shop-level programming or external, machine-independent program generation
- Parallel programming, free contour programming, freely definable sub-program
- Fast execution due to short block execution time
- Swiveling of the machining plane
- 3D tool offset

**Efficient chip management**
Effortless crane loading

Outstanding view of the machining process

Flexible workpiece automation

Efficient chip management

Effortless crane loading
Ergonomics and process reliability
Safety and accessibility know no compromises.
- Unaltered accessibility in any configuration
- Outstanding view of the working area
- Access from 3 sides through opening a single free-moving door – also for crane loading
- Side windows for optimum supervision of the machining processes

Process optimization
Developed and patented by GF Agie Charmilles: the original OSS Smart Machine module. With OSS the machining process can be optimized according to the workpiece requirements.

Accuracy
What use is speed if accuracy suffers? Precision as standard:
- High static and dynamic rigidity
- Absolute glass scales on all axes with a resolution of 0.02 μ guarantee an incomparable contour accuracy
- Water cooling of all heat sources
- Temperature compensation of the Z-axis

Stability and absorption
Primary prerequisites for the highest precision and best workpiece surface quality are rigidity and stability of the components:
- Highly stable portal construction
- Monolithic construction
- Machine base made of mineral composite with high absorption properties [8-10x better than gray cast iron]
- Improvement in the workpiece surfaces and up to 30% increase in tool life

Dynamics
Homogeneous dynamic performances on all axes due to direct drive technology. Highly dynamic axes are a prerequisite for high-speed milling in mold making and for other high-end applications.
- Highest dynamics (acceleration > 2g)
- Highest rigidity
- Excellent precision and contour accuracy
- No lead error, no backlash
- No wear
- No maintenance

Temporal decrease of the oscillation amplitude

Gray cast iron
Mineral composite

Temporal decrease of the oscillation amplitude

Temperature
Time
Amplitude

Gray cast iron
Mineral composite
For the best possible efficiency, GF AgieCharmilles Milling has developed its own pallet magazine, which can be adapted to all standardized palletization systems ex factory.

The pallet magazine can be loaded during operation, and can be very simply operated using the CNC control. In this way automatic production is ensured.

**Advantages of automation:**
- Repetitive machining is executed without interruption in multi-shift operation.
- The machine’s efficiency is increased with consequently higher profit

### Automation

**Even more productive due to automation**

**Ergonomic pallet loading**

**Outstanding accessibility in any configuration**

The outstanding feature of MIKRON machining centers is their exceptional ergonomics. What is impressive about the XSM series is its unrivalled accessibility, which is not dependent on the machine’s configuration.

#### XSM 400

| System 3R  | Dynafix 280 x 280 mm | + 7x |
| GPS 240 x 240 mm | + 10x |
| Erowa UCP 320 x 320 mm | + 7x |

(Payload max. 80 kg)

#### XSM 400U

| System 3R  | Macro Magnum | + 18x |
| Erowa ITS 148 | + 20x |
| System 3R Macro | + 48x |

(Payload max. 80 kg)

18x System 3R Macro Magnum
Achieve more...

MIKRON
XSM 400, XSM 400U
Table variations

Process-oriented workpiece clamping - the integrated automation interface

Main features
Pivoting angle of 220° (+110°/-110°)
max. tilt speed: 165 min⁻¹
Rotation angle up to n x 360°
Max. rotary speed: 250 min⁻¹
Max. payload: 25 kg

5-axis simultaneous machining - real team work
Perfect coordination of all the elements involved in 5-axis simultaneous machining to achieve the goals of extremely high speed machining:
• Direct drive with "Torque" motor
• Direct measuring of the angle positions by optical rotary encoder
• Hydraulic clamping devices
• Liquid cooling
• Integrated zero point clamping system

Stable and flexible: static table with integrated zero point clamping system
Outstanding ratio of weight and rigidity - through:
• Ferritic ductile graphite iron GGG50
• Heavily ribbed construction
• Direct load transmission in the guideways
• Optimization by means of FEM simulation

Rotary tilting table with integrated System 3R MacroMagnum clamping chuck

Static table with integrated System 3R Dynafix clamping chuck

Table with integrated Mecatool GPS 240 type clamping chuck
Table with integrated Erowa UCP type clamping chuck
Tilting rotary table with Erowa ITS Ø 148 pallet clamping chuck
Complete machining in one clamping position due to 5-axis milling ensures productivity and workpiece accuracy.
High-tech spindles

Constant HSC-operations with smallest tools require a powerful high-speed spindle

Choice of spindle
The XSM 400 and XSM 400U offer a wide range of motor spindles for any application in the high speed field. The finely graduated pallet extends up to a 54,000 min\(^{-1}\) spindle for machining with the smallest tools and spindle drive powers up to 13 kW.

The facts
• Spindles with vector control
• Ceramic hybrid ball bearings
• Oil/air lubrication system with extraction of the used oil
• Integrated water cooling
• Integrated “smart machine” sensor technology

Its advantages
• High torque at low speeds
• Shorter acceleration phases
• Longer life limit
• Process supervision by means of smart machine modules
• Rigid tapping possible

Motor spindles
HSK-E40, 30,000 min\(^{-1}\)
HSK-E40, 42,000 min\(^{-1}\)
HSK-E32, 54,000 min\(^{-1}\)

smart machine inside
Since the high-speed spindle is located directly on the machining process, it is best suited to monitoring the work process. The spindles contain a complete sensor system, which with the versatile choice of Smart Machine modules, bring intelligence to the milling process.
Tool magazine

Customized solutions for your production

Tool automation in any configuration
- Single or double-row disk-type magazine
- Reliable "Pick-up" change system
- Loading control by a beam of light
- Capacity of up to 68 tools
- Tool length of up to 200 mm
- Tool diameter of up to Ø 65 mm
- Workpiece weight of up to 2 kg

Obtainable installation sizes:
- HSK-E32: 20; 40 tools
- HSK-E40: 18; 36; 68 tools

User-friendly tool loading
Productivity and process reliability are guaranteed due to the side tool loading
- Simultaneous machining and loading
- Simple loading control through a large pane of glass
- Ergonomic access

Double-row HSK-E40 magazine with a capacity of 68 tools
Further options:

- Chip chute
- Spiral conveyor
- Chip flushing
- HP lift-up conveyor
- Working area wash out
- Mist extraction system
- Dust extraction
- Interfaces to external robot
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 fulfills 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.

The smart machine is constantly being developed further.

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

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.

Spindle  HSM Spindle Technology

Development, production and sale of the motor spindles that form the core components of modern HSM centers. The spindles rotate at speeds between 10 000 and 60 000 rpm.

Service  Services and Consumables

Service, maintenance, spare parts and consumables for EDM, milling and HSM systems as well as for other machine tools; consumables include filters, wire, graphite, copper electrodes and special resin.
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