HEMBRUG
A DANOBAT COMPANY

The Hard Turning Company

HARD TURNING AND FINISH GRINDING

MIKROTURNGRIND 1000

About a hard turning and finish grinding hybrid machine

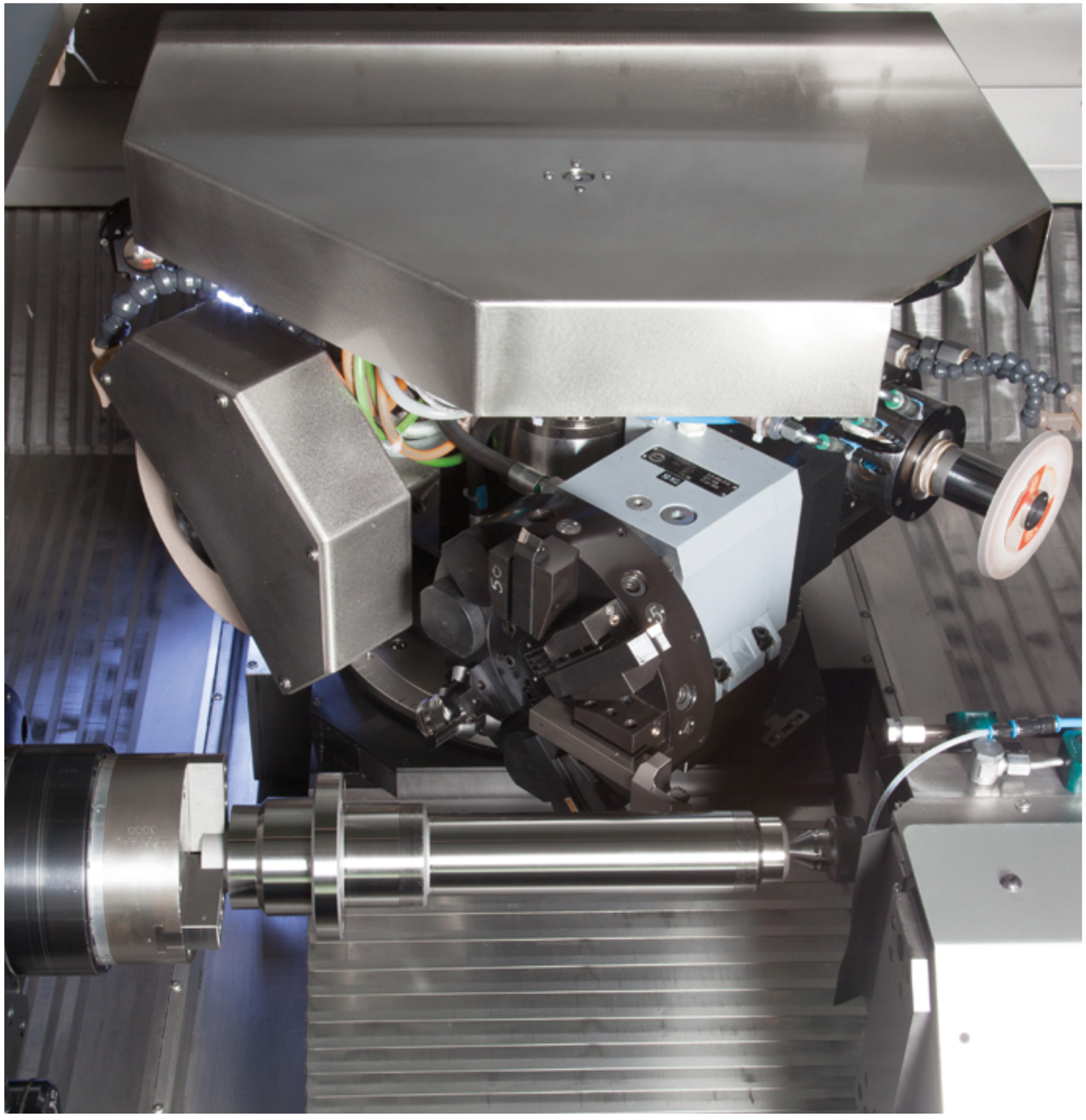
A hybrid machine, such as the MikroTurnGrind 1000, combines the advantages of hard turning and fine grinding. This allows manufacturers to use the most suitable technology for each surface to be machined.

Hard turning offers advantages, particularly for complex shapes and where a combination of internal and external machining is required. The process is also easy to set up and changeover. Grinding however offers advantages where surface finish textures together with process mandates specify that grinding must be used for finishing. Additionally, some of the exotic materials, such as Inconel, are better suited for grinding.

A hybrid process therefore offers great flexibility, accuracy and economic advantages, especially for manufacturers of small to medium-sized production runs over a wide variety of workpiece types.

Combining hard turning and finish grinding offers

- Reduced cycle times with minimal material removal during the grinding cycle
- Longer wheel life is achieved and fewer dressing cycles are required
- Lower costs per workpiece through the integration of two technologies in one machine. The need for a multistep process and multiple machines is eliminated
- Super part geometry by both hard turning and grinding workpieces in a single chucking. Re-clamping errors are avoided
- Minimal set up times. Therefore ideally suited for medium to large sized work-pieces series where you often change workpieces



Innovative Solutions

Applications

The MikroTurnGrind 1000 offers unsurpassed accuracies in both hard turning and finish grinding and contributes to a reliable and optimised production process. A process with low cycle times, (sub)-µm workpiece quality and a high flexibility with as few process steps as possible.

The MikroTurnGrind 1000 is used by leading companies for machining high precision workpieces with complex shapes that also require a grind surface or have strong interrupted surfaces.

Suitable workpieces

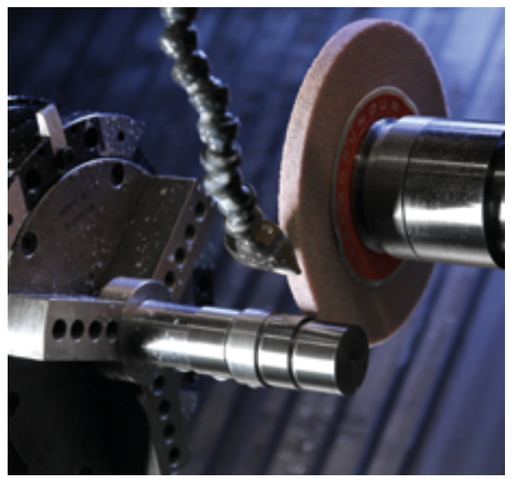
- Drive shafts and gear wheels
- Bearing rings and roller bearings
- Hydraulic components such as hydraulic pistons
- Various mold & die components

Suitable materials

- Bearing steels such as 100Cr6
- High speed steels
- Die steels
- Case hardened steels
- Carbide
- Exotic materials such as Inconel

Achievable tolerances in workpieces up to 70 HRC

- Form accuracies: < 2 µm
- Shape accuracies: 0.1 – 2 µm
- Surface finish (Ra): 0.1 – 0.3 µm



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The MikroTurnGrind 1000

The MikroTurnGrind 1000 meets the highest requirements in the field of static and dynamic stiffness, thermal stability and geometrical precision. The machine can replace multiple, time-consuming and labour-intensive machines/processes with a single machine.

TECHNICAL SPECIFCATION	MikroTurnGrind 1000
Max. turning diameter	Ø 380 mm
Max. workpiece size between centers	Ø 200 x 1000 mm
Spindle speed	4000 (50 Nm) rpm
Max. part weight including clamping	100 Kg
Spindle run out(radial & axial)	0.1 µm
Z-axis travel	1180 mm
X-axis travel	355 mm
Max. feed rate	0-12 m/min
CNC resolution	0.01 µm
Positioning accuracy-linear axis	1 µm
Repeatability-linear axis	0.2 µm
B-axis	Adjustable in 90 positions over 270°

O.D. Grinding spindle (Option)	MikroTurnGrind 1000
Spindle position	on B-axis
Fixture	HSK 63
Drive power	17 kW
Wheel dimensions	Ø 300/40x76.2 mm

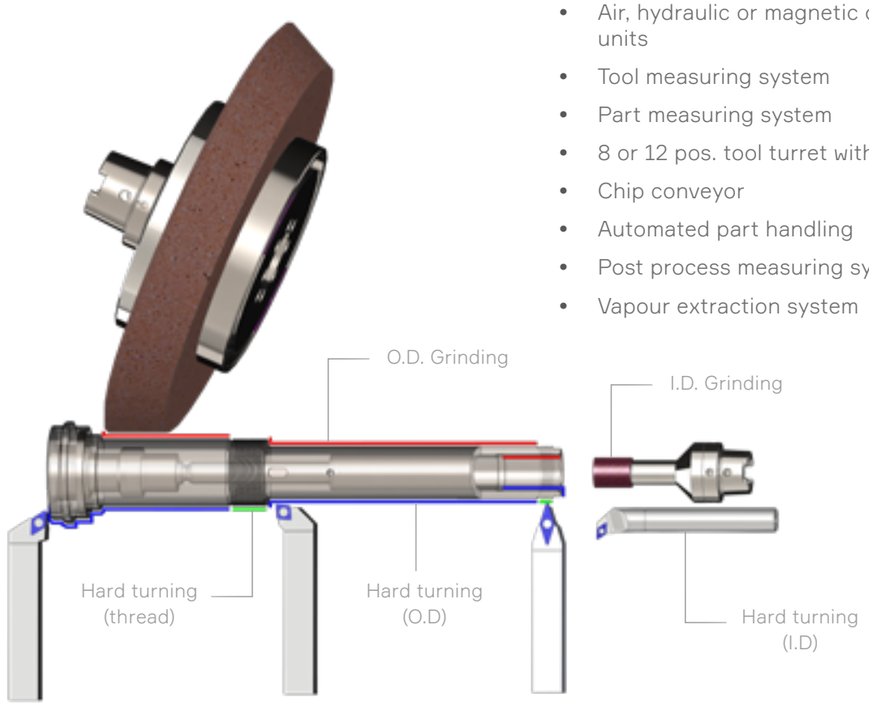
I.D. Grinding spindle (Option)	MikroTurnGrind 1000
Spindle position	on B-axis
Fixture	HSK 50
Drive power	6.5 kW

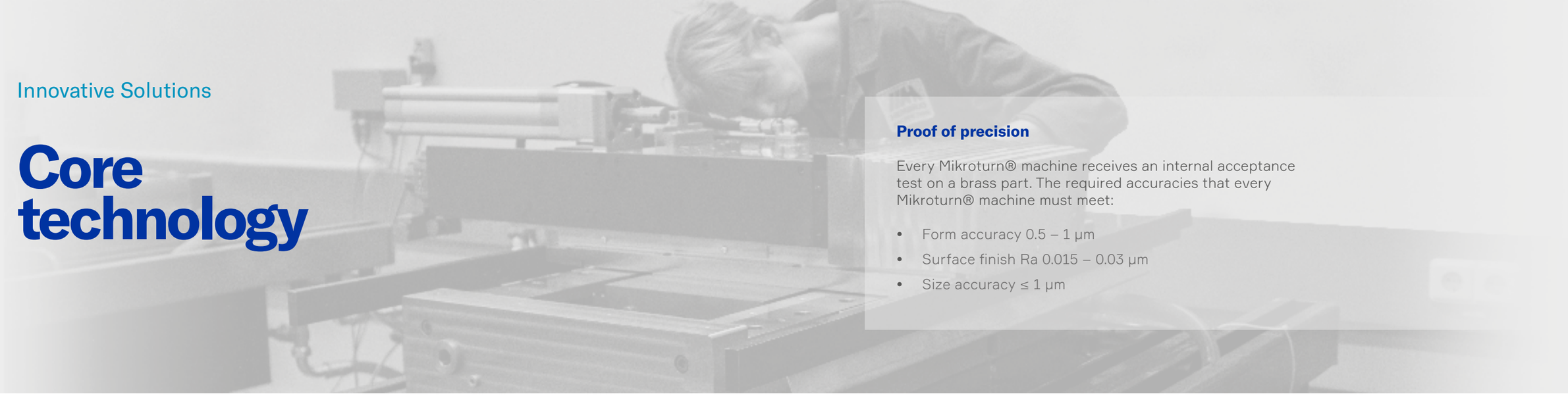
STANDARD EQUIPMENT

- Main spindle 4,000 rpm having 50 Nm torque
- B-axis with Hirth coupling, positioning over 270° with 3° increments
- Siemens 840D Solution Line CNC control
- Hydraulic unit (water cooled)
- Watercooled air conditioner in electrical cabinet door

OPTIONS, AMONG OTHERS

- Main spindle 4,000 rpm having 100 Nm torque
- Dressing units for the O.D. and I.D. grinding spindle
- O.D. grinding spindle
- I.D. grinding spindle
- Milling spindle
- Precision tailstock
- Fixed steady rest
- Automatic machine door opening
- Air, hydraulic or magnetic operated clamping units
- Tool measuring system
- Part measuring system
- 8 or 12 pos. tool turret with non-driven tooling
- Chip conveyor
- Automated part handling
- Post process measuring system
- Vapour extraction system





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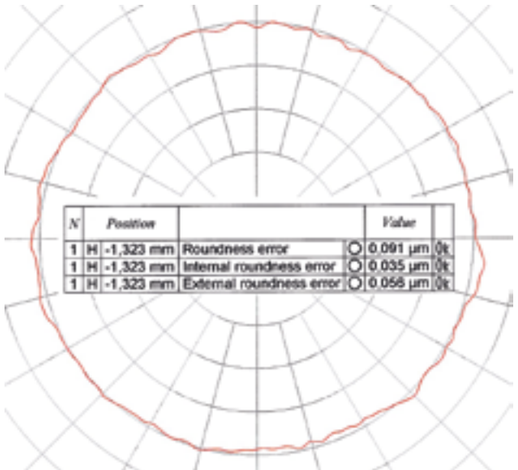
Core technology

Proof of precision

Every Mikroturn® machine receives an internal acceptance test on a brass part. The required accuracies that every Mikroturn® machine must meet:

- Form accuracy 0.5 – 1 µm
- Surface finish Ra 0.015 – 0.03 µm
- Size accuracy ≤ 1 µm

The MikroTurnGrind 1000 machine is designed to meet the highest requirements in the field of static and dynamic stiffness, thermal stability and geometrical precision and is therefore able to offer (sub)-µm precision levels.



The chart shows a run-out of the main spindle of 0.09 µm at 3,200 rpm. This run-out accuracy was measured on a 17 year old Super-Mikroturn®. The Mikroturn® machines have an everlasting accuracy due to the absence of metal contact between the moving parts.

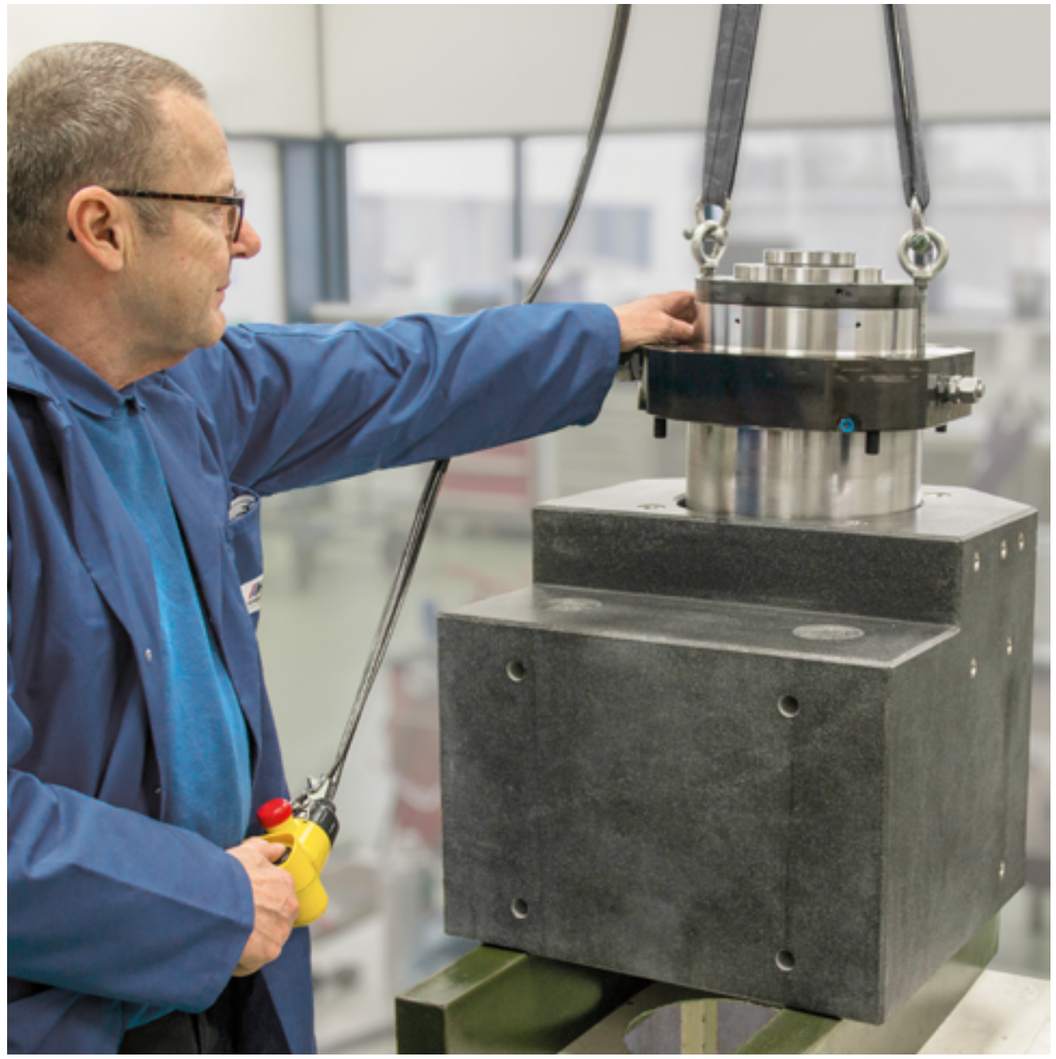
A stress free natural granite machine base

All Mikroturn® machine have a natural granite machine base with an integrated vibration damping system. Natural granite is the ideal machine base for a high precision machine. It is completely stress and corrosion free, has very good damping properties and a offers a high thermal stability.

Wear free hydrostatic main spindle and guideways

All Mikroturn® machines are equipped with a hydrostatic main spindle and guideways. This in house developed and produced system is far superior to any other conventional bearing system and offers many advantages:

- A new continuous oil film over the entire length of the guideways and bearing elements provides excellent damping properties, a high dynamic stiffness and ensures a long tool life
- Everlasting accuracy due to the absence of contact between moving components
- The temperature controlled oil flow guarantees a stable and reliable process, independent of the ambient temperature
- Due to the absence of the stick-slip effect smallest incremental steps of 0.01 µm are possible



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Advanced services

Hembrug offers worldwide an extensive range of maintenance and servicing options which accommodates the machine age, user level and the general machine state. A worldwide network of service engineers ensure that every Mikroturn® machine remains in top condition and optimal useful.

Service support

- Corrective maintenance: a worldwide network of service engineers guarantees a quick response to machine problems or machine downtime
- Servicing on call. You decide if and when you want maintenance carried out
- Services on a contractual basis: By having maintenance carried out on a regular basis, malfunctions and machine stoppages are kept to a minimum
- Tele-service: a VPN connection allows us to connect to your machine allowing us to solve CNC control related problems without the need for engineer visit

Other services

- Advanced training: extensive and tailored training options in the area of programming and machine operation contributes to the workpiece quality and continuity of your production process
- OEM parts: A wide stock of original spare parts are ready to be dispatched immediately from different warehouses around the world
- Production optimisation: due to new workpieces or changed production requirements the configuration of your machine may no longer be suitable. Together with you we will examine how we can modify the machine to any new requirements so that process continuity is guaranteed
- Retrofitting: if the CNC operating system is outdated, malfunctions will occur with growing frequency as a result. In addition, it will also no longer be possible to guarantee the constant supply of spare parts. Retrofitting is therefore an economically appealing alternative to a complete new machine

About Hembrug Machine Tools

Hembrug Machines Tools develops and manufactures high precision, fully hydrostatic finish hard turning machines and hybrid machines with hard turning and finish grinding capabilities. Hembrug is very solution-oriented, committed to providing machining solutions suited to a wide variety of production requirements. The Mikroturn® machines offer the highest accuracy levels on the market and are supplied worldwide to renowned companies in among others the bearing industry, machine builders and the tool/mould making.

Since September 2019 Hembrug is now part of the Spanish machine tool manufacturer Danobat. Danobat designs, manufactures and supplies grinding machines and turning machines, as well as complete turnkey systems for the manufacturing of high added-value components. Hembrug is located in Haarlem, the Netherlands. Hembrug and also has a sales office in North America together with a variety of sales agents around the world.

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