HEMBRUG
DANOBAT

Got a Challenge?

FINISH HARD TURNING

MIKROTURN® 100 MACHINE SERIES

Innovative Solutions

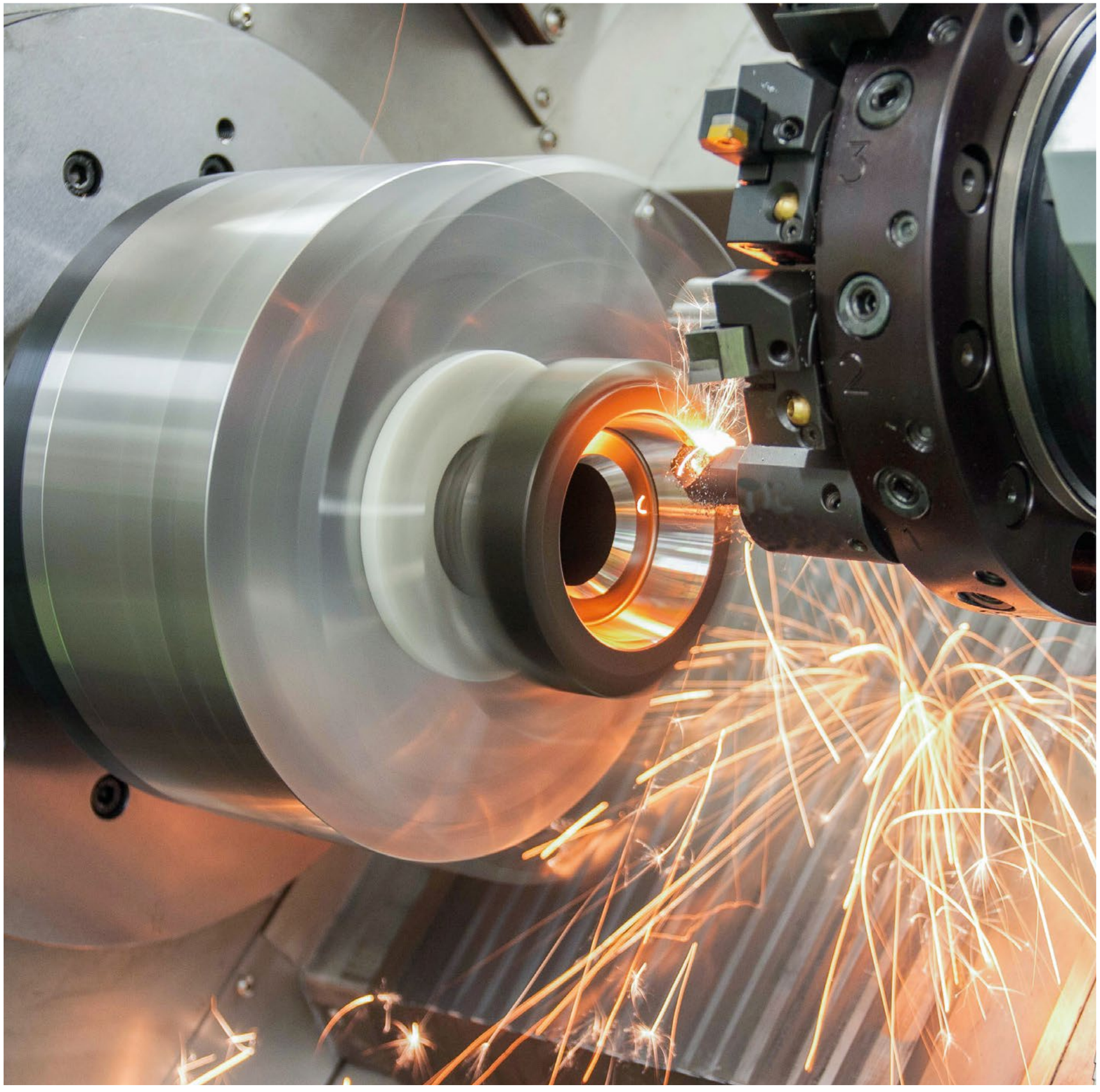
About finish hard turning

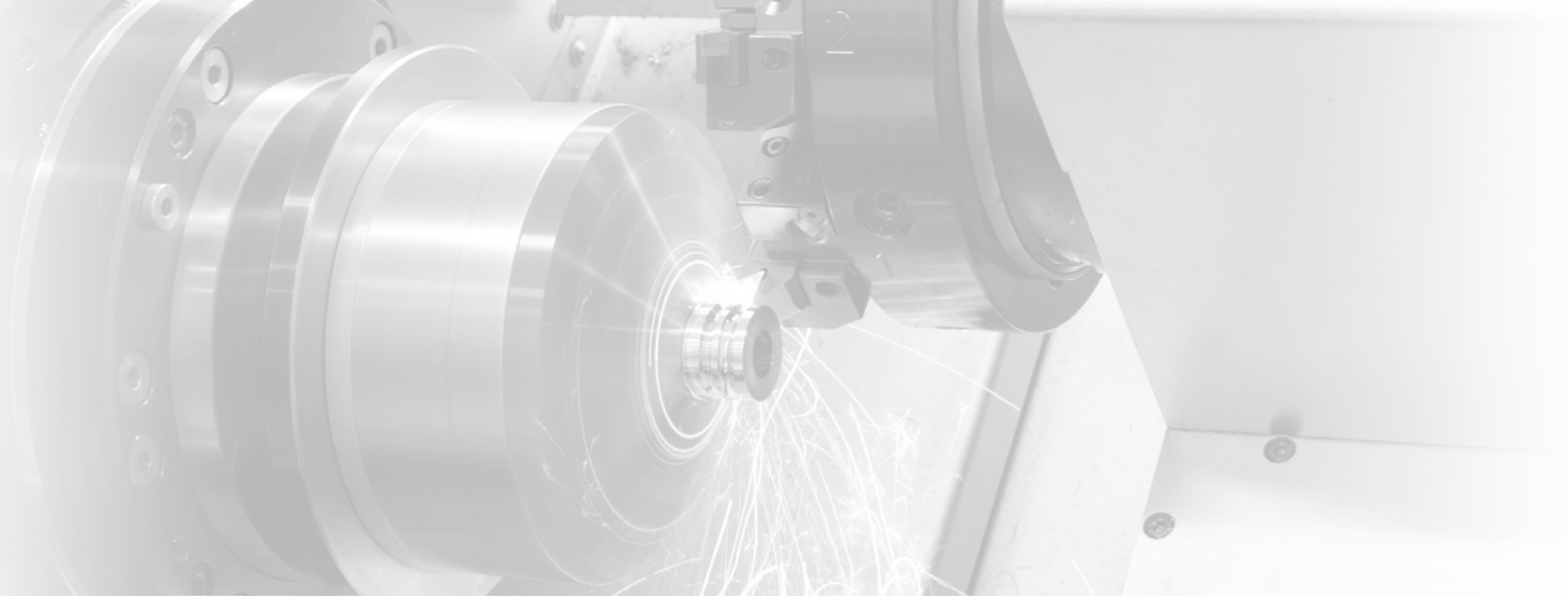
Finish hard turning refers to the process of single point cutting of hardened pieces within the 2 µm range having hardness between 55 and 70 HRC. It is a simple and reliable process that offers many advantages, especially for multi surface workpieces with complex shapes and a combination of OD and ID machining.

The process is also easy to set up and change over making it very suitable for manufacturers of small to medium-sized production runs over a wide variety of workpiece types.

Finish hard turning means

- Soft turn & hard turn on a single machine
- High metal removal rates leading to low cycle times
- Machining complex shapes and perform multiple operations in one set-up saving process steps
- Simple process set-up & change overs with standard tooling only
- A dry and environmental process due to the absence of machining fluids





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Applications

The Mikroturn® 100 series offer the highest finish hard turning accuracy levels on the market and contribute 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 Mikroturn® machines are used worldwide by leading companies for machining high precision workpieces such as:

- Ball screw nuts
- Bearings rings and roller bearings
- Hydraulic components
- Drive shafts and gears
- 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 hardened steel workpieces up to 70 HRC

- Size: < 2 µm
- Form: 0.1 – 2 µm
- Surface finish (Ra): 0.1 – 0.4 µm

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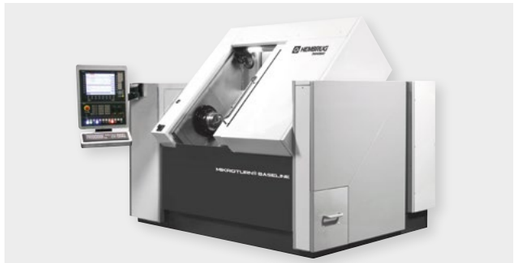
The Mikroturn® 100 machine series

The Mikroturn® 100 machine series is designed to meet the highest requirements in the field of static and dynamic stiffness, thermal stability and geometrical precision. They offer the highest finish hard turning precision levels available on the market. A large number of available options ensure that every machine can be fully adapted to your needs.



Mikroturn® Baseline

- The entry level Mikroturn® machine for workpieces up to Ø 380 mm
- Equipped with a Fanuc 0i control

Mikroturn® 100

- For small to medium sized workpieces up to Ø 380 mm or Ø 200 x 350 mm between centres
- Equipped with a Siemens 840 SL or Fanuc 32i CNC control

Mikroturn® 100 XLS

- For long workpieces up to Ø 350 mm or Ø 240 x 1000 mm between centres
- Equipped with a Siemens 840 SL or Fanuc 32i CNC control

Mikroturn® 100XLD

- For large and heavy workpieces up to Ø 610 mm
- Equipped with a Siemens 840 SL or Fanuc 32i CNC control

TECHNICAL SPECIFICATION	Baseline	Mikroturn® 100	Mikroturn® 100 XLS	Mikroturn® 100XLD
Max. turning diameter	Ø 380 mm	Ø 380 mm	Ø 350 mm	Ø 610 mm
Max. turning diameter between centers	Ø 200 x 350 mm	Ø 200 x 350 mm	Ø 240 x 1000 mm	N/A
Max. part weight / between centers	50 / 100 kg	50 / 100 kg	50 / 100 kg	300 kg
Max. spindle speed	4,000 rpm	4,000 rpm	4,000 rpm	2,000 rpm
Main spindle run-out	0.15 µm	0.1 µm	0.1 µm	0.2 µm
Positioning accuracy	2 µm	1 µm	2 µm	1 µm
Slide repeatability	0.3 µm	0.2 µm	0.2 µm	0.2 µm
CNC resolution	0.1 µm	0.01 µm	0.01 µm	0.01 µm

OPTIONS, AMONG OTHERS

- Max.spindle speed 2,000 and 8,000 rpm
- Air or magnetic operated clamping units
- Precision tailstock
- 8, 12 or 16 position tool turret
- Live tooling
- Tool presetting probe
- Part probing system
- Automatic machine door opening
- Chip conveyor
- Fanuc 0i CNC control

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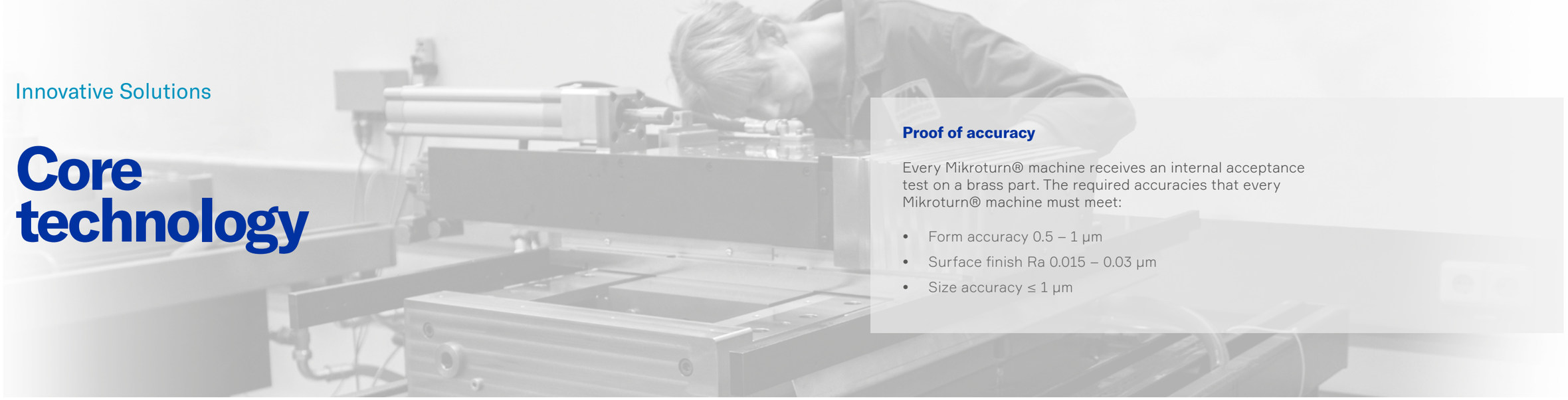
Core technology

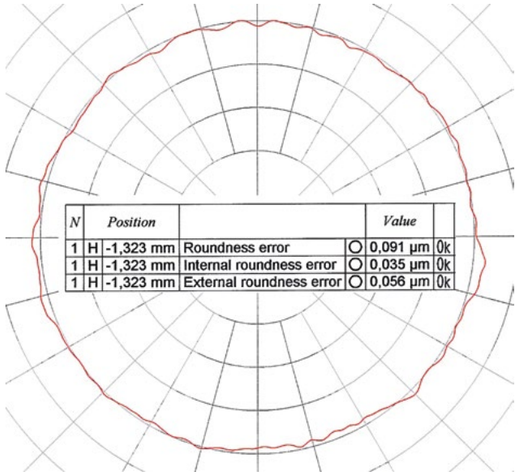


Proof of accuracy

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 Mikroturn® 100 machine series is designed to meet the highest requirements in the field of static and dynamic stiffness, thermal stability and geometrical precision and are therefore able to offer (sub)-µm precision levels.



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

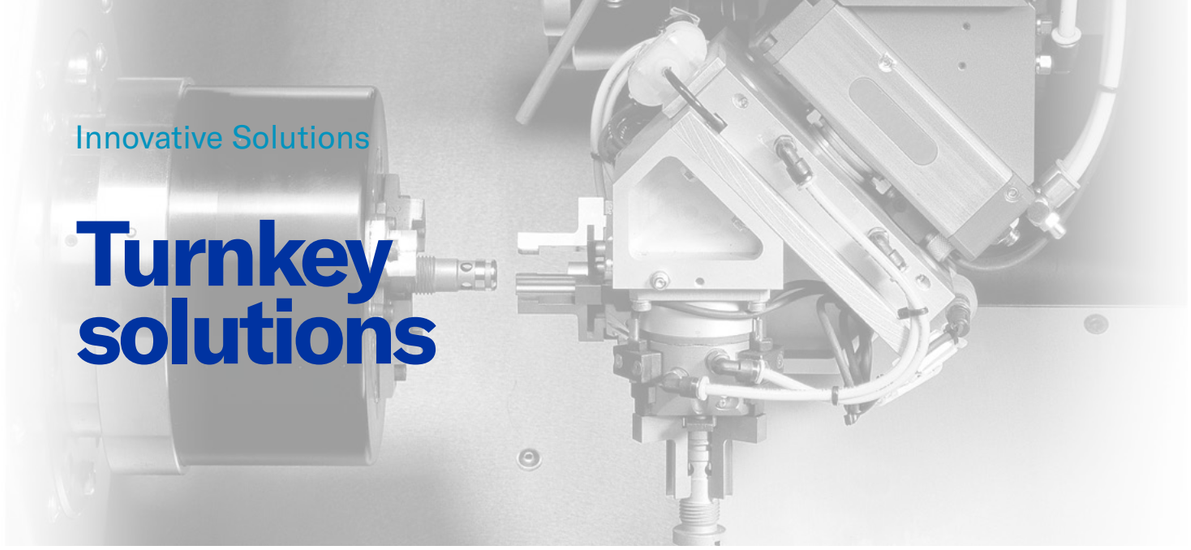
A stress free natural granite machine base

All Mikroturn® machines have a natural granite machine base with in 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 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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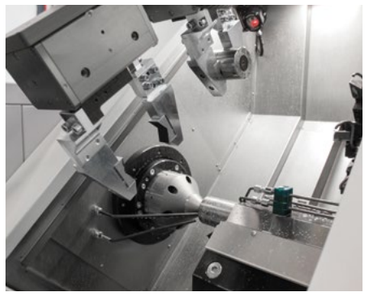
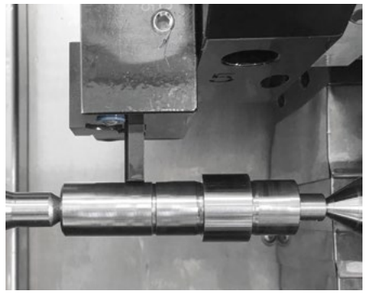
Turnkey solutions

Hembrug offers customer specific, turn-key solutions in the area of automation and hard turning/finish grinding applications. All solutions are based on proven technology and ensure a further increase in productivity with even shorter production times and improved workpiece quality.





Automated solutions

Hembrug provides various automation solutions, such as gantry loaders or robotized systems depending on the application. These solutions are delivered turn-key and also can be supplemented with post-process measuring systems.

Surface finishing options

When a surface quality and structure is specified that cannot be achieved with hard turning, a grinding spindle or stone finish technology, can be integrated. This technology incorporates a stone finish unit that mounts directly into the tool changer. The rotation of the workpiece and movement of the stone are controlled out by the machine. The oscillation of the stone and the contact pressure are maintained by a force sensing unit.

This way, hard turning and ultra-fine surface finishing can then take place on a single machine. This saves process steps, costs and result in a very low surface finish (< 0.3 µm Rz) and form accuracy (< 2 µm).

Advanced services

Hembrug offers worldwide an extensive range of maintenance and servicing options which accommodate 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

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 among others the bearing industry, machine builders and tool/mould making.

Since September 2019 Hembrug is now part of the Spanish machine tool manufacturer Danobat.

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