



Centre hole grinding machine ZSM

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With more than two thousand centre hole grinding machines being operated by customers, the ZSM is one of the most successful machine systems built by Technica and among the best-selling centre hole grinding machines in the world.

Areas of application ZSM

Cutting tools, grinding mandrels, tool holders, tempered drive shafts and gear shafts are just some examples of workpieces on which cylindrical grinding must be carried out with the greatest precision. The quality of the cylindrical grinding is strongly influenced by the set-up of the workpiece and therefore by the exact geometry of the centre hole.

The Technica grinding principle ¹

With its unique simultaneous 3D grinding wheel motions the centre hole grinding machine ZSM fabricates a geometrically highly precise centre. The workpiece is mounted in a stationary and self-centering position:

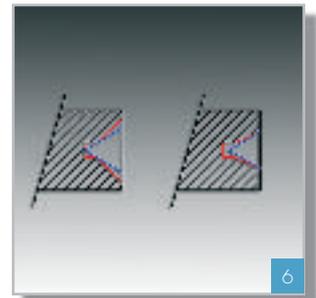
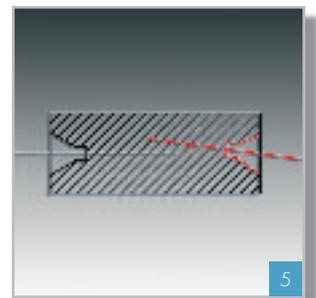
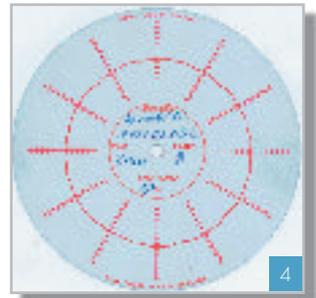
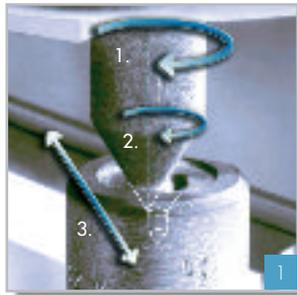
1. *Rotary motion of the grinding wheel*
2. *Planetary motion of the grinding spindle*
3. *Oscillating motion of the grinding wheel along the conical surface to be ground*

Component part fabrication ²

Due to its modular design, the Technica ZSM is suitable both for component part and high-volume fabrication. The ZSM 810 model has a manual grinding head infeed and a semi-automatic dressing device and is preferably used for component part and small scale fabrication.

High-volume fabrication ³

The Technica ZSM 815 is equipped with an automatic program flow for high-volume fabrication. All grinding parameters can be programmed as desired. The dressing process is integrated into the machining process. For repetitive workpieces the operator can enter the corresponding part-specific grinding data. The grinding results are therefore precisely reproducible. Grinding is always performed under the same conditions, regardless of who is operating the machine.



Precise centre holes

The greater the demands on precision of cylindrical grinding, the more important is the set-up of the workpiece and thus the exact geometry of the centre hole in which the workpiece is mounted to dead centres for cylindrical grinding. The following features characterize geometrically precise centre holes fabricated on a Technica centre hole grinding machine ZSM.

Roundness deviation 4

In conventional grinding processes, oval centre holes are often produced that can lead to undefined workpiece set-ups. The Technica ZSM, however, grinds geometrically round centre holes and permits a defined workpiece set-up.

- Achievable roundness deviation of centre hole < 1 µm

Axial alignment 5

As shown in the adjacent figure, non-aligned centre holes represent an additional source of error in cylindrical grinding operations. The Technica centre hole grinding machine, however, grinds geometrically aligned centre hole axes.

- Axial alignment of centre hole < 10 µm

Angle 6

Angles in centre holes that are too large or too small also lead to undefined set-ups of the workpiece. The Technica ZSM grinds a precise taper angle of 60°.

- Angle tolerance of the angle < 1' angle sec.

Grinding pattern

Due to the three simultaneous grinding motions, the ZSM fabricates a homogeneous cross-grinding pattern with microscopic oil pockets that form a constant oil film between the workpiece and dead centre of the cylindrical grinding machine. This prevents dry running and seizing of the dead centre and eliminates an additional source of error for high quality cylindrical grinding.

- Surface roughness of the centre hole N4-N6
= 0.2 - 0.8 µm





Dressing device 7

The semi-automatic dressing device is mounted to the side of the grinding head and is swiveled into the dressing position manually. When dressing, the grinding wheel turns only around its own axis. During the dressing operation, in addition to the longitudinal motion, the diamond simultaneously performs a sideways oscillating motion along the grinding wheel cone. Regardless of the position and the wear of the dressing diamond, this ensures a constant, geometrically precise conical shape of the grinding wheel. In the ZSM 815 model, there is also the possibility of dimensional compensation of the dressing value via CNC control.



Workpiece clamping devices 8

The self-centering clamping devices simplify workpiece set-up in the centre hole grinding machine. Depending on customer application, various workpiece clamping devices are available.

Additional accessories

With the workpiece drive, mounted workpieces can be rotated additionally at 48 1/min., which permits a higher degree of concentricity between centre hole and outside diameter. For frequently changing centre diameters, using the continuously adjustable speed regulation of the spindle is recommended.

Key figures of the centre hole grinding machine ZSM

Centre hole diameter	ø1 - 60 mm
Workpiece clamping range	ø4 - 220 mm
Workpiece length and weight	50 - 1100 mm (special version 50 - 2800 mm), max. 120 kg
Centre hole angle	60°
Grinding spindle rpm	up to 45'000 revolutions per minute

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