

# Xstep® honing tool technology

The Xstep® honing tool technology facilitates conventional honing in a machining centre with a tension/compression rod available on the machine or with a tool-changeable U-axis (e.g., KomTronic® von KOMET). The machining is done with regular honing kinematics (expansion during machining), thus generating the classic cross hatch at a specific angle. Enormous advantages result during honing on the machining centre from the arrangement of both system parts (tool and workpiece) in fixed clamping:

- only a small honing allowance is required, thus very short machining times
- separate honing machines can be eliminated
- highly scalable to fluctuations in production due to use in machining centres
- no limitations compared to conventional honing with honing machines
- Process control and availability of advanced measuring facilitate 100% testing of components
- no additional costs for separate devices or articulation connections for the honing process

Xstep® honing tools use a tensile/compression rod for expansion of the cutting stones. Cooling lubricant is diverted directly to the contact point honing stone/bore for process cooling. This ensures optimum cooling and chip removal. The finished diameter is set via control of the end position of the tensile / compression rods and compensates for the wear on the honing stone. By meeting the specifications for the honing stones, the required parameters (e.g., roughness, cycle time or cylinder shape) can be adapted to the specifications.

Depending on the requirement and hole geometry, Xstep® honing tools can be used in different variants:

- blind hole or passage tools
- double expansion tools
- mounting tools with connecting rod

The use of post-process air measuring devices, for example, with an interface to evaluation systems and feedback into the controls of the processing machine enables process control identical to conventional honing machines.

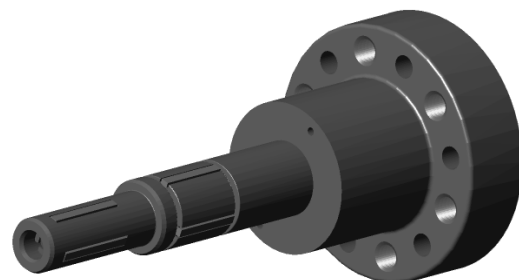
## Combination of KOMET® attachment and Xstep®KT honing tool on a KomTronic® U-axis

In combination with the KOMET® attachment and Xstep®KT honing tools, KomTronic® U-axis system opens up machining options that couldn't even be imagined on a machining centre until now.

With the options of boring, undercutting (recesses for honing), bevelling, generating NC controlled lathe contours and subsequent honing, workpieces can be completely machined with higher precision, while saving time and costs. Freely programmable U-axis systems enable the desired contour and lathe machining even on parts without rotational symmetry. Adapted attachment tools together with Xstep®KT honing tools enable the interior and exterior machining of workpieces with subsequent honing in significantly shorter production times, with improved surface quality and higher contour accuracy. The KomTronic® U-axis system is available in various designs (e.g. SK-40, HSK-A63 or HSK-A100) and provides a fully adequate NC axis in the controls of the machine (also for interpolation).

Xstep®KT honing tools are adapted Xstep® honing tools, whose interface to the U-axis is specially optimised to the requirements of honing on the machining centre. By using the DAH® (DIHART® compensating chuck) the honing tools can be fitted and adjusted on the U-axis very simply and efficiently. The tension / compression rods for actuating the honing tools within the U-axis are optimised with respect to the travel paths and feeding forces required. The use of interior cooling of the machine through the U-axis into the honing tool ensures efficient chip removal, good process cooling and at the same time keeps the honing tool free of honing chips and other contamination.

Using tension and compression movements of the feed rod and/or in combination with the coolEX® honing tool technology, multiple expansion honing tools enable, for example, the machining of plateau surfaces with one tool.



### Projects with Xstep® honing tool technology

1-step honing process: Honing of ceramic inserts pressed in sheet metal housings	Part: Diameter: Material:	Pump bearings 10.00mm Hilox 910	Machine manufacturer: Machine: Holding fixture:	EMAG VLC 200 Trio HSK-C63 Sonder
1-step honing process: Honing of connecting rods, small and large eyes (same clamping) with coaxial tool on KomTronic® U-axis with HSK-A63	Part: Diameter: Material:	Connecting rod 14.00 mm and 19.00 mm 16MnCr5	Machine manufacturer: Machine: Holding fixture:	HERMLE C40U dyn. DAH81
1-step honing process: Honing of control blocks, honing tool on KomTronic® U-axis with HSK-A63	Part: Diameter: Material:	Control block 14.00mm GJL-250	Machine manufacturer: Machine: Holding fixture:	HERMLE C40U dyn. DAH81
2-step honing process: Plateau honing of tracks in compressor housings, honing tool on KomTronic® U-axis with HSK-A100	Part: Diameter: Material:	Compressor 46.00mm GJL-250	Machine manufacturer: Machine: Holding fixture:	HüllerHille NBH170 DAH81

The trade names KOMET®, KomTronic®, DIHART® and DAH® are the property of KOMET Group GmbH. More information at [www.kometgroup.com](http://www.kometgroup.com)

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