

Micro precision $\pm 1.0 \mu\text{m}$
with a small footprint



Micro- und Feinwerktechnik

KERN Micro

High Precision
CNC Machining Centre
for single part and small
series production



KERN Micro

Micro machine tool with
polymer concrete machine base



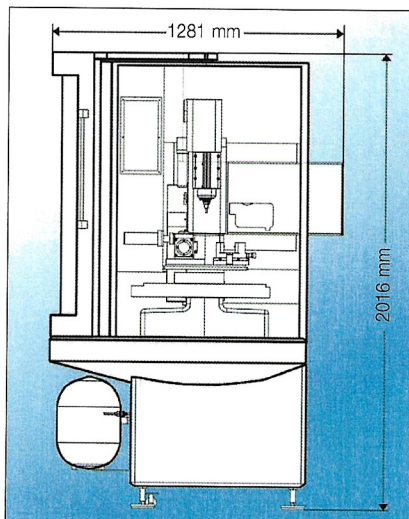
Specific characteristics:

The machine body of the **KERN Micro** is specially designed to take full advantage of the characteristics offered by the high tech material polymer concrete. The C-frame structure of the machine body is filled with polymer concrete for better absorption of vibrations (patented). Moreover, the machine stands on a stable polymer concrete machine base providing maximum rigidity and extraordinary vibration absorption – basic requirement for maximum precision on the workpiece. The 1.7 tons weight carrying and also exceptional space saving design permits its installation even under extremely narrow room conditions.

The **KERN Micro** is specially designed for single part and small series production. It has been proven worldwide in being particularly suitable for applications requiring the following features:

- **Highest precision on the workpiece**
(positioning scatter $P_s \pm 1.0 \mu m$ according to VDI/DGQ 3441)
- **Excellent surface quality $Ra \leq 0.2 \mu m$**
- **Milling of steel, non ferrous metals, plastics, ceramics**
- **Single or multi-part clamping**
- **3 and 5 axes machining**

- Vector-controlled spindle
- Infrared touch probe for measuring of workpiece
- Laser measuring system for tools
- Interface for 4th /5th axis with analog drives
- Cast iron machine body filled with polymer concrete
- KERN polymer concrete



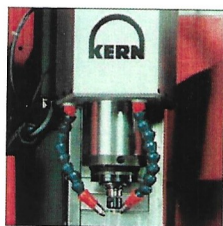
The **KERN Micro** high precision machining centre can be fitted with a wide range of accessories and options, e.g.:

- Powerful vector-controlled spindle (other spindle types available up to 160,000 rpm)
- CNC precision dividing head (4th /5th axis) with analog drives
- Automatic tool changer (ATC) HSK 25 with 20 positions
- Automatic measuring of the workpiece by a touch probe with data transfer by infrared beam (only for vector-controlled or oriented spindles)
- Automatic tool length and tool radius measuring with a laser measuring system

KERN Micro

Options and Accessories

Achieving the optimal results in machining operations depends on a variety of factors. One of these factors is the use of original KERN accessories.



Spindles

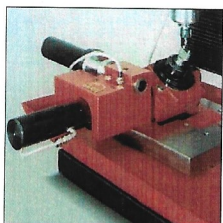
The KERN Micro can be fitted with several spindles and the user can change spindle on his own simply and quickly.

500 – 30,000 rpm	permanently grease lubricated, oriented	2.5 kW
500 – 50,000 rpm	permanently grease lubricated, 0.8 Nm vector-controlled	3.4 kW
30,000 – 90,000 rpm	permanently grease lubricated	0.17 kW
60,000 – 160,000 rpm	oil/air lubricated	0.5 kW



Tool changer

20 positions HSK 25
Tool changing time about 6.5 s
Average chip-to-chip time about 14 s (depending on spindle configuration)
Tool length max. 110 mm
Tool diameter max. 40 mm
Tool shank diameter max. 10 mm



CNC precision dividing head analog (4th / 5th axis)

Rotational and swivelling axis, 2 axes or 1 axis system
DC motor driven
Collet chucks: max. chucking capacity Ø 20 mm, max. passage Ø 20 mm
Feed rate C/B 1600 / 800 °/min
Max. swivelling range from -10 to +100°
Height of centres 40 mm
Positioning scatter $P_s \leq 3''$, precision on the workpiece $\leq 10''$



Tool length measuring: Laser

A laser beam with a diameter of 30 µm permits non-contact measuring of the smallest tool according to length, radius and concentric accuracy even at high spindle speeds. The measured data is transferred automatically into the Heidenhain contouring control and is taken into consideration in the active programme. In case of deviations from individually defined tolerances, for example automatic change of a sister-tool will take place (programmable).



Touch probe system with wireless infrared transmission

for measuring of the workpiece to be machined. An infrared touch probe which can be transferred automatically from the tool magazine to the spindle and measures the height and position of the workpiece. Can only be used in combination with vector-controlled or oriented spindle.

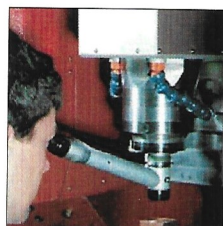
Vice with gripping jaws

for clamping of tools/collets in a collet chuck



Optical measuring device

Centring and controlling microscope with HSK interface
Magnification 30-times, alternatively 50- or 100-times



not illustrated:

Flood coolant device 100 litres with temperature regulation $\pm 1^\circ\text{C}$

Oil mist lubrication / cooling unit

Special coolant system for temperature control of spindle

Inductive heat shrink unit

Heat shrink tool holder HSK 25 (KERN Special)

Tool holder HSK 25 (KERN Special)

EX 16 high precision collet chuck

ESX 16 precision collet chuck

D 14 high precision collet chuck

Precision vice for workpieces

Solutions for customer specific applications



Technical Data

KERN Micro

Axes:

Travel X/Y/Z	250/220/200 mm (9.84/8.66/7.87")
Clamping area max.	350 x 230 mm (13.78 x 9.06")
Drives	digital (AC Servo)
Workpiece weight max.	30 kg
Feed rate	0.01-6,000 mm/min (0.00039-236.22")
Acceleration	2 m/s ² (78.74 "/s ²)

Precision according to VDI/DGQ 3441:

Resolution	0.1 µm (0.0000039")
Positioning scatter P _s	±1.0 µm (0.0000393")
Positioning tolerance P	±1.0 µm (0.0000393")
Precision on the workpiece (3-axis)	±2.0 µm (0.0000787")

Choice of spindles:

up to 30,000; 50,000; 90,000; 160,000 rpm etc.	
Taper	HSK 25 (using spindles up to 50,000 rpm max.)
Tool changer capacity	20 positions
Tool diameter	max. 40 mm (1.57")
Tool changing time	about 6.5 s
Chip to chip	about 14 s

4th /5th axis:

Rotational	360° continuous
Swivelling	-10 up to +100°
Precision on the workpiece	≤ 10"
Feed rate C/B	1600 / 800 °/min

KERN Micro:

Space requirements min.	2.50 x 2.20 x 2.10 m (98.43 x 86.61 x 82.68")
Weight	about 1700 kg
Controller	Heidenhain

Subject to technical changes



Maintenance

Like all KERN machining centres the KERN Micro is in general maintenance-free. It simply requires regular thorough cleaning as well as high-level professionalism in its operation.

Machine operators will be instructed in the technical details of their KERN machine during commissioning.

Environmental conditions

To obtain the best machining results, it is necessary to pay due care and attention to the working environment and avoid fluctuations in temperature.

CNC controls

from the market leader in shop floor programming

Heidenhain, the market leader in shop floor programming, supplies the CNC controls of the KERN Micro. Maximum comfort and performance even allow programming of 3, 4 or 5 axes applications directly on the machine.

Handwheel for Heidenhain control



Fully comprehensive package

Heidenhain controls are fully equipped with all software packages required in a tool shop. This includes up to 5 axes interpolation, preprogrammed cycles for rigid tapping, various drilling and milling cycles, subprogramming, teach-in programming, cylinder barrel programming, graphical simulation, tool administration, tool radius correction, etc. ... no additional software packages required.



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