

→ Specific features

Hydrostatic guideways - the best of all guides

Hydrostatic guides in the X and Y axis eliminate the stick-slip effect, i.e. the stick-slip movement of roller bearing guides. Hydrostatics enables:

- Life-long constant axis precision
- Complete isolation of the workpiece and milling spindle from the machine base
- Optimum dampening properties combined with high stiffness, thus eliminating vibrations during machining and guaranteeing exceptional surface finishes
- A temperature-controlled oil circuit thermally stabilises the axes

3 or 5 axis?

- Rapid changeover from 3- to 5-axis machining while maintaining the highest precision



In figures

- 5 axis simultaneous machining of work-pieces. \varnothing 500 mm x 110 mm or \varnothing 220 mm x 220 mm with a load capacity of up to 60 Kg are possible depending on the clamping system.
- High-precision positioning with increments of 0.1 μ m and a repeatability of only 0.5 μ m. This enables machined work-piece accuracies that are demanded in today's high-end markets.
- Positional uncertainty A/C: $P = \pm 2.5''$
- Axways X/Y/Z: 500/500/400 mm
- Pivoting A: -10° to $+110^\circ$, Rotation C: $n \times 360^\circ$
- Hydraulic clamping of the swivelling axis for maximum stiffness during engaged machining.
- Rotation speed C up to 250 min⁻¹

Why micron-precise machining?

Investment in KERN machines is worthwhile even when it involves machining parts that do not need the "last μ ". The high repeatability accuracy of KERN machines is what really enables the production of parts with the least possible dimensional variability, 24 hours a day, 7 days a week. Including in the "unmanned shift" in which the money is earned. Another factor: the higher the achievable Cpk (process capability index) values, the lower the quality assurance costs. 100% checking is then no longer needed, and periodic sampling is sufficient, instead requiring for example only the measurement of every hundredth component.

KERN machines offer two considerable advantages compared to standard machines in series production:

- distinctly higher process reliability in unmanned fabrication, minimum rejects
- considerably lower quality assurance costs

Universal capability

Automated production with the KERN Triton had already been taken into account at the design stage. It can work with any automation solution and is not tied to particular manufacturers – either with external pallet changers or single part tooling via a robotic module. KERN also develops and implements reliable clamping technology and customised workpiece gripper systems, or even your complete fabrication process, including series production start-up.



→ KERN Micro- und Feinwerktechnik GmbH & Co. KG
Olympiastraße 2 | 82438 Eschenlohe | Germany
Phone : +49 8824 9101 229
mtsales@kern-microtechnic.com | www.kern-microtechnic.com

KERN Triton - High productivity

This 5-axis machining centre perfectly combines surface quality and accuracy with productivity. Bigger components can now be machined and larger chip volumes removed even with ultra-high precision machining. A powerful milling spindle with high pressure tool through-coolant system for internally cooled tools, high torque and up to 40,000 rpm makes this possible.

The KERN Triton is designed for both fully 5-axis simultaneous machining and for a combination of 3-axis machining. Through a special arrangement of the 4th and 5th axes, the KERN Triton combines the benefits of both machining concepts. The strategic positioning of the rotary table permits machining of long workpieces in the horizontal position. On the other hand, direct clamping onto the worktable allows high-precision 3-axis machining – with low programming effort and energy consumption and with high chip-cutting forces.

The hydrostatic bearing decouples the axes from the base and environment, thus avoiding all vibration transmission. The stick-slip effect of the guides commonly found in machine tools is eliminated, allowing jolt-free positioning of even the smallest increments. The temperature-controlled hydrostatic oil circulation also ensures permanent stability of the axis temperatures – even with very long machining times.

A large tool magazine, very fast tool-change times, preparation for the integration of automatic workpiece changing systems and the Heidenhain controller form the basis for maximum productivity. The KERN Triton provides state-of-the-art technology, equally suitable for one-off production, e.g. in tool- and mould-making, or for the series production of precision parts.

KERN Triton - High productivity

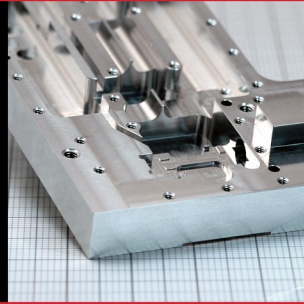


Application examples

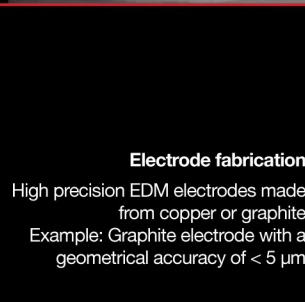


Tool- and mould-making
High-precision, dynamic simultaneous 5-axis machining of hardened steels
Example: Forging die, 250 x 200 mm, 60-62 HRC (Rockwell hardness, C scale)

Series production of precision parts
5-side machining, 3-shift
With automatic work-piece loading/unloading
Example: High-frequency technology, tolerances < 5 µm, filigree structures, stringent requirements for parallelism and rectangularity



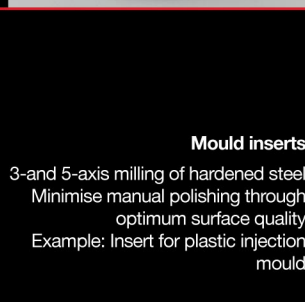
Optics
Hydrostatically milled, ultra-high-quality surfaces
Example: Reflector prototype



Electrode fabrication
High precision EDM electrodes made from copper or graphite
Example: Graphite electrode with a geometrical accuracy of < 5 µm



Impellers
Series production, simultaneous 5-axis, automatic work-piece loading/unloading.
Aluminum, titanium or steel
Example: Impellers with minimum machining time and maximum balance quality



Mould inserts
3- and 5-axis milling of hardened steel
Minimise manual polishing through optimum surface quality
Example: Insert for plastic injection mould

KERN Triton - Better in every detail

Crane loading possible

Z-axis slides and guides of one-piece fabrication, giving maximum Z-axis stiffness for long-term precision

Machine design is particularly flexible for automatic workpiece loading: Systems of any kind can be attached at the side. This retains unrestricted free visibility and front access for the operator.

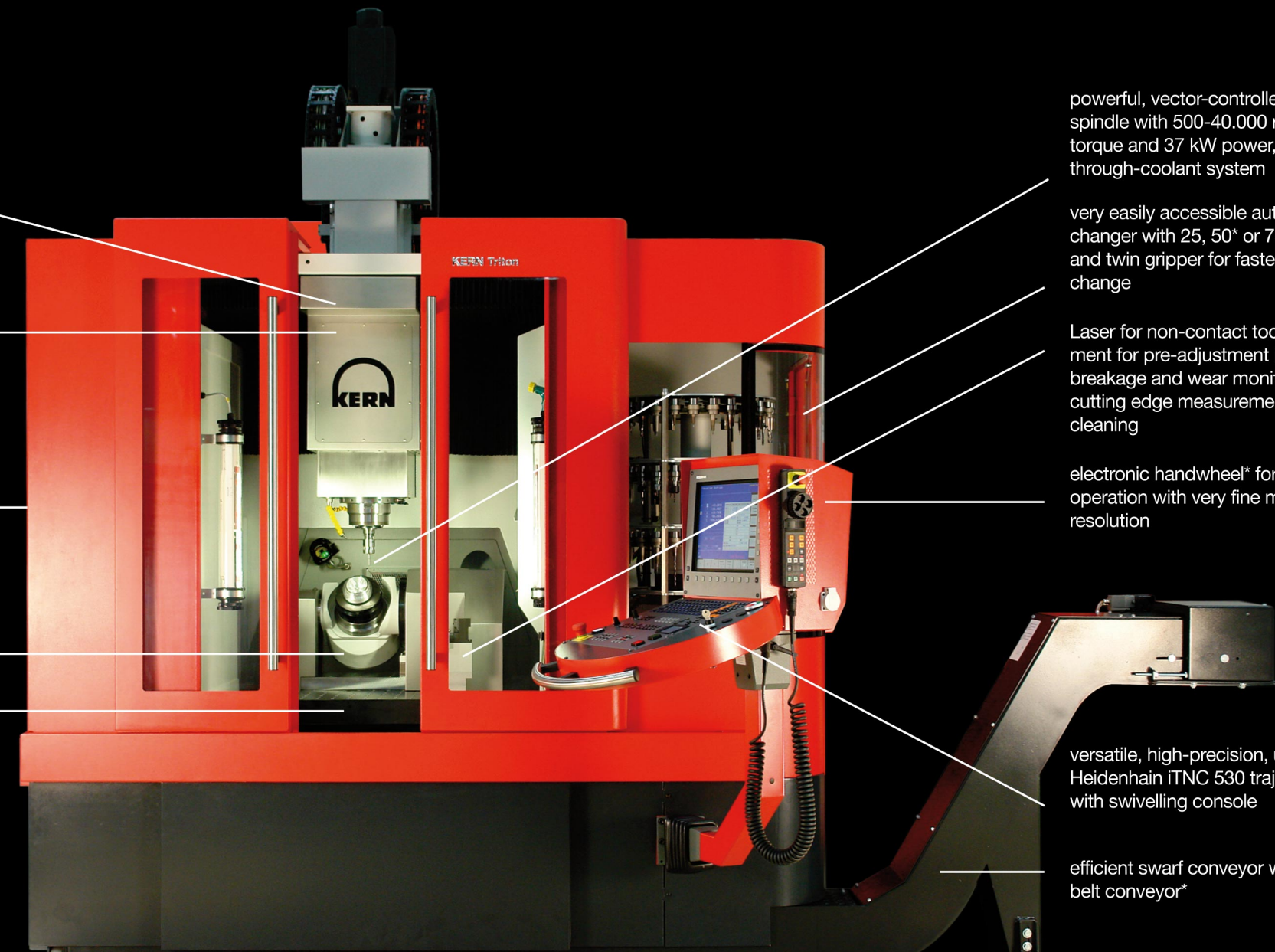
high-precision, temperature-controlled 4th/5th axis for simultaneous 5-axis machining with torque drives, additional space for 3-axis clamping and machining of workpieces

Wear free hydrostatic X and Y axis for superb surface finishes and high precision positioning with the smallest possible positioning increments

Eliminate thermal effects: A central temperature management system ensures temperature control of the spindle, axes, metalworking fluid, hydraulics, machine base and electrical cabinet with a regulation accuracy of < ±0.25 K

Focus on the human factor: Exemplary ergonomics through optimum visibility in the work space and workpiece changer, low bench height and operator friendly loading height

Solid as a rock: Machine base-frame with symmetrical portal construction made of KERN ARMORITH®, a material developed specifically for nano-precision machines



powerful, vector-controlled HSK 40 milling spindle with 500-40.000 rpm, up to 18 Nm torque and 37 kW power, with option for tool through-coolant system

very easily accessible automatic tool changer with 25, 50* or 75* tool positions and twin gripper for fastest possible tool change

Laser for non-contact tool position measurement for pre-adjustment in seconds, tool breakage and wear monitoring and individual cutting edge measurement, with built-in tool cleaning

electronic handwheel* for set-up operation with very fine movement resolution

versatile, high-precision, user-friendly Heidenhain iTNC 530 trajectory controller with swivelling console

efficient swarf conveyor with scraper belt conveyor*

* optional

Options & accessories

- Touch probe system for workpiece height and position measurement, interchangeable from the tool magazine, with data transfer via infra-red interface
- Minimal quantity lubrication system
- Flood cooling with emulsion or oil, temperature controlled
- Swarf conveyor
- Band filter with compact filter (removes particles down to 10 µm)
- High pressure tool through-coolant system
- Internal tool cooling with air
- Electrostatic suction unit for oil and emulsion mist
- Solid particle extraction unit for e.g graphite extraction
- Integration of a datum clamping system as required, automatic chuck for 3-axis clamping on the table and/or for the 4th/5th axis
- Preparation for an interface to an external automation system
- Dynamic Collision Monitoring (DCM)
- Macro video system
- Teleservice equipment for remote diagnostics
- Built-in automatic CO₂ fire extinguisher
- Rotating viewing window
- Hand-held flushing gun
- Interior flushing

always.**KERN**.precision