
KERN



MICRO VARIO

Compact, High Performance, Powerful





Rigth Side View



Left Side View

Kern Microtechnik

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Kern Microtechnik

WHO WE ARE

Kern Microtechnik GmbH is headquartered in Upper Bavaria in southern Germany. Located in the foothills of the Alps, we have been developing and manufacturing high-precision machining solutions for our customers around the globe for decades. With a focus on innovation, technology and close cooperation with our customers, we help them tackle the challenges of tomorrow. These include the energy transition, medical technology, the semiconductor industry and sustainable manufacturing. As part of AMETEK, we combine the agility and innovative strength of a technology company with the stability and global network of a leading international industrial group. Innovation, the courage to embrace change, and—above all—our dedicated team are the foundation of Kern’s success and resilience.



„One proof of our strong focus on technology is that we have as many people working in R&D as we have in our assembly.“

Matthias Fritz | DVP Research/Development

What sets Kern apart

In a constantly changing industrial environment, a machine must be adaptable. That’s why we offer a wide range of machining capabilities and a variety of options, allowing each machine to be configured for its specific application. Kern machines are designed with the future in mind and can be expanded or upgraded at any time.

Our commitment to ethics and sustainability is reflected not only in the way we do business, but also in how we develop our machines. We believe in honest, straightforward relationships with our customers, suppliers and partners. For us, sustainability means taking responsibility for both people and the environment. One example is our regional supply chain: 85% of our suppliers are located within 350 km (220 miles) of our headquarters. We source components from trusted partners, including suppliers in Germany, Austria, and Switzerland.

Wherever tomorrow’s technologies are being developed, quality, precision, and productivity matter today.

Through our work and our machines, we help shape the products and technologies of tomorrow — and contribute to progress across industries. That’s what drives us. We’re proud of the machines, innovations, and technology we develop, but we know that even the most accurate machine alone does not guarantee outstanding parts. Every application requires a stable, optimized process and the right expertise to achieve its full potential. That’s why Kern offers more than highly precise, highly productive machine tools. We share our expertise, support our customers in developing new products and technologies, and help them build successful, efficient processes for the long term.



„We strive to exceed our customers’ expectations and build long-term partnerships.“

Franz Guglhör | Head of Global Service

Distinctive Partnership With Customers

Sales

Our sales team listens closely and develops a deep understanding of our customers’ requirements. Innovation is often driven by customer needs. We look beyond the machine itself and consider the entire manufacturing process to provide comprehensive solutions and address challenges as quickly and effectively as possible.



„We are proud of our team and our machine technology. One indication that we’re on the right track is that there are virtually no used Kern Micro machines on the market—and no customers who are not achieving profitable results with their Kern Micro.“

Simon Eickholt | DVP Business Manager

Applications

Our applications engineering team is equipped with state-of-the-art technology and staffed by experienced, highly motivated experts. It is not a showroom or a laboratory — it is where real parts and real production requirements are used to develop robust, stable processes under real-world conditions. Customers gain a realistic, firsthand understanding of the machine’s capabilities using their own parts and applications. Together, Kern and its customers explore what is possible - and then push those limits further. This is only possible by combining Kern’s comprehensive expertise with the customer’s in-depth knowledge of their application and process.

Kern Training Center

The Kern Training Center provides thorough operator training. Courses show users how to get the most from the machine and the Heidenhain control. The program includes standard Heidenhain courses as well as specialized training in ceramics, deep-hole machining, carbide machining, and more. We also support customers with application-specific process development, maintenance, and service to accelerate the learning curve and keep machines operating efficiently.

Kern Service

Kern Service provides fast, personalized support. Whether you’re dealing with a machine issue, an error message, or a technical question, our service experts respond quickly and work with you to find the right solution. Remote support is also available to resolve issues as quickly as possible. With service technicians located nearby and backed by extensive expertise, we help keep your machines running reliably and performing at their best.



„I’m grateful to be part of this great team of inventors, pioneers, and honest, genuine people who make up the Kern family.“

Sebastian Guggenmos | DVP Operations

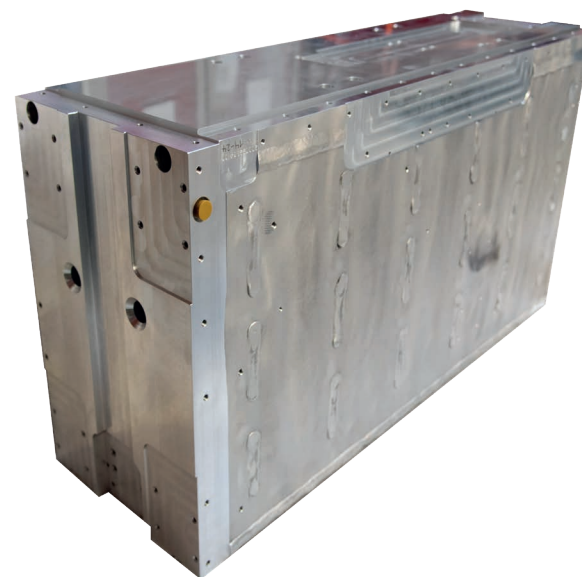
Lightweight. Powerful. Stable.

3-AXIS STRUCTURE – WHY ALUMINUM?

Exceptional precision comes not from accuracy alone, but from stability. That's why the Kern Micro Vario uses actively temperature-controlled aluminum axis structures. The result is high dynamic performance, outstanding thermal stability and consistently repeatable machining results.

The perfect combination of material and thermal control

Aluminum's high coefficient of thermal expansion is often viewed as a disadvantage in machine tool construction. What matters, however, is not expansion itself, but how it is controlled. That's why Kern combines an aluminum structure with integrated cooling channels and second-generation thermal management. The axis structures are actively temperature-controlled and maintained at a constant temperature over their entire length, allowing Kern to fully leverage the advantages of aluminum.



At a Glance

+ High Dynamics

The low weight of the aluminum axes significantly reduces moving mass, enabling high acceleration, short positioning times and productive machining without compromising precision.

+ High Specific Stiffness

Aluminum provides a significantly higher stiffness-to-weight ratio than conventional machine-tool materials. The result is a lightweight yet extremely stable 3-axis structure that provides the foundation for high contouring accuracy and excellent machining results.

+ Fast Thermal Response

Aluminum responds quickly to changes in temperature. Active thermal control helps compensate for thermal effects and maintain machine stability.

Turntable: Single-Sided Bearing Support

A key principle of precision engineering is Exact Constraint Design, also known as Kinematic Design. The goal is to constrain the system only as much as necessary. Adding unnecessary constraints may increase stiffness, but it can also create unwanted forces.

An over-constrained system can react unpredictably to small geometric errors in its components, including errors from manufacturing and assembly, as well as to changes in temperature and other environmental conditions.

The Micro Vario's rotary and swivel axes therefore offer a significant advantage: stable, predictable, and repeatable performance under changing production conditions. The design also provides excellent access for workpiece handling and process monitoring, making operations in the machining area easier to manage.*

At a Glance

+ Thermal Performance

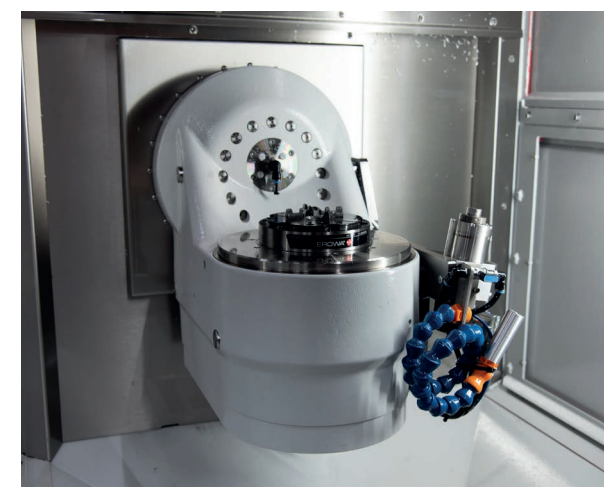
Stable performance despite changing environmental temperatures.

+ Repeatable System Performance

Avoiding an overconstrained bearing arrangement reduces unwanted forces and makes sources of error easier to identify and compensate for.

+ Workpiece Access

Open machining area with excellent access for operators, tools, and automation.



Single-Sided Bearing Support



Double-Sided Bearing Support

*James Clerk Maxwell, 1890 [MAX90]: „Hence if a solid piece is constrained in more than six ways it will be subject to internal stress and will become strained or distorted, and this in a manner which, without the most exact micrometrical measurements, it would be impossible to specify.“ *

Independent & Stable Processes

KERN TEMPERATURE-MANAGEMENT

Precision starts with thermal stability

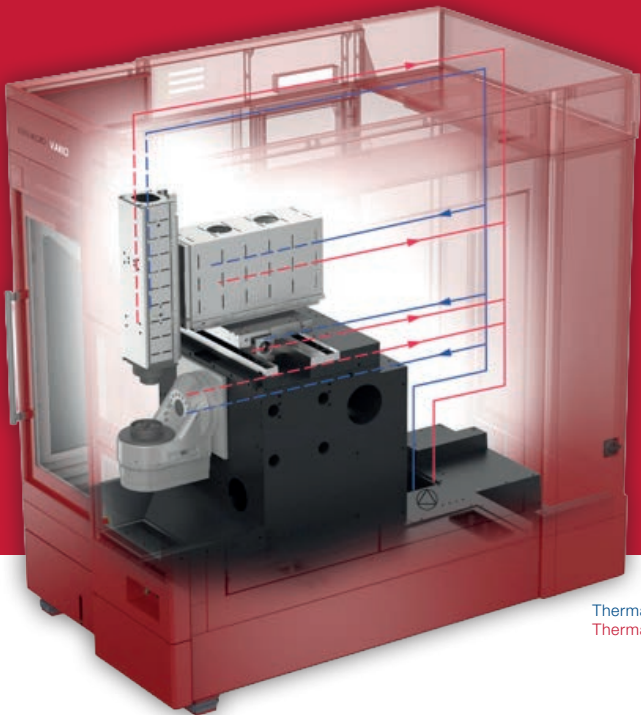
Temperature is one of the biggest factors affecting the accuracy of a precision milling machine.* Even the smallest temperature variations can cause changes in the machine structure, resulting in deviations at the workpiece. Second-generation Kern Temperature Management minimizes these effects and provides the foundation for consistently repeatable precision and accuracy.

Three Advantages

- + **Repeatable, consistent results:**
Constant temperatures ensure consistent production results and stable processes over time.
- + **Independence from environmental conditions:**
Temperature fluctuations in the manufacturing environment have significantly less impact on machine geometry.
- + **Productivity without warm-up delays:**
The machine quickly reaches a stable thermal state and maintains consistently high accuracy even as machining conditions change.

At a Glance

- + Active thermal control of all components critical to accuracy
- + High process stability
- + Consistently high part quality
- + Stable performance despite environmental influences



Thermal Control - Supply
Thermal Control - Return

*Source:
Mayr, J., Jedrzejewski, J., Uhlmann, E., Donmez, M.A., Knapp, W., Haertig, F., Wendt, K., Moriwaki, T., Shore, P., Schmitt, R., Brecher, C., Wuerz, T., Wegener, K., 2012. Thermal issues in machine tools. CIRP Annals - Manufacturing Technology, 61(2):771-791.

How is thermal control achieved?
- Flow Rate: 60 L/min
- Temperature: 20°C ± 0,08 K
- Supply/Return temperature difference: <0.5 K

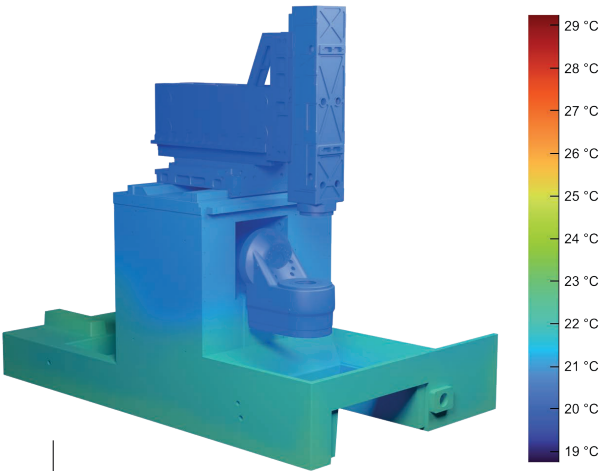
Four-Stage Axis Thermal Control

Active Thermal Control of Machine Components

What matters is not the temperature of individual components, but how they interact. That's why Kern actively controls the temperature of all components critical to machine accuracy and maintains them at a constant temperature.

Actively Temperature-Controlled Components:

- + **Linear Axes:**
Axis structure, motor
- + **Turntable:**
Drive, bearing support, and critical assemblies
- + **Spindle:**
Bearing, motor, rotary union
- + **Electrical cabinet and electronic components**
- + **Media and fluids:**
Coolants and lubricants



Thermal Stability in Action
Climate-chamber testing demonstrates the effectiveness of Kern Temperature Management. The color gradient shows the temperature distribution across the machine.

Stability you can't see - but you can measure

Second-generation Kern Temperature Management is always working in the background. High flow rates and precise temperature control keep the Kern Micro Vario consistently accurate, even as operating

conditions change. The result: repeatable production results, high-quality surface finishes, and stable processes over the long term.



„The Kern Micro Vario’s intelligent temperature management delivers exceptional thermal stability. It helps ensure reliable, consistent processes, so we can focus on what matters most.“

Christoph Angerer | Head of Kern Training Center

At a Glance

KERN MICRO VARIO

- + *Compact design and a small footprint* of just under 54 sq ft (5 m²)
 - + *Exceptional machine stability* with optimized Kern Temperature Management
 - + *High Productivity* and uncompromising accuracy
 - + *Superior quality, flexibility and competitiveness*
- + *Unattended multi-shift production* with an integrated changer for up to 210 tools and 60 work-pieces
 - + *Certified interfaces* for external equipment and automation systems
 - + *Inspection and maintenance* without interrupting production

The Kern Micro Vario

With its unique design and many upgrades, the second-generation Kern Micro raises the bar for flexibility, precision, and productivity.

Ultra-compact, flexible and application-focused, the Kern Micro Vario delivers a decisive competitive advantage—every day, with exceptional efficiency.



Spindle Options

+ *HSK-E 25*: 50,000 rpm, 6 kW (S1) ball bearing



+ *HSK-E 40*: 42,000 rpm, 15 kW (S1) ball bearing



Picture:
FISCHER AG Präzisionsspindeln

Ergonomic & User-Friendly

HEIDENHAIN CONTROL TNC7

With Heidenhain's TNC7 control, operators are supported throughout the entire machining process, from the initial idea to the finished part—whether producing a single part or a series. The TNC7 is fully optimized for touchscreen operation, making the software intuitive and easy to use. Its hardware and software are designed to work seamlessly together, providing a comfortable and ergonomic operating experience. Kern has integrated the new high-resolution widescreen displays

into a folding and swiveling control panel, positioning them for easy access. All future technology upgrades will be developed exclusively for the TNC7. The Heidenhain control's fast block processing and advanced path planning enable highly precise, high-speed simultaneous 5-axis machining. Combined with Kern's machine concept, this makes it possible to economically produce even the most challenging parts.



MORE OPTIONS

Filtration

- + **Paper Band Filter:**
Available with low- or high-pressure systems up to 1,160 PSI (80 bar) for through-tool coolant delivery, with a 130-gallon (490 L) tank. Paper band filters are available in different configurations and can be tailored to specific applications.

Cooling, Lubrication, Chip Management

- + **Through-Tool Coolant Delivery:**
Rotary union for through-tool coolant delivery using air, emulsion, or oil, in combination with a paper band filter. Pressure: coolant 1,160 PSI (80 bar) /compressed air 87 PSI (6 bar).
- + **BEMA-Nozzles:**
Coolant nozzles automatically adjust to the individual tool length for best possible cooling.
- + **Chip Conveyor:**
Integrated chip conveyor with discharge at the rear of the machine. Available only in combination with a paper band filter.
- + **Internal Chip Collection Bin:**
The temperature-controlled chip collection bin has a capacity of 26.4 gal (100 L). It is connected to the machine's central thermal management system. Coolant flow rate: 6.6 GPM (25 L/min) at 5.8 PSI (4 bar).
- + **Minimum Quantity Lubrication:**
Micro-dosing pumps with dual dosing units and two coaxial nozzle arms with stainless-steel nozzle tips. Oil flow is easily adjusted from the Heidenhain control to match the application. Oil reservoir capacity: 0.4 gal (1,5 L).
- + **Machining Area Flush System:**
High-performance nozzles keep chips and debris from building up on covers, doors, and the Z-axis bellow. Coolant flow is matched to the machining process to provide effective cleaning at the required pressure.

Integrated Tool-Management

- + **Tool Recognition DMC-Scan:**
Each time the tool changer door closes, the system automatically scans all toolholders and tools and retrieves the stored data for each tool.
- + **Tool Cleaning:**
Automated in-machine cleaning removes oil and debris from cutting tools immediately before laser measurement, helping ensure reliable measurement results.
- + **3D Tool Comp:**
Provides powerful 3D tool-radius compensation and allows measurement of 3D tool geometries. Tool compensation tables can be used to define angular delta values that describe deviations from the tool's ideal circular profile. The system can also compensate for the radius at the tool's current contact point with the workpiece.
- + **Form Control X:**
User-friendly measurement and automation software for automated quality control of parts in both single-part and series production. It helps maximize productivity and minimize scrap by enabling in-process and post-process inspection, measurement-based process control, and rework without removing the part from its original setup.
- + **BLUM Laser LC50 with Digilog:**
Digilog technology uses a scanning measurement process with higher sampling rates, reducing measurement and inspection times by up to 60%. It also improves process reliability when chips or coolant build up on the cutting edge.

Automation

- + **Integrierter Workpiece Changer:**
Unattended multi-shift production with an integrated changer for up to 60 parts.
- + **External Automation:**
See page 15

Productivity

- + **Kern Advanced Surface:**
The machine's capabilities translate directly into exceptional surface quality.
- + **Energy Efficiency Option:**
Designed to reduce overall energy consumption while increasing productivity and maximizing machine uptime.
- + **Kern Active Thermal Calibration:**
Thermal compensation for heat generated by individual machine components helps maintain high accuracy and productivity while significantly reducing warm-up time.

Safety

- + **Collision Monitoring – DCM V2:**
Software for real-time monitoring of components within the machining area. Predefined clearance zones are continuously checked against machine movements. If a collision is imminent, machining is automatically stopped.
- + **Fire Suppression:**
Fire protection system with an adjustable activation temperature from 122°F (50°C) to 302° F (150°C).
- + **Teleservice:**
Kern Service can remotely access the Heidenhain control and other machine components through the internet and the customer's network, enabling fast diagnostics and troubleshooting.

Information

- + **BDE-Interface - 3 Signals available:**
The machine provides key operating and status data for digital production monitoring. Operators have a clear view of machine status and can adjust processes as needed to keep production running efficiently.
- + **OPC UA Interface:**
A secure, reliable interface for integrating modern industrial applications. Standardized interfaces simplify integration and allow multiple systems to be connected as needed.
- + **DNC 18:**
Software function for communication between a cell controller and the Heidenhain control.

Kern Micro Vario

FEATURES



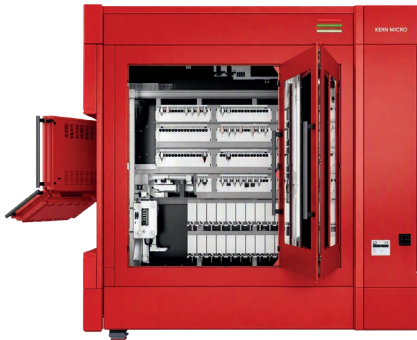
Built for Performance Compact

Compact, space-efficient and powerful, the all-in-one design integrates all machine systems into a single unit with a footprint of less than 54 sq ft (5 m²). At just 9.2 ft (2.80 m) long and 5.4 ft (1.64 m) wide, the machine is remarkably compact without compromising capability.



Full Access Productive Maintenance

The well-organized and fully accessible service area on the side of the machine allows operators to check and refill operating fluids without stopping production. Maintenance needs are easy to identify at a glance, helping keep the machine up and running.



Efficient & Space-Saving Fully Automated

The right level of automation can make a major difference in production efficiency. With an integrated workpiece changer for up to 60 parts, the Kern Micro Vario combines unattended production with a compact footprint of less than 54 sq ft (5 m²).

Kern Micro Vario

FEATURES



Automation-Ready External Automation

The Kern Micro Vario integrates easily with external automation systems for reliable, efficient part loading and unloading. The open design maintains clear visibility of the machining process at all times. The machine is fully equipped for unattended operation.



Fully Integrated Key Components

Components such as the coolant system can be fully integrated into the machine without taking up additional floor space. The machine also features a space-efficient connection for the optional paper band filter and chip conveyor.

At a Glance

SPECIFICATIONS

Linear Axes

Travel X/Y/Z: 13.8 / 8.7 / 9.8 in. (350/220/250 mm)
Feed Rate: 1,180 IPM (30 m/min)
Acceleration: up to 1.02 G (10 m/s²)

Rotary & Swivel Axes

Rotary axis: 360° continuous / 200 rpm (200 min⁻¹)
Swivel axis: ±110° (opt. -180°) / 100 rpm (100 min⁻¹)
Swivel axis Clamping: 300 Nm

Workpiece

Max. clamping surface: Ø 13.8 × 7.9 in. (350 × 200 mm)
Max. workpiece weight: 110 lb (50 kg)

Accuracy (VDI/DGQ 3441) (X/Y/Z)

Positioning uncertainty P: < 1,5 µm
Mean positioning spread Ps: < 1 µm

Accuracy (ISO 230-4)

Circularity error Gyx: ≤ 3 µm
Circularity error Gxy: ≤ 3 µm

Tool Changer

HSK 40: 90-, 102-, 186- and 210 pockets
Max. tool diameter: 2.8 in. (70 mm)
Max. tool length: 6.1 in. (155 mm)
Optional: Combined tool and workpiece changer

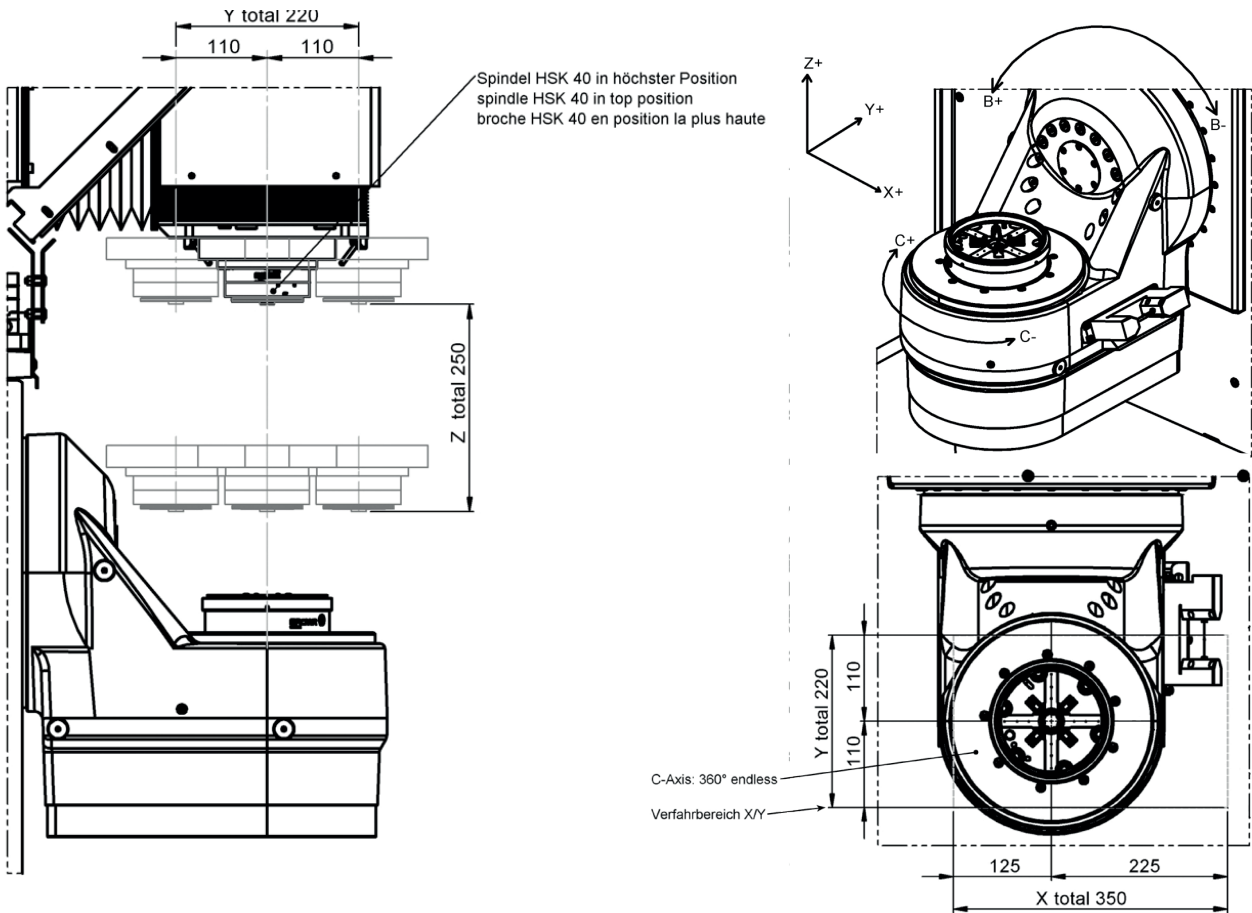
Technology

Integrated Thermal Management
with ±0,08 K temperature control
Simultaneous 5-axis machining
Heidenhain Control TNC7
Compact all-in-one design

Dimensions & Weight

Weight: 11,464 lb (5,200 kg)
Minimum space required (W/D/H):
5.4 × 9.2 × 9.0 ft (1.64 × 2.80 × 2.74 m)

As of 08/2026
(Specifications subject to change without notice)



Front View

Left Side View



Right Side View



Kern CNC Machining Centers

MACHINE OVERVIEW

Specification		Micro Vario	Micro HD	Micro HD+	Fortis HD
Travel X-Axis in. (mm)		13.8 (350)	13.8 (350)	13.8 (350)	30.71 (780)
Travel Y-Axis in. (mm)		8.7 (220)	8.7 (220)	8.7 (220)	16.5 (420)
Travel Z-Axis in. (mm)		9.8 (250)	9.8 (250)	9.8 (250)	17.7 (450)
Max. Feed Rate X IPM (m/min)		1,180 (30)	2,360 (60)	2,360 (60)	2,360 (60)
Max. Feed Rate Y IPM (m/min)		1,180 (30)	2,360 (60)	2,360 (60)	2,360 (60)
Max. Feed Rate Z IPM (m/min)		1,180 (30)	2,360 (60)	2,360 (60)	2,360 (60)
Acceleration X G (m/s²)		1.02 (10)	1.02 (10)	1.02 (10)	1.02 (10)
Acceleration Y G (m/s²)		1.02 (10)	1.22 (12)	1.22 (12)	1.02 (10)
Acceleration Z G (m/s²)		1.02 (10)	2.04 (20)	2.04 (20)	1.53 (15)
Spindle Option 1	HSK-Interface	HSK-E 25	HSK-E 25	HSK-E 25	CSC HSK-E 40
	Max. spindle Speed rpm	50,000	80,000	80,000	45,000
	Bearing	Rolling Bearing	Air Bearing	Air Bearing	Rolling Bearing
	Power S1 kW	6	5.8 (4.3)	5.8 (4.3)	15
	Torque S1 Nm	1.4	0.7	0.7	6
	Max. tools	241	241	241	349
Spindle Option 2	HSK-Interface	HSK-E 40	HSK-E 40	CSC HSK-E 40	CSC HSK-A 63
	Max. spindle Speed rpm	42,000	42,000	45,000	24,000
	Bearing	Ball Bearing	Ball Bearing	Ball Bearing	Ball Bearing
	Power S1 kW	15	15	15	29
	Torque S1 Nm	6	6	6	69.2
	Max. tools	210	210	210	154
Max. Table Load lb (kg)		110 (50)	110 (50)	110 (50)	upon request
Max. Workpiece Dimension in. (mm)		13.8 x 7.9 (350 x 200)	13.8 x 7.9 (350 x 200)	13.8 x 7.9 (350 x 200)	22.2 x 13.8 (565 x 350)
Control		Heidenhain TNC7	Heidenhain TNC7	Heidenhain TNC7	Heidenhain TNC7
Dimension: L x W x H ft (mm) (without aspiration)		9.2 x 5.4 x 9.0 (2.800 x 1.640 x 2.740)	9.2 x 5.4 x 9.0 (2.800 x 1.640 x 2.740)	9.2 x 5.4 x 9.0 (2.800 x 1.640 x 2.740)	13.3 x 10.3 x 11.5 (4.063 x 3.140 x 3.500)
Weight lb (kg)		11,464 (5,200)	12,125 (5,500)	12,125 (5,500)	36,156 (16,400)
Tool Changer		integrated	integrated	integrated	integrated
Workpiece Changer		integrated/external	integrated/external	integrated/external	external
Drives Guidance system linear (X/Y/Z)		Ball Screw Bearing Guide	Linear Motor Hydrostatic	Linear Motor Hydrostatic	Linear Motor Hydrostatic
Drives Guidance system 4 th /5 th Axes (B/C)		Torque Motor Bearing Guide	Torque Motor Bearing Guide	Torque Motor Hydrostatic	Torque Motor Bearing Guide

As of 08/2026 (Subject to technical changes)



Kern Micro Vario



Kern Micro HD



Kern Micro HD+



Kern Fortis HD



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Kern Microtechnik GmbH | Olympiastr. 2 | DE-82438 Eschenlohe
kern.info@ametek.com | www.kern-microtechnik.com

