Qualität
Made in Germany

The inpotron Group

inpotron
activates your best

inpotron Schaltnetzteile GmbH
Hebelsteinstraße 5
78247 Hilzingen
T +49 7731 9757-0
F +49 7731 9757-10
info@inpotron.com
www.inpotron.com

ZORN
Maschinenbau

ZORN Maschinenbau GmbH
Höllstraße 11
78333 Stockach
T +49 7771 87373-0
F +49 7771 87373-290
zorn@zorn-maschinenbau.com
www.zorn-maschinenbau.com

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3. PLATZ
KATEGORIE 1
ENERGIEEFFIZIENZ

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ZORN
Maschinenbau

MICRO PROCESSING

High-precision, energy-efficient and sustainable micromachining!

Micro assembly

Special machine construction

Micro machining

Machine tool building

Wire processing

Special machine construction

The dawn of modern precision machining in a new dimension

SMALL, FINE, PRECISE...

Micro-machining without compromises

Precision in comparison:
from the left: Fine, Drill, Cutter, Pencil Point

What is special about microone?

microone is the professional micromachining centre that can be adapted extremely flexibly to the most diverse requirements. Characteristic is not only its extremely compact and high-quality design, but also the detachable modules.

Modularity in a "miniature size". You only have to invest a maximum of 0.9 m² of valuable floor space to obtain a fully-fledged 5-axis machining system. Plug and Play not only describes the technology of the product, this also applies to transport – microone fits easily through any standard door.

Maximum flexibility and the best possible operability were the guiding principles in the development of the microone. Optimal access and an ideal viewing area for the workpiece allow an efficient and effective machine operation. The work table height of the microone, with which even the smallest components can be easily seen and gripped, also contributes to this. Perfect ergonomics, and always the essentials in view at an optimum distance from the workpiece. The generous access from two sides underlines the user-friendliness. The modularity makes it possible to integrate the processing module separately into assembly systems, while the supply unit remains outside.

Currently, the microone is designed as a classic machining centre. However, further development also aims to achieve the integration of other machining methods. The currently used high-performance spindle can then be replaced, for example, by laser optics or by a dosing unit, so that laser welding, marking, gluing or other dosing and inspection tasks are also possible areas of application.

Combined with our experience in micro-assembly, this creates an interesting package for your production. This includes a gripping and handling of small parts as well as direct further processing using a wide range of technologies.

Pleasure in the value creation with precision

ENERGY AND ENVIRONMENT

Save and win

72 %
lower electricity costs *

74 %
less CO2-Emission *

80 %
less space required *

Sustainability is increasingly determining our everyday lives. The topics of environmental protection and resource management are also becoming increasingly important in the production. The microone is able to score in all relevant areas and impresses with its low energy consumption, significantly lower CO_2 emissions and a very small footprint compared to conventional CNC machines.

* Compared to a conventional CNC machine

Sustainability in the production

Size comparison
Euro pallet

NATURAL GRANITE - A RELIABLE FOUNDATION

WORKPIECE AND TOOL MEASUREMENT

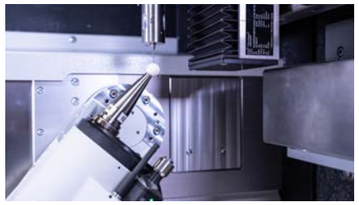
Precision needs stability

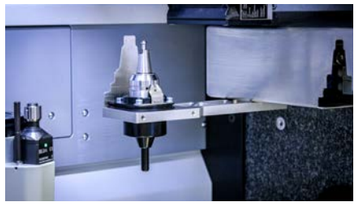
The smaller the workpiece, the higher the demand for precision. The solid granite foundation absorbs all movements of the ZORN microone. Even today, the "unbeatable" properties of natural granite are used by the designers for their microone.

Granite block (natural hard rock): created by nature millions of years ago

- More inherent rigidity
- More thermal stability
- More mechanical stability
- Maximum repeatability
- Precisely ground

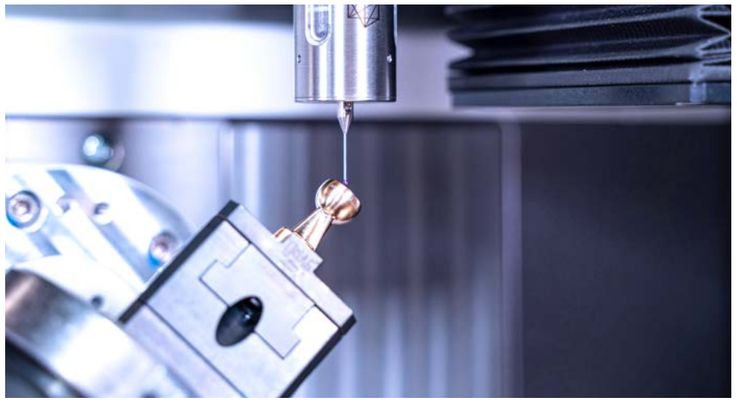
More than half a ton of granite creates a reliable foundation





For the measurement of the tool lengths, a probe is placed as close as possible to the C-axis. In the case of direct clamping, the length is measured each time after a tool change, whereas this can be omitted when using the SBN pick-ups.

Two variants are available for measuring the workpieces.



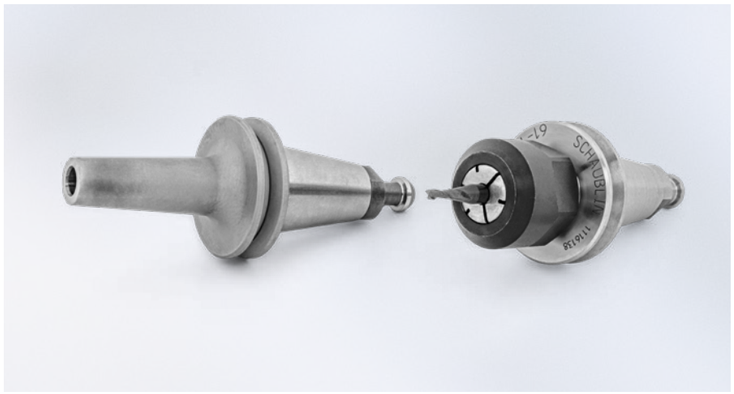
SPINDLES AND TOOL CLAMPING

TOOL STORAGE

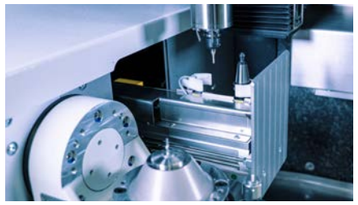
Miniature steep taper seat with collet chuck

Tool for direct clamping Diameter 3 / 4 / 6 mm

With all variants of tool holders, the tools are always moved along the main axis and changed as close as possible to the work table. Here, the short distances and the length measurement directly at the work table are of great advantage.



The extended tool storage holds up to 40 tools without taking up additional space. Old and new tools are exchanged via the drawer system. Access is possible via the side door even during operation.



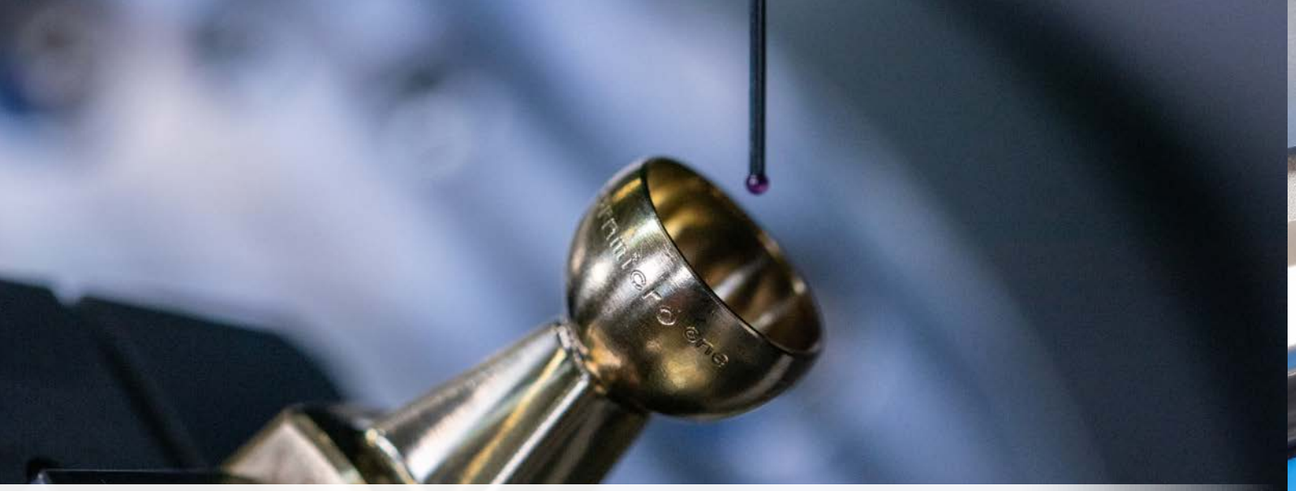
Tool changing system with a large tool storage

Standard tool magazine Direct clamping with twelve places

The standard magazine can hold either six SBN10 tools or twelve tools with direct clamping. The choice between the type of tool holder depends on many factors and can be freely selected.

Standard tool magazine SBN10 with six places

A jewel for precious metal processing



MODULAR

CHIP CONVEYOR

Modular construction

The modularity of the actual machining unit makes it possible to design an ergonomic seated workstation. The supply unit is moved to the side or back to provide sufficient legroom. The processing module can be positioned as desired (the max. cable length must be taken into account).

Furthermore, the processing module can also be integrated into assembly systems, while the supply module remains outside.

The supply module houses the power supply with control and all other auxiliary units. Two side switching cabinets accommodate the electrical supply on the one hand and the cooling unit for the water cooling of the axes and the spindle on the other. The minimum quantity lubrication and the pneumatics are installed in the middle section.

All supply lines are bundled and installed between the machining level and the supply unit.

Optionally, an air bearing between both modules is possible to protect the working plane from external vibrations. Two drawers are provided in this intermediate space, both for the keyboard and for items like tools.

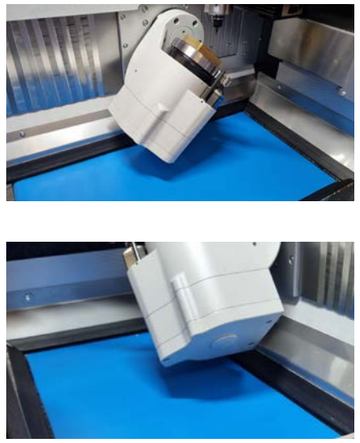
Processing module

Supply module

Removal of the chips

This consists of a conveyor belt (blue in the picture) that covers the entire floor area. Deflector plates lead the chips to fall towards the floor.

At the left-hand end of the chip conveyor, the chips fall into an auger conveyor attached to the side. This transports the chips to the rear outside the machine. At the end of the auger is a chute where the chips fall into a container provided.

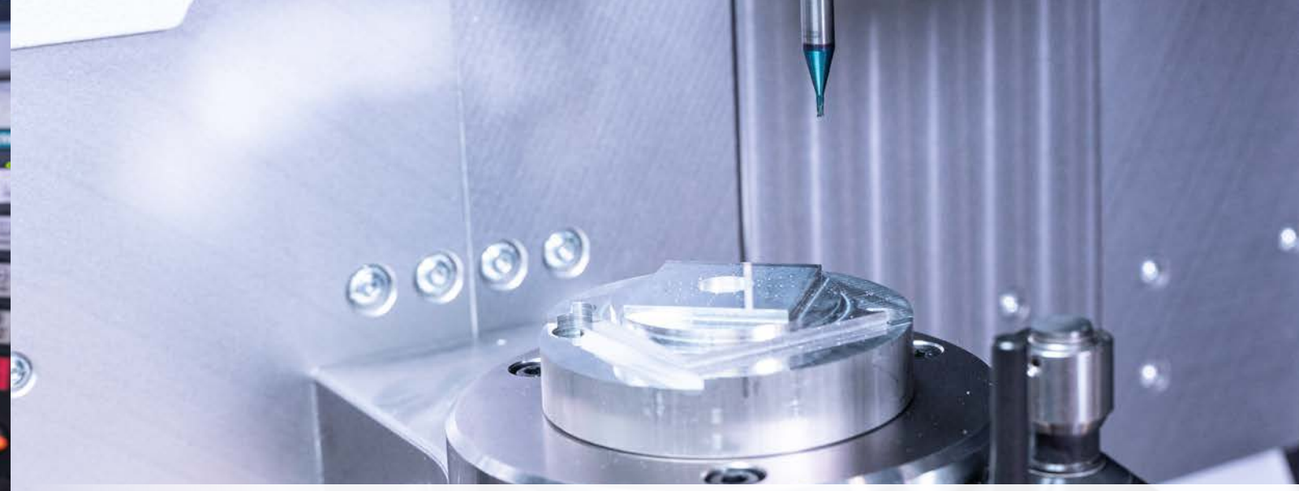


ERGONOMICS

Ideal access from two sides

Due to the access from two sides and the elevated machining level, an optimal visibility and access situation for the operating personnel was created.

Ergonomics, that your employees will love



CONTROLLER TECHNOLOGY

Sinumerik 840D sl– perfectly complements the microone!

The drive-based CNC from Siemens belongs to the premium class and supports the microone machine concept with a maximum performance.
Flexibility and openness are supported with Sinumerik, as is the use of technologies for multitasking concepts.

5-axis simultaneous machining with optimum kinematics opens doors in a wide range of different part machining operations.

SECURITY

Extraction and fire extinguishing system

To ensure the highest possible level of safety and a good climate, the air in the working area is extracted and filtered. The modular filter system facilitates maintenance. In addition, a fire extinguishing system is available to ensure operation even when processing flammable materials.

LASER PROCESSING

Complete packages

During the development of microone, care was taken to prepare everything for future automation. The 30 years of experience in the field of special machine construction of ZORN Maschinenbau GmbH has clearly been integrated here. A wealth of experience can be accessed, especially when it comes to the handling of small components.

Many possible applications: Laser cutting or laser welding with all the degrees of freedom of a modern machining centre in the smallest space with the highest precision. Further alternative uses, are possible e.g. as a 3D dosing system or similar.

The parts feed, deposit and / or even the visual part measurement can be integrated according to your wishes.

Everything from one source

– No coordination and deadline problems

We can automate and equip your new machining centre according to your wishes

– Special solutions are our strength

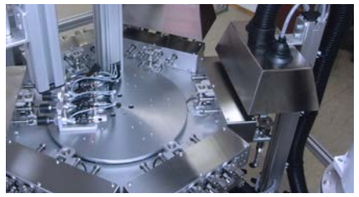
– Turnkey projects or only small wishes – we are open for everything

– No external providers

SOPHISTICATED AUTOMATION

Modular, flexible, compact

As a rule, the automation module is used as a feeding and removal device. Several variants of feeding technology are available for this purpose. Alternatively or in addition to this use, it is also possible to integrate further manufacturing processes and to link other modules instead of further microones.



Everything from a single source, through a reliable partner

Raw material or component feeding

Smart automation example for loading and unloading a machine tool. This low-cost variant is without intrinsic control and should only be selected for "smaller" tasks. Typically, this variant is used to automatically insert and remove products for processing.

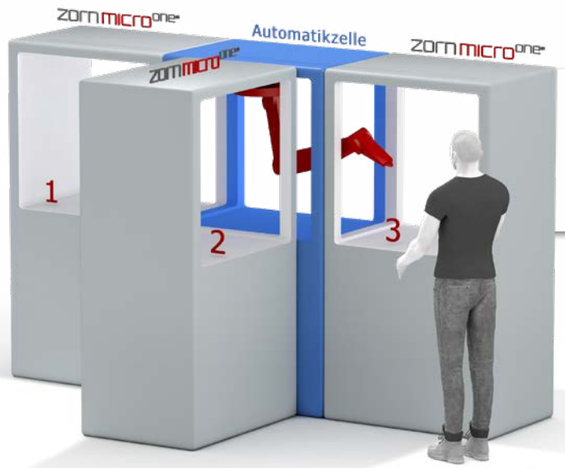
This can be in the form of prefabricated parts or as sections, rods or on material on pallets.

Additional feeding devices can be offered for all automation variants, from conventional bulk material feeders, bar loaders for short bars to optical systems, pallets and magazine lifts.

PREMIUM / SMART AUTOMATIC CELL

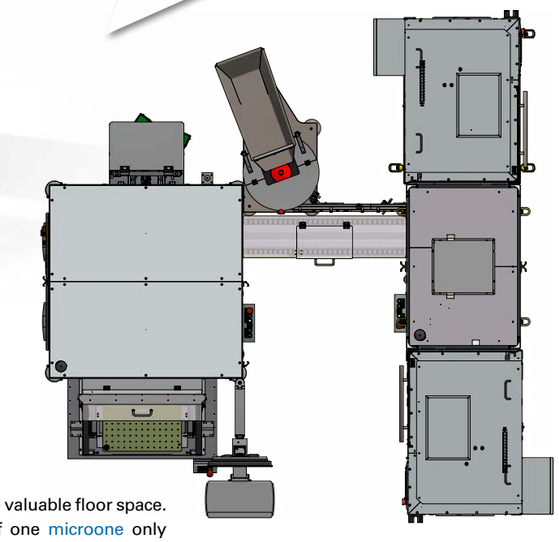
Several adapted automation cells are available for different tasks. The type and scope of the task determine the use of the cell variant. Everything is possible, from a pure loading function to complex further processing or interlinking. In particular, there are also many options for feeding parts, whether as raw material or in prefabricated form. Here we can draw on the entire wealth of experience from over 30 years of special machine construction.

MODULAR CONSTRUCTION



Example:
Feeding through automatic cell
to 3 × microone

Our space miracle



Our development of the modular production cell is adapted to the size and design of the microone down to the last detail. The ceiling mounting of the robot guarantees the utilization of the entire floor space with maximum flexibility for your products. This allows the robot to reach out of the cell on all sides and operate up to three microone!

This allows you to save valuable floor space. For the automation of one microone only approx. 1.8 m² are needed, and with maximum arrangement with three microone only approx. 6.5 m². A modular space wonder with the highest benefit for the characteristic value output / m².

ZORN MASCHINENBAU

Why our competence shows up in the details ...

Your benefit is what drives us

For decades, a team of highly motivated employees and a network of creative partners have been implementing both standard solutions and individual projects according to customer specifications.

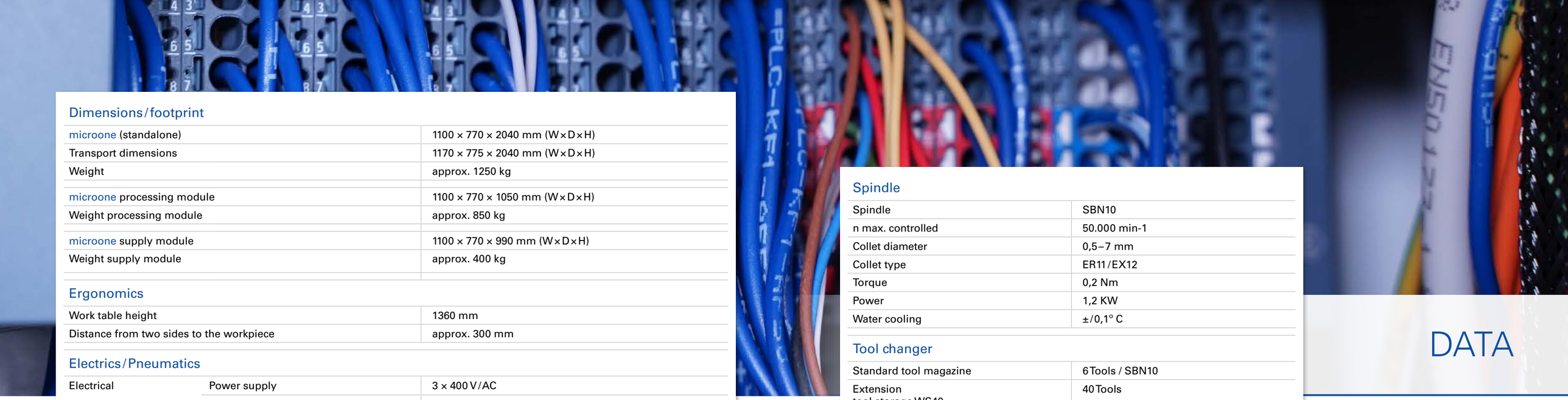
The mechanical engineering originated from the equipment construction of a light bulb factory. For the production of the precision miniature incandescent lamps, all jigs and machines were developed and manufactured in-house over period of several decades. After the first machines on which glass and wire were processed, many other special machines for precision mechanical assembly tasks followed. Even today, wire is regularly processed in a wide variety of forms on our plants.This includes the feeding, as well as the assembly and further processing of small and very small parts by e.g. bending, riveting, upsetting, soldering, welding, labelling and much more.

Over the last 25 years, industrial manufacturing has changed significantly. All companies are required to manufacture or assemble their products at low cost, even if the quantities sometimes do not allow it. Flexible and reusable, of very high quality, this must or can be the answer to the requirement. Also: Automation of critical processes to ensure greater safety in production, possibly combined with manual activities.

ZORN Maschinenbau has adapted to these tasks and offers solutions specially adapted to the customer's product. Since 2013, ZORN Maschinenbau has been part of the inpotron Schaltnetzteile GmbH group of companies and employs around 50 people.

In order to serve our customers even more comprehensively, we have developed the microone, a miniature machining centre which can be used as a stand-alone variant but can also be used as a single module on our assembly systems. This makes machining in combination on one of our automatic assembly machines possible for the first time.

"Combining the product know-how of our customer with our experience from over 35 years of mechanical engineering creates an added value for both partners."



DATA

Dimensions/footprint

microone (standalone)	1100 × 770 × 2040 mm (W×D×H)
Transport dimensions	1170 × 775 × 2040 mm (W×D×H)
Weight	approx. 1250 kg
microone processing module	1100 × 770 × 1050 mm (W×D×H)
Weight processing module	approx. 850 kg
microone supply module	1100 × 770 × 990 mm (W×D×H)
Weight supply module	approx. 400 kg

Ergonomics

Work table height	1360 mm
Distance from two sides to the workpiece	approx. 300 mm

Electrics/Pneumatics

Electrical	Power supply	3 × 400 V/AC
	Connected load	6,0 KVA
Pneumatics	Compressed air supply	6 bar

Travel axes

X-axis	Linear actuator	190 mm
Y-axis	Linear actuator	140 mm
Z-axis	Linear actuator	170 mm
Optional B-axis	Torque with clamping	+110 / -10 degrees, opt. - 90 degrees
Optional C-axis	Torque	360 degrees

Rapid traverse axes

X- / Y- / Z-Achse	55 m/min
Optional B-Achse	130 rpm
Optional C-Achse	1300 rpm, up to 3,000/6,000 rpm

Beschleunigung Achsen

X/Y/Z-axis	up to 15 m/s²

Feed force axes

X / Y / Z-axis	550 N
Optional B-axis	7,5 N
Optional C-axis	2,5 N

Positioning accuracy axes according to VDI/DGQ 3441

Direct measurement systems in all axes with the highest precision	

Workpiece size/clamping surface

Max. diameter	100 mm
Max. height incl. clamping medium	80 mm
Max. weight incl. clamping medium	1,0 kg

Controller

Siemens	840 D sl

Spindle

Spindle	SBN10
n max. controlled	50.000 min-1
Collet diameter	0,5–7 mm
Collet type	ER11/EX12
Torque	0,2 Nm
Power	1,2 KW
Water cooling	±/0,1° C

Tool changer

Standard tool magazine	6 Tools / SBN10
Extension tool storage WS40	40 Tools

Alternative for direct voltage

Standard tool magazine	12 tools/direct clamping
(variants depending on spindle)	

Options

CAD/CAM	standard systems can be used
Minimum quantity lubrication/ Medium distributor	
Suction	
Workpiece measurement	
Extinguishing system	
Laser applications	Cutting/Welding
Bar loader/pallet loader	
Automation	Smart / Premium