



KOMtronic

Efficient actuating tool systems for turning contours with a stationary workpiece for machining centres and special-purpose machines.



best per part.

best per part.

SW – Schwäbische Werkzeugmaschinen GmbH – is the world market leader in multi-spindle machining centers. We have been setting standards in precision, efficiency and sustainability for over 25 years. In everything we do, we pursue the goal of continually perfecting production. Piece by piece – “best per part”. You too can rely on our **Smart Manufacturing Solutions**: highly productive manufacturing solutions that are precisely tailored to your needs.

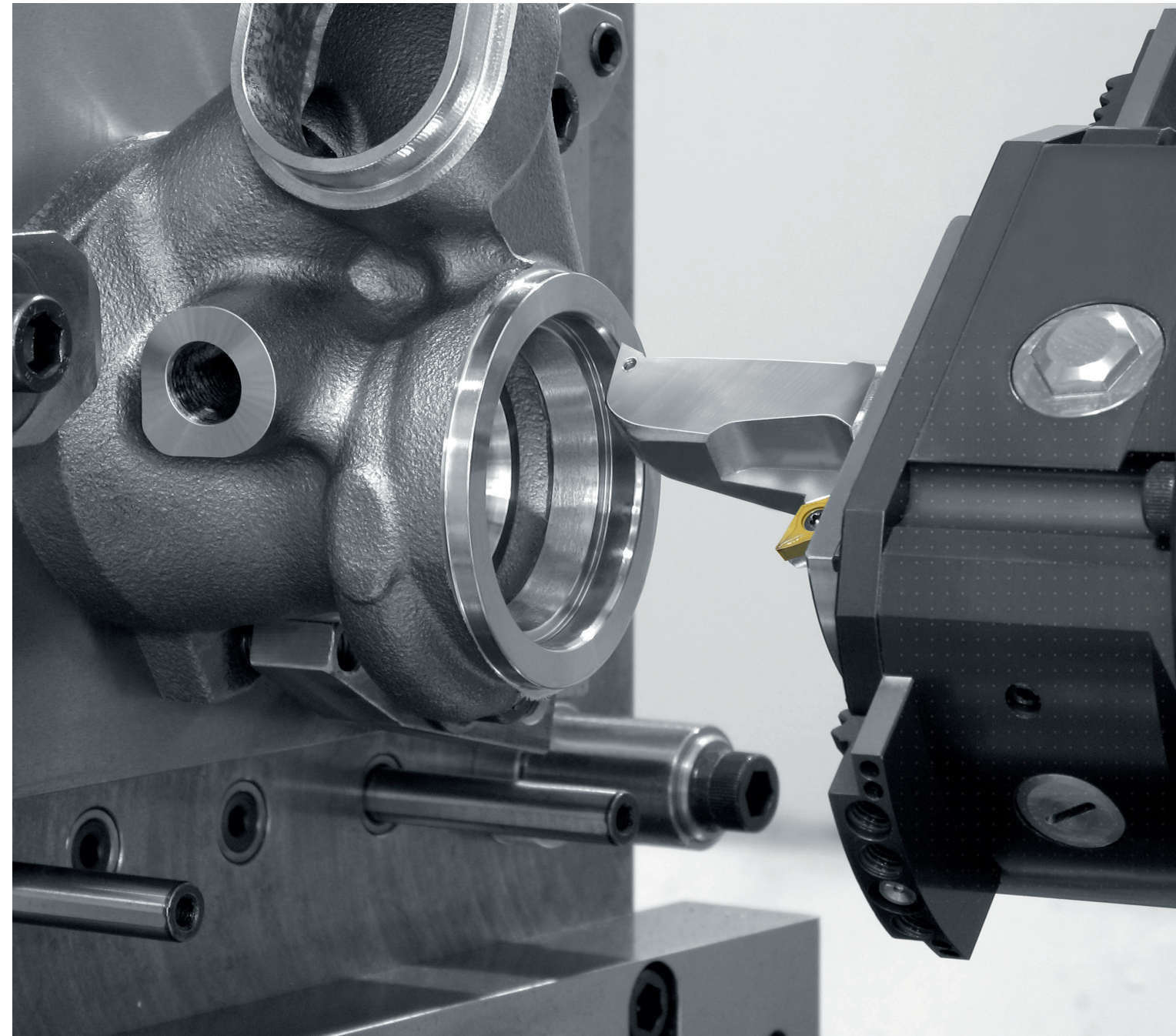


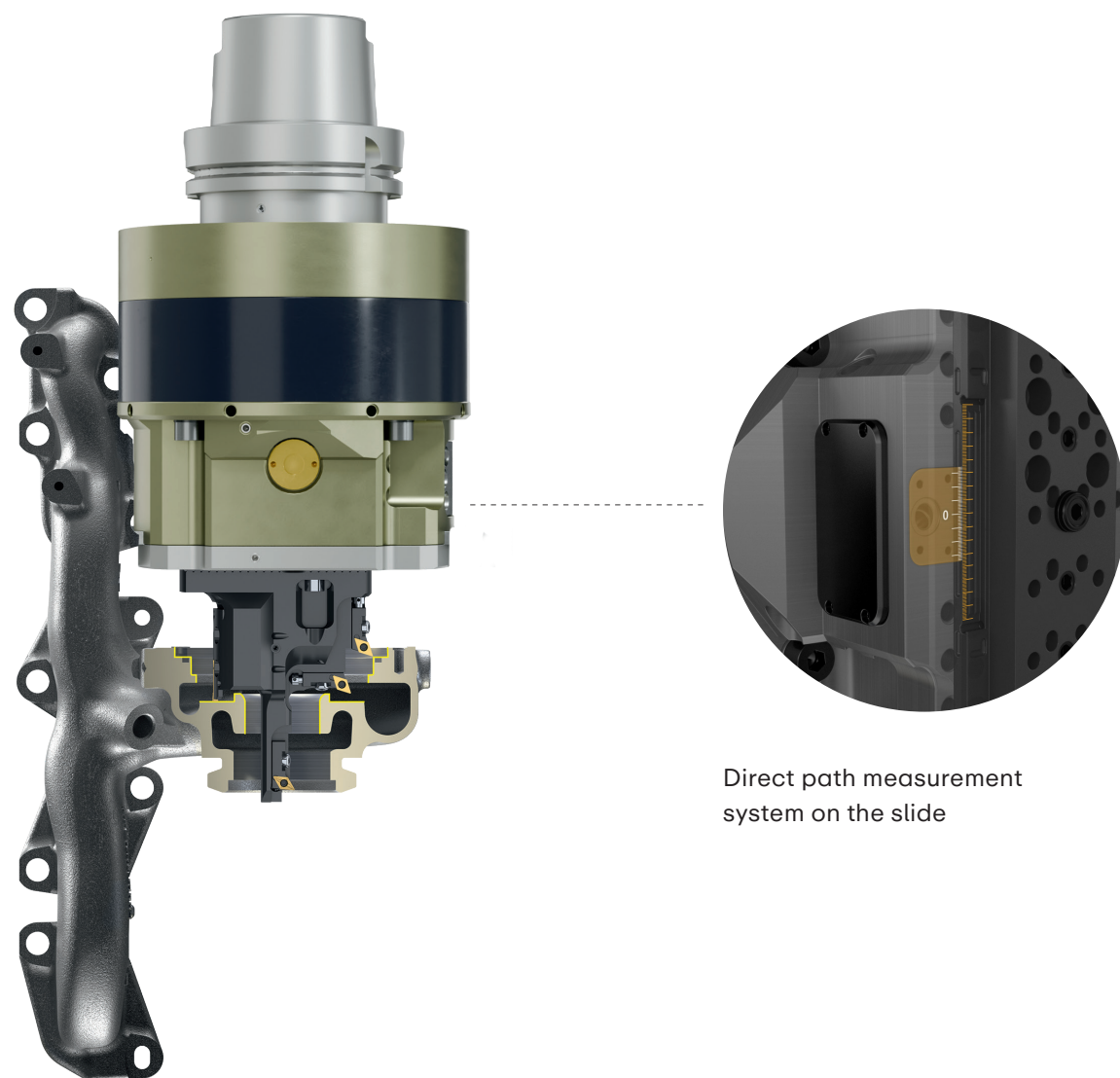
Everything from a single source:
the 360° production portfolio.

- Machines
- Automation
- Systems
- Technologies & process solutions
- Digitalization & digital services
- Performance processes
- Peripheral processes

Our SW advantage

Intelligent, modular and connected solutions combine flexibility, productivity and future-ready technologies – enabling the best per part in every dimension.





Direct path measurement
system on the slide

It makes turning contours possible when working with a stationary workpiece



The freely programmable KOMtronic U-axis system makes any contour and turning operations possible on non-rotationally symmetrical parts.

Combined with custom-made front tools and the optimum selection of inserts, contours in bores and external machining operations can be successfully carried out. This allows a considerable reduction in production times – with better surface quality and greater accuracy of form.

Higher economy

- Use of standard instead of special machines
- Reduction in number of tools
- No need for clamping devices for finish machining on turning machines

Reduced unit costs

- Reduction in machining and throughput times
- Savings on tool changes
- Replacement of time consuming circular machining operations
- Reduced holding times
- High cutting capacity

Lower operating costs

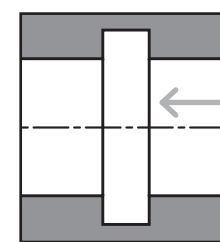
- Complete machining on one machine without the workpiece being rotated
- Minimum power consumption because of U-axis systems

KOMtronic U-Axis system with linear encoder

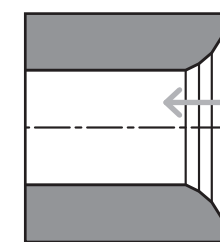
Advantages and benefits

- **Direct path measurement system on the slide**
Position detection as close to the tool as possible
- **Maximum positioning accuracy**
For precise machining
- **Direct coupling of the slide movement**
Mechanical influences such as wear are eliminated
- **Consideration of the disturbance variables of mechanical components such as backlash, wear, etc.**
Process-secure machining reduces disturbing influences
- **Improvement of the repeatability**
Consistent quality
- **Wear monitoring of the mechanical components**
Through double position detection within the U-axis

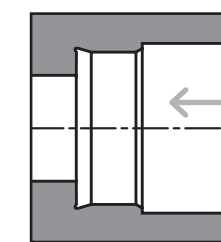
Machining examples



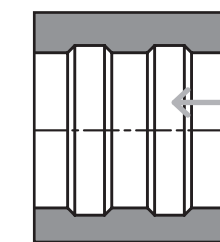
Grooving



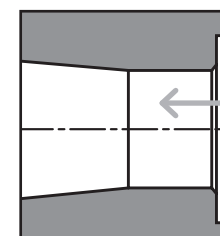
Turning valve seats



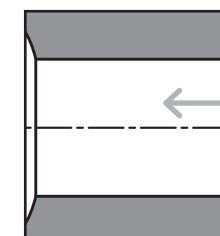
Bearing seat



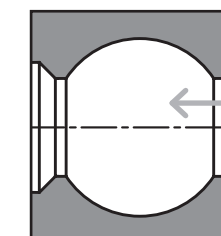
Bore with coolant
passages



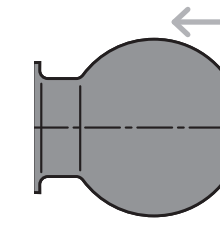
Tie rod



Undercutting
differential housing

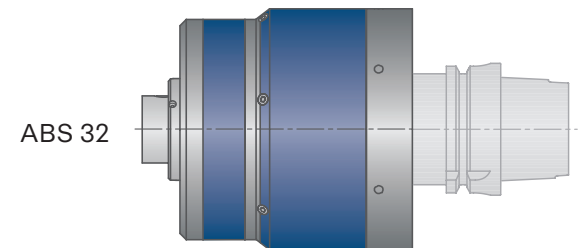


Internal contour
turning



External contour
turning

KOMtronic U-Axis systems

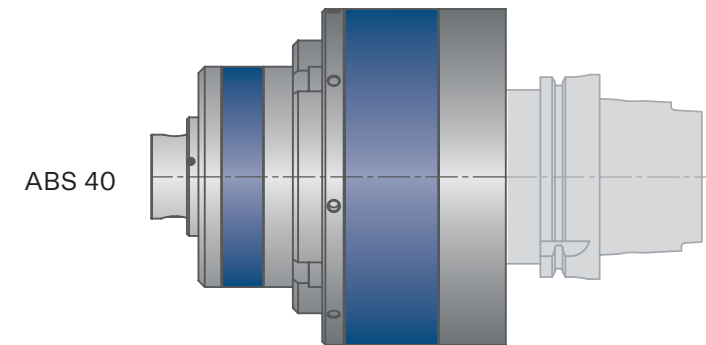


ABS 32

HPS 115

- stroke: 2 (± 1) mm
- max. feed: 80 mm/min
- max. spindle speed: 6000 rpm

HPS-115-EM-ABS32
Available on request

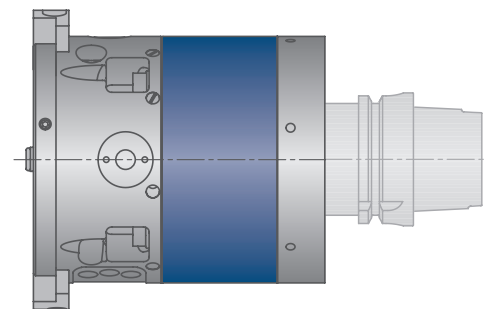


ABS 40

HPS 160

- stroke: 2 (± 1) mm
- max. feed: 100 mm/min
- max. spindle speed: 6000 rpm

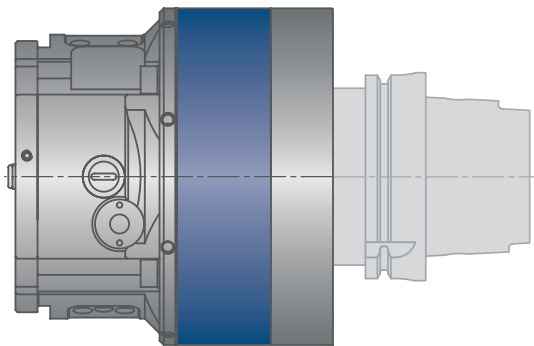
HPS-160-EM-ABS40
Available on request



UAS 115

- stroke: 22 (± 11) mm
- max. feed: 300 mm/min
- max. spindle speed: 4000 rpm

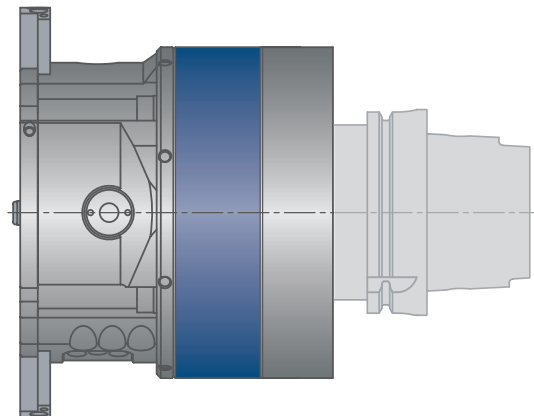
UAS-115-E-G-22-2
UAS-115-EM-G-22-2
UAS-115-E90-G-22-2
UAS-115-EM90-G-22-2



UAS 160-3

- stroke: 32 (± 16) mm
- max. feed: 350 mm/min
- max. spindle speed: 4000 rpm

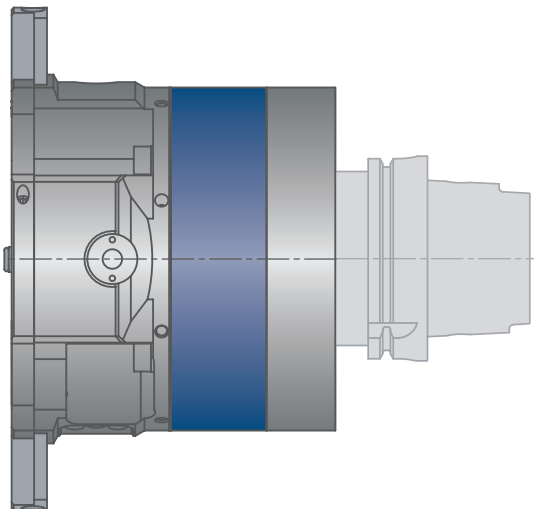
UAS-160-EM-G-32-3



UAS 160-3

- stroke: 50 (± 25) mm
- max. feed: 350 mm/min
- max. spindle speed: 4000 rpm

UAS-160-EM-G-50-3



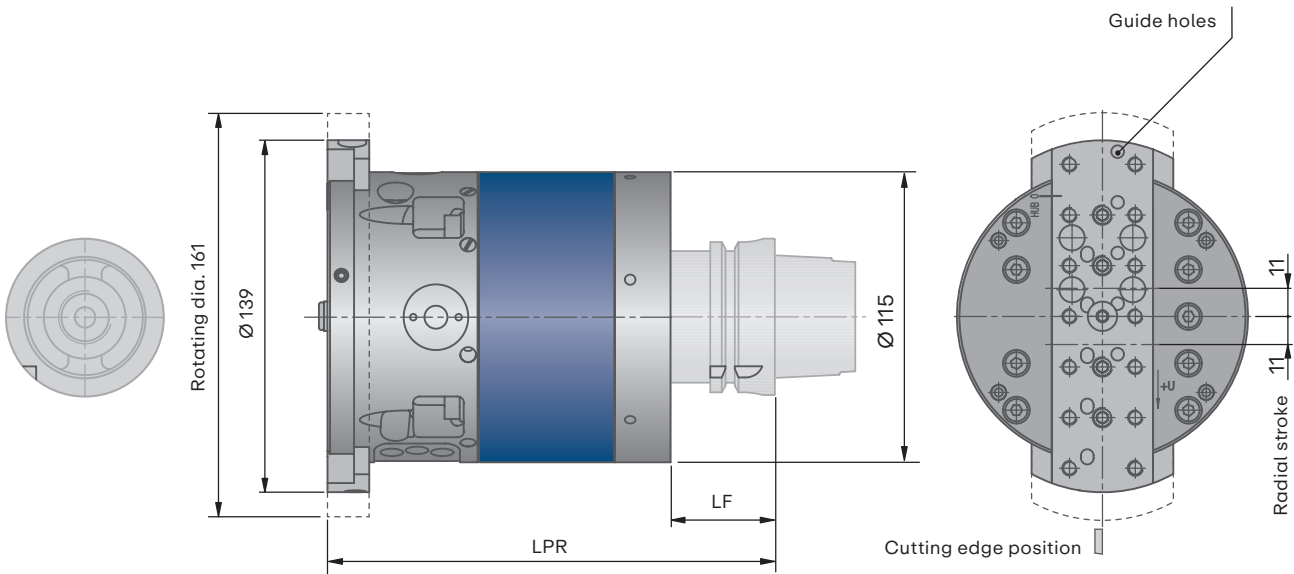
UAS 160-3

- stroke: 70 (± 35) mm
- max. feed: 350 mm/min
- max. spindle speed: 4000 rpm

UAS-160-EM-G-70-3

KOMtronic U-axis

UAS-115-2



Standard interface HSK, Interface rotated by 90° on request.

UAS-115-HSK63-E-G-22-2				
Description	Interface	LPR mm	LF mm	WT kg

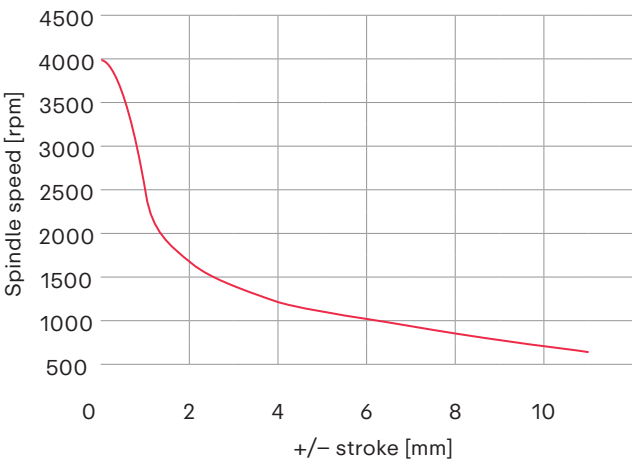
UAS-115-HSK63-E-G-22-2	HSK 63	178	42	6,4
UAS-115-SK40-E-G-22-2	SK 40	171	35	6,5
UAS-115-CAT40-E-G-22-2	CAT 40	171	35	6,8
UAS-115-BT40-E-G-22-2	BT 40	178	42	6,7

Further version:
UAS115...-EM-.... → with measuring system

Technical data

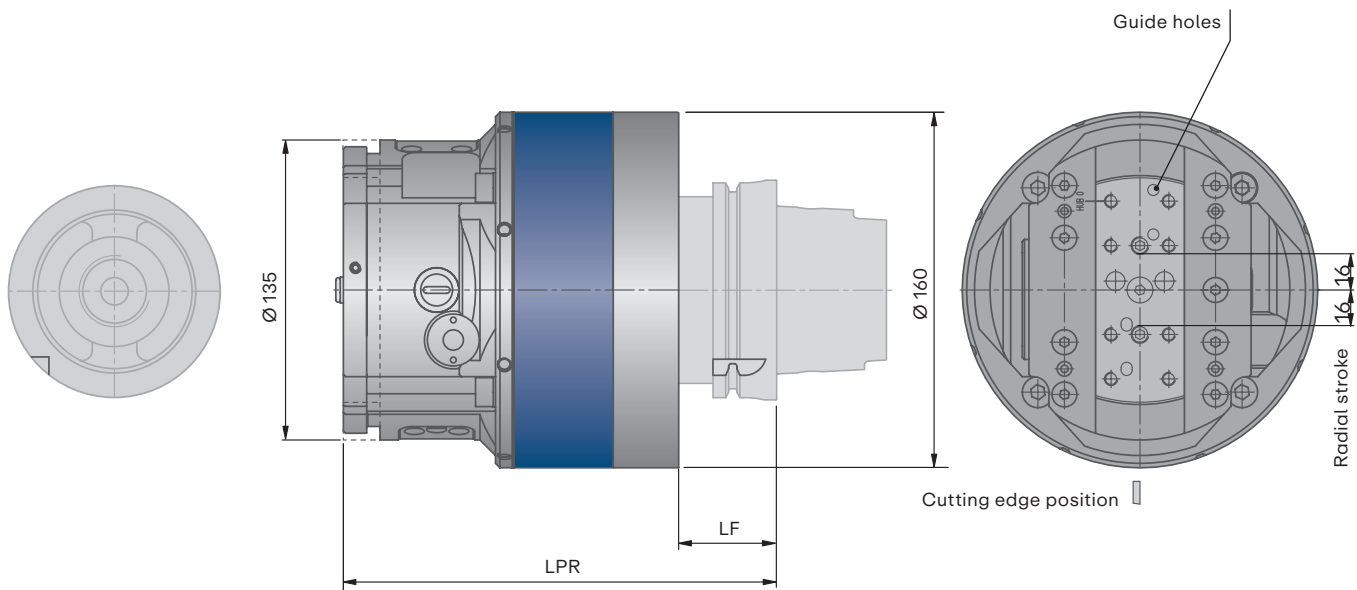
- Stroke: 22 (±11) mm
- Max. feed: 300 mm/min
- Max. spindle speed: 4000 rpm, depending on slide position (see stroke/spindle speed diagram)
- With internal coolant: 40 bar
- Versions with other strokes on request
- Protection class: IP67
- Operating modes: full NC axis for interpolation
- Adaption into machine tool control and spindle

Max. stroke/spindle speed diagram
up to 1 kg front tool incl. adaptor



KOMtronic U-axis

UAS-160-3



Standard interface HSK, Interface rotated by 90° on request.

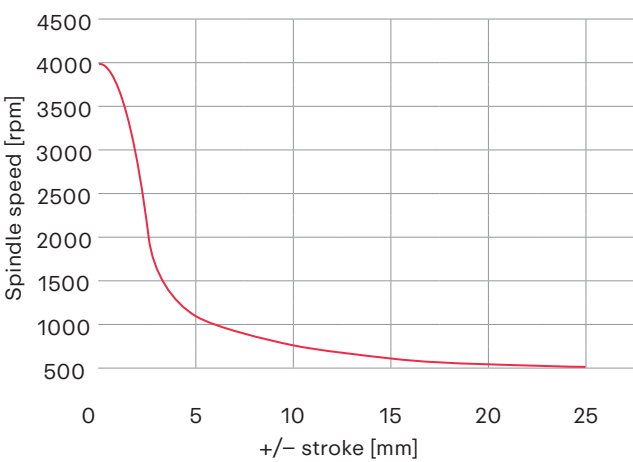
UAS-160-EM-G-32-3				
Description	Interface	LPR mm	LF mm	WT kg

UAS-160-HSK100-EM-G-32-3	HSK 100	198,5	45	12,1
UAS-160-SK50-EM-G-32-3	SK 50	188,5	35	12,5
UAS-160-CAT50-EM-G-32-3	CAT 50	188,5	35	12,5
UAS-160-BT50-EM-G-32-3	BT 50	206,5	53	13,6

Technical data

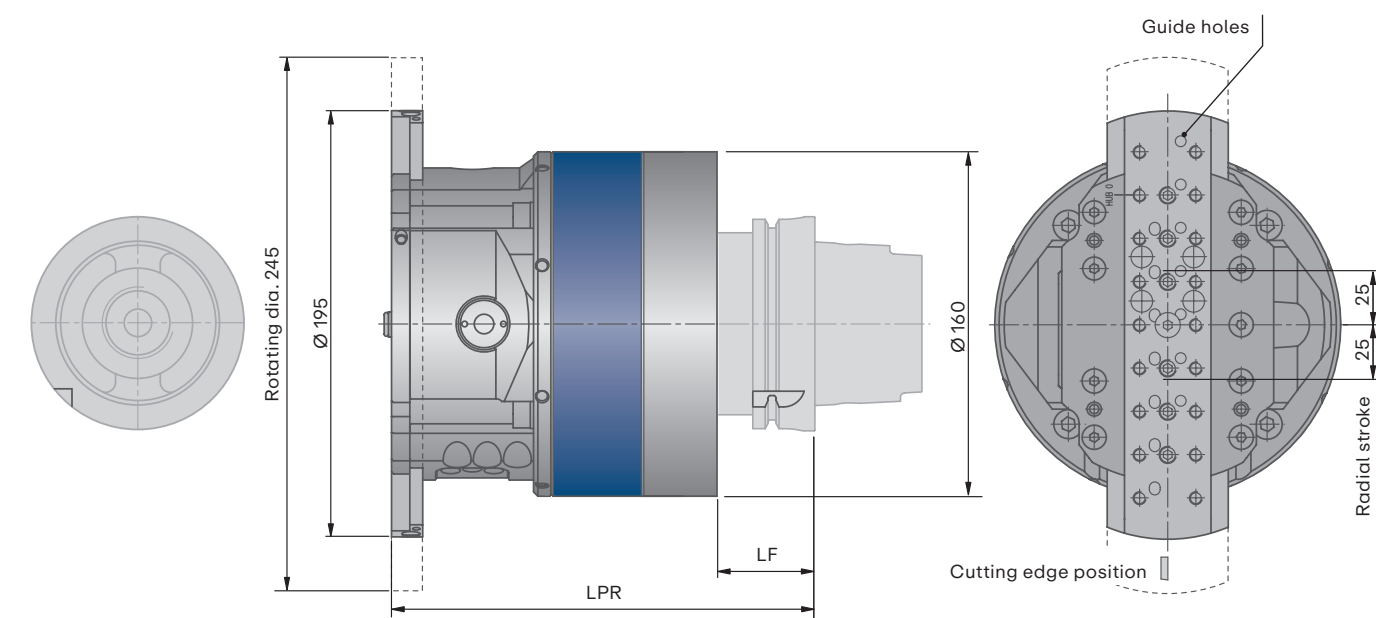
- Stroke: 32 (±16) mm
- Max. feed: 350 mm/min
- Max. spindle speed: 4000 rpm, depending on slide position (see stroke/spindle speed diagram)
- With internal coolant: 40 bar
- Protection class: IP67
- Operating modes: full NC axis for interpolation
- Versions with other strokes on request
- Adaption into machine tool control and spindle

Max. stroke/spindle speed diagram
up to 1,8 kg front tool incl. adaptor



KOMtronic U-axis

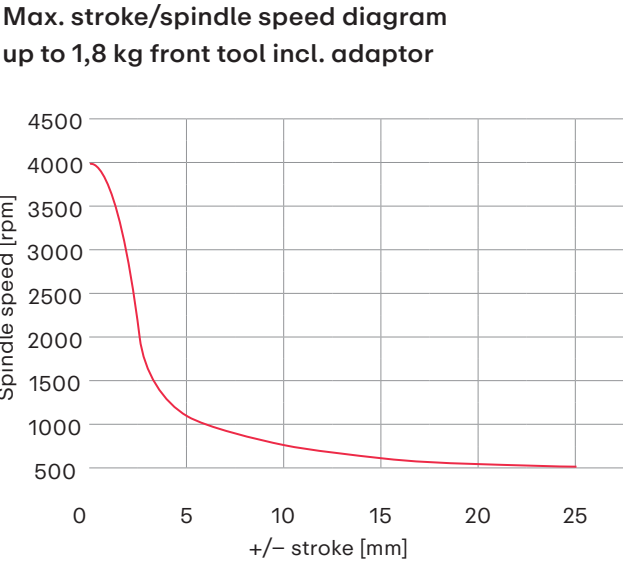
UAS-160-3



Standard interface HSK, Interface rotated by 90° on request.

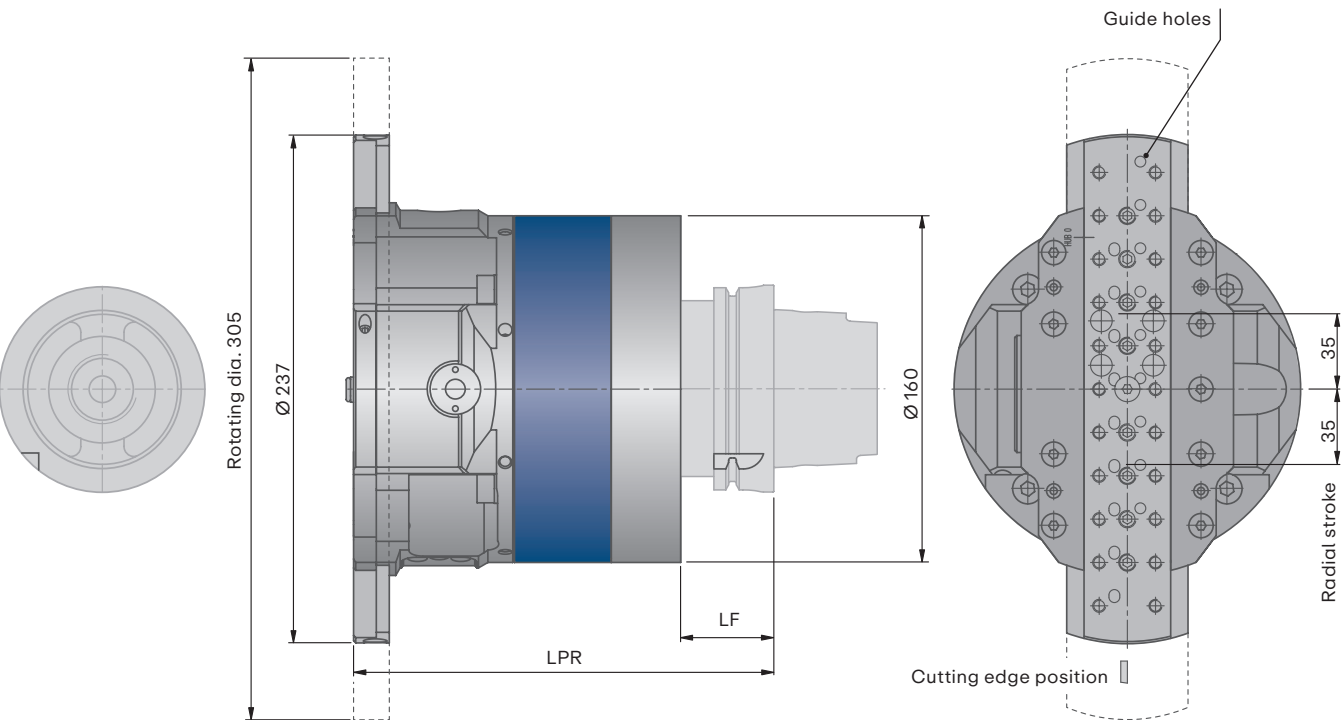
UAS-160-EM-G-50-3				
Description	Interface	LPR mm	LF mm	WT kg
UAS-160-HSK100-EM-G-50-3	HSK 100	196	45	12,4
UAS-160-SK50-EM-G-50-3	SK 50	186	35	12,8
UAS-160-CAT50-EM-G-50-3	CAT 50	186	35	12,8
UAS-160-BT50-EM-G-50-3	BT 50	204	53	13,9

- Technical data**
- Stroke: 50 (±25) mm
 - Max. feed: 350 mm/min
 - Max. spindle speed: 4000 rpm, depending on slide position (see stroke/spindle speed diagram)
 - With internal coolant: 40 bar
 - Versions with other strokes on request
 - Protection class: IP67
 - Operating modes: full NC axis for interpolation
 - Adaption into machine tool control and spindle



KOMtronic U-axis

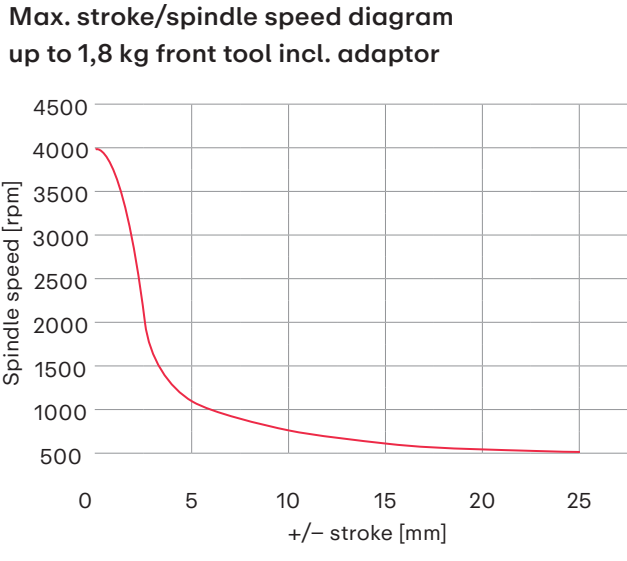
UAS-160-3



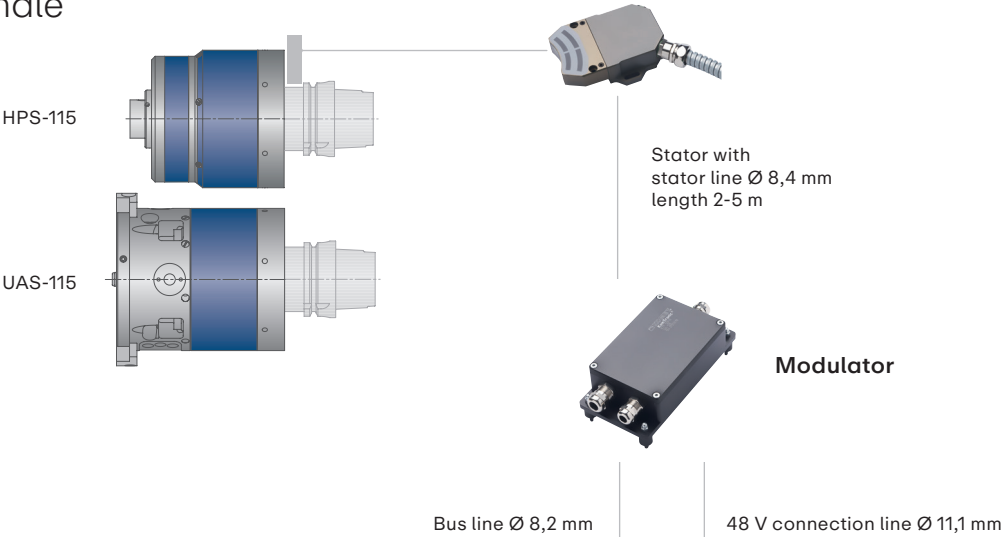
Standard interface HSK, Interface rotated by 90° on request.

UAS-160-EM-G-70-3				
Description	Interface	LPR mm	LF mm	WT kg
UAS-160-HSK100-EM-G-70-3	HSK 100	196	45	12,6
UAS-160-SK50-EM-G-70-3	SK 50	186	35	13,0
UAS-160-CAT50-EM-G-70-3	CAT 50	186	35	13,0
UAS-160-BT50-EM-G-70-3	BT 50	204	53	14,1

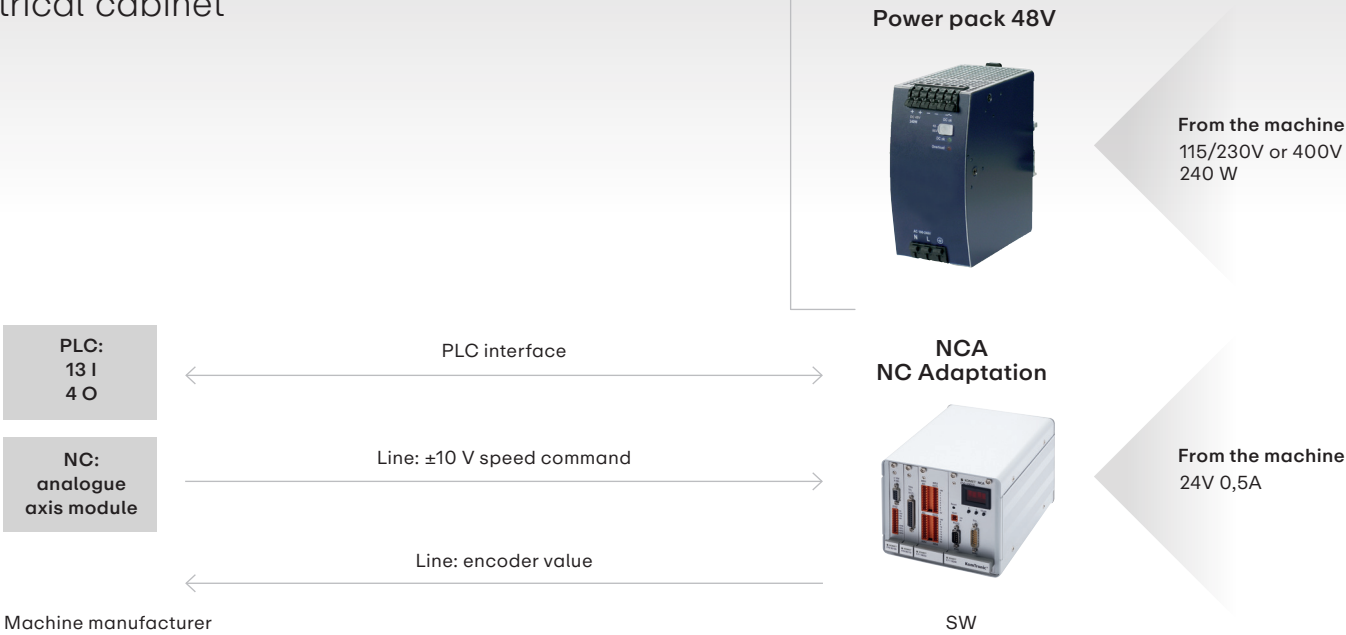
- Technical data**
- Stroke: 70 (±35) mm
 - Max. feed: 350 mm/min
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 - Protection class: IP67
 - Operating modes: full NC axis for interpolation
 - Adaption into machine tool control and spindle



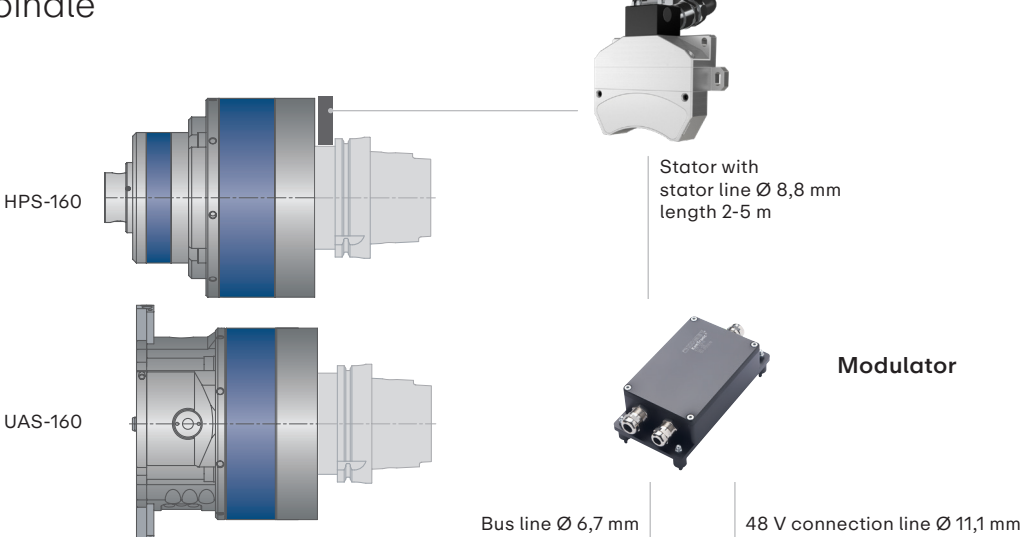
Machine / spindle



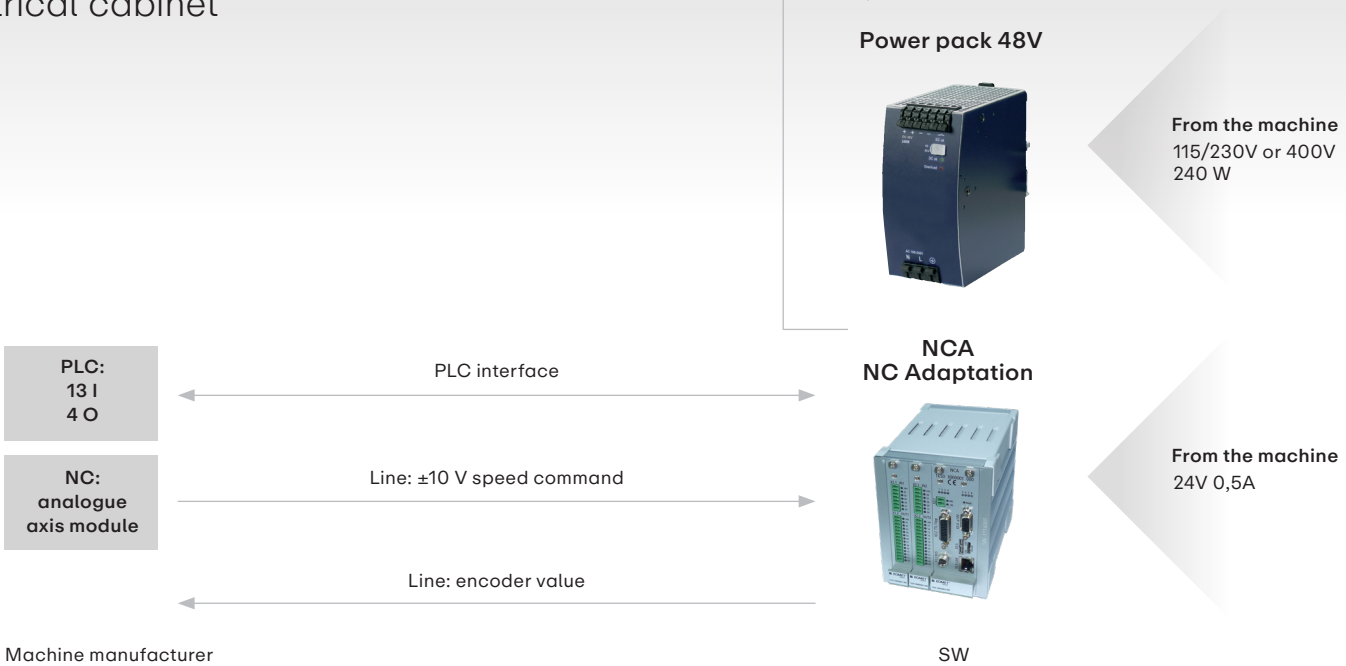
Electrical cabinet



Machine / spindle



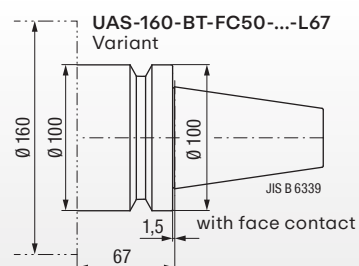
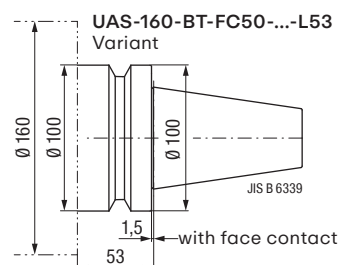
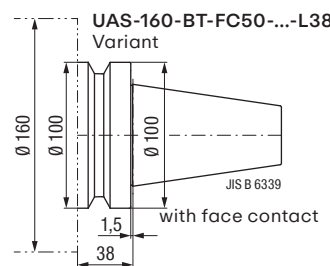
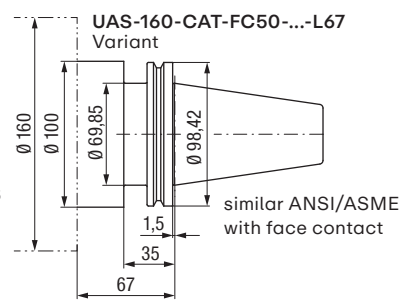
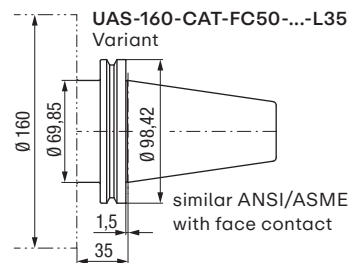
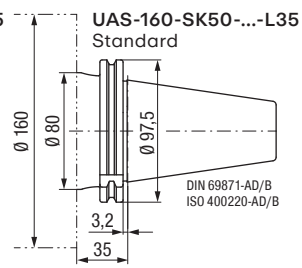
Electrical cabinet



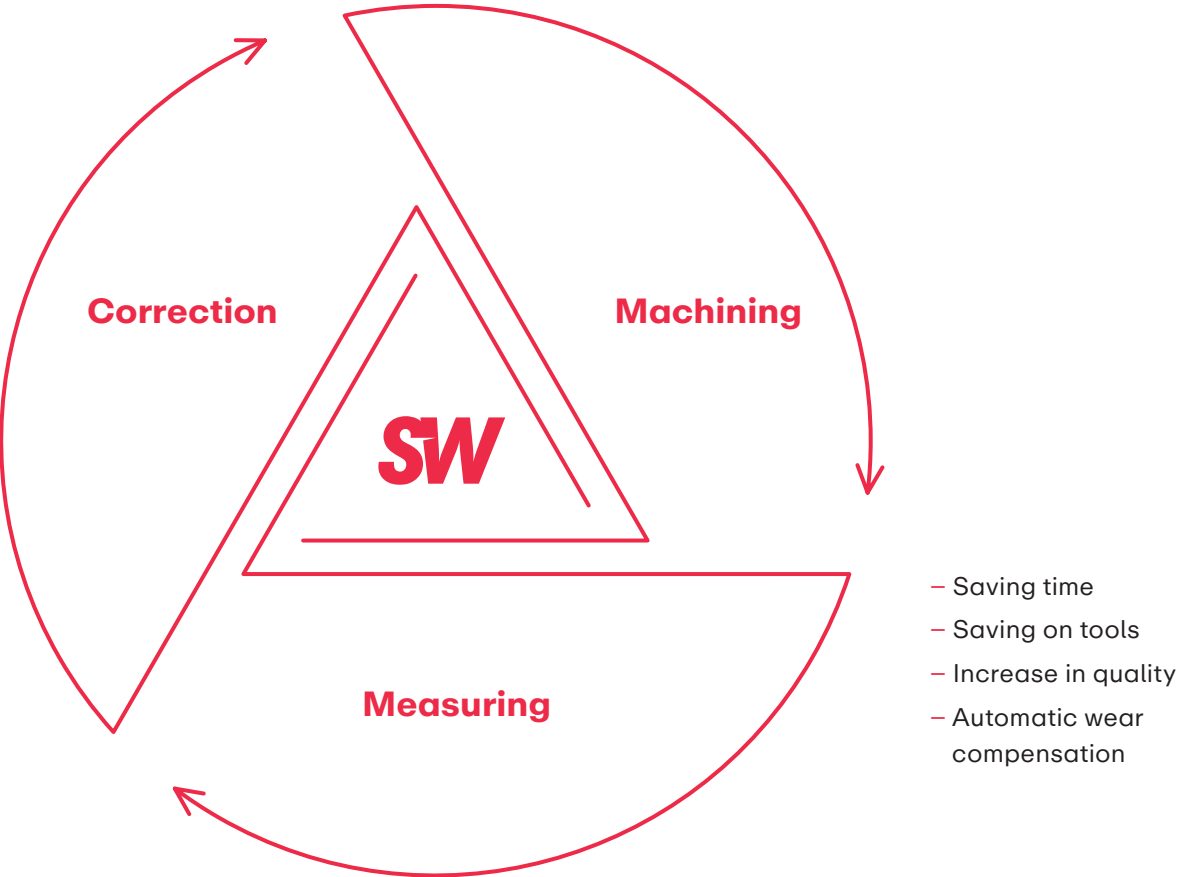
Adaptation into machine tool control and spindle

The PLC requires 13 inputs and 4 outputs, with 3 M-commands for U-axis function selection. The nominal speed value is transmitted from the NC control's analogue axis module to the NCA via ±10 V. Position feedback from the NCA is provided as either interpolated TTL (5 V, RS 422) or 1 Vpp sine signal.

▶ ▶ ▶ ▶ The KOMtronic u-axis system does not need a power unit on the NC control.



The technical drawing illustrates a multi-hole tool bit with four distinct stroke configurations. The main view shows a tool with a total width of 70 mm (± 35) mm and a central hole diameter of 6 mm. It features guide holes with a diameter of 5E8 / 4.5 deep and M6 / 10 deep holes. The coolant transfer can be offset in the 20 mm catch, and an O-ring with dimensions 7x2 is shown. The cutting edge position is indicated by a 6 mm dimension. Four smaller views show the tool at different strokes: 50 mm (± 25) mm, 22 mm (± 11) mm, and 32 mm (± 16) mm. A photograph of the physical tool is included in the top right corner.



Complete machining in a closed process chain



Turning and measuring on the machining centre

- Complete machining:**
- No switching to a turning machine
 - Saving on tools, no special tools required
 - Higher quality

- Measuring of fits:**
- Precision measurement with a barrel gauge or calliper
 - Automatic test cut possible

- G0 U15
G1 Z0
G1 U14.5 Z-0.5
G1 Z-6
G1 U14
G1 U13.75 Z-6.25
G1 Z-17
G1 U13.5
G1 Z-25
G3 Z-34.18 U9.9 E13.5
G1 Z-42 U12
G0 U9.75
G0 Z10

1

Chamfer

2

Level

2

Chamfer

3

Level

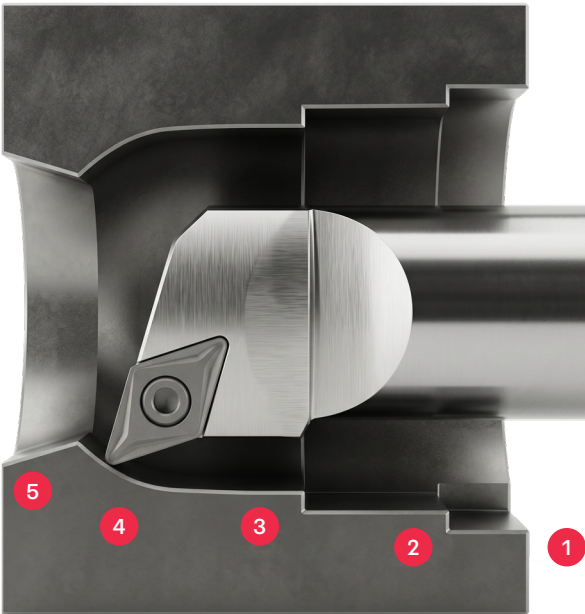
4

Radius

5

Incline

Programming as usual ...



Integration of the KOMtronic U-Axis system into different machine control systems

Control system	Manufacturer
Sinumerik 840 D powerline Sinumerik 840 D(i) solution line Sinumerik ONE	SIEMENS
Fanuc 15i 16i 18i 21i Fanuc 30i 31i 32i 0i	FANUC
Heidenhain iTNC 530 iTNC 530 HSCI Heidenhain TNC 640, TNC 7	HEIDENHAIN
Mazatrol Matrix SmoothX	MAZAK
Bosch Rexroth MTC-200 V18 Bosch Rexroth MTX	BOSCH REXROTH
Meldas	MITSUBISHI



Questions and answers regarding U-axis tools

01 What level of accuracy can be achieved with the KOMtronic U-axis?

Without a measuring system on the slide ± 0.01 mm for the diameter, with a measuring system ± 0.005 mm for the diameter. The measuring system has a resolution of $< 1 \mu\text{m}$ (the level of accuracy that can be achieved depends on other machining influences, such as tool change errors, cutting edge wear, etc.).

02 How can the cutting insert position be corrected?

Each cutting edge can be corrected via the tool management area of the NC control system. Settings can also be made in this way for tools with short clamping holders.

03 Does the U-axis always need to be re-measured each time the inserts are changed?

No, the U-axis or slide is always in the same position. The insert position can be corrected directly in the machine via an in-process measurement.

04 Does the KOMtronic U-axis have to be removed from the machine to measure the tool?

No, it can easily be released using an interface connection (optional).

05 What is the RPM limit?

When the snap-on tool is mounted centrally on the slide so that the weight distribution is completely balanced the speed is max. 4000 rpm, stroke-dependent actuation.

06 Can the KOMtronic U-axis also be used for roughing?

A variety of machining processes can be used (finishing and roughing). The slide has a maximum power of 4000 N and a permissible torque of 200 Nm. However, the possible usage data depends on the overall length of the tool and the U-axis.

07 How is the U-axis driven?

The U-axis is driven by a servo motor. Slides in the UAS115/160 series are driven by a low-backlash roller screw drive.

08 What workpiece diameters can be machined?

The range of application is 0.5 – 500 mm, taking into consideration the relevant projection length and attachment point.

09 How many different diameters and cutting edges are possible?

There are several possible cutting edges depending on the NC control system and tool design.

10 How is the tool system set?

The U-axis is always changed in the central position. This enables the snap-on tool to be measured on a dummy in the presetting device. In addition, post-process measurement with automated cutting edge correction is possible via the tool management.

11 What about maintenance intervals and servicing?

Recommended 1x year or every 2 years at the latest.

12 How long is the expected service life?

With regular maintenance and care and the replacement of wear parts, a service life of $> 6,500$ operating hours is realistic, corresponding to approximately 10 years.

13 Can KOMtronic U-axes be used on multi-spindle machines?

Yes, taking into account the usual specifications for tools in multi-spindle machines.

14 What is the maximum size that can be machined with HSK63 or HSK100?

KOMtronic UAS-115: Up to dia. approx. 250 mm
KOMtronic UAS-160: Up to dia. approx. 500 mm
taking into consideration the relevant projection length and attachment point.

15 Are U-axes better suited to vertical machining rather than horizontal machining?

U-axes are used vertically and horizontally. Compare with the advantages and disadvantages of a conventional tool (centrifugal forces).



Installation support

In order to ensure that the KOMtronic U-Axis system is correctly incorporated into the machine and is able to carry out the required functions, the customer must provide clarification and comply with the necessary requirements:

01

Fitting the stator for non-contact power and data transmission to the KOMtronic U-Axis system. Care should be taken to ensure that no conflict occurs with other parts of the machine, the tool changer or similar units. SW obligations do not include provision of the adaptor element for the stator unit.

02

The customer will supply the inputs and outputs required for the KOMtronic U-Axis system on the machine side. The analogue axis unit required for operation with the U-Axis must be provided and configured for the machine control system by the customer.

03

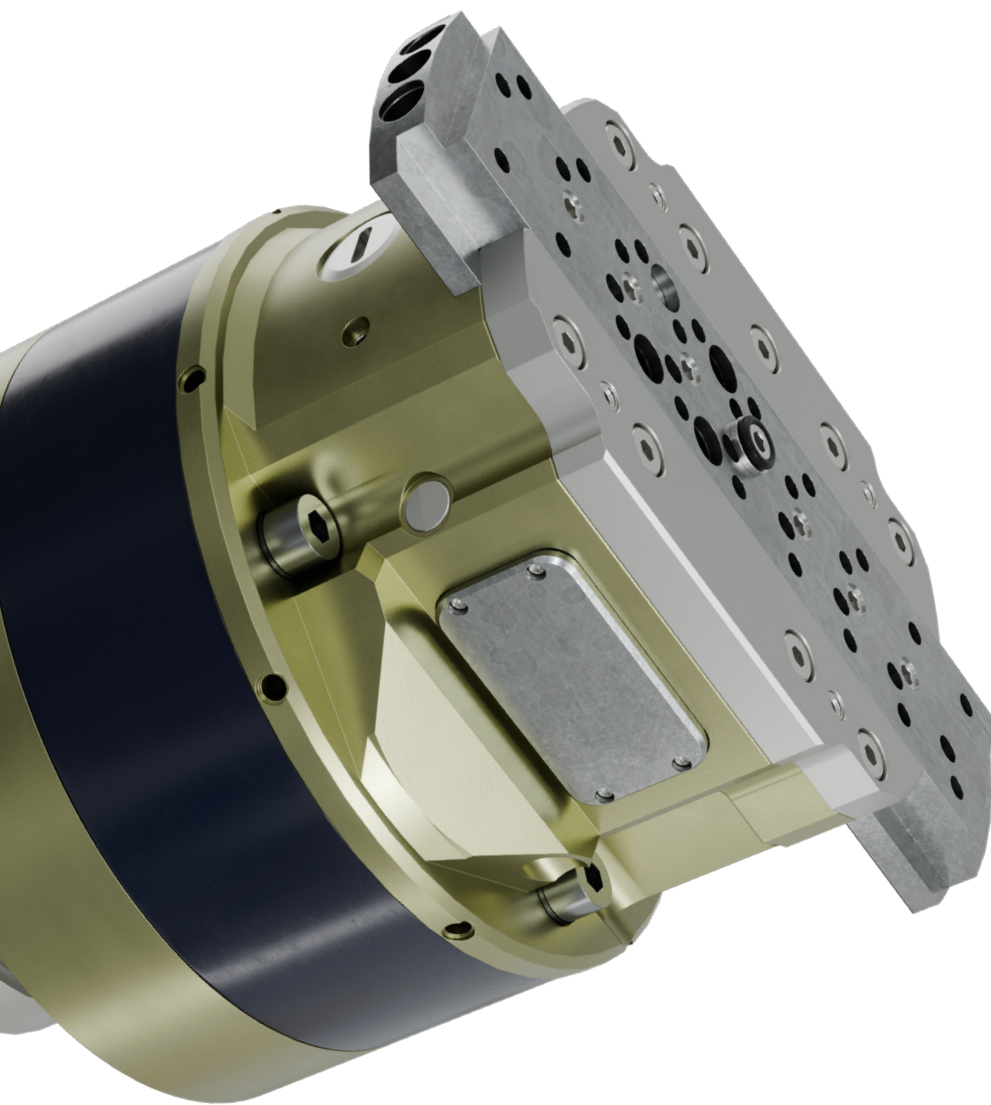
The customer must carry out the necessary software adjustments for the machine sequence control before the installation.

04

Function clarification: Process requirements must be met with reference to machine and processing concept. For example cycle times and machining data must be clarified. The automatic tool changer must be rated for the total weight, and sufficient space must be available in the tool magazine.

SW will provide the necessary assistance for clarification of the tasks as stated.





Digital services: the virtual world is at your feet.

With SW, you can track every component and document every processing step. We offer you automation and digitalization solutions such as the “ScadaPlatform” control and monitoring software or the “life data core” IoT gateway.



Strong service that leaves no questions unanswered.

With our life-services, we support you throughout the entire service life of your machine. Our common goal is to keep your productivity at the highest level and extend the life cycle of your machines. Benefit from our comprehensive service performance for your machining centers, fully automated systems and complete production lines. Gain new insights into your production with data-based tools – as comprehensive as you want and with full control over your data.



Always at your side – process support from A to Z

SW's experienced Technology People will accompany you from the very beginning and support you to ensure a smooth production start-up – from the right choice of production variant to regulatory and certification issues and the organization of downstream process steps.

- **life academy:** employee training for maximum productivity (for operators, maintenance specialists, etc.).
- **life startup:** machines and automation solutions into operation.
- **life upgrade:** Inspections, maintenance, overhauls and retrofits.
- **life help:** Real-time support via hotline, remote services and on-site service with our service technicians.
- **life parts:** Original spare parts, pre-assembled components and replacement parts.
- **life data:** Exploiting the almost limitless possibilities of digitalization to raise productivity, quality, availability and efficiency to a new level.



... and much more - ask us for the right solution for your workpieces.

service.de@sw-machines.com
+49 7402 74-7240

3

further reasons for SW: Discover these worlds of benefits for yourself.

1

Direct drives or ball screw drives

Highly dynamic linear motors: for the fastest CNC machines on the market.

Direct drives, such as linear motors and torque motors, generate the desired movements directly, without mechanical transmission elements. They therefore operate wear-free, without mechanical play and with extreme precision. These dynamics provide you with shorter cycle times, lower unit costs and higher productivity.

- Acceleration values: over 2.5g
- Rapid traverse speeds: up to 120 m/min
- Positioning accuracy: guaranteed deviation (combined from the X/Y/Z axis) of less than 0.006 mm
- Kv factor: 10
- Jolt: 1,200 m/s³

Efficient ball screw drives: with particularly high efficiency.

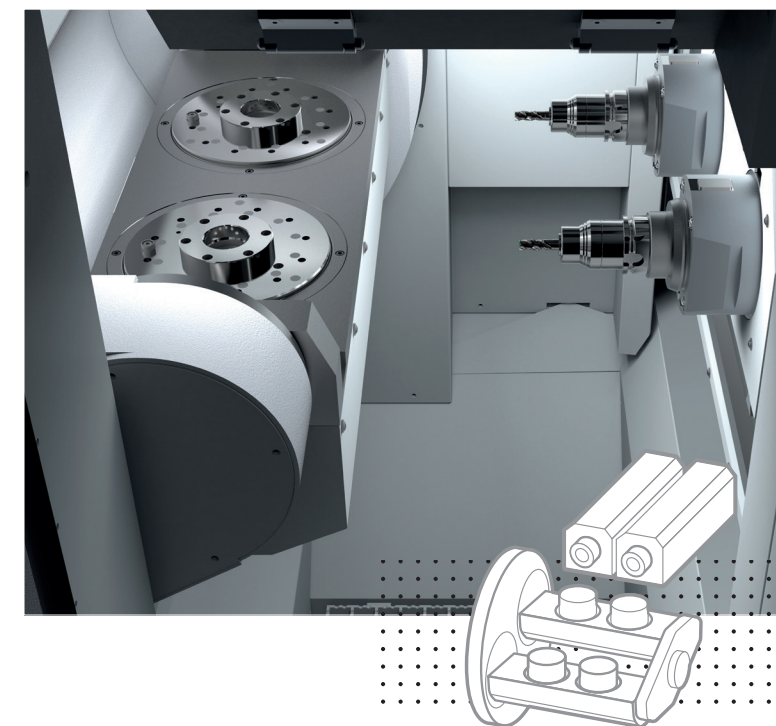
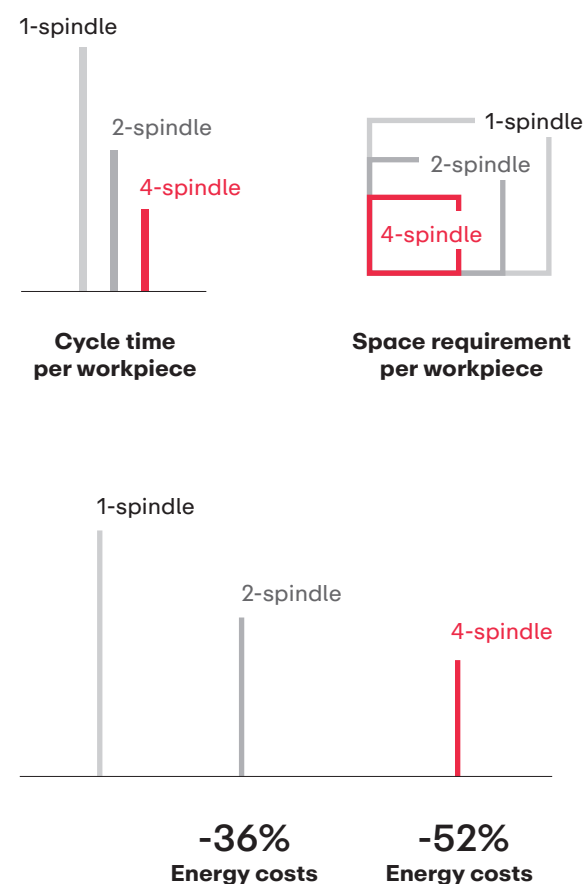
The power transmission through balls results in less friction and wear than with conventional screw drives, which enables higher speeds. The design principle makes ball screw drives from SW extremely energy-efficient thanks to their high degree of efficiency. Their precise linear movements make them ideal for use in CNC machines.

- Axle acceleration: up to 20 m/s²
- Rapid traverse speeds: up to 75 m/min

2

Multiple spindles - the best example of the power of good ideas.

Depending on the version, you can more than double your productivity with multi-spindle capability - with the same personnel and in the same space. In addition, the unit costs can be more than halved. How? We will be happy to show you in person at our Technology Center, where you can experience our manufacturing solutions live and in action.



3

Just the right thing for you: a wide range of single- and double-station machines.

With SW, you have the choice of having your machines in single or multi-station design: This gives you the flexibility to determine whether a processing step should be carried out at one station or whether several processing steps should be carried out simultaneously in one clamping to reduce production time.

Your advantages with our 1-place machines:

- Extremely high precision
- Flexible processing of parts from one piece
- High efficiency through high reliability

Your advantages with our 2-place machines:

- Extremely high production speed
- Economical production of the most complex components
- Increased productivity thanks to simultaneous, parallel loading



A small selection - a large portfolio:
SW's machine portfolio sets standards in the eco-
nomical and precise machining of steel, cast iron
and non-ferrous metals - and is constantly being
expanded with new solutions.

Machines with linear drive ↓



BA W02 BA W03 BA W04 BA one6



BA one8 BA W06 BA W08



BA space3



BF



Machines with ball screw drive ↓

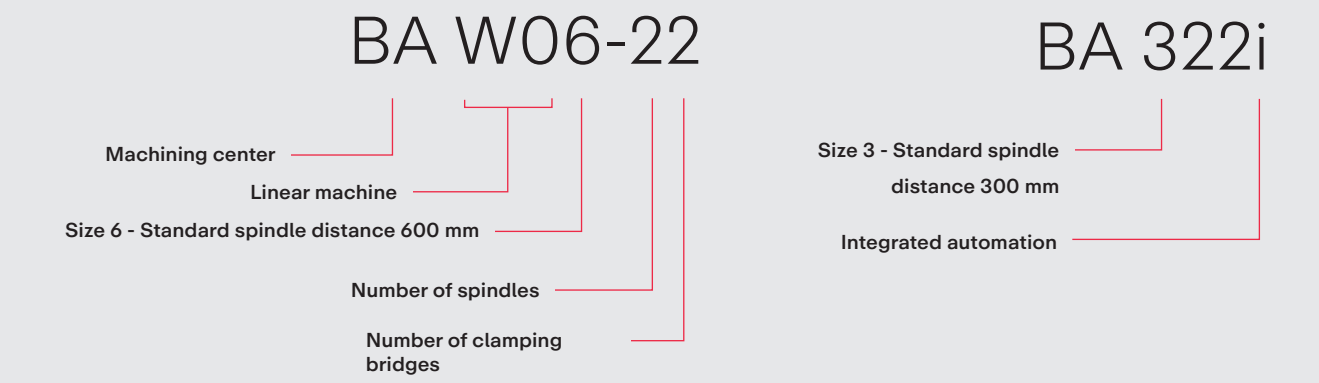


BA 2 BA 3 BA 4 BA 6



BX 6 BA 7

Machine nomenclature



- Automotive
- E-mobility
- Aerospace
- Medical technology
- Agricultural & construction machinery
- Watches
- Water & fuel cells

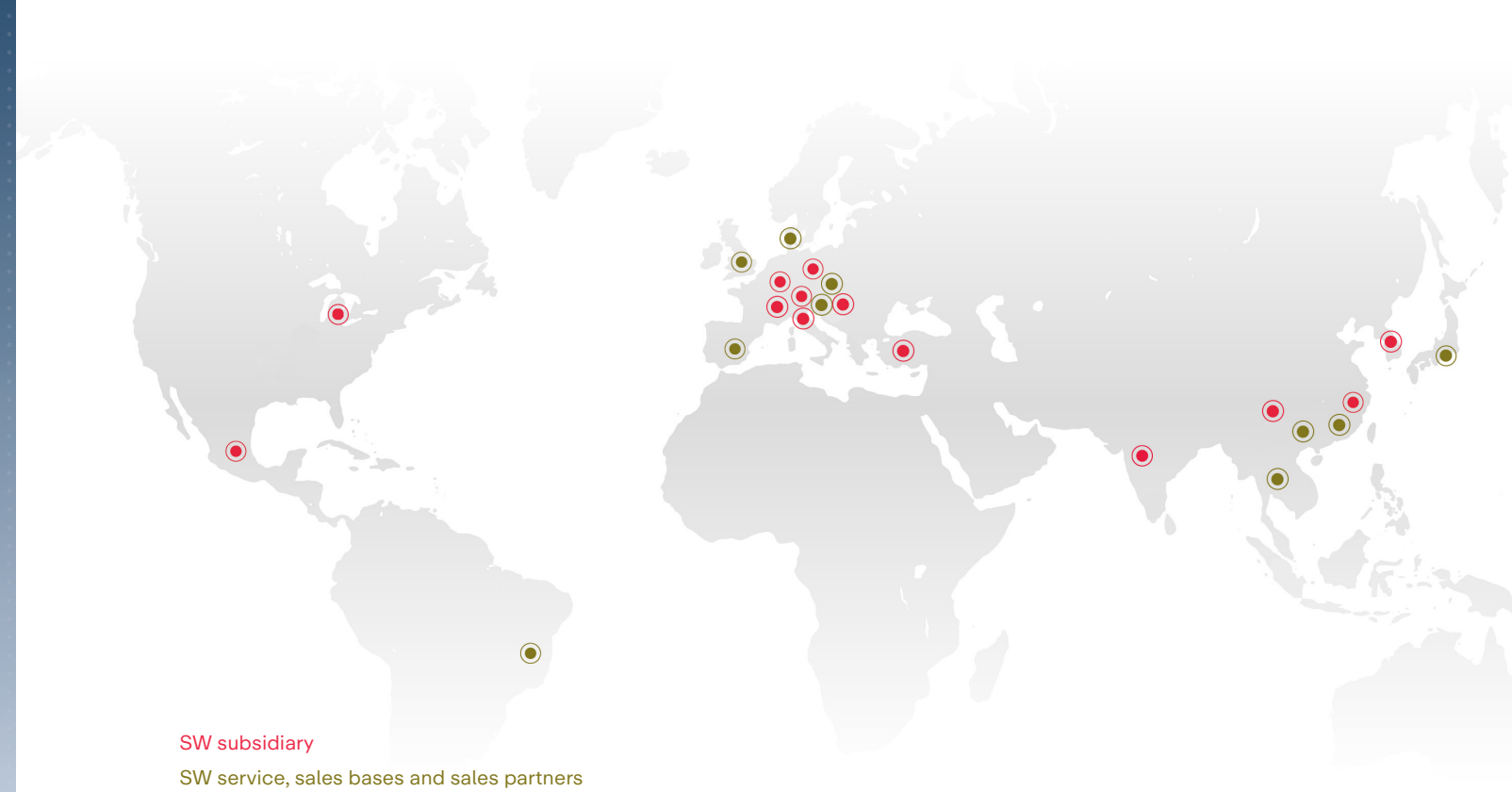
Machine Finder



Fewer emissions, higher productivity.

Energy monitoring and predictive maintenance are among the central pillars of SW's sustainability strategy and are included in the SW Cloud-Platform (SWCP). Active efficiency management and energy monitoring can minimize the energy consumption of machines. Predictive maintenance enables the early detection of the wear condition of components, which avoids ad hoc spare parts deliveries and enables forward-looking spare parts planning and energy-optimized transport.

Find out more about our comprehensive sustainability initiatives and smart manufacturing solutions at www.sw-machines.com.



1,700 professionals worldwide at your service.

The SW strategy of internationalization, which we have been pursuing for decades, brings you many advantages – our growth enables us to support you even closer, faster and in a more cooperative manner. You benefit from our global presence, especially in areas such as automation, networking or the construction of complete systems – with first-class manufacturing and service solutions at your side.

**With the world market leader of multi-spindle machines on board,
you can achieve your production goals safely, quickly and effectively.**

KOMtronic product information and new sales inquiries

KOMtronic-sales@sw-machines.com

KOMtronic service inquiries

service.de@sw-machines.com

Schwäbische Werkzeugmaschinen GmbH

contact@sw-machines.com

www.sw-machines.com

+49 7402 74-0



Schwäbische Werkzeugmaschinen GmbH
Seedorfer Strasse 91
78713 Schramberg-Waldmössingen
Germany

Tel: +49 7402 74-0
contact@sw-machines.com

sw-machines.com

