

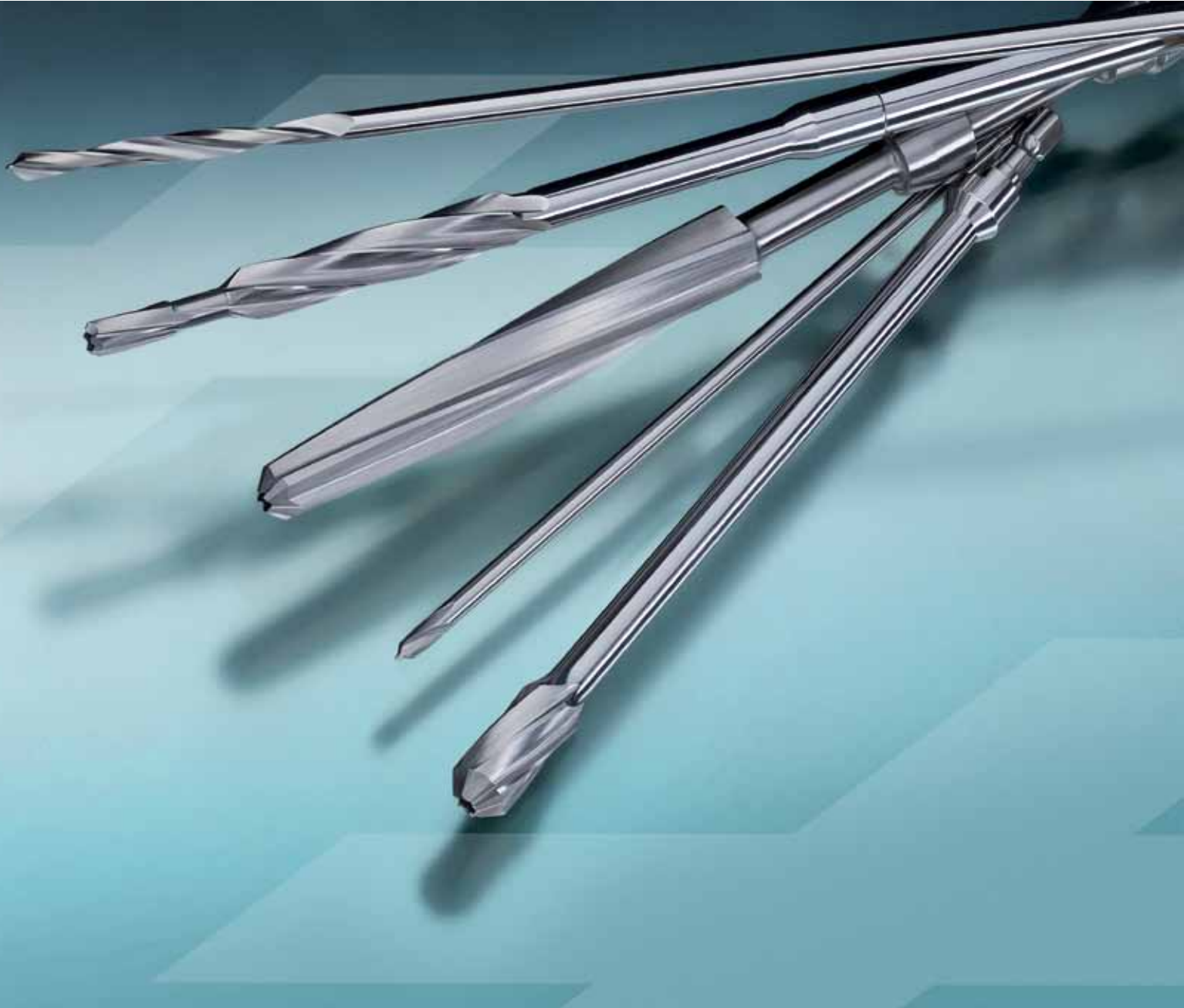


325linear – freedom on two auxiliary slides

LARGE MACHINING AREA WITH TRIED-AND-TESTED 5-AXIS DYNAMICS

The 325*linear* allows you to ideally cover the diversity of the processes and clamping technology for your workpieces:

- production and resharpening of material removal tools
- pre-machining and finish-machining of production workpieces
- grinding, mill cutting, polishing and finishing of implants
- process-sure grinding of profile plates and micro tools

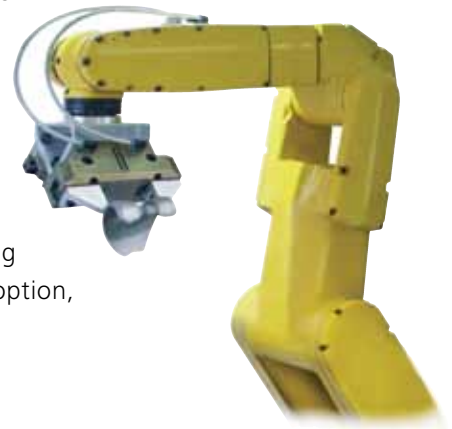


Exact grip on each workpiece

The automation solutions of the *325linear* allow you to produce workpiece geometries efficiently and flexibly from a batch size of one up to highly optimised bulk production. For this purpose, the *325linear* is automated as an individual cell and can thus operate profitably in unmanned shifts or can be interlinked in production systems.

Depending on the workpiece and batch size, equipping of the *325linear* ranges from manual loading by means of a pick-up solution with pallet integrated in the constructed space, a chain magazine with space for 140 tools, up to a fully flexible robot cell. Our gripper solutions can change the smallest micro tools, long drilling tools and even heavy production components reliably and precisely.

Even the standard version includes a grinding wheel changer with a 5-fold grinding wheel magazine. The solution patented by Schütte changes the cooling lubricant distributor tuned to the grinding wheels at the same time. As an option, the *325linear* can be extended from 5 to 12 or 24 grinding wheel packages.



- Scalable automation: Pick-up, chain magazine, robot
- Precise, safe gripping technology
- Fast change cycles
- 5, 12 or 24-fold grinding wheel magazine
- Grinding wheel change with associated cooling lubricant distributors

Automatic loading and unloading of workpieces with chain magazine (left) and workpiece pallet (right)

YOUR PRODUCTION DETERMINES THE HANDLING SYSTEM



Images at top:
The patented workpiece guidance system WFS guarantees optimum process guidance even for tools with a high L/D ratio (e.g. gun drills)

The 325*micro* grinds micro tools from a diameter of 20 µm



Image page 5
Cutting edge preparation in the machine with the magnetic finishing process

325*micro* – small but very special

The production of micro tools places high demands on machine technology. Schütte meets this challenge with the 325*micro*, which is characterised by innovative solutions in the grinding of very small tools.

A prerequisite for high-quality work with micro tools is excellent surface quality at the cutting edges of the tools combined with precise concentricity between cutting edges and tool shanks. The WFS work guide system patented by Schütte ensures exact, backlash-free and stable workpiece clamping and a low-oscillation and vibration grinding process – even with long, thin tools. This is possible because high-precision guidance and support of the tool is always guaranteed directly beside the grinding point. The use of linear motors guarantees precise and highly dynamic grinding processes and short grinding times. Very high grinding performances are also achieved in cylindrical grinding of the smallest of diameters: the workpiece rotation axes permit speeds of up to 4000 rpm.

The small geometries of the tools accurate in the μm range place high demands on the geometry and sharpness of the grinding wheel. Schütte offers integrated systems in this area for dressing and sharpening. The machine can be dressed and cleaned without having to remove the grinding wheel. **SIGSpro** provides convenient operations for defining dressing cycles and integrating them in loader operation. For further micro-machining processes, such as edge preparation, Schütte offers special grinding processes or a fully integrated magnetic finishing process. Fully automatically and without clamping conversion, a finishing process is used to create a defined and uniform rounding along the cut edge in the μm range – independently of the tool geometry.



- Top precision through direct drives free of backlash with a closed control loop in all axes
- Precise, backlash-free workpiece guidance with the patented workpiece guidance system WFS
- Simple alignment of the workpiece without having to unclamp it
- Machine setup is more convenient thanks to menu-guided calibration cycles for workpiece positioning and alignment
- Excellent surface finishes on the tool through low-vibration grinding process, achieved by using the WFS
- Uniform quality thanks to thermal stability with liquid cooling in all drives
- Precision grinding with heat-balanced, micro-filtered coolant

**EXACT GUIDANCE AND LOW-VIBRATION GRINDING PROCESS WITH
PATENTED WORKPIECE GUIDANCE SYSTEM**



left:
High flexibility; programmable, foldable tailstock

bottom left:
Combined structure of support and tailstock (swivelled out)

The solutions for clamping, supporting and precise guiding of the 325 linear are as versatile and sophisticated as your workpieces.

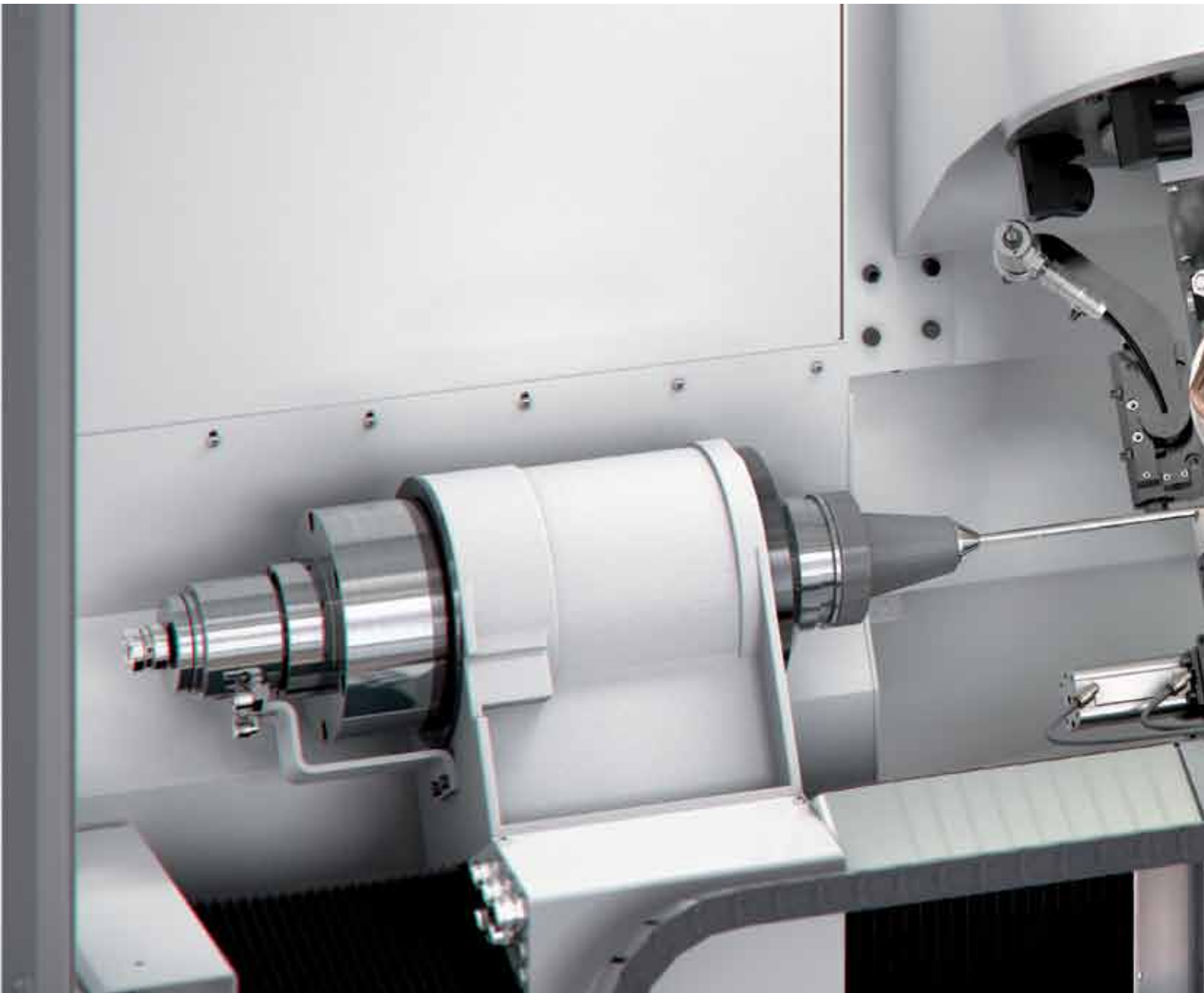
On the rotation axis (A-axis), you can install either collet chucks, hydraulic expansion chucks or multi-range chucks. Thanks to an automated collet change, workpieces with different diameters can be clamped with high concentricity in unmanned loader operation. The precisely positioned A-axis also permits position-oriented clamping of non-rotationally symmetrical workpieces.

Depending on the machining task, the two auxiliary slides make the use of different support and guidance systems possible. The standardised interfaces for assembly and activation permit rapid installation and removal and a variable arrangement of workpiece guidance system, support or tailstock on the two slides. For compact, machine-integrated loading, a pallet can be installed on the rear slide.

It is also possible to combine these systems or to program them to fold away as required. The optimum solution is thus set up in each case for different workpiece lengths, diameters and grinding operations, programmed in **SIGSpro** for collision analysis and put into operation fully automatically. From roughing to finish-machining, the workpiece can be clamped safely without loss of accuracy or a machine change and precisely machined.



- Two auxiliary slides in the X-workpiece axis
- Slide traverse and clamping can be programmed
- Pneumatic auxiliary stroke for tailstock function
- Modular structure for flexible setup of the systems
- Workpiece guidance system, supports, tailstocks and pallet
- Support and tailstock can be combined on a single slide





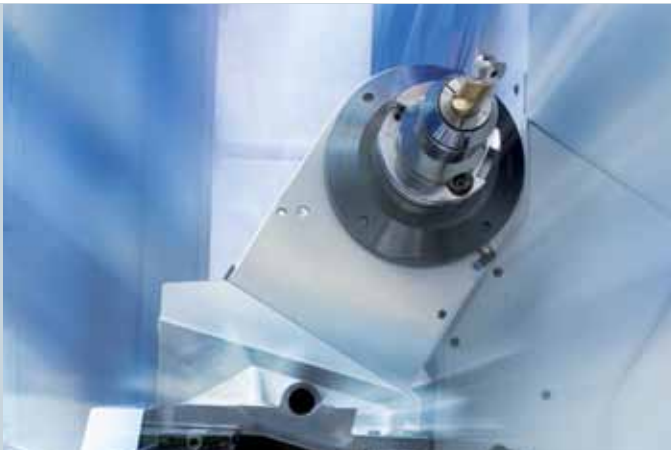
The 325*linear* – the all-rounder

The 325*linear* extends the tried-and-tested, high-precision 5-axis CNC grinding machine 325. Its longer axis paths, increased rigidity plus 2 auxiliary slides for workpiece clamping and guidance cover all of your tasks from micro tools to gun drills.

The extremely compact and well-arranged design of the 325*linear* offers an even more rigid structure so that the extended X and Z paths can be traversed with maximum dynamics in the shortest possible cycle times. Workpieces ranging from extremely small drill bits through production components up to hob cutters are guided and positioned precisely. Wheel change and handling systems round off the productivity of the 325*linear*.

The innovative second auxiliary slide permits the combined use of tool guidance, support, tailstock or workpiece pallets. Thanks to the modular structure, the equipment can be set up flexibly for a very wide variety of workpieces and process tasks on both of the slides as an option.

The **SIGSpro** software always provides consistent support for the user: Users can program the machining operations and devices in an operation-based and menu-guided manner at the machine or the PC workstation. The 3D simulation also allows you to prepare the most complex clamping situations offline, to check for collisions and to optimise cycle times.



- Two auxiliary slides on the X-axis
- Extended X and Z-axis paths
- Dynamic linear axes
- Efficient cooling
- Energy-optimised control
- 3D simulation in **SIGSpro**

The universal rotation axis (A-axis) with extremely high levels of concentricity and pitch accuracy makes exact process guidance possible. Speed range from 2500 up to max. 4000 rpm for cylindrical grinding.

FROM SMALL TO LARGE – THE DIVERSITY KNOWS NO LIMITS



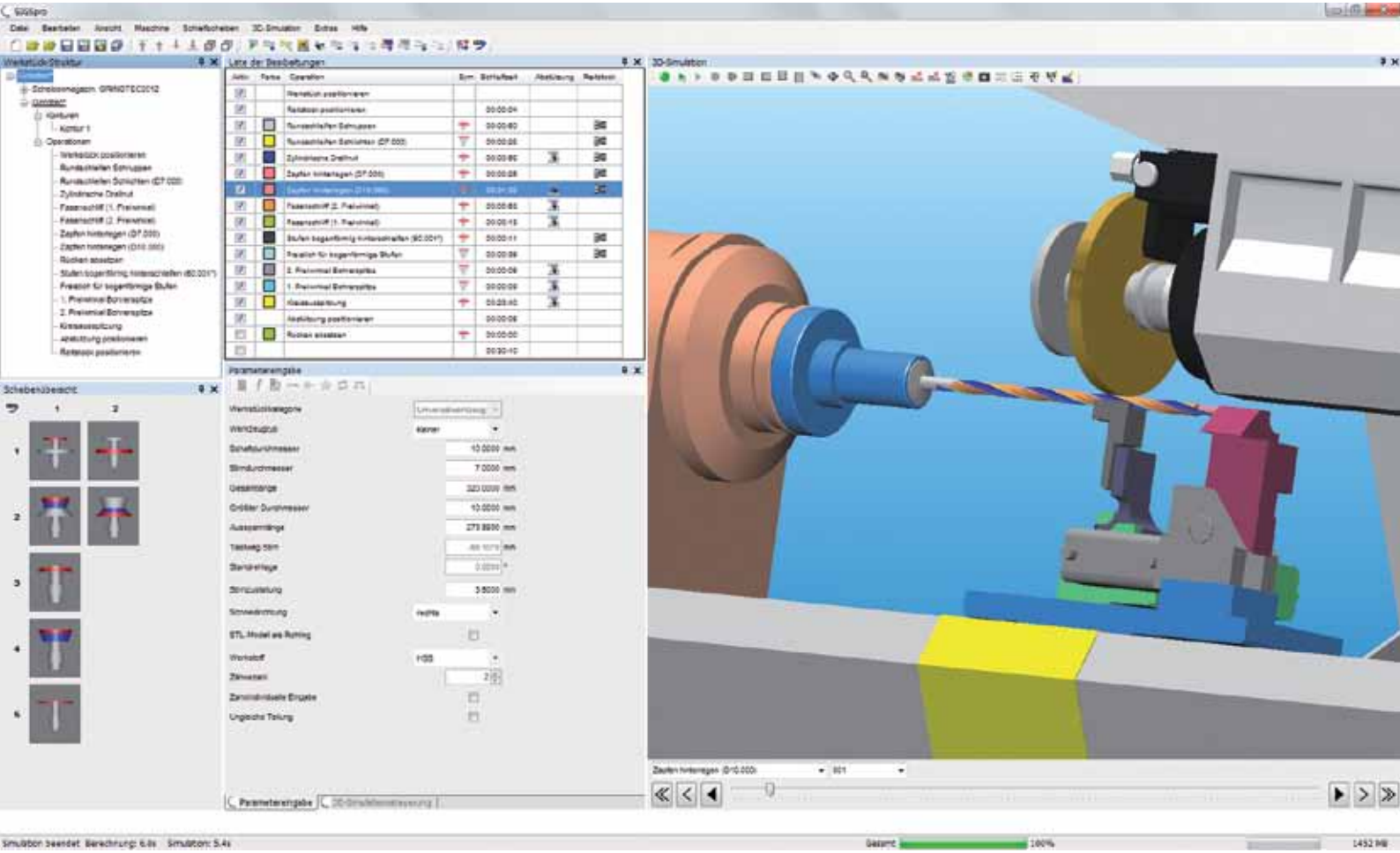
Efficiency thanks to automation



FLEXIBLE IN THE PROCESS AND HANDLING



Swivellable 19" Schütte control panel with *SIGSpro* user interface for complete control over equipment and process

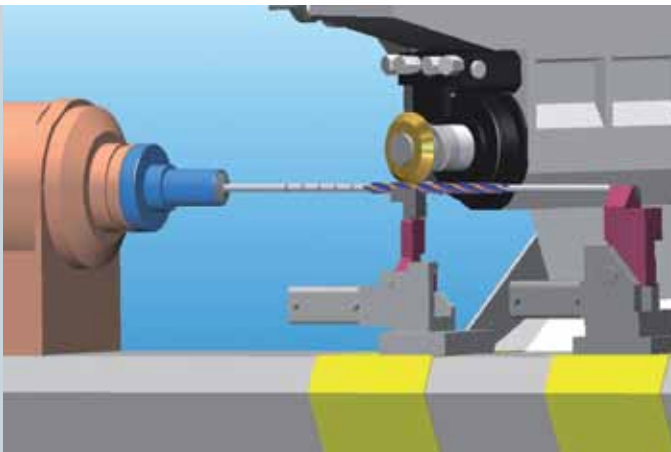


SIGS*pro* – flexible and convenient

Variable clamping and guidance options are only of value if they can be operated safely and comfortably. This is guaranteed because the programming interface SIGS*pro* (Schütte Integrated Grinding Software) is an in-house development from Schütte and ideally tuned to the hardware.

In **SIGS*pro***, users can assign the clamping options (support, tool guidance system, tailstock) they wish to use to every grinding operation. When the support and tool guidance system are used, users can also set whether the distance to the grinding wheel or the workpiece face is to be predefined and held constant. In the 3D simulation, the complete process including all clamping devices can be observed, controlled and optimised - also at the external workstation during work preparation. The integrated collision monitoring guarantees a reliable production sequence.

Once the sequence has been defined, the prepared project can be forwarded to the automation module. **SIGS*pro*** can handle both bulk production as well as randomly mixed loading in resharpening mode.



- Comprehensive, convenient and user-friendly control system interface
- Free assignment of the clamping and support options to the grinding operations
- Flexible parameterisation of the clamping and support options
- Integrated 3D simulation with depiction of material removal and collision possibility
- Flexible automation module

FLEXIBLE IN THE PROCESS AND HANDLING

MACHINE

325linear 325micro

Linear axes

Stroke:

X-axis (longitudinal movements)	mm	480	480
Y-axis (transverse movement)	mm	250	250
Z-axis (vertical movement)	mm	275	275

Resolution:

X-, Y- and Z-axis	µm	< 0.1	< 0.1
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max. feed speed:

X-axis	m/min	48	48
Y- and Z-axis	m/min	24	24

Rotation axis for workpiece (A-axis)

Resolution in dividing mode	degrees	< 0.0001	< 0.0001
max. speed range as rotation axis	rpm	200	200
max. speed range as universal rotation axis	rpm	2500	4000
Mounting shank		SK 50	HSK 50 E
max. torque	Nm	88	25

Swivelling axis for grinding head (C-axis)

Swivelling range	degrees	225	225
Resolution	degrees	< 0.0001	< 0.0001
max. swivelling speed	degrees/s	360	360

Grinding spindle (motor spindle)

max. speed	rpm	12000	12000
max. drive output	kW	15	8
Mounting shank		HSK-E 50	HSK-E 50

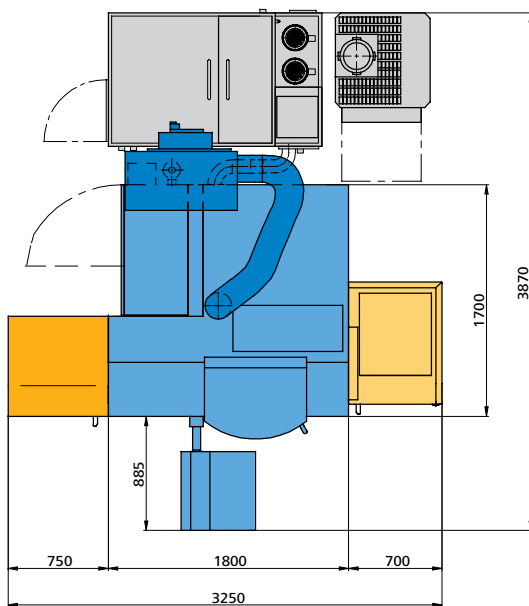
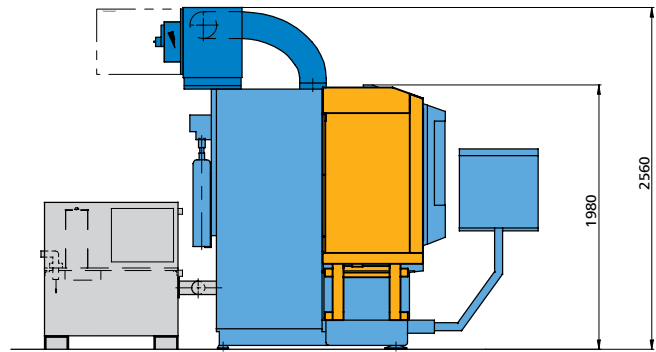
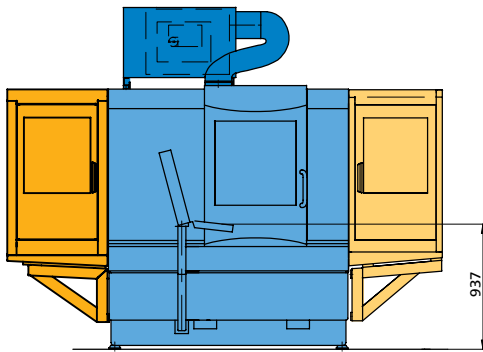
Grinding spindle option (among others, grinding points)

max. speed	rpm	24000	24000
max. drive output	kW	8	8
Mounting shank		HSK-E 50	HSK-E 50

Control system

CNC	SIEMENS	SINUMERIK 840D sl	SINUMERIK 840D sl
Drive technology	SIMODRIVE	SINAMICS S 120	SINAMICS S 120

Technical data



- Grinding centre based on the *325linear*
- with 12-fold grinding wheel changer and
- 140-fold chain magazine,
- cooling lubricant and oil filter system, oil cooler,
- extraction system



SERIES 325

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