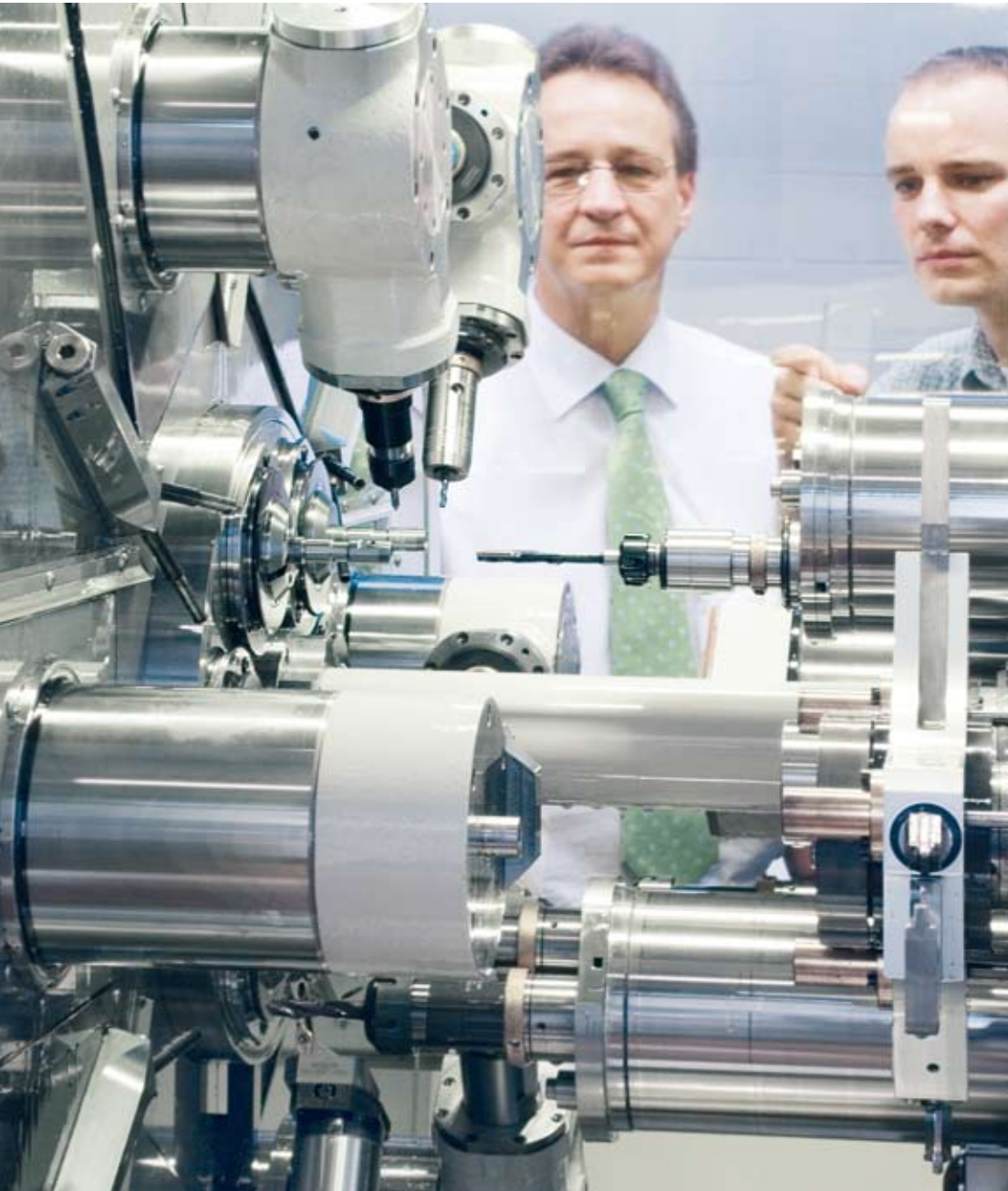




New Definition of Freedom

CNC MULTI-SPINDLE AUTOMATIC LATHES – THE GENERATION SCX



Complete manufacturing of complex workpieces – the SCX provides wide-ranging technology for both workpiece sides

All drives, cross slides, lubrication and cooling lines are outside the machining area

Concept: Freedom

More complex workpieces in smaller batch sizes, shorter life cycles and an intensely competitive environment reflect present-day work processes in industrial production. The company's scope for development is directly determined by the means of production. The ability to react quickly and flexibly to market requirements is therefore an essential prerequisite for being and remaining competitive.

These considerations guided our engineers during the development of the new Schütte multi-spindle automatic lathes. Everything that is not directly linked to the production of the workpiece has been eliminated from the machining area of the SCX. Neither drive and guiding elements nor lubrication lines, cooling lines or cables can be found inside the tooling area of the SCX. The open machining area thus provides you with the greatest possible configuration flexibility and the simplest retooling procedures.

Furthermore, the SCX from Schütte considerably extends the machining options:

- On the second workpiece side through exact transfer and three additional spindles.
 - In complete machining with the possibility of integrating C- and Y-axes on all positions.
- A wider range of workpiece geometries than ever before is now possible in multi-spindle production.

We are proud of the result: SCX, the new CNC multi-spindle automatic lathe from Schütte.

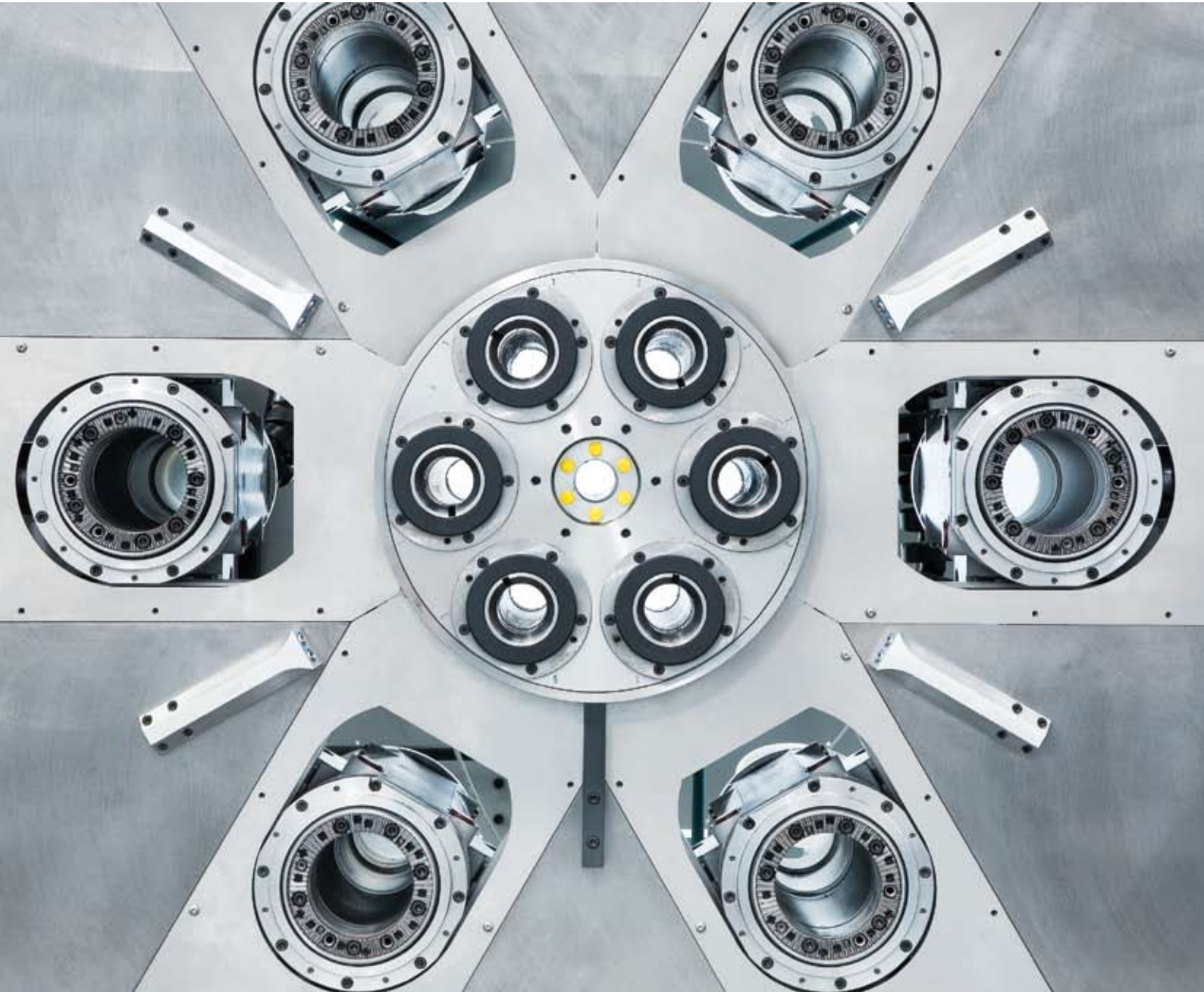
Six spindle positions with opposed spindles complete two-side machining



- Clean, freely accessible machining area
- No drives, cross slides, lubrication and cooling lines or cables within the tooling area
- Free-falling chips
- Really simple retooling and tool retrofitting
- Free speed selection
- Expansion of the machining range through extended rear-side machining including C- and Y-axis

TURN YOUR COMPANY TO THE FUTURE

Precision and process reliability
even with complex workpiece geometries



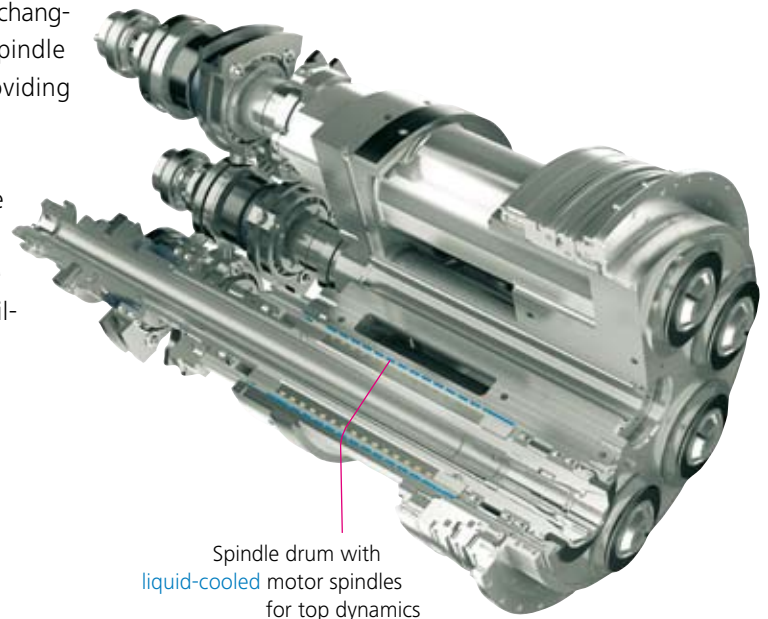
You alone determine cycle and speed

The core of the SCX, the spindle drum, is positioned precisely in its angular position by a high-precision Hirth coupling system. Together with the purely thermo-symmetrical structure of the headstock, this guarantees top process reliability in all spindle positions.

The liquid-cooled motor spindles allow you to make speed changes or to shut down spindles with high dynamics. Each spindle has speeds that are independent of each other, thus providing optimum cutting speeds.

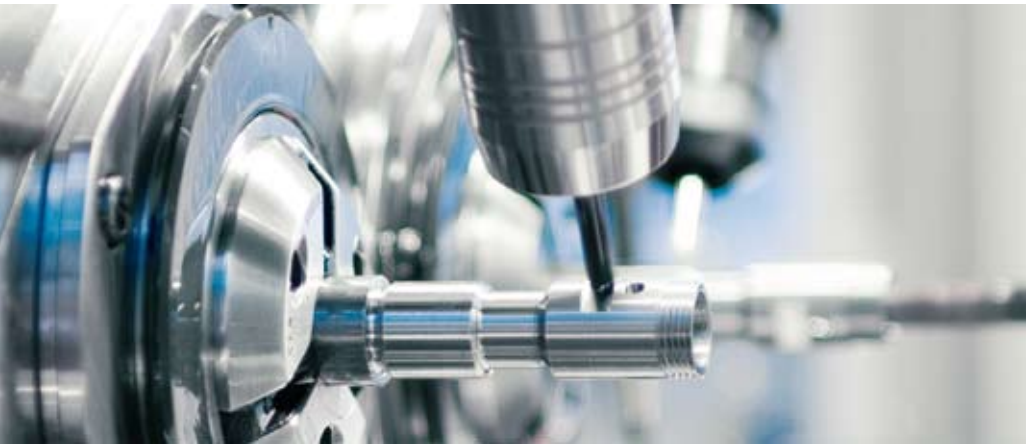
The patented Schütte concept of autonomous drive controllers without moving cables and with a minimum of slip ring contacts allows the spindle drum to cycle through continuously and minimises wear and susceptibility to faults.

Freely configurable with machining units of identical construction and tool heads not tied to specific positions



- Process reliability through thermo-symmetry
- Liquid-cooled motor spindles with high dynamics and torque
- Precise digital speed control, C-axis operation and spindle positioning
- Independent speeds and optimum cutting speeds improve surface quality, tool life and chip breaking
- Continuous spindle drum indexing with the patented decentralised drive controller from Schütte
- Autonomous drive controllers result in no moving cables, a minimum of slip rings and reduction of wear and susceptibility to faults

SPINDLE DRUMS CYCLE THROUGH WITH THE PATENTED AUTONOMOUS DRIVE CONTROL FROM SCHÜTTE



Milling with the Y-axis is possible in all spindle positions



Productivity through parallelism – two tools engaged simultaneously (milling or drilling on the outside diameter while reaming the bore with the spindle static).

Arrange the processes to suit your workpiece ...

... and not because the machine demands it. With world's first innovative axis structure of the cross machining units used in the multi-spindle machines, Schütte has developed a concept that combines the advantages of a rigid slide construction with a flexible machine configuration.

The cross machining units are already integrated in the standard version as cross slides and provide all the functions of NC machining. The X-axes are guided hydrostatically via roller guides – Z-axes are designed as quills. Both are driven electromechanically. The advantages of high guidance precision and superior damping behaviour thus complement one another during material removal.

The cross slide units are designed as a modular system for fixed and driven tools. The internal coolant supply is an integrated element of the tool units. This modular system can be equipped, retooled and retrofitted in a few simple steps and can be subsequently extended by auxiliary functions and axes. Each machining unit can be equipped with a turret function for sister and follow-on tools. Further more, every position can be equipped with a Y-axis.

All drive and guide elements, including those for the optional auxiliary devices, are outside the machining area – a given standard throughout the SCX.

All cross machining heads permit machining in the X-, Z- and Y-axis

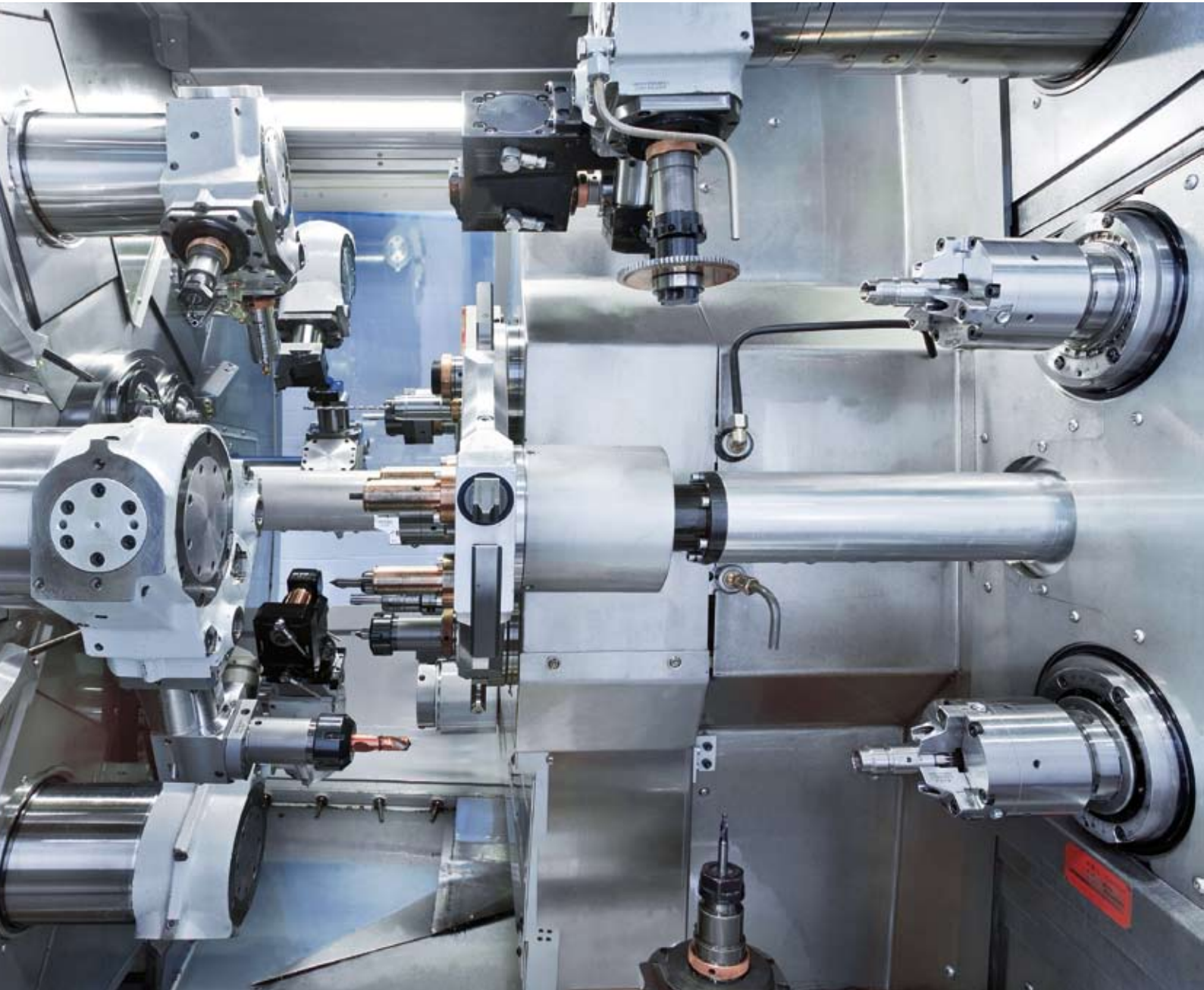


- Rigid cross slide units are standard – allowing flexible configuration with fixed and driven tools
- Full CNC cross slides in all positions
- Turret functions for follow-on and sister tools
- Drilling and milling with C- and Y-axis
- Modular system provides retooling and retrofitting options
- No drives, cables, etc. within the machining area
- Excellent accessibility, free falling chips
- Less wear

MORE FREEDOM OF MOVEMENT THANKS TO UNIQUE SCHÜTTE SLIDE ARRANGEMENT



Two tools can be used per endworking machining unit. Both can be used for stationary as well as driven tools, also in combination. They can be used in all spindle positions and can be replaced and retrofitted at any time.



Show your tools who's boss – in every position

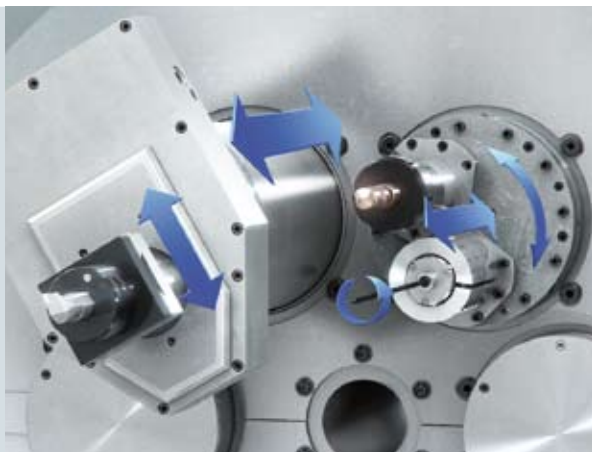
Stable, precise tool carriers and short machining times are important for efficient end-face milling. In every spindle position, the SCX permits simultaneous machining on the circumference and on the front surface of the workpiece.

All tools for endworking machining are carried by hydrostatically mounted quills. The main material removal forces act with a linear distribution of forces on the rigid quill body to prevent bending moments on the tool carriers.

In the same manner as cross machining, turret or cross slide units can also be used for endworking with stationary as well as driven tools. This module system can be retrofitted for all spindle positions with identical construction and at any time.

All drive and guide elements, including the coolant and lubricant supply and those for auxiliary devices, are outside the machining area – which is standard throughout the SCX. This provides excellent accessibility and clearance. Setup and operating procedures can be carried out simply and safely.

A system without corners and edges guarantees free falling chips.



- Short cycle times thanks to simultaneous machining of circumference and front surface
- Absolute precision of bar feeding
- Linear distribution of main material removal forces in the longitudinal axis prevents bending moments on the tool carrier
- Modular system for turret and cross slide units
- Simple retooling and retrofitting in the freely accessible machining area
- Excellent accessibility
- Front face machining with follow-on tools and Y-axis

**SIMULTANEOUS CROSS AND ENDWORKING MACHINING –
FAST AND PRECISE**



Workpiece parting off and takeover by the opposed spindle



Two-side machining with three fully-fledged additional spindles and up to eight tools

Discover the other side

With its seven- or nine-spindle version, the SCX opens up a completely new dimension in machining of the workpiece rear side. Complex workpieces can now be manufactured completely in a single operation without leaving the machine.

After machining the first side, the workpiece is parted off and transferred with the opposed spindle (spindle position 7) to a new machining area. Here, two fully-fledged machining units complete the workpiece in two further cycles on two opposed spindles (spindle position 8 and 9). As on the headstock side, they are provided with all functions, for example, C- and Y-axis, polygon turning, or turret.

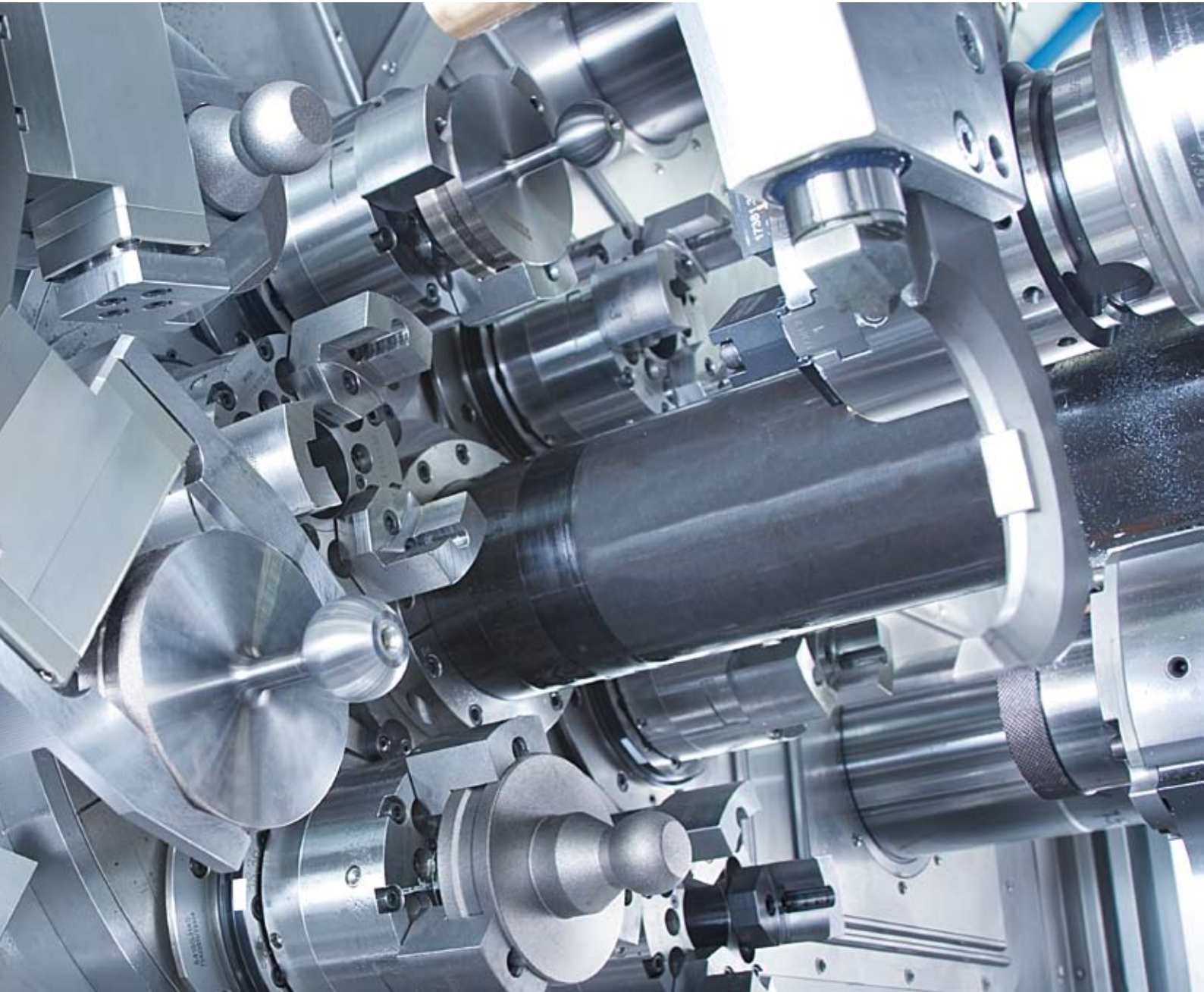
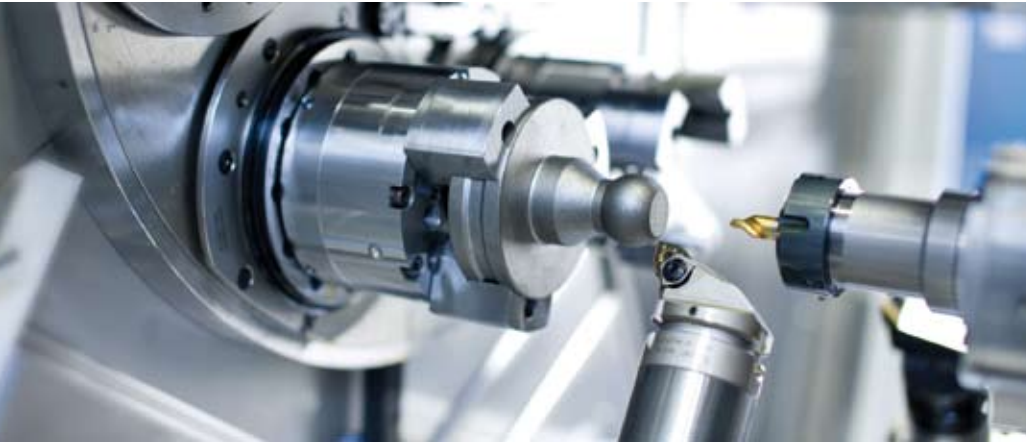
After the precise takeover of the workpiece by an opposed spindle during part-off, it remains firmly clamped in a collet or jaw chuck for the machining cycles. The HSK quick-change interface, which has been tried and tested for decades, is used to forward the workpiece with a high degree of accuracy in concentricity and positioning.

This also applies to machining of the second side: the material removal area remains free and cleared because all drives are located outside the machining area.



- Accurately positioned transfer of the workpiece using the tried and tested HSK quick-change interface
- Machining of the workpiece rear side in three additional fully-fledged spindles
- Workpiece is firmly clamped and forwarded in its clamping device without loss of accuracy
- All functions (C- and Y-axis, polygon turning, turret) are also available for the second side
- Complete machining of the workpieces
- The machining area remains open and easily accessible

UNRESTRICTED TWO-SIDE MACHINING



Your workpiece determines the type of clamping – collet or chuck

Irrespective of the selected basic material – bars, bar sections, cast or forging blanks – the flexibility of the SCX is also reflected in its various clamping concepts. The freely selectable version as chuck, bar or magazine machine makes adaptation of the machine to diverse production concepts possible.

The chuck clamping system available on the SCX-46 permits machining of moulding blanks with diameters up to 130 mm. Needless to say this includes an option of end-face milling and rear-side machining (with opposed spindle and 2 additional spindles for machining the second side).

The magazine machine with collet clamping completes the machine range. Positive opening, spring stop in the main spindle for inserting the blank and, optionally, active ejection of the machined workpiece onto the discharge chute or into the opposed spindle are only a few of the features that characterise material clamping on the SCX.

Tried and tested new material transfer concepts – amongst others the Schütte feed, bar feeding via the loading magazine, pre-drawing from the machining area via the cross or longitudinal positions and the innovative material supply and discharge via the cross slide in position VI – supplement the SCX to a multifunctional production system for highly complex workpieces with varied designs.



- Flexible production of bars, bar sections, forging or cast blanks
- Material clamping in collet or chuck on the main and opposed spindle
- Maximum machinable part diameter 46 mm (collet clamping) or 130 mm (chuck clamping)
- Full rear-side function in every machine version
- Multifaceted material transfer versions from raw material provision to finished part discharge
- Spring stop / active ejection of magazine parts

THE SCX IS DESIGNED FOR FLEXIBLE USE – IRRESPECTIVE OF WHETHER YOU ARE PROCESSING BAR MATERIAL OR PREFABRICATED BLANKS



Machine-integrated workpiece handling by the pallet system – an intelligent concept for damage-free and aligned discharge of the workpieces. Automatic sorting of inspection parts and in-process measurement is also possible



From raw material to the finished part – workpiece transfer

The SCX offers intelligent solutions in material transfer by the machine. The requirements of the different machine versions – collet or chuck – necessitate adaptable material workpiece discharge versions. In this sense, the modular machine design of the SCX generation allows you to make allowance for the characteristic differences of the raw material (e.g. bars, bar sections, forging or cast blanks), workpiece weight and size as well as material ejection (random, aligned or damage-free).

The SCX generation offers – apart from the classic feed versions by the bar loader – a machine-integrated bar infeed. Optionally, the material can be advanced inside the spindle or can be pulled forward from the machining area with high positioning accuracy. The finished parts are ejected either by means of chutes or conveyor belts to the front or rear side of the machine. With increased demands on the discharge quality, a machine-integrated workpiece handling system permits damage-free and aligned depositing in a double-pallet device. The pallets can be replaced during machining in automatic mode.

For handling magazine and chuck parts – particularly with increased workpiece weight – the machine program includes parts handling on the basis of the cross slide unit position VI. Workpiece transfer in the machine is based on an integrated hood interface via the machine axis in position VI, whereas the external part infeed and discharge to up to hood interface can be arranged according to the customer's wishes. A wide variety of solutions from pipe infeed and chutes through conveyor belts up to robots can be configured.



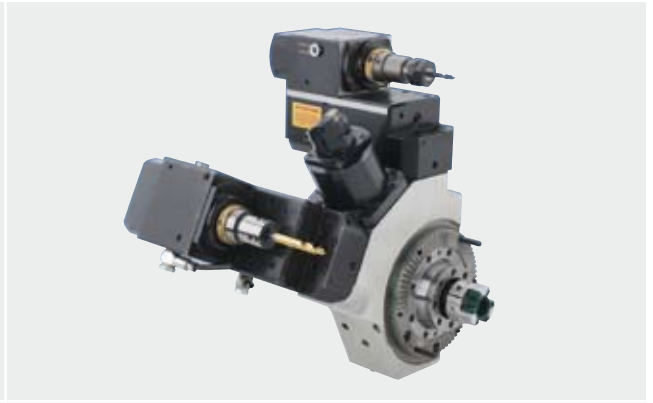
- Integrated material feed
- Precisely positioned pre-drawing of material from the machining area
- Variable parts discharge via chutes or conveyor belts
- Aligned, damage-free placement into double-pallet devices during machining
- Handling of heavy chuck parts via the machine axis position VI
- Neutral machine interface for flexible arrangement of the parts infeed and discharge

Material pre-drawing device from endworking axis to first spindle position

THE UNIVERSALLY APPLICABLE WORKPIECE HANDLING SYSTEMS OF THE SCX GENERATION ARE INNOVATIVE AND SAVE TIME AND MONEY



Tool presetting outside the machine



endworking

cross

One system – so you remain flexible

Even with the modular tool system of the SCX, we integrated the concept of freedom. Tool units with one or several stationary or driven tools, or even a combination of both, can be used both for endworking and cross machining.

The standard tool units include devices for drilling, contour milling and hobbing, spherical and polygon turning (cross) as well as cross slides (endworking) for driven and stationary tools. Essentially important: all units can be used independently from one another in every spindle position.

Currently marketed, standardised quick-change interfaces permit fast and convenient changing of the tools. The possibility of tool presetting outside the machine allows you to shorten retooling times even more. Internal coolant supply up to the tool cutter also makes its contribution in this regard. The new SCX concept considerably widens your production time frame.



- Modular tool carrier system
- Integrated coolant supply (suitable for high pressure)
- Precise quick-change interfaces facilitate the presetting
- Compact tool carriers guarantee free falling chips and easy access.
- Top accuracy of repeatability during tool change
- Simple and convenient setup

Ease of physical and visual access for assembly and disassembly of the tool heads

**THE MODULAR TOOL SYSTEM MAKES YOUR APPLICATION OPTIONS
FLEXIBLE AND REDUCES IDLE MACHINE TIME**

Example of use, left:
adjustable angle drilling unit
with smoothing tool and spherical
turning attachment
right:
endworking machining module
with rigid tool and driven
high-frequency spindle



Spherical turning attachment
in 4th spindle position

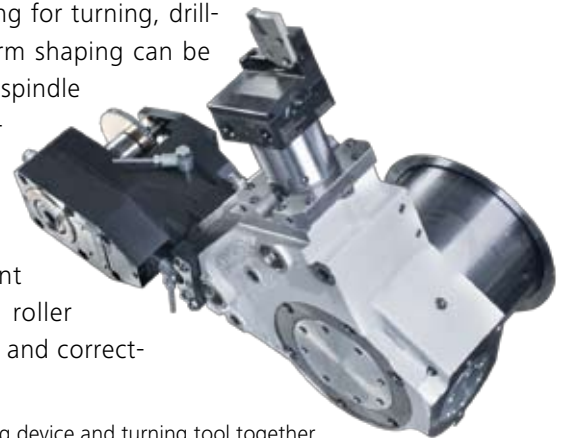


Additional equipment extends range of applications

Already with its basic equipment – comprising CNC cross slides from endworking and cross as well as Y- and C-axes – the SCX multi-spindle automatic lathes already have versatile applications. With standard additional devices for special machining tasks, the range of the application field of this series can be expanded almost without limitations. Complete machining of turned parts with milling cuts, tothing etc., complex extensive front and rear-side machining, top precision and repeatable quality in interaction with extremely short machining times can thus be implemented on our multi-spindle automatic lathes in the SCX generation.

The machining modules for endworking, cross and/or rear-side machining for turning, drilling, mill cutting, tooth grinding, thread cutting, polygon turning or form shaping can be used within the working area assigned to them (endworking, cross) in all spindle positions and can also be interchanged according to your specific process requirements.

The application example on the left shows a spherical turning attachment. The circular path is executed by a single pivot movement of the machining unit. Instead of a spherical turning attachment, a roller burnishing tool can also be used. The ball diameter can be programmed and corrected by the CNC.



Milling device and turning tool together on a machining module



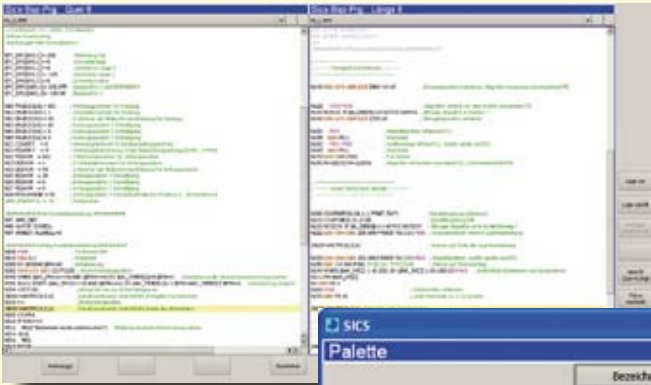
Shift hobbing via Y-axis

- All setting and feed axes are CNC-controlled
- Internal coolant supply up to the machining point
- Use of quick-change turning and roller burnishing tools
- All auxiliary devices are fully interchangeable within their working area, including application in two-side machining

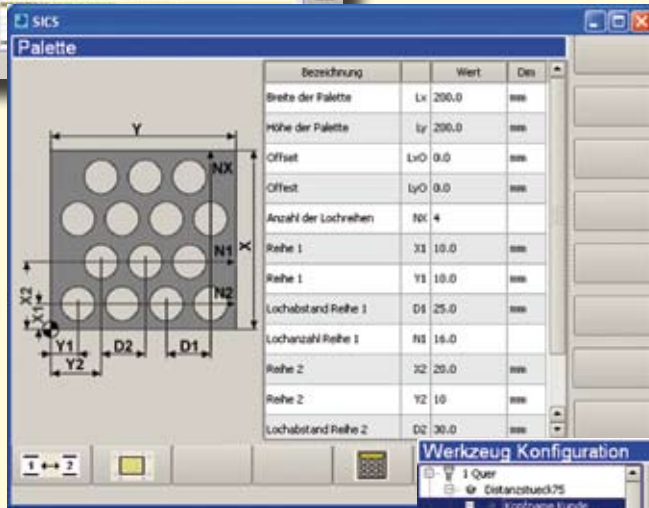
**COMPLETE MACHINING OR COMPLEX GEOMETRICAL CONTOURS –
ADDITIONAL EQUIPMENT INCREASES YOUR PRODUCTIVITY**



Programming and controlling

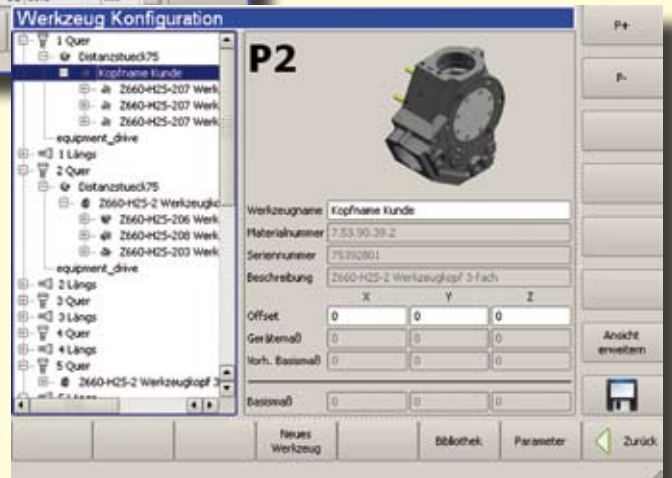


Standardised interface for configuration, setup and NC programming at work stations and at the machine.



Dialogue-guided configuration of the infeed and pick-up devices. The configuration is loaded together with the workpiece program. To the left: an example with palletising

Management and selection of the tool heads.
Processing of the correction values

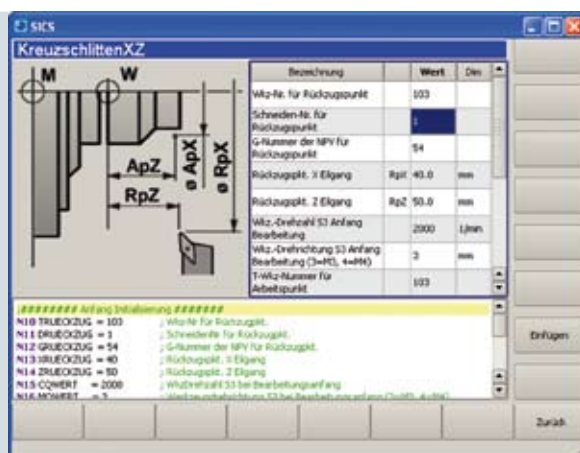


Controlled diversity – operation and configuration

The SCX control system makes no compromises. It works through the widest possible range of machining programs – reliably, precisely and in extremely short cycle times. Before machining starts, it supports users with intuitive dialogue, templates and information on tooling, setting work, operation, maintenance and service of the SCX multi-spindle automatic lathes. Parallel to these tasks, safety functions integrated in the control system protect operators and prevent damage to the machine.

Configuration and NC programming is simplified by SICS. SICS software is used both on a work preparation PC as well as on the machine control panel. The operator selects tooling for set-up from a clearly arranged menu and parameterises it. Linked to the NC program, the set-up is then loaded automatically. SICS thus controls, among other things, the basic movements of the tool heads, the part orientation plan for palletising and the axis configuration of the machining positions.

NC programming supports SICS by adopting the previously defined machine and tooling setups. The programmer is offered optimised program and function templates in the individual positions for the set-up equipment. They can then be used by the NC programmer to create an optimised NC program, with minimal operator input covering the entire from material feed to machining and parts discharge.



- Fast control for short cycle times
- Precise synchronisation and dialogue-guided configuration of all positions
- Fully programmable load/unload process optimization
- SICS integrated for work station programming and at machine
- Clearly arranged management of the tool heads
- Loading of setup data with the NC program
- NC programming with graphical support
- Equipment-specific NC templates as programming aid

THE SCHÜTTE PROGRAMMING PHILOSOPHY ASSURES RELIABLE PROGRAMMING AND SIMPLE OPERATION

MACHINE		SCX-32	SCX-46
Workpiece range			
Clamping diameter, max.	mm	32	46
Chuck diameter, max.	mm	–	130
Material feed, max.	mm	125	125
Main spindles			
Rated torque	Nm	18.5	35
Torque, max.	Nm	50	80
Speed, max.	min ⁻¹	7,000	5,000
Machining units, endworking			
Positions I...VI / machining of 2nd workpiece side, position VIII, IX			
X-axis travel	mm	70 / 110	110 / 150
X-axis speed, max.	m/min	30	30
Z-axis travel	mm	125	150
Z-axis speed, max.	m/min	30	30
optional:			
Y-axis travel	mm	50	100
Tool turret, positions		3	3
Machining units, endworking			
Z-axis travel	mm	280	280
Z-axis speed	m/min	30	30
optional:			
X-axis travel (turning tools)	mm	16	25
Y-axis travel (driven tools)	mm	50	70
Tool turret, positions		2	2
Opposed spindles, spindles for machining the second workpiece side			
Rated torque	Nm	15	25
Torque, max.	Nm	21	33
Speed, max.	rpm	10,000	7,500
Tool drives			
Rated torque	Nm	15	15
Speed, max.	rpm	10,000	10,000
Tool interfaces			
Stationary tools, optional		HSK/Capto	HSK/Capto
Driven tools		HSK	HSK
Internal coolant supply, max.	bar	200	200
Control system			
CNC		SIEMENS SL	SIEMENS SL
optional: Teleservice, tool monitoring, DNC			

One concept – you select your version

With its SCX series, Schütte re-defines the vision of a “multi single-spindle machine”: the diversity of the machining options of a multi spindle machine combined with the simple setup and operation of a single spindle machine.

The SCX offers different versions for workpieces of varying complexity. Six main spindles and an opposed spindle for workpieces can be manufactured almost completely from the first workpiece side. Plus the 9-spindle machine for workpieces that also have to be extensively machined on the opposite workpiece side – economic and complete.



The versions

SC6-32 SC6-46
SC7-32 SC7-46
SC9-32 SC9-46

without opposed spindle

with opposed spindle

with opposed spindle and 2 additional spindles
for machining the second side

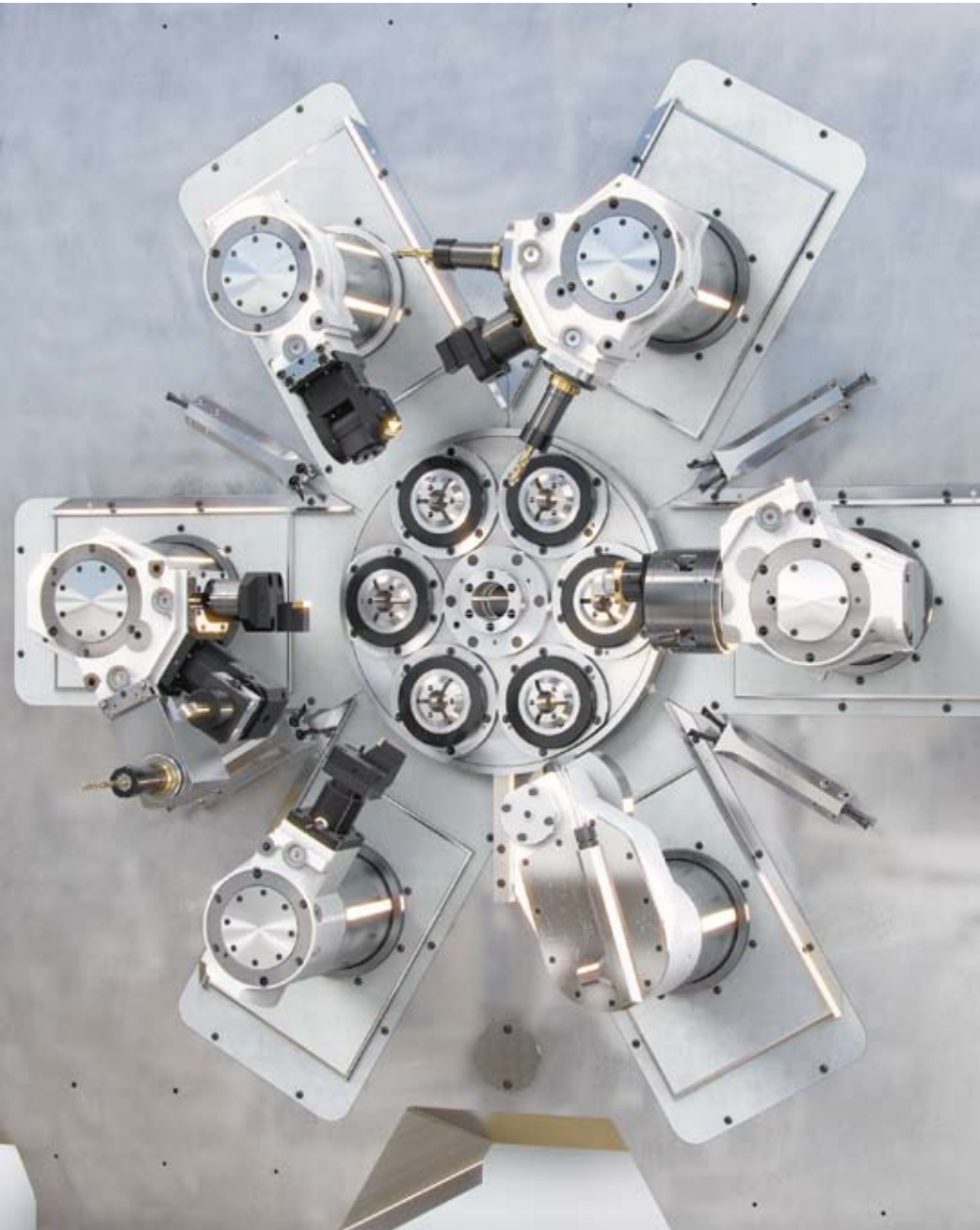


- Different expansion stages depending on the complexity of your workpieces
- Modular exchange of the machining heads – across the entire range of machines and versions
- Easy, simple and safe tool configuration, setup and operation
- Transferability of programs
- Version change without additional training requirements
- Precision and convenience thanks to quick-change interface for equipment and tool heads

THE NEW DIMENSION IN FREEDOM: THE SCX SERIES



Spherical finishing tool installed on a 1-position machining unit



Headstock with cross machining units. They are already designed as cross slides as standard and have the full range of NC functions.

3-position machining units used for rear-side machining,
left: 8th spindle position, right: 9th spindle position



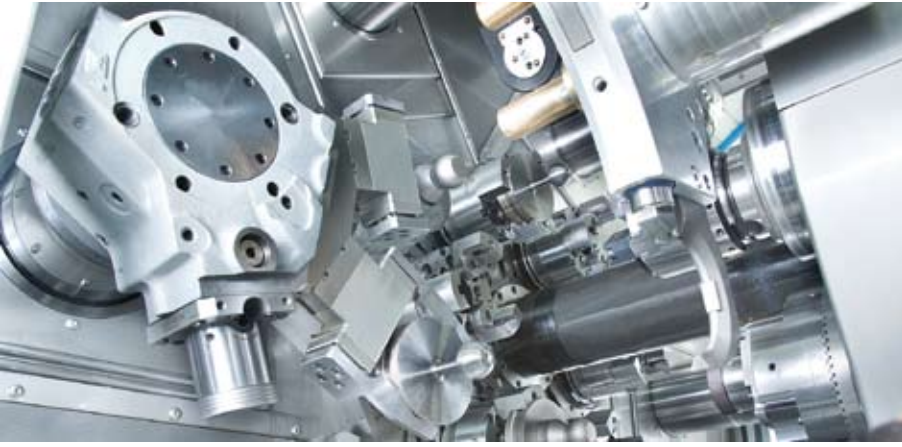
SC9-32
SC9-46

SC9-32
SC9-46



The number of work cycles required determines the expansion stage of the SCX

Rear-side machining with one or three spindles for machining the second workpiece side



The SCX also displays flexibility in handling workpiece removal. Several pick-up systems from the endworking and cross axis are available for this purpose.

Technical data





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