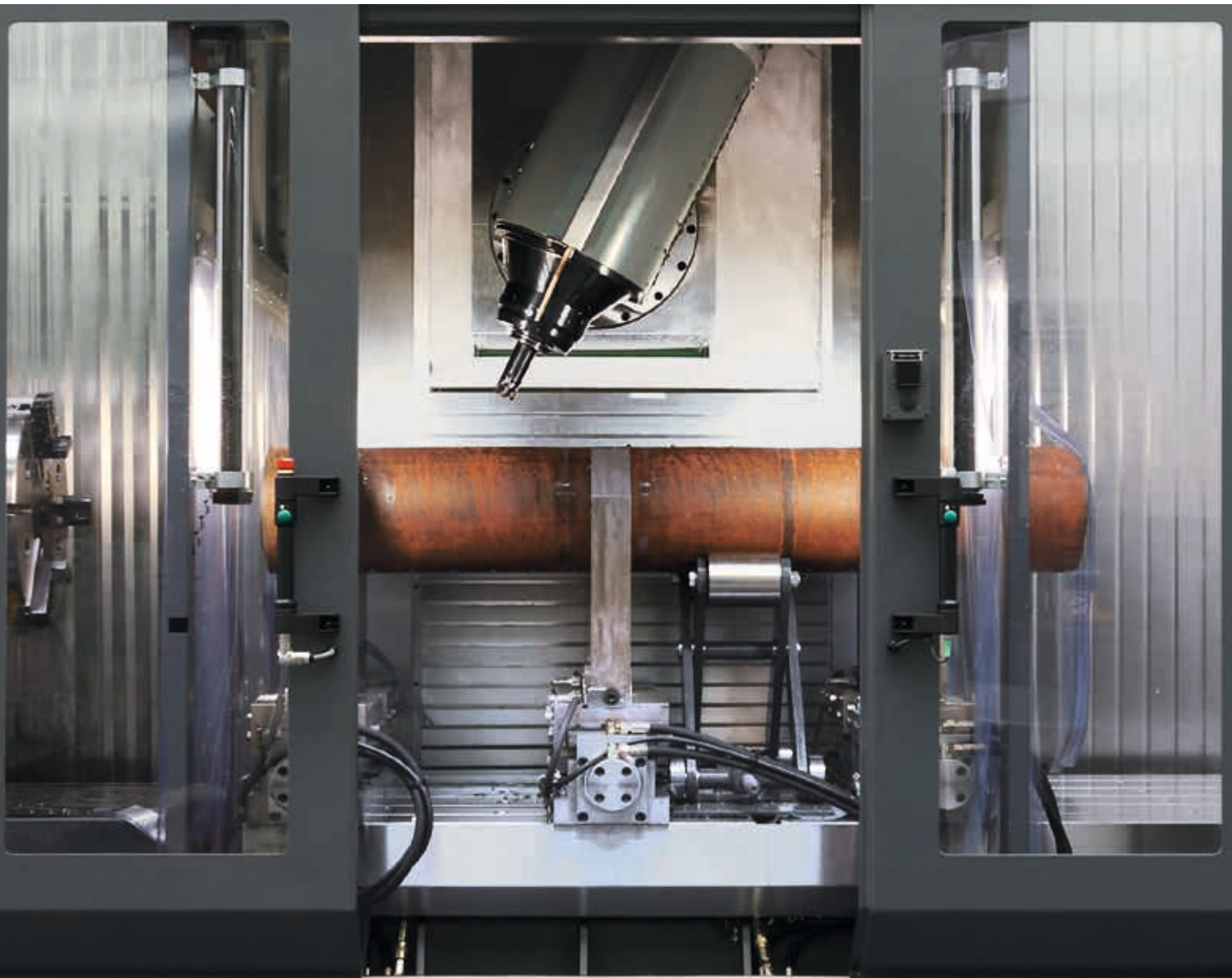


Application Engineering



Producing success.
With AXA's uniqueness.



Entwicklungs- und
Maschinenbau GmbH



Adjustably placed hydraulic vice enable the secure and variable tension of long rails



The parallel machining of a workpiece with double travelling column machining centre reduces the production time by up to 50% - the time-consuming long strokes are no longer required during face-side machining

Uniqueness

made by AXA

Individual solutions to meet truly special demands

Specific assignments require particular working conditions. Not every machining centre can master each challenge.

Our strength lies in taking on these challenges and developing the ideal application engineering for all of our customers.

That thanks to decades of experience we have gathered in our company. We are capable of displaying the

entire development process of our machines in the development of production of tool machines and their components – from the conception and development stages right up to production and assembly.

We don't only produce ourselves the machine beds and the machine covering. We make all the key core components ourselves. This high proportion of vertical integration gives our customers

unique added value as this puts us in the position to take on board practically all wishes and proposals to offer exactly the kind of solution our customers are looking for.

Whether standard, special or comprehensive system solutions:

Our customers receive optimally created and individual machine concepts.

Index – Application engineering



6 - 9

Vertical Turning Centres VTC

Machining centres designed for purely turning operations, with a vertically integrated turning spindle and one or two separately movable tool slides.

VTC

- Good chip flow by means of the vertically integrated turning spindle
- Hydromechanical workpiece clamping by means of expansion collets or expanding mandrel
- Simple workpiece feed-in, automatic loading and unloading
- Turning spindle with direct drive via asynchronous or torque motor for high rotation rates and/or torque
- Parallel machining of two workpiece sections with different tools
- Tools held in turning tool holders or as interchangeable tools in multiple turrets



10 - 19

End machining centres HEB and DEB

On the horizontal end machining centres HEB, the work-piece is either only machined on one side, or after completion of one side it is automatically rotated by 180° by means of an indexing table.

In the double end machining centres DEB both ends of the work-piece are machined in parallel.

HEB / DEB

- Workpieces held in self-centring vices
- Workpiece length adjustment via manual or automatic movement of the vices
- Diameter adjustment via interchangeable clamp jaws
- With up to 5 individually selected spindles per side, end machining operations such as face milling, drilling and threading take place in one step
- Integrated measurement functions and automated loading
- Equipped with gear spindles to provide higher torque



20 - 27

Horizontal machining centres HSC

The horizontal machining centres HSC have a fixed horizontally integrated main spindle. This design offers advantages for chip flow and handling.

The horizontal arrangement allows large oscillation circuits to be achieved. Several devices for independent workpiece clamping are possible, so that a workpiece can be fully machined on just one machine.

HSC

- Tool changer as horizontal disc-type changer or horizontal chain magazine
- Secure and precise clamping in individually-designed clamping devices
- Clamping of shafts and pipes in self-centring vices – workpiece positioning for radial drilling by means of an NC rotary table
- Clamping of long rails and strips in hydraulic clamps
- Gear spindles for high cutting torque when using large milling cutters
- Provision of special tools at pick-up stations



28 - 47

Individually customised solutions

Individual customisation to customer requirements on the basis of the existing series machines.

In addition, a wide variety of accessories are available, such as NC rotary tables, swivelling bridges and counter bearings.

Customer solutions

- Combination of several travelling columns in a joint X-axis
- Alignment of two travelling columns opposite one another for parallel machining of long profiles
- Swivelling table machining centre with two workpiece clamping positions on a rotary indexing table
- Assembly in front section in parallel with machining by partitioning the working space
- Machine and working space designed for machining abrasive materials with aggressive coolants
- Adaptation and locking of heavy vertical milling heads
- Individually-designed clamping devices

Vertical turning centres – VTC

The task:

Double-sided screwing of a centring shoulder onto electric motors

The solution:

- Hydromechanical clamping of the stator by means of expansion collets or expanding mandrel

Special characteristics:

- Workpiece driven by a directly driven asynchronous motor spindle
- Double travelling column turning machine with one turning support on each column

Technical data:

Working area

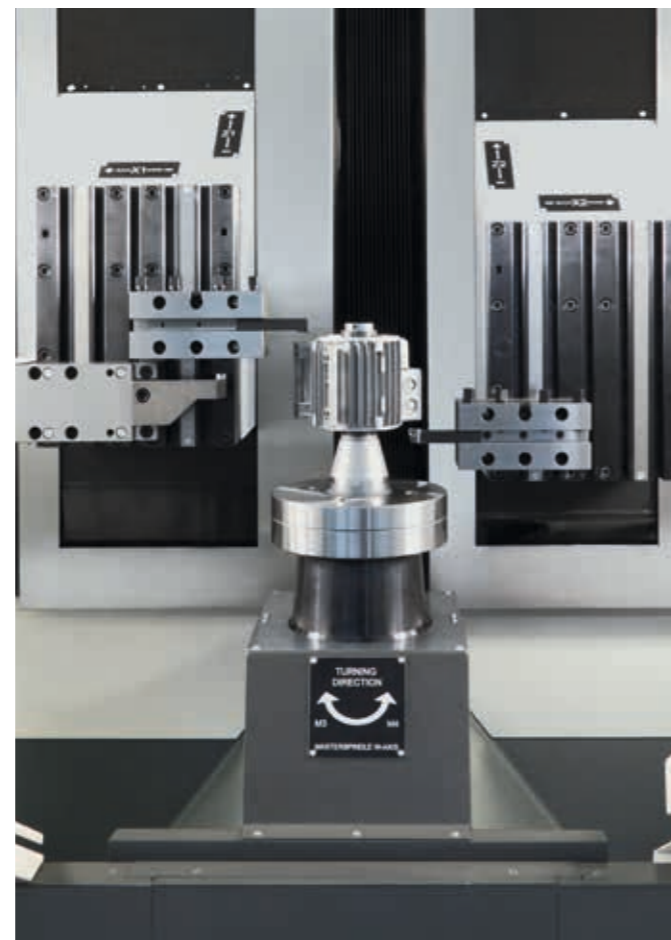
X-traverse range	[mm]	X1 / X2 = 300
Z-traverse range	[mm]	Z1 / Z2 = 900

Spindle

Main drive (with 40 % DC)	[kW]	30
Spindle torque (with 40 % DC)	[Nm]	143
Speed range	[rpm]	100 - 4000

Tool changer

Tool changing system	each travelling column has a rotary support with turning tool holder
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Vertical integration of the turning spindle for good chip flow and simple manual or automatic parts feed

Two supports that are movable independently of one another in X and Z execute different work steps in parallel

Vertical turning centres – VTC

The task:

Turning of centring shoulders on gas jets

The solution:

- Gas jets clamped manually by means of an expansion collet or expanding mandrel

Special characteristics:

- Workpiece driven by means of a rapidly rotating rotary table powered by a torque motor
- Use as a turning machine through the use of a quadruple turret

Technical data:

Working area

X-traverse range	[mm]	X1 / X2 = 300
Z-traverse range	[mm]	Z1 / Z2 = 900

Spindle

Spindle torque (with 40 % DC)	[Nm]	700
Speed range	[rpm]	350

Tool changer

Tool changing system	quadruple turret
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The quadruple turret provides different turning tools simultaneously

A rotary axis driven by a torque motor is used as a turning spindle

Vertical turning centres – VTC

The task:

Double-sided screwing of a centring shoulder onto electric motors

The solution:

- Hydromechanical clamping of the stator by means of expansion collets or expanding mandrel
- Turning tool holder in two quadruple Sauter turrets

Special characteristics:

- Workpiece driven by means of a turning spindle with asynchronous direct drive
- Double travelling column turning machine with a quadruple turret on each column

Technical data:

Working area

X-traverse range	[mm]	X1 / X2 = 300
Z-traverse range	[mm]	Z1 / Z2 = 600

Spindle

Main drive (with 40 % DC)	[kW]	30
Spindle torque (with 40 % DC)	[Nm]	143
Speed range	[rpm]	100 - 4000

Tool changer

Tool changing system		each travelling column has a quadruple turret
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Simultaneous cutting operations with two separately movable supports for short machining times – the setup with a quadruple turret on each support also enables complex programs with different tools

Vertical turning centres – VTC

The task:

Double-sided screwing of a centring shoulder onto electric motors

The solution:

- Hydromechanical clamping of the stator by means of expansion collets or expanding mandrel
- Turning tool holder in two quadruple Sauter turrets

Special characteristics:

- Workpiece driven by means of a turning spindle with asynchronous direct drive
- Double travelling column turning machine with a quadruple turret on each column

Technical data:

Working area

X-traverse range	[mm]	X1 / X2 = 800
Z-traverse range	[mm]	Z1 / Z2 = 600

Spindle

Main drive (with 40 % DC)	[kW]	40
Spindle torque (with 40 % DC)	[Nm]	255
Speed range	[rpm]	30 - 500

Tool changer

Tool changing system		each travelling column has a quadruple turret
----------------------	--	---



Workpieces are held precisely and securely via the hydromechanical clamping device

End machining – HEB

The task:

One-sided machining of extruded T-parts for pipes

The solution:

- Clamping of pipe T-parts up to a diameter of 600 mm in specially manufactured centring clamps
- 4 x 90° indexing table for the respective positioning of the workpiece in front of the spindle
- Welded seam preparation by means of heavy SK 60 spindle and NC-controlled slide head

Special characteristics:

- Easy changeover to different pipe diameters by exchanging the attached prismatic jaws
- Use of an extremely high-torque gear spindle

Technical data:

Working area

Z-traverse range	[mm]	500
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Spindle

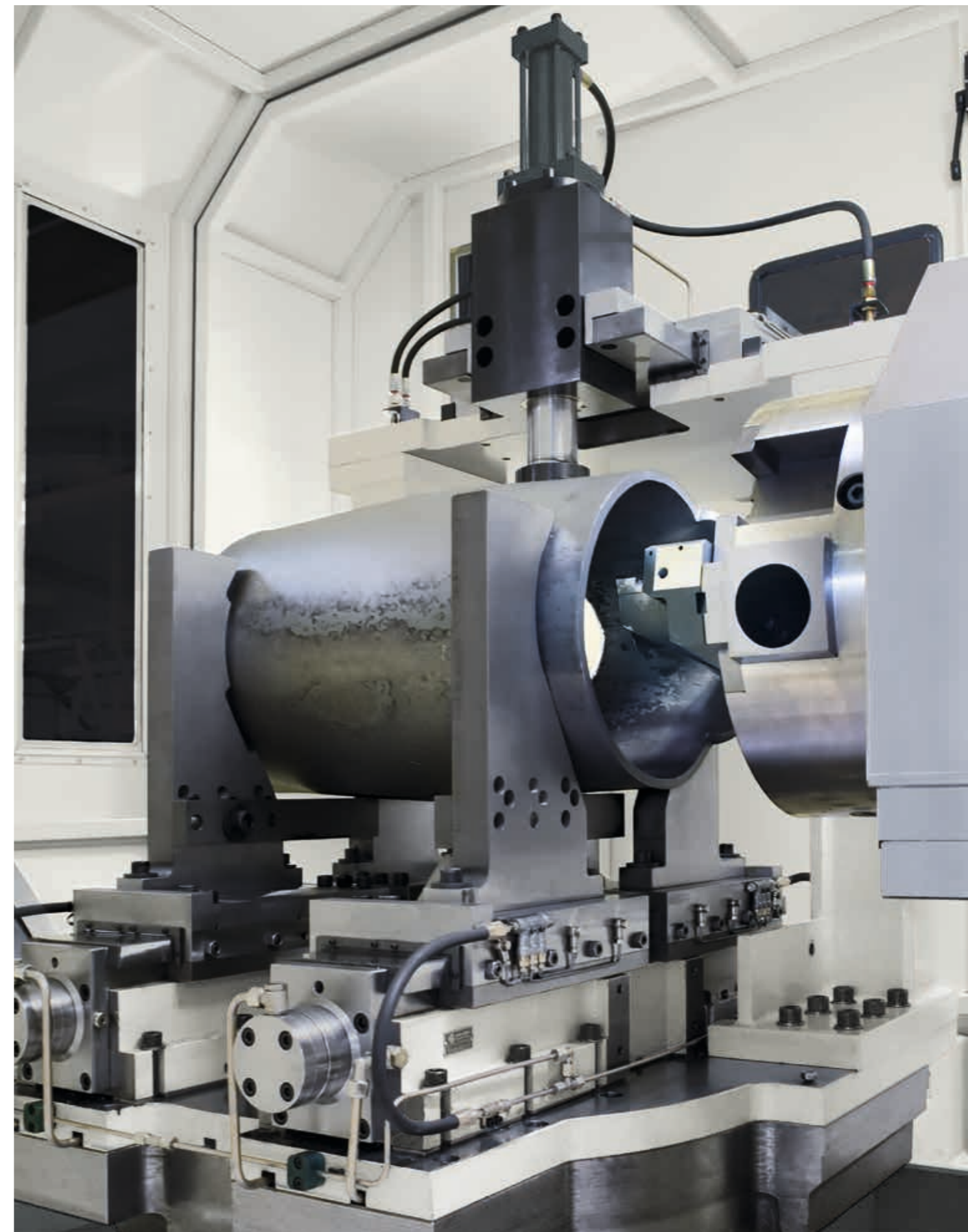
Main drive (with 40 % DC)	[kW]	40
Spindle torque (with 40 % DC)	[Nm]	3800
Speed range	[rpm]	20 - 500

Rotary table

Type		NC rotary table RTA 5 S
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Centering clamps ensure that pipes are clamped centrally – Top jaws are swapped according to the different pipe diameters



The workpiece is placed in different machining positions by means of the indexing table – A gear spindle with 3800 Nm and SK 60 holder provides the necessary torque for heavy cutting with large diameters

End machining – HEB

The task:

One-sided end machining of off-shore pipes, post-machining of sealing surfaces

The solution:

- Post-machining of the sealing surfaces of an approx. 17 m long pipe using an NC-controlled feed unit and an NC-controlled slide head with 2 ABS tool holders, optionally for turning tools, measurement sensors or measuring probes
- Measurement of the workpiece position by means of measurement sensors in the slide head
- Alignment by means of adjustable roller supports
- Ascertainment of the area to be machined using interchangeable measuring probes, and subsequent machining by means of the interchangeable turning tools

Special characteristics:

- Two tool holders, optionally for turning tools, measurement sensors or measuring probes
- Hydraulic clamping of the workpiece by means of “floating” jaws
- Measurement of the workpieces along the Z- and U-axis

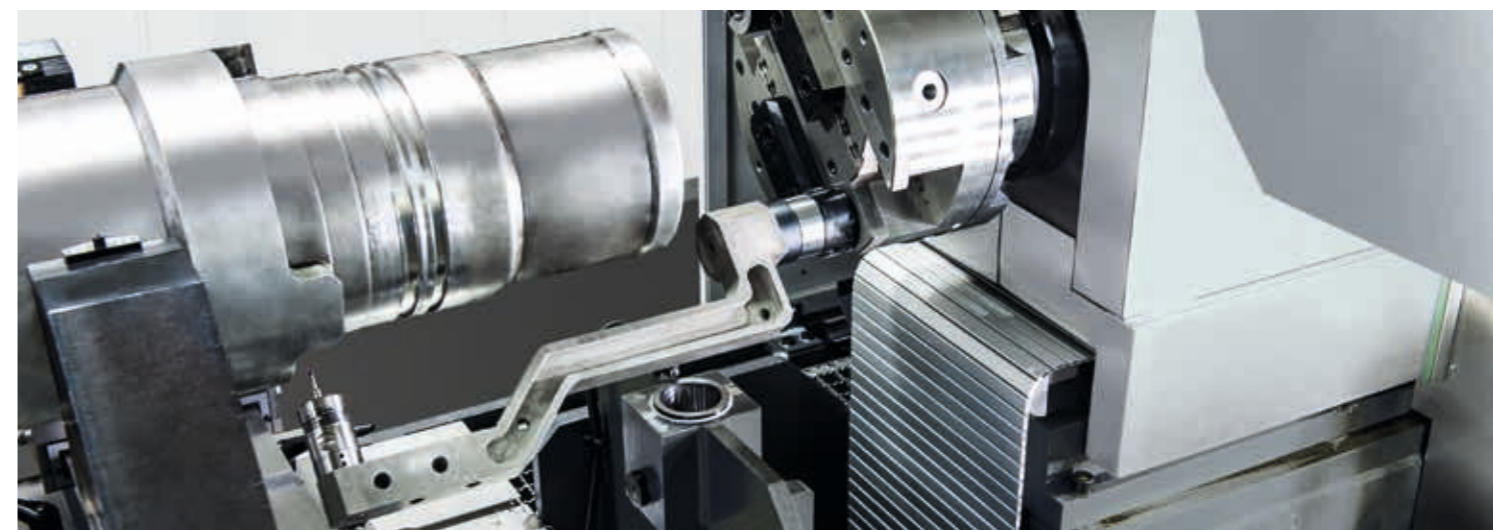
Technical data:

Working area

Z-traverse range	[mm]	600
U-traverse range	[mm]	63

Spindle

Main drive (with 40 % DC)	[kW]	21
Spindle torque (with 40 % DC)	[Nm]	140
Speed range	[rpm]	500



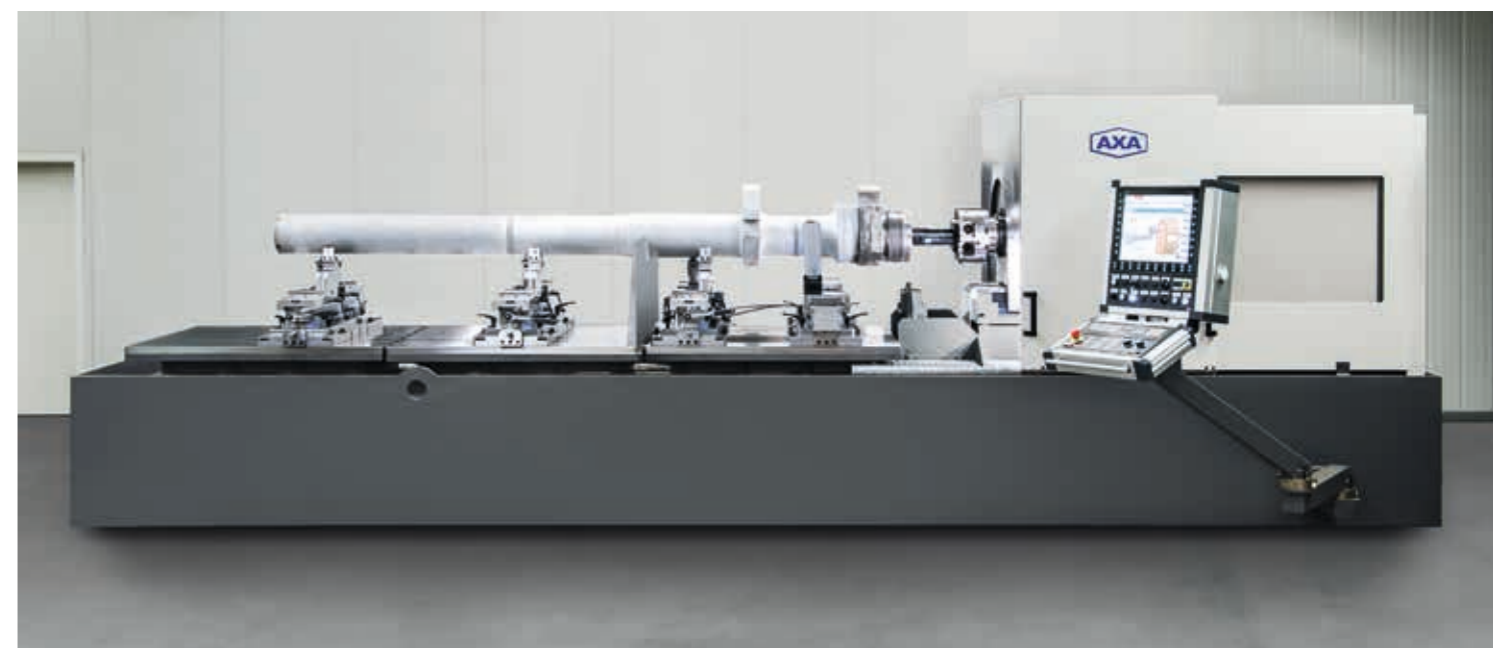
Automatic measurement and positioning of the workpiece by means of rotating measuring probes



External machining of the sealing surfaces



One-sided post-machining of sealing surfaces on long pipes



Machining on the face side

End machining – DEB

The task:

Double end machining – face milling, drilling and threading – of shafts in one clamping operation

The solution:

- Use of three spindles on the face sides of a shared compound slide, optimally set up for the respective machining

Special characteristics:

- 2 x HSK A63 tool holders for face milling
- 2 x HSK A63 tool holders for drilling
- 2 x HSK A63 tool holders for threading

Technical data:

Working area

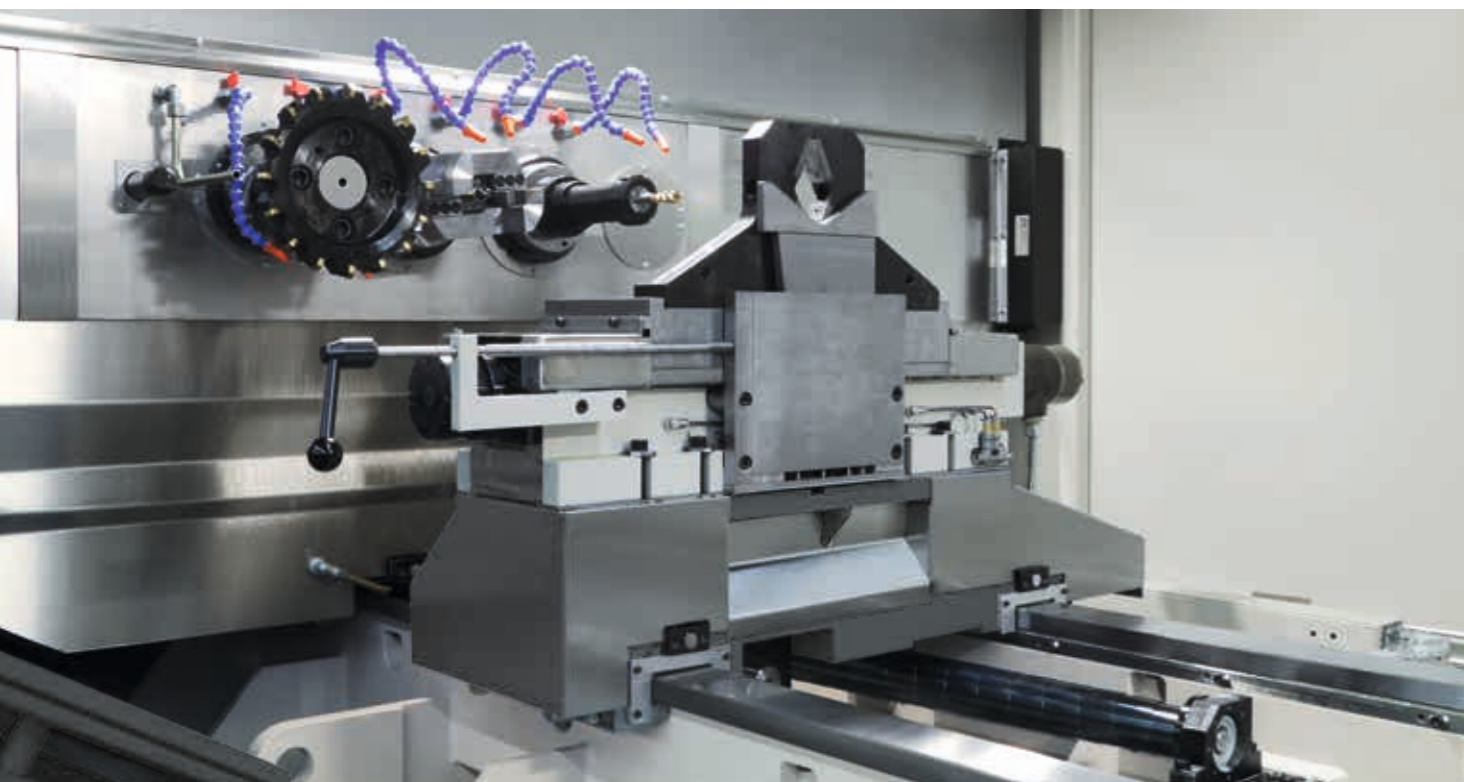
X-traverse range	[mm]	X1 / X2 = 300
Z-traverse range	[mm]	Z1 / Z2 = 900

Spindle

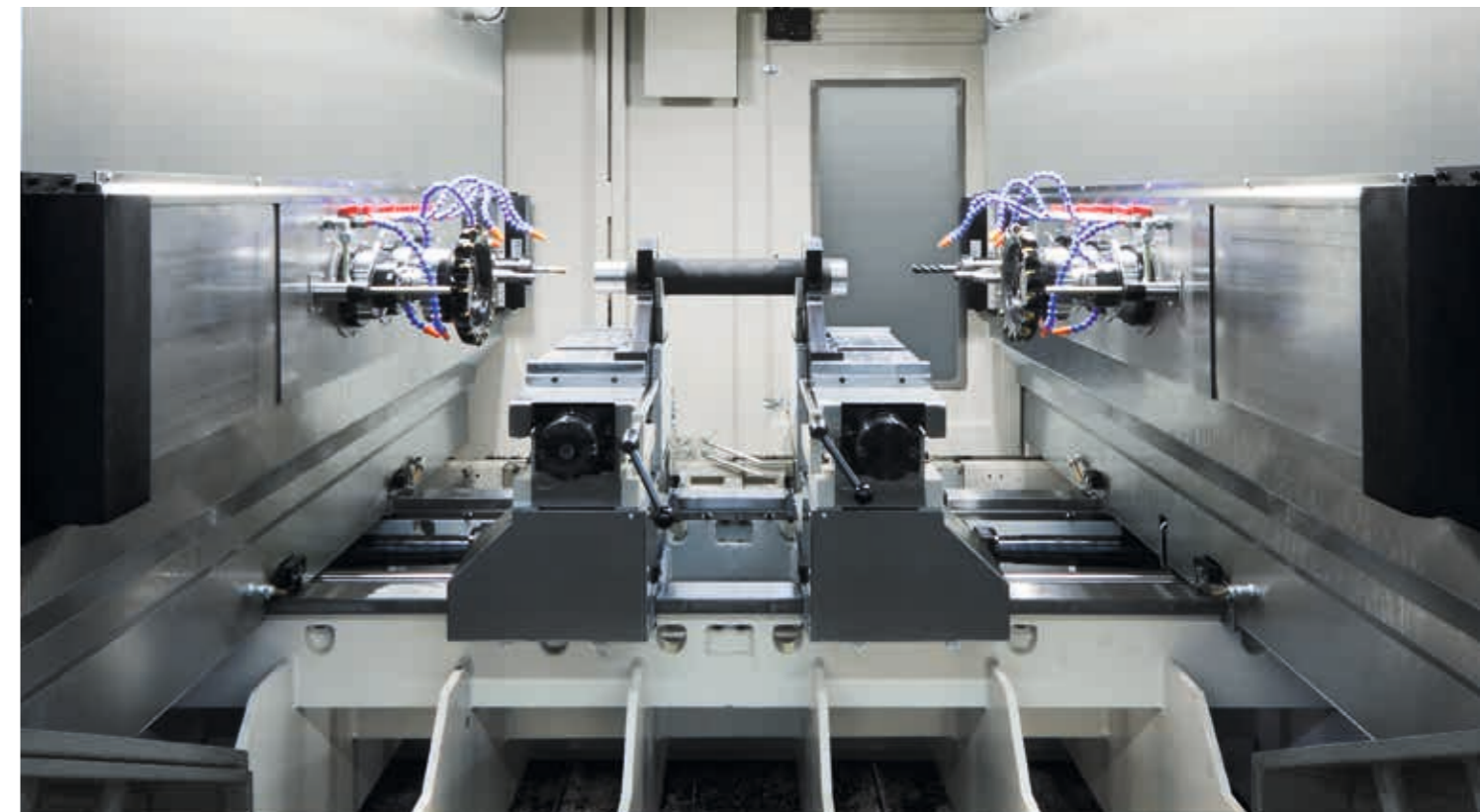
Main drive (with 40 % DC)	[kW]	Milling:	30
		Drilling:	56
		Threading:	56
Spindle torque (with 40 % DC)	[Nm]	Milling:	541
		Drilling:	357
		Threading:	357
Speed range	[rpm]	Milling:	1500
		Drilling:	40 - 4000
		Threading:	40 - 4000



The double end machining centre consists of two Z-slides positioned opposite one another with tool supports both movable on the X-axis



The Z-slide (longitudinal axis) holds the support which is movable on the X-axis (horizontal axis) with three firmly integrated spindles



By docking the movable and hydraulically clamped centring clamp onto the respective Z-slides, the centring clamp can move along the Z-axis and thus automatically be adjusted to different workpiece lengths

End machining – DEB

The task:

Double end machining– face milling, drilling and threading – of shafts in one clamping operation, with direct measurement of the length and position of the workpiece

The solution:

- Use of three spindles on the face sides of a shared compound slide, optimally set up for the respective machining
- Axial measurement of the workpiece by means of a measuring probe attached to the Z-axis

Special characteristics:

- 2 x HSK A63 tool holders for face milling
- 2 x HSK A63 tool holders for drilling
- 2 x HSK A63 tool holders for threading
- Direct workpiece measurement

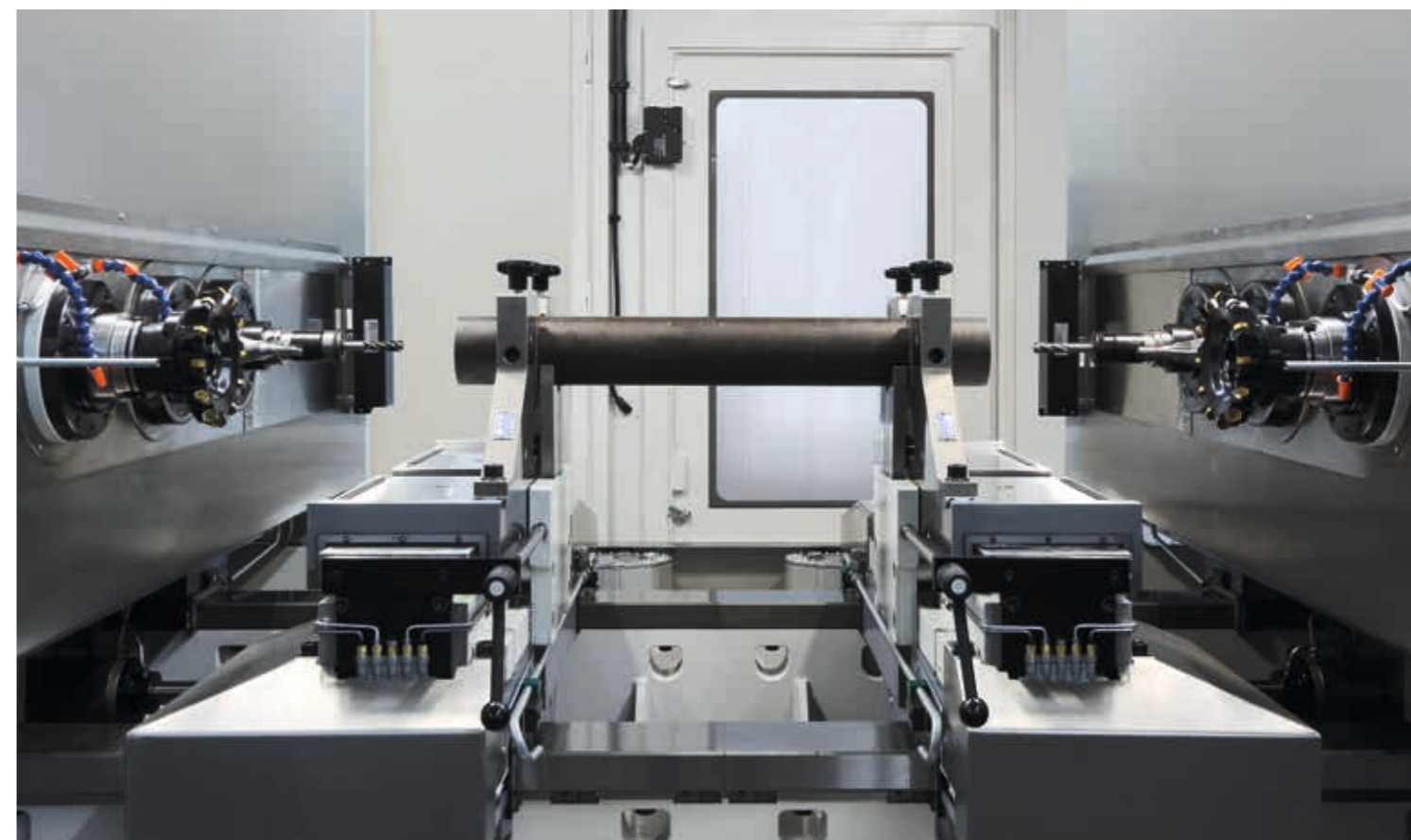
Technical data:

Working area

X-traverse range	[mm]	2 x 950
Z-traverse range	[mm]	2 x 1600

Spindle

Main drive (with 40 % DC)	[kW]	Milling:	56
		Drilling:	40
		Threading:	40
Spindle torque (with 40 % DC)	[Nm]	Milling:	357
		Drilling:	255
		Threading:	255
Speed range	[rpm]	Milling:	10 - 10000
		Drilling:	30 - 6000
		Threading:	30 - 6000



Simultaneous machining of both ends of the workpiece, even with different operations, reduces the main times



Generously sized, upward opening sliding doors enable excellent accessibility of the working space and crane loading



The machine is adjusted for different tool diameters by exchanging the clamp jaws and pre-centring on the centring vices

End machining – DEB

The task:

Double end machining of shafts
Automatic loading and unloading of workpieces

The solution:

- Use of three spindles on the front face of a shared compound slide, optimally set up for the respective machining
- Solution for automated loading and unloading using a gantry loader with a double gripper – the workpiece is exchanged in one work step
- Hydraulic clamping by means of clamp jaws

Special characteristics:

- 2 x HSK A100 tool holders for face milling
- 2 x HSK A63 tool holders for drilling
- 2 x HSK A63 tool holders for threading

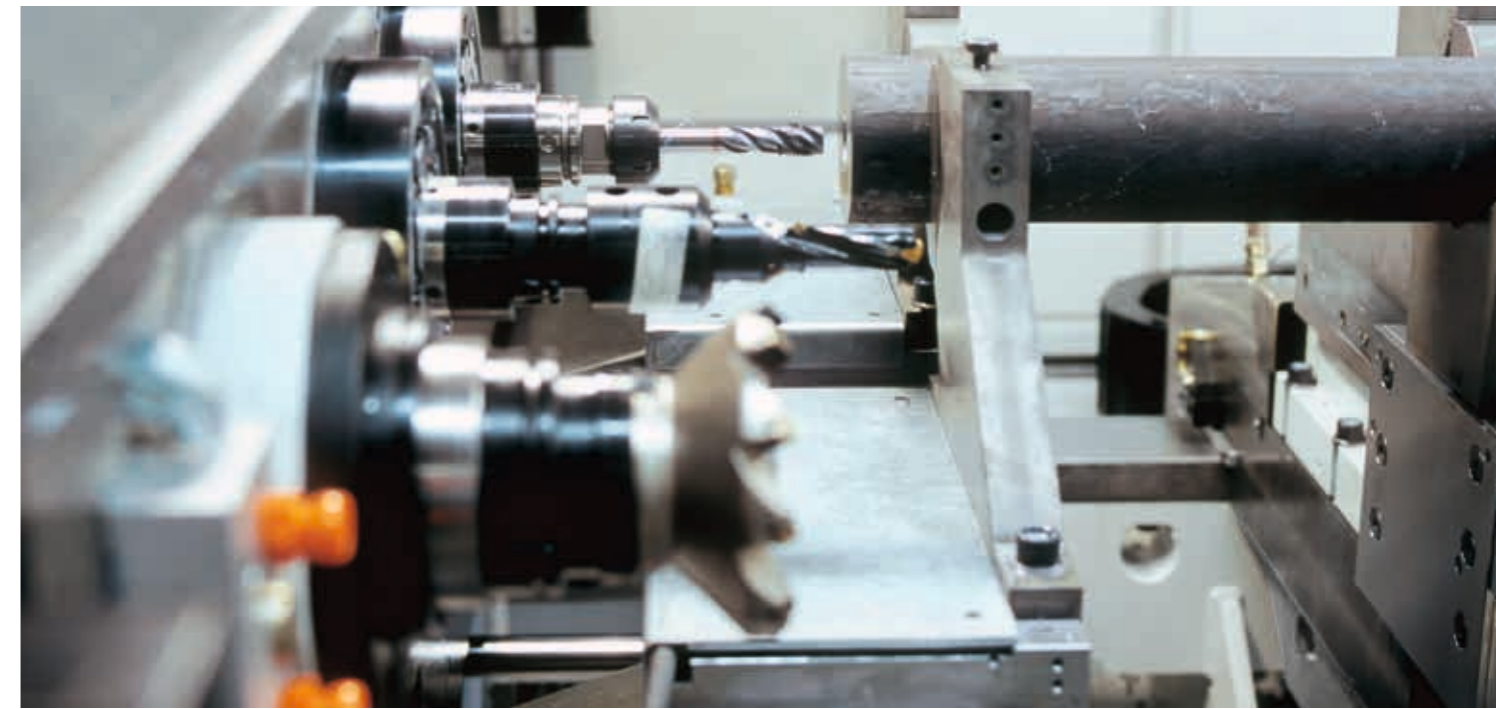
Technical data:

Working area

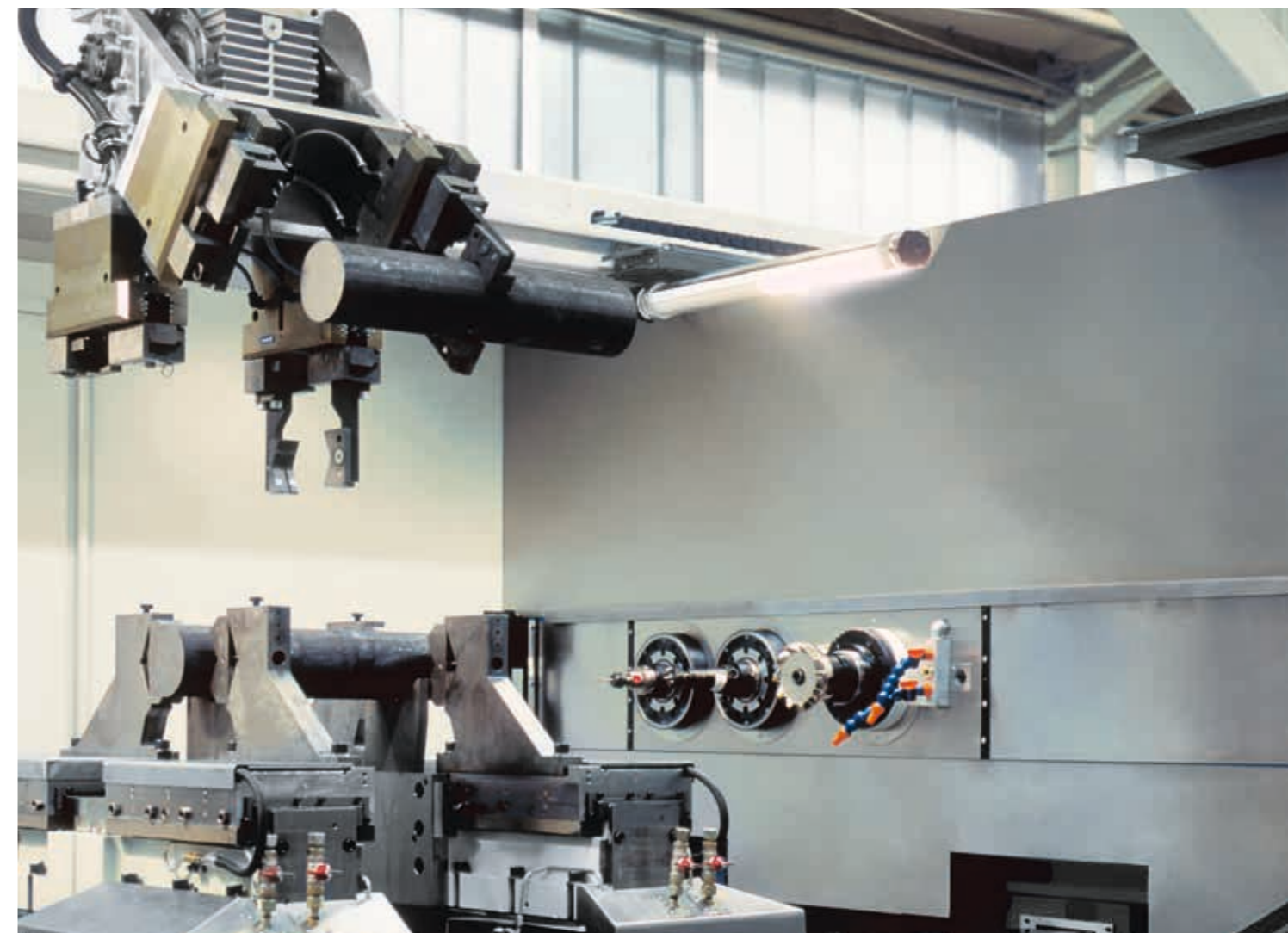
X-traverse range	[mm]	2 x 900
Z-traverse range	[mm]	2 x 1100

Spindle

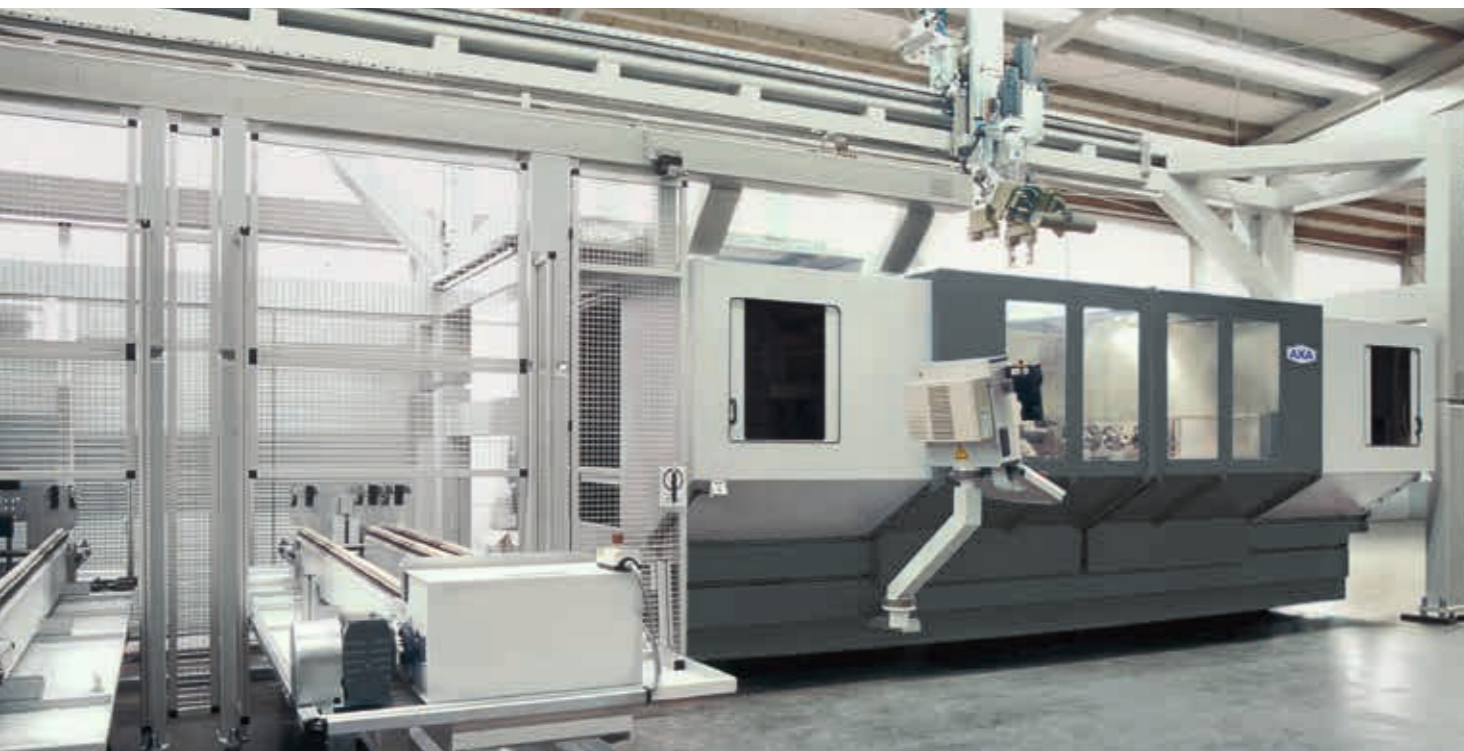
Main drive (with 40 % DC)	[kW]	Milling:	33
		Drilling / Threading:	43
Spindle torque (with 40 % DC)	[Nm]	Milling:	300
		Drilling / Threading:	287
Speed range	[rpm]	Milling:	40 - 500
		Drilling / Threading:	40 - 4000



The tool support is fitted with up to five interchangeable spindles adapted to the respective cutting operation



The use of a double gripper to feed in the next raw workpiece enables the workpieces to be exchanged in one work cycle and thus reduces the loading times



The automatic doors enable excellent automation of the workpiece assembly – a gantry loader was used for loading

Horizontal machining centres – HSC

The task:

Planing and centring shafts

The solution:

- The workpiece is inserted manually or by robot
- Measurement of the axial length of the workpiece from the spindle and subsequent face milling
- Installation of the clamping device on a 180° indexing table – machining of both sides immediately one after the other by swivelling the table

Special characteristics:

- Different work processes, such as planing, drilling, threading and screwing in a shoulder, with just one spindle through the integration of a tool changer

Technical data:

Working area

Y-traverse range	[mm]	400
Z-traverse range	[mm]	900

Spindle

Main drive (with 40 % DC)	[kW]	16,5
Spindle torque (with 40 % DC)	[Nm]	105
Speed range	[rpm]	40 - 6000

Tool changer

Tool changing system		12 tool places HSK A63
----------------------	--	------------------------



End machining on short workpieces with a horizontal spindle and rotary indexing table. to pivot the workpiece by 180°



A tool plate changer set up alongside the spindle makes a wide variety of tools available for the flexible machining of shafts



A universal spindle is used, which has been adapted to the machining task



The distance from the centring clamp, which can be moved and clamped manually, is adapted to the length of the workpiece

Horizontal machining centres – HSC

The task:

End machining of shafts

The solution:

- Workpiece is clamped using centring clamps
- Front end is machined using two horizontal spindles

Special characteristics:

- Double end machining with 2 main spindles and 2 tool changers with 40 tool stations each
- Use of hydraulic centring clamps

Technical data:

Working area

X-traverse range	[mm]	2 x 600
Y-traverse range	[mm]	2 x 600
Z-traverse range	[mm]	2 x 1400

Spindle

Main drive (with 40 % DC)	[kW]	64
Spindle torque (with 40 % DC)	[Nm]	556
Speed range	[rpm]	30 - 4000

Tool changer

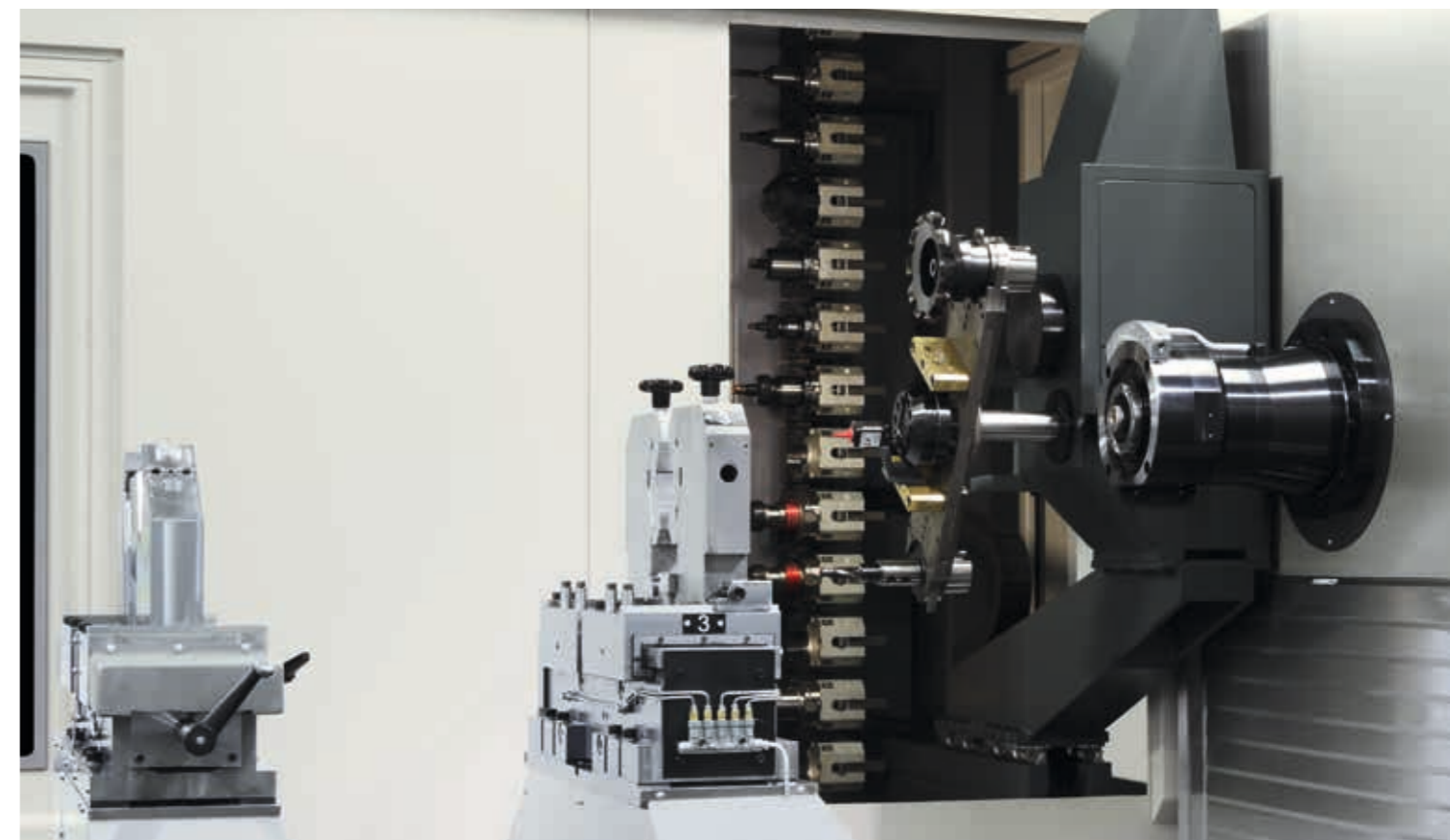
Tool changing system		2 x 40 tool places HSK A100
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As well as the centring clamps on the ends of the shafts, intermediate supports are used to improve the stability



The ends of long workpieces are machined on a horizontal centre with two main spindles opposite one another which can be moved along the X-, Y-, or Z-axis



The main spindle has a horizontal chain magazine with 40 tool stations – double tool grippers ensure short tool change times

Horizontal machining centres – HSC

The task:

Complete machining of several individual parts of an assembly on just one machine
Easy adjustment of the clamping device to different sizes

The solution:

- Use of a horizontal machining centre in pendulum mode
- All-round machining by clamping the workpiece to a rotary table
- Assembly during machining through use of pendulum mode with two working spaces

Special characteristics:

- Two horizontally assembled rotary tables with clamping device for four-sided machining
- Horizontal tool plate changer with 22 places

Technical data:

Working area

X-traverse range	[mm]	2 x 1650
Y-traverse range	[mm]	850
Z-traverse range	[mm]	700

Spindle

Main drive (with 40 % DC)	[kW]	56
Spindle torque (with 40 % DC)	[Nm]	355
Speed range	[rpm]	30 - 4000

Tool changer

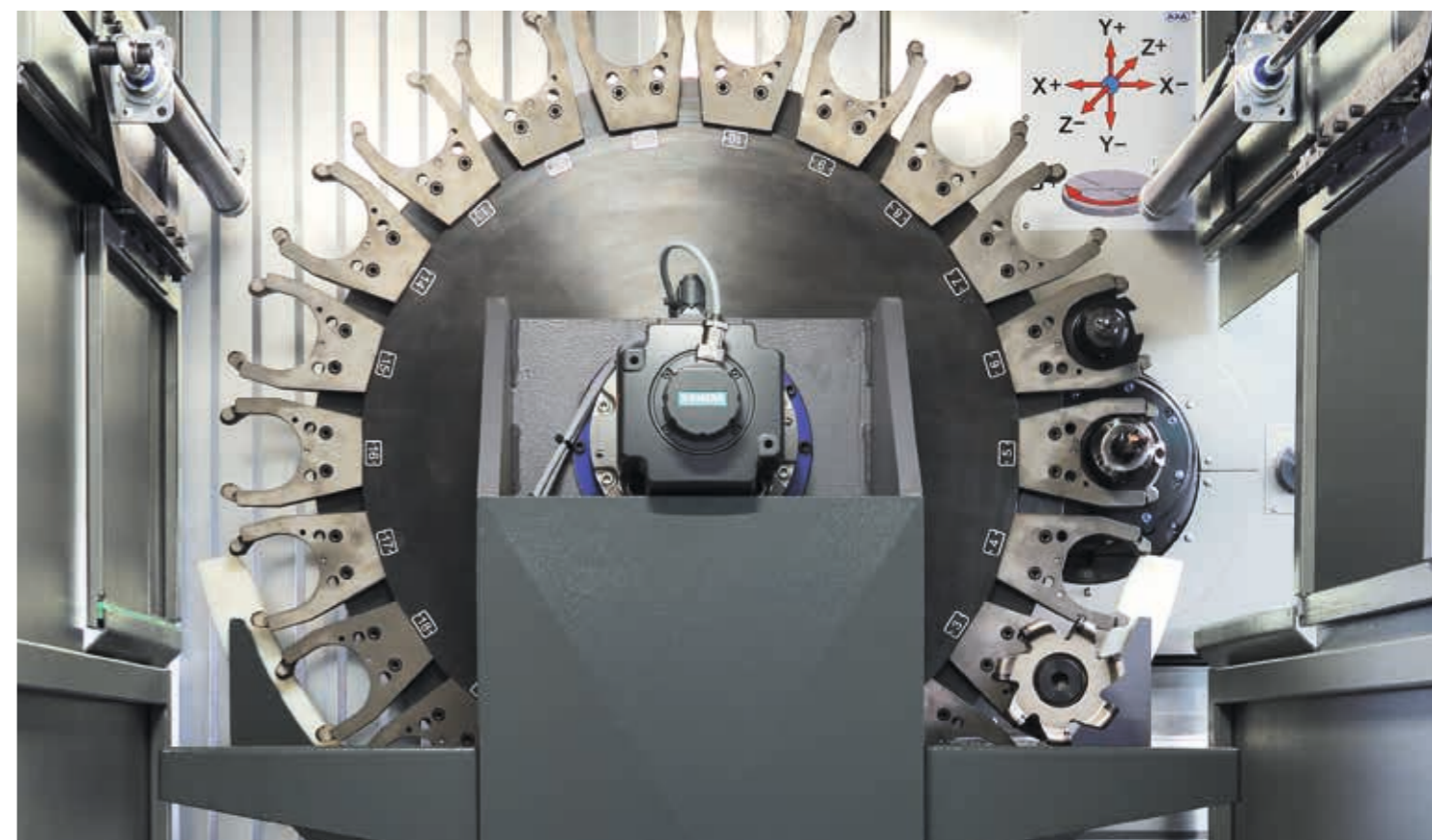
Tool changing system		22 tool places SK 50
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Rotary table

Type		NC rotary table 2 x RTA 4S-1000
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The assembly of the clamping device and workpiece on a rotary table allows several sides to be machined in one clamping operation



The centrally assembled tool changer is accessible from both working spaces – the tool plate magazine can be moved forward to exchange the tools



Two working spaces with one rotary table each, separated by a centrally assembled tool changer, enable clamping and cutting on one machine during machining

Horizontal machining centres – HSC

The task:

Milling of rolled steel profiles up to 8.8 m in length (lift masts for forklifts and high rack warehouses)

The solution:

- Standard travelling column machining centre with horizontal SK 60 spindle
- Four tools in a pick-up magazine, consisting of an SK 60 milling cutter with counter bearing, each fitted with 4 disc cutters of D = 500 mm
- Hydraulic workpiece clamping device

Special characteristics:

- Prepared for unmanned operation with automated loading and unloading
- Identification of the raw workpieces lying on the conveyor belt by means of a camera system
- Prefabricated parts are inserted into the clamping device and removed by means of a gantry loader
- Automated clamping device for optimal workpiece clamping
- High-performance chip extractor running in parallel on the X axis

Technical data:

Working area

X-traverse range	[mm]	12000
Y-traverse range	[mm]	600
Z-traverse range	[mm]	525

Spindle

Main drive (with 40 % DC)	[kW]	66
Spindle torque (with 40 % DC)	[Nm]	3200
Speed range	[rpm]	10 - 500

Tool changer

Tool changing system		4 tool places SK 60
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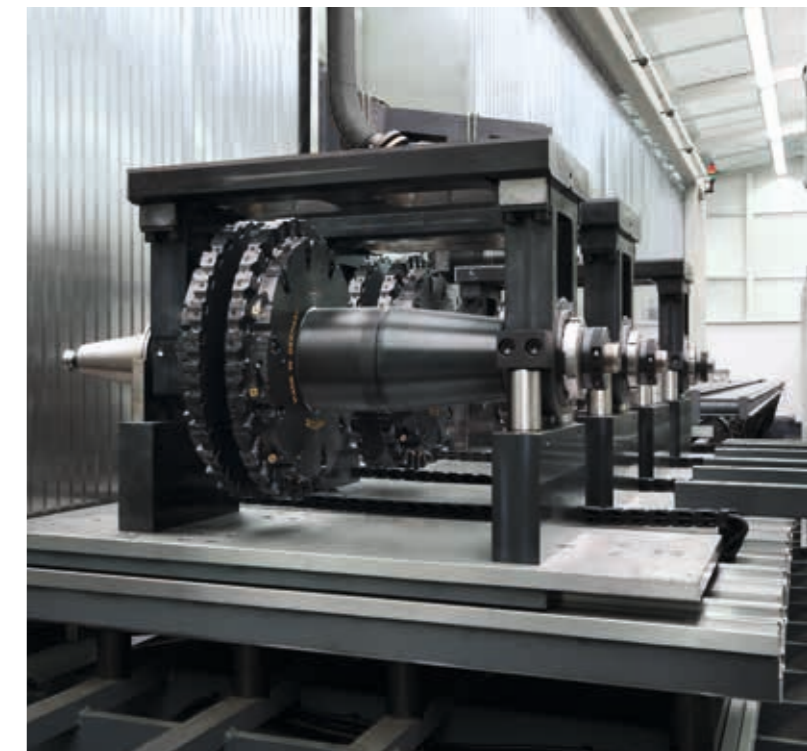
The clamping elements each open and pivot sideways to uncover the area to be machined for the milling tool as it moves past – Once the tool has passed this point, the clamps pivot back again and ensure that the workpiece is securely clamped



For heavy-duty machining of rail and strip profiles a high-torque 3200 Nm horizontal spindle and SK 60 tool holder are used



The tools, milling cutters equipped with disc cutter combinations, are housed in the spindle using an SK 60 cone, and stabilised by means of a counter bearing



Quadruple pick-up station enables the different milling cutter combinations to be changed automatically

Individually customised solutions

The task:

End machining (radial drill holes) of long workpieces

The solution:

- Standard travelling column machining centre with two travelling columns that can move separately and customer-specific clamping technology in the working space
- Design on centring clamps and clamping shells for securing the workpiece
- NC rotary table enables the workpiece to be rotated automatically

Special characteristics:

- Parallel machining of a long workpiece with two tilting spindle heads
- Optional machining of two workpieces in pendulum mode with a maximum length of 1280 mm

Technical data:

Working area

X-traverse range	[mm]	5360 (each travelling column 3860)
Y-traverse range	[mm]	600
Z-traverse range	[mm]	800

Spindle

Main drive (with 40 % DC)	[kW]	40
Spindle torque (with 40 % DC)	[Nm]	255
Speed range	[rpm]	30 - 10000

Tool changer

Tool changing system		each travelling column has a XTS tool magazine with 36 tool places
----------------------	--	--

Swivel head

Type		infinitely variable $\pm 105^\circ$
------	--	-------------------------------------



Additional travelling column for the machining centre – Both spindles can be used in parallel on one workpiece or independently on separate workpieces



The table area is equipped with guide rails on which support units with rotary tables, clamping shells and tailstocks can be flexibly fitted and positioned



Using the rotary table and tailstock, the workpieces can be rotated in position in addition to the tilting spindle heads

Individually customised solutions

The task:

Parallel machining of long profiles and strips

The solution:

- Loading and unloading using a crane or gantry loader
- Travelling columns positioned opposite each other, each with its own X-, Y- and Z-axis
- Centrally aligned clamping table

Special characteristics:

- Cameras on each spindle for better process monitoring
- Installation of screens above the control panel

Technical data:

Working area

X-traverse range	[mm]	4500 lengthwise
Y-traverse range	[mm]	2 x 850 vertical
Z-traverse range	[mm]	2 x 700 cross

Spindle

Main drive (with 40 % DC)	[kW]	each 40
Spindle torque (with 40 % DC)	[Nm]	each 255
Speed range	[rpm]	each 30 - 6000

Tool changer

Tool changing system		2 plate-tool-shops with each 22 tool places
----------------------	--	---



The clamping table is located centrally between the two travelling columns



Two horizontal tool plate changers are in place at the face end



For machining long profiles, two travelling columns are set up opposite one another, each with its own control cabinet and its own controls



Each travelling column is allocated its own control panel – Camera systems make it easier to monitor the parts production

Individually customised solutions

The task:

Machining base frames for knitting machines

The solution:

- Around 20 racks are stored in a high rack axially in front of the machine
- The workpiece is inserted into the hydraulic clamping device by means of a gantry loader
- Complete machining by means of 2 swivel heads with HSK A100 spindles

Special characteristics:

- 2 angular milling heads above a stable four-point support on the spindle with integral HSK A63 tool clamp
- Each angular milling head has its own 32-fold tool plate

Technical data:

Working area

X-traverse range	[mm]	6200 each travelling column
Y-traverse range	[mm]	900 each travelling column
Z-traverse range	[mm]	800 each travelling column

Spindle

Main drive (with 40 % DC)	[kW]	each 45
Spindle torque (with 40 % DC)	[Nm]	each 286
Speed range	[rpm]	each 7500

Tool changer

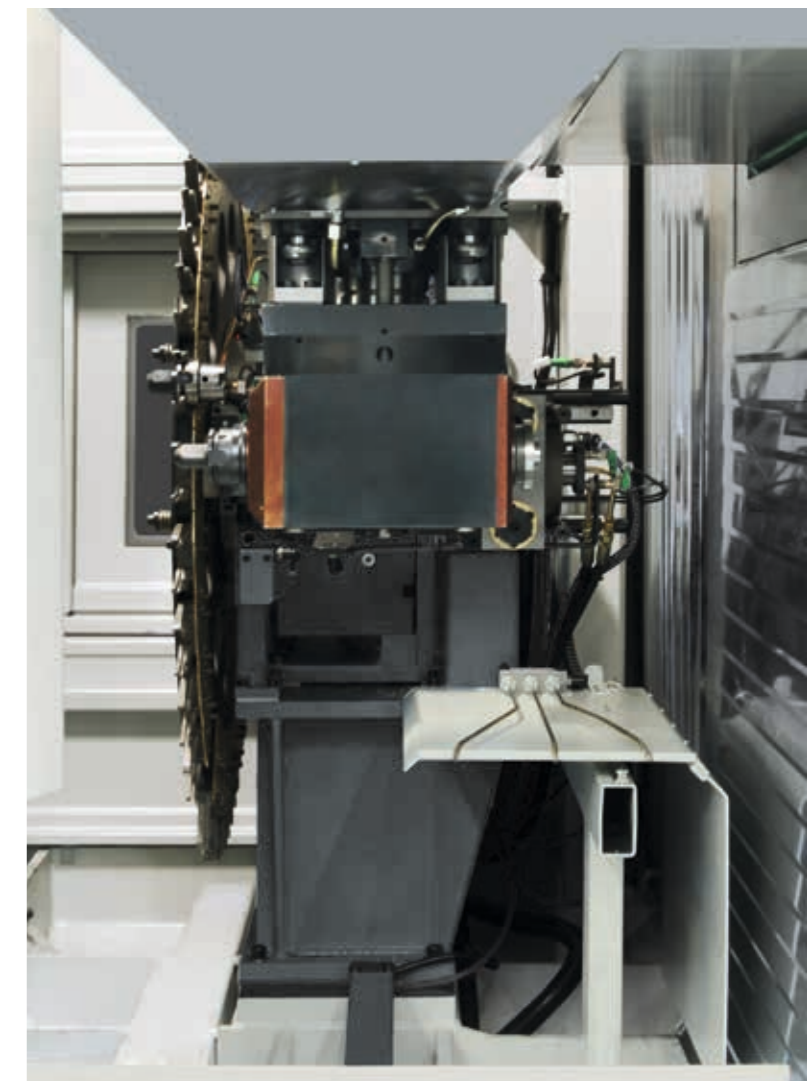
Tool changing system		XTS tool magazines with each 46 tool places (HSK A100) Plate-tool-shops with each 32 tool places for angular heads (HSK A63)
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Swivel head

Type		individual swivel heads (A-axes)
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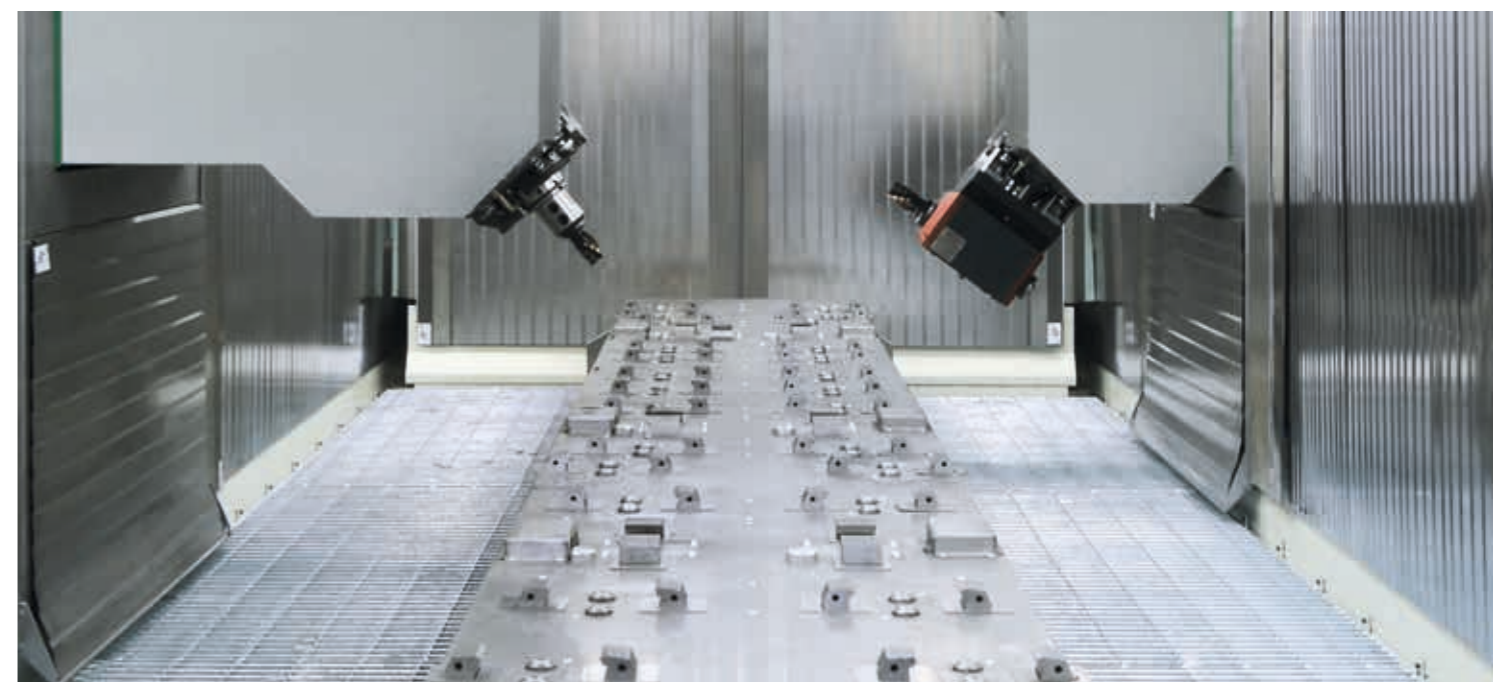
Partial machining from beneath by bolting heavy angular milling heads above a four-point support



Disc magazines installed at the face end and places for angular milling heads serve for switching between directly incorporated tools and angular milling heads



Main spindles that swivel around the X axis enable flexible manufacture of any contours, including with inclinations



Hydraulic clamping devices integrated into the machine table

Individually customised solutions

The task:

Hydraulic clamping devices integrated into the machine table

The solution:

- Swivelling table machining centre with two clamping devices on one rotary table
- Loading manually or by robot

Special characteristics:

- Workpieces are clamped upside down in the device by means of a vacuum
- Machining and loading/unloading take place during machining by the installation of two clamping positions on the 180° rotary index table
- Pneumatically movable workpiece stop for aligning the workpieces during loading
- Well-enclosed working space with special layout for the machining of abrasive materials using coolants such as mains water

Technical data:

Working area

X-traverse range	[mm]	1850
Y-traverse range	[mm]	700
Z-traverse range	[mm]	850

Spindle

Main drive (with 40 % DC)	[kW]	30
Spindle torque (with 40 % DC)	[Nm]	143
Speed range	[rpm]	30 - 8000

Tool changer

Tool changing system		plate-tool-shop SK 40
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The rear working space has been optimised for machining abrasive materials, with mains water used as the coolant



By pivoting the indexing table through 180° the ready-machined workpiece is rotated into the setup position while the next raw workpiece is simultaneously rotated into the machining position



Swivelling table machining centre with two clamping sections – A wall in the centre of the rotary table separates the clamping sections so that the workpiece can be machined while the front section is being equipped in parallel



A shutter secures the machine compartment during the swivelling process

Individually customised solutions

The task:

Face milling of steel samples in a steel casting plant

The solution:

- Swivelling table machining centre with two clamping devices on a rotary table
- Hydraulic clamping of the manually inserted sample including automatic measurement of the surface of the raw workpiece
- Ascertaining the number and thickness of the milling steps on the basis of the measurement results

Special characteristics:

- Simultaneous assembly and machining
- Ergonomically optimal alignment of the workpieces by means of the obliquely positioned clamping devices on the 180° indexing table
- Use of two high-torque gear spindles for the highest level of machining

Technical data:

Working area

X-traverse range	[mm]	910
Z-traverse range	[mm]	320

Spindle

Main drive (with 40 % DC)	[kW]	2 x 100
Spindle torque (with 40 % DC)	[Nm]	817
Speed range	[rpm]	500

Rotary table

Type		RTA 6, diameter 1400 mm
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The slightly inclined machining position allows a good chip flow to be achieved during milling and ergonomic handling of the workpiece assembly



The separation of the assembly at the front and the working space at the rear enables the swivelling table machining centre to be loaded in parallel with machining



By pivoting the indexing table through 180° the ready-machined workpiece is rotated into the setup position while the next raw workpiece is simultaneously rotated into the machining position

Individually customised solutions

The task:

Machining special shafts and pipes

The solution:

- Standard travelling column machining centre with customer-specific clamping technology in the working space
- Use of a swivelling bridge with hydraulic clamps and additional centring clamps
- Moveable rotary table with power chuck, pick-up station

Special characteristics:

- Working space equipped with swivelling bridge and rotary table with power chuck
- Can be used in pendulum mode

Technical data:

Working area

X-traverse range	[mm]	3000 (2 x 1250)
Y-traverse range	[mm]	700
Z-traverse range	[mm]	850 / 790

Spindle

Main drive (with 40 % DC)	[kW]	56
Spindle torque (with 40 % DC)	[Nm]	355
Speed range	[rpm]	7500

Tool changer

Tool changing system	XTS tool magazine, 2 x tool towers with 120 places + pick up station
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Rotary table

Type	2 x NC rotary table RTA 4L-520
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Swivel head

Type	infinitely variable $\pm 90^\circ$
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Shafts and pipes are held in centring clamps – The workpieces are automatically rotated by means of the rotary table housed on the left-hand side and the tailstock installed on the right-hand side



Use of special tools on a horizontally aligned pick-up magazine



On the swivelling bridge installed in the left-hand pendulum working space, several workpieces can be clamped in parallel and each machined on three sides

Individually customised solutions

The task:

Machining excavator shovel teeth and special lugs made of toughened steel

The solution:

- Asymmetric pendulum stroke for optimal work processes
- Right: 5-axis machining of the ends of lugs in three sizes by means of rapidly exchangeable clamping devices
- Left: Machining the mounting surfaces of excavator shovel teeth
- Alignment by means of centring bolts, clamped onto hydraulically movable contact surface

Special characteristics:

- Two different hydraulic clamping mechanisms for workpiece machining in pendulum mode

Technical data:

Working area

X-traverse range	[mm]	2035 / pendulum stroke left = 620 / pendulum stroke right = 915
Y-traverse range	[mm]	600
Z-traverse range	[mm]	800

Spindle

Main drive (with 40 % DC)	[kW]	56
Spindle torque (with 40 % DC)	[Nm]	355
Speed range	[rpm]	30 - 4000

Tool changer

Tool changing system		XTS tool magazine, 26 tool places
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Rotary table

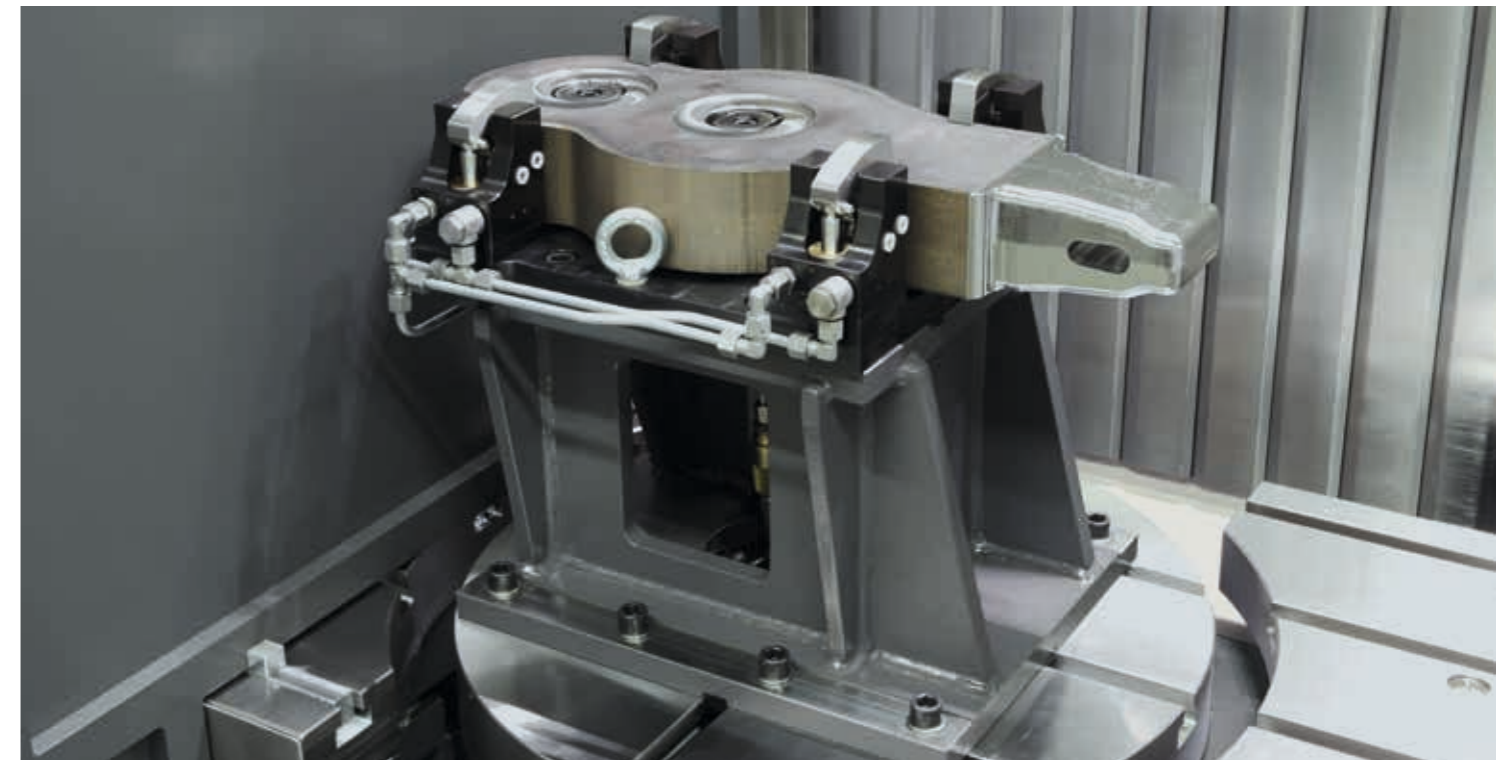
Type		RTA 3-630
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Swivel head

Type		infinitely variable
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The asymmetric pendulum stroke allows the optimal utilisation of the working spaces while the machine is still of compact construction



The workpiece is hydraulically aligned and clamped against impacts – Rapidly changeable clamping devices for workpieces of different sizes minimise the retooling times



Parallel machining of two workpieces – These are aligned by means of centring bolts and clamped from beneath against a hydraulically movable surface

Individually customised solutions

The task:

Machining of T-, L- and U-shaped steel girders of up to 8 m in length for glass facades
Milling and spot welding of threaded bolts in one clamping process

The solution:

- Mechanical machining using a VHC 3 type standard travelling column machining centre with tilting spindle head, with SK 40 spindle and XTS tool changer
- Integration of two welding heads on an additional column alongside the travelling columns for welding the threaded bolts; one welding head for M6 threaded bolts, and a second for M8
- Welding heads have an independent Y- and Z-axis and move along the X-axis with the travelling column
- The threaded bolts are automatically loaded by a magazine with an oscillating feed that moves with the travelling column

Special characteristics:

- Implementation of two welding heads on the left alongside the travelling column
- Clamping tables that are fully insulated electrically from the machine bed

Technical data:

Working area

X-traverse range	[mm]	8000
Y-traverse range	[mm]	900
Z-traverse range	[mm]	950

Spindle

Main drive (with 40 % DC)	[kW]	40
Spindle torque (with 40 % DC)	[Nm]	255
Speed range	[rpm]	30 - 6000

Tool changer

Tool changing system		XTS tool magazine SK 40, 96 tool places
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Swivel head

Type		infinitely variable $\pm 90^\circ$
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The girders are held in movable hydraulic clamps aligned with the machine table



Two welding heads that are independently movable along the Y- and Z-axis move with the travelling column – These are used to weld threading bolts that are automatically supplied by a magazine moving with them



The machining centre with tilting spindle head is used for milling long steel girders and additionally for welding bolts

Individually customised solutions

The task:

Double-sided machining of pipes accompanied by the introduction of radial drill holes on the circumference

The solution:

- The pipes are deposited manually or by robot onto a pre-centring and then hydraulically clamped using centring clamps
- Double-sided end machining using centring clamps and introduction of radial drill holes by means of a tilting spindle head
- Use of an NC rotary table with 3-jaw power chuck on a separate linear axis for automatically rotating the workpiece into the machining position
- Followed by clamping and drilling once again

Special characteristics:

- Coverage of a large diameter range through the use of exchangeable prismatic jaws

Technical data:

Working area

X-traverse range	[mm]	7000
Y-traverse range	[mm]	900
Z-traverse range	[mm]	1250

Spindle

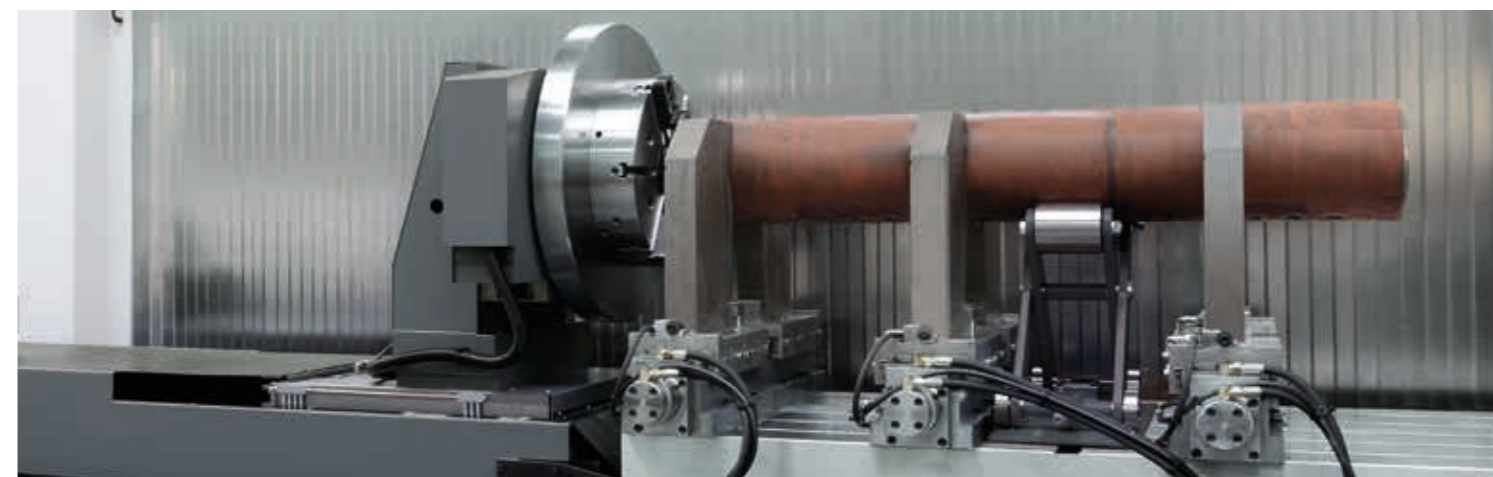
Main drive (with 40 % DC)	[kW]	56
Spindle torque (with 40 % DC)	[Nm]	540
Speed range	[rpm]	30 - 4000

Tool changer

Tool changing system		XTS tool magazine, 60 tool places
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Rotary table

Type		RTA 4S, diameter 1000 mm
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The pipe is tensed in self-centring vices that are constructed in the table area



Using the movable rotary table, the pipe ends can be held and the pipes can be rotated into position for the introduction of radial drill holes



Instead of the fixed machine cladding of the heavy travelling column machining centre with tilting head, the working space around the spindle is encased in a hood that moves with the travelling column



During the setup, the spindle is accessible through the opened doors of the hood that moves with the travelling column – Safety buffers attached to the side of the hood serve as protection against impact

Individually customised solutions

The task:

Machining of long rail sections for switches

The solution:

- Machining centre with tilting spindle head and pendulum mode
- Machine table divided into two working spaces with a special clamping device in each
- Assembly in parallel with machining

Special characteristics:

- Construction of hydraulic clamps for the workpiece
- Construction of special clamp jaws for rail tracks

Technical data:

Working area

X-traverse range	[mm]	9000
Y-traverse range	[mm]	1000
Z-traverse range	[mm]	1000

Spindle

Main drive (with 40 % DC)	[kW]	82
Spindle torque (with 40 % DC)	[Nm]	820
Speed range	[rpm]	30 - 4000

Tool changer

Tool changing system		XTS tool magazine, 60 tool places
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Rotary table

Type		2 x RTA 4S, diameter 630 mm
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Swivel head

Type		infinitely variable $\pm 90^\circ$
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Two NC rotary tables working in gantry mode ensure torsionally stiff suspension of the long clamping bridge in the left-hand pendulum working space



In the right hand working space long strips can be manufactured in clamps that can be positioned flexibly



The heavy SK 50 pendulum machining centre is fitted with a high-performance tilting spindle head – Different clamping devices allow different workpieces to be machined in parallel

AXA Entwicklungs- und Maschinenbau GmbH

Post Office Box 12 60
48621 Schöppingen
Münsterstraße 57
48624 Schöppingen
Germany
Tel. +49 2555 87 - 0
Fax +49 2555 1496
www.axa-maschinenbau.de
mail@axa-maschinenbau.de

AXA Subsidiary South

Rudolf-Wanzl-Straße 9
89340 Leipheim
Germany
Tel. +49 8221 20782 - 0
Fax +49 8221 20782 - 20
nl.sued@axa-maschinenbau.de

AXA Subsidiary East

Auerswalder Höhe 3
09244 Lichtenau/Chemnitz
Germany
Tel. +49 37208 6995 - 0
Fax +49 37208 6995 - 21
nl.ost@axa-maschinenbau.de

AXA CNC-stroje, s.r.o.

Na Cintlovce 1580/5
26801 Hořovice
Czech Republic
Tel. +420 311 516420
Fax +420 311 516410
info@axacnc.cz

