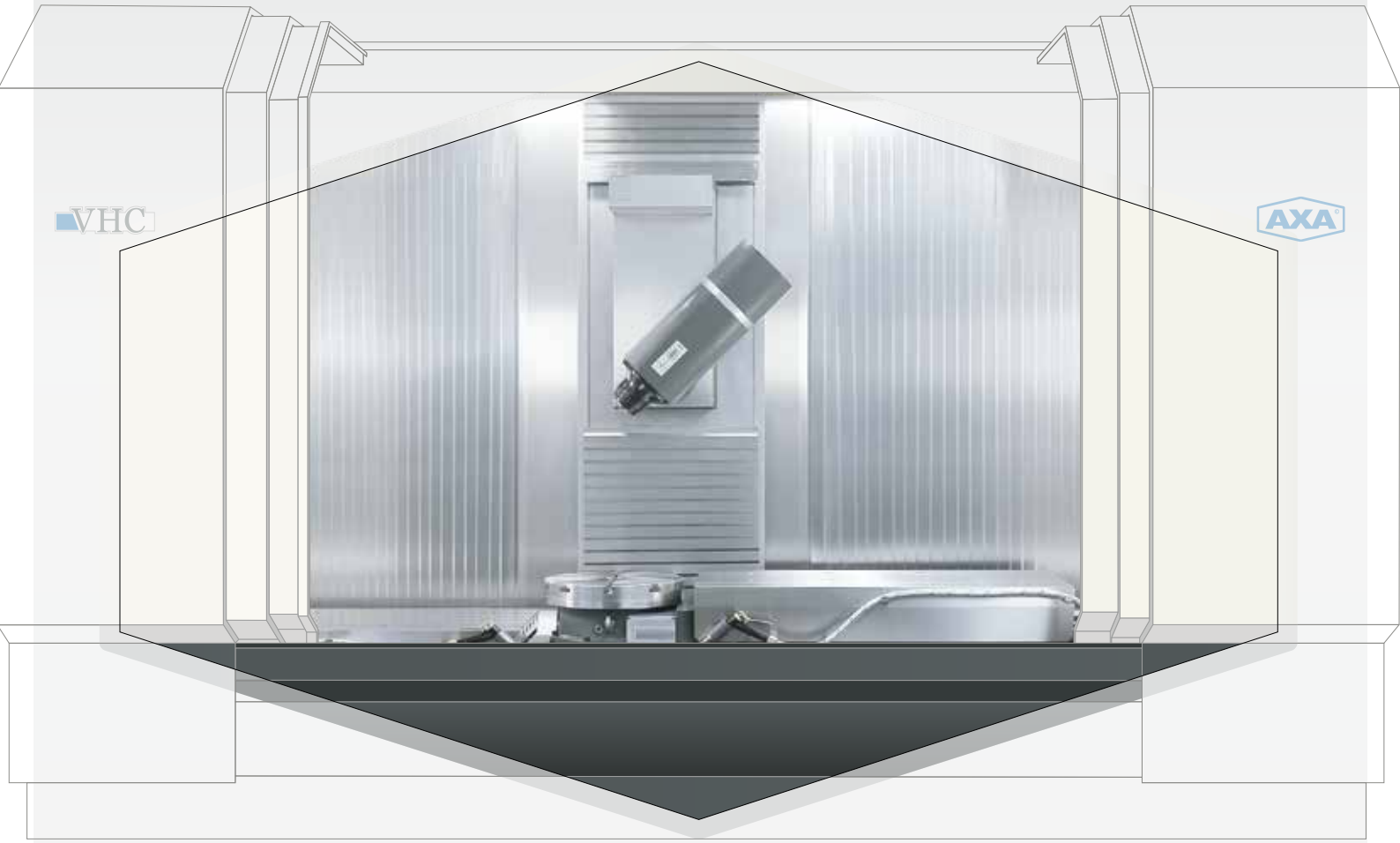
# VSC / VHC




**Producing success.**
*With AXA uniqueness.*

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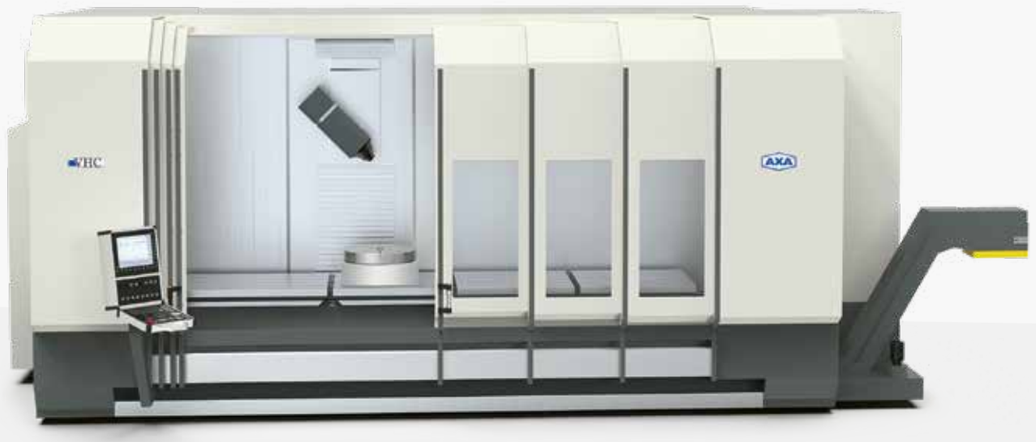



Right at the heart of your production process: the machining centres of the VSC and VHC series stand out through precision quality and flexible design

# Uniqueness

*made by AXA*

## The VSC and VHC travelling column machines

On hand at all times. Showing no weakness despite being non-stop in action. Always mastering new challenges – machine tools are at the centre of the production process in the metal processing industry. They must correspond to the highest requirements concerning availability and precision.

The travelling column machines VSC and VHC are clear in their structure, yet flexible in their assembly. The working area is constructed to be extremely rigid. The fixed machine tables and stationary positioned tool magazine pool ensure that only the travelling column is in motion. Strong drive motors cater for the very dynamic performance of our machine tools. The combination of fixed machine tables with linear motion axes on the tool side opens up a whole world of possibilities: small and compact machine variants for the manufacturing of small parts are just as possible as sophisticated machines for large and complex work pieces. The machines are also capable of operating in pendulum processing machining mode, which minimises set-up times so as to be quickly ready for operation.

AXA tradition lies in the development, construction and assembly of machine tools.


Conception and construction from a single source: overview of the VSC main assembly


Maximum efficiency: the workspace is partitioned into two sections and thus reduces set-up times to a minimum

# VSC – Power and intuition for every workpiece

**Main design:**
- Cross slides, travelling columns and spindle head stock are made from high-quality cast iron
- Extremely rigid, static and dynamically well balanced ground frame construction
- Direct measuring systems for X/Y/Z axes
- Casing according to current machinery directives, totally closed working area with no interfering contours – also in pendulum operation mode
- Total access to working area when doors are fully open
- Excellent accessibility for maintenance and service tasks
- Machine transport in one piece

**Guideways and drives:**
- Hardened precision steel slideways mounted on manually scraped or grinded surfaces
- Optimal guiding by extremely large guidance ratio and Turcite coatings
- High rigidity, outstanding long-term precision performance and excellent vibration absorbing capabilities of the guideways
- Excellent resetting and adjustability of the guideways
- Drives and guideways are protected set outside of working area
- Ball screws in all linear axes with patented support units for ball screws in the X-axis for large travel lengths

**Tool changing system:**
- Fixed location coded tool management enables better monitoring
- Tool pre-selection by double gripper arm during machining
- Support of various tool holding systems such as SK, BT, HSK, CAPTO
- Tool magazine is protected outside of working area
- Placement of the XTS magazine during machining possible
- Tool change takes place behind working area cladding: no disturbing contours in the working area during tool change by the gripper or parts
- Transport unit from XTS magazine has its own drive and moves at up to 120 m/min to the spindle position for the tool change
- Any number of tool pockets are provided by several compact XTS towers
- Tool pockets within a tower can also be expanded at any point in time in the future

# Flexible thanks to numerous options

- Through spindle coolant with filter system
- Chip conveyor in slat-band belt, scraper belt or magnetic belt versions
- Controllers either from Heidenhain or Siemens
- Rotary tables horizontally or vertically integrated, in 1 or 2 axes, combined with tailstocks, counterbearings or a further rotar table in gantry mode for clamping bridges.
- Automatic doors
- Clamping systems – hydraulic, pneumatic, magnetic or manual
- Touch probes and tool touch probe systems
- Active power monitoring, collision monitoring and complete process monitoring
- Tool identification systems
- Laser breakage control with tool measurement
- Remote maintenance

We can develop and manufacture special solutions for you upon request.

Rotary table in the left and right workspace or rotary tables in gantry mode for clamping bridges in long bed machining mode

Rotary table combined with a tailstock as well an additional pick-up station for special tools, angular heads or multiple spindle heads

# Technical data VSC

| Technical data | | VSC 1 - XTS | VSC 2 - XTS | VSC 2 - XTS50 | | VSC 3 - XTS | VSC 3 - XTS50 | VSC 50 - XTS |
|---|---|---|---|---|---|---|---|---|
| **Working area** | | | | | | | | |
| X-traverse range | [mm] | 1760 - 9000 | 1760 - 9000 | 1760 - 9000 | [mm] | 1760 - 9000 | 1760 - 9000 | 2000 - 9000 |
| Optional pendulum travel | [mm] | (X-axis - 400) / 2 | (X-axis - 500) / 2 | (X-axis - 500) / 2 | [mm] | (X-axis - 500) / 2 | (X-axis - 500) / 2 | (X-axis - 700) / 2 |
| Y-traverse range | [mm] | 550 | 600 | 600 | [mm] | 700 (900, 1000, 1100) [2] | 700 (900, 1000, 1100) [2] | 1000 (1250) |
| Z-traverse range | [mm] | 600 | 850 | 850 | [mm] | 850 (950, 1200) [2] | 850 (950, 1200) | 1000 (1250) |
| Distance table - spindle nozzle | [mm] | 180 - 780 | 180 - 1030 | 180 - 1030 | [mm] | 180 - 1030 (1130) [2] | 180 - 1030 | 180 - 1180 |
| **Machine table** | | | | | | | | |
| Clamping surface, grinded, approx. | [mm] | (X-axis + 400)x Y-axis | (X-axis + 400)x Y-axis | (X-axis + 400)x Y-axis | [mm] | (X-axis + 400)x Y-axis | (X-axis + 400)x Y-axis | (X-axis + 400)x Y-axis |
| T-slots, reference slot H7 | [mm] | 14 H9 | 14 H9 | 18 H9 | [mm] | 14 H9 | 18 H9 | 18 H9 |
| T-slots indexing | [mm] | 160 | 160 | 160 | [mm] | 160 | 160 | 160 |
| Number of T-slots | | 3 | 4 | 4 | | 5 (6) [2] | 5 (6) [2] | 6 |
| Max. table load | [kg/m²] | 800 | 1000 | 1000 | [kg/m²] | 1200 | 1200 | 1500 |
| **Feed drive** | | | | | | | | |
| Max. rapid traverse | [m/min] | 30/30/25 (40/40/30) [2] | 40/40/30 | 40/40/30 | [m/min] | 40/40/30 | 40/40/30 | 30/30/25 |
| Max. feed force | [N] | 9000 | 9000 | 9000 | [N] | 9000 | 9000 | 20000 |
| **Main spindle drive** | | | | | | | | |
| Standard drive no. [1] | | 110 | 110 | 131 | | 110 | 131 | 161 |
| Optional drive no. [1] | | 100/111 | 100, 111, 113 | 133 | | 100, 111, 113 | 133 | 163, 182 |
| **Tool holding fixture** | | | | | | | | |
| DIN ISO 7388-1 AD / DIN ISO 7388-3 AD | | SK 40 | SK 40 | SK 50 | | SK 40 | SK 50 | SK 50 |
| Optional | | BT 40, HSK A63, C6 | BT 40, HSK A63, C6 | BT 50, HSK A100, C8 | | BT 40, HSK A63, C6 | BT 50, HSK A100, C8 | BT 50, HSK A100, C8 |
| **Tool changer** | | | | | | | | |
| Number of tool pockets standard | | 22 | 22 | 26 | | 22 | 26 | 30 |
| Optional expandable up to | | 216 [3] | 216 [3] | 156 [3] | | 288 [3] | 180 [3] | 180 [3] |
| Max. tool diameter | [mm] | 85 | 85 | 110 | [mm] | 85 | 110 | 110 |
| By free adjacent pockets | [mm] | 135 | 135 | 180 | [mm] | 135 | 180 | 180 |
| Max. tool length | [mm] | 400 | 400 | 400 | [mm] | 400 | 400 | 400 |
| Tool change time approx. | [s] | 4 | 5 | 7 | [s] | 5 | 7 | 8 |
| **Accuracy** | | | | | | | | |
| Positioning accuracy [4] | [mm] | ± 0,015 (± 0,0075) [2] | ± 0,015 (± 0,0075) [2] | ± 0,015 (± 0,0075) [2] | [mm] | ± 0,015 (± 0,0075) [2] | ± 0,015 (± 0,0075) [2] | ± 0,015 |
| Repeating accuracy | [mm] | ± 0,005 | ± 0,005 | ± 0,005 | [mm] | ± 0,005 | ± 0,005 | ± 0,005 |

| [1] Main spindle drives | | 100 | 110 | 111 | 113 | | 131 | 133 | 161 | 163 | 182 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Speed range | [rpm] | 6000 | 6000 | 6000 | 6000 | [rpm] | 4000 | 4000 | 4000 | 4000 | 4000 |
| Optional up to | [rpm] | 15000 | 12000 | 12000 | 10000 | [rpm] | 9000 | 9000 | 7500 | 7500 | - |
| Max. torque (40% DC) | [Nm] | 95 | 143 | 191 | 255 | [Nm] | 286 | 355 | 540 | 540 | 820 |
| Max. power (40% DC) | [kW] | 20 | 30 | 40 | 40 | [kW] | 45 | 56 | 28 | 56 | 81 |

[2] Optional features
[3] e.g. 3 fully equipped towers
[4] Per 1000 mm per axis X/Y/Z


VHC travelling column machine with tilting spindle head: machining a workpiece from all sides in only one setting

Rotary tables in gantry mode for clamping bridges as well as further, removable pick-up station left for pendulum operation or right for long bed operation

# VHC – Additional options due to tilting spindle head

**Main design:**
- Cross slides, travelling columns and spindle head stock are made from high-quality cast iron
- Extremely rigid, static and dynamically well balanced ground frame construction
- Direct measuring systems for X/Y/Z axes
- Casing according to current machinery directives, totally closed working area with no interfering contours – also in pendulum operation mode
- Total access to working area when doors are fully open
- Excellent accessibility for maintenance and service tasks
- Machine transport in one piece

**Guideways and drives:**
- Hardened precision steel slideways mounted on manually scraped or grinded surfaces
- Optimal guiding by extremely large guidance ratio and Turcite coatings
- High rigidity, outstanding long-term precision performance and excellent vibration absorbing capabilities of the guideways
- Excellent resetting and adjustability of the guideways
- Drives and guideways are protected set outside of working area
- Ball screws in all linear axes with patented support units for ball screws in the X-axis for large travel lengths

**Tool changing system:**
- Fixed location coded tool management enables better monitoring for the operator
- Tool pre-selection by double gripper arm during machining
- Support of various tool holding systems such as SK, BT, HSK, CAPTO
- Tool magazine is protected outside of working area
- Placement of the XTS magazine during machining possible
- Tool change takes place behind working area cladding: no disturbing contours in the working area during tool change by the gripper VHC – Precise results from every viewpoint or parts
- Transport unit from XTS magazine has its own drive and moves at up to 120 m/min to the spindle position for the tool change
- Any number of tool pockets are provided by several compact XTS towers
- Tool pockets within a tower can also be expanded at any point in time in the future

**Tilting spindle head:**
- Vertical and horizontal machining
- In combination with a rotary table, 5 face machining or 5 axes simultaneous machining can be achieved
- Tilting spindle head 0,001° indexing increments or fully interpolating
- Tilting range up to ± 100°

# Flexible thanks numerous options

- Through spindle coolant with filter system
- Chip conveyor in slat-band belt, scraper belt or magnetic belt versions
- Controllers either from Heidenhain or Siemens
- Rotary tables horizontally or vertically integrated, in 1 or 2 axes, combined with tail-stocks, counterbearings or a further rotary table in gantry mode for clamping bridges
- Automatic doors
- Clamping systems – hydraulic, pneumatic, magnetic or manual
- Touch probes and tool touch probe systems
- Active power monitoring, collision monitoring and complete process monitoring
- Tool identification systems
- Laser breakage control with tool measurement
- Remote maintenance

We can develop and manufacture special solutions for you upon request.

The tilting spindle head in operation: enables the machine to work in a range of ± 100°


Thanks to the tilting spindle with a tilting range of ± 110° and the rotary table's raised position work pieces can also be machined from a rear position

# Technical data VHC

| Technical data | | VHC 2 - XTS | VHC 2 - XTS50 | VHC 3 - XTS | | VHC 3 - XTS50 | VHC 50 - XTS |
|---|---|---|---|---|---|---|---|
| **Working area** | | | | | | | |
| X-traverse range vertical | [mm] | 1760 - 9000 | 1760 - 9000 | 1760 - 9000 | [mm] | 1760 - 9000 | 2000 - 9000 |
| Optional pendulum travel vertical | [mm] | (X-axis - 400) / 2 | (X-axis - 500) / 2 | (X-axis - 500) / 2 | [mm] | (X-axis - 500) / 2 | (X-axis - 600) / 2 |
| Y-traverse range horizontal / vertical | [mm] | 600 | 600 | 700 (900,1000, 1100) [2] | [mm] | 700 (900, 1000, 1100) [2] | 1000 (1250) |
| Z-traverse range horizontal / vertical | [mm] | 850 / 820 | 850 / 790 | 850 (950, 1200) [2] | [mm] | 850 / 790 (950 / 890, 1200 / 1140) | 1000 / 970 (1250 / 1220) |
| Distance table - spindle nozzle vert. | [mm] | 0 - 820 | 0 - 790 | 40 - 890 (990) [2] | [mm] | 0 - 790 (0 - 890, 0 - 1140) | 0 - 970 |
| Distance table - spindle nozzle hor. | [mm] | 180 - 1030 | 250 - 1100 | 250 - 1100 (1200) [2] | [mm] | 250 - 1100 | 280 - 1280 |
| **Machine table** | | | | | | | |
| Clamping surface, grinded, approx. | [mm] | (X-axis + 400)x Y-axis | (X-axis + 400)x Y-axis | (X-axis + 400)x Y-axis | [mm] | (X-axis + 400)x Y-axis | (X-axis + 400)x Y-axis |
| T-slots, reference slot H7 | [mm] | 14 H9 | 18 H9 | 14 H9 | [mm] | 18 H9 | 18 H9 |
| T-slots indexing | [mm] | 160 | 160 | 160 | [mm] | 160 | 160 |
| Number of T-slots | | 4 | 4 | 5 (6) [2] | | 5 (6) [2] | 6 |
| Max. table load | [kg/m²] | 1000 | 1000 | 1200 | [kg/m²] | 1200 | 1500 |
| **Feed drive** | | | | | | | |
| Max. rapid traverse | [m/min] | 40/40/30 | 40/40/30 | 40/40/30 | [m/min] | 40/40/30 | 30/30/25 |
| Max. feed force | [N] | 9000 | 9000 | 9000 | [N] | 9000 | 20000 |
| **Main spindle drive** | | | | | | | |
| Standard drive no. [1] | | 110 | 131 | 110 | | 131 | 161 |
| Optional drive no. [1] | | 100, 111, 113 | 133 | 100, 111, 113 | | 133 | 163, 182 |
| **Tool holding fixture** | | | | | | | |
| DIN ISO 7388-1 AD / DIN ISO 7388-3 AD | | SK 40 | SK 50 | SK 40 | | SK 50 | SK 50 |
| Optional | | BT 40, HSK A63, C6 | BT 50, HSK A100, C8 | BT 40, HSK A63, C6 | | BT 50, HSK A100, C8 | BT 50, HSK A100, C8 |
| **Tilting spindle head** | | | | | | | |
| Swivelling range B-axis | | ± 90° (± 100°) [2] | ± 90° (± 100°) [2] | ± 90° (± 100°) [2] | | ± 90° (± 100°) [2] | ± 90° (± 100°) [2] |
| Indexing | | 0,001° (fully interpolating) [2] | 0,001° (fully interpolating) [2] | 0,001° (fully interpolating) [2] | | 0,001° (fully interpolating) [2] | 0,001° (fully interpolating) [2] |
| **Tool changer** | | | | | | | |
| Number of tool pockets standard | | 22 | 26 | 22 | | 26 | 30 |
| Optional expandable up to | | 216 [3] | 156 [3] | 288 [3] | | 180 [3] | 180 [3] |
| Max. tool diameter | [mm] | 85 | 110 | 85 | [mm] | 110 | 110 |
| By free adjacent pockets | [mm] | 135 | 180 | 135 | [mm] | 180 | 180 |
| Max. tool length | [mm] | 400 | 400 | 400 | [mm] | 400 | 400 |
| Tool change time approx. | [s] | 5 | 7 | 6 | [s] | 7 | 8 |
| **Accuracy** | | | | | | | |
| Positioning accuracy[4] | [mm] | ± 0,015 (± 0,0075) [2] | ± 0,015 (± 0,0075) [2] | ± 0,015 (± 0,0075) [2] | [mm] | ± 0,015 (± 0,0075) [2] | ± 0,015 |
| Repeating accuracy | [mm] | ± 0,005 | ± 0,005 | ± 0,005 | [mm] | ± 0,005 | ± 0,005 |

## [1] Main spindle drives

| | | 100 | 110 | 111 | 113 | | 131 | 133 | 161 | 163 | 182 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Speed range | [rpm] | 6000 | 6000 | 6000 | 6000 | [rpm] | 4000 | 4000 | 4000 | 4000 | 4000 |
| Optional up to | [rpm] | 15000 | 12000 | 12000 | 10000 | [rpm] | 9000 | 9000 | 7500 | 7500 | - |
| Max. torque (40% DC) | [Nm] | 95 | 143 | 191 | 255 | [Nm] | 286 | 355 | 540 | 540 | 820 |
| Max. power (40% DC) | [kW] | 20 | 30 | 40 | 40 | [kW] | 45 | 56 | 28 | 56 | 81 |

[2] Optional features
[3] e.g. 3 fully equipped towers
[4] Per 1000 mm per axis X/Y/Z with vertical spindle

# Top notch in all movements during milling, drilling and turning

Increasingly complex turning and milling jobs are demanded upon the metal processing industry.
The machines of the VSC and VHC series have been designed to fulfil these requirements. To ensure this success, the machines are equipped with rotary tables that are directly driven by quick-turning, high performance torque motors as well as vertical or horizontal turning spindles to create very high speeds.

A further firmly fixed, hydraulic turning tool holder with automatic pull-in next to the working spindle serves to assimilate the corresponding required turning tools. The separate clamping unit for turning tools thus ensures for utmost stability, a clear orientation of the turning tools and avoids further stress on the main spindle bearing during turning operation.

Tool changing between two tool holding systems thanks to the adjustable XTS changer and gripping arm is one of the outstanding benefits of the machine. For example, one magazine chain can be set with CAPTO C6 uptake for turning tools and at the same time a second magazine can be carried out with SK 50 for drilling and milling tools.

Thanks due to the expandable tool shop, you can set the configuration of the magazine chains yourself and therefore determine the number of required tools for turning and drilling/milling.

# Top notch in all movements during milling, drilling and turning


Milling, drilling and turning in one setting with vertical and horizontal spindle position

All intermediary angles can be set on the turning tool position beside the vertical and horizontal spindle position

Turning spindle with 1500 rpm in combination with a tailstock that can be manually adjusted over the fixed machine table in longitudinal direction for varying lengths of the turning workpieces

A further firmly fixed turning tool holder with automatic pull-in next to the working spindle serves to assimilate the corresponding required CAPTO turning tools

# Keeping a firm grip on small and large workpieces alike

A firm and secure hold is the key to a faultless result. The requirements are just as different as the forms of the workpieces. Alongside fixing, other factors play an essential role when choosing the right clamping technology:

- cost effectiveness
- operator convenience
- machine reliability

The AXA experts give the right advice on the choice of the right clamping technology: Regardless whether mechanical, hydraulic, magnetic or vacuum technology – place your trust in our experience. Systems that already exist can also be integrated – just as much as individual solutions can be developed. Together with numerous partners, we find the correct clamping technology.

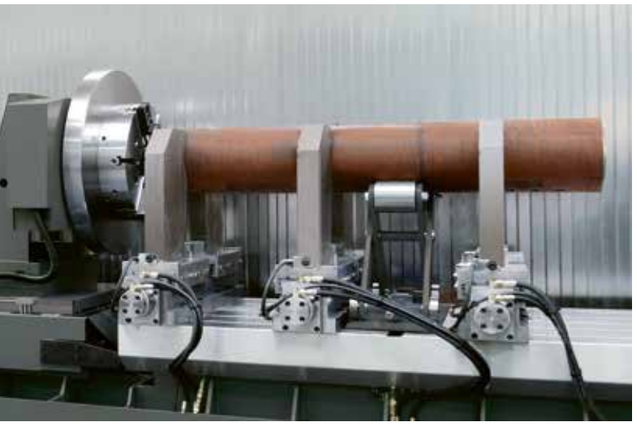
Clamping technology in its diversity:

- Chucks or clamping devices
- Machine vices
- Centering vices
- Box jaws
- Multiple clamping systems
- Clamping towers
- Simple table clamping systems
- Clamps of moulded parts with special clamping system

Quick set-up change from very small workpieces to very large and long workpieces by main supporting units - These can be adjusted manually in the X-direction or be NC-driven - Quickly changing clamping elements can be incorporated by the zero-point clamping systems

# Keeping a firm grip on small and large workpieces alike

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



The workpiece can be rotated to position when clamped

Manual or NC-driven pre-centering and presetting of the clamping elements for the next workpiece diameter

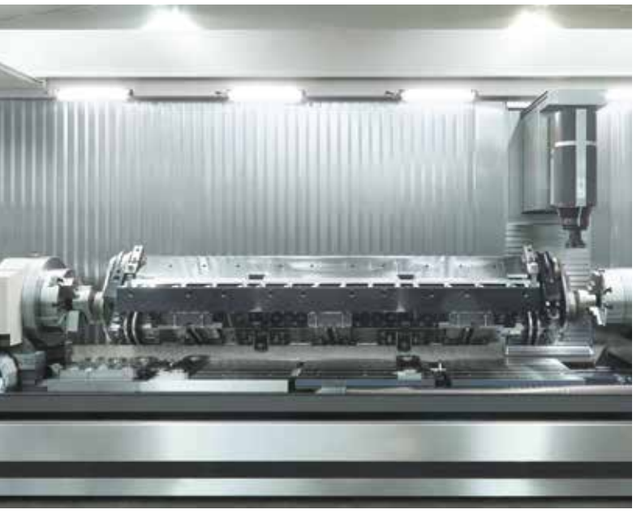
In the right hand working space long strips can be manufactured in clamps that can be positioned flexibly

Two NC rotary tables working in gantry mode ensure torsionally stiff suspension of the long clamping bridge in the left-hand pendulum working space

# Keeping a firm grip on small and large workpieces alike

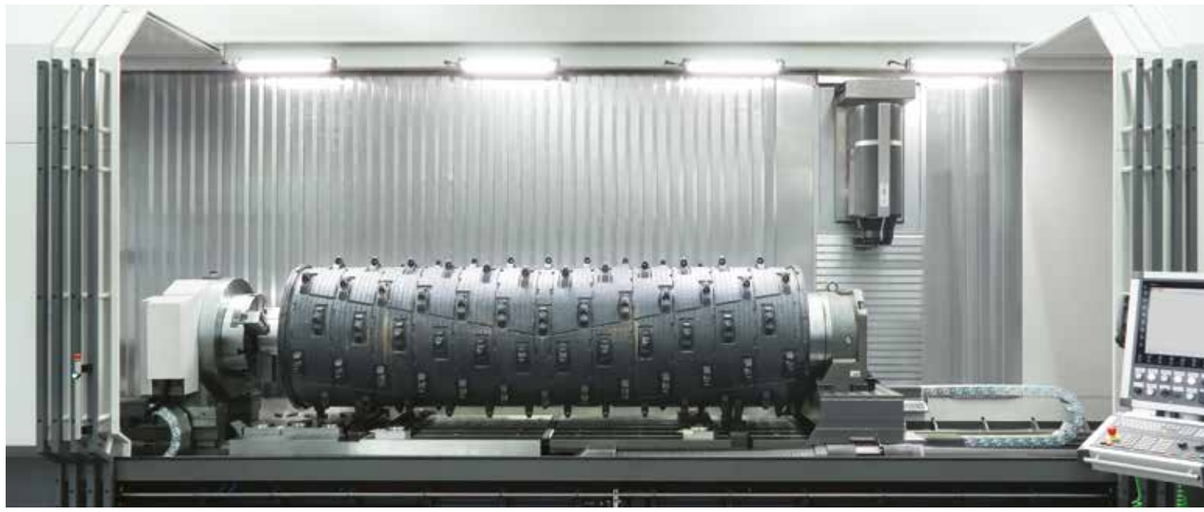
An outstanding multi-purpose working area! Rotary tables movable along the X-axis and zero-point clamping systems on the fixed machine tables allow for fast and flexible changeovers to meet different work piece requirements

Version 2: The rotary tables are driven to the outer park positions and the work pieces can be positioned flexibly in the working area via a range of different clamping elements that are held by the zero-point clamping systems



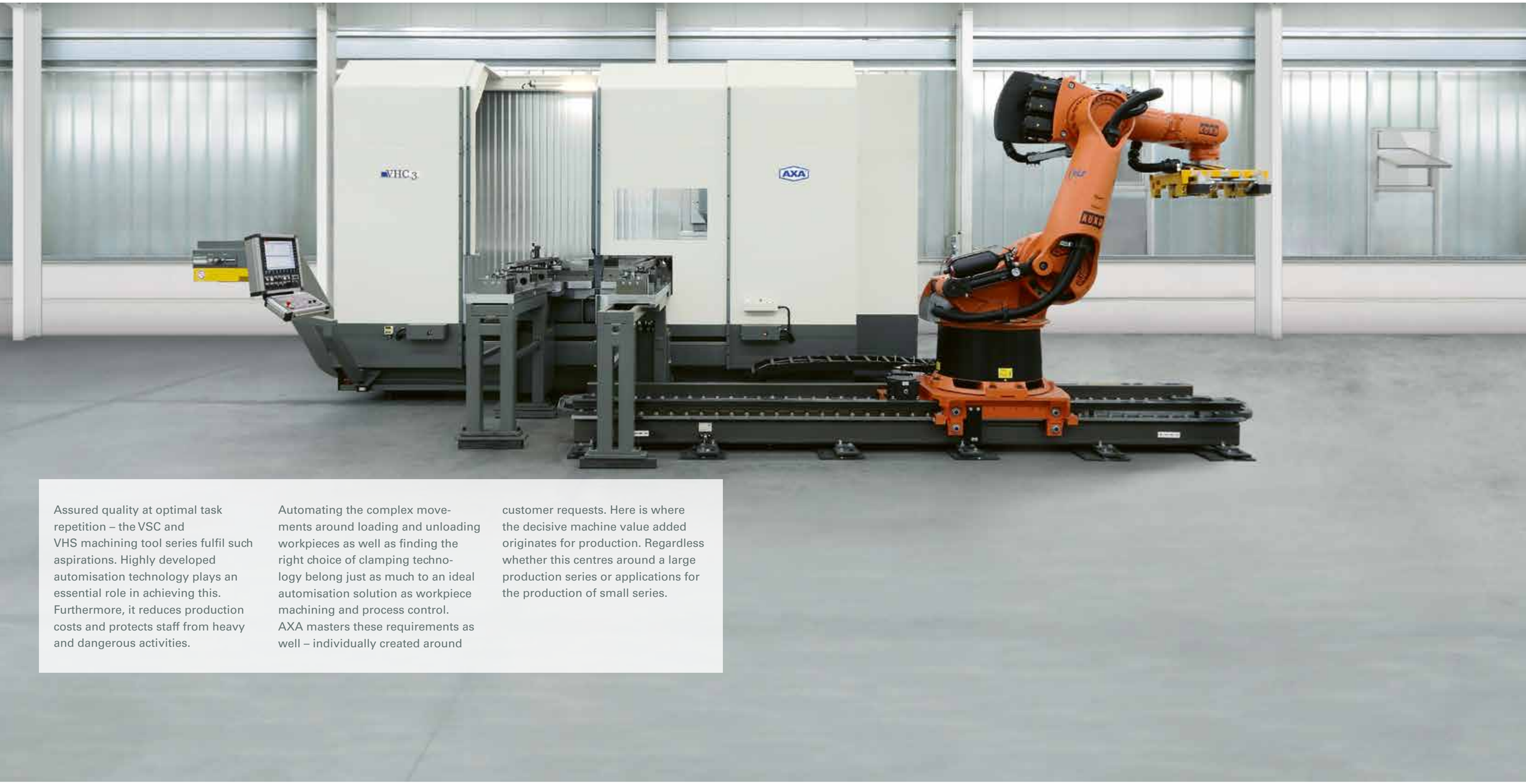
Version 1: The rotary tables are driven into the working area to take up a hydraulic clamping device for the work pieces

The work pieces can now be taken hold of directly via the hydraulic clamping device - Sliding doors that open above the working area allow for optimal loading from above



Version 3: The rotary tables are driven into the working area and the work pieces are taken hold of directly by the rotary tables - Since one of the rotary tables can be driven across the fixed machine table, the work piece length is flexibly adjustable

# Automisation at every work cycle




Assured quality at optimal task repetition – the VSC and VHS machining tool series fulfil such aspirations. Highly developed automisation technology plays an essential role in achieving this. Furthermore, it reduces production costs and protects staff from heavy and dangerous activities.

Automating the complex movements around loading and unloading workpieces as well as finding the right choice of clamping technology belong just as much to an ideal automisation solution as workpiece machining and process control. AXA masters these requirements as well – individually created around customer requests. Here is where the decisive machine value added originates for production. Regardless whether this centres around a large production series or applications for the production of small series.

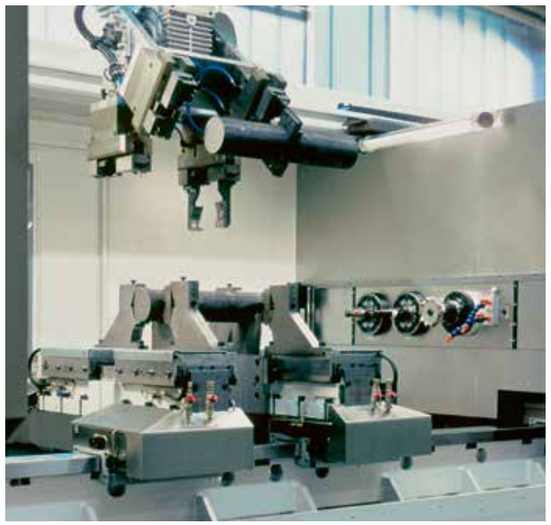
In X-travelling industrial robot to load and unload palettes with clamped components in pendulum operation

# Automisation at every work cycle


Installed industrial robot in front of the travelling column machine for direct machine loading and unloading with workpieces


Quick and simple automisation by compact complete solution with workpiece storage, handling system and zero-point clamping

Machine buffer store reduces set-up times due to long transport distances of the robot system - During machining, the robot changes the workpieces from the buffer into the workpiece storage unit



Double gripper swaps the finished item with the raw material in one work cycle - As loading takes place from above by the portal robot, machine accessibility remains intact

Complex hydraulic clamping unit, modularly designed by AXA, for quick conversion and secure chip flow

# Product overview

## TMP

**Gantry machining centre for 5-side-machining in mould making for large-scale workpieces**

| | |
|---|---|
| X-travel: | 2300 - 2940 mm (vertical)<br>2000 - 2640 mm (horizontal) |
| Y-travel: | 1400 - 1600 mm |
| Z-travel: | 900 mm |
| Spindle power: | 27 - 56 kW |

## VPC 2800 U

## VPC

## VPC U

**Gantry machining centres in compact design with vertical spindle or swivel head for 5-side-machining**

| | |
|---|---|
| X-travel: | 2360 - 3900 mm |
| Y-travel: | 1200 - 2940 mm |
| Z-travel: | 500 - 1100 mm |
| Spindle power: | 20 - 63 kW |

## VSC

## VHC

**Travelling column machining centres with vertical spindle or swivel head for 5-side-, long bed and pendulum machining**

| | |
|---|---|
| X-travel: | 1200 - 12000 mm |
| Y-travel: | 500 - 1000 mm |
| Z-travel: | 600 - 1000 mm |
| Spindle power: | 20 - 81 kW |

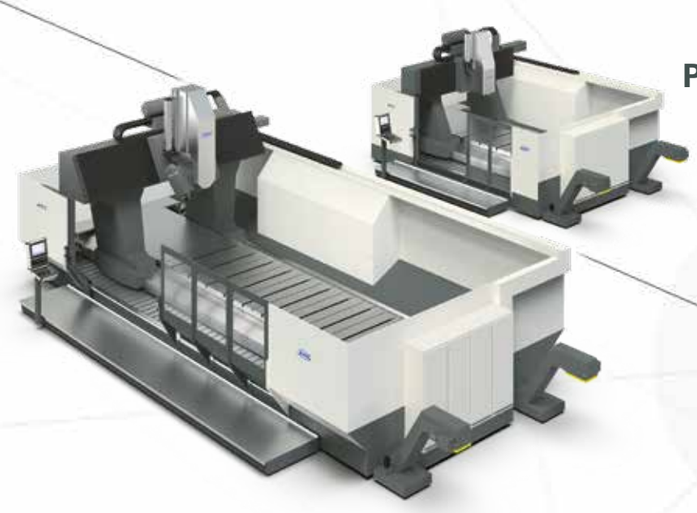
## DBZ

## VCC

**Vertical travelling column machining centres in compact design in short bed version, with pendulum machining or with swivel rotary table**

| | |
|---|---|
| X-travel: | 750 - 1200 mm - 2 x 750 / 2 x 900 mm |
| Y-travel: | 500 - 600 mm |
| Z-travel: | 700 mm |
| Spindle power: | 20 - 40 kW |

## PFZ



## UPFZ

**Large gantry machining centres with vertical spindle or swivel head for 5-side-machining**

| | |
|---|---|
| X-travel: | 2000 - 12000 mm |
| Y-travel: | 1500 - 4000 mm |
| Z-travel: | 650 - 1200 mm |
| Spindle power: | 20 - 57 kW |

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