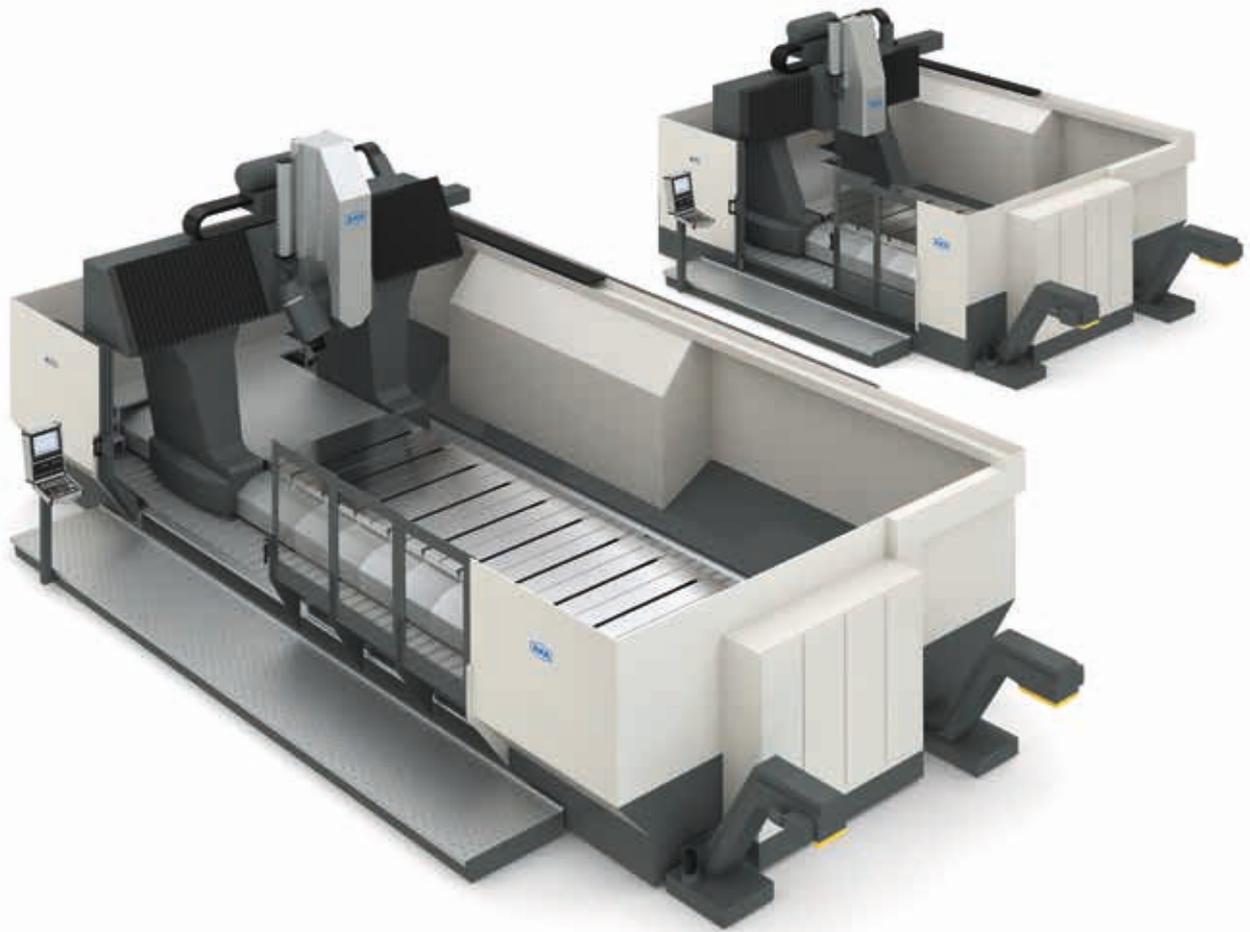


# PFZ / UPFZ



**Pure Technology!**



Entwicklungs- und  
Maschinenbau GmbH



Size counts: the precision and flexible layout of the large gantry machining centres from the PFZ and UPFZ series makes them particularly strong for solid workpieces

# Pure Technology!

## The large gantry machining centres from the PFZ and UPFZ – Strong performers with impressive precision

Workpieces – solid and really heavy. Milling and drilling – in a complex way and extremely accurate. The results – individual and precise. The large gantry machining centres PFZ and UPFZ unite what has been previously worlds apart: Solid, massive and large workpieces can now be milled, drilled or even turned by precision tools right to the finest levels of detail. The results fulfil all requirements each and every time and enable completely new custom-made constructions.

Designed especially for machining large volume workpieces, these AXA machines offer high cutting performance and also master really long traverse ranges in a very confined floor space. Only the machining spindle moves over the workpiece during the entire working procedure since the clamping table is fixed. The machine bed is thus hardly longer than the workpiece itself.

This series of machines uncompromisingly unites the ideas of the AXA engineers: A machine in gantry design, each with its own motor drive and measuring system for both left and right sides in order to complete extremely large traverse ranges combined with a stationary, centre-oriented positioned magazine pool. This plays a major role in reducing the gantry moving mass and at the same time, it masters the precondition for large tool magazines chains. A double gripping system then loads at the same time and thus ensures minimal disruption time during machining by the tooling change.

Place your trust in the specialist with plenty of tradition: AXA

Ready for use in many industries and many applications:

- Plant and equipment manufactories
- Precision tool making including fixtures, mould and press tools
- Automotive industry
- Aerospace industry
- Subcontract machining
- Jobbing shop for large and small manufacturing series
- Rail track and rolling stock equipment
- Medical industry
- Automation technology
- Packaging machines
- Hydraulic components
- Valve manufacture
- Profile machining
- Plastics and aluminium machining



The large gantry machining centre PFZ: optimal machining of substantial workpieces

## PFZ – Powerful partner for heavy-duty tasks

The AXA gantry machining centre PFZ is the specialist for particularly large and solid workpieces that need to be machined with a vertically set main spindle. Powerful, yet extremely precise – that is how the PFZ completes such difficult tasks. Its excellent reliability and efficiency speak for itself alongside its flexibility and adaptability. The rigid construction of the PFZ means that it is very tough and robust. The implementation of angular heads enables machining on the side surfaces.

### Main design:

- Extremely rigid, static and dynamically well-balanced ground frame construction
- Spacious and easily accessible machine tables
- Direct measuring systems for the X/Y/Z-axes
- Cover according to current machinery directives
- Ideal for crane loading by the open

covering over the work area

- Optimal accessibility for all maintenance and service requirements

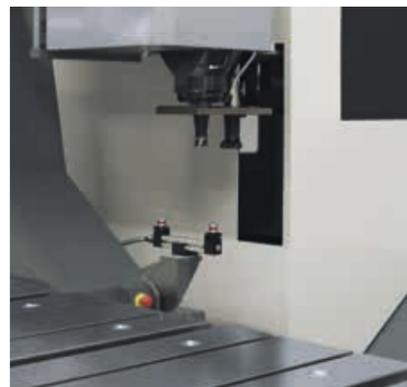
### Guideways and drives:

- 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
- Ball screws in all linear axes

### Tool changing system:

- Extremely robust, stationary fixed tool changer
- This enables very long chains without any restrictions of machine dynamics and precision

- Short tool changing times by double gripping arm and due to centrally set tool transfer in X-axis
- Fixed location coded tool management for better operator monitoring
- Support of various tool holding systems such as SK, BT, HSK, CAPTO
- Magazine placement possible during machining



Stationary tool changer with integrated tool measurement

## Ingenuity and great ideas

Its strength is its flexible structure: Your ideas and all your requirements can be achieved thanks to the PFZ. The AXA experts develop and design solutions – also by integrating other technologies.

- 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, counter-bearings 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 – from the standard solution up to made-to-measure customer manufacture.

Flexibility in every detail: Your ideas become our mission!



A solid covering is standard even in the basic version



Outstanding accessibility and perfect possibility for crane loading by means of wide-opening doors and the open covering from above



The large gantry machining centre PFZ: optimal machining of substantial workpieces

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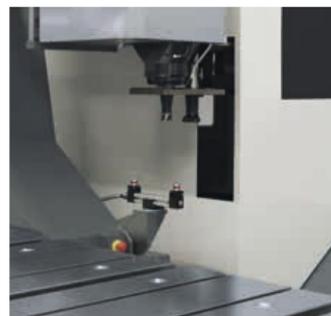
- Optimal accessibility for all maintenance and service requirements

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- Magazine placement possible during machining



Machine tables with integrated T-slots to clamp the workpieces as standard



Alternative clamping technology: the large table surface offers many possibilities to arrange clamping devices – such as magnetic clamping plates as shown here

## Technical data PFZ

		PFZ 40	PFZ 50
<b>Working area</b>			
X-traverse range	[mm]	2000 - 10000	3000 - 10000
Y-traverse range	[mm]	1000 - 3000	1500 - 3000
Z-traverse range	[mm]	650 - 1200	800 - 1200
Min. distance table - spindle nozzle	[mm]	230	230
<b>Machine table</b>			
Table width	[mm]	1200 - 3000	1500 - 3000
Table length approx.	[mm]	X-stroke	X-stroke
T-slots, reference slot H7	[mm]	22 H9	22 H9
T-slots indexing	[mm]	660	660
Max. table load	[kg/m <sup>2</sup> ]	1000	1500 (2000) <sup>2</sup>
<b>Feed drive</b>			
Max. rapid traverse in X/Y/Z	[m/min]	20/20/15 (30/30/25) <sup>2</sup>	15/15/10 (20/20/15) <sup>2</sup>
Max. feed force	[N]	10000	15000
<b>Main spindle drive</b>			
Standard drive no. <sup>1</sup>		110	161
Optional drive no. <sup>1</sup>		100, 111, 113	131, 133, 163
<b>Tool holding fixture</b>			
DIN 69871 A / DIN 69872 A		SK 40	SK 50
Optional		BT 40, HSK A63, C6	BT 50, HSK A100, C8
<b>Tool changer</b>			
Number of tool pockets standard		22	22
Optional expandable up to		90	90
Max. tool diameter	[mm]	85	110
By free adjacent pockets	[mm]	135	180
Max. tool length	[mm]	300 (400) <sup>3</sup>	400
Tool change time approx.	[s]	13	13
<b>Accuracy</b>			
Positioning accuracy <sup>4</sup>	[mm]	± 0,02 <sup>5</sup>	± 0,02 <sup>5</sup>
Repeating accuracy	[mm]	± 0,0075	± 0,0075

### <sup>1</sup> Main spindle drives

		100	110	111	113
Speed range	[rpm]	6000	6000	6000	6000
Optional up to	[rpm]	15000	12000	12000	10000
Max. torque (40% DC)	[Nm]	95	143	191	255
Max. power (40% DC)	[kW]	20	30	40	40
		<b>131</b>	<b>133</b>	<b>161</b>	<b>163</b>
Speed range	[rpm]	4000	4000	4000	4000
Optional up to	[rpm]	9000	9000	7500	7500
Max. torque (40% DC)	[Nm]	286	355	540	540
Max. power (40% DC)	[kW]	45	56	28	57

<sup>2</sup> Optional features

<sup>3</sup> From X-stroke 800 mm

<sup>4</sup> Per 1000 mm per axis X/Y/Z

<sup>5</sup> Increased accuracy on request

Technical specifications refer to the standard version. Extensions and modifications upon request and depending on overall configuration and application.



The large gantry machining centre UPFZ: a 2-axis tilting head for 5-side machining of large cubic workpieces

## UPFZ – The multi-talent for the toughest demands

The 2-axis tilting head is the key component of the UPFZ machine series. The head works in practically any position and so offers the greatest possible usability in your production plant. Once in place, the UPFZ also machines particularly large and complex workpieces all the way round – horizontally, vertically and even diagonally. Lower set-up times drive efficiency. Powerful, reliable and simple to use – indeed, it is a real talent.

### Main design:

- Extremely rigid, static and dynamically well-balanced ground frame construction
- Spacious and easily accessible machine tables
- Direct measuring systems for the X/Y/Z-axes
- Cover according to current machinery directives
- Ideal for crane loading by the open

- covering over the work area
- Increased stability and rigidity by means of portal in inclined bed version for the UPFZ 50
- Optimal accessibility for all maintenance and service requirements

### 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
- Ball screws in all linear axes

### Tool changing system:

- Version and equipment according to PFZ series

### Tilting spindle head:

- 2-axis tilting head for 5-side machining
- Tilting head in Hirth-coupled design or stepless positioning
- Tilting range A-axis 180°, tilting range B-axis 360°



The 2-axis tilting head: divisions in angle steps of 2.5°, 1° or 0.001°

## Ingenuity and great ideas

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- 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 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 – from the standard solution up to made-to-measure customer manufacture.

Flexibility in every detail: Your ideas become our mission!



Complete machine covering all around as standard with the optimal possibility of crane loading



Further optional working space doors at the front side offer maximum accessibility



The large gantry machining centre UPFZ: a 2-axis tilting head for 5-side machining of large cubic workpieces

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covering over the work area

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- Tilting head in Hirth-coupled design or stepless positioning
- Tilting range A-axis 180°, tilting range B-axis 360°



The 2-axis tilting head: divisions in angle steps of 2.5°, 1° or 0.001°



For even more stability on the UPFZ 50 due to the large tilting head and gantry cross section: the Y-guideway is placed on an inclined bed portal



The cross support for the Y- and Z-axis on the UPFZ 40 runs on a portal with vertically positioned Y-guideways

## Technical data UPFZ

		UPFZ 40	UPFZ 50		
<b>Working area</b>					
X-traverse range	[mm]	2000 - 10000	3000 - 10000		
With horizontal spindle minus	[mm]	2 x 375	2 x 460		
Y-traverse range	[mm]	1000 - 4000	1500 - 4000		
With horizontal spindle minus	[mm]	2 x 375	2 x 460		
Z-traverse range horizontal / vertical	[mm]	650 - 1200	800 - 1200		
Min. distance table - spindle nozzle	[mm]	230	230		
<b>Machine table</b>					
Table width	[mm]	1200 - 3000	1500 - 3000		
Table length approx.	[mm]	X-stroke	X-stroke		
T-slots, reference slot H7	[mm]	22 H9	22 H9		
T-slots indexing	[mm]	660	660		
Max. table load	[kg/m <sup>2</sup> ]	1000	1500 (2000) <sup>2</sup>		
<b>Feed drive</b>					
Max. rapid traverse in X/Y/Z	[m/min]	20/20/15 (30/30/25) <sup>2</sup>	15/15/10 (20/20/15) <sup>2</sup>		
Max. feed force	[N]	10000	15000		
<b>Main spindle drive</b>					
Standard drive no. <sup>1</sup>		110	161		
Optional drive no. <sup>1</sup>		100, 111, 113	131, 133, 163		
<b>Tool holding fixture</b>					
DIN 69871 A / DIN 69872 A		SK 40	SK 50		
Optional		BT 40, HSK A63, C6	BT 50, HSK A100, C8		
<b>Tilting spindle head</b>					
Swivelling range A-axis		180°	180°		
Swivelling range B-axis		360°	360°		
Indexing		2,5° (1°) <sup>2</sup>	2,5° (1°, 0,001°) <sup>2</sup>		
<b>Tool changer</b>					
Number of pockets standard		22	22		
Optional expandable up to		90	90		
Max. tool diameter	[mm]	85	110		
By free adjacent pockets	[mm]	135	180		
Max. tool length	[mm]	300 (400) <sup>3</sup>	400		
Tool change time approx.	[s]	13	13		
<b>Accuracy</b>					
Positioning accuracy <sup>4</sup>	[mm]	± 0,02 <sup>5</sup>	± 0,02 <sup>5</sup>		
Repeating accuracy	[mm]	± 0,0075	± 0,0075		
<b><sup>1</sup> Main spindle drives</b>					
Speed range	[rpm]	6000	6000	6000	6000
Optional up to	[rpm]	15000	12000	12000	10000
Max. torque (40% DC)	[Nm]	95	143	191	255
Max. power (40% DC)	[kW]	20	30	40	40
		<b>100</b>	<b>110</b>	<b>111</b>	<b>113</b>
Speed range	[rpm]	4000	4000	4000	4000
Optional up to	[rpm]	9000	9000	7500	7500
Max. torque (40% DC)	[Nm]	286	355	540	540
Max. power (40% DC)	[kW]	45	56	28	57
		<b>131</b>	<b>133</b>	<b>161</b>	<b>163</b>

<sup>2</sup> Optional features

<sup>3</sup> From X-stroke 800 mm

<sup>4</sup> Per 1000 mm per axis X/Y/Z with vertical spindle

<sup>5</sup> Increased accuracy on request

Technical specifications refer to the standard version. Extensions and modifications upon request and depending on overall configuration and application.

## UPFZ – Top-class precision from any angle

The main feature of the UPFZ is the 2-axis tilting head. It enables the spindle to work vertically, horizontally or even diagonally in the working area. Thus, the spindle can machine the fixed workpiece from all five sides as it can move in any position around the workpiece, including an inclined position. Depending on customer requirements, various versions are possible for choosing how to arrange the angle positions.

The Hirth-coupled version is available with a standard 2.5° or an optional 1° indexing. Alternatively, the UPFZ 50 is obtainable with the tilting head

also in a stepless positioned version. Here, the head automatically undertakes intermediate positions in angle steps of 0.001°. During the individual machining process, the tilting head remains clamped.

The complete unit of the UPFZ tilting head is mounted on vertical Z-slides and can be swivelled around the X-axis in a range of 180° during workpiece machining by the A-axis. In addition to this, there is also the possibility to swivel the main spindle in the tilting head by the B-axis with a tilting range of 360° around the Y-axis (compared to the standard setting). The standard head setting, A- und B-axis = 0°, is

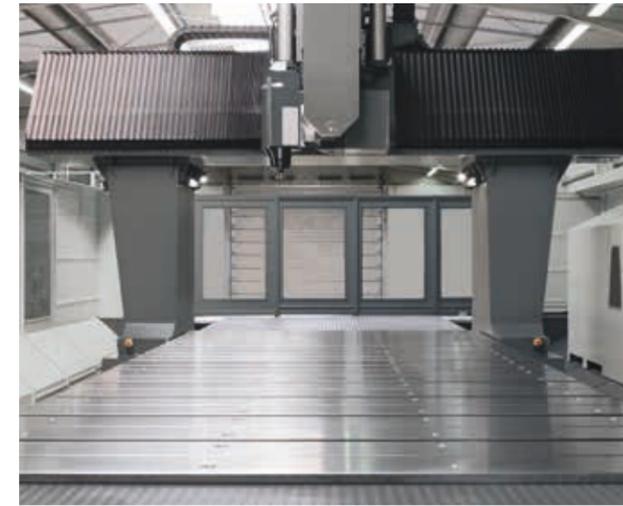
normally set as the vertical position to the operator side.

The specific tilting head construction enables, for example contrary to the fork head solution, the entire Z-movement in a vertical as well as in a horizontal spindle setting at lower portal height. Any potential travel loss arisen by reason of the swivelling movements can be compensated by the expandable Y-stroke at the portal carrier that can be increased up to 1000 mm opposite the table width.

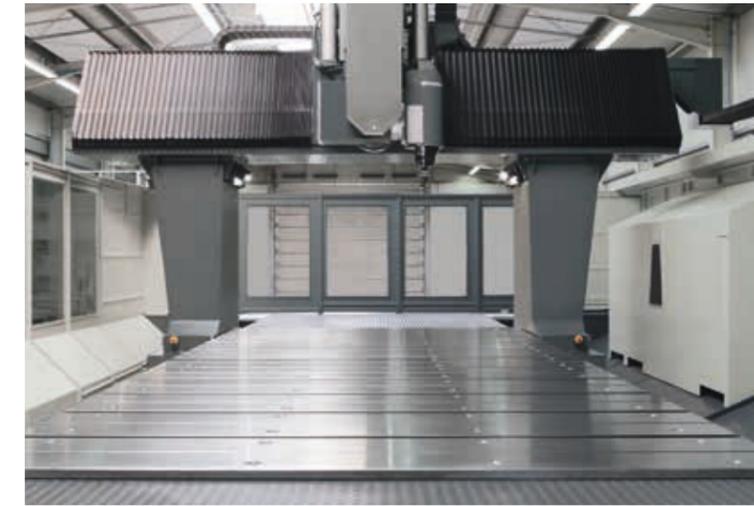
UPFZ – With an eye for the essential!



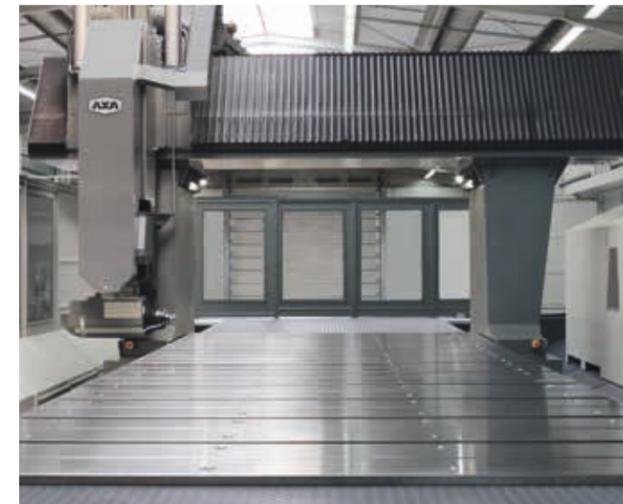
2-axis tilting head of UPFZ with A-axis tilting range of 180° and B-axis of 360°  
(in picture: various spindle head settings)



Spindle head with vertical positioning on operator side  
Standard setting: A-axis 0°, B-axis 0°



Spindle head rotated, vertical positioning on tool changer side  
Standard setting: A-axis 180°, B-axis -180°



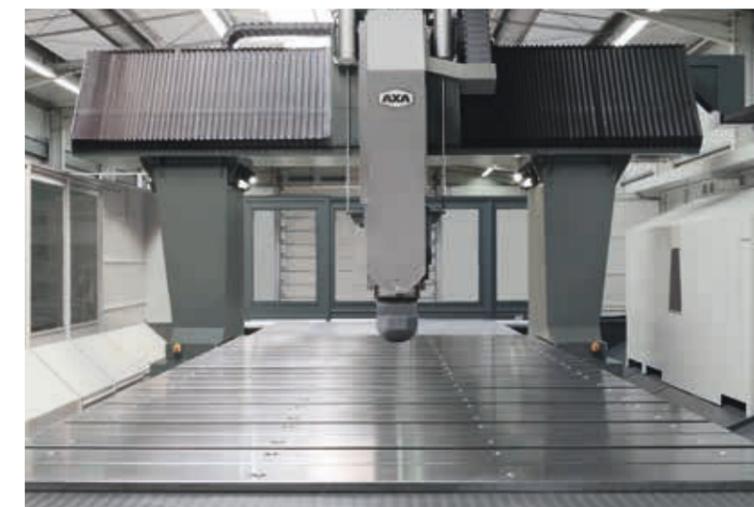
Spindle head horizontal on the operator side  
Standard setting: A-axis 90°, B-axis 0°



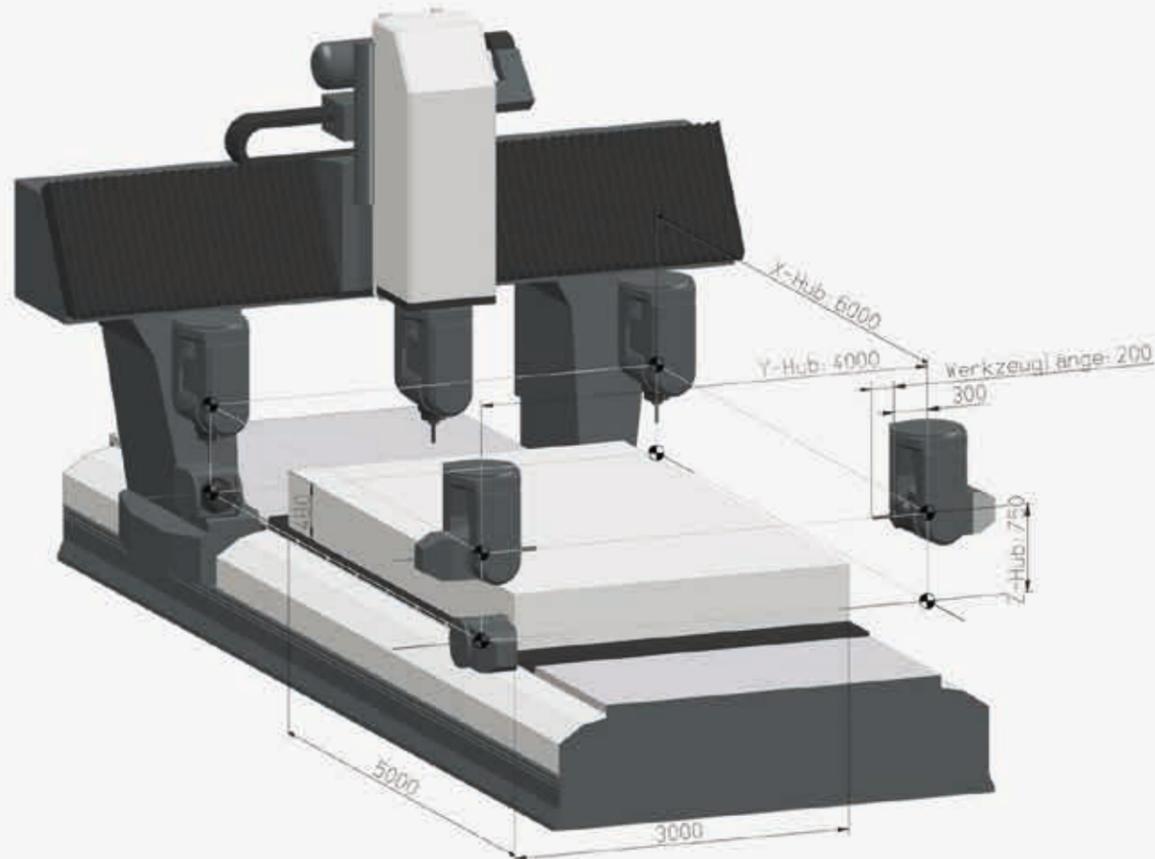
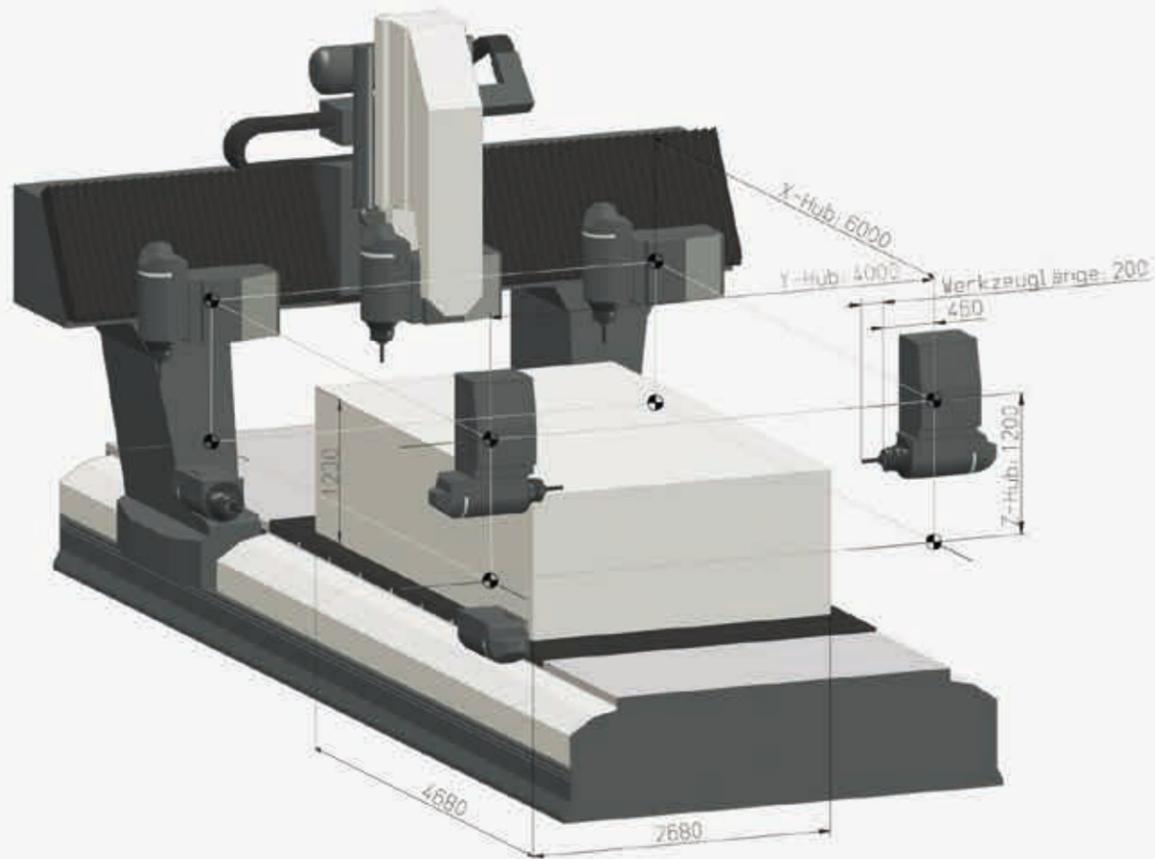
Spindle head horizontal on tool changer side  
Standard setting: A-axis 90°, B-axis -180°



Spindle head horizontal in positive X-direction  
Standard setting: A-axis 90°, B-axis -90°



Spindle head horizontal in negative X-direction  
Standard setting: A-axis 90°, B-axis 90°



The tilting head of the UPFZ (picture above) in comparison to the fork head version (picture below): with equal gantry height and equal Z-traverse range, the UPFZ tilting head can work at much greater workpiece heights when compared with the fork head

## UPFZ – Striking in detail

### The tilting head

The advantages of the UPFZ tilting head from AXA are clear to see: The tilting head has been designed so that it will not suffer from any height detriment when tilting in the Z-direction from the vertical into the horizontal spindle position. This is possible because of its special construction. The vertical distance from the spindle nose to the tilting centre corresponds to the horizontal

distance from the spindle centre to the centre of the rotating axis. Thus, the Z-traverse range can be used both vertically and horizontally without any displacements. This means that a more efficient use of the Z-stroke is not only more economical but also plays a major role in improving stability and accuracy. The gantry height and the length of the vertical Z-slide are

major factors for machine stability.

The UPFZ tilting head unites low gantry height with a low Z-stroke for a given workpiece height. Therefore, maximum stability and accuracy are attained – an essential advantage of the AXA construction in comparison to the fork head solution.

### The tool changer

The extremely robust and fixed tool changer enables very long tool chains for this type of machine – together with constant dynamics and accuracy. Since the tool change is stationary, the tool magazine can be loaded also during machining. Quick tool changing times are guaranteed as tool changing takes place centrally above the X-travel and tool preselection by the double gripping system in use works in parallel. Fixed location coded tool management for better operator monitoring and the possibility to use various tool holders make this tool changer a very solid and user-friendly system.

The stationary positioned tool changer guarantees quick changing times by the double gripping system and the central positioning on the X-axis



## Enormous opportunities

### Machine full covering and suction

Individual tool machine requirements demand very individual solutions for covering and suction demands. Various possibilities are thus available to effectively protect employees

and machine alike. These come in different versions when choosing the required covering and suction.

#### Cabin solution:

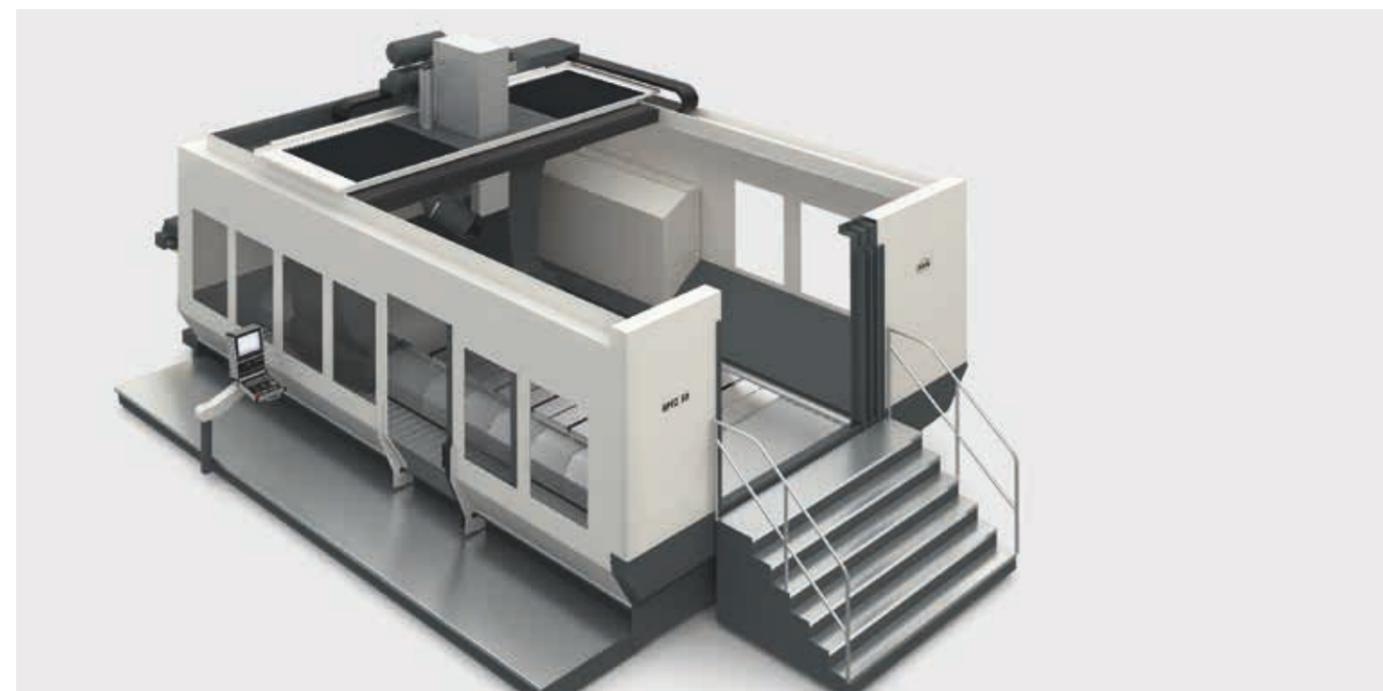
The machine is completely surrounded by an independent cabin that can also be equipped with an additional sound-absorbing device.



Complete machine encasement by an independent cabin



The implementation of automatically driven angle gates furthermore enables crane loading by opened cabin



Completely enclosed working area by expanding the entire encasement by a roof with bellow solution

The roof can be opened or closed by the gantry. This enables loading from above or over the separate front-facing doors

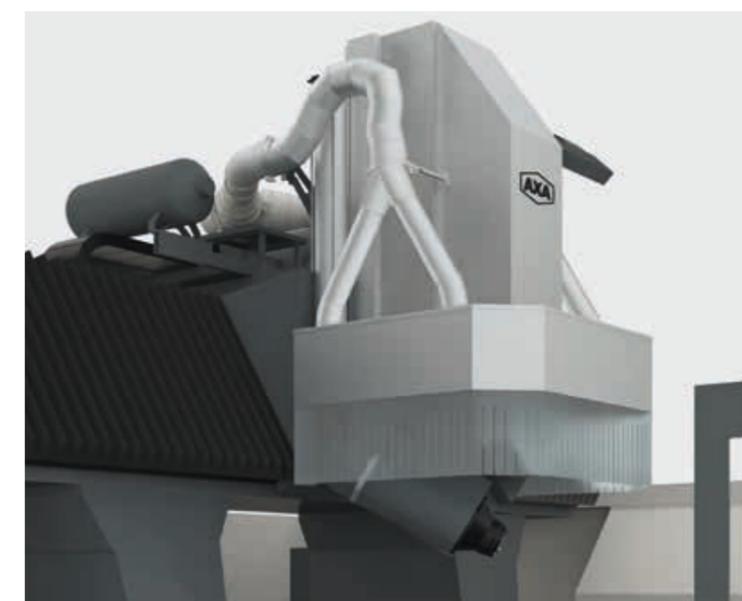
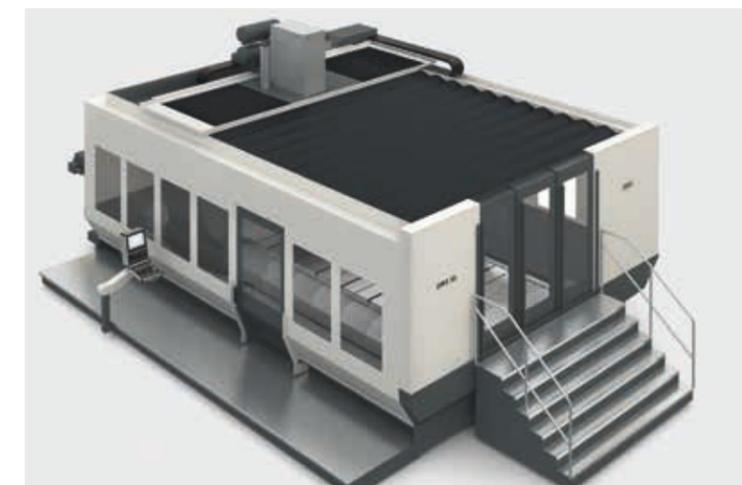
#### Bellow solution:

Additional to the standard machine covering, it is also possible to expand this with a bellow roof. The bellow is locked to the gantry and opened and closed via the gantry travel. An additional drive is therefore not required and the advantage of the low machine height remains.

#### Suction solution of hood mounted next to the spindle:

In some cases, a part of the created fumes can be extracted directly at the Z-slides by a separate hood.

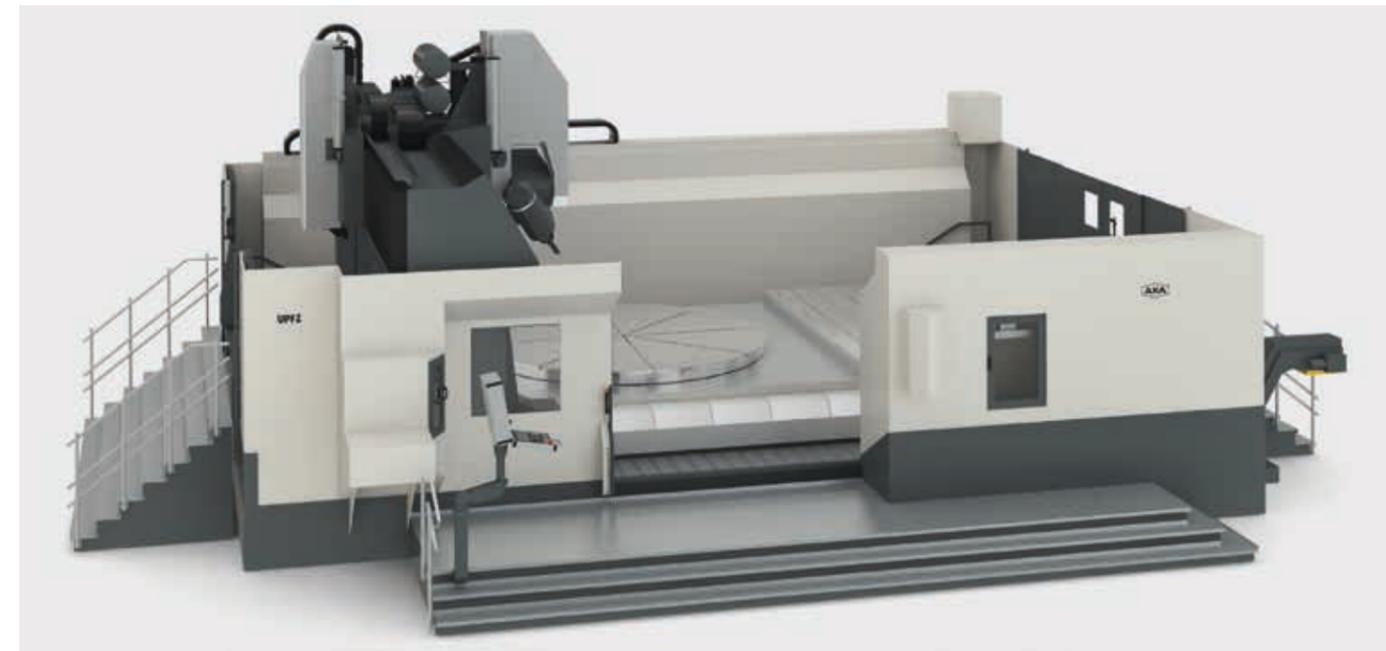
UPFZ – With safety for your factory!



An extraction system directly on the vertical Z-slides can already remove a part of the fumes generated



Ring machining with large gantry column machine combined with a rotary table



The combined milling and turning operation of workpieces is possible in one setting when using additional auxiliary turning equipment

## Machining on NC-rotary table

Adding an NC-rotary table for large, rotation-symmetric workpieces to the gantry machining centre enables further machining processes

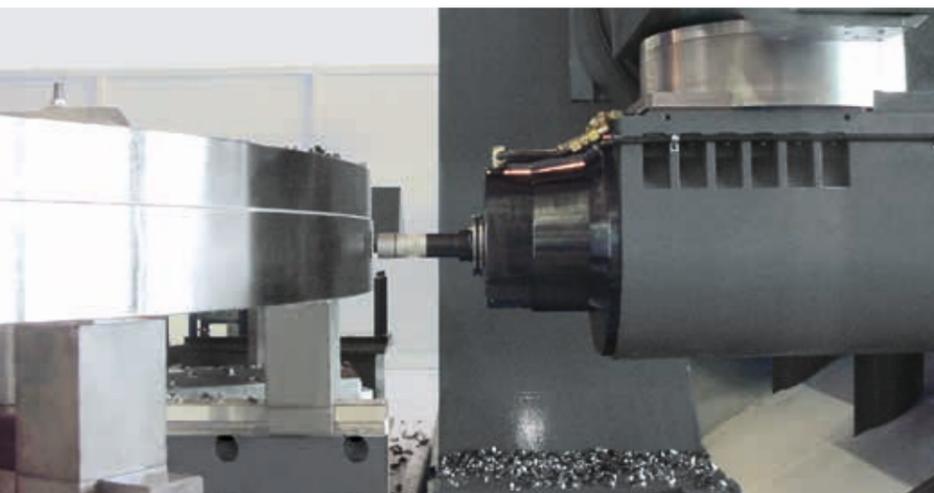
in just one setting. This increases machine flexibility and productivity and reduces unpopular auxiliary process times and sources of error

by changing and setting workpieces.

The 2-axis tilting head multiplies the possibilities thanks to horizontal and inclined milling and drilling. Immersing the working spindle into the part for inner machining of the rings is even possible for large workpieces. Additional angle heads for inner machining can be implemented to machine smaller ring diameters. Complete machining has now become reality.

A firm and secure hold of the workpieces is thus an important factor for perfect results. Regardless, whether mechanical, hydraulic or magnetic: We find the correct clamping technology and hold your workpiece firmly in place.

UPFZ – An all-round solution!



Horizontal ring machining with 2-axis tilting head and a rotary table

## Additional auxiliary turning equipment

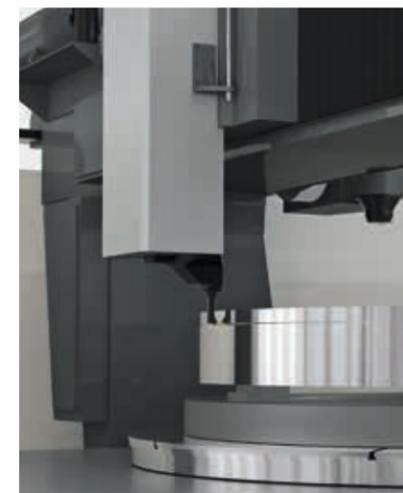
Combined milling and turning operation is possible with the gantry machining centre together with optional additional auxiliary

turning equipment. A fast turning rotary table is integrated here that either supports or replaces the fixed machine tables. A further guideway

system for a second vertical Z-slide, implemented with a turning tool holder in CAPTO C6, is mounted on the gantry backside to hold the turning tools. The separate clamping unit for turning tools ensures utmost stability, clear orientation of the turning tools and at the same time avoids further stress on the main spindle bearing. Alongside the standard tool magazine for drilling and milling tools, a further independent tool magazine for turning tools can be integrated into the working area.

Adapting the complete machine covering into the corresponding security requirements goes without saying in this specially designed construction.

UPFZ – Unites flexibility and individuality!



An additional cross support with Y-Z-axis and CAPTO C6 tool holder for the turning operation



2-axis tilting head for milling and drilling as standard

## Individual solutions

### UPFZ as pallet machine

Large and complex components with long set-up and machining times are just the right job for the UPFZ with pallet table – designed especially to master such tasks, making use of the general standard machine construction. However, the clamping table is no longer firmly positioned. It can move out of the

machining station for set-up along the guideway system. The machining centre is in the middle that can be loaded alternatively by both loading and unloading stations on the machine left-hand side and right-hand side with both moving machine tables. Continuous machine operation is thus guaranteed.

The basic machining centre is housed in a cabin as complete machining station. Both freely accessible loading and unloading areas in front and behind the machine offer enough space for necessary set-up work on the pallets, thus reducing time loss here to a minimum.



Cabin sectional view of the UPFZ machining station with pallet table



UPFZ as pallet machine with machining station in the middle and a loading and unloading station in front and behind the machine centre



Gantry machining centre UPFZ in special design without machine table and complete covering with front-facing doors

### UPFZ without machine table

For much larger and solid workpieces, AXA has developed the UPFZ without machine table. Necessary water drains, clamping possibilities as well as the covering have been directly integrated into the machine foundation and built upon this.

Additional doors at the machine front side offer enough space to roll the workpieces into the workspace without having to lift the parts. In addition to this, the machine height without machine table is much less. Side-mounted sliding doors give the machine operator an excellent view of the entire work in progress.

UPFZ – Unites flexibility and individuality!



Side-mounted door with good view of entire work process

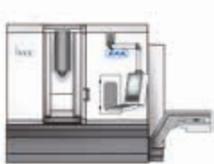
# Product overview

## VCC DBZ

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

X-travel:	720 - 1200 mm 2 x 750 / 2 x 900 mm
Y-travel:	500 - 600 mm
Z-travel:	600 mm
Tool holder:	SK40 / HSK-A63
Spindle power:	20 - 40 kW

## VCC



## DBZ



## VSC VHC

**Moving 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
Tool holder:	SK40/50 / HSK-A63/A100
Spindle power:	20 - 57 kW

## VSC



## VHC

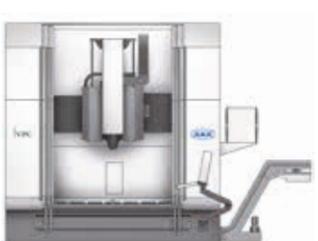


## VPC VPC-U

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

X-travel:	2360 - 3000 mm
Y-travel:	1200 - 1600 mm
Z-travel:	500 - 900 mm
Tool holder:	SK40/50 / HSK-A63/A100
Spindle power:	20 - 57 kW

## VPC



## VPC-U

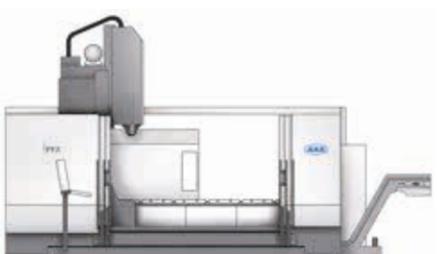


## PFZ UPFZ

**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
Tool holder:	SK40/50 / HSK-A63/A100
Spindle power:	20 - 57 kW

## PFZ



## UPFZ



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