

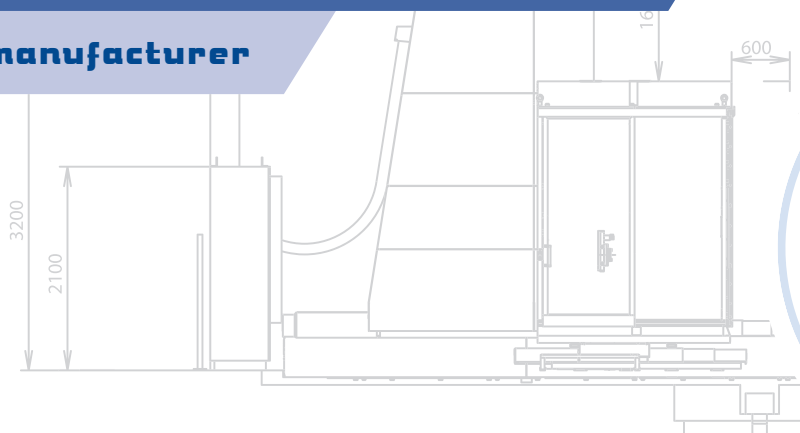
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PRODUCTION PROGRAMME

TOS VARNSDORF a.s.

Milling machine manufacturer





52.9 mil €

Annual turnover
in 2016

30

Located on a site
larger than
30 Football Pitches

481

Number
of employees

1903

The company
was established
in 1903

10

10 subsidiaries
companies around
the world

19,494

Machines sold
between 1941 and 2016

0.01

Machine accuracy
in the order of hundreds
of a millimeter

Table-type machines

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References**TOS Olomouc**

Horizontal table-type boring machines

Horizontal table-type WH 10 CNC, WH(Q) 105 machines
The CNC, WHN 110/130 (Q, MC), WHN(Q) 13 CNC, WHR
13 Q and MAXIMA are milling and boring machines with
a cross-arrangement of the beds. The machines are on
top-class technical level corresponding to the needs of
modern progressive technology. The machines' design

offers a wide choice of versions in all parameters, thus
allowing the customer to choose the optimum version.
The horizontal table-type machines offer effective
machining with a great cutting performance and high
precision. They are built for demanding customers, who can
apply very demanding technological procedures.

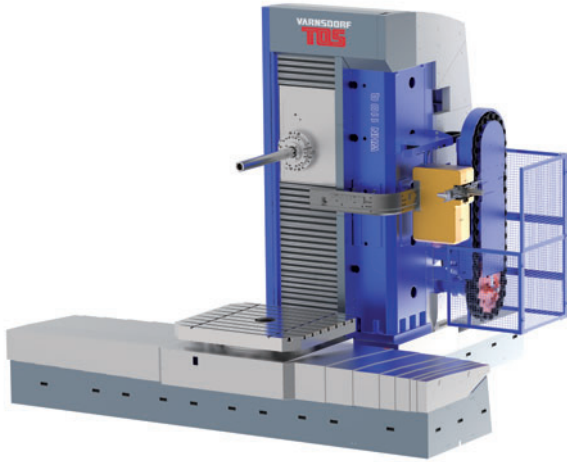




WH 10 CNC



WH(Q) 105 CNC



WHN 110 / 130 (Q, MC)



WHN(Q) 13 CNC



WHR 13 (Q)



MAXIMA

WH 10 CNC



WH 10 CNC is a horizontal table-type boring machine with travelling work spindle 100 mm in diameter and maximum weight capacity of the table 3000 kg. This is the smallest machine in the TOS VARNSDORF range.

The optimally dimensioned structure from grey cast-iron consists of a Fixed Column and a longitudinal bed with a cross moving Rotary Table. Thanks to a rigid structure excellently absorbing vibrations, sufficiently dimensioned drives and accurate guides, the machine is designed for universal cutting operations of Prismatic parts, light workpieces from cast iron, cast steel and steel including technologically demanding operations.

The machine can be extended by special equipment, peripheral devices and special technological equipment (e.g. guide supports, facing head, milling heads, chucking equipment, etc.).



Machine configuration

- WH 10 CNC – The machine with a traveling spindle and a rotatory table is fully continuously driven in four axes (X, Y, Z, W), the table is rotated by a CNC positioner (B).

TECHNICAL PARAMETERS

Headstock

Work spindle diameter	mm	100
Spindle taper		ISO 50
Work spindle speed range	1/min	10 – 2 500
Rated output of main motor S1 / S6	kW	20 / 25
Rated torque on spindle S1 / S6	Nm	1 640 / 2 050
Spindle stroke W	mm	710

Column

Vertical spindle adjustment Y	mm	1 100
Longitudinal table adjustment Z	mm	940

Rotational table

Crosswise table adjustment X	mm	1 250
Max. workpiece weight	kg	3 000
Optional table size	mm	1 000 x 1 120

Feeds

Feed range – X, Y, Z, W	mm/min	4 – 8 000
Rapid traverse – B	1/min	2
Rapid traverse – X, Y, Z, W	mm/min	8 000

R 2,014



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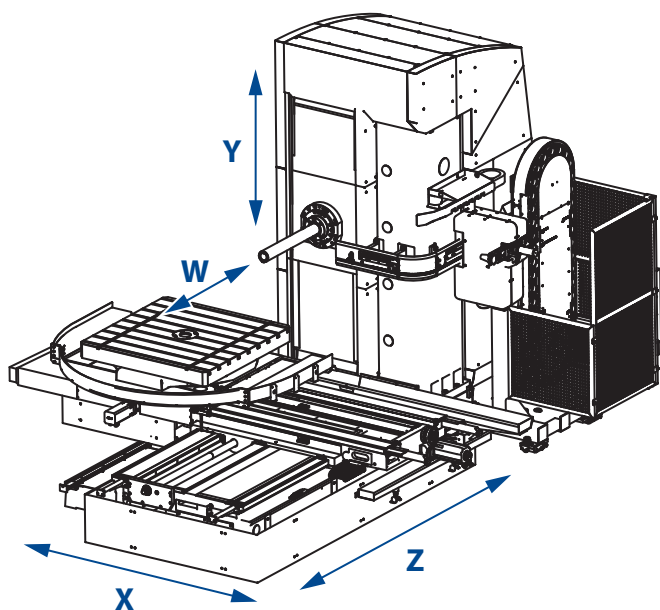
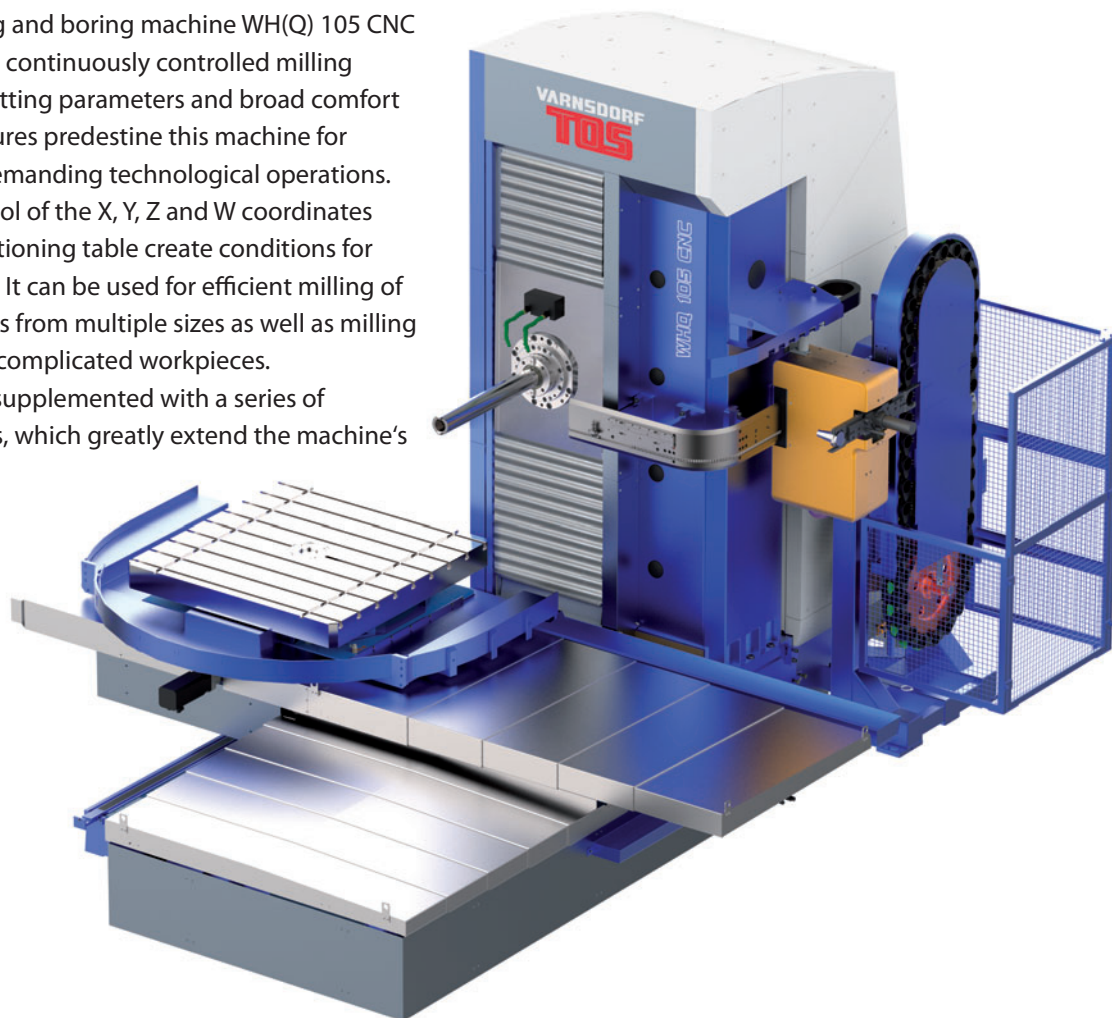
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WH(Q) 105 CNC

The horizontal milling and boring machine WH(Q) 105 CNC is a modern, efficient, continuously controlled milling machine. The high cutting parameters and broad comfort of technological features predestine this machine for application in very demanding technological operations. The continuous control of the X, Y, Z and W coordinates and the rotating positioning table create conditions for universal application. It can be used for efficient milling of box-type components from multiple sizes as well as milling of moulds and other complicated workpieces. The machine can be supplemented with a series of technological devices, which greatly extend the machine's potentialities.



Machine configuration

- WH 105 CNC – basic version of the machine
- WHQ 105 CNC – version with an automatic tool change
- Machine with the „N“ headstock – suitable for power milling operations
- Machine with the „R“ headstock – suitable especially for high-performance milling operations
- Machine with the „R4“ headstock – high-speed version of headstock up to 4,000 rpm

TECHNICAL PARAMETERS

Spindle type		„N“	„R“	„R4“
Work spindle diameter	mm	105	105	105
Spindle taper			ISO 50	
Work spindle speed range	1/min	10 – 2 300	10 – 3 300	10 – 4 000
Main motor output (S1 / S6 – 60%)	kW		28 / 35	
Rated torque on spindle (S1 / S6 – 60%)	Nm	1 170 / 1 462		919 / 1 148
Max. torque on spindle (S6 – 60%)	Nm	1 462		1 148
Spindle stroke W	mm		630	
Column				
Vertical spindle adjustment Y	mm		1 250, 1 600	
Minimum height of spindle axis above work table	mm		0	
Table Loading				
Max. workpiece weight	kg		5 000 / 3 000	
Table clamping surface	mm		1 400 x 1 400, 1 400 x 1 600	
Longitudinal table adjustment Z	mm		1 250	
Crosswise table adjustment X	mm		1 800 / 2 000*	
Feeds				
Feed range – X, Y, Z, W	mm/min		5 – 5 000	
Rapid traverse – X, Y, Z	mm/min		10 000	
– W	mm/min		8 000	
– B	1/min		2	

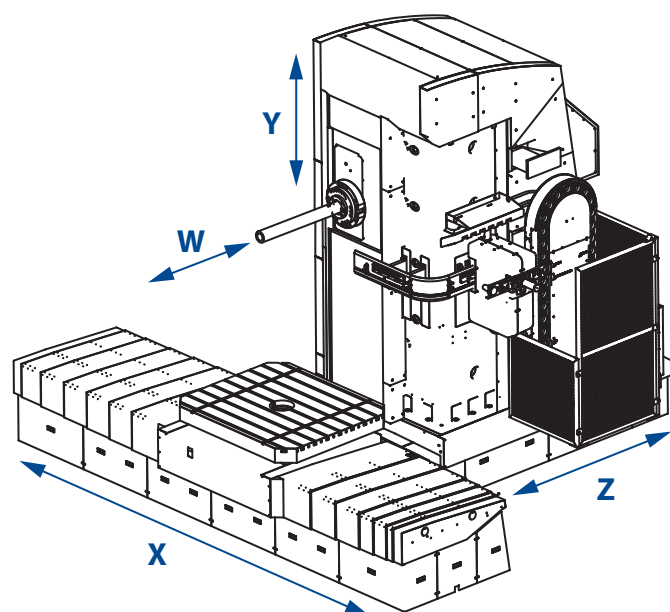
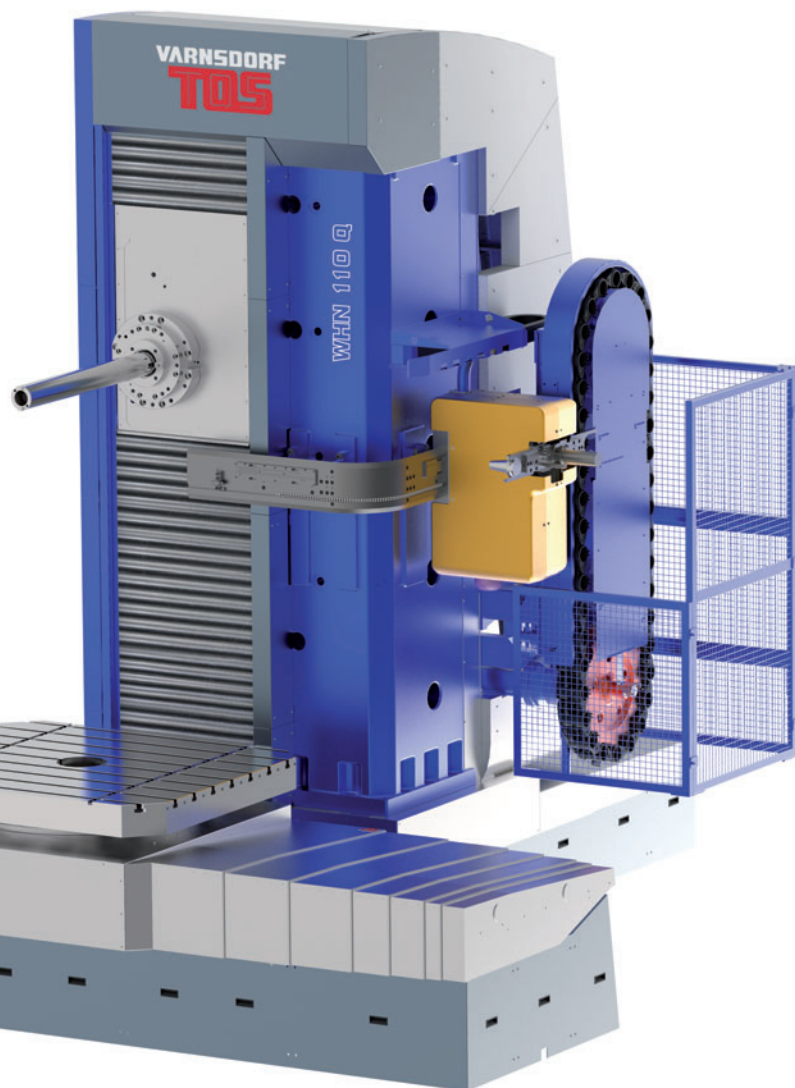
* max. workpiece weight 3 000 kg



WHN 110/130 (Q, MC)

The WHN 110 / 130 (Q, MC) milling and boring machines are powerful, efficient representatives of the TOS VARNSDORF a.s. advanced generation, which responds to the needs of modern progressive technology.

The machines are produced in a cross arrangement of the beds, with a longitudinally adjustable stand, a traversing spindle and cross-wise adjustable rotary table.



Machine configuration

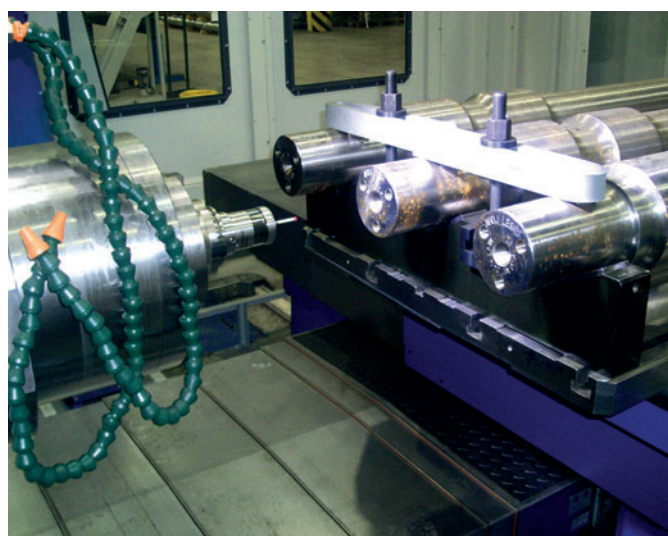
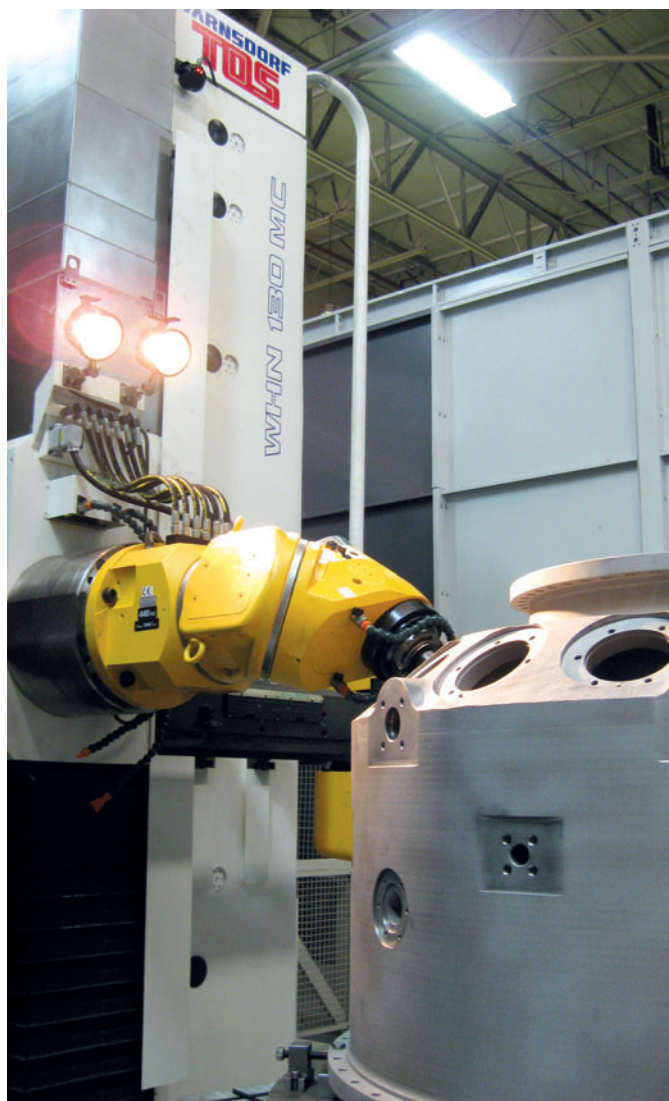
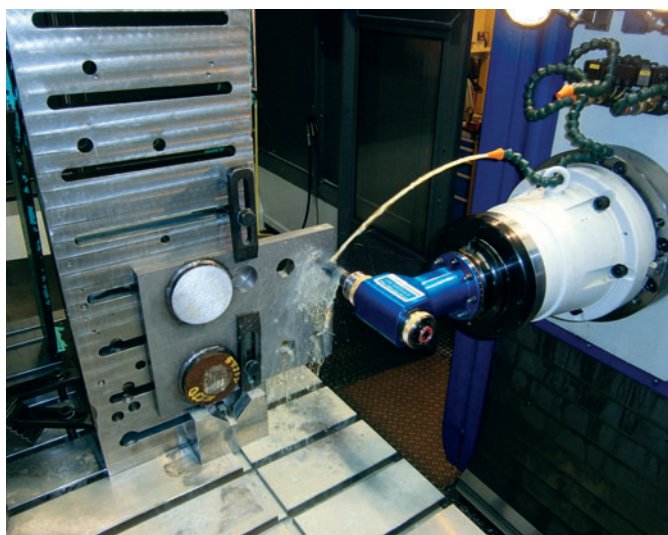
- WHN 110 – machine with spindle diameter 112 mm
- WHN 130 – machine with spindle diameter 130 mm
- WHN 110/130 – basic version
- WHN 110/130 Q – version with an automatic tool change
- WHN 110/130 MC – version with an automatic palette change
- 5 continuously controlled axes (X, Y, Z, W and B)

TECHNICAL PARAMETERS

Machine type		WHN 110 (Q, MC)		WHN 130 (Q, MC)	
Headstock		„N“	„N/R“	„N“	„N/R“
Work spindle diameter	mm	112		130	
Spindle taper		ISO 50 / ISO 50 BIG+			
Work spindle speed range	1/min	10 – 2 800	10 – 3 300	10 – 2 500	10 – 3 000
Main motor output (S1 / S6 – 60%)	kW	37 / 46			
Torque on spindle (S1 / S6 – 60%)	Nm	2 110 / 2 623	1 457 / 1 811	2 480 / 3 083	1 622 / 2 017
Spindle stroke W	mm	710		800	
Column					
Vertical spindle adjustment Y					
– version with normal work table	mm	1 250, 1 400, 1 600		1 600, 2 000, 2 500	
– version with technological palette	mm	1 120, 1 250, 1 400		1 400, 1 800, 2 240	
Minimum height of spindle axis above work table / Pallet Changer	mm	50 / 0			
Longitudinal column adjustment Z	mm	800, 1 000, 1 250		1 000, 1 250, 1 600, 2 000	
Rotary table					
Max. workpiece weight	kg	8 000		12 000	
Table attachment area	mm	1 250 x 1 400, 1 400 x 1 600, 1 400 x 1 800		1 600 x 1 800, 1 800 x 2 240	
Crosswise table adjustment X	mm	1 600, 2 000, 2 500, 3 000		2 000, 2 500, 3 000, 3 500, 4 000	
Automatic palette exchange					
Max. workpiece weight	kg	5 000		8 000	
Palette attachment area	mm	1 250 x 1 400, 1 250 x 1 600		1 600 x 1 800	
Number of Pallets in the system		2		2	
Total period of automatic palette change	sec	85		85	
Feeds					
Feed range – X, Y, Z, W	mm/min	1 – 6 000			
Feed range – B	1/min	0,003 – 1,5			
Rapid traverse – X, Y, Z, W	mm/min	10 000			
– B	1/min	2,5		2	



WHN 110/130 (Q, MC) – Technological examples





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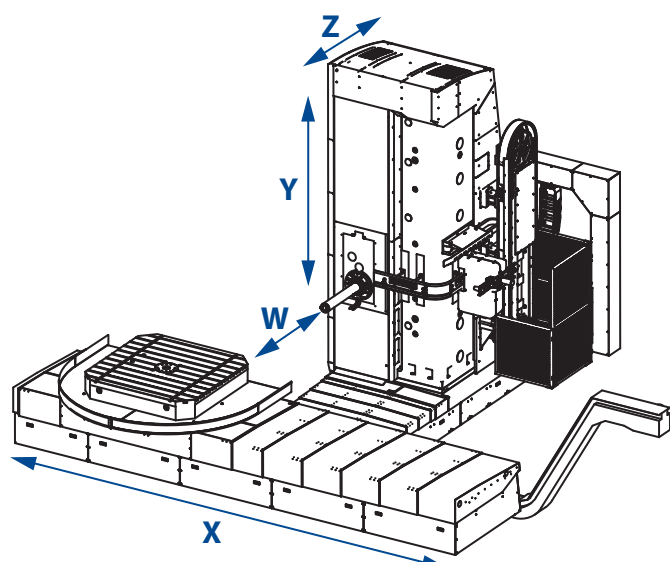
WHN(Q) 13/15 CNC

The horizontal milling and boring machine WHN(Q) 13/15 CNC is a universal machine designed for precise milling, line-coordinate drilling, boring and thread-cutting of box- and board-type workpieces as well as complicated workpieces from cast-iron, steel cast-iron and steel with the weight of up to 25,000 kg.

WHN(Q) 13/15 CNC is the most successful machine from the company production. The first model of the machine was produced in 1969. The success of this machine can be documented by the fact that almost 2,500 of these machines have been made up to now.

It particularly excels in the ratio between capacity and the purchasing costs. The users value the structure of the machine, which guarantees high rigidity and

reliability as well as high technical parameters and a broad range and comfort of the technological features. The machine can be supplemented with a series of options, which greatly extend the machine's potentialities.



Machine configuration

- WHN 13/15 CNC – basic version of the machine
- WHQ 13/15 CNC – version with an automatic tool change
- WHQ 13/15 MC – the machine has a character of a machining centre Tool and Pallet change
- The WHN(Q) 13/15 CNC machines are equipped with work spindle diameter 130 mm or 150 mm
- 5 continuously controlled axes (X, Y, Z, W and B)

TECHNICAL PARAMETERS

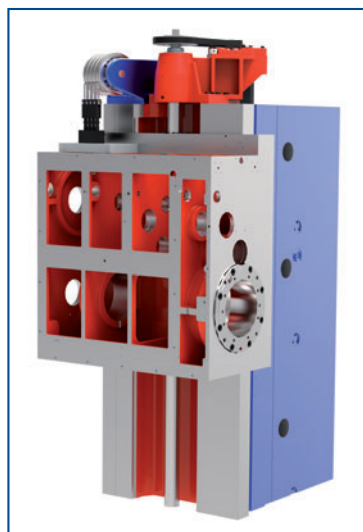
Headstock		„R“	„N“	„15“
Work spindle diameter	mm	130	130	150
Spindle taper		ISO 50 / ISO 50 BIG+		
Work spindle speed range	1/min	10 – 3 000	10 – 1 500	10 – 3 000
Rated output of main motor S1 / S6	kW	37 / 46		46 / 55
Rated torque on spindle S1 / S6	Nm	2 502 / 3 111	3 322 / 4 132	3 100 / 3 720
Spindle stroke W	mm	800		900
Column				
Vertical spindle adjustment Y	mm	2 000, 2 500, 3 000, 3 500		
Longitudinal column adjustment Z	mm	1 250, 1 600, 2 200, 3 200		
Rotational table				
Crosswise table adjustment X	mm	3 500, 4 000, 5 000, 6 000		
Max. workpiece weight	kg	12 000 / 16 000 / 18 000 / 25 000		
Optional table sizes	mm	1 800 x 1 800 / 1 800 x 2 200 / 1 800 x 2 500 2 000 x 3 000 / 2 500 x 3 000		
Feeds				
Feed range – X, Y, Z	mm/min	4 – 5 000 (8 000)		
Feed range – W	mm/min	4 – 5 000		
Feed range – B	1/min	0,003 – 1,5		
Rapid traverse – Y, Z	mm/min	10 000 (12 000)		
Rapid traverse – W	mm/min	10 000		
– X = 3,500 mm (capacity 12,000 kg)	mm/min	10 000 (12 000)		
– X = 3,500 mm (other tables)	mm/min	8 000		
– X = 4 000, 5 000, 6 000 mm	mm/min	8 000		
– B capacity 12,000 kg / other tables	1/min	2 / 1,5		



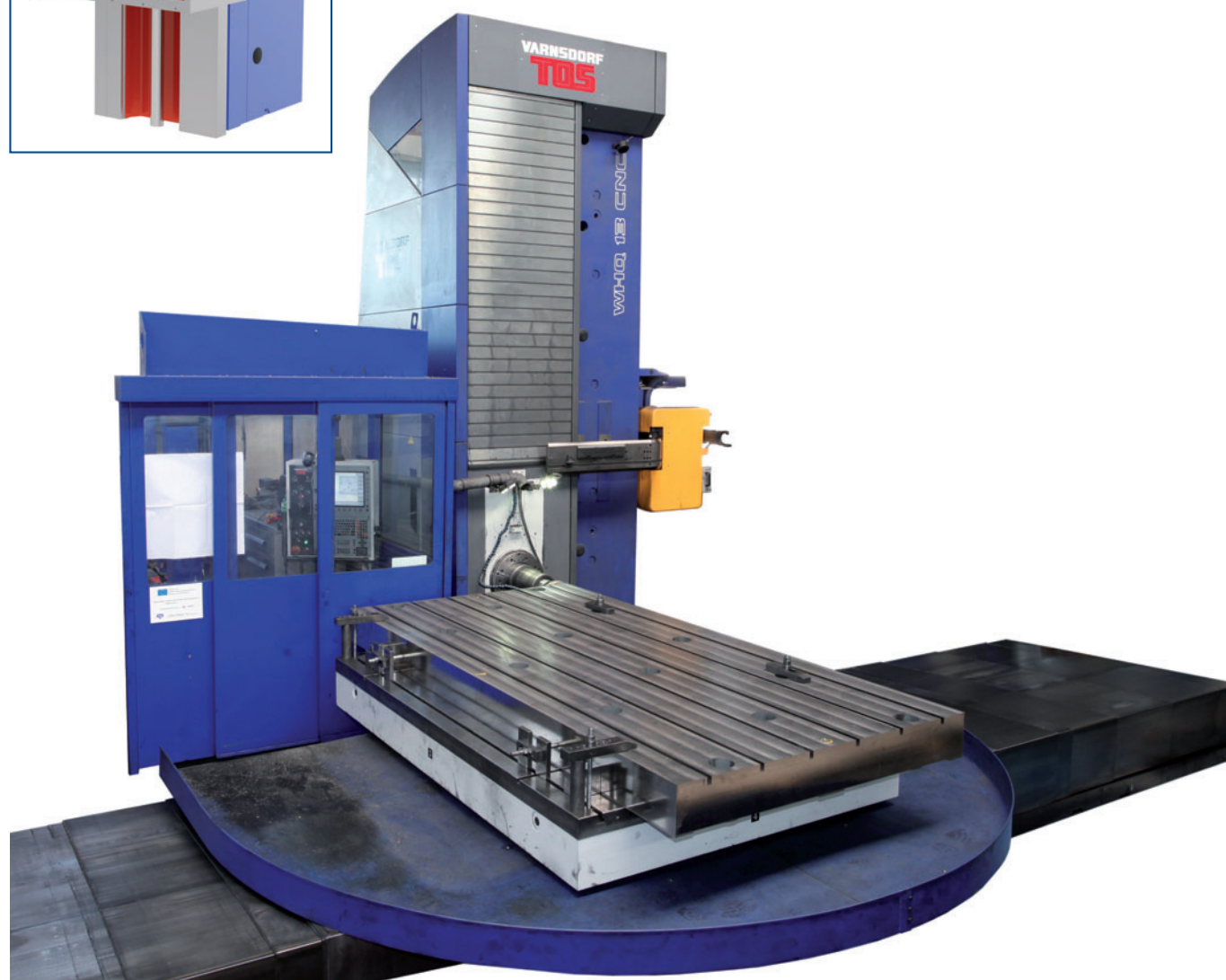
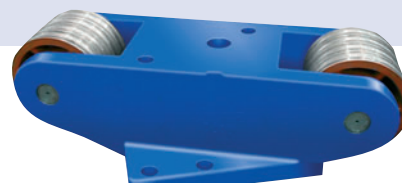
WHN(Q) 13/15 CNC

Headstock

The Headstock contains the Spindle drive motor and Gearbos together with the W axis drive system. The travelling work spindle is nitrided, housed with a minimum allowance in an all-nitrided hollow spindle, which is housed in a set of highly precise pre-stressed bevel bearings. The spindle speed is controlled in two mechanical rows automatically engaged by a hydraulic circuit. For more information see page 72.

**Headstock Counterbalance**

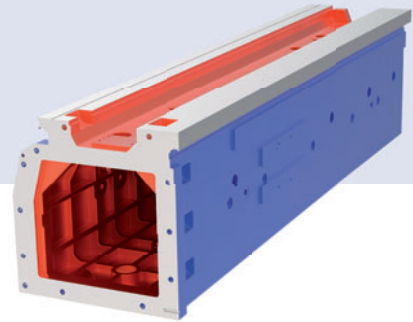
The spindle weight is balanced by a counter-weight suspended on cables and conducted in the stand.



WHN(Q) 13/15 CNC

Stand

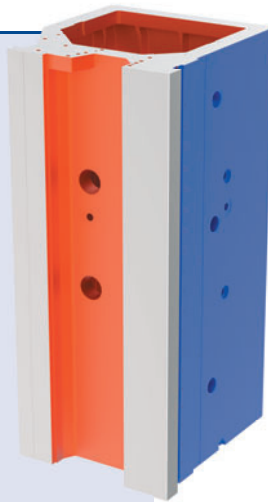
The basic part of the WHN(Q) 13/15 CNC machines are made of high-quality grey cast-iron made in the Czech Republic, which forms a cast-iron skeleton. The structure and the ribbing of the frame guarantee high rigidity.



Guides of adjustable groups

Guides of all linear groups are sliding. The guide surfaces are laser-hardened. Hardened steel bars on guide surfaces are installed under friction bearings and otherwise loaded areas. Matching areas are treated with a sliding material with a low friction coefficient. In addition, the table rails are eased by four friction units.

Guides on the bed are protected against dirt by telescopic guards, guide surfaces of the column are protected by bellows covered by steel plates. The table is housed in a peripheral slide guide and a friction bearing in the centre.



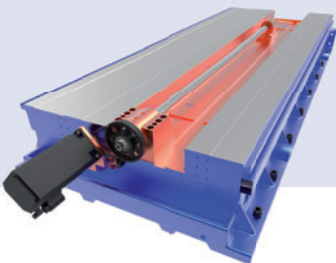
Revolving attachment table

It is equipped with a rotation sensor, which allows automatic positioning of the table with an increment of 0.001°. After reaching the target position, the table is automatically fixed. The rotation is driven by a motor with gear to one of two sprockets, which mesh in the ring gear of the table.



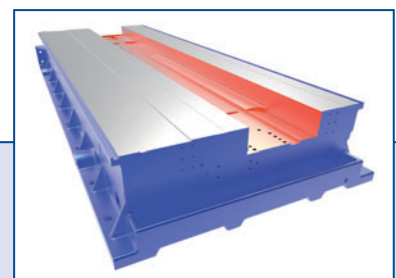
Drives of travel units

The travel units are driven by digitally controlled AC servo drives Siemens. To reach higher travel forces, an allowance-free gear is inserted between the servo drive and the ball screw.



The bed

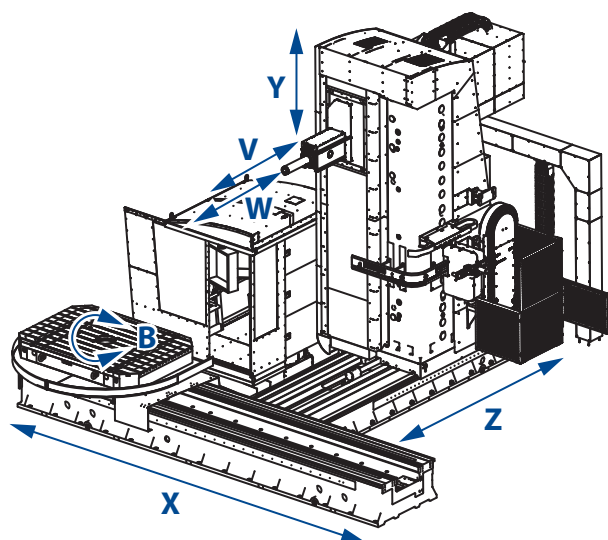
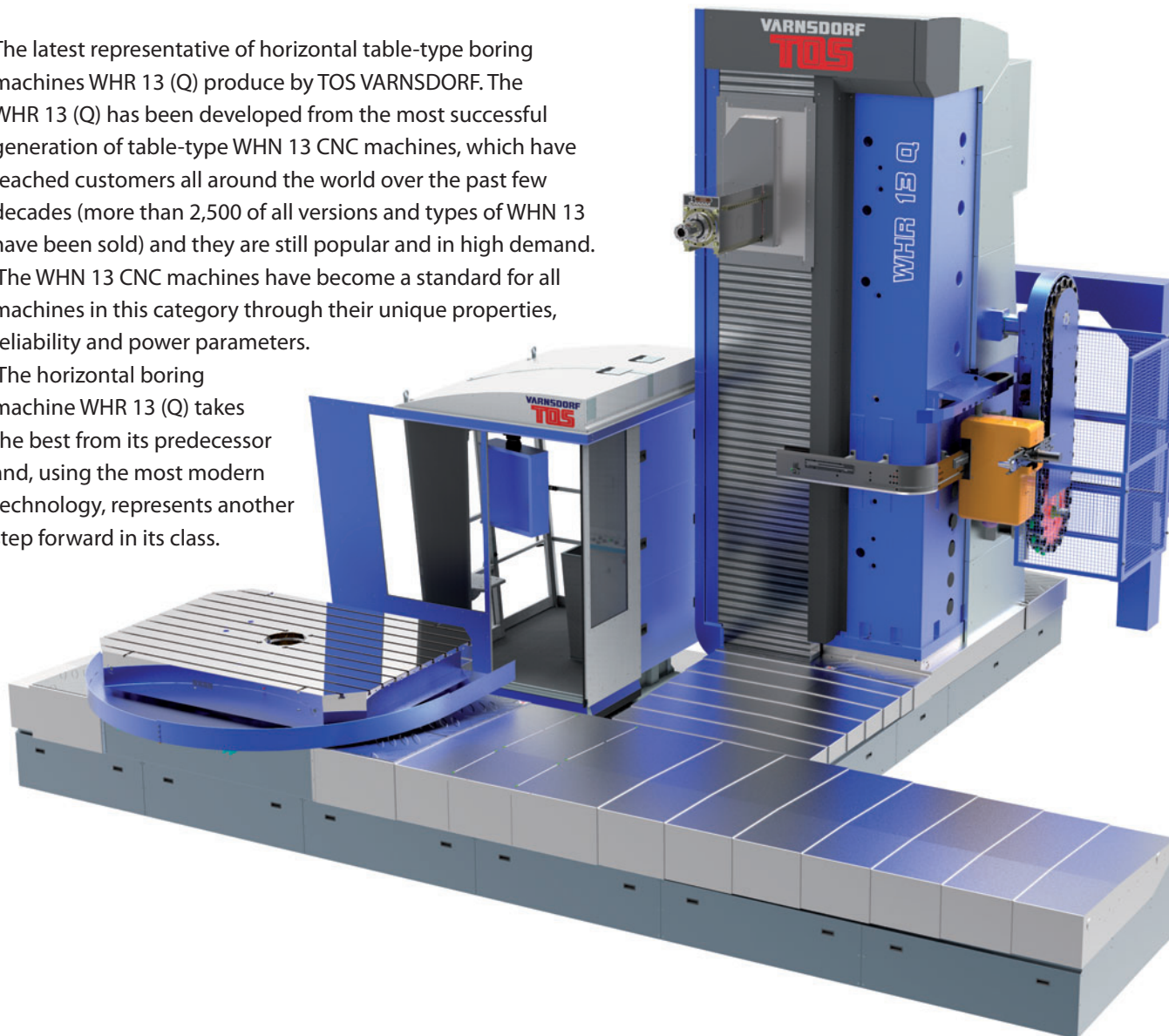
We use the GG 25 cast iron for production of the support sections because of high demands for vibration absorption in the horizontal boring machines. High rigidity of an optimally dimensioned cast-iron frame guarantees high efficiency and productivity of the milling machine while securing top geometrical accuracy of the workpiece.



WHR 13 (Q)

The latest representative of horizontal table-type boring machines WHR 13 (Q) produce by TOS VARNSDORF. The WHR 13 (Q) has been developed from the most successful generation of table-type WHN 13 CNC machines, which have reached customers all around the world over the past few decades (more than 2,500 of all versions and types of WHN 13 have been sold) and they are still popular and in high demand. The WHN 13 CNC machines have become a standard for all machines in this category through their unique properties, reliability and power parameters.

The horizontal boring machine WHR 13 (Q) takes the best from its predecessor and, using the most modern technology, represents another step forward in its class.



Machine configuration

- WHR 13 – basic version of the machine
- WHR 13 (Q) – version with an automatic tool change
- WHR 13 MC – machine adapted to automatic palette change
- The WHR 13 (Q) machines are equipped with a work spindle diameter 130 mm and 6 continuously controlled axes (X, Y, Z, W, V and B)

TECHNICAL PARAMETERS

Headstock

Work spindle diameter	mm	130
Spindle taper		ISO 50 / ISO 50 BIG+
Work spindle speed range	1/min	10 – 3 000
Rated output of main motor S1 / S6	kW	37 / 46
Rated torque on spindle S1 / S6	Nm	2 537 / 3 111
Spindle stroke W	mm	650
RAM stroke V	mm	700

Column

Vertical spindle adjustment Y	mm	2 000, 2 500, 3 000
Longitudinal column adjustment Z	mm	1 250, 1 600, 2 200, 3 200

Rotational table

Crosswise table adjustment X	mm	3 500, 4 000, 5 000, 6 000
Max. workpiece weight	kg	12 000 / 16 000 / 18 000 / 25 000
Optional table size	mm	1 800 x 1 800 / 1 800 x 2 200 / 1 800 x 2 500 2 000 x 3 000 / 2 500 x 3 000

Feeds

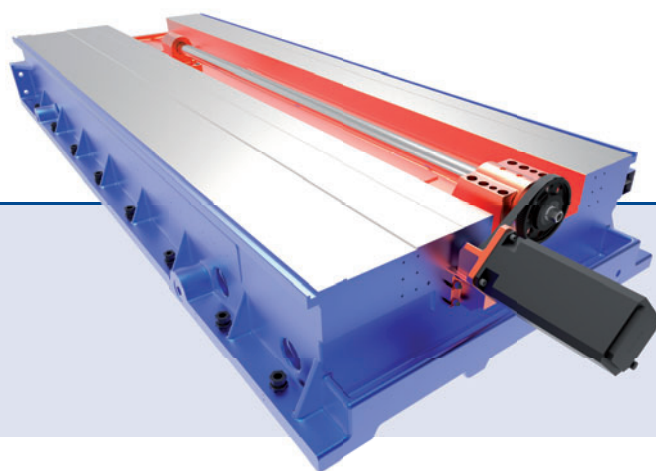
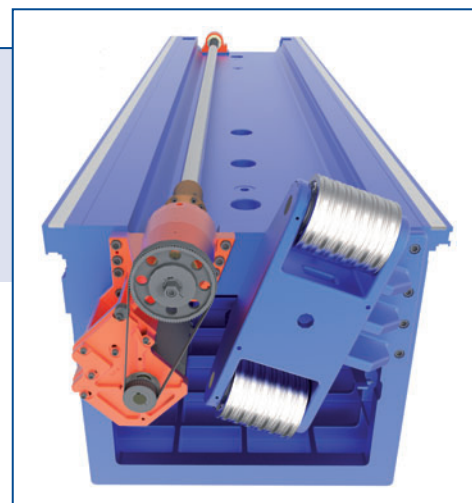
Feed range – X	mm/min	4 – 5 000 (8 000)
Feed range – Y, Z, W, V	mm/min	4 – 5 000
Feed range – B	1/min	0,003 – 1,5
Rapid traverse – Y, Z, W, V	mm/min	10 000
– X = 3,500 mm (capacity 12,000 kg)	mm/min	10 000 (12 000)
– X = 3,500 mm (other tables)	mm/min	8 000
– X = 4 000, 5 000, 6 000 mm	mm/min	8 000
– B capacity 12,000 kg / other tables	1/min	2 / 1,5



WHR 13 (Q)

Column

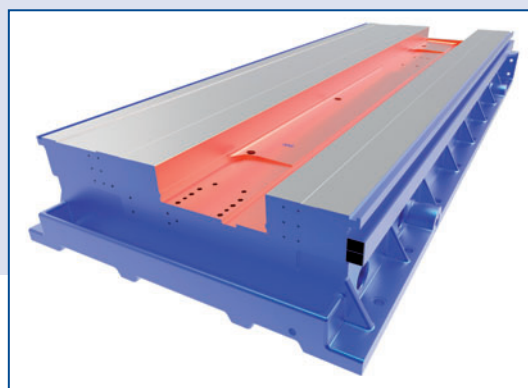
The basic part of the machine frames made by TOS VARNSDORF are of high-quality grey cast-iron made in the Czech Republic, which forms a cast-iron skeleton. The structure and the ribbing of the frame guarantee high rigidity.

**Drives of traverse units**

The traverse units are driven by digitally controlled AC servo drives Siemens. To reach higher travel forces, an allowance-free gear is inserted between the servo drive and the ball screw.

The bed

We use the GG 25 cast iron for production of the support sections because of high demands for vibration absorption in the horizontal boring machines. High rigidity of an optimally dimensioned cast-iron frame guarantees high efficiency and productivity of the milling machine while securing top geometrical accuracy of the workpiece.

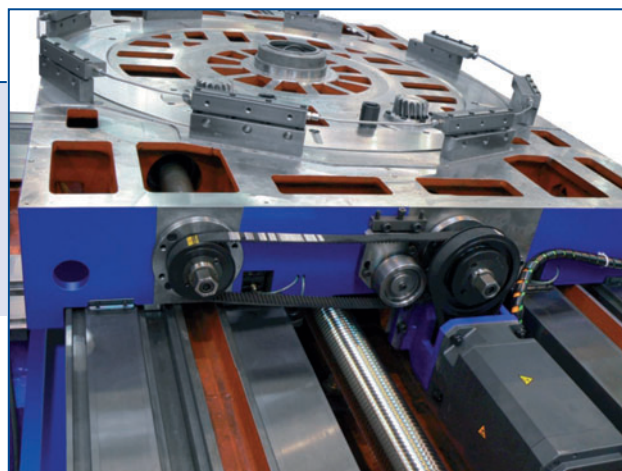
**Automatic palette change**

The WHR 13 (Q) machine can be equipped with automatic palette change; for more information see page 54.

WHR 13 (Q)

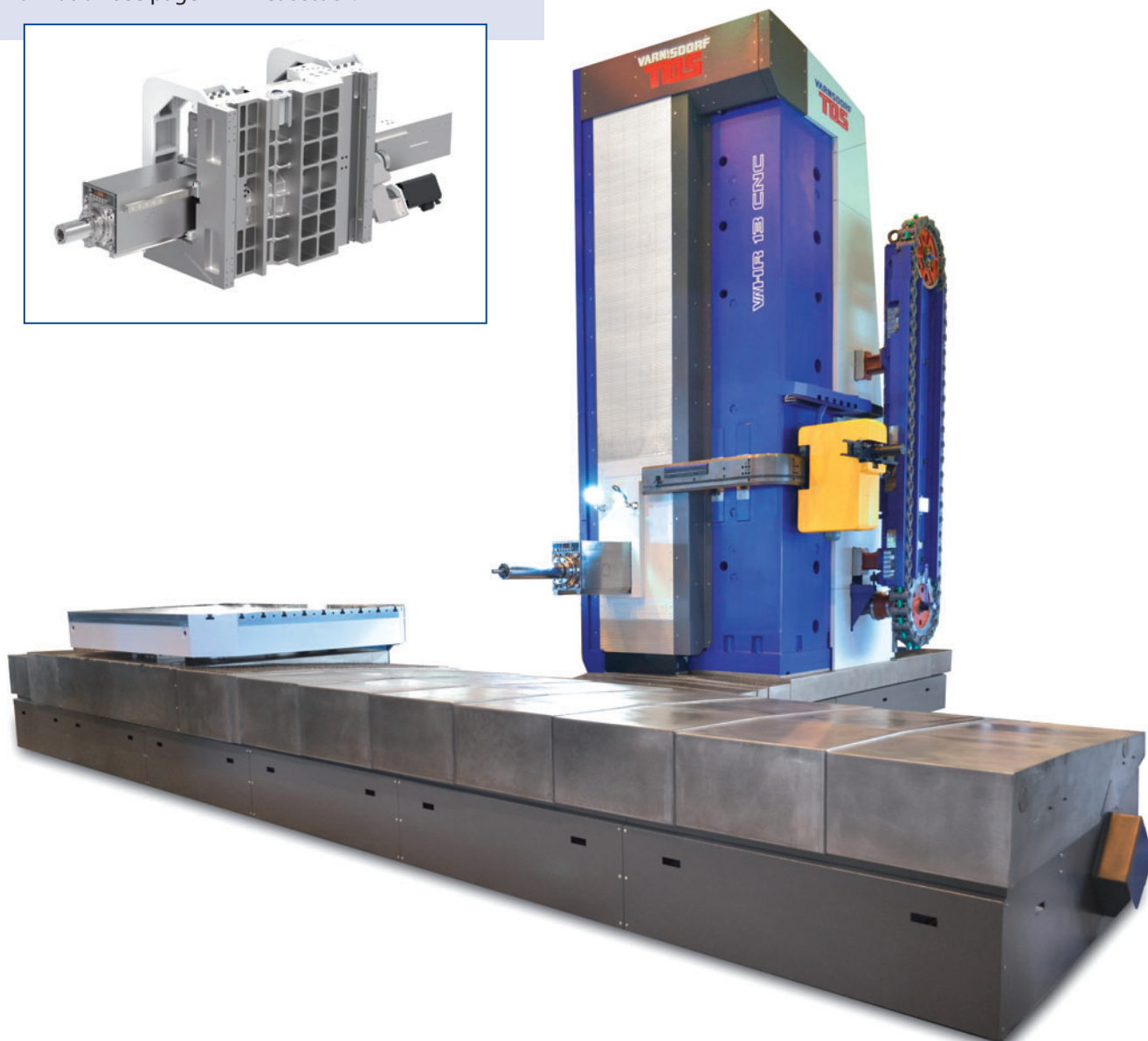
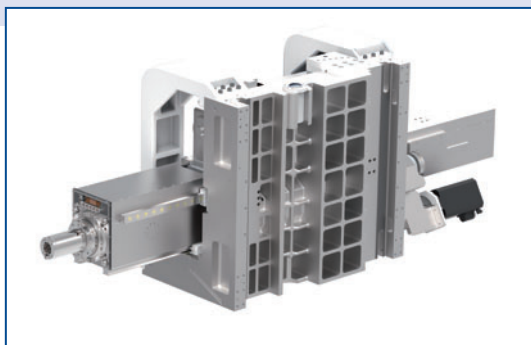
Rotating attachment table

It is equipped with a rotation sensor, which allows automatic positioning of the table with an increment of 0.001° . After reaching the target position, the table is automatically fixed.



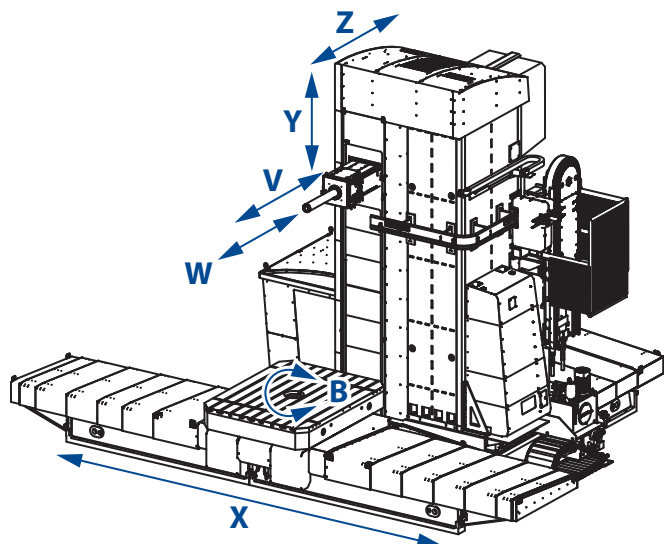
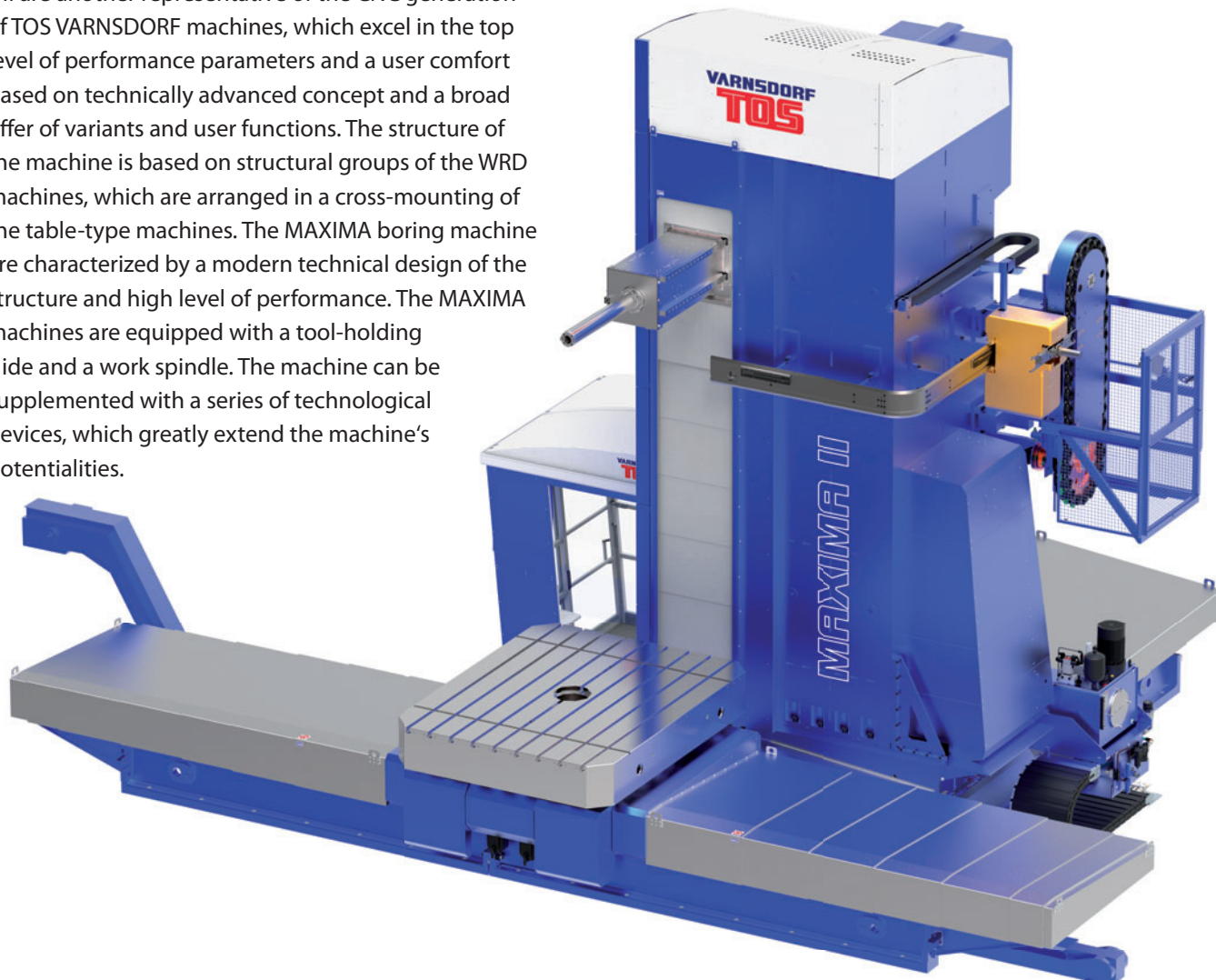
Headstock

The main casing is a rigid gray iron casting of L shape which is directly integrated lines for ram. For more information see page 72 – Headstock.



MAXIMA

The horizontal table-type boring machines MAXIMA I, II are another representative of the CNC generation of TOS VARNSDORF machines, which excel in the top level of performance parameters and a user comfort based on technically advanced concept and a broad offer of variants and user functions. The structure of the machine is based on structural groups of the WRD machines, which are arranged in a cross-mounting of the table-type machines. The MAXIMA boring machine are characterized by a modern technical design of the structure and high level of performance. The MAXIMA machines are equipped with a tool-holding slide and a work spindle. The machine can be supplemented with a series of technological devices, which greatly extend the machine's potentialities.

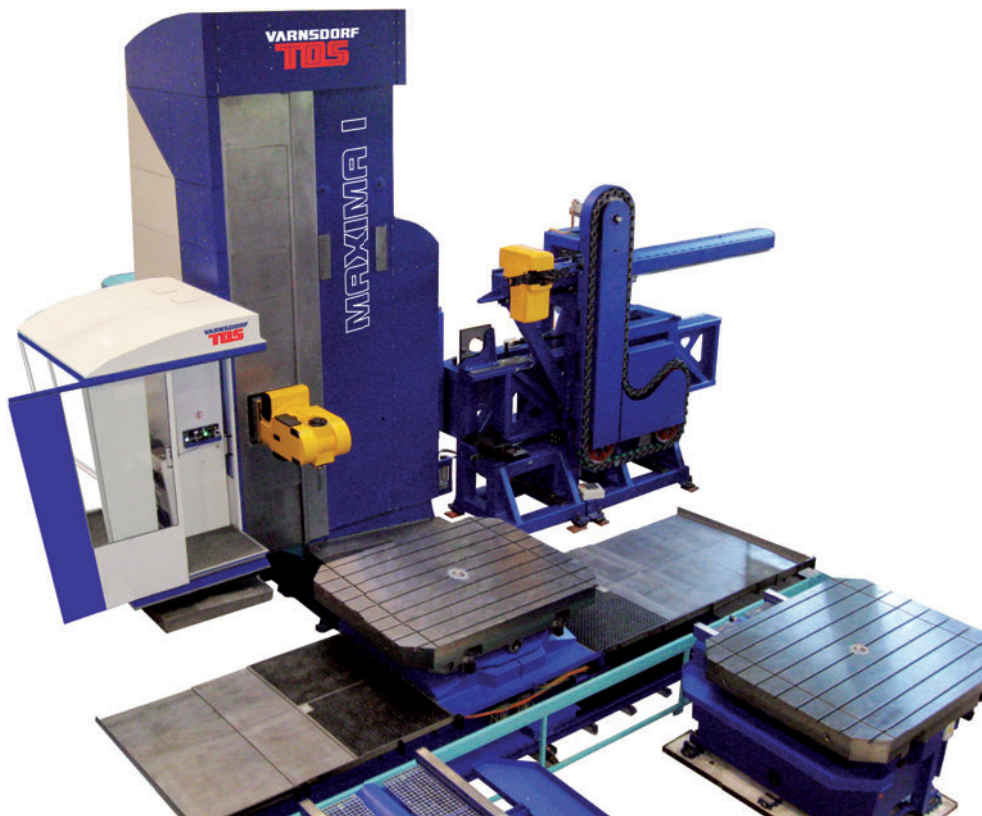


Machine configuration

- basic version of the machine
- version with an automatic tool change
- version with an automatic palette change
- MAXIMA I: machine with spindle diameter 130 mm
- MAXIMA II: machine with spindle diameter 150 mm
- 6 continuously controlled axes (X, Y, Z, W, V and B)

TECHNICAL PARAMETERS

Machine type		MAXIMA I	MAXIMA II
Work spindle diameter	mm	130	150
RAM size	mm	450 x 450	
Spindle taper		ISO 50 / ISO 50 BIG+	
Work spindle speed range	1/min	10 – 3 000	10 – 2 500 (2 800)
Main motor output (S1 / S6 – 60%)	kW	37 / 46	51 / 65
Rated torque on spindle (S1)	Nm	2 535 / 3 152	2 460 / 3 138
RAM stroke V	mm	1 000	1 000
Spindle stroke W	mm	700	800
Column			
Vertical spindle adjustment Y	mm	2 000 – 4 500	
Longitudinal column adjustment Z	mm	1 500, 2 000, 2 500	
Table			
Optional table size	mm	2 000 x 2 000, 2 000 x 2 500, 2 500 x 3 000	
Max. workpiece weight	kg	30 000	
Crosswise table adjustment X	mm	3 000, 4 000, 5 000, 6 000	
Feeds			
Feed range – X, Y, Z, V, W	mm/min	1 – 8 000	
Feed range – B	1/min	0,003 – 1,5	
Rapid traverse – X, Y, Z, V	mm/min	16 000	
– W	mm/min	12 000	
– B	1/min	3	



Floor-type machines

Horizontal table-type boring machines WRD 13 (Q), GRATA, WRD 130/150 (Q), WRD 170 (Q) and WRD 180 H are designed for precise line-coordinate drilling, boring, milling and thread cutting.

They are particularly suitable for machining box- and board-type workpieces and complicated shapes from

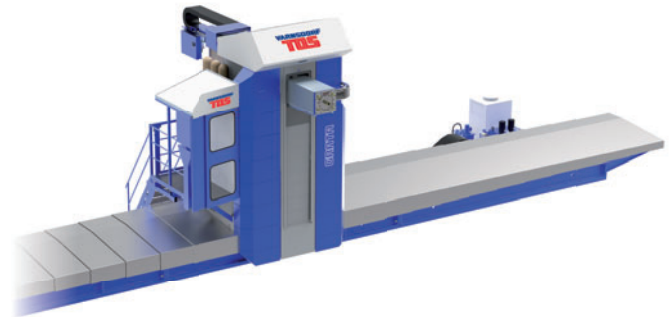
cast-iron, steel cast-iron and other machinable materials, especially large as well as the largest sizes and weights.

The machines are suitable for series manufacture as well as demanding technological applications. The user can extend technological potentialities of the machine by a series of additional equipment.

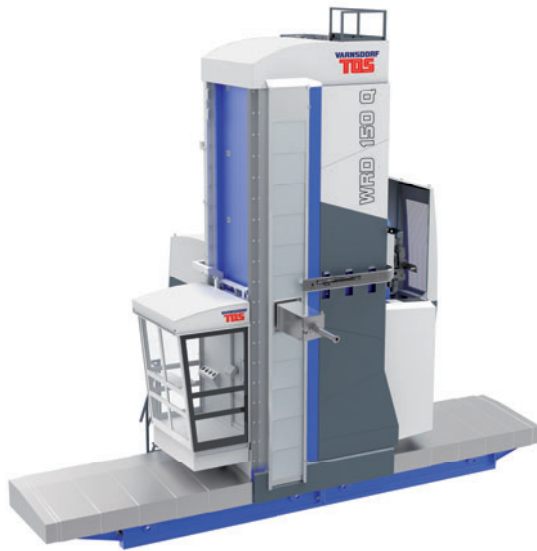




WRD 13 (Q)



GRATA



WRD 130 / 150 (Q)



WRD 170 (Q)

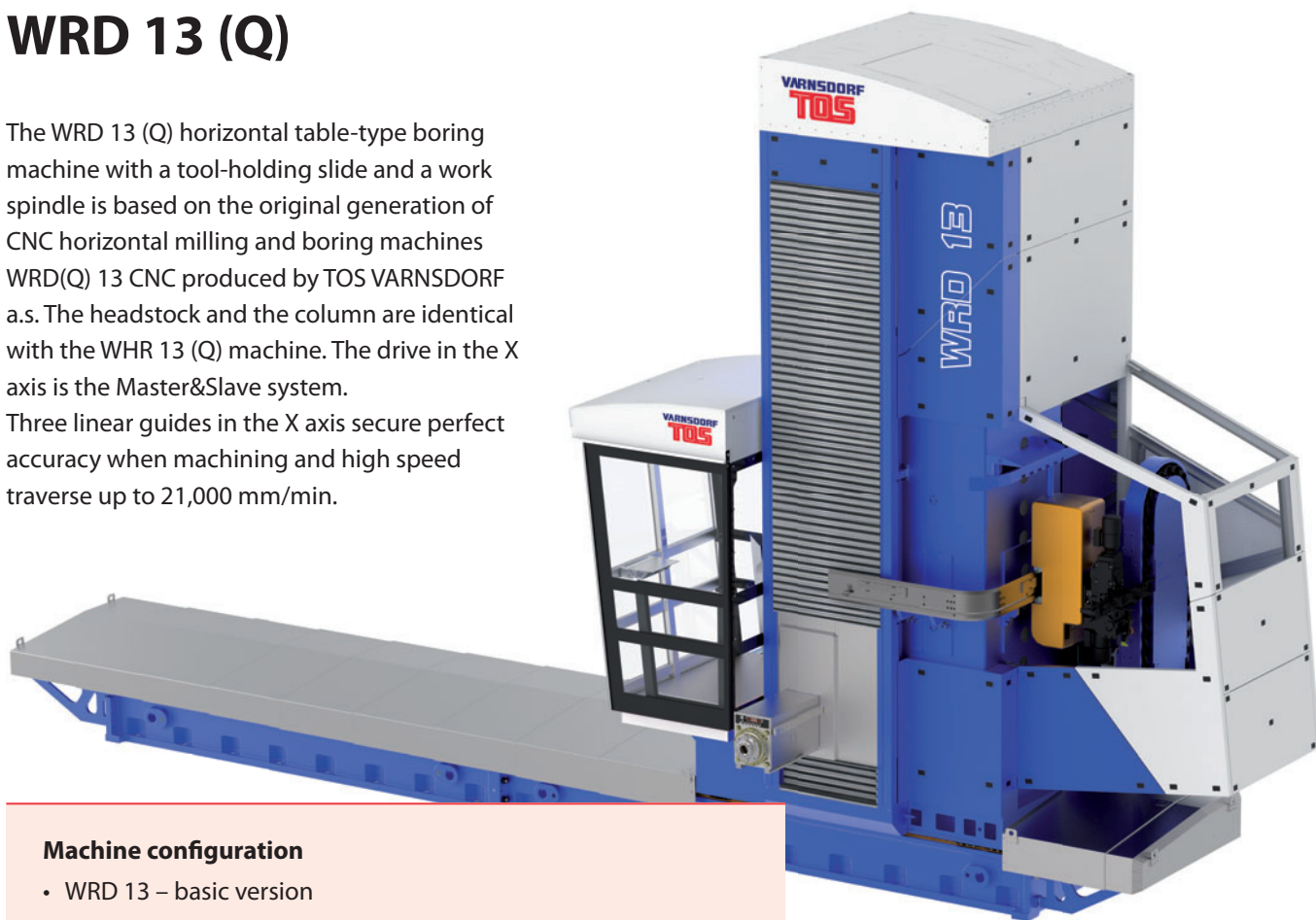


WRD 180 H

WRD 13 (Q)

The WRD 13 (Q) horizontal table-type boring machine with a tool-holding slide and a work spindle is based on the original generation of CNC horizontal milling and boring machines WRD(Q) 13 CNC produced by TOS VARNSDORF a.s. The headstock and the column are identical with the WHR 13 (Q) machine. The drive in the X axis is the Master&Slave system.

Three linear guides in the X axis secure perfect accuracy when machining and high speed traverse up to 21,000 mm/min.



Machine configuration

- WRD 13 – basic version
- WRD 13 (Q) – version with an automatic tool change
- the WRD 13 machines are controlled in 5 axes (X, Y, Z, W and V – additional rotary table) and are offered with a spindle diameter of 130 mm



TECHNICAL PARAMETERS

Headstock

Work spindle diameter	mm	130
Spindle taper		ISO 50 / ISO 50 BIG+
Work spindle speed range	1/min	10 – 3 000
Main motor output (S1 / S6 – 60%)	kW	37 / 46
Rated torque on spindle (S1)	Nm	2 535
Max. torque on spindle (S6 – 60%)	Nm	3 111
Spindle stroke W	mm	650
Tool-holding slide diameter	mm	320 x 400
RAM stroke Z	mm	700

Column

Vertical spindle adjustment Y	mm	2 000, 2 500, 3 000
Horizontal crosswise adjustment of the column X	mm	3 000 – 20 000 in steps of 1 000

Feeds

Work traverse and rapid traverse – X	mm/min	5 – 21 000
Work traverse and rapid traverse – Y, Z, W	mm/min	5 – 10 000

m&h MEASURING ON MACHINE TOOLS



m&h 3D Form Inspect V2.7

3D Form Inspect Software enables quick, easy measuring and logging of important geometries and shapes on all sides and with all axes directly on the machine tool.

- The original, since 2002 a leader in the market!
- Checking free-form surfaces on 3 and 5 axis machines
- RTC – Real Time Calibration

m&h RWP38.41

The compact radio-wave touch probe RWP38.41 it is ideally suited for use on machine tools with limited maximum tool diameter and restricted height of the Z axis, particularly with 5-axis heads.

- Proven, reliable SCS radio-wave transmission
- ITE technology – with high-speed pre-positioning
- THERMO-LOCK® Technology patented (optional)
- Flexibly and modularly extendable

Technical Data

RWP 38.41

Unidirectional max. with repeatability	2 Sigma $\leq 1 \mu\text{m}$ with 50 mm stylus and 254 mm/min probing feedrate
Recommended probing speed	Max. 2000 mm/min
Probing directions	$\pm X, \pm Y, -Z$
Max. stylus deflection	X/Y $\pm 12,5^\circ$, Z -6 mm
Trigger force with 50mm stylus	X/Y = 0,3 - 1,4 N, Z = 2,5 - 12,5 N, adjustable
Extensions $\varnothing 25$ (0.98")	50 mm (1.97"), 100 mm (3.94"), 200 mm (7.87")
Power Supply	2x batteries 3,6 V $\frac{1}{2}$ AA
Battery Life Time	325h in continuous use
Weight without shank	Ca. 460 g
Temperature range	Storage: 5 °C – 70 °C, Operating: 10 °C – 50 °C
Material	Stainless Steel
Radio-wave transmission	SCS Technologie (Self-Channel-Select)
Protection class	IP68: EN60529

m&h RWT35.50

Position-variable radio-wave tool measuring system RWT35.50 for milling machines and machining centers. Through use of a magnetic mount, the tool setter can be placed in wide range of table positions (patented).

- Quick mounting on optional base plate
- Proven, reliable SCS radio-wave transmission
- Can be shared between machines



GRATA

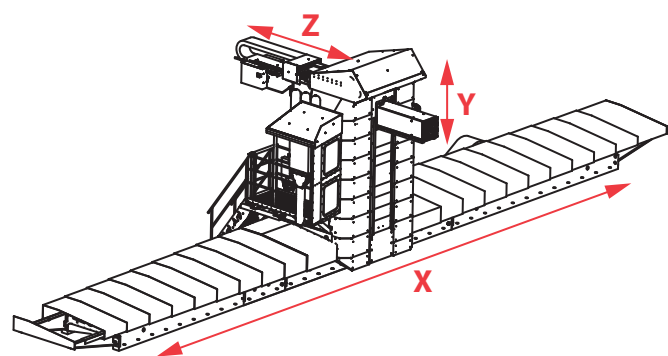


The GRATA table-type machine tools are designed for precise line-coordinate milling, drilling, boring, milling and thread cutting. They are particularly suitable for machining of box- and plate-type workpieces and complicated workpieces from cast-iron, steel cast-iron, steel and other machinable materials, mainly large as well as the largest sizes and weights.

The machines are equipped with an extensible tool-holding slide, which can be fitted with a broad range of

additional devices that significantly enhance the machine's potentialities.

The machines are suitable for series manufacture as well as demanding technological applications. They are continuously controlled in three basic coordinates (X, Y, Z) or other axes according to the used special equipment by the machine's control system.



Machine configuration

- basic version
- machine with automatic tool change
- machines are controlled in 4 axes (X, Y, Z and V – rotary table)
- Headstock with spindle extension
- Headstock with milling heads (see page 60)

TECHNICAL PARAMETERS

Headstock

RAM size mm 500 x 500

Termination of the slide plate with an interface for application of the technological devices.

Main motor speed range 1/min 10 – 5 000

Max. output of main motor kW 37

Max. torque on the driving shaft Nm 1 584

Column

Crosswise adjustment of the column X mm 5 000 – 25 000
(in steps of 2,000 mm)

Vertical spindle adjustment Y mm 1 600, 2 000, 2 500, 3 000

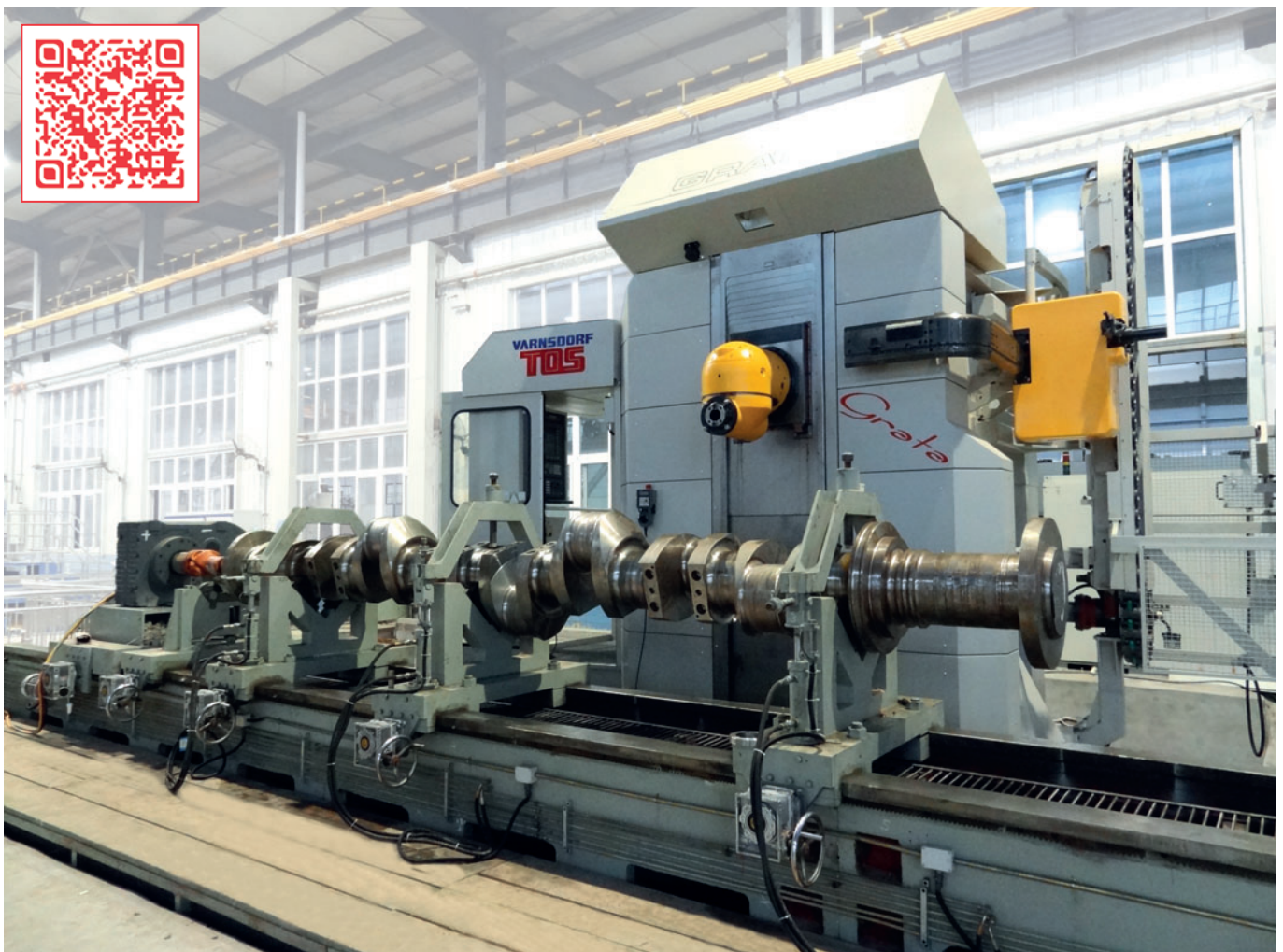
RAM stroke Z mm 1 500

Feeds

Feed range – X, Y, Z mm/min 1 – 15 000

Rapid traverse – X, Y mm/min 25 000

Rapid traverse – Z mm/min 15 000

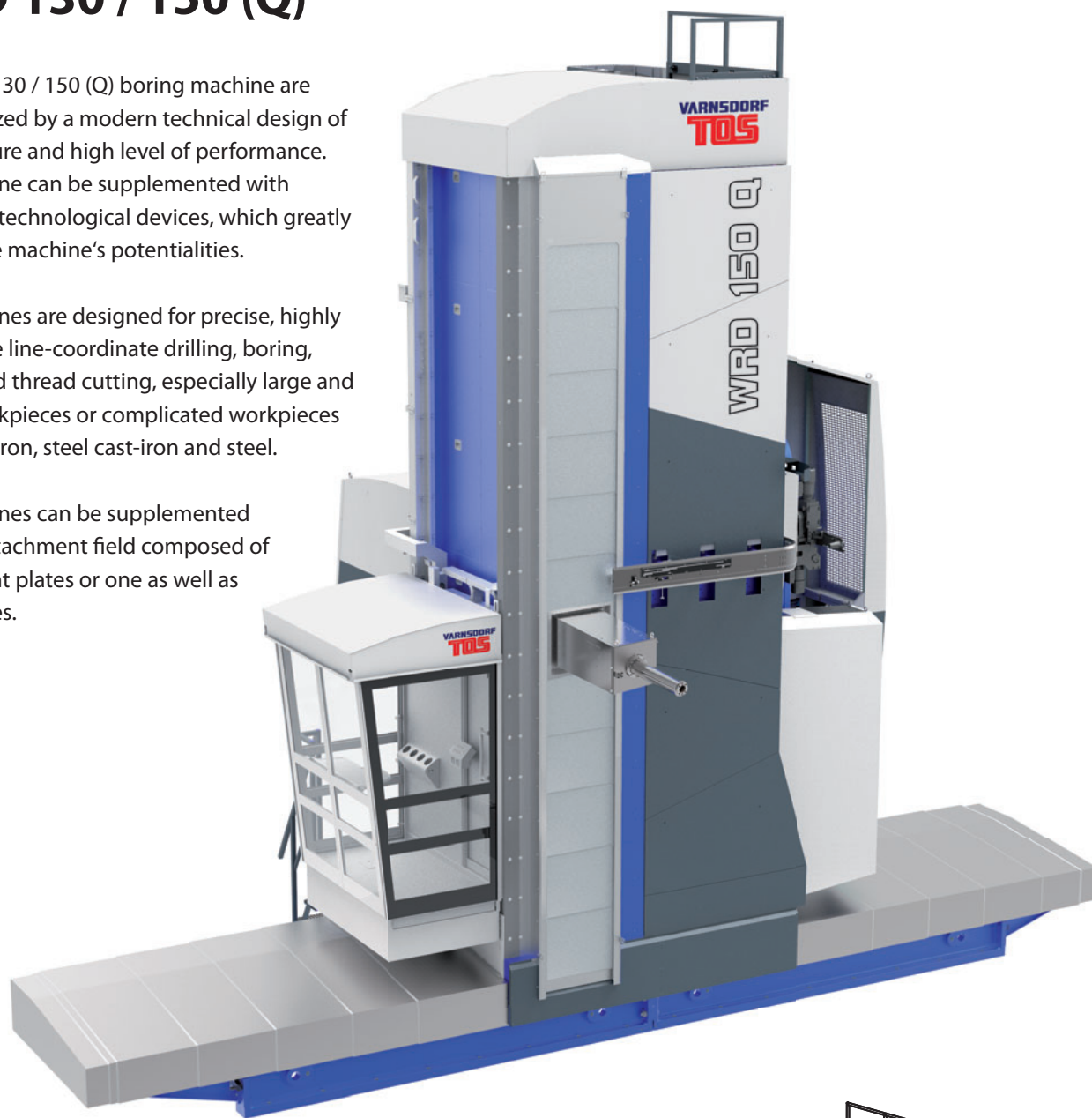


WRD 130 / 150 (Q)

The WRD 130 / 150 (Q) boring machine are characterized by a modern technical design of the structure and high level of performance. The machine can be supplemented with a series of technological devices, which greatly extend the machine's potentialities.

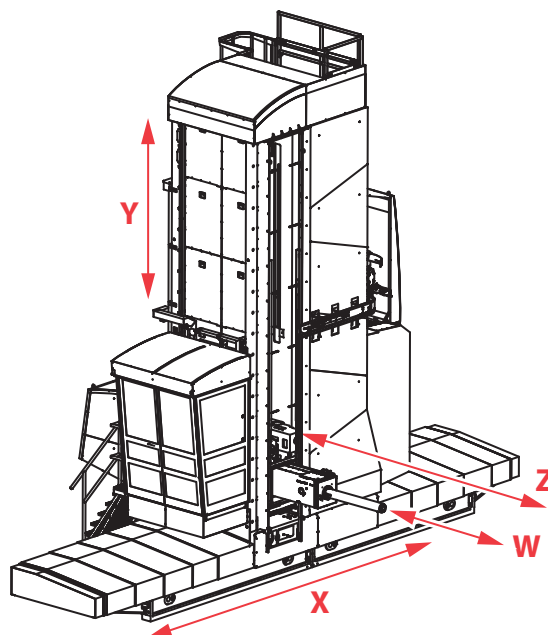
The machines are designed for precise, highly productive line-coordinate drilling, boring, milling and thread cutting, especially large and heavy workpieces or complicated workpieces from cast-iron, steel cast-iron and steel.

The machines can be supplemented with an attachment field composed of attachment plates or one as well as more tables.



Machine configuration

- basic version of the machine without automatic tool change
- version with an automatic tool change
- machine with spindle diameter 130 mm
- machine with spindle diameter 150 mm
- machine with spindle diameter 160 mm



TECHNICAL PARAMETERS

Headstock		WRD 130	WRD 150	
Work spindle diameter	mm	130	150	160
RAM size	mm	450 x 450		
Spindle taper		ISO 50 / ISO 50 BIG+		
Work spindle speed range	1/min	10 – 3 000	10 – 2 500 (2 800) (10 – 1 500*)	10 – 2 400
Rated output of main motor (at permanent operation of S1)	kW	37	51	51
Max. output of main motor (at operation of S6-60% working hours)	kW	46	65	65
Torque on spindle (S1)	Nm	2 535	2 460 (2 500/4 870*)	2 460
Max. torque on spindle (S6 – 60%)	Nm	3 152	3 138	3 138
RAM stroke Z	mm	1 200		
Spindle stroke W	mm	700	800	800
Column				
Vertical spindle adjustment Y	mm	2 000 – 5 000 (in steps of 500 mm)		
Crosswise adjustment of the column X	mm	5 000 – 27 000 (in steps of 2,000 mm)		
Feeds				
Feed range – X, Y, Z, W	mm/min	1 – 8 000		
Rapid traverse – X, Y, Z	mm/min	24 000		
Rapid traverse – W	mm/min	12 000		

* an option suitable for drive of the facing head from the hollow spindle, Nmax=1500 rpm, 2,500 Nm on the work spindle, 4870 Nm on the hollow spindle



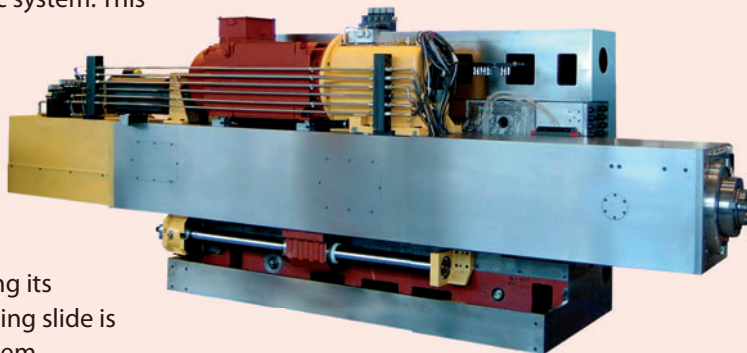
WRD 130 / 150 (Q)

Headstock

The basic body is a rigid casting from ductile iron; like other corresponding parts, they have an L shape, which creates a guiding rail for the tool-holding slide. The conception of this unit allows electro-magnetic compensation of the tool-holding slide drop during its extension in the Z axis (for more information see page 72 – Headstock).

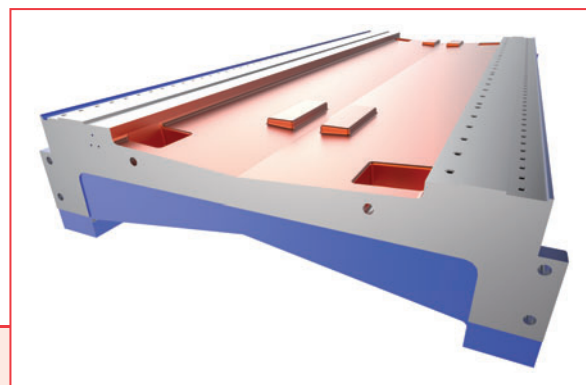
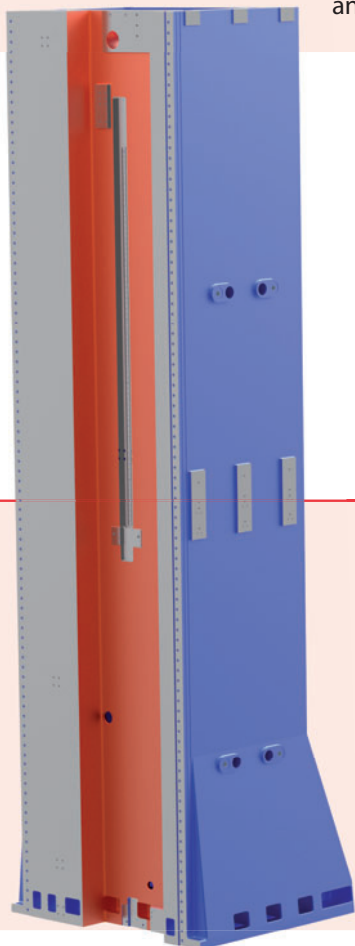
Balancing of the headstock weight: The weight of the headstock is balanced by a telescopic cylinder from the hydropneumatic system. This system of headstock weight balancing demands minimum traverse forces, thus reducing power consumption during the machining process.

Compensation of the tool-holding slide dropping: This concept of compensating the tool-holding slide dropping is unique and patented. The concept of the whole headstock allows compensation of the slide plate drop during its extension in the Z axis. Dropping of the tool-holding slide is compensated by a special electromechanical system.



Column

The column is designed as a rigid optimally dimensioned castings of gray iron. To column vertically moves the headstock with ram which is guided on two linear guide ways. On the column is fastened a ball screw, drive of Y-axis and hydraulic cylinder for weight balancing of the headstock.



Guides of adjustable groups

Guides of all linear adjustable groups are rolling with pretensioning (guide of the headstock, the column rail, the slide plate guide), based on compact linear rolling guides.

Guides of the beds are covered by steel telescopic guards.

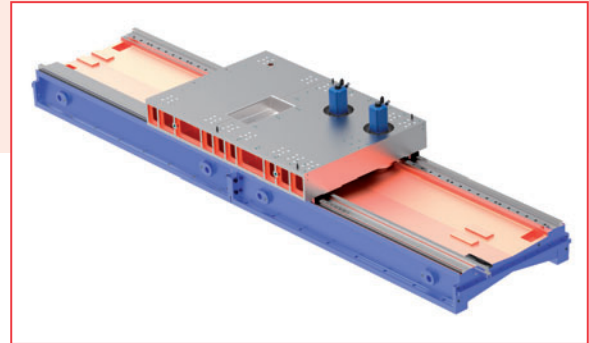
The guide on the column is protected by steel guards of the whole headstock movement area; on the face towards the workpiece by steel plates; on the operator's platform side, the whole area is covered by a fixed guard; on the rear side by cover bellows.

WRD 130 / 150 (Q)

Drives of traverse units and fixation

All 4 axes (X, Y, Z, W) are equipped with separate electric control servo drives. Transfer to straight motion of the Y, Z, W axes is achieved by ball screws with pre-tensioned nuts, movement of the X axis is provided by two electric servo motors with reducers.

Prestress of pinions on outlets from reducers to the rack is achieved by engagement of drives in the „Master-Slave“ operation.



WRD 130 / 150 DUO

The WRD 130 / 150 DUO workplace consists of two independent WRD 130/150 Q machines, which share a communal working space. The main advantage of this arrangement is the possibility to machine one workpiece by two independent spindles, or two workpieces together.

The machines are designed for precise, highly productive machining of large and heavy workpieces or complicated workpieces from cast-iron, steel cast-iron and steel. A series of technological devices greatly extend the machine's potentialities.



TECHNICAL PARAMETERS

Headstock		WRD 130	WRD 150
Work spindle diameter	mm	130	150
RAM size	mm	450 x 450	
Spindle taper		ISO 50 / ISO 50 BIG+	
Work spindle speed range	1/min	10 – 3 000	10 – 2 500 (2 800) (10 – 1 500*)
Rated output of main motor (at permanent operation of S1)	kW	37	51
Max. output of main motor (at operation of S6-60% working hours)	kW	46	65
Torque on spindle (S1)	Nm	2 535	2 460 (2 500/4 870*)
Max. torque on spindle (S6 – 60%)	Nm	3 152	3 138
Extension of tool-holding slide Z	mm	1 000	1 000
Work spindle traverse W	mm	700	800
Column			
Vertical spindle adjustment Y	mm	2 000 – 5 000 (in steps of 500 mm)	
Crosswise adjustment of the column X	mm	5 000 – 27 000 (in steps of 2,000 mm)	
Feeds			
Feed range – X, Y, Z, W	mm/min	1 – 8 000	
Rapid traverse – X, Y, Z, W	mm/min	24 000	
Rapid traverse – W	mm/min	12 000	

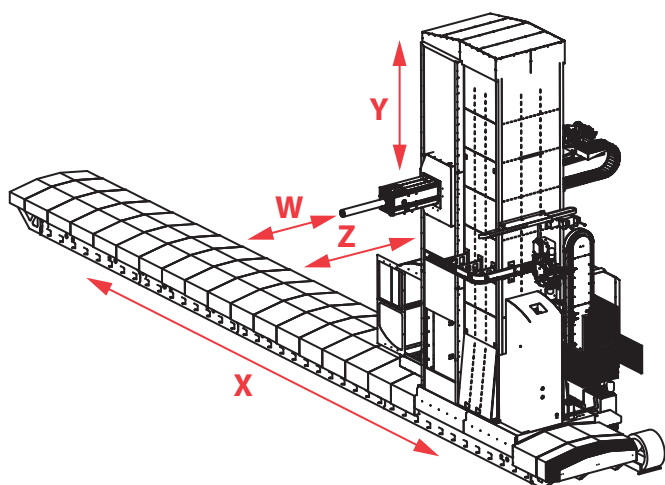
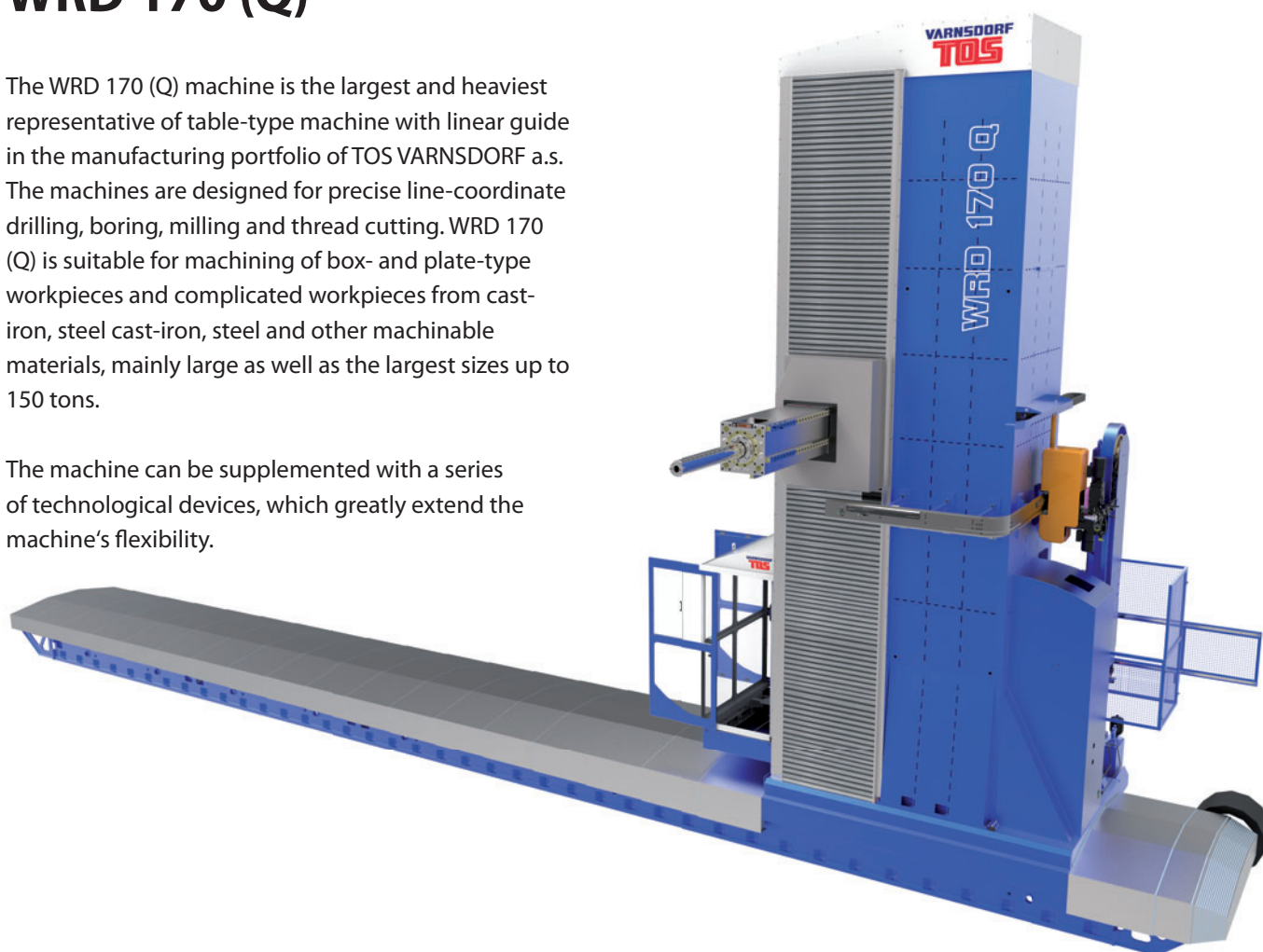
* an option suitable for drive of the facing head from the hollow spindle, Nmax=1500 rpm, 2,500 Nm on the work spindle, 4870 Nm on the hollow spindle



WRD 170 (Q)

The WRD 170 (Q) machine is the largest and heaviest representative of table-type machine with linear guide in the manufacturing portfolio of TOS VARNSDORF a.s. The machines are designed for precise line-coordinate drilling, boring, milling and thread cutting. WRD 170 (Q) is suitable for machining of box- and plate-type workpieces and complicated workpieces from cast-iron, steel cast-iron, steel and other machinable materials, mainly large as well as the largest sizes up to 150 tons.

The machine can be supplemented with a series of technological devices, which greatly extend the machine's flexibility.



Machine configuration

- WRD 170 – basic version of the machine
- WRD 170 Q – version with an automatic tool change
- the machines are controlled in 5 axes (X, Y, Z, W and V – additional rotary table)
- work spindle diameter 170 mm
- work spindle diameter 160 mm

TECHNICAL PARAMETERS

Headstock		WRD 170	Ø 160 mm
Work spindle diameter	mm	170	160
RAM size	mm	550 x 550	
Spindle taper		ISO 50 / ISO 50 BIG+	
Work spindle speed range	1/min	10 – 2 200	
Rated output of main motor (S1 / S6 – 60%)	kW	71 / 88	
Rated torque on spindle (S1)	Nm	3 870	
Max. torque on spindle (S6 – 60%)	Nm	4 800	
RAM stroke Z	mm	1 500	
Spindle stroke W	mm	1 000	
Column			
Vertical spindle adjustment Y	mm	3 000 – 6 000 (in steps of 500 mm)	
Crosswise adjustment of the column X	mm	5 000 – 29 000 (in steps of 2,000 mm)	
Feeds			
Feed range – X, Y, Z, W	mm/min	1 – 8 000	
Rapid traverse – X	mm/min	16 000	
– Y, Z, W	mm/min	12 000	

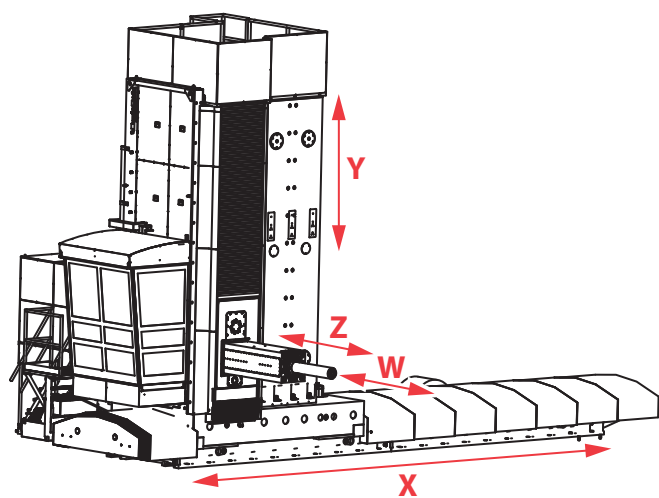


WRD 180 H



The largest, heaviest and most powerful, this is a representative of fully hydrostatic WRD 180 H machines. Thanks to excellent properties of hydrostatic guide, the machines are designed for the most demanding machining methods.

The WRD 180 H machines are designed for precise line-coordinate drilling, boring, milling and thread cutting. They are particularly suitable for machining of box- and plate-type workpieces and complicated workpieces from cast-iron, steel cast-iron, steel and other machinable materials, mainly large as well as the largest sizes up to 200 tons.



Machine configuration

- basic version of the machine without automatic tool change
- version with an automatic tool change
- machine with spindle diameter 160 mm
- machine with spindle diameter 180 mm
- machine with spindle diameter 200 mm

TECHNICAL PARAMETERS

Headstock		Ø 160 mm	Ø 180 mm	Ø 200 mm
Work spindle diameter	mm	160	180	200
RAM size	mm	550 x 550		
Spindle taper		ISO 50 / ISO 50 BIG+		
Work spindle speed range	1/min	10 – 3 000	10 – 2 500	10 – 2 000
Rated output of main motor (at permanent operation of S1)	kW	74 / 101		
Rated torque on spindle (S1)	Nm	6 820	11 165	13 927
RAM stroke Z	mm	1 600		
Spindle stroke W	mm	1 200		
Column				
Vertical spindle adjustment Y	mm	3 000 – 6 000 (in steps of 500 mm)		
Crosswise adjustment of the column X	mm	5 000 – 29 000 (in steps of 1,000 mm)		
Feeds				
Feed range – X, Y, Z, W	mm/min	1 – 12 000		
Rapid traverse – X, Y, Z, W	mm/min	20 000		

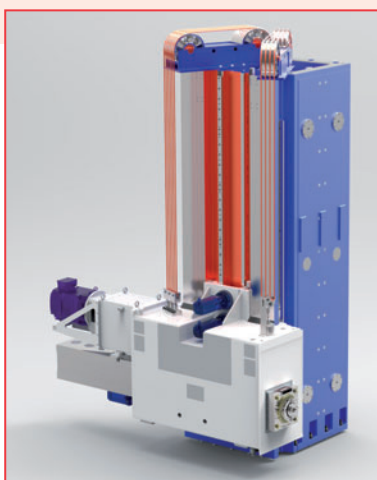


WRD 180 H

Drives of Y, Z, W axes

All 3 axes (Y, Z, W) are equipped with separate electric control servo drives. Traverse of the Y axis is achieved by a couple of electric servo motors. Transfer to straight motion of the W and Z axes is achieved by ball screws.

The primary level of the Z and W axis drives is provided by cogwheel gears.



WRD 180 H

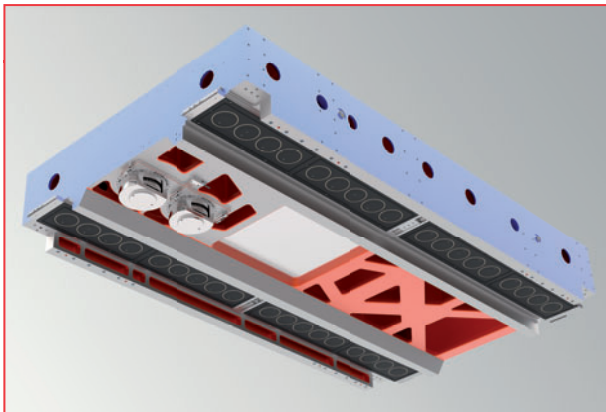
Balancing and compensation

Headstock compensation: By means of steel cables, which connect the headstock with a counter-weight.

Compensation of the column's deformation: By means of four rods passing through the rear wall of the column, which can be used for correction of the guide surfaces.

Thermal compensation: Special housing and cooling of bearings minimizes the amount of heat generated in the housing.

Compensation of deformation of the shape and incline of the tool-holding slide: Bending deformations of the tool-holding slide are prevented by four prestressing rods. The rods are pushed by hydraulic cylinders according to the tool-holding slide's position. The front hanger incorporates a hydraulic cylinder, which tensions cables according to the tool-holding slide's traverse.



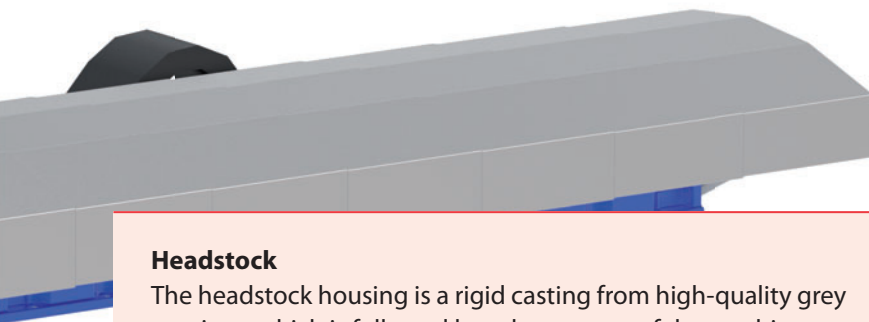
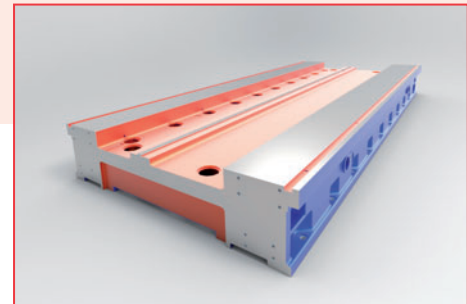
Guides of adjustable groups

The main support guide (X axis) consists of four sizeable bars inserted between the bed and the rails. Each bar incorporates 9 closed hydrostatic cells arranged in two separately powered sections. In total, the machine is carried by 36 closed cells.

Guide surfaces of the face, side and rear guides (the Y axis) are precisely ground. Guiding surfaces of the headstock housing consist of two rows of classic hydrostatic cells with separate pressure oil inlets.

Guide surfaces

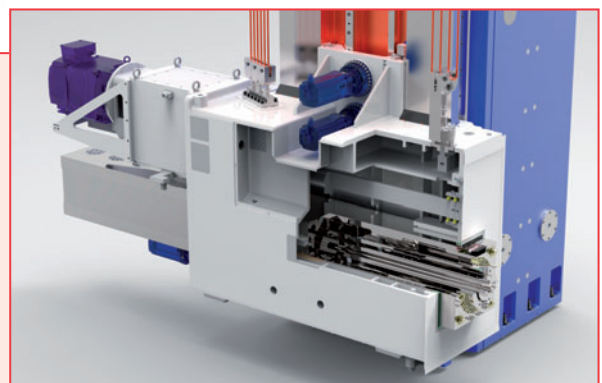
of the tool-holding slide (the Z axis) consist of sixteen bars lined by Biplast with hydrostatic chambers.



Headstock

The headstock housing is a rigid casting from high-quality grey cast iron, which is followed by other groups of the machine.

The internal area of the casting has a horizontal square tunnel with precisely machined surfaces for guiding the tool-holding slide. The tool-holding slide housing is a prismatic casting from ductile cast iron with a hollow for housing the spindle in the machine's axis.



Machining centres

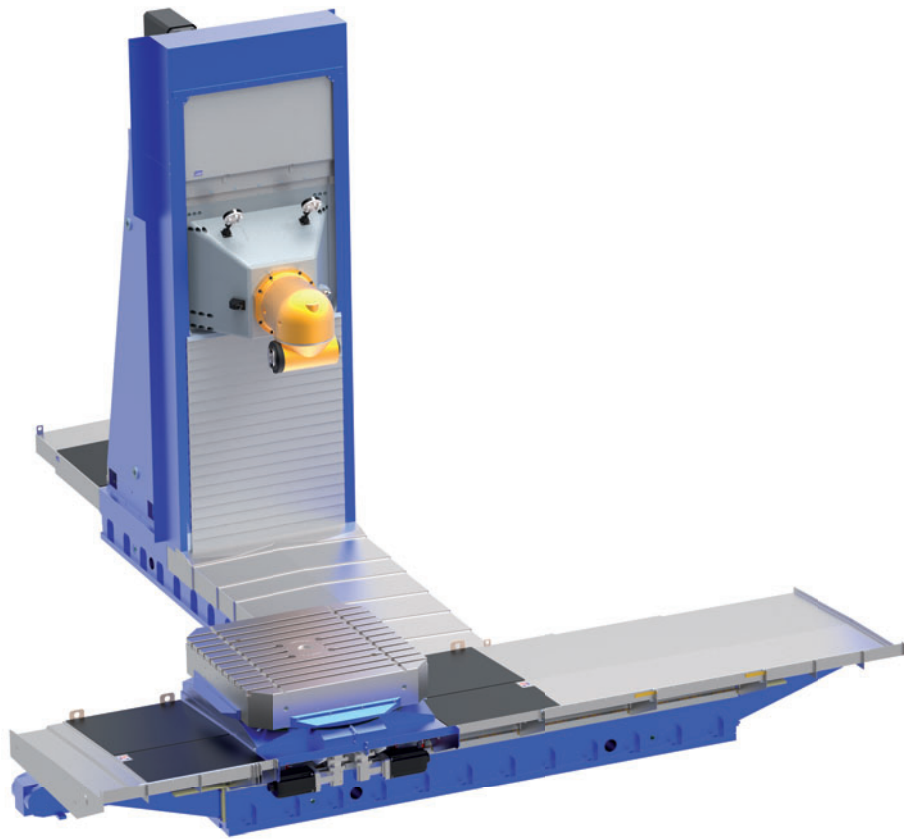
The PRIMA, OPTIMA and WHtec 130 machining centres create a modular kit, which can be used for assembling various versions of machines by selecting the modules and their sizes.

Basic modules: stand, table, basic headstocks with horizontal axes of spindles and special headstocks with milling heads and automatically controlled angular position of the spindle or headstocks with an extensible tool-holding slide.

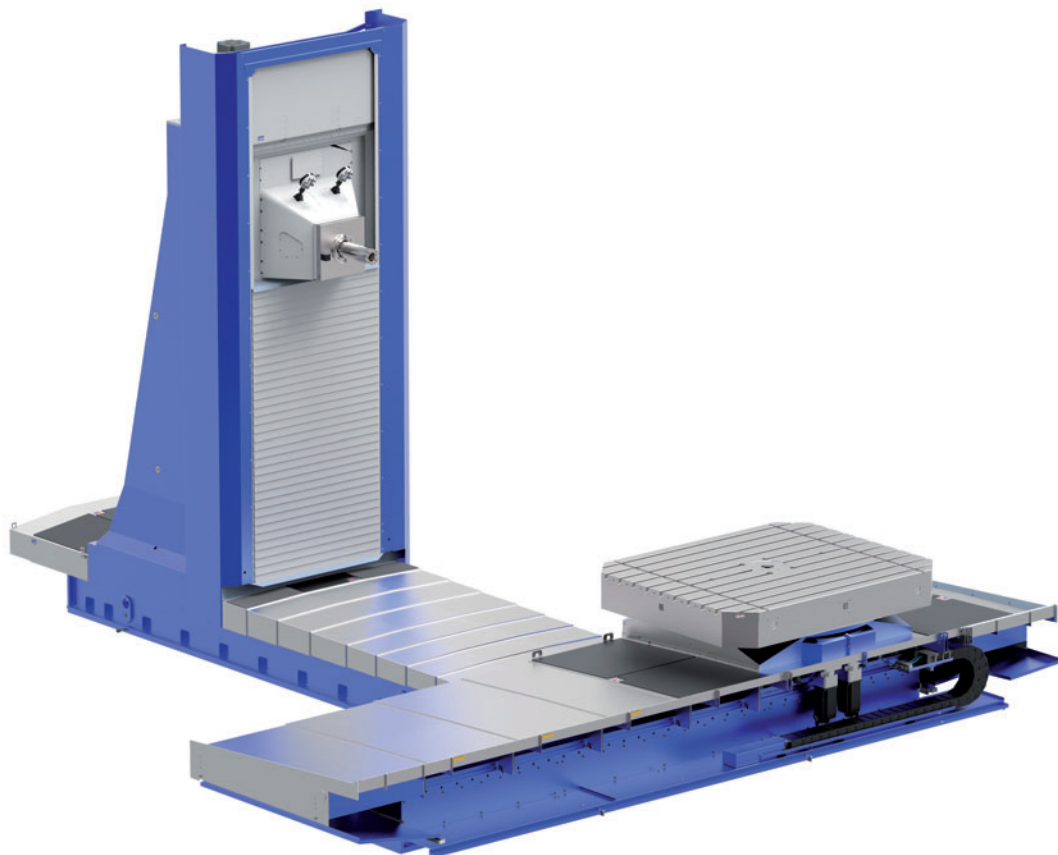
Supplementary modules: peripheries for automatic tool changer (ATC), automatic palette changer (APC), technological equipment and various machine coverings.

Machining centres PRIMA, OPTIMA and WHtec 130 are standardly equipped with complete covering, which prevents spraying of the cooling fluid and scatter of chips.





TOStec PRIMA / OPTIMA



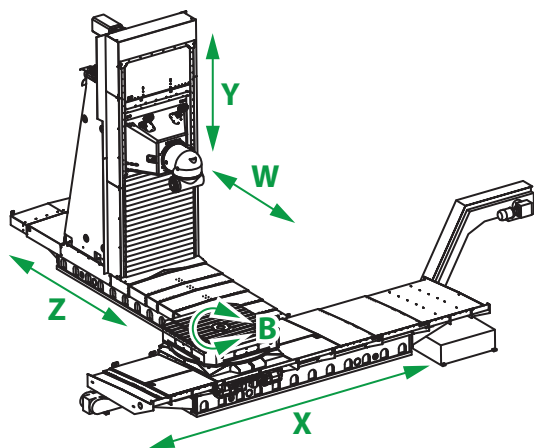
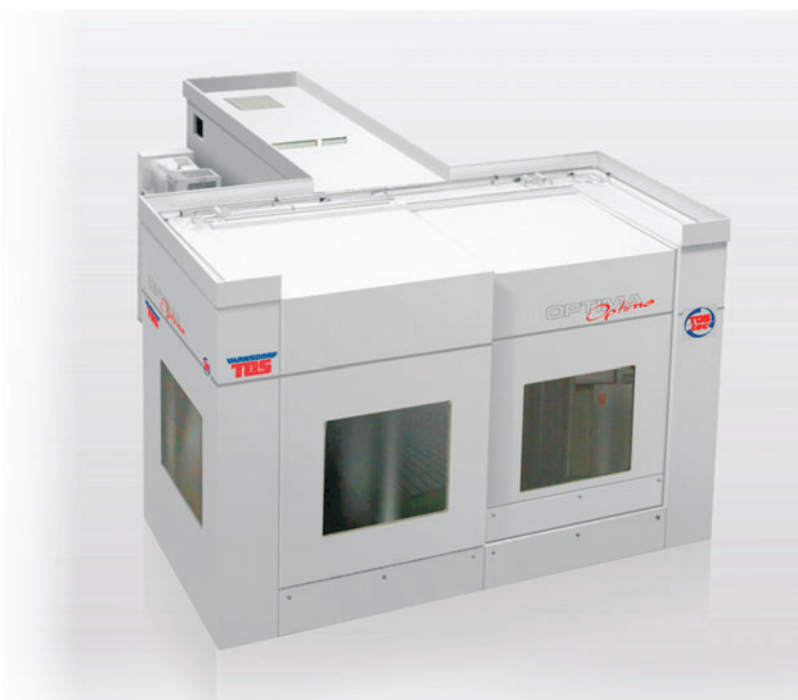
WHtec 130

TOStec PRIMA / OPTIMA

The TOStec machining centres are designed for various levels of automatically controlled equipment from the simplest to the most complicated techniques in modern machining of box- and board-type workpieces as well as exceptionally large workpieces.

The series is conceived as a modular kit, which, by selection of the modules, can be used for creation of a broad range of machines differing in the size of coordinate axes, equipment of headstocks for various technological purposes, application of automatic equipment and various types of additional peripheries such as automatic replacement of tools or palettes.

The TOStec machining centres are characterized by high parameters and a broad range of technological features that allow application of advanced tools.



Machine configuration

- headstock with extensible work spindle
- headstock with non-extensible work spindle
- headstock with permanently engaged milling head
- machine with a rotary table or a palette system
- version with an automatic tool replacement

TECHNICAL PARAMETERS

Headstock with extensible work spindle		PRIMA	OPTIMA
Work spindle diameter	mm	100	112
Spindle taper		ISO 50	ISO 50 / ISO 50 BIG+
Max. speed	min ⁻¹	5 000	4 200
Main motor output (S1 / S6-60)	kW	22/28	28/35
Max. torque (S1 / S6-60)	Nm	874 / 1 100	1 205 / 1 506
Spindle stroke W	mm	500	650
Headstock with non-extensible electric spindle			
Conical hole of electric spindle			HSK A63
Max. speed	min ⁻¹		24 000
Electric spindle output	kW		37
Max. torque on spindle	Nm		60
Column			
Vertical spindle adjustment Y	mm	1 000, 1 300	1 300, 1 600
Longitudinal column adjustment Z	mm	1 600, 2 000	1 600, 2 000, 2 500
Table			
Max. table load	kg	5 000	10 000
Optional table size	mm	1 000 x 1 250	1 250 x 1 250, 1 250 x 1 600
Crosswise table adjustment X	mm	1 600, 2 000	2 000, 2 300
Automatic palette change			
Max. palette load	kg	4 000	8 000
Palette attachment area	mm	1 000 x 1 000, 1 000 x 1 250	1 250 x 1 250, 1 250 x 1 600
Crosswise table adjustment X for 2 palettes	mm	1 600, 2 000	2 000, 2 300
Crosswise adjustment X for 3 or 4 palettes	mm	1 600, 2 000	2 000, 2 300
Feeds			
Feed range – X, Y, Z, W	mm.min ⁻¹	1 - 20 000	1 – 15 000
– B	min ⁻¹		0,003 - 1,5
Rapid traverse – X, Y, Z, (W)	mm.min ⁻¹	30 000	24 000 (20 000)
– B	min ⁻¹		6,5



TOStec PRIMA / OPTIMA – Technological examples

Table-type machines

Floor-type milling machines

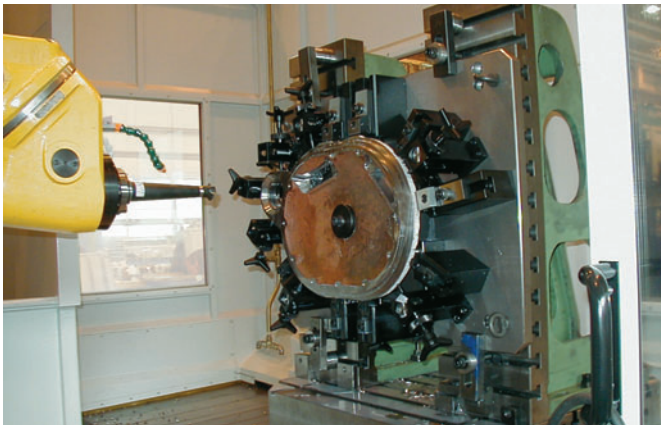
Machining centres

Accessories

Components

References

TOS Olomouc



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FANUC offers the widest range of CNC systems in the industry from best value controllers with powerful functionality to high-performance control systems for complex machines – fast programming and easy to use. For the highest quality and short processing times.

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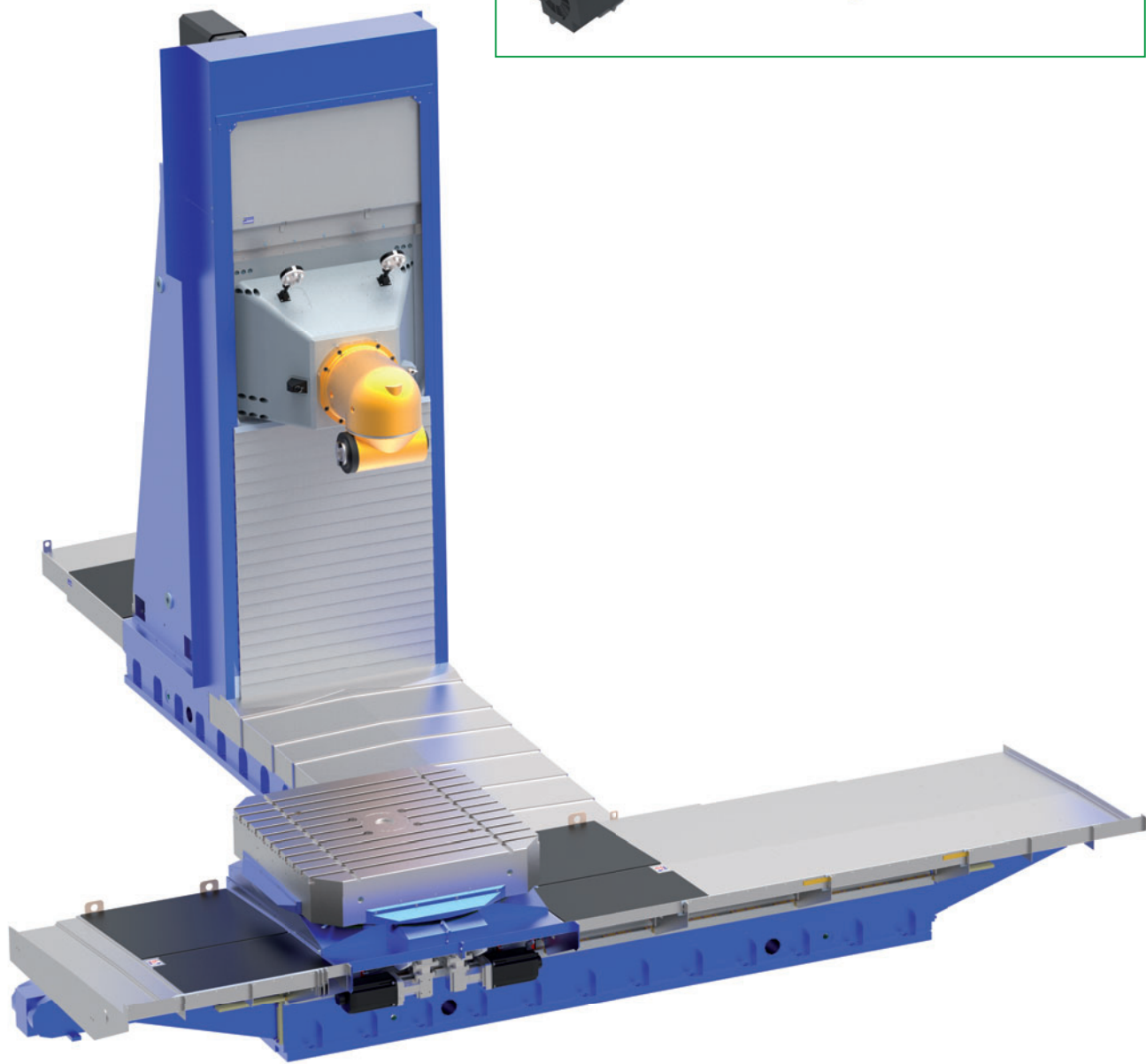
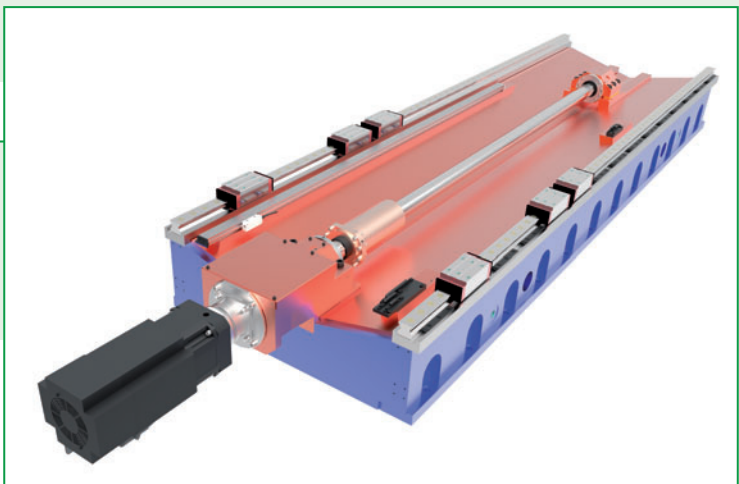
TOStec PRIMA / OPTIMA

Drives of travel units

Drives of all linear axes are equipped with digitally controlled AC servo drives Siemens with direct drives. The torque is transferred to the group by ball screws. After reaching the target position, the X, Y, Z and potentially W axes are held in a positioned bonding. The B axis is automatically fixed.

Linear guides

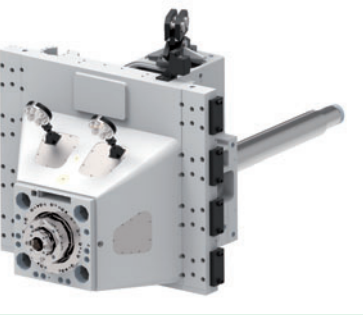
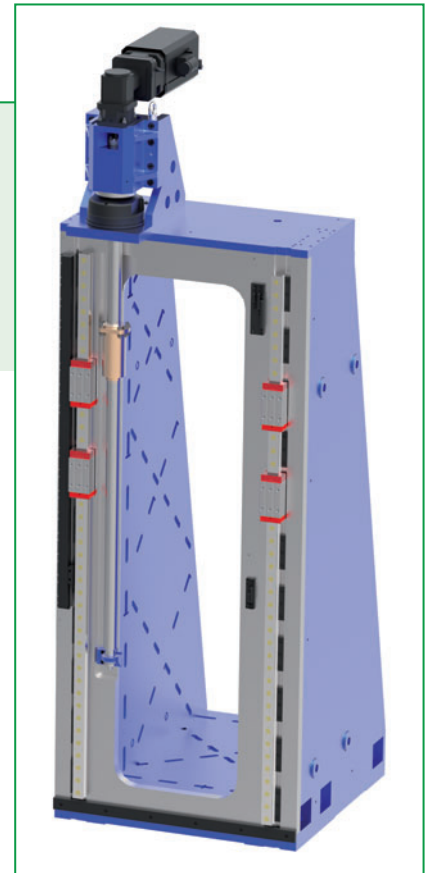
Guiding of all linearly adjustable groups in the X, Y, Z axes is achieved by pre-stressed compact linear rolling guides.



TOStec PRIMA / OPTIMA

Column

Basic parts of the machine frame (the bed) use the COMBltec technology. It consists of densely ribbed weldments filled with a special absorption material. This solution guarantees a high dynamic and static stability of the frame and, thanks to low weight of the adjustable groups, allows reaching top acceleration values.



Central headstock

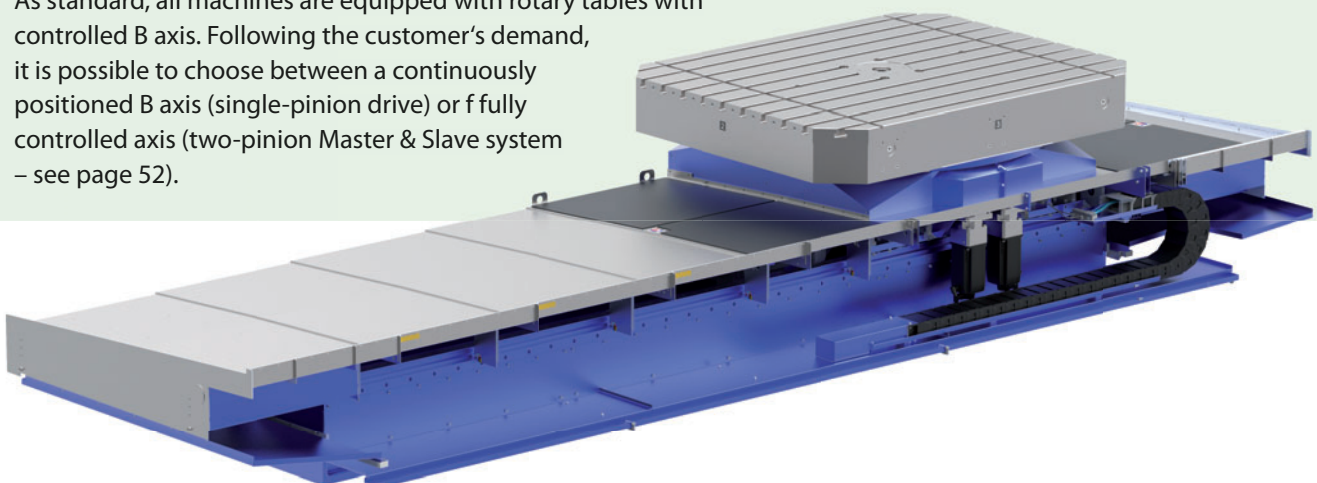
The TOStec series is characterized by centrally conducted headstock (see page 72).

Measurement

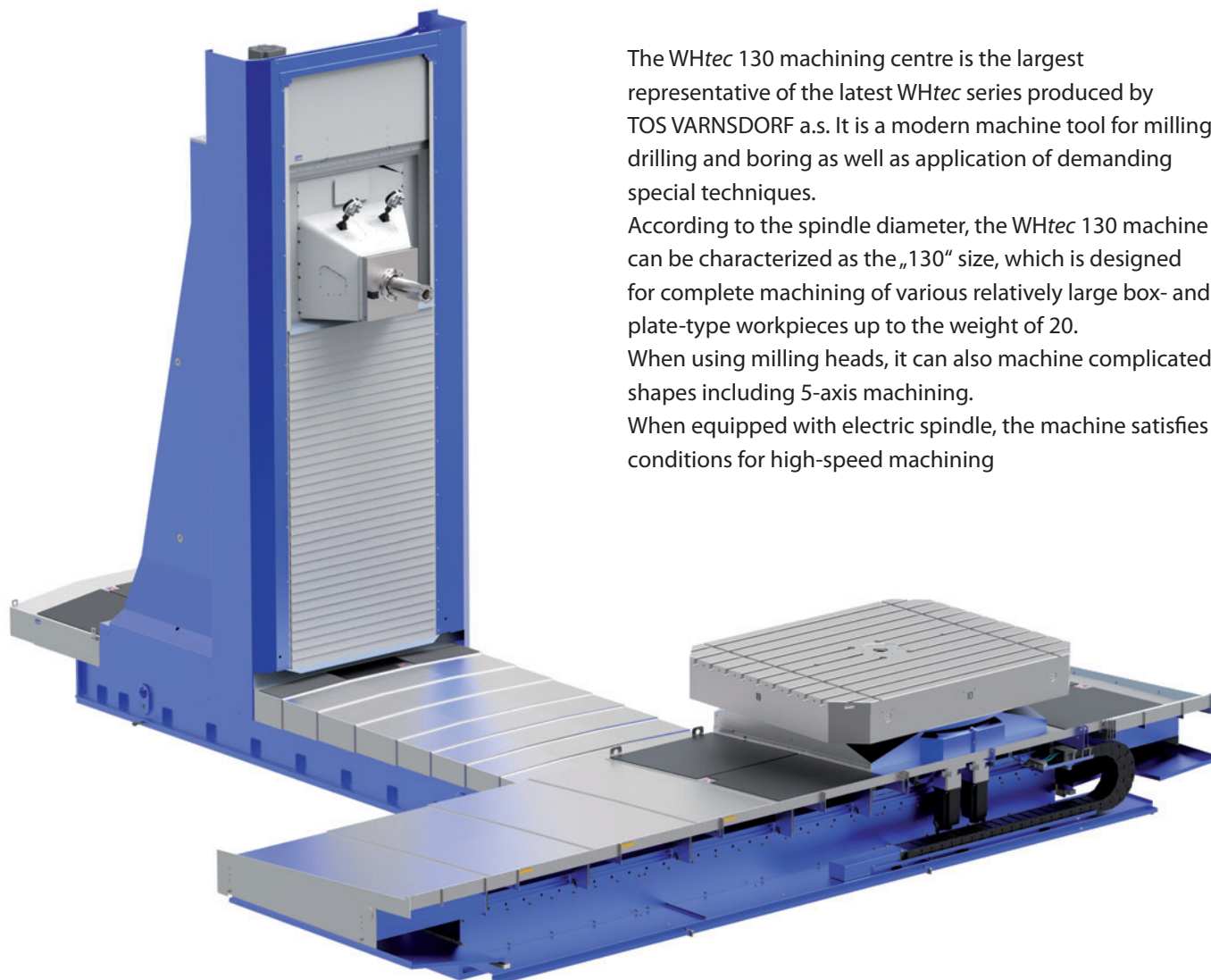
The linear axes X, Y, Z are equipped with direct measurement with closed electro-optical HEIDENHAIN gauges.

Table

As standard, all machines are equipped with rotary tables with controlled B axis. Following the customer's demand, it is possible to choose between a continuously positioned B axis (single-pinion drive) or fully controlled axis (two-pinion Master & Slave system – see page 52).



WHtec 130

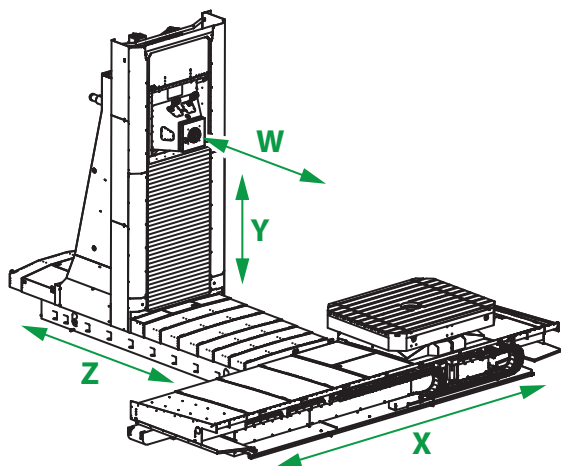


The WHtec 130 machining centre is the largest representative of the latest WHtec series produced by TOS VARNSDORF a.s. It is a modern machine tool for milling, drilling and boring as well as application of demanding special techniques.

According to the spindle diameter, the WHtec 130 machine can be characterized as the „130“ size, which is designed for complete machining of various relatively large box- and plate-type workpieces up to the weight of 20.

When using milling heads, it can also machine complicated shapes including 5-axis machining.

When equipped with electric spindle, the machine satisfies conditions for high-speed machining



Machine configuration

- basic version of the machine without automatic tool palette replacement
- version with an automatic tool or palette replacement
- version with an extendable spindle, permanently integrated or replaceable milling head, or electric spindle
- machine with spindle diameter 130 mm

TECHNICAL PARAMETERS

Headstock

Work spindle diameter	mm	130
Spindle taper		ISO 50 / ISO 50 BIG+
Speed range of the work spindle	1/min	10 – 4 000
Rated output of the main motor (at permanent operation of S1)	kW	37 / 46
Rated torque on the spindle (S1)	Nm	3 200
Spindle stroke W	mm	800

Column

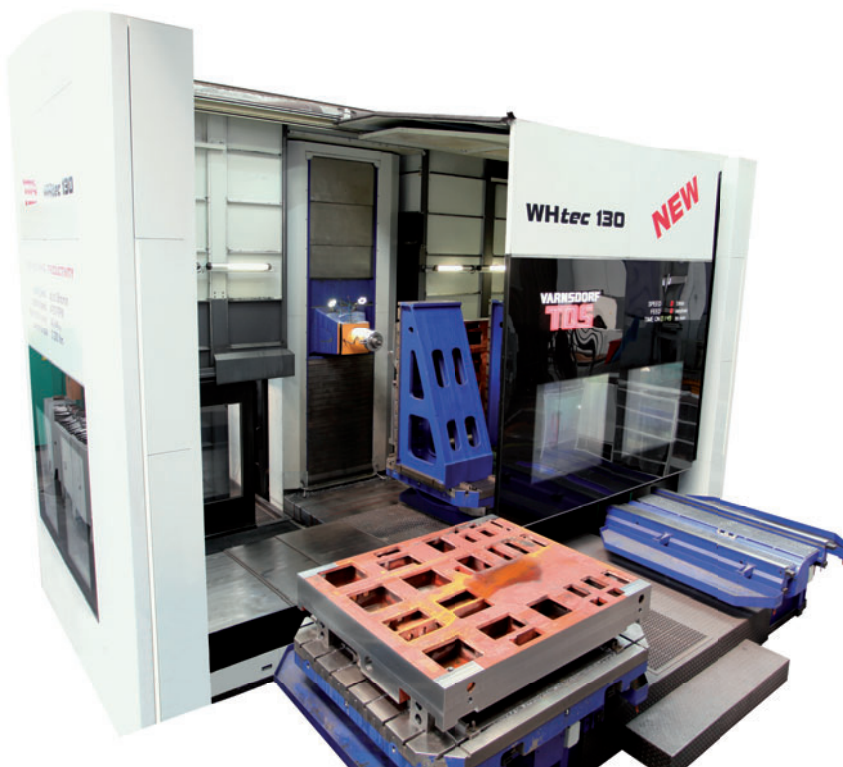
Vertical adjustment of spindle Y	mm	1 600, 2 000, 2 500
Min. height of spindle axis above the work table / technological palette	mm	0
Longitudinal adjustment of column Z	mm	1 600, 2 000, 2 500

Work table

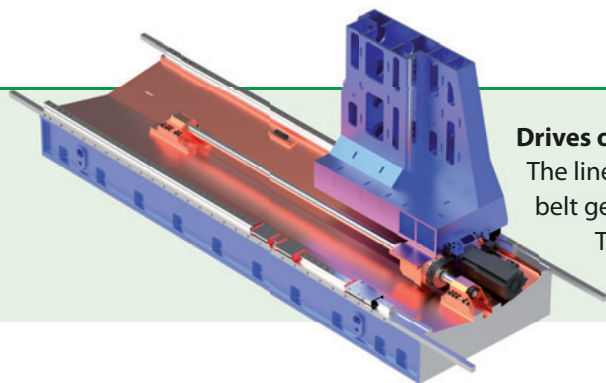
Optional table size	mm	1 800 x 1 800, 1 800 x 2 200, 1 800 x 2 500
Max. workpiece weight	kg	20 000
Crosswise adjustment of the table X	mm	2 000, 3 000, 4 000

Feeds

Range of feeds (working and rapid traverse) – X, Y, Z	mm/min	1 – 36 000
Range of feeds (working and rapid traverse) – W	mm/min	20 000
Range of feeds (working and rapid traverse) – B	1/min	0,003 – 3
Max. feed forces – in axes X, Y, Z, W	kN	20
– in axis B	kNm	15
Max. loading torque at fixing the B axis	kNm	25



WHtec 130



Drives of the X, Y, Z, W axes

The linear axes are driven by separate servo drives with incorporated belt gear and ball screws with steep lead.

The X and Z axes are driven by a ball screw with a rotating ball nut. The Y and W axes are driven by a rotating ball screw.

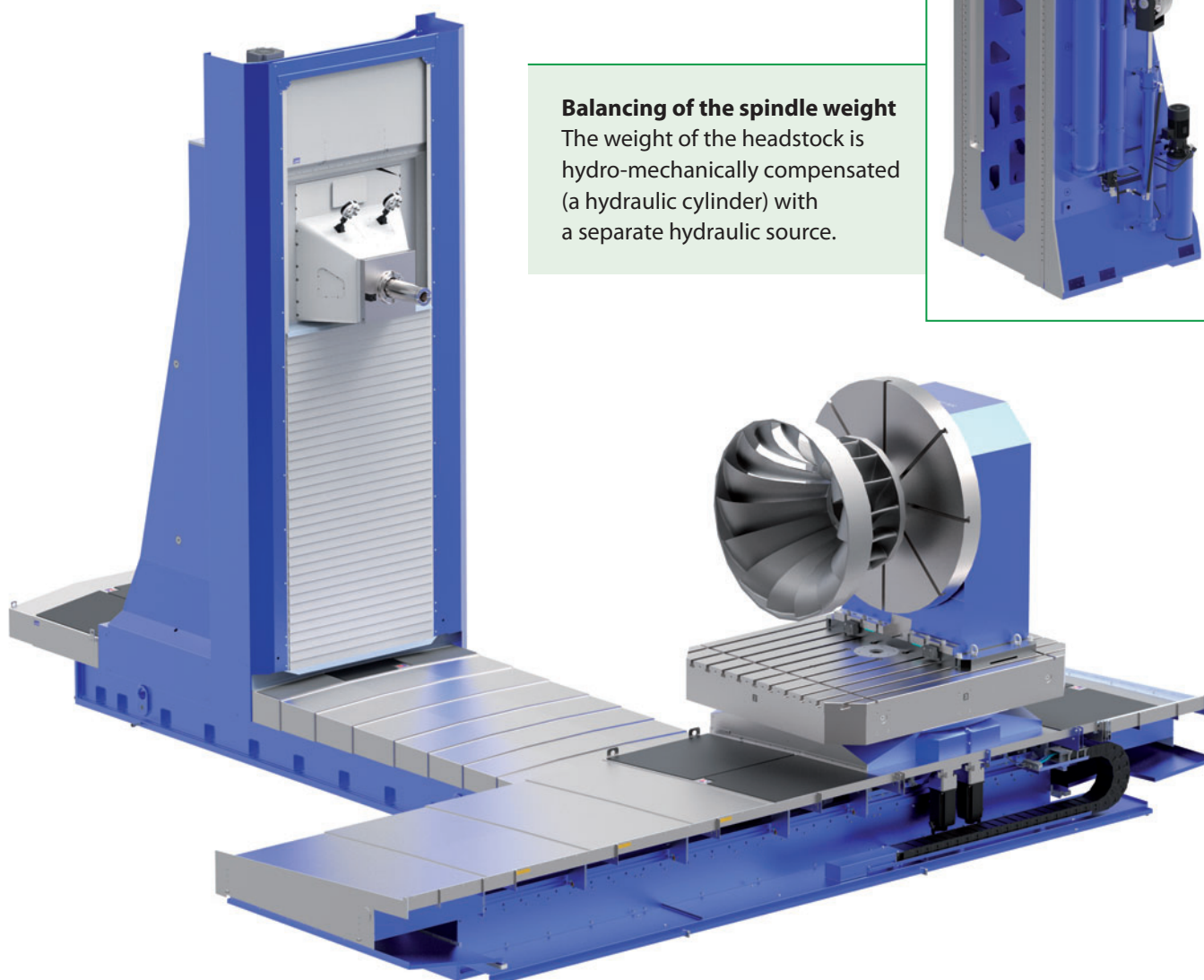
Headstock

The centrally conducted headstock consists of a solid plate (ductile cast-iron casting), which carries the boom (ductile cast-iron casting), the main motor and other nodes and mechanisms of the housing and the spindle drive, differing according to the type of headstock (for more information see page 72).

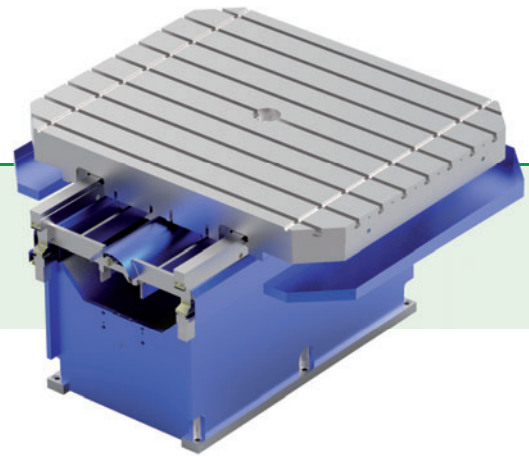


Balancing of the spindle weight

The weight of the headstock is hydro-mechanically compensated (a hydraulic cylinder) with a separate hydraulic source.

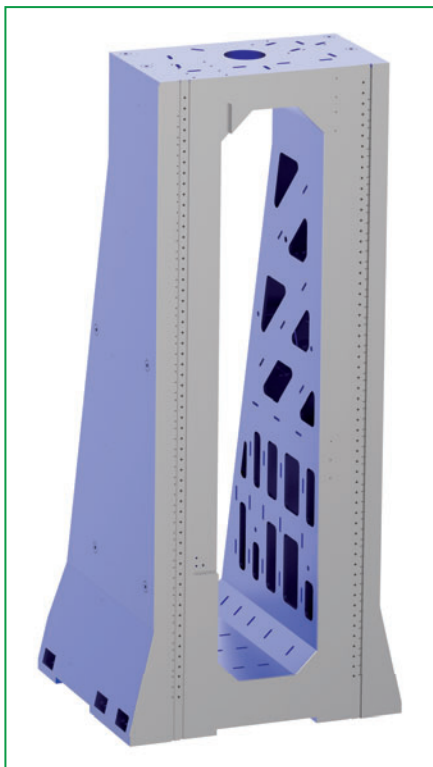


WHtec 130



Automatic palette change

The WHtec130 machine can be equipped with automatic palette change; for more information see page 54.

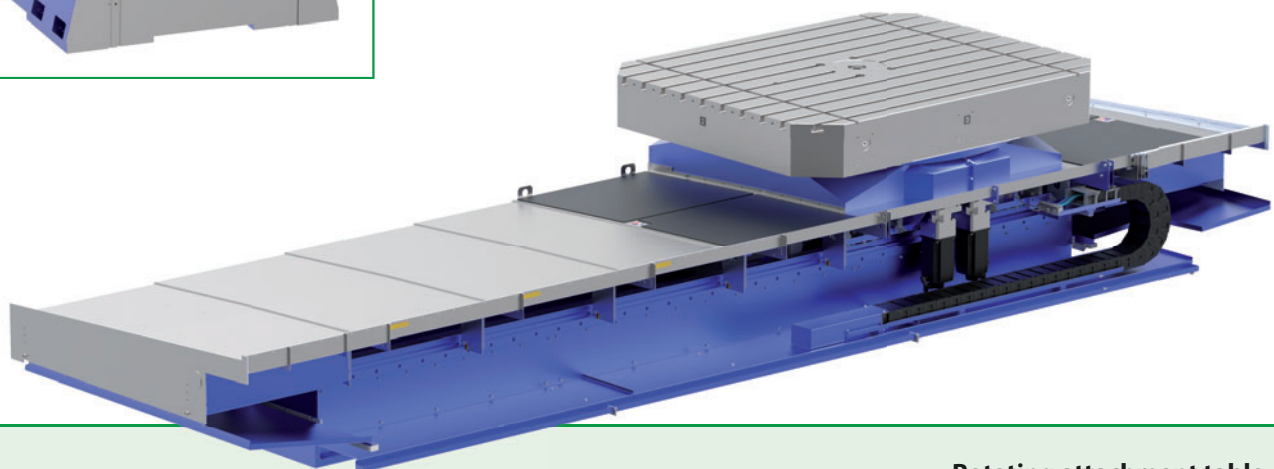


Machine frame

The basic heavy parts (tables, palettes, longitudinal and crosswise bed) are cast from grey cast-iron. The table rails are designed as a densely ribbed weldment. The column is a double-casing steel weldment with an optimized structure.

Guides of adjustable groups

Guiding of all linearly adjustable groups in the X, Y, Z axes is achieved by pre-stressed compact linear rolling guides. The extendable spindle is slidingly guided in the hollow spindle. The table is housed on a large radial-axial ball bearing with crossed prestressed rollers, thus having a high bearing capacity and rigidity.



Rotating attachment table

In the centre, it is equipped with a rotation sensor, which allows automatic positioning of the table with an increment of 0.001° . The rotation is driven by a servo motor with a pinion meshing without allowance with the outer ring gear on the large bearing of the table housing – positioning axis, or two servo drives with 2 pinion gears (the Master-slave system) – a continuously controlled axis. For more information see page 52.

Rotating tables

The additional work tables with horizontal adjustment are designed as special accessory for horizontal table-type boring machines (the WRD series) and machining centres (TOStec and WHtec) adaptable for machines by other manufacturers.

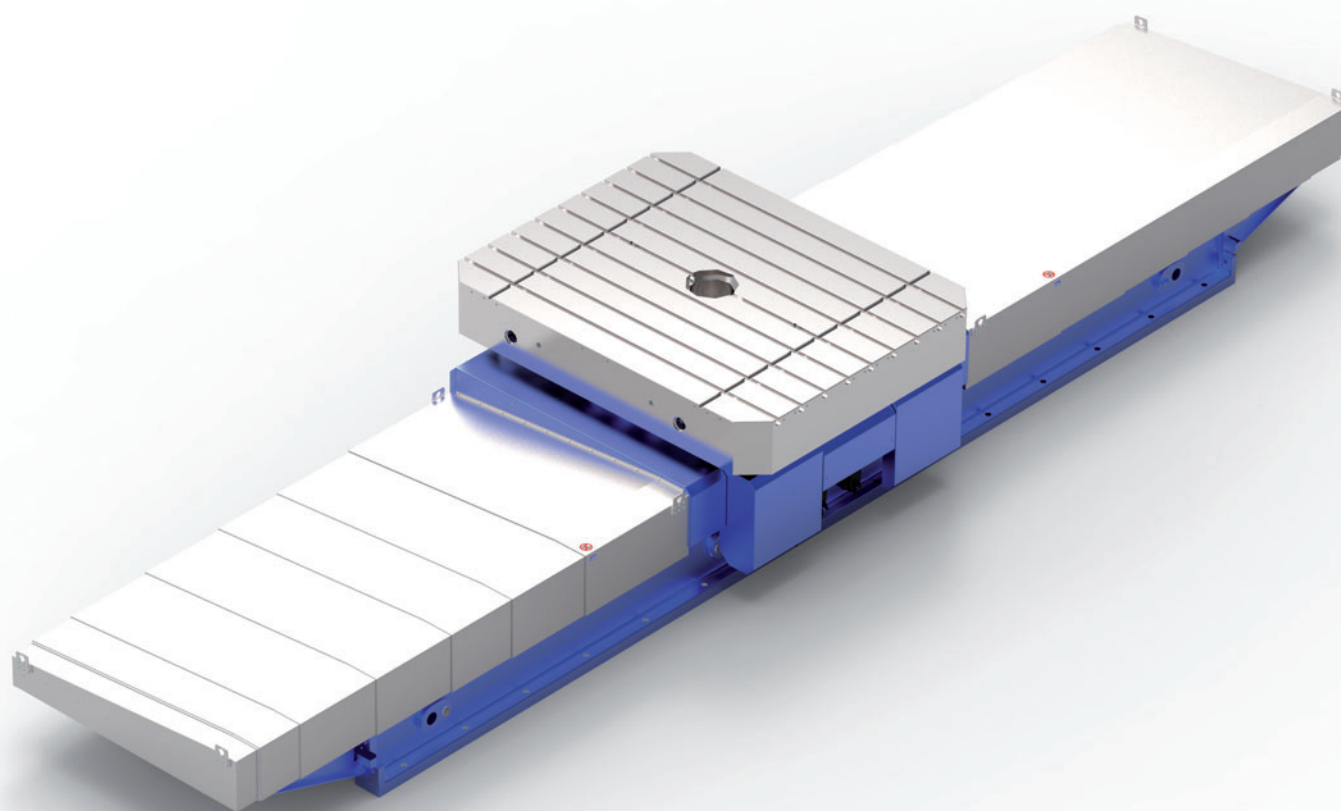
The additional turning tables with horizontal adjustment consist of a rigid bed on the top of which a table with horizontal attachment area rotationally housed on the rail usually travels.

The CNC-controlled table is used for attachment and positioning of workpieces on the technological sites and can be multiply applied. It allows interpolation in the longitudinal axis, in the rotational axis and both axes simultaneously with other continuously controlled axes of the corresponding machine.

The rotational axis can be used classically for positioning or machining during the table's rotation when the main cutting motion is performed by the rotating tool attached in the work spindle of the machine.

The control of the supplementary tables and the servo drives are integrated in the CNC control, operation and electrical equipment of the machine. The position in the coordinates is programmed with the increment of 0.001° .

The B coordinate is driven by the „Master-Slave“ system, which incorporates two separate servo drives and their control.



TECHNICAL PARAMETERS

Additional rotating table		S 5	S 10	S 20
Max. workpiece weight	kg	5 000	10 000	20 000
Optional table size	mm	1 000 x 1 250	1 250 x 1 250 1 250 x 1 600	1 800 x 1 800 1 800 x 2 200 1 800 x 2 500
T-slots dimensions	mm	28H8		
Size of table adjustment	mm	0, 1 600, 2 000	0, 1 500, 2 000, 3 000	0, 2 000, 3 000
Feed range – V	mm/min	1 – 20 000		1 – 15 000
Feed range – B	1/min	0,003 – 1,5		
Rapid traverse – V	mm/min	30 000	24 000	20 000
Rapid traverse – B	1/min	7	5	3,5
Min. programmable positioning increment – in the V coordinate	mm	0,001		
– in the B coordinate	grad	0,001		

Additional rotating table		S 16	S 30	S 50	S 80
Max. workpiece weight	kg	16 000	30 000	50 000	80 000
Optional table size	mm	1 800 x 2 240, 2 000 x 2 500	2 000 x 2 000, 2 000 x 2 500, 2 500 x 3 000	3 000 x 3 000, 3 000 x 3 500, 3 000 x 4 000	3 500 x 3 500, 3 500 x 4 000, 4 000 x 4 000, 4 000 x 4 500
T-slots dimensions	mm	28H8			
Size of table adjustment	mm	0, 1 400, 1 800	0, 1 300, 1 800, 2 500, 3 000	0, 1 500, 2 000, 2 500, 3 000, 3 500	2 000, 3 000, 4 000
Feed range – V	mm/min	1 – 5 000	1 – 8 000		1 – 6 000
Feed range – B	1/min	0,003 – 1,5		0,002-1	
Rapid traverse – V	mm/min	10 000	16 000	15 000	13 700
Rapid traverse – B	1/min	1,75	3	2,5	1,6
Min. programmable positioning increment – in the V coordinate	mm	0,001		0,001	
– in the B coordinate	grad	0,001		0,0001	



Automatic palette changer (APC)

The AVC automatic palette changer replaces the table; it is suitable for quick replacement of the workpiece by preparation and setting of another workpiece during machining of the first workpiece. This significantly speeds up the machining.

The palette change equipment is based on automatic replacement of technological palettes between stationary stacking stations equipped with manipulators and the palette attachment base on the machine. The palette is locked on the attachment base by centring pins and fixed by disc springs, release of the palette is hydraulic.

The automatic palette changer is designed for machines WHN(Q) 13/15, WHR 13 (Q), TOStec PRIMA, OPTIMA, WHtec 130 and MAXIMA.



TECHNICAL PARAMETERS

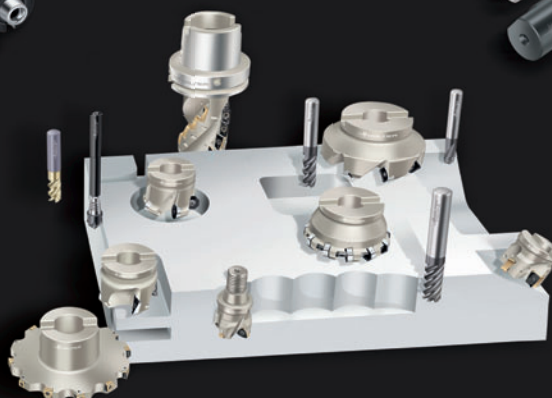
Type marking of the palettes		P 4	P 5	P 8	P 16
Size of the work area	mm	1 000 x 1 000 1 000 x 1 250	1 250 x 1 400 1 250 x 1 600	1 250 x 1 250 1 250 x 1 600 1 600 x 1 800	1 600 x 1 600 1 600 x 2 000 1 800 x 1 800 1 800 x 2 200
Palette capacity	kg	4 000	5 000	8 000 (6 000)	16 000
T-slots dimensions	mm	22H8			
Size of adjustment	mm	1 600, 2 000	1 600, 2 000, 2 500	2 000, 2 500, 3 000, 3 500, 4 000	3 000, 3 500, 4 000
Number of palettes in the system		up to 4	2	up to 4	2
Period of automatic palette change	sec		85	90	120



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Tilting and turning tables

Tilting tables

Tilting table has been designed as the special accessories for WHR 13 (Q) and WHN(Q) 13/15 CNC horizontal boring mills.

Tilting table is possible to use for workpiece clamping and positioning, in axes B and X is controlled by control system of the machine, tilting mechanism is carried out by air-driven hydraulic pump.

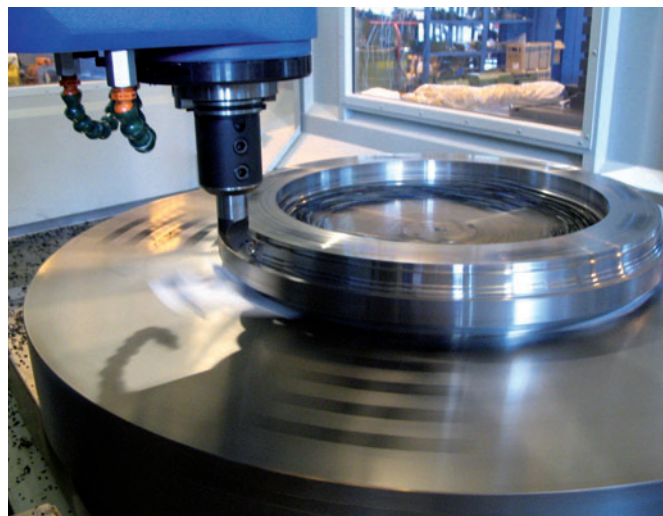
TECHNICAL PARAMETERS

Max. workpiece weight	kg	16 000
Tilting range		0 – 5°
Table clamping surface	mm	1800 x 1800, 1800 x 2200, 1800 x 2500



Turning tables

Option for Machining centers with higher circular working feed of table / pallet with possibility of vertical lathe-turning.



TECHNICAL PARAMETERS

		Prima	Optima	WHtec 130
Table / pallet clamping surface	mm		1 000 x 1 000, Ø 1 250	
Table / pallet max. loading	kg		4 000 / 2 500	
Number of pallet			2, 3, 4	
Max. circular working feed	min ⁻¹		250	
B-axis working torque	Nm		3 000	
Max. holding torque of clamped B-axis	Nm		10 000	

U-TRONIC



Medium and large sized NC boring and facing heads for boring machines, machining centers, and special machinery, which are applied manually, automatically, and with palletized systems on boring machines, machining centers, and special machinery.

General features

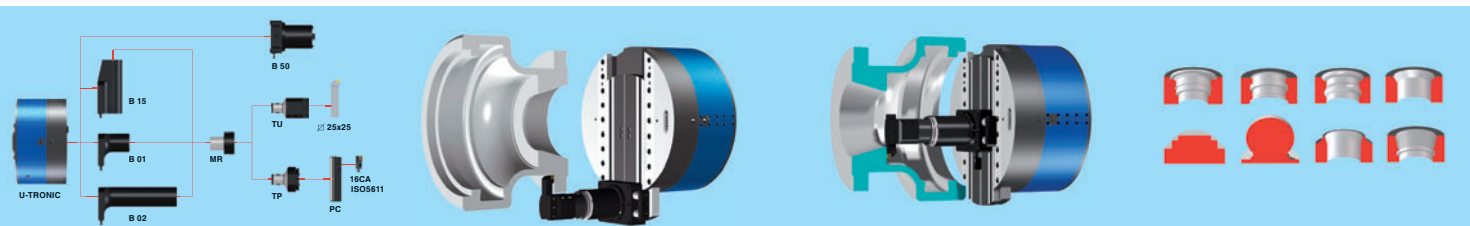
U-TRONIC are medium and large sized NC heads that are connected to the U axis of the NC in the machine tool for outer facing, inner facing, back-facing, cylindrical and conical boring and threading, concave and convex corner rounding through interpolation with the other axes of the machine tool.

They can be applied manually or automatically and with pallet systems on boring machines, machining centers and special machines.

They are constructed in 6 models from \varnothing 360 to \varnothing 1000 mm. All these include an internal passage for coolant. Special versions of U-TRONIC, with two slides or with counterweights for self-balancing, may be supplied upon request.

Fixed toolholders may be applied to the slide, with either manual or automatic tool change.

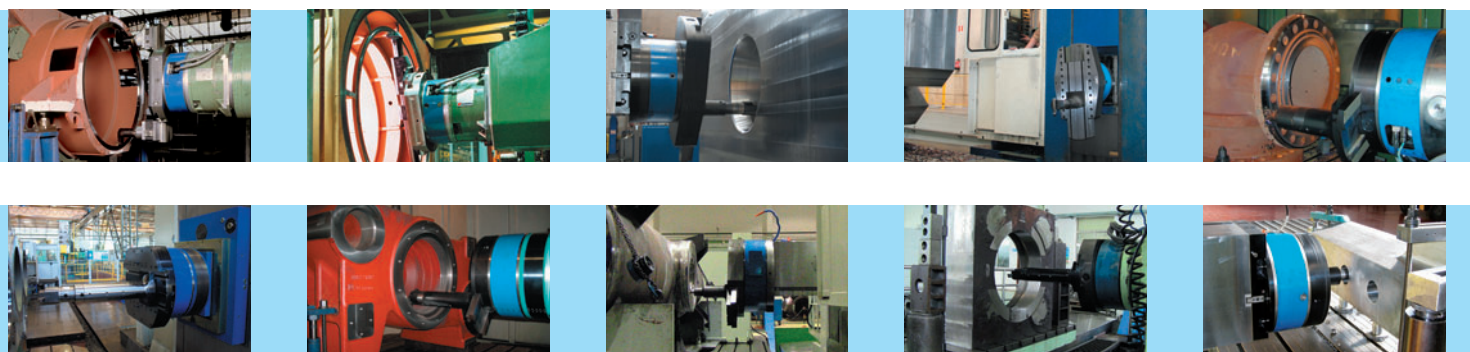
Any application on machines that do not permit the connection to an axis of the NC, may be made by managing the motor of the drive unit with a practical, simple, and economical U-CONTROL positioner with wireless REMOTE-CONTROL.



Application

U-TRONIC is applied manually or automatically using a flange for fastening to the machine tool and a plate for the rotation of the rotating body. It is applied manually using a flange for fastening with a cam lock quick coupling, or automatically with a palletized system and special connectors.

U-TRONIC can also be fitted with an automatic tool change toolholder mounted on the slide to obtain total automation.



Automatic tool changer (ATC)

It consists of a chain meander- or rack-type magazine, a manipulator path on the column or rack and the actual manipulator equipped with a rotating two-arm hand. The tool detection is based on a coded bed in the magazine.

The equipment allows automatic change of tools for milling heads in the horizontal direction.

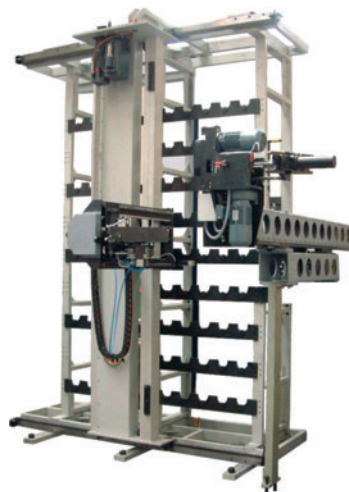
It is possible to choose a variable number of storage sites on customer demand.



Loop magazine



Chain magazine

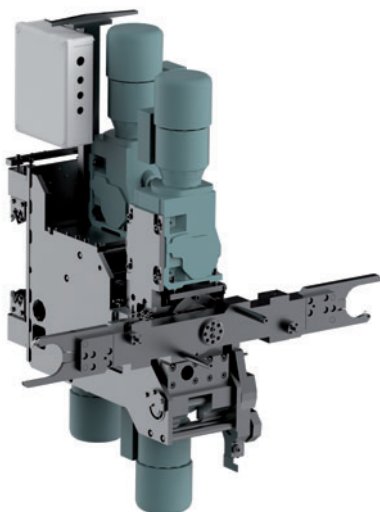


Rack magazine

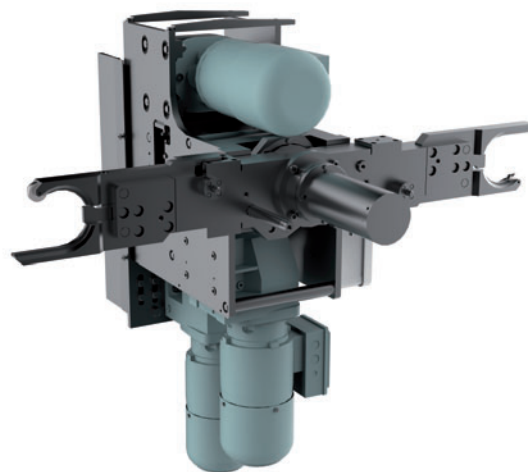


Robot application

Four-motor tilting tool manipulator



3-motor untilting tool manipulator



TECHNICAL PARAMETERS

Table-type machines		WHN 105	WHN 110	WHN 130	WHN 13/15	WHR 13	MAXIMA	
Number of storage sites in the magazine		40, 60, 80, 120					40, 60, 80	
Pitch of storage sites in the magazine	mm	130						
Max. tool diameter – in fully loaded magazine – in free neighbouring areas	mm	125 - 150	125	125 - 150		125	125	
	mm	320	320	320		320	320	
Max. diameter of a special flat tool	mm							
Max. tool length	mm	500						
Max. tool weight	kg	25						
Max. tool weight in the chain	kg	1 000						
Max. tool imbalance in the chain	kg	150						
Tool change period (tool-tool)	sec	15						

Plate-type machines		WRD 130/150	WRD 170	WRD 180 H	GRATA	WRD 13
Number of storage sites in the magazine		40, 60, 80				
Pitch of storage sites in the magazine	mm	130				
Max. průměr nástroje – při plně obsazeném zásobníku – při volných sousedních místech	mm	125				
	mm	320				
Max. diameter of a special flat tool	mm					
Max. tool length	mm	500				
Max. tool weight	kg	25				
Max. tool weight in the chain	kg	1 000				
Max. tool imbalance in the chain	kg	150				

Machining centres		Prima	Optima	WHtec 130
Type of magazine - number of storage sites				
– Chain-type		40, 60		
– Meander-type		80, 100, 120		
– Rack-type		150 až 300		
Pitch of storage sites in the magazine	mm	130		
Max. tool diameter – in fully loaded magazine – in free neighbouring areas	mm	125		
	mm	320		
Max. tool length	mm	500		
Max. tool weight	kg	25		
Max. tool weight in the chain	kg	1 000		
Tool change period (tool-tool)	sec	14		



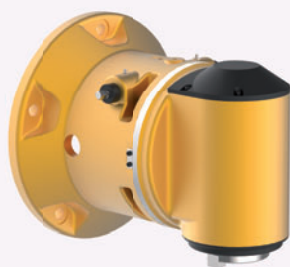
Milling heads

Hand-adjustable heads

FP 40 / 50

The milling machine serves as an accessory to the WH 10 CNC and WHN(Q) 13 CNC machines. It is suitable for milling flat surfaces or planing of faces. Manual attachment of the tool and the milling instrument on the machine.

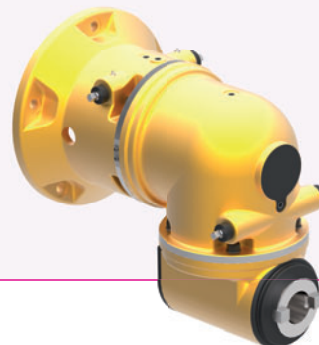
- number of axes: 1
- speed (min⁻¹): 900
- output (kW): 10
- moment (Nm): 250
- positioning: manual
- weight (kg): 180



UFP 40 / 50

Used as an accessory for the WH 10 CNC and WHN(Q) 13 CNC machines. It is suitable for machining variously inclined surfaces parallel with one of the machine's main axes. Manual attachment of the tool and the milling instrument on the machine.

- number of axes: 2
- speed (min⁻¹): 900
- output (kW): 10
- moment (Nm): 250
- positioning: manual
- weight (kg): 180



HPR 50

The right-angle manual HPR 50 head consists of two compactly joined basic parts, which can be mutually rotated to reach the required position of the work spindle head.

- number of axes: 1
- speed (min⁻¹): 3,000
- output (kW): 25
- moment (Nm): 1,200
- positioning: manual
- weight (kg): 200



HUR 50

Universal hand-positioned milling head HUR 50 head consists of three compactly joined basic parts, which can be mutually rotated to reach the required general position of the work spindle head. The adjustment angles have the increment of 0.1° on circumferential scales fitted with nonius. For adjustment of parts of the head into 8 basic positions (4x90° in the vertical separating plane, 2x180° in the inclined separating plane).

- number of axes: 2
- speed (min⁻¹): 3,000
- output (kW): 20
- moment (Nm): 1,000
- positioning: manual
- weight (kg): 330



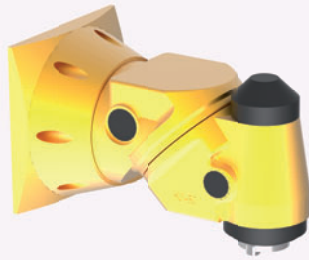
Table-type machines
Floor-type milling machines
Machining centres
Accessories
Components
References
TOS Olomouc

Automatically positioning heads

HUI 50

The HUI 50 milling head is automatically indexed in both planes in 2.5° , thus allowing higher efficiency of the spindle head's rotation against the orthogonal system of coordinates.

- number of axes: 2
- speed (min^{-1}): 3,000
- output (kW): 32
- moment (Nm): 1,000
- positioning: index 2.5
- weight (kg): 440



HUF 50

The milling universal continuously positioned HUF 50 head is used as a special accessory for the TOS VARNSDORF a.s. machines. The HUF 50 milling head can be positioned in both axes in 0.001° .

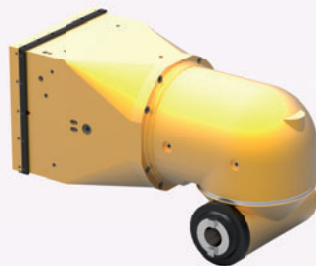
- number of axes: 2
- speed (min^{-1}): 3,000
- output (kW): 32
- moment (Nm): 1,000
- positioning: 2×0.001
- weight (kg): 600



HOI 50

The milling orthogonal automatically indexed HOI 50 head consists of three compactly joined basic parts, which can be mutually rotated in the A and C axes to reach the required general position of the work spindle head. The rotational parts are positioned by a mechanical drive from the machine's spindle, which allows positioning $\pm 185^\circ$ in axis C, $\pm 120^\circ$.

- number of axes: 2
- speed (min^{-1}): 4,000
- output (kW): 37
- moment (Nm): 1,200
- positioning: index 1°
- weight (kg): 1,100



HOF 50

Two-axis milling orthogonal head positional in both planes in 0.001° .

- number of axes: 2
- speed (min^{-1}): 4,000
- output (kW): 25
- moment (Nm): 800
- positioning: index 0.001°
- weight (kg): 500



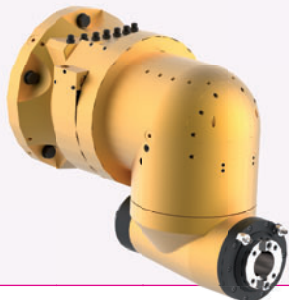
Milling heads

Automatically positioning heads

HOIL 50

The orthogonal automatically indexed light HOIL 50 head is based on the same concept as the milling head HOI 50.

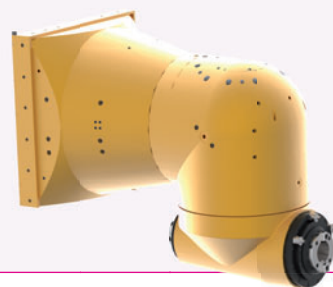
- number of axes: 2
- speed (min⁻¹): 3,500
- output (kW): 25
- moment (Nm): 1,000
- positioning: index 1°
- weight (kg): 450



HOIT 50

The two-axis milling heavy orthogonal HOIT 50 head is designed as a special accessory especially for hydrostatic machines.

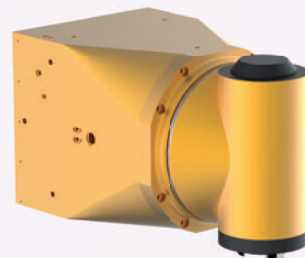
- number of axes: 2
- speed (min⁻¹): 2,000
- output (kW): 50
- moment (Nm): 2,500
- positioning: index 1°
- weight (kg): 1,100



HPI 50

Single-axis right-angle milling head positioned in 1°.

- number of axes: 1
- speed (min⁻¹): 3,500
- output (kW): 37
- moment (Nm): 1,200
- positioning: index 1°
- weight (kg): 600

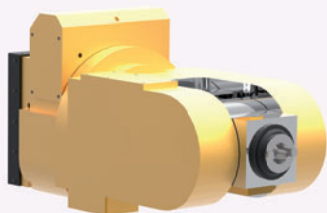


Automatically positioning – Continuously controlled heads

HV / V

The head consists of three compactly joined basic parts with mutual rotation in the A and C axes. The mutual movement of these parts is provided by separate servo drives, which allow continuous positioning in full rotation range and smooth movement of both axes during machining.

- number of axes: 2
- speed (min⁻¹): 3,500
- output (kW): 22
- moment (Nm): 300
- positioning: 0.001°
- weight (kg): 800



HV / E-H

Fork-type one- or two-axis milling head with integrated electric spindle.

- | | | |
|-------------------------------|---------|---------|
| • number of axes: | 2 | 2 |
| • speed (min ⁻¹): | 22 000* | 18 000* |
| • output (kW): | 20* | 28* |
| • moment (Nm): | 30* | 90* |
| • positioning: | 0,001° | 0,001° |
| • weight (kg): | 800* | 800* |



* another type of electrospindle or milling head can be discussed with the machine tool manufacturer

Milling heads

Assortment of milling heads

Head assortment	FP / UFP	HPR 50	HUR 50	HPI 50	HUI 50	HUF 50	HOI 50	HOIL 50	HOIT 50	HOF 50	HV/V	HV/E-H
WH 10 CNC	✓	✓										
WH(Q) 105 CNC		✓	✓									
WHN 110 (Q,MC)		✓	✓									
WHN 130 (Q,MC)		✓	✓		✓			✓		✓		
WHN(Q) 13/15 CNC	✓	✓	✓		✓	✓		✓		✓		
WHR 13 Q	✓	✓	✓		✓	✓		✓		✓		
MAXIMA		✓	✓	✓	✓	✓	✓	✓		✓	✓	
WRD 13 (Q)	✓	✓	✓		✓	✓		✓		✓		
WRD 130 / 150 (Q)		✓	✓	✓	✓	✓	✓	✓		✓	✓	
WRD 170 (Q)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
GRATA		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
WRD 180 H		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
PRIMA		✓			✓	✓		✓		✓		✓
OPTIMA		✓	✓		✓	✓	✓	✓		✓		✓
WHtec 130		✓	✓		✓	✓	✓	✓		✓	✓	✓

Facing heads

D'Andrea facing head

- Maximum boring diameter: 1 000 / 1 250 / 1 400 mm
- Plate dimensions: 500 / 600 / 800 mm
- Traverse range: 160 / 200 / 250 mm
- Boring accuracy: 0,01 mm
- Positioning: Automatic

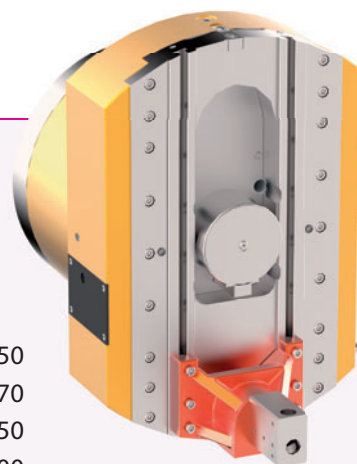


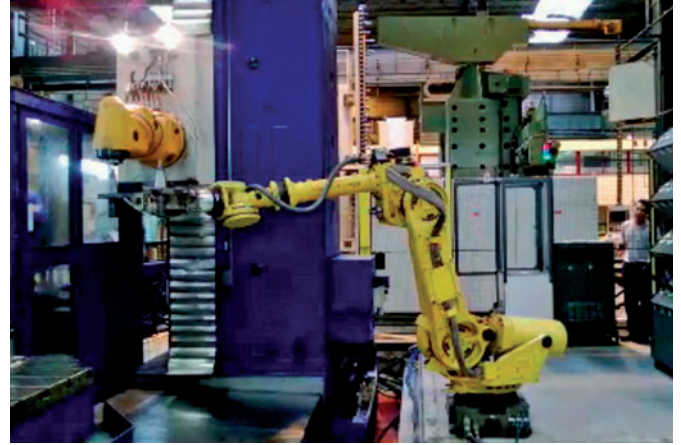
LD 650

The facing head consists of an axially symmetrical rotational basic body fitted with an axial hole for potential passage of the machine's work spindle and a slide conducted perpendicularly to the body.

- The slide's adjustment
- Diameter of the basic body
- Max. speed of the facing head
- Max. allowable speed when the machine's work spindle is used
- Range of the slide's working traverses
- Slide's rapid traverse
- Max. diameter of face turning
- Range of the boring diameters

mm	650
mm	170
1/min	150
1/min	200
mm/min	1 – 1 000
mm/min	1 000
mm	1 000
mm	300 – 1 000





The operator's platform and the machine guards

The operator's cabin

To ease the operator's work, the machines are equipped with moveable cabins (horizontally and vertically adjustable).

The cabins move independently of the spindle head, thus ensuring the operator's excellent visual contact during machining, excellent access to the workpiece during its attachment or tuning the NC programme and comfortable manual tool replacement. The operator's cabins are sufficiently spacious, thus satisfying strict ergonomic demands.



The machine guards and design

The TOS VARNSDORF machines are delivered in modern designs, which satisfy the customers' ecological and ergonomic demands and correspond to the strictest safety standards (CE).

The guards also protect key components of the machine against mechanical damage and pollution.



GÜHRING



PROJECT DEPARTMENT

Complete project preparation from A to Z

- Design of new technology or optimization of the existing processes
- Drawing documentation, also in other languages
- 3D construction Siemens NX9
- Technology operations timing
- Checking collision conditions in 3D graphics
- Technical training to develop customres skills and knowledge



CLAMPING DEVICES GM300

- Hydraulic chucks
- Shrinkfit chucks
- Side lock holders (type Weldon and Whistle Notch, ...)
- Collet holders
- Special holders (HPC, Synchro chucks, ...)



FROM SULKOV CZECH REPUBLIC PLANT

COMPLETE PRODUCT PORTFOLIO

- Drills and gun drills
- Threading tools
- Milling cutters
- Reamers
- Countersinks
- Modular systems
- PKD/CBN tools
- Special tools for specific applications
- MICRO turning tools (grooving, internal turning, broaching,...)



1991 Foundation of Gühring oHG
Sales Agency for the CR

1993 Production start
in the CR, brazed tools

1996 Introduction of
gun drill production

1996 Start of production
in the new plant at
Líně-Sulkov

1996 Introduction of
reamer production

1999 Introduction of
micro-drill production

2000 Establishment of
a machinery and equipment
assembly department
Establishment of a service department/
tool sharpening + coating/

2001
Certification to ISO 9001

2003
Certification to ISO 14001

2005 Introduction of
tool clamp production

2010 Plant reconstruction
+ extension of production departments

2012 Introduction of production
of tools with PKD/CBN

2013 Addition + extension of
production shops

2014 Introduction of
production of HT 800

2015 Establishment of the
Research&Development

2016 Certification to ISO 18001
Introduction of production of carbide
micro-drills and micro-reamers

GÜHRING, s.r.o.

Na Perkách 608
330 21 Líně - Sulkov
WWW.GUEHRING.CZ

Tel.: +420 378 212 200
Fax: +420 378 212 220
E-mail: sekretariat@guehring.de

Control systems

Specifications of the HEIDENHAIN iTNC 530 HSCI, Siemens Sinumerik 840 D-SL or FANUC 30i / 31i control systems correspond to demands for control of all TOS VARNSDORF a.s. machines and demands for all technological operations performed on these machines.

The control systems allow simple control of the machine in the manual as well as fully automatic mode. As standard, the control systems are offered with 15" displays. The control systems can also be operated by a manual wheel and control panel for automatic tool replacement.



HR510



HR520



HR550



Heidenhain iTNC 530 HSCI



HT2



HT8



Mini HHU



Siemens Sinumerik 840 D-SL



HMOP



I-Pendant



Fanuc 31i

Table-type machines

Floor-type milling machines

Machining centres

Accessories

Components

References

TOS Olomouc



HEIDENHAIN



+ TNC 640 – High-End Control for Milling and Turning Operations

The TNC 640 from HEIDENHAIN: for the first time, milling and turning are combined in one TNC. Now users can switch as desired between milling and turning—within the same NC program. Switchover is independent of the machine kinematics. It automatically takes the respective operating mode into account and without any additional action. This new simplicity is complemented by dialog-guided plain language programming, the optimized user interface, powerful programming aids as well as comprehensive cycle packets taken from amply field-proven HEIDENHAIN controls into the TNC 640.

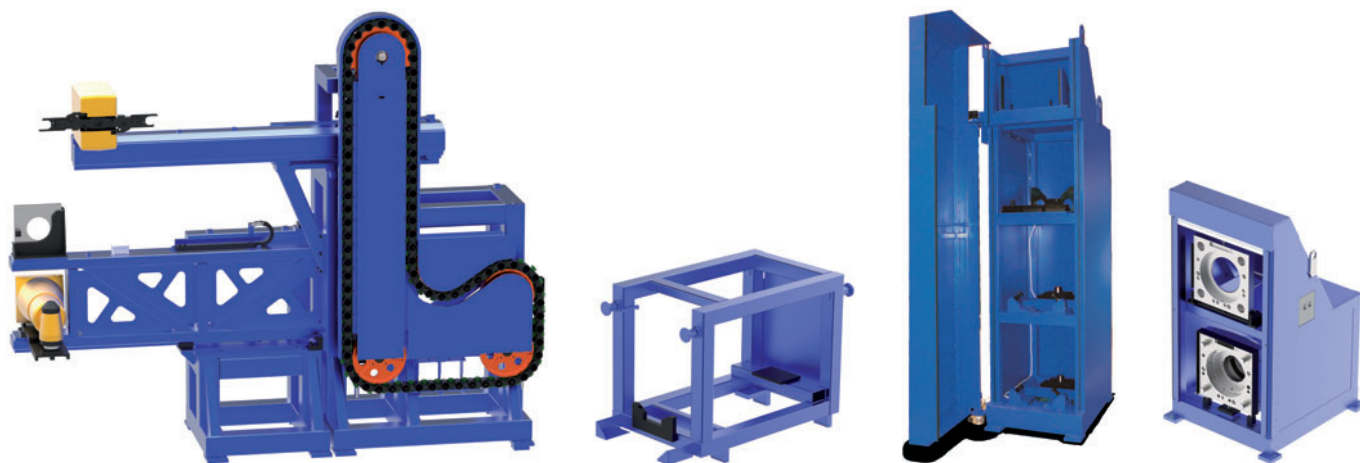
HEIDENHAIN s.r.o. 10200 Prague 10, Czech Republic Phone +420 272 658 131 www.heidenhain.cz

Angle Encoders + Linear Encoders + Contouring Controls + Position Displays + Length Gauges + Rotary Encoders

Other accessories and services

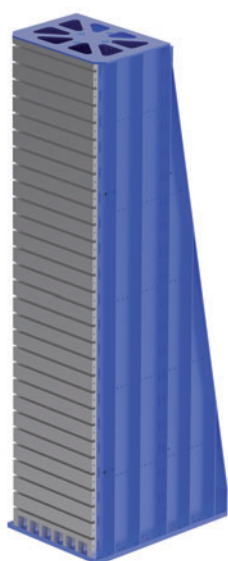
PICK UP system

Special technological accessories can be put aside and replaced using the PICK-UP system by means of a column for special accessories whose design (the number of storage sites, method of location, etc.) follows the customer's special demands. The table-type machines have two versions of column guard, i.e. with a swivelling or rolling opening. For the table-type machines, it is possible to choose a supplementary stand, which is attached and locked on the turning table, an additional stand, which is locked on swivelling arms on the turning table or a stand, which is located on a concrete floor next to the machine; this concept can also be applied to the machining centres PRIMA, OPTIMA and WHtec 130.



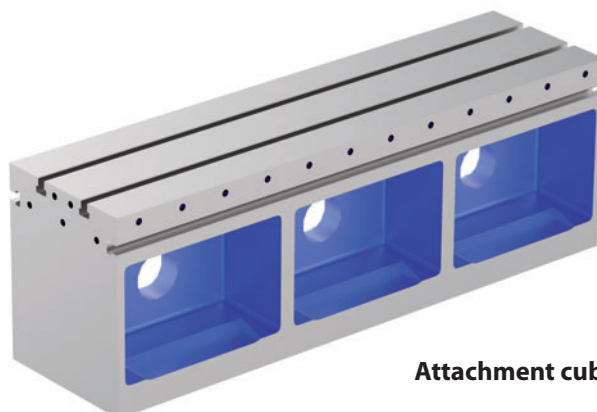
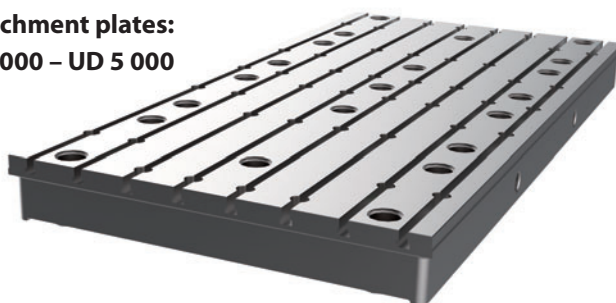
Attachment equipment

The attachment devices are used as special technological equipment for horizontal boring machines. They are used for attachment of the workpiece.

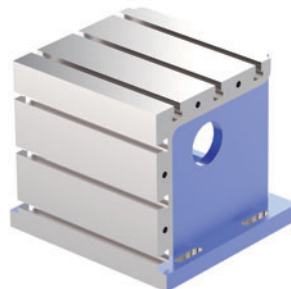


Attachment angle pieces:
UU 800 – UU 6 000

Attachment plates:
UD 2 000 – UD 5 000



Attachment cubes: UK 500 – UK 3 000



Spindle guide supports 340 - 650

The guide support provides increased rigidity of the housing and guiding of the work spindle, thus making it usable for power machining or precise machining at large traverses within the entire range of speeds, while allowing traverse of the work spindle.



Tool cooling

Two tool cooling methods can be applied on the TOS VARNSDORF a. s. machines. Cooling by adjustable nozzles (CHZ) or internal axial tool cooling (CHOV). The axial cooling can be used with an inserted milling head.

Chip conveyor

It is possible to supply the machine with a chip conveyor at customer demand. The length of the conveyor and the delivery height can be adjusted to the user needs..



Probes

All control systems can use various types of measurement probes.

TOSwide

We also offer a system of services for permanent care of the customer.

TOSwide potentialities:

- visualization of the current screen of the connected control system and its remote controlling
- reception of data from connected control system for inspection
- quick remote solution of problems (error determination) on the machine tool – transfer of interactive data on the machine's condition
- diagnostics of drives, measurements and indication of the machine's inputs/outputs
- transfer of data from the service network into the customer's control system as a support during technological utilization of the machine (transfer of NC programmes, tool tables and zero points) and modifications of the machine's properties (transfer of PLC programmes and machine parameters).

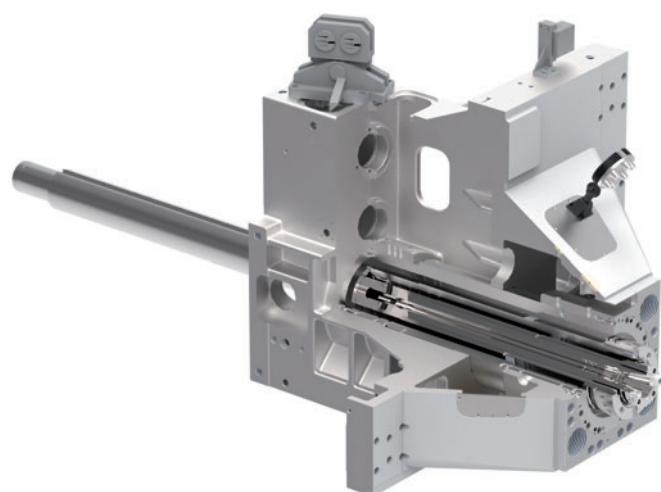
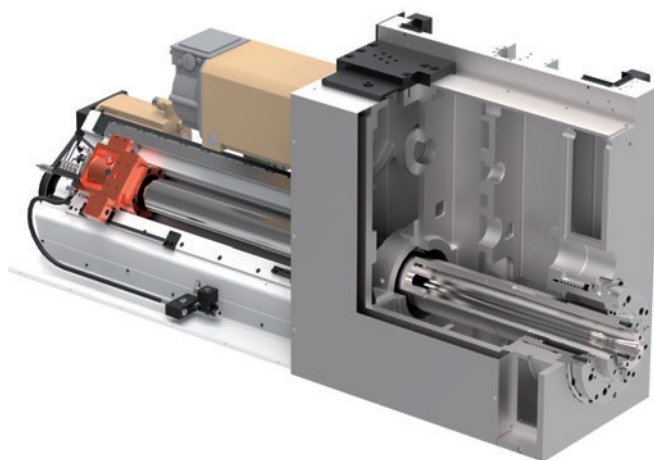


Headstocks

Headstocks for the WH machines: 10, 105, 110, 130, 13, 15

They contain complete nodes and mechanisms of the spindle housing and driving (the C axis) and traverse of the work spindle (W axis) including chucking of the tool. It is possible to connect special removable accessories on the headstock face such as guiding supports, facing heads, milling heads, etc.

The spindle is housed in precise spindle ball bearings with oblique-angled contact of increased accuracy in multiple arrangement with a prestress. The spindle weight is balanced by a counter-weight suspended on cables and conducted in the stand.



Headstocks for machining centres: PRIMA, OPTIMA, WHtec 130, GRATA

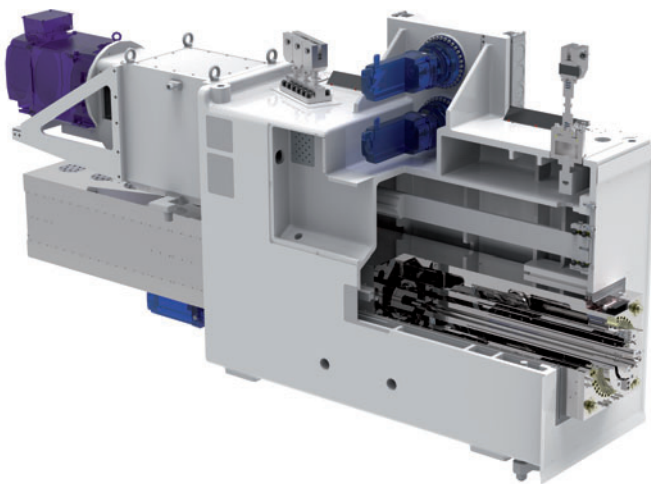
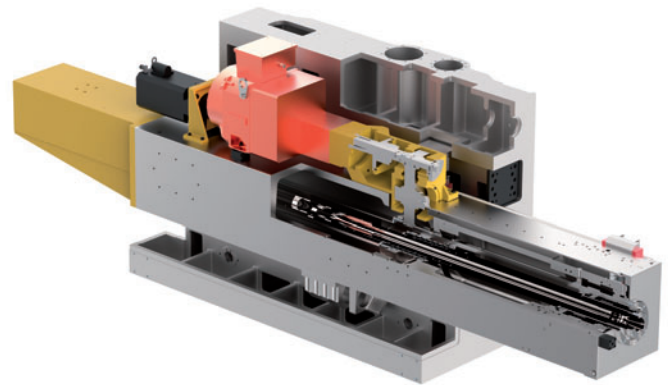
Headstocks for machining centres are produced with centrally conducted spindle. This concept is optimal as regards even thermal and power load on the machine's frame. The headstock consists of a solid plate, which carries the boom, the main motor and other nodes and mechanisms of the housing and the spindle drive, differing according to the type of spindle head. In machines with traversing spindle (PRIMA, OPTIMA, WHtec 130), the main housing consists of a set of hollow and work spindle. The traversing work spindle is nitrided, housed with a minimum allowance in an all-nitrided hollow spindle.

The hollow spindle is housed in a set of highly precise pre-stressed spindle bearings with oblique contact. In the GRATA machine headstock, a tool-holding slide is slidingly inserted. The headstock incorporates electro-mechanical deformity compensation during traverse of the tool-holding slide. The spindle drive is conducted through a standardized gearbox connected to the main motor, where two mechanical speed ranges of the spindle are electromechanically engaged.

Headstocks for the WHR / WRD machines: 13, 130, 150, 160, 170, MAXIMA

The basic body is a rigid casting from ductile iron; like other corresponding parts, they have an L shape, which creates a guide for the tool-holding slide. The concept of the WRD 130 – 170 headstocks allow electro-mechanical compensation of the tool-holding slide's drop during its traverse in the Z axis. The tilting of the WHR / WRD 13 tool-holding slide is compensated by a height-adjustable plate in the rear section of the headstock.

The drive of the work spindle is derived from the electric regulation drive through a two-speed gearbox. The weight of the WRD 130 – 170 headstock is balanced by a hydraulic cylinder. The balancing equipment also includes pressure cylinders for the hydraulic oil and gas located on the column rails. The weight of the WHR / WRD 13 headstock is compensated by a counter-weight housed in the stand's hollow.



Headstocks for hydrostatic machines WRD H: 160, 180, 200

The headstock housing is a rigid casting from high-quality grey cast iron, which is followed by other groups of the machine. The internal area of the casting has a horizontal square tunnel with precisely machined surfaces for guiding the tool-holding slide. The drive of the work spindle is derived from powerful electric regulation drive through a robust two-speed gearbox. Three mechanical speeds of the gearbox are shifted automatically. Two traverse motors incorporated in the internal section drive the headstock in the Y coordinate.

Other components

Lubrication system

The automatic loss lubrication system with a central lubrication aggregate ensures lubrication of sliding guide surfaces of adjustable groups and the ball nuts in the traverse drives. Cogwheels of the spindle drive in the headstock are lubricated by a circulating oil system.



Energy sources

The electrical equipment is mostly located in a four-part electric box. It includes the basic module of the control system and control of drives and traverses as well as the spindle and all supply, switch and protection elements. The equipment was produced by renowned manufacturers (Telemècanique, Merlin Gerin, Siemens).

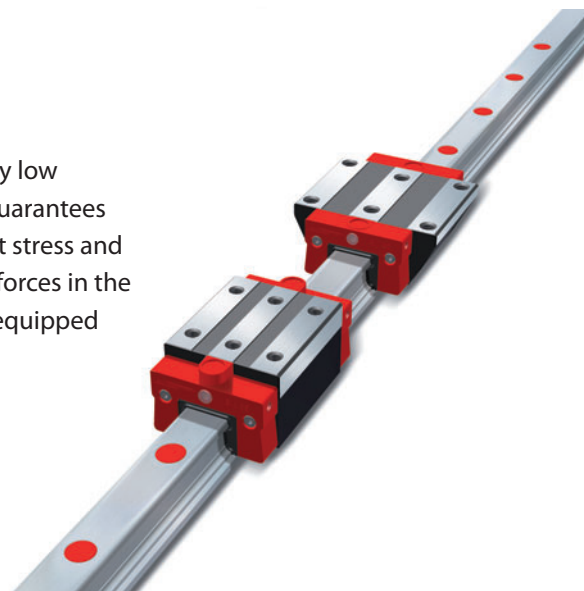
Hydraulic aggregate

The source of pressure oil for lubrication of the guide surfaces comes from a lubrication aggregate located together with the hydro-aggregate in a separate energy box



Linear guides

This concept ensures high accuracy and rigidity of the guides at a very low friction coefficient; it allows application of high traverse speeds and guarantees long life. The individual linear guides are located in areas of the largest stress and force transmission. Thanks to the profile rail, the carriage can capture forces in the vertical and horizontal direction. Machines with linear guides can be equipped with direct gauging integrated directly in the linear guide.





HEIDENHAIN



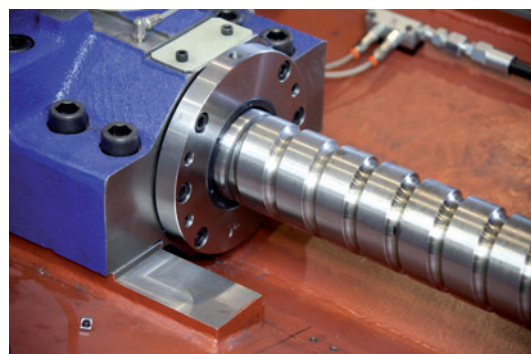
+ All-Around Protected Touch Probe

The TS 460 touch probe from HEIDENHAIN helps you in workpiece setup and measurement in the machine tool's working space. One innovation is the mechanical collision protection between the touch probe and taper shank: in the event of a light collision of the TS with the workpiece, the adapter allows the touch probe to yield. At the same time, the control stops the probing process. Neither the probe nor the machine suffers damage. At the same time, the collision protection adapter also functions as a thermal decoupler, protecting the touch probe from excessive heating through the spindle during very long or intensive probing processes.

Other components

Gauging

As standard, the linear axes X, Y, Z are equipped with direct measurement with closed electro-optical HEIDENHAIN gauges.

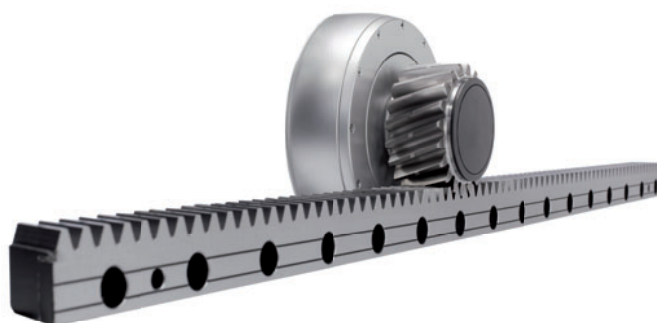


Ball screws

The linear axes are driven by ball screws with pre-stressed nuts. Sufficient diameters of the ball screws guarantee top-level rigidity of the drive in the individual linear axes.

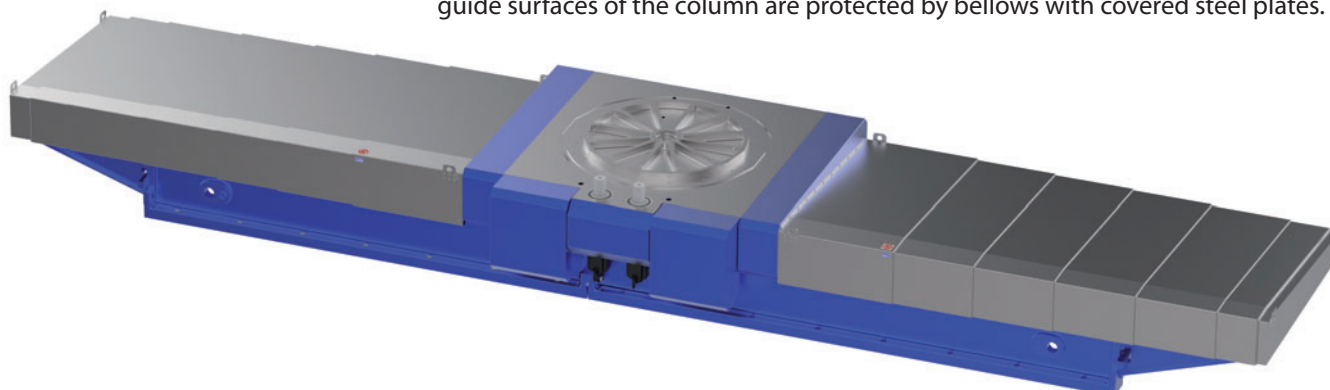
Toothed shaft

If the X axis is longer than 6,000 mm, the ball screw is replaced with a toothed shaft. This concept is driven by an AC-digital servo drive and a pinion - toothed shaft gear (the master slave system).



Telescopic guards

The guides on the rails are protected against dirt by telescopic guards and the guide surfaces of the column are protected by bellows with covered steel plates.



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WRD 130 Q
Manoir Industries – France

X = 9 000 mm
Y = 2 500 mm
ATC = 40
Table clamping surface
= 1 800 x 2 200 mm (20t)



WRD 170 Q
GE CANADA – Canada

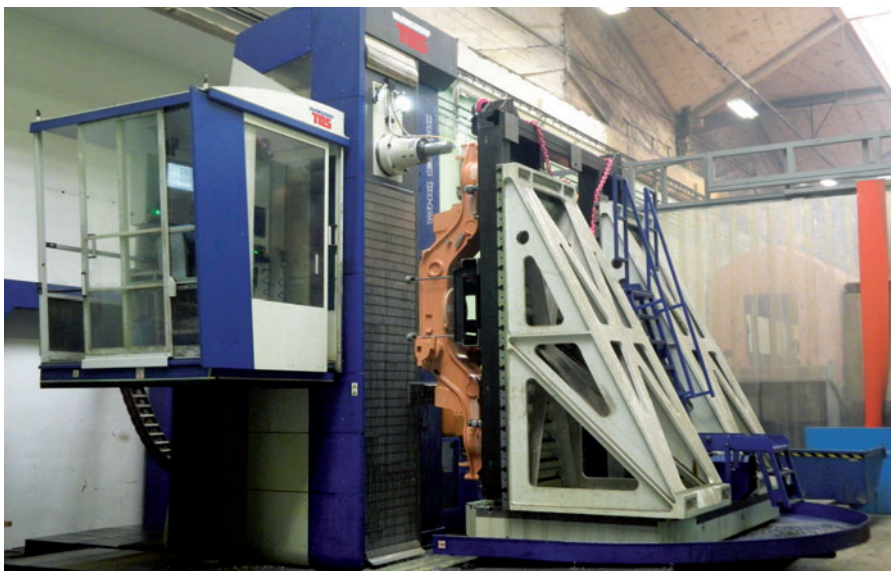
X = 13 000 mm
Y = 4 000 mm
ATC = 80
Table clamping surface
= 3 000 x 3 500 mm (50t)



3x WRD 150 Q
Indian Railways - India



**3x machine TOS Varnsdorf
WHQ 15 CNC, WHQ 13 CNC,
WHN 110 Q
Strojirna TYC s.r.o. – Czech Republic**



**WHN 13 CNC
PARS NOVA a.s. – Czech Republic**

X = 6 000 mm
Y = 3 500 mm
Z = 2 200 mm
Table clamping surface
= 2 000 x 3 000 mm



**WHQ 13 CNC
Hiecise Heavy
– duty Machines Co., Ltd. – China**

X = 3 500 mm
Y = 2 500 mm
Z = 1 600 mm
ATC = 60
Table clamping surface
= 1 800 x 2 200 mm (12t)



WHN 130 Q

Fasten Group IMP. / Exp. Co., Ltd.
– China

X = 3 000 mm

Y = 1 600 mm

Z = 1 000 mm

ATC = 40

Table clamping surface
= 1 800 x 2 240 mm (12t)



WRD 130 Q

Strojírny Prostějov
– Czech Republic

X = 9 000 mm

Y = 3 000 mm

ATC = 40



WRD 170 Q

JOY Global Inc. – Chile

X = 17 000 mm

Y = 6 000 mm

ATC = 80 mm

Table clamping surface
= 5 000 x 5 000 mm (65t)

**WHN 130 MC**

Solar Turbines EAME s.r.o.
– Czech Republic

X = 2 000 mm

Y = 2 240 mm

Z = 1 250 mm

2x clamping pallette 1 600 x 1 800 mm

ATC = 120

**WHQ 105 CNC**

Engcon – Poland

X = 1 800 mm

Y = 1 250 mm

Z = 1250 mm

ATC = 40

Table clamping surface
= 1 400 x 1 400 mm (5 t)

**WHQ 13 CNC**

Frýdlantské strojírny
– Czech Republic

X = 3 500 mm

Y = 2 500 mm

Z = 1 250 mm

ATC = 40

Table clamping surface
= 1 800 x 2 200 mm (12t)



WRD 150 Q
S.E.P.F.A. – France

X = 8 000 mm
Y = 3 000 mm
ATC = 40
Table clamping surface
= 2 000 x 2 500 mm (25 t)



WH 10 CNC
Škoda auto Mladá Boleslav
– Czech Republic

X = 1 250 mm
Y = 1 100 mm
Z = 940 mm
Table clamping surface
= 1 000 x 1 120 mm (3 t)



WRD 130 Q
Faymonville – Belgium

X = 11 000 mm
Y = 4 000 mm
ATC = 80
Milling head HOI 50

X Y Z



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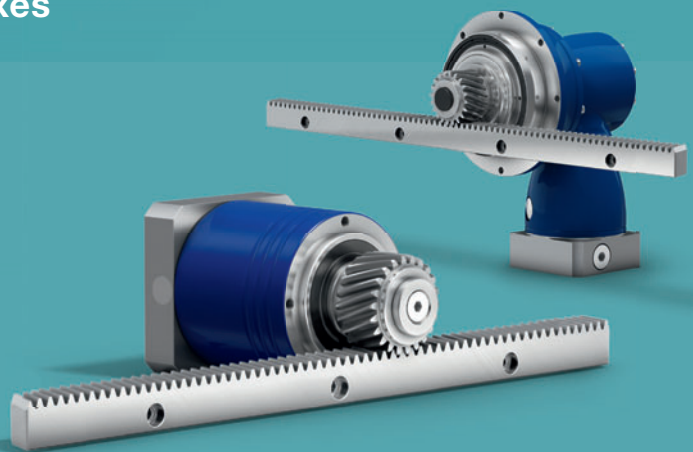
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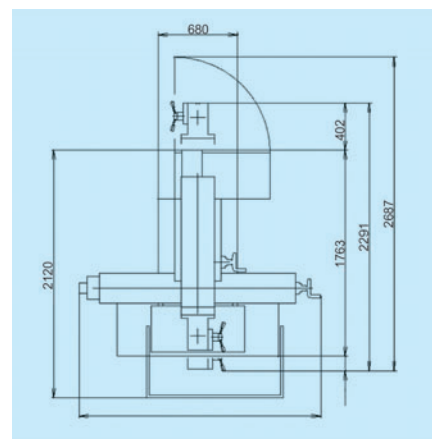
www.wittenstein-alpha.com



alpha

FNGJ 40 / 50 A

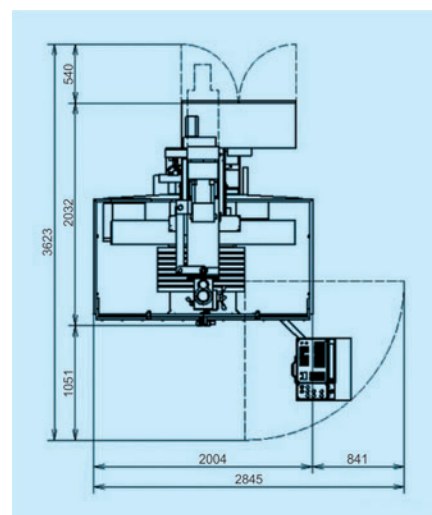
The FNGJ 40 / 50 A machine is a conventional milling machine designed for milling, drilling, boring and thread-cutting operations on workpieces of up to 350 kg in small-series manufacture, mainly in the toolrooms. It is supplied with a horizontal spindle housed in a tool-holding slide spindle head. The machine is also equipped with a vertical head with a lifter and fixed angle table. The vertical head is equipped with a manually traversed tailstock; the spindle can be tilted in the range of $\pm 90^\circ$. The machine is also equipped with tool cooling, a light and a safety guard of the working space.



		FNGJ 40 A	FNGJ 50 A
Table	mm	800 x 400	900 x 500
Working travels			
– longitudinal	mm	600	700
– crosswise	mm	400	500
– vertical	mm	400	500
Tailstock travel	mm	80	80
Spindle		ISO 40	ISO 40
Speed	min ⁻¹	50 – 4 000	50 – 4 000
Motor output	kW	4,0	4,0
Total input of the machine	kVA	22	22
Built-up area	mm	2 070 x 2 120	2 170 x 2 120
Height	mm	2 115	2 115
Weight	kg	2 500	2 500

FNG 40 / 50 CNC A

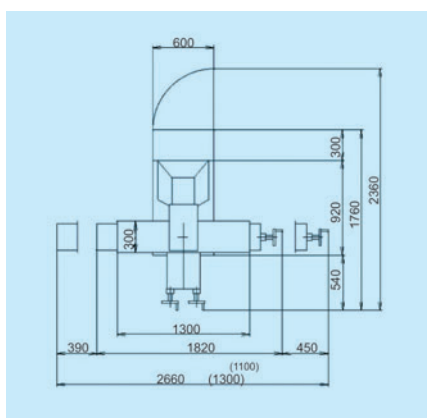
The FNG 40 / 50 CNC A machine is a milling machine with continuous control in three coordinates designed for milling, drilling, boring and thread-cutting operations on workpieces of up to 350 kg. It is equipped with a horizontal spindle in the tool-holding slide spindle and vertical spindle in the spindle head, which can be tilted within $\pm 90^\circ$. It is delivered with a vertical head with lifter and a fixed angle table. The spindle is driven by a motor with smooth speed control. As standard the machine is equipped with tool cooling, a light and a safety semi-cabin guard of the working space.



		FNG 40 CNC A	FNG 50 CNC A
Table	mm	800 x 400	900 x 500
Working travels			
– longitudinal	mm	600	700
– crosswise	mm	400	500
– vertical	mm	400	500
Tailstock travel	mm	80	80
Spindle		ISO 40	ISO 40
Speed	min ⁻¹	50 – 4 000	50 – 4 000
Motor output	kW	5,5	5,5
Total machine input	kVA	20	20
Built-up area	mm	3 623 x 2 845	3 623 x 2 845
Height	mm	2 120	2 120
Weight	kg	2 750	2 750

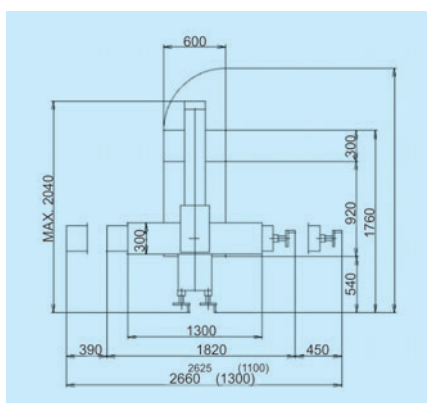
F2V-R

The F2V R knee-type milling machine (regulating) is designed for milling and drilling operations of workpieces of up to 200 kg in all spheres of mechanical manufacture. The headstock with spindle housed in extensible tailstock can be tilted in the longitudinal plane of the table. The machine's potentialities can be extended by using special equipment.



FNK2-R

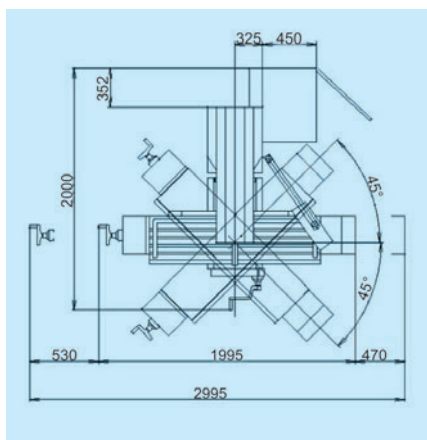
The knee-type milling machine FNK2 R (regulating) is a multi-purpose machine tool for milling, drilling and boring operations on workpieces of up to 200 kg in all spheres of mechanical manufacture, mainly in toolrooms. The arm with the spindle can be moved in the swivelling guide and turn it around its vertical axis. The headstock with spindle housed in extendable tailstock is turning in two mutually perpendicular planes. The machine's potentialities can be extended by using special equipment.



		F2V-R	FNK2-R
Table	mm	300 x 1 300	300 x 1 300
Working travels			
– longitudinal	mm	840	840
– crosswise	mm	376	376
–vertical	mm	420	460
Tailstock travel	mm	125	127
Spindle		ISO 40	ISO 40
Speed	min ⁻¹	60 – 4 000	60 – 4 000
Motor output	kW	3	3
Total machine input	kVA	12	12
Built-up area	mm	2 660 x 1 730	2 660 x 2 040
Height	mm	2 270	2 250
Weight	kg	1 550	1 700

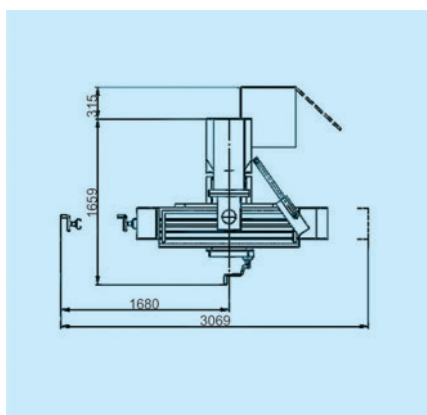
FGU 32

The FGU 32 milling machine is a highly powerful milling machine with a horizontal spindle. The machine is designed for accurate and efficient milling of flat and box-type workpieces of up to 250 kg in single-part production as well as series manufacture. The range of spindle speeds and working traverses allow economical machining of various materials by tools from high-speed steels and cemented carbide. A divided transverse table allows turning of the longitudinal table around its vertical axis, thus strongly extending utility of the machine.



FGV 32

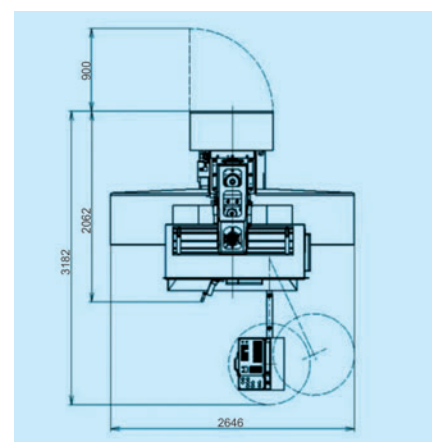
The FGV 32 milling machine is a highly powerful milling machine with a vertical spindle. The spindle is housed in a tilting headstock with an extensible tailstock. The machine is designed for a broad range of milling and drilling operations on workpieces of up to 250 kg in single-part production as well as series manufacture.



		FGU 32	FGV 32
Table	mm	360 x 1 400	360 x 1 400
Working travels			
– longitudinal	mm	1 000	1 000
– crosswise	mm	275	300
– vertical	mm	420	420
Tailstock travel	mm	–	75
Spindle		ISO 50	ISO 50
Speed	min ⁻¹	31,5 – 1 400 45 – 2 000	31,5 – 1 400 45 – 2 000
Motor output	kW	5,5	13
Total machine input	kVA	5,5	13
Built-up area	mm	2 995 x 2 000	2 995 x 2 000
Height	mm	1 980	2 100
Weight	kg	2 900	2 860

FV 30 CNC A

The FV30 CNC A milling machine is a continuously controlled knee-type milling machine where the controlled movement in the vertical direction is performed by the tailstock with spindle. This machine is characterized by a very favourable ratio between the price and the technical parameters. The machine can be used in production of complicated components with a large proportion of drilling, boring and thread-cutting operations. The rigid headstock and spindle belt drive guarantee a smooth operation at the highest speed. The well-dimensioned drive and broad range of spindle speed allow efficient machining of all types of metals, from tool steels to light metal alloys.



		FV 30 CNC A
Table	mm	305 x 1 300
Working travels		
– longitudinal	mm	760
– crosswise	mm	380
– vertical	mm	152
Tailstock travel	mm	450
Spindle		ISO 40
Speed	min ⁻¹	50 – 6 000
Motor output	kW	5,5
Total machine input	kVA	22
Built-up area	mm	2 646 x 3 182
Height	mm	2 250
Weight	kg	2 300





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