

Your partner for future machining



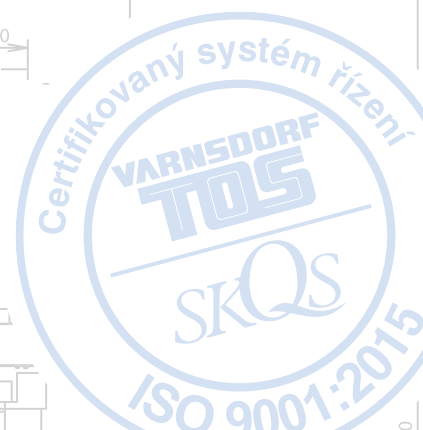
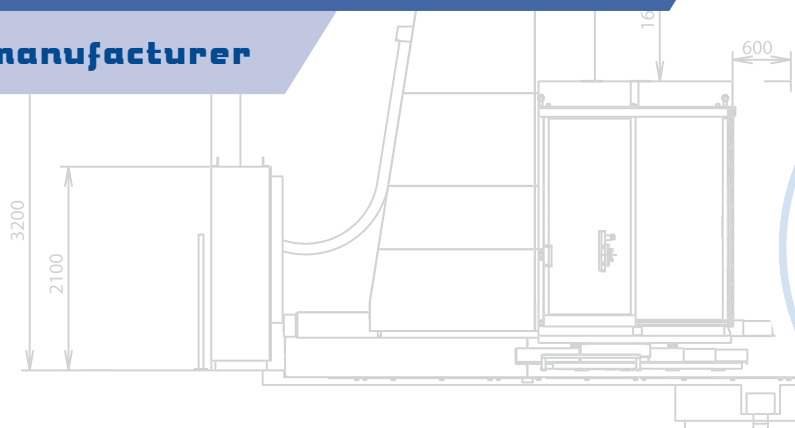
**The best-selling
machine
since 1968**



PRODUCTION PROGRAMME

TOS VARNSDORF a.s.

Milling machine manufacturer



53.4 mil €

Annual turnover
in 2019

30

Located on a site
larger than
30 Football Pitches

455

Number
of employees

1903

The company
was established
in 1903

10

Subsidiaries
companies around
the world

19,775

Machines sold
between 1941 and 2019

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(Q) 10 CNC, WH(Q) 105 CNC, WHN 110 / 130 (Q, MC), WHN(Q) 13 / 15 CNC, WHR 13 (Q) and MAXIMA I / II 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(Q) 10 CNC



WH(Q) 105 CNC



WHN 110 / 130 (Q, MC)



WHN(Q) 13 / 15 CNC



WHR 13 (Q)



MAXIMA I / II

Table-type machines

WH(Q) 10 CNC



WH(Q) 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 – basic version with work spindle diameter 100 mm
 - WHQ 10 CNC – version with an automatic tool change

TECHNICAL PARAMETERS

Headstock		
Work spindle diameter	mm (in)	100 (3.9370)
Spindle taper		ISO 50
Work spindle speed range	1/min	10 – 2 500
Main motor power (S1 / S6 – 60%)	kW (HP)	22.5 (30.6) / 34 (46.2)
Torque on spindle (S1 / S6 – 60%)	Nm (ft lb)	812 (598.9) / 1 218 (898.4)
Spindle stroke W	mm (in)	710 (27.9527)
Column		
Headstock vertical travel Y	mm (in)	1 100 (43.3070)
Table longitudinal travel Z	mm (in)	940 (37.0078)
Rotational table		
Table transverse travel X	mm (in)	1 250 (49.2125)
Max. workpiece weight	kg (lbs)	3 000 (6613)
Table clamping area	mm (in)	1 000 x 1 120 (39.3700 x 44.0944)
Feeds		
Range of feeds (working and rapid traverse) – X, Y, Z, W	mm/min (ipm)	4 – 8 000 (0.1574 – 314.9606)
– B	1/min	0.003 – 2

Walter innovations are setting standards.



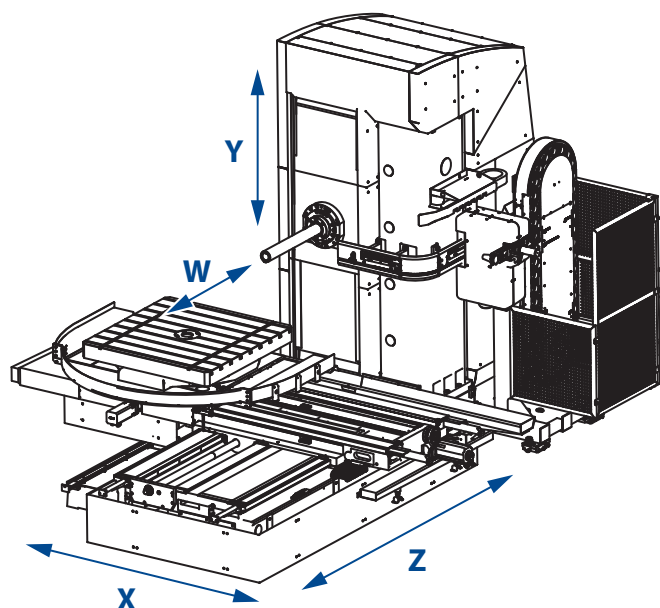
Walter innovations are setting standards worldwide

As a premium manufacturer of metal cutting tools, Walter enjoys an excellent reputation among customers and users worldwide. Whether it is innovative milling bodies and indexable inserts, new drill concepts or multi-stage thread milling cutters: Walter is setting standards in turning, milling, holemaking and threading – across the industry. More than 35% of the products we sell are less than five years old. With our innovations, we are ensuring that tools from Walter will continue to rank among the best in future.

Table-type machines

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 with work spindle diameter 105 mm
- WHQ 105 CNC – version with an automatic tool change
- „N“ headstock – suitable for power milling operations
- „R“ headstock – suitable for high-performance milling operations
- „R4“ headstock – high-speed version of headstock up to 4 000 rpm
- work table with maximum load 3 tonnes or 5 tonnes

TECHNICAL PARAMETERS

Spindle type		„N“	„R“	„R4“
Work spindle diameter	mm (in)	105 (4.1338)		
Spindle taper		ISO 50		
Work spindle speed range	1/min	10 – 2 300	10 – 3 300	10 – 4 000
Main motor power (S1)	kW (HP)	29 (39.4)		
Max. output of main motor (S6 – 60%)	kW (HP)	35 (47.6)		
Torque on spindle (S1)	Nm (ft lb)	1 170 (862.9)	921 (679.3)	
Max. torque on spindle (S6 – 60%)	Nm (ft lb)	1 462(1078.3)	1 148 (846.7)	
Spindle stroke W	mm (in)	630 (24.8)		
Column				
Headstock vertical travel Y	mm (in)	1 250 (49.2125), 1 600 (62.9921)		
Minimum height of spindle axis above work table	mm (in)	0		
Rotational table				
Max. workpiece weight	kg (lbs)	5 000 (11023) / 3 000 (6613)		
Table clamping area	mm (in)	1 400 x 1 400, 1 400 x 1 600 (55.1181 x 55.1181, 55.1181 x 62.9921)		
Table longitudinal travel Z	mm (in)	1 250 (49.2125)		
Table transverse travel X	mm (in)	1 800 (70.8661) / 2 000 (78.7401)*		
Feeds				
Range of feeds (working and rapid traverse) – X, Y, Z	mm/min (ipm)	5 – 10 000 (0.1968 – 393.7007)		
– W	mm/min (ipm)	5 – 8 000 (0.1968 – 314.9606)		
– B	1/min	0.003 – 2		

* max. workpiece weight 3 000 kg (6613 lbs)



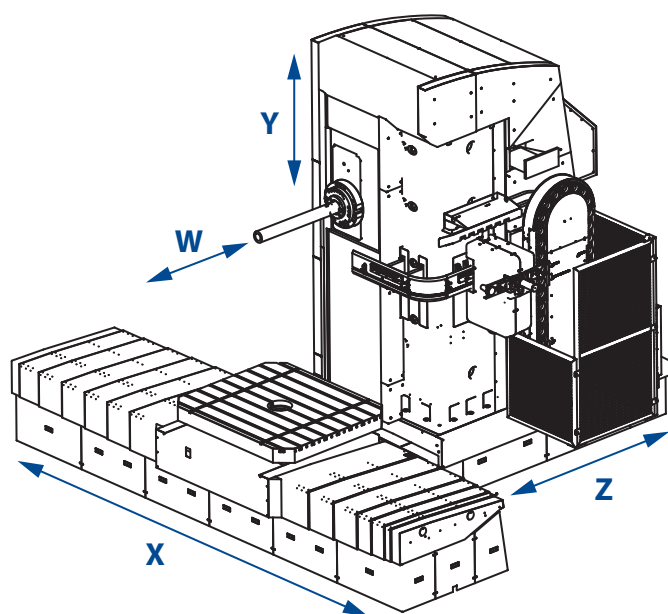
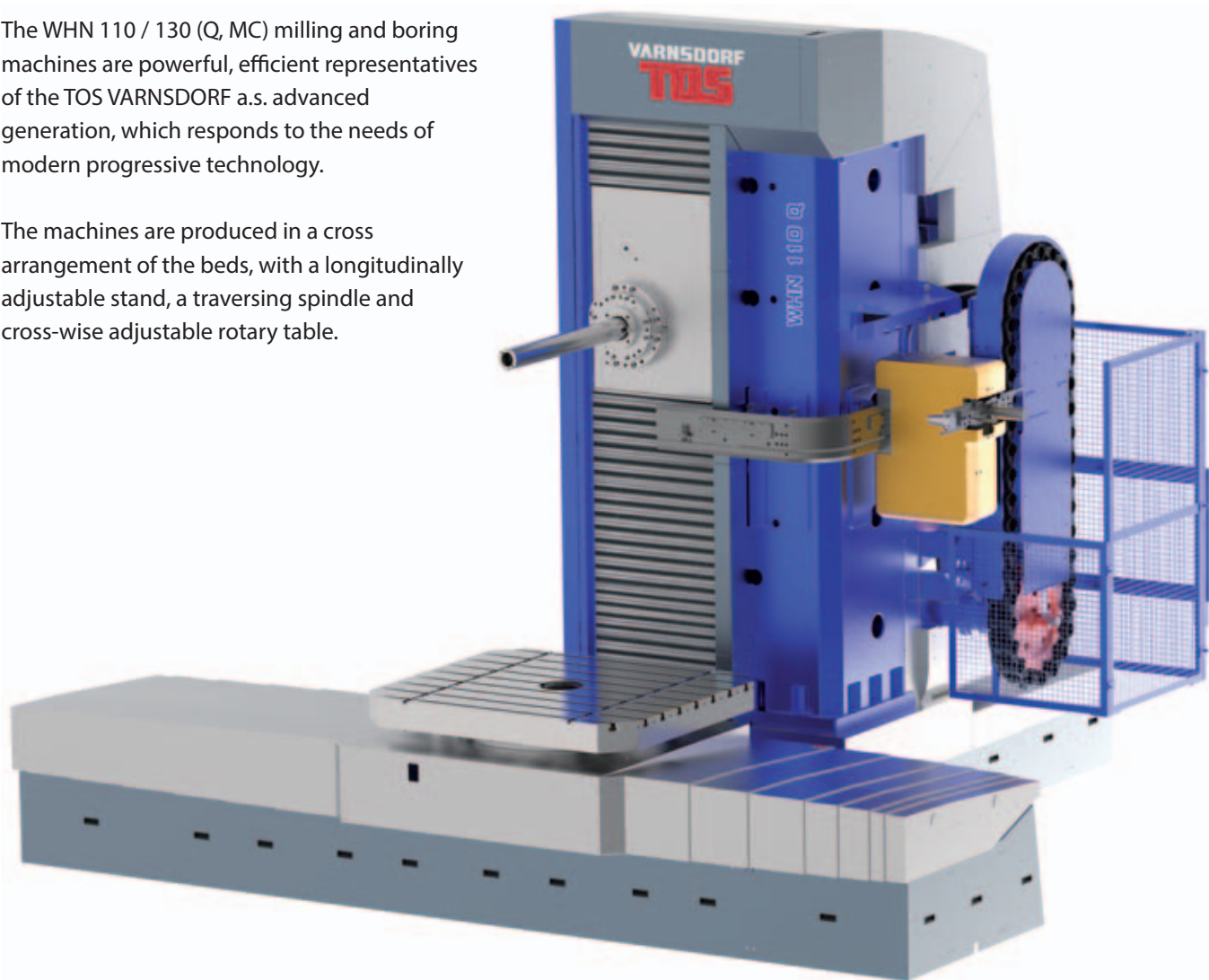
Customised solution for special products and series production.



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 – basic version with work spindle diameter 112 mm
- WHN 130 – basic version with work spindle diameter 130 mm
- WHN 110/130 Q – version with an automatic tool change
- WHN 110/130 MC – version with an automatic palette change
- variable work table clamping area size

TECHNICAL PARAMETERS

Machine type		WHN 110 (Q, MC)	WHN 130 (Q, MC)
Headstock		„N/R“	„N/R“
Work spindle diameter	mm (in)	112 (4.4094)	130 (5.1181)
Spindle taper		ISO 50 / ISO 50 BIG+	
Work spindle speed range	1/min	10 – 3 300	10 – 3 000
Main motor power (S1)	kW (HP)	41 (55.7)	
Max. output of main motor (S6 – 60%)	kW (HP)	46 (62.5)	
Torque on spindle (S1)	Nm (ft lb)	1 463 (1079.1)	1 624 (1197.8)
Max. torque on spindle (S6 – 60%)	Nm (ft lb)	1 811 (1335.7)	2017 (1487.7)
Spindle stroke W	mm (in)	710 (27.9527)	800 (31.4960)
Column			
Headstock vertical travel Y			
– version with normal rotary table	mm (in)	1 250, 1 400, 1 600 (49.2125, 55.1181, 62.9921)	1 600, 2 000, 2 500 (62.9921, 78.7401, 98.4251)
– version with technological palette	mm (in)	1 120, 1 250, 1 400 (44.0944, 49.2125, 55.1181)	1 400, 1 800, 2 240 (55.1181, 70.8661, 88.1889)
Minimum height of spindle axis above work table / palette	mm (in)	50 (1.9685) / 0	
Column longitudinal travel Z	mm (in)	800, 1 000, 1 250 (31.4960, 39.3700, 49.2125)	1 000, 1 250, 1 600, 2 000 (39.3700, 49.2125, 62.9921, 78.7401)
Rotational table			
Max. workpiece weight	kg (lbs)	8 000 (17637)	12 000 (26455.5)
Table clamping area	mm (in)	1 250 x 1 400, 1 400 x 1 600, 1 400 x 1 800* (49.2125 x 55.1181, 55.1181 x 62.9921, 55.1181 x 70.8661*)	1 600 x 1 800, 1 800 x 2 240 (62.9921 x 70.8661, 70.8661 x 88.1889)
Table transverse travel X	mm (in)	1 600, 2 000, 2 500, 3 000 (62.9921, 78.7401, 98.4251, 118.1102)	2 000, 2 500, 3 000, 3 500, 4 000 (78.7401, 98.4251, 118.1102, 137.7952, 157.4803)
Automatic palette exchange			
Max. workpiece weight	kg (lbs)	5 000 (11023.1)	8 000 (17636.9)
Palette clamping area	mm (in)	1 250 x 1 400, 1 250 x 1 600 (49.2125 x 55.1181, 49.2125 x 62.9921)	1 600 x 1 800 (62.9921 x 70.8661)
Number of Pallets in the system		2	2
Total period of automatic palette change	s	85	85
Feeds			
Range of feeds (working and rapid traverse) – X, Y, Z, W	mm/min (ipm)	1 – 10 000 (0.0393 – 393.7007)	
– B	1/min	0.003 – 2.5	0.003 – 2

* max. workpiece weight 5 000 kg (11023.1 lbs)



WHN 110 / 130 (Q, MC) – Varied use



Drilling and milling
at angles.



Deep drilling
and reaming.



Interpolation turning
of large diameter holes.

Minimisation of downtime
when replacing a workpiece
with a palette system that
replaces a product in only
85 seconds.



CoroPlus® Process Control

Monitor machining processes and automate actions

- Collision detection
- Tool breakage detection
- Tool wear detection
- Contact detection



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Table-type machines

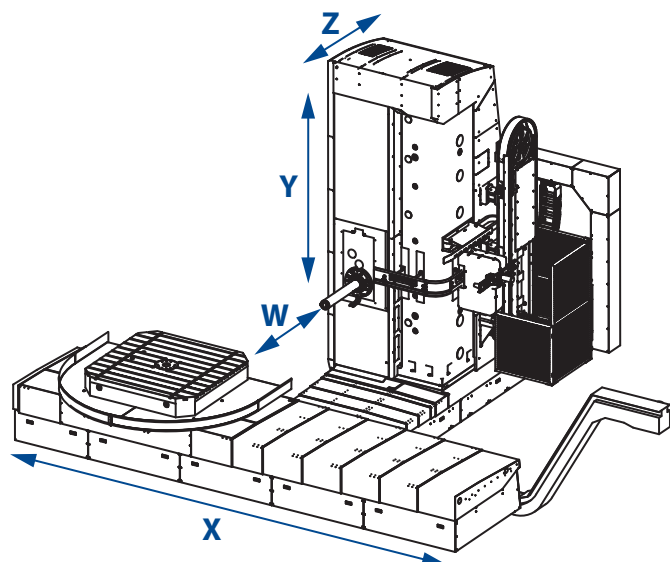
WHN(Q) 13/15 CNC

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 1968. The success of this machine can be documented by the fact that more than 2670 pieces of these machines have been sold 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 CNC – basic version with work spindle diameter 130 mm
- WHN 15 CNC – optional version with work spindle diameter 150 mm
- WHQ 13/15 CNC – version with an automatic tool change
- WHQ 13/15 MC – machine with a character of a machining centre (automatic tool change and automatic pallet change)
- wide range of work table designs

TECHNICAL PARAMETERS

Headstock		„R“	„N“	„15“
Work spindle diameter	mm (in)	130 (5.1181)	130 (5.1181)	150 (5.9055)
Spindle taper		ISO 50 / ISO 50 BIG+		
Work spindle speed range	1/min	10 – 3 000	10 – 1 500	10 – 3 000
Main motor power (S1)	kW (HP)	41 (55.7)		53 (72.1)
Max. output of main motor (S6 – 60%)	kW (HP)	46 (62.5)		55 (74.8)
Torque on spindle (S1)	Nm (ft lb)	2 508 (1849.8)	3 330 (2456.1)	3 114 (2296.8)
Max. torque on spindle (S6 – 60%)	Nm (ft lb)	3111 (2294.6)	4132 (3047.6)	3720 (2743.7)
Spindle stroke W	mm (in)	800 (31.4960)		880 (34.6456)
Column				
Headstock vertical travel Y	mm (in)	2 000, 2 500, 3 000, 3 500 (78.7401, 98.4251, 118.1102, 137.7952)		
Column longitudinal travel Z	mm (in)	1 250, 1 600, 2 200, 3 200 (49.2125, 62.9921, 86.6141, 125.9842)		
Rotational table				
Table transverse travel X	mm (in)	3 500, 4 000, 5 000, 6 000 (137.7952, 157.4803, 196.8503, 236.2204)		
Max. workpiece weight	kg (lbs)	12 000 / 16 000 / 18 000 / 25 000 (26455.5 / 35273.9 / 39683.2 / 55115.6)		
Table clamping area	mm (in)	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 (70.8661 x 70.8661 / 70.8661 x 86.6141 / 70.8661 x 98.4251 / 78.7401 x 118.1102 / 98.4251 x 118.1102)		
Feeds				
Range of feeds (working and rapid traverse) – Y, Z	mm/min (ipm)	4 – 10 000 (0.1574 – 393.7007)		
– W	mm/min (ipm)	4 – 10 000 (0.1574 – 393.7007)		
– X = 3,500 mm (137.7952 inch) / capacity 12,000 kg	mm/min (ipm)	4 – 10 000 (0.1574 - 393.7007) / 12 000 (472.4409)		
– X = 3,500 mm (137.7952 inch) / other tables	mm/min (ipm)	4 – 8 000 (0.1574 – 314.9606)		
– X = 4 000, 5 000, 6 000 mm (157.4803, 196.8503, 236.2204 inch)	mm/min (ipm)	4 – 8 000 (0.1574 – 314.9606)		
– B capacity 12,000 kg (26455.5 lbs) / other tables	1/min	0.003 – 2 / 1.5		



The machine has been manufactured for more than 50 years with more than 2,670 pieces sold.

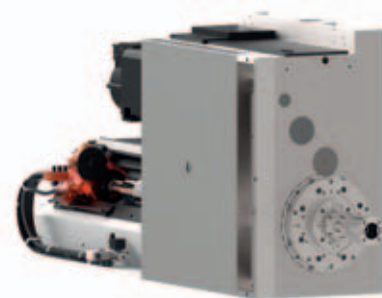


Table-type machines

WHN(Q) 13/15 CNC

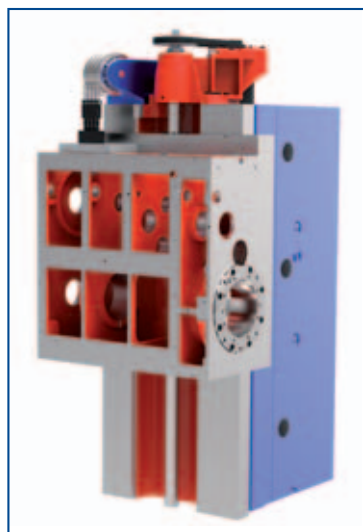
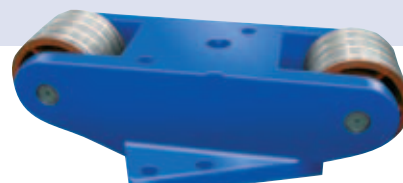
Headstock

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 76.



Headstock Counterbalance

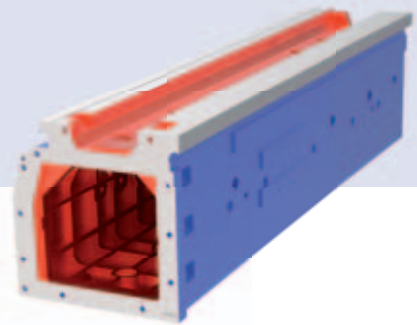
The spindle weight is balanced by a counter-weight suspended on cables and conducted in the stand.



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

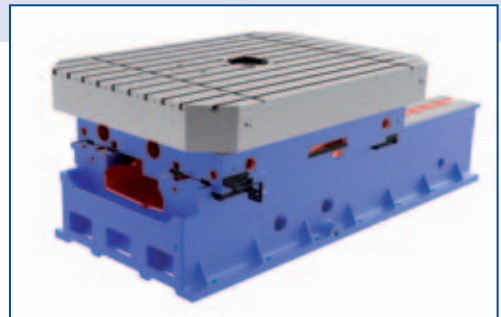
Guides of all linear groups are sliding. The guide surfaces are laser-hardened. Hardened steel bars on guide surfaces are installed under friction bearings and otherwise loaded areas. Matching areas are treated with a sliding material with a low friction coefficient. In addition, the table rails are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

Guides on the bed are protected against dirt by telescopic covers, 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.



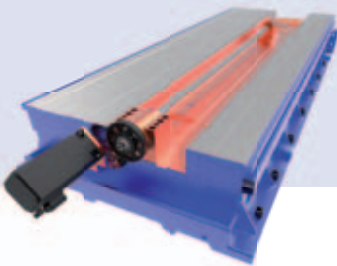
Revolving attachment table

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.



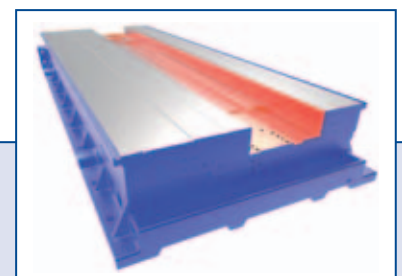
Drives of travel units

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

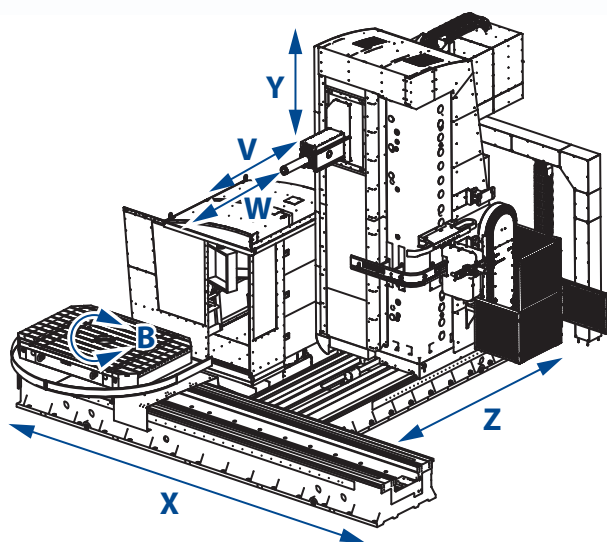
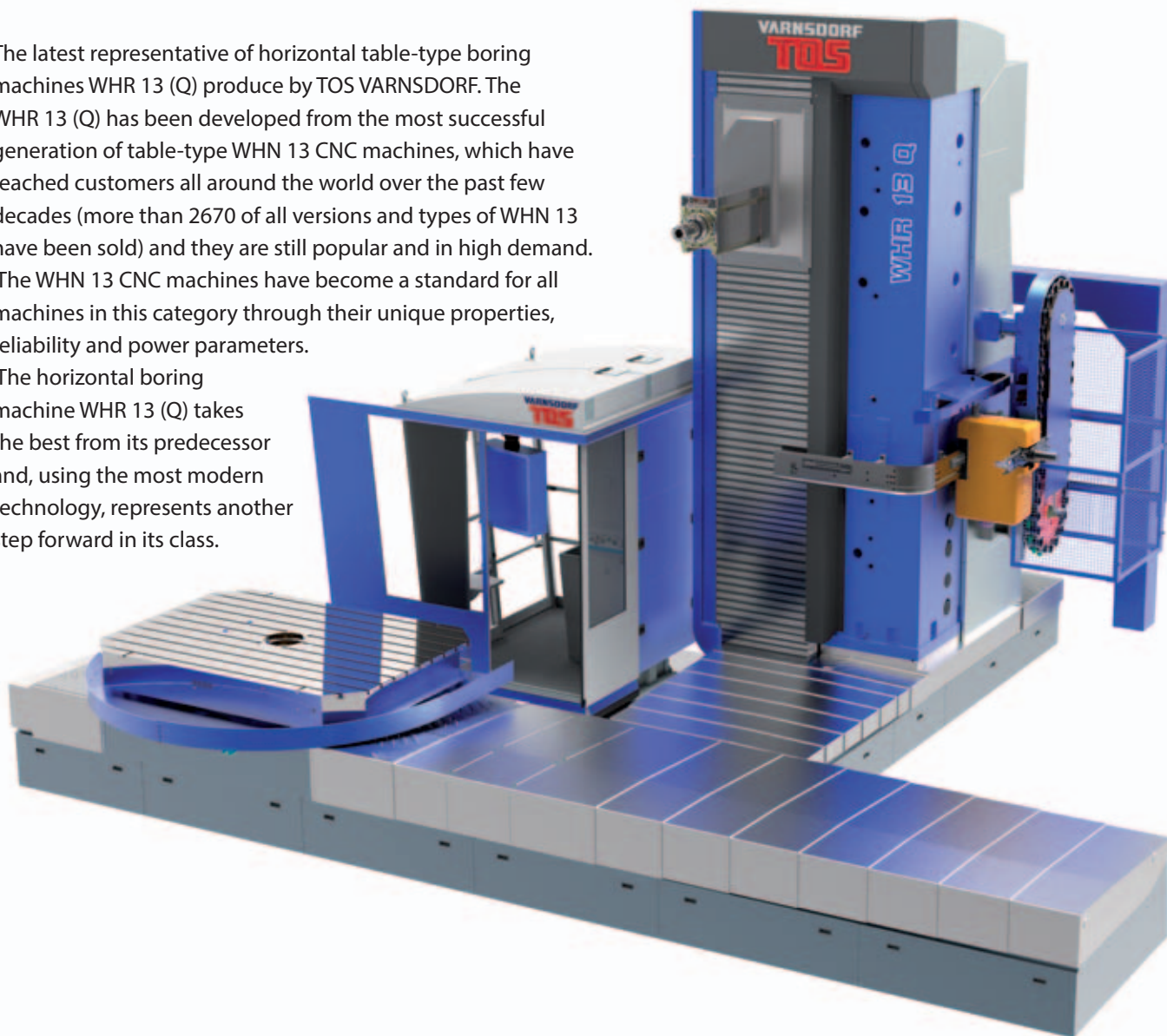
We use the GG 25 cast iron for production of the support sections because of high demands for vibration absorption in the horizontal boring machines. High rigidity of an optimally dimensioned cast-iron frame guarantees high efficiency and productivity of the milling machine while securing top geometrical 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 2670 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.

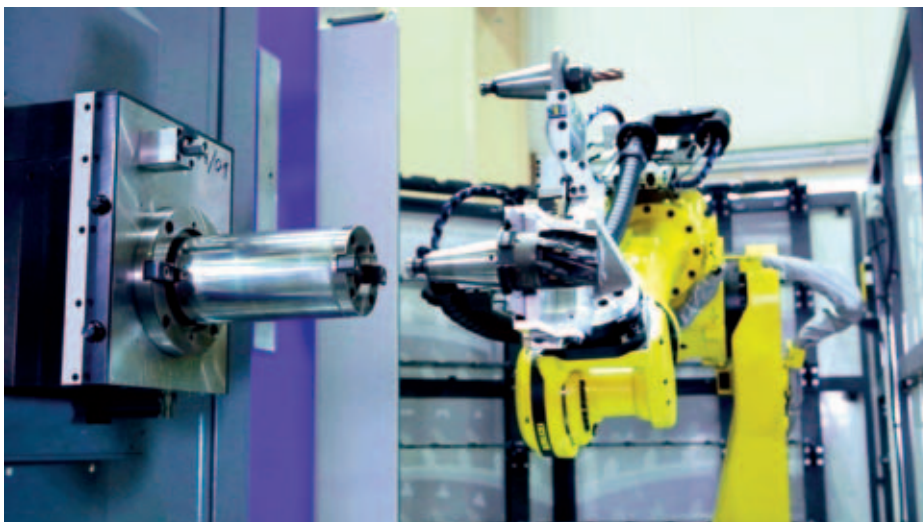


Machine configuration

- WHR 13 – basic version with work spindle diameter 130 mm
- WHR 13 Q – version with an automatic tool change
- WHR 13 MC – version with an automatic palette change
- wide range of work table designs

TECHNICAL PARAMETERS

Headstock		
Work spindle diameter	mm (in)	130 (5.1181)
RAM size	mm (in)	320 x 400 (12.5984 x 15.7480)
Spindle taper		ISO 50 / ISO 50 BIG+
Work spindle speed range	1/min	10 – 3 000
Main motor power (S1)	kW (HP)	41 (55.7)
Max. output of main motor (S6 – 60%)	kW (HP)	46 (62.5)
Torque on spindle (S1)	Nm (ft lb)	2 542 (1874.9)
Max. torque on spindle (S6 – 60%)	Nm (ft lb)	3 111 (2294.6)
Spindle stroke W	mm (in)	650 (25.5905)
RAM stroke V	mm (in)	700 (27.6)
Column		
Headstock vertical travel Y	mm (in)	2 000, 2 500, 3 000 (78.7401, 98.4251, 118.1102)
Column longitudinal travel Z	mm (in)	1 250, 1 600, 2 200, 3 200 (49.2125, 62.9921, 86.6141, 125.9842)
Rotational table		
Table transverse travel X	mm (in)	3 500, 4 000, 5 000, 6 000 (137.7952, 157.4803, 196.8503, 236.2204)
Max. workpiece weight	kg (lbs)	12 000 / 16 000 / 18 000 / 25 000 (26455.5 / 35273.9 / 39683.2 / 55115.6)
Table clamping area	mm (in)	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 (70.8661 x 70.8661 / 70.8661 x 86.6141 / 70.8661 x 98.4251 / 78.7401 x 118.1102 / 98.4251 x 118.1102)
Feeds		
Range of feeds (working and rapid traverse) – Y, Z, W, V	mm/min (ipm)	5 – 10 000 (0.1574 - 393.7007)
– X = 3,500 mm (137.7952 inch) / capacity 12,000 kg	mm/min (ipm)	4 – 10 000 (0.1574 – 393.7007) / 12 000 (472.4409)
– X = 3,500 mm (137.7952 inch) / other tables	mm/min (ipm)	4 – 8 000 (0.1574 – 314.9606)
– X = 4 000, 5 000, 6 000 mm (157.4803, 196.8503, 236.2204 inch)	mm/min (ipm)	4 – 8 000 (0.1574 – 314.9606)
– B capacity 12,000 kg (26455.5 inch) / other tables	1/min	0.003 – 2 / 1.5



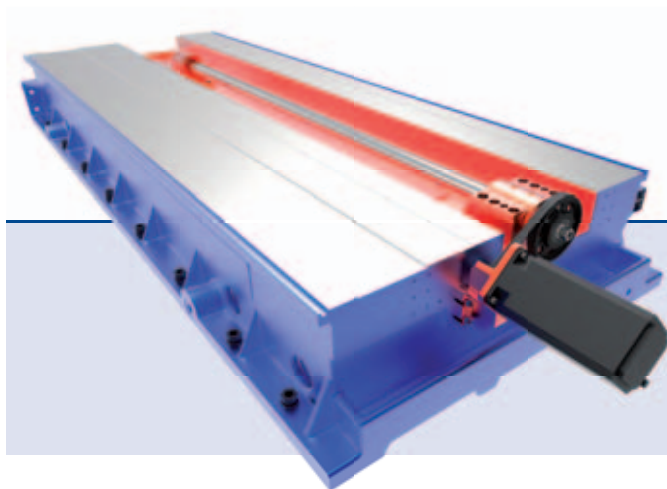
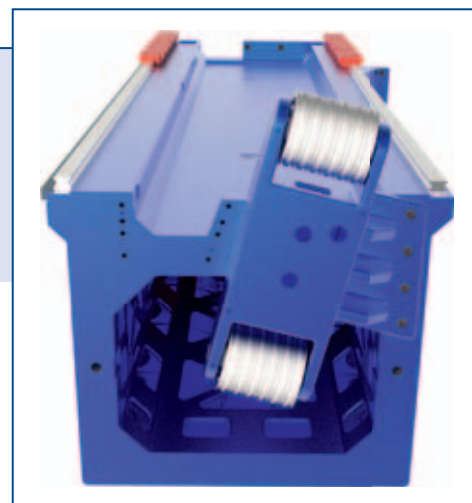
The robotic manipulator provides effective tool exchange in the main spindle and milling head.

Table-type machines

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.

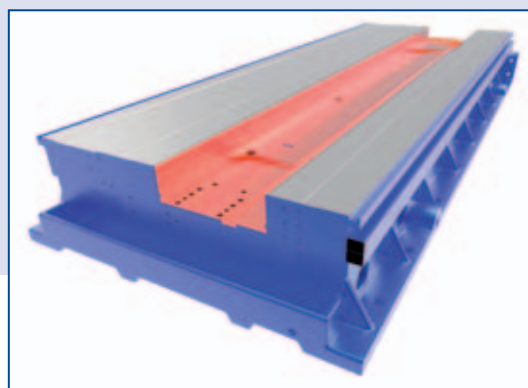


Drives of traverse units

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 60.

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 76 – Headstock.

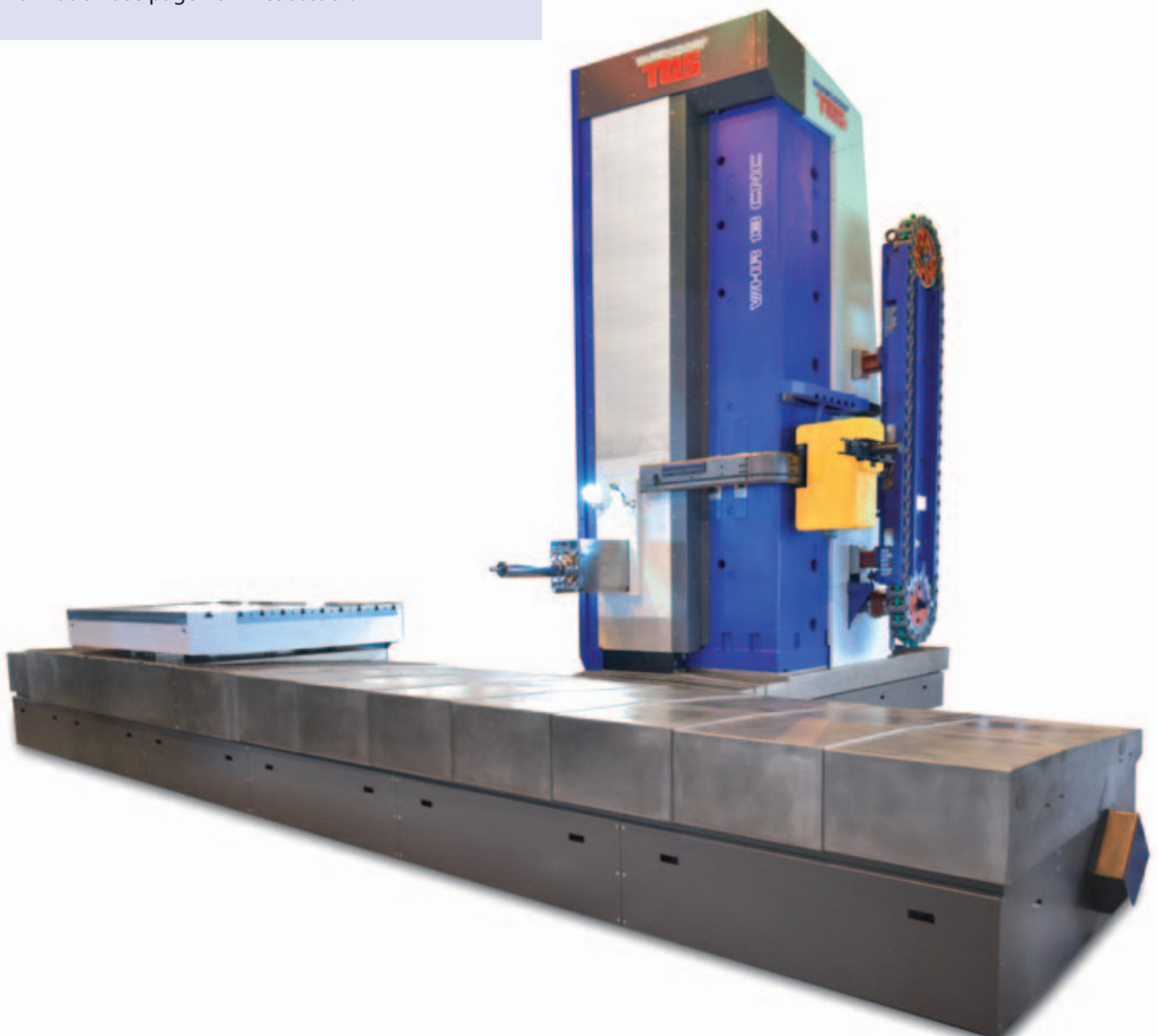
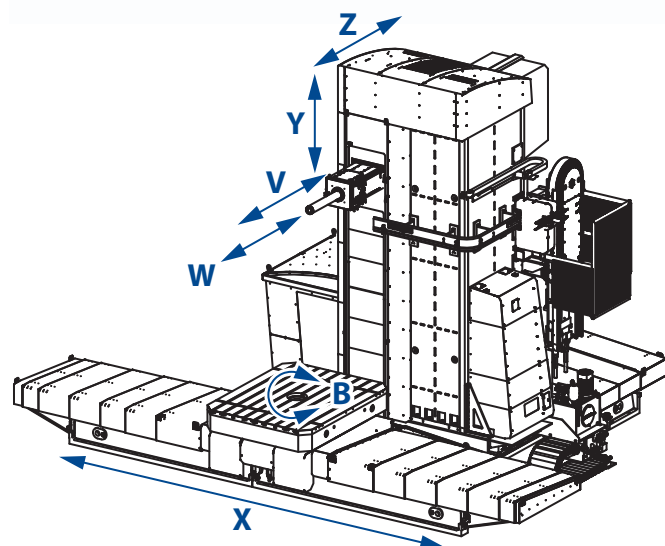
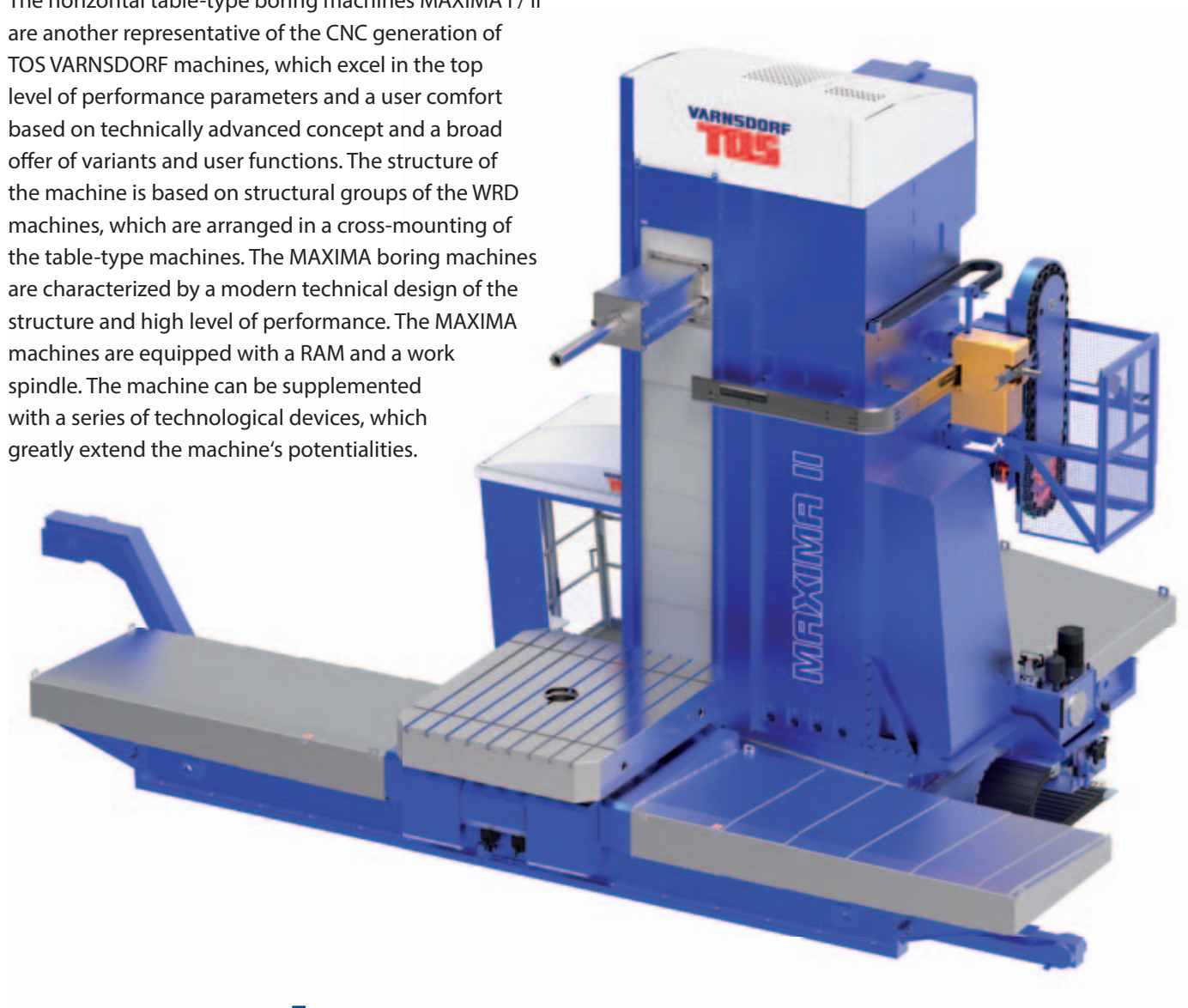


Table-type machines

MAXIMA I / II

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 machines are characterized by a modern technical design of the structure and high level of performance. The MAXIMA machines are equipped with a RAM and a work spindle. The machine can be supplemented with a series of technological devices, which greatly extend the machine's potentialities.



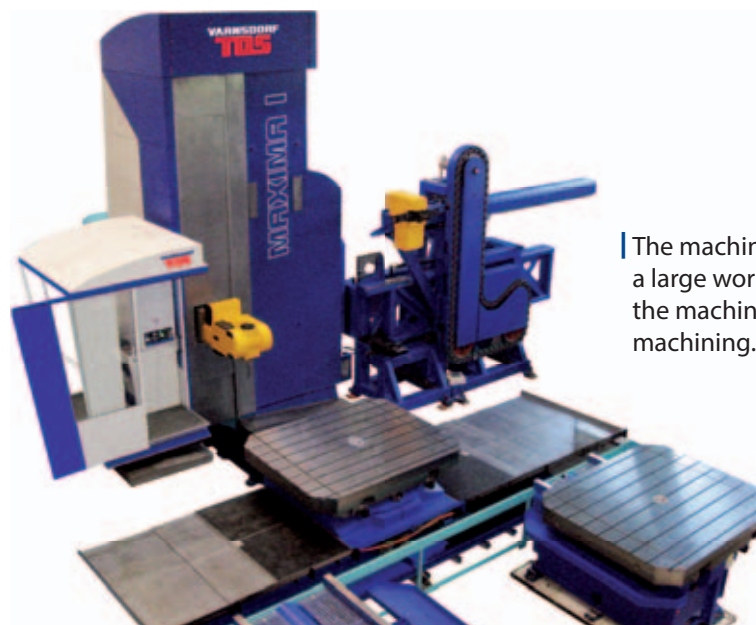
Machine configuration

- MAXIMA I – basic version with work spindle diameter 130 mm
- MAXIMA II – optional version with work spindle diameter 150 mm or 160 mm
- version with an automatic tool change
- version with an automatic palette change
- work table with maximum load 30 tonnes or 50 tonnes

TECHNICAL PARAMETERS

Machine type		MAXIMA I	MAXIMA II	
Work spindle diameter	mm (in)	130 (5.1181)	150 (5.9055)	160 (6.2992)
RAM size	mm (in)	450 x 450 (17.7165 x 17.7165)		
Spindle taper		ISO 50 / ISO 50 BIG+		
Work spindle speed range	1/min	10 – 3 000	10 – 2 500 (2 800)	10 - 2 400
Main motor power (S1)	kW (HP)	41 (55.7)	58 (78.9)	
Max. output of main motor (S6 – 60%)	kW (HP)	46 (62.5)	65 (88.4)	
Torque on spindle (S1)	Nm (ft lb)	2 542 (1874.9)	2 437 (1797.4)	
Max. torque on spindle (S6 – 60%)	Nm (ft lb)	3152 (2324.8)	3138 (2314.5)	
RAM stroke V	mm (in)	1 200 (47.2440)		
Spindle stroke W	mm (in)	700 (27.6)	800 (31.5)	
Column				
Headstock vertical travel Y	mm (in)	2 500 – 6 000 (98.4251 – 236.2204) in steps of 500 mm		
Column longitudinal travel Z	mm (in)	1 500, 2 000, 2 500 (59.0551, 78.7401, 98.4251)		
Rotational table				
Table clamping area	mm (in)	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 (78.7401 x 78.7401, 78.7401 x 98.4251, 98.4251 x 118.1102 / 118.1102 x 118.1102, 118.1102 x 137.7952, 118.1102 x 157.4803)		
Max. workpiece weight	kg (lbs)	30 000 (66138.7) / 50 000 (110231.1)		
Table transverse travel X	mm (in)	3 000, 4 000, 5 000*, 6 000* (118.1102, 157.4803, 196.8503*, 236.2204*)		
Feeds				
Range of feeds (working and rapid traverse) – X, Y, Z, V	mm/min (ipm)	1 – 16 000 (0.0393 – 629.9212)		
– W	mm/min (ipm)	1 – 12 000 (0.0393 – 472.4409)		
– B	1/min	0.003 – 3		

* Only for rotational tables with a load capacity of 30 tonnes (33.06 tons).



The machine concept provides a large work space that enables the machine to apply efficient machining.



Floor-type machines

Horizontal floor-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 floor-type boring machine with a RAM 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 with work spindle diameter 130 mm
- WRD 13 Q – version with an automatic tool change
- machine can be equipped with an additional rotary table



TECHNICAL PARAMETERS

Headstock

Work spindle diameter	mm (in)	130 (5.1181)
RAM size	mm (in)	320 x 400 (12.6 x 15.7)
Spindle taper		ISO 50 / ISO 50 BIG+
Work spindle speed range	1/min	10 – 3 000
Main motor power (S1 / S6 – 60%)	kW (HP)	41 (55.7) / 46 (62.5)
Torque on spindle (S1 / S6 – 60%)	Nm (ft lb)	2542 (1874.9) / 3 111 (2294.6)
Spindle stroke W	mm (in)	650 (22.6)
RAM stroke Z	mm (in)	700 (27.6)

Column

Headstock vertical travel Y	mm (in)	2 000, 2 500, 3 000 (78.7401, 98.4251, 118.1102)
Column longitudinal travel X	mm (in)	3 000 – 20 000 (118.1102 – 787.4015) in steps of 1 000 mm

Feeds

Range of feeds (working and rapid traverse) – X	mm/min (ipm)	5 – 21 000 (0.1968 – 826.7716)
– Y, Z, W	mm/min (ipm)	5 – 10 000 (0.1968 – 393.7007)

New, ground-breaking measuring technologies for machine tools



Machine Tool Measurement

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GRATA

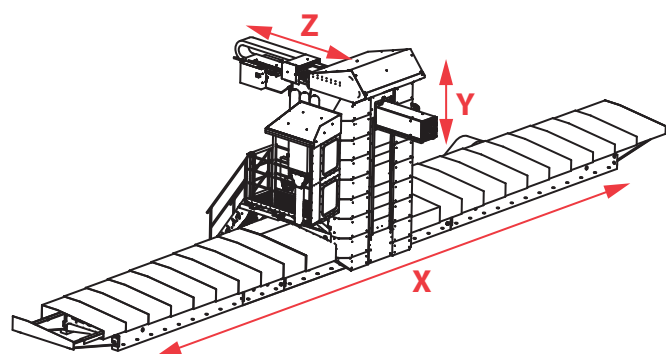


The GRATA floor-type machine tools are designed for precise line-coordinate milling, drilling, boring, milling and thread cutting. They are particularly suitable for machining of box- and plate-type workpieces and complicated workpieces from cast-iron, steel cast-iron, steel and other machinable materials, 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 of the machine
- machine with an automatic tool change
- headstock with an exchangeable spindle attachment
- headstock with an exchangeable milling head (see page 64)
- machine can be equipped with an additional rotary table

TECHNICAL PARAMETERS

Headstock

Termination of RAM by an interface for application of technological accessories

RAM size	mm (in)	500 x 500 (19.6850 x 19.6850)
Main motor speed range	1/min	10 – 5 000
Main motor power (at permanent operation of S1)	kW (HP)	37 (50.3)
Torque on the driving shaft (S1)	Nm (ft lb)	1 375 (1014.2)
RAM stroke Z	mm (in)	1 500 (59.0551)

Column

Column longitudinal travel X	mm (in)	5 000 – 25 000 (196.8503 – 984.2519) in steps of 2 000 mm
Headstock vertical travel Y	mm (in)	1 600, 2 000, 2 500, 3 000 (62.9921, 78.7401, 98.4251, 118.1102)

Feeds

Range of feeds (working and rapid traverse) – X, Y	mm/min (ipm)	1 – 25 000 (0.0393 – 984.2519)
– Z	mm/min (ipm)	1 – 15 000 (0.0393 – 590.5511)

Example of crankshaft machining at a Chinese customer, customised technology was turnkey delivered with a complete set of tools and special accessories.

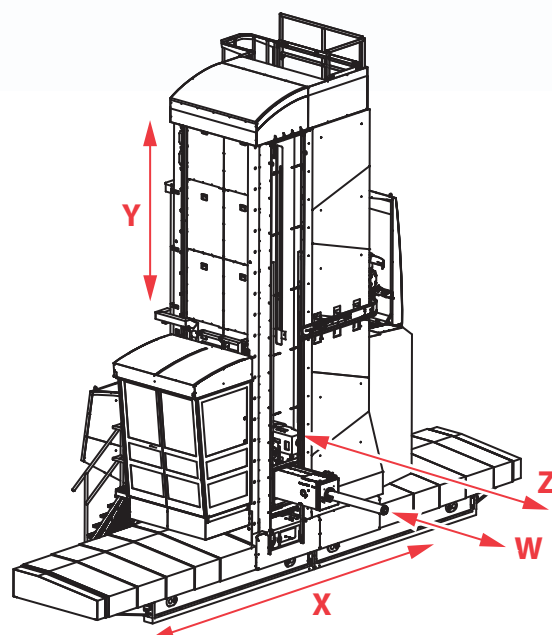


WRD 130 / 150 (Q)

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

- WRD 130 – basic version with work spindle diameter 130 mm
- WRD 150 - optional version with work spindle diameter 150 mm or 160 mm
- WRD 130/150 Q – version with an automatic tool change
- machine can be equipped with an additional rotary table

TECHNICAL PARAMETERS

Headstock		WRD 130 (Q)	WRD 150 (Q)	
Work spindle diameter	mm (in)	130 (5.1181)	150 (5.9055)	160 (6.2992)
RAM size	mm (in)	450 x 450 (17.7165 x 17.7165)		
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
Main motor power (at permanent operation of S1)	kW (HP)	41 (55.7)	58 (78.9)	58 (78.9)
Max. output of main motor (at operation of S6-60% working hours)	kW (HP)	46 (62.5)	65 (88.4)	65 (88.4)
Torque on spindle (S1)	Nm	2 542	2 437	2 437
	(ft lb)	(1874.9)	[2 465/4 870*] 1797.4 ([1818.1/3591.9*])	(1797.4)
Max. torque on spindle (S6 – 60%)	Nm (ft lb)	3 152 (2324.8)	3 138 (2314.5)	3 138 (2314.5)
RAM stroke Z	mm (in)	1 200 (47.2440)		
Spindle stroke W	mm (in)	700 (27.5590)	800 (31.4960)	800 (31.4960)
Column				
Headstock vertical travel Y	mm (in)	2 500 – 6 000 (98.4251 – 236.2204) in steps of 500 mm		
Column longitudinal travel X	mm (in)	5 000 – 27 000 (196.8503 – 1062.9921) in steps of 2 000 mm		
Feeds				
Range of feeds (working and rapid traverse) – X, Y, Z	mm/min (ipm)	1 – 24 000 (0.0393 – 944.8818)		
– W	mm/min (ipm)	1 – 12 000 (0.0393 – 472.4409)		

* an option suitable for drive of the facing head from the hollow spindle, Nmax=1 500 rpm, 2 465 Nm (1818.1 ft lb) on the work spindle, 4 870 Nm (3591.9 ft lb) on the hollow spindle



Example of an application at a Finnish customer, where the machine was also adapted for the application of turning operations (special milling heads, extensions and carousel table).

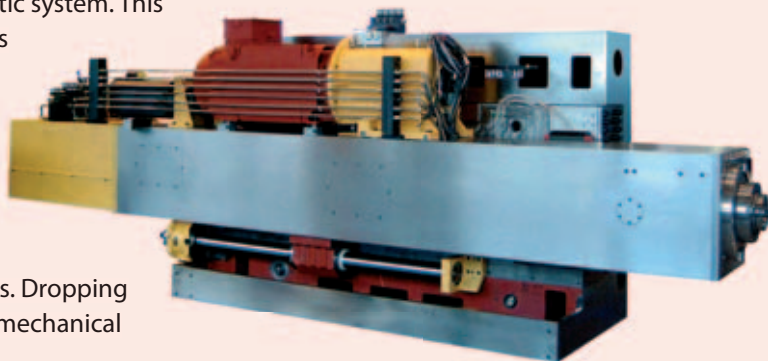
WRD 130 / 150 (Q)

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 RAM. The conception of this unit allows electro-magnetic compensation of the RAM drop during its extension in the Z axis (for more information see page 76 – Headstock).

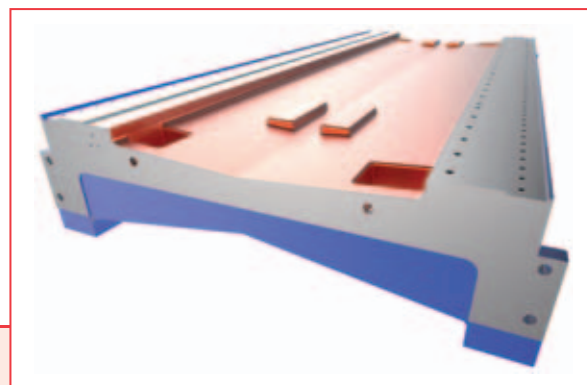
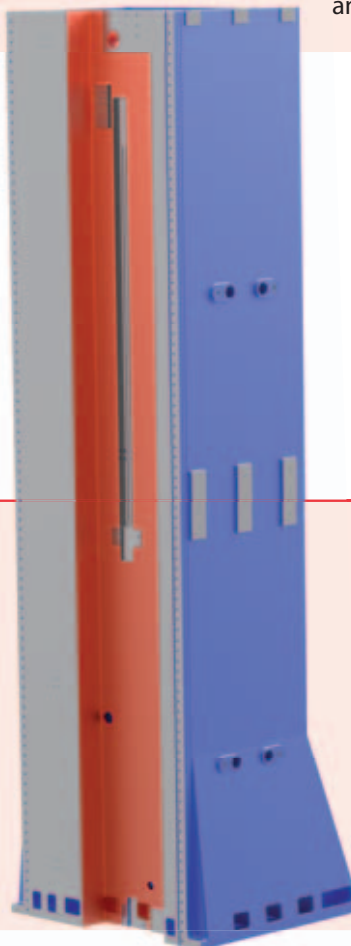
Balancing of the headstock weight: The weight of the headstock is balanced by a telescopic cylinder from the hydropneumatic system. This system of headstock weight balancing demands minimum traverse forces, thus reducing power consumption during the machining process.

Compensation of the RAM dropping: This concept of compensating the RAM 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 RAM 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 covers.

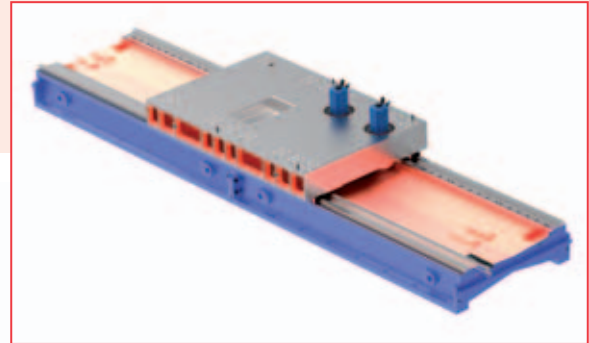
The guide on the column is protected by steel covers of the whole headstock movement area; on the face towards the workpiece by steel plates; on the operator's platform side, the whole area is covered by a fixed covering; on the rear side by cover bellows.

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.

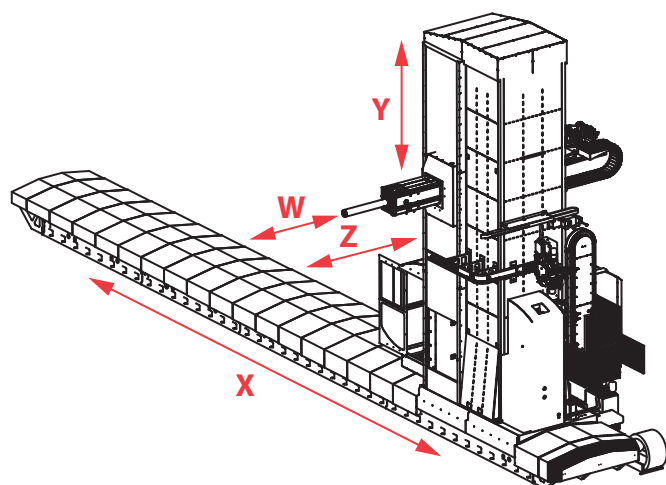
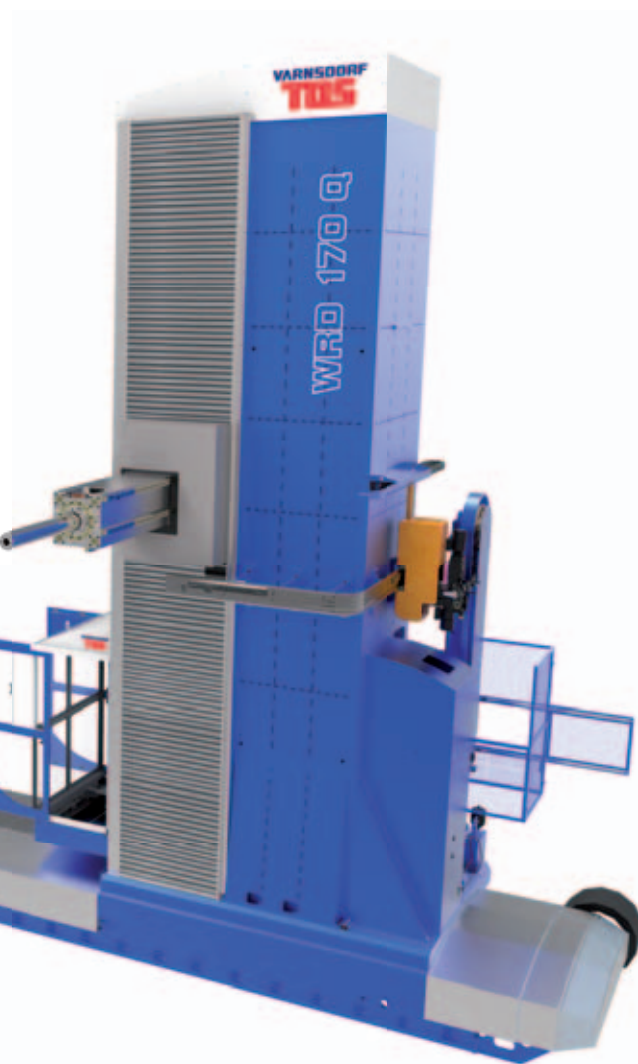
Prestress of pinions on outlets from reducers to the rack is achieved by engagement of drives in the „Master-Slave“ operation.



WRD 170 (Q)

The WRD 170 (Q) machine is the largest and heaviest representative of floor-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 with work spindle diameter 170 mm, optionally 160 mm or 200 mm
- WRD 170 Q – version with an automatic tool change
- machine can be equipped with an additional rotary table

TECHNICAL PARAMETERS

Headstock

Work spindle diameter	mm (in)	160 (6.2992)	170 (6.6929)	200 (7.8740)
RAM size	mm (in)	550 x 550 (21.6535 x 21.6535)		
Spindle taper		ISO 50 / ISO 50 BIG+		
Work spindle speed range	1/min	10 – 2 200		10 - 1 800
Main motor power (at permanent operation of S1)	kW (HP)	81 (110.1)		
Max. output of main motor (at operation of S6-60% working hours)	kW (HP)	88 (119.6)		
Torque on spindle (S1)	Nm (ft lb)	3 846 (2836.7)		
Max. torque on spindle (S6 – 60%)	Nm (ft lb)	4 800 (3540.3)		
RAM stroke Z	mm (in)	1 500 (59.0551)		
Spindle stroke W	mm (in)	1 000 (39.3700)		

Column

Headstock vertical travel Y	mm (in)	3 000 – 6 000 (118.1102 – 236.2204) in steps of 500 mm
Column longitudinal travel X	mm (in)	5 000 – 29 000 (196.8503 – 1141.7322) in steps of 2 000 mm

Feeds

Range of feeds (working and rapid traverse) – X	mm/min (ipm)	1 – 16 000 (0.0393 – 629.9212)
– Y, Z, W	mm/min (ipm)	1 – 12 000 (0.0393 – 472.4409)

Example of propeller blade machining at a Russian customer, where the machine was equipped with an additional rotary table with load capacity of up to 130 tonnes (143.3 tons).

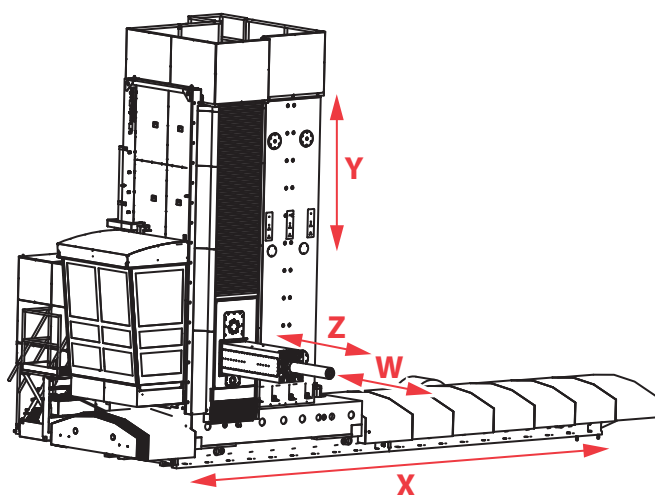


WRD 180 H



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 with work spindle diameter 180 mm, optionally 160 mm or 200 mm
- version with an automatic tool change
- machine can be equipped with an additional rotary table

TECHNICAL PARAMETERS

Headstock

Work spindle diameter	mm (in)	160 (6.2992)	180 (7.0866)	200 (7.8740)
RAM size	mm (in)	550 x 550 (21.6535 x 21.6535)		
Spindle taper		ISO 50 / ISO 50 BIG+		
Work spindle speed range	1/min	10 – 2 200	10 – 2 200	10 – 2 000
Main motor power (at permanent operation of S1)	kW (HP)	74 (100.6)	101 (137.3)	
Torque on spindle (S1)	Nm (ft lb)	6 820 (5030.2)	11 165 (8234.9)	13 927 (10272)
RAM stroke Z	mm (in)	1 600 (62.9921)		
Spindle stroke W	mm (in)	1 200 (47.2440)		

Column

Headstock vertical travel Y	mm (in)	3 000 – 6 000 (118.1102 – 236.2204) in steps of 500 mm		
Column longitudinal travel X	mm (in)	5 000 – 29 000 (196.8503 – 1141.7322) in steps of 1 000 mm		

Feeds

Range of feeds (working and rapid traverse) – X, Y, Z, W	mm/min (ipm)	1 – 20 000 (0.0393 – 787.4015)		
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Example of an application at an Indian customer, where the machine has been operating under demanding conditions for almost 5 years.



Floor-type machines

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.



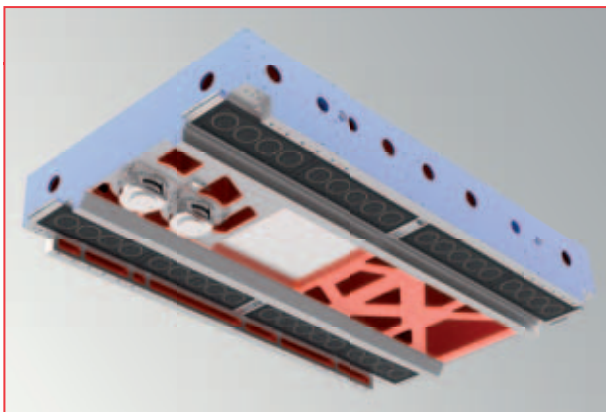
Balancing and compensation

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 RAM: Bending deformations of the RAM are prevented by four prestressing rods. The rods are pushed by hydraulic cylinders according to the RAM's position. The front hanger incorporates a hydraulic cylinder, which tensions cables according to the RAM's traverse.



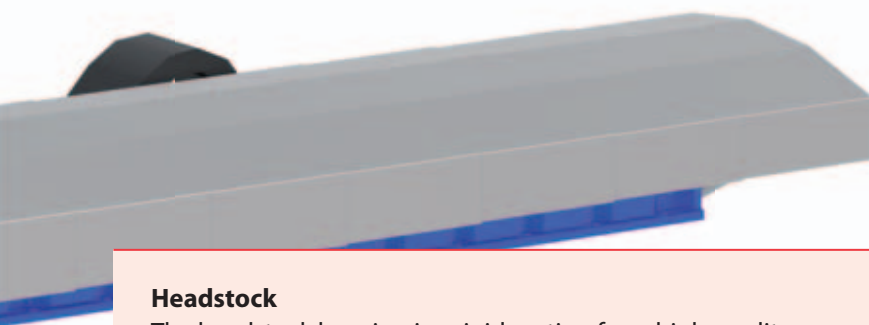
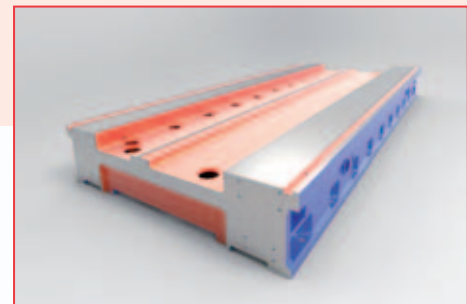
Guides of adjustable groups

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.

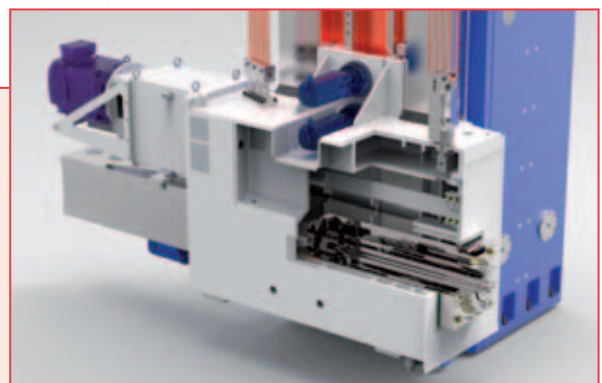
Guide surfaces

of the RAM (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 RAM. The RAM housing is a prismatic casting from ductile cast iron with a hollow for housing the spindle in the machine's axis.



Machining centres

The WHT 110 (C), WHT 130 (C), 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.

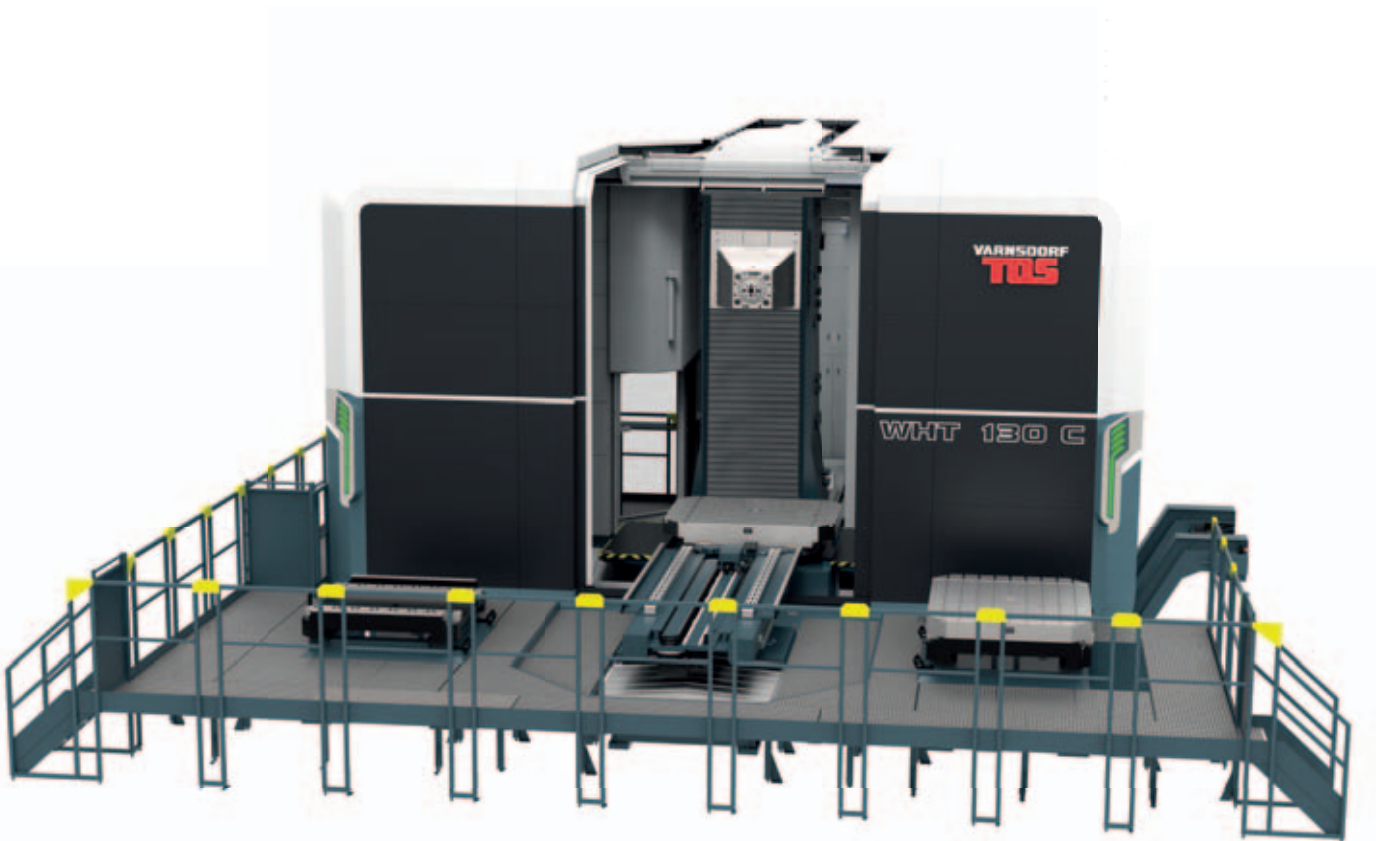
Supplementary modules: peripheries for automatic tool changer (ATC), automatic palette changer (APC), technological equipment and various machine coverings.

Machining centres WHT 110 (C), WHT 130 (C) are standardly equipped with complete covering, which prevents spraying of the cooling fluid and scatter of chips.





WHT 110 (C)



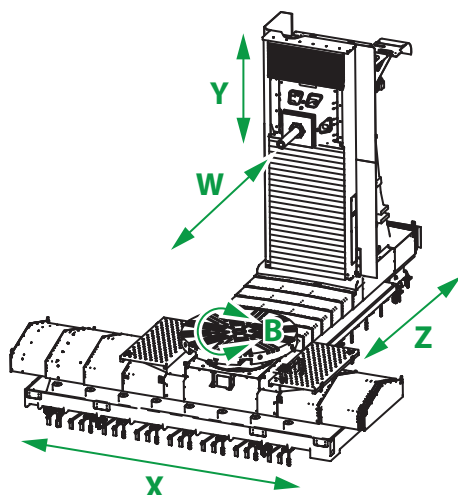
WHT 130 (C)

WHT 110 / 130 (C)

The new high-performance WHT 110 / 130 is a horizontal machine tool suitable for the most demanding operations that require precise drilling, gear cutting, turning operations or milling.

WHT 110 / 130 machines may be designed as machining centres with a wide choice of accessories, e.g., automatic change of technological palettes, tools, special accessories, turning tables, and a range of other options that will satisfy the needs of the most demanding applications in areas such as the aerospace industry, power industry, mining industry, oil industry, and engineering industry.

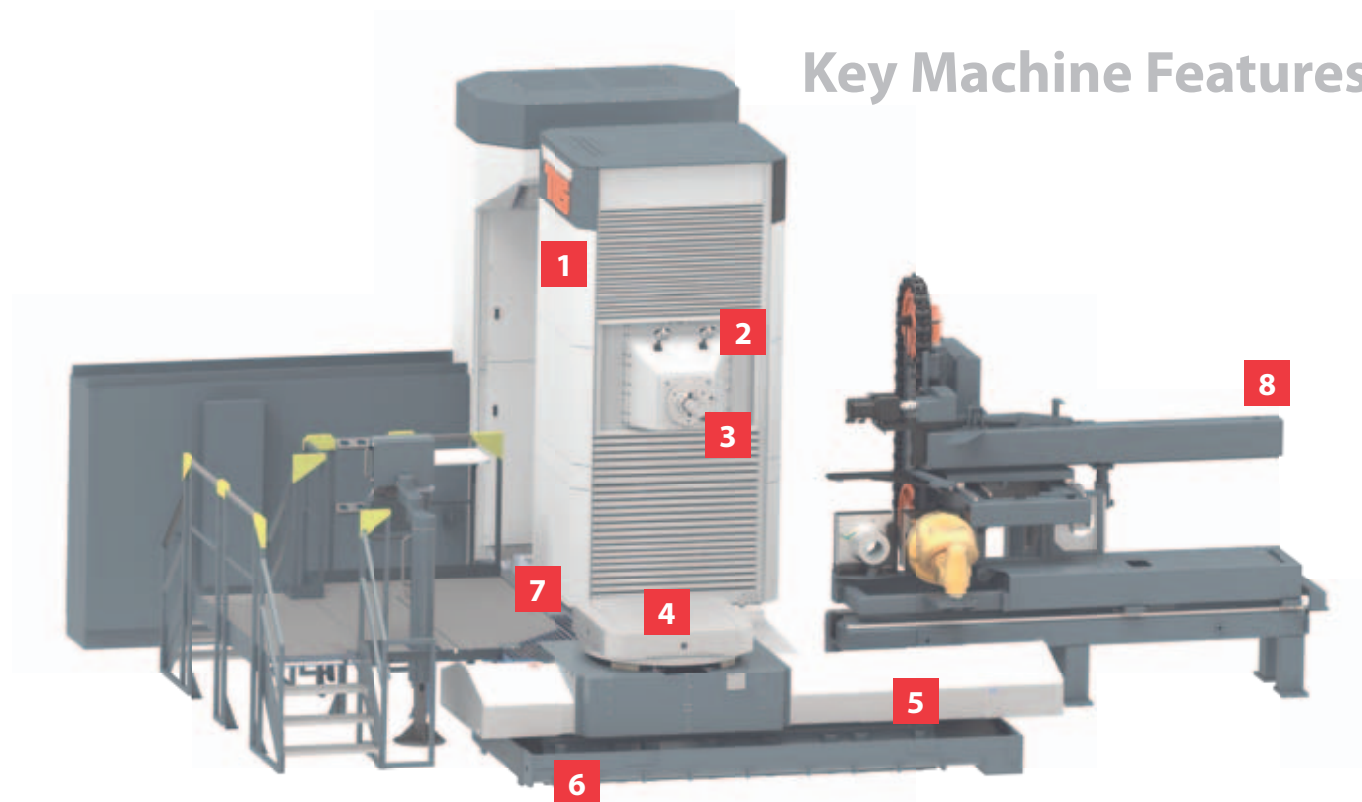
These „multi-tasking“ machines are suitable both for single-piece and batch production.



Machine configuration

- WHT 110 / 130 S – so called „small“ machine version with a rotary table, rotation speed of work spindle up to 4 000 rpm
- WHT 110 / 130 L – so called „large“ machine version with a rotary table, rotation speed of work spindle up to 4 000 rpm
- WHT 110 / 130 C (S / L) – machining centre version (automatic palette and automatic special accessory change, fully covered) with work spindle revolutions up to 6,000 per minute for WHT 110, and up to 5,000 per minute for WHT 130
- WHT 110 machines are equipped with work spindle diameter 112 mm
- WHT 130 machines are equipped with work spindle diameter 130 mm

Key Machine Features



Multiple machine utilization

The machine can be used for milling, boring, gear cutting, turning operations, toothed gear manufacturing, and 5-axis machining.

Maximum machine automatization

Automatic changing of the tools, special accessories, and technological palettes.

User friendly

Machine cover is adapted for easy and fast service access. Simply removable with magnet fixed covers. The machining center is equipped with a rolling shutter along the Z axis.

- 1** Maximum machine dimensions:
WHT 110:
X – 3 000 mm, Y – 2 000 mm and Z – 2 500 mm
(X – 118.1102 inch, Y – 78.7401 inch and Z – 98.4251 inch)
WHT 130:
X – 5 000 mm, Y – 3 000 mm and Z – 3 000 mm
(X – 196.8503 inch, Y – 118.1102 inch and Z – 118.1102 inch)

- 2** Two types of central headstocks:
WHT 110:
4 000 rpm, 31 kW (42.1 HP), 1 205 Nm (888.8 ft lb)
6 000 rpm, 31 kW (42.1 HP), 1 375 Nm (1014.1 ft lb)
WHT 130:
4 000 rpm, 41 kW (55.7 HP), 3 200 Nm (2360.2 ft lb)
5 000 rpm, 41 kW (55.7 HP), 1 718 Nm (1267.1 ft lb)

- 3** Temperature monitoring and compensation on the machine.

- 4** A wide choice of clamping devices.
Rotary table capacity: Carousel table:
WHT 110: up to 6 000 kg (13227.7 lbs) WHT 110: Ø 1 600 mm (62.9921 inch), 400 rpm
WHT 130: up to 20 000 kg (44092.5 lbs) WHT 130: Ø 2 000 mm (78.7401 inch), 250 rpm
Up to 4 automatically changeable palettes.

- 5** Linear guideways in X, Y and Z axes ensure a high accuracy and strength of the guide with a very low friction coefficient.

- 6** The basic parts of the frame (tables, palettes, longitudinal and transverse beds) are made of the highest quality grey cast iron of Czech origin.

- 7** High feed speeds in X, Y, Z axes:
WHT 110: 25 000 mm/min and 40 000 mm/min
(984.2519 ipm and 1574.8031 ipm)
WHT 130: 25 000 mm/min and 36 000 mm/min
(984.2519 ipm and 1417.3228 ipm)

- 8** Automatic replacement of special accessories with two storage sites and a cover plate.

Machining centres

TECHNICAL PARAMETERS – BASIC MACHINE PARAMETERS

Machine type		WHT 110 S	WHT 110 L	WHT 110 SC	WHT 110 LC
Headstock					
Work spindle diameter	mm (in)	112 (4.4094)			
Spindle taper		ISO 50			
Work spindle speed range	1/min	10 – 4 000		10 – 6 000	
Main motor power (S1)	kW (HP)	31 (42.1)		31 (42.1)	
Torque on spidle (S1)	Nm (ft lb)	1 205 (888.8)		1 375 (1041.1)	
Spindle stroke W	mm (in)	650 (25.5905)			
Column					
Headstock vertical travel Y	mm (in)	1 250 (49.2125)	1 600 (62.9921)	1 250 (49.2125)	1 600 (62.9921)
Longitudinal column adjustment Z	mm (in)	1 500 (59.0551)	2 500 (98.4251)	1 500 (59.0551)	2 500 (98.4251)
Rotational table					
Transverse table travel X	mm (in)	1 500 (59.0551)	2 500 (98.4251)	1 500 (59.0551)	2 500 (98.4251)
Max. workpiece weight	kg (lbs)	6 000 (13227.7)			
Table clamping area	mm (in)	1 250 x 1 250 (49.2125 x 49.2125)	1 250 x 1 600 (49.2125 x 62.9921)	1 250 x 1 250 (49.2125 x 49.2125)	1 250 x 1 600 (49.2125 x 62.9921)
Feeds					
Range of feeds (working and rapid traverse) – X, Y, Z	mm/min (ipm)	1 – 25 000 (0.0393 – 984.2519)		1 – 40 000 (0.0393 – 1574.8031)	
– W	mm/min (ipm)	1 – 20 000 (0.0393 – 787.4015)			
– B	1/min	0.003 – 3			
Basic machine equipment					
– Chip conveyor			•		•
– Machine operator covering			•		•
– X and Z-axis covering			•		
– Modification for the manual change of the manually adjusted miling heads			•		
– Remote diagnostics			•		•
– Complete machine enclosure (including the machine operator covering)					•
– Automatic tool change ATC 40					•
– Modification for the automatic change of the milling heads (UPPT)					•
– CHZ tool cooling (via the external nozzles)					•

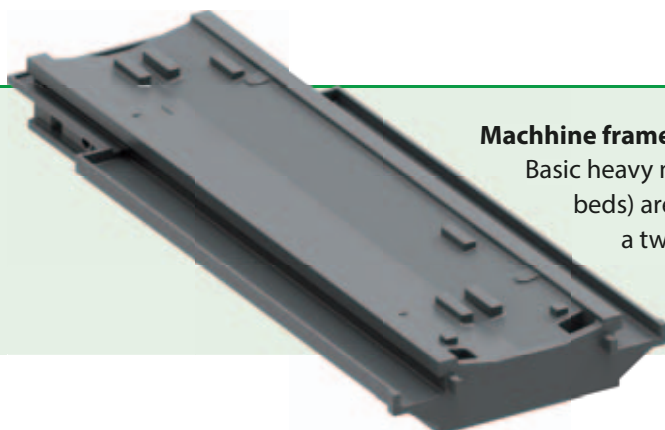
Basic horizontal table type machines or centres are available in two versions – S (small) and L (large). Each version has its pre-defined parameters (see the table) and equipment. It is possible to only select from the range of options (e.g. milling heads, face plates, etc.).

OPTIONAL MACHINE VERSIONS

Machine type		WHT 110		WHT 110 C	
Headstock					
Work spindle diameter	mm (in)	112 (4.4094)			
Spindle taper		ISO 50			
Work spindle speed range	1/min	10 – 4 000		10 – 4 000	10 – 6 000
Main motor power (S1)	kW (HP)	31 (42.1482)			
Torque on spidle (S1)	Nm (ft lb)	1 205 (888.8)		1 205 (888.8)	1 375 (1014.1)
Spindle stroke W	mm (in)	650 (25.5905)			
Column					
Headstock vertical travel Y	mm (in)	1 250, 1 600, 2 000* (49.2125, 62.9921, 78.7401*)			
Longitudinal column adjustment Z	mm (in)	1 500, 2 000, 2 500 (59.0551, 78.7401, 98.4251)			
Rotational table					
Transverse table travel X	mm (in)	1 500, 2 000, 2 500, 3 000 (59.0551, 78.7401, 98.4251, 118.1102)			
Max. workpiece weight	kg (lbs)	6 000 (13227.7)			
Table clamping area	mm (in)	1 250 x 1 250, 1 250 x 1 600 (49.2125 x 49.2125, 49.2125 x 62.9921)			
Turning table					
Traverse table travel X	mm (in)	1 500, 2 000, 2 500, 3 000 (59.0551, 78.7401, 98.4251, 118.1102)			
Max. workpiece weight / max. palette load	kg (lbs)	6 000 (13227.7) / 4 000 (8818.5)			
Table clamping area	mm (in)	Ø 1 600 (62.9921)			
Max. speed	1/min	400			
Automatic palette change					
Transverse table travel X	mm (in)	1 500, 2 000, 2 500, 3 000 (59.0551, 78.7401, 98.4251, 118.1102)			
Max. workpiece weight	kg (lbs)	4 000 (8818.5)			
Palette clamping area	mm (in)	1 250 x 1 250, 1 250 x 1 600 (49.2125 x 49.2125 , 49.2125 x 62.9921)			
Max. number of palettes	pcs	2 to 4			
Automatic tool change					
Number of storage sites – chain type magazine	pcs	40, 60, 80			
Number of storage sites – rack type magazine	pcs	100+			
Max. tool diameter					
– with fully loaded magazine	mm (in)	125 (4.9212)			
– with free neighbouring storage sites	mm (in)	320 (11.8110)			
Max. tool length	mm (in)	500 (19.6850)			
Tool change time	s	8			

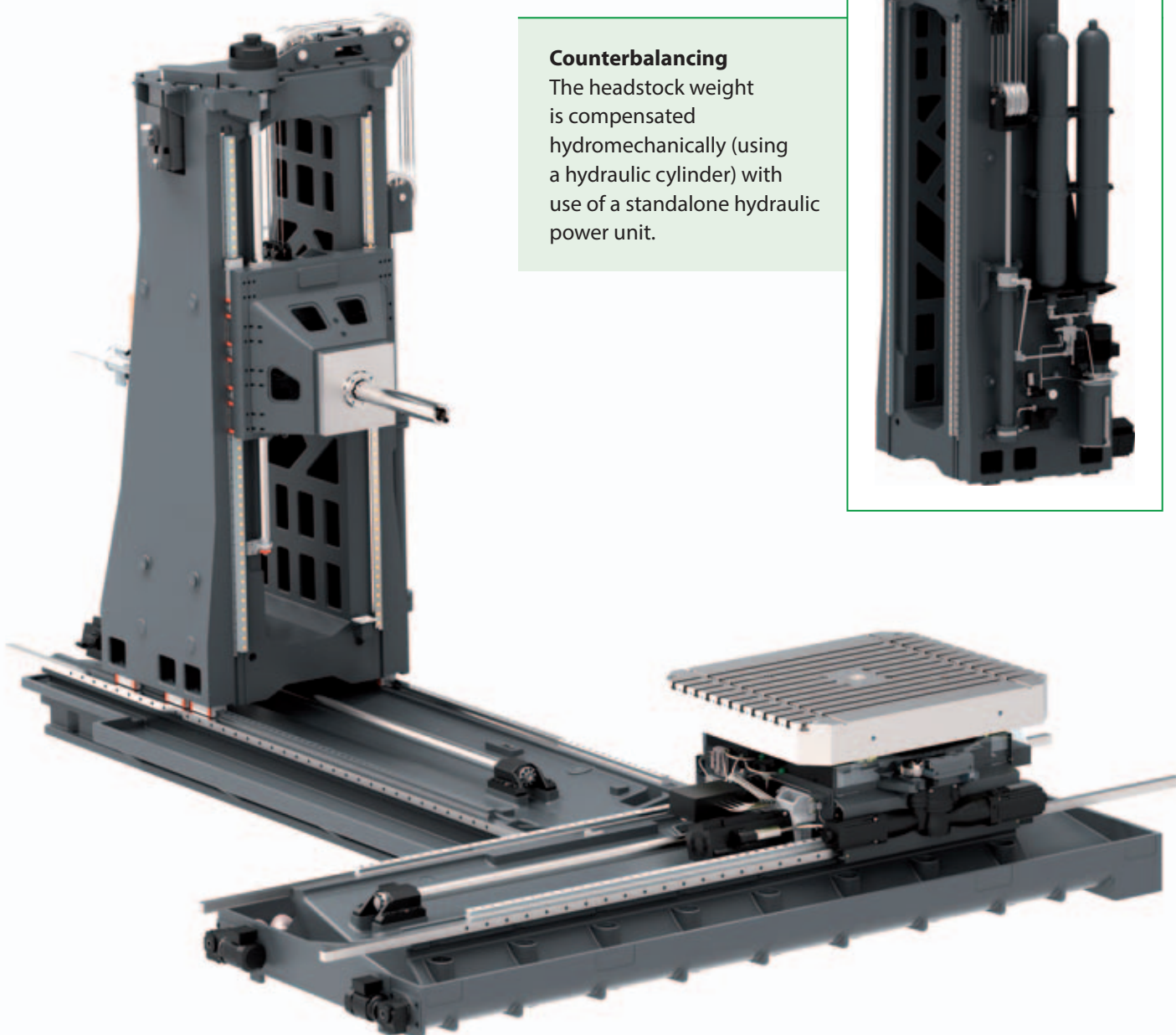
* only for the WHT 110 horizontal boring machine

WHT 110/130 (C)



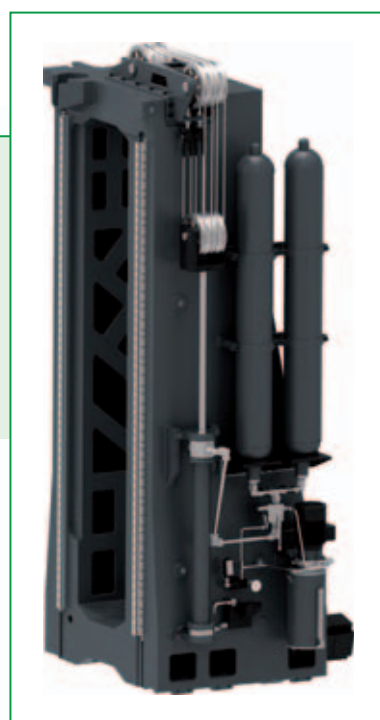
Machine frame

Basic heavy machine parts (tables, palettes, longitudinal and transverse beds) are casted from grey iron. The machine column is designed as a twin-shell casting also made of grey iron with an optimised structure. The high rigidity of the whole machine structure is ensured by joining the X and Z axes together



Counterbalancing

The headstock weight is compensated hydromechanically (using a hydraulic cylinder) with use of a standalone hydraulic power unit.



WHT 110/130 (C)

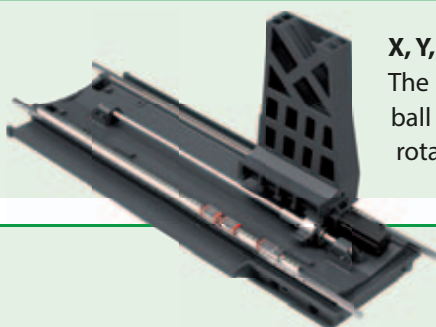
Automatic change of technological palettes

Conceptually, the palette change equipment is based on the automatic change of the technological palettes between the stationary stowage stations and the palette clamping base on the machine. The palettes are handled using a rotary palette manipulator.



X, Y, Z and W axis drives

The linear axes are driven by standalone actuators with embedded belt gears and ball screws with a large pitch. The X and Z axes are driven from the ball screws with rotating ball nuts. The Y and W axis are driven from the rotating ball screws.

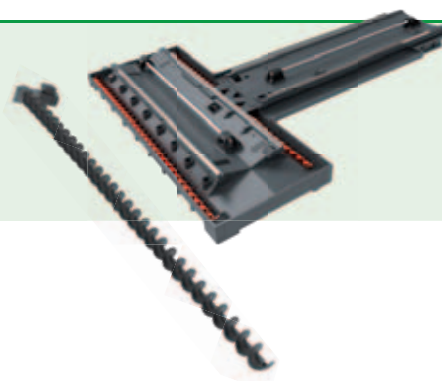


Travelling group guides

All the linear travelling machine groups in the X, Y and Z axes are guided in the pre-loaded compact rolling linear guideways. The travelling spindle is sliding in the hollow spindle. The table is supported on a large radial-thrust cylindrical roller bearing with high capacity and rigidity.

Chip conveyor

The chip conveyor is provided with each version of the machine as a standard part of delivery.



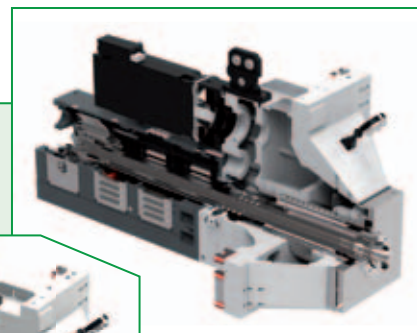
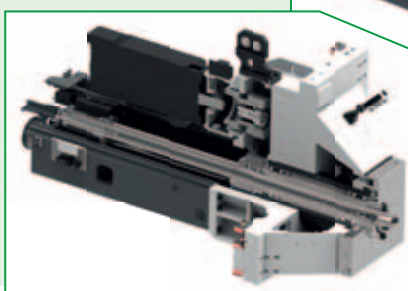
Machine controls

The machine controls are located on the main control panel: It is mounted on a rotary arm that can be adjusted vertically in the operator's position.



Central headstock

The WHT 110/130 machine is equipped with a central core headstock. This solution is optimum in respect to a uniform thermal and mechanical loading of the machine frame. The spindle is driven from a standardised gear case connected to the main motor. Two mechanical spindle speed ranges are shifted electromechanically. The travelling spindle is sliding in the hollow spindle.



Machining centres

TECHNICAL PARAMETERS – BASIC MACHINE PARAMETERS

Machine type		WHT 130 S	WHT 130 L	WHT 130 SC	WHT 130 LC
Headstock					
Work spindle diameter	mm (in)	130 (5.1181)			
Spindle taper		ISO 50			
Work spindle speed range	1/min	10 – 4 000		10 – 5 000	
Main motor power (S1)	kW (HP)	41 (55.7)		41 (55.7)	
Torque on spidle (S1)	Nm (ft lb)	3 200 (2360.2)		1 718 (1267.1)	
Spindle stroke W	mm (in)	800 (31.4960)			
Column					
Headstock vertical travel Y	mm (in)	1 500 (59.0551)	2 500 (98.4251)	1 500 (59.0551)	2 500 (98.4251)
Longitudinal column adjustment Z	mm (in)	2 000 (78.7401)	3 000 (118.1102)	2 000 (78.7401)	3 000 (118.1102)
Rotational table					
Transverse table travel X	mm (in)	2 000 (78.7401)	4 000 (157.4803)	2 000 (78.7401)	4 000 (157.4803)
Max. workpiece weight	kg (lbs)	20 000 (44092.5)			
Table clamping area	mm (in)	1 800 x 1 800 (70.8661 x 70.8661)	1 800 x 2 200 (70.8661 x 86.6141)	1 800 x 1 800 (70.8661 x 70.8661)	1 800 x 2 200 (70.8661 x 86.6141)
Feeds					
Range of feeds (working and rapid traverse) – X, Y, Z	mm/min (ipm)	1 – 25 000 (0.0393 – 984.2519)		1 – 36 000 (0.0393 – 1417.3228)	
– W	mm/min (ipm)	1 – 20 000 (0.0393 – 787.4015)			
– B	1/min	0.003 – 3			
Basic machine equipment					
– Chip conveyor			•		•
– Machine operator covering			•		•
– X and Z-axis covering			•		
– Modification for the manual change of the manually adjusted miling heads			•		
– Remote diagnostics			•		•
– Complete machine enclosure (including the machine operator covering)					•
– Automatic tool change ATC 40					•
– Modification for the automatic change of the milling heads (UPPT)					•
– CHZ tool cooling (via the external nozzles)					•

Basic horizontal table type machines or centres are available in two versions – S (small) and L (large). Each version has its pre-defined parameters (see the table) and equipment. It is possible to only select from the range of options (e.g. milling heads, face plates, etc.).

OPTIONAL MACHINE VERSIONS

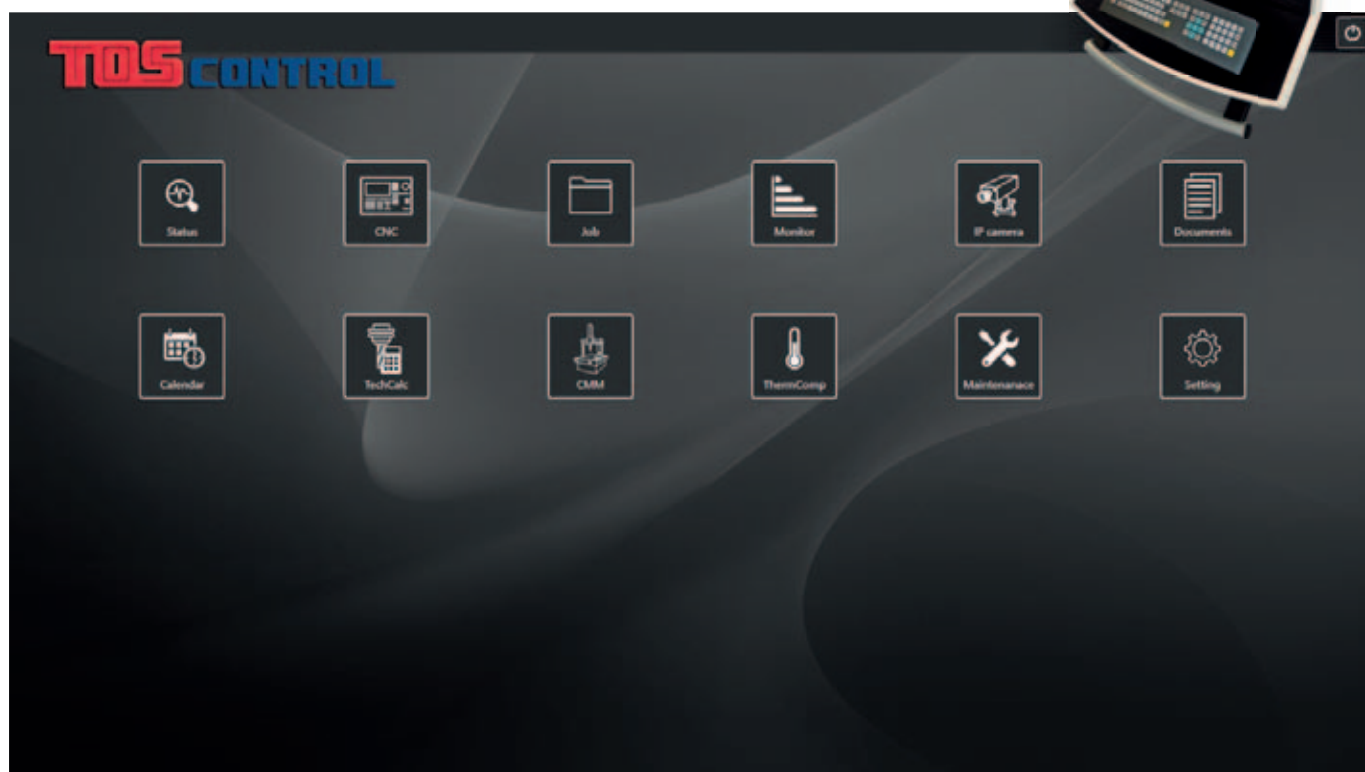
Machine type		WHT 130	WHT 130 C	
Headstock				
Work spindle diameter	mm (in)	130 (5.1181)		
Spindle taper		ISO 50		
Work spindle speed range	1/min	10 – 4 000	10 – 4 000	10 – 5 000
Main motor power (S1)	kW (HP)	41 (55.7)		
Torque on spindle (S1)	Nm (ft lb)	3 200 (2360.2)	3 200 (2360.2)	1 718 (1267.1)
Spindle stroke W	mm (in)	800 (31.4960)		
Column				
Headstock vertical travel Y	mm (in)	1 500, 2 000, 2 500, 3 000* (59.0551, 78.7401, 98.4251, 118.1102*)		
Longitudinal column adjustment Z	mm (in)	1 500, 2 000, 2 500, 3 000 (59.0551, 78.7401, 98.4251, 118.1102)		
Rotational table				
Transverse table travel X	mm (in)	2 000, 3 000, 4 000, 5 000* (78.7401, 118.1102, 157.4803, 196.8503*)		
Max. workpiece weight	kg (lbs)	20 000 (44092.5)		
Table clamping area	mm (in)	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 (70.8661 x 70.8661, 70.8661 x 86.6141, 70.8661 x 98.4251, 78.7401 x 118.1102, 98.4251 x 118.1102)		
Turning table				
Traverse table travel X	mm (in)	2 000, 3 000, 4 000, 5 000* (78.7401, 118.1102, 157.4703, 196.8503*)		
Max. workpiece weight / max. palette load	kg (lbs)	10 000 (22046.2)		
Table clamping area	mm (in)	Ø 2 000 (78.7401)		
Max. speed	1/min	250		
Automatic palette change				
Transverse table travel X	mm (in)	2 000, 3 000, 4 000, 5 000* (78.7401, 118.1102, 157.4803, 196.8503*)		
Max. workpiece weight	kg (lbs)	16 000 (35274)		
Palette clamping area	mm (in)	1 600 x 1 600, 1 600 x 2 000 (62.9921 x 62.9921, 62.9921 x 78.7401) Ø 2 000 (78.7401)		
Max. number of palettes	pcs	2 to 4		
Automatic tool change				
Number of storage sites – chain type magazine	pcs	40, 60, 80		
Number of storage sites – rack type magazine	pcs	100+		
Max. tool diameter				
– with fully loaded magazine	mm (in)	125 (4.9212)		
– with free neighbouring storage sites	mm (in)	320 (12.5984)		
Max. tool length	mm (in)	500 (19.6850)		
Tool change time	s	16		

* only for the WHT 130 horizontal boring machine

WHT 110 / 130 (C)

TOScontrol

This is a machine administration software consisting of the default screen with icons of individual applications (similar to mobile device operating systems). TOScontrol is part of the standard equipment of all machines.



TOSControl system default screen.

Standard machine equipment



Status screen

Clearly displays basic information about the machine (coordinates, program, alarms, logged in user, etc.).



CNC control system

Displays the standard control system screen supplemented by a sidebar with a button for returning to the TOS Control default screen.



Documentation

This is an application enabling the reading and management of PDF documents (e.g. operating instructions, repair manual, etc.), including the creation of user rights and the creation of tabs and notes in documents.



Calendar

Standard calendar view – day, week, month
User event, add, change, delete
Meeting of machine tool manufacturers – service event
Calendar reminder
All data stored in the local database

Option applications

(not-included in standard equipment)



IP camera

The application enables control of one or more motorised cameras located on any part of the machine. Data from the camera can also be used to facilitate machine operation.



Inspection and compensation

This is metrological software integrated into the control system, which together with the touch probe allows the work-piece to be measured accurately and directly on the machine making it possible to perform the automatic compensation of errors and program debugging.

Applications under preparation



Work administrator

Displays the work order view and the overview of operations directly on the machine tool control panel, which is linked to the ERP system. It is also possible to add other documents into the application, e.g., operation description, photographs, tables of NC programs.



Machine monitor

An integrated system for monitoring the history of machine tool use. This system displays the time axis of basic machine states, e.g., ready, production, production slowdown, error, off, etc.



Technology calculation

A technology consultant for a selected tool that facilitates the selection and control of cutting conditions and provides optimal utilisation of the tool properties.



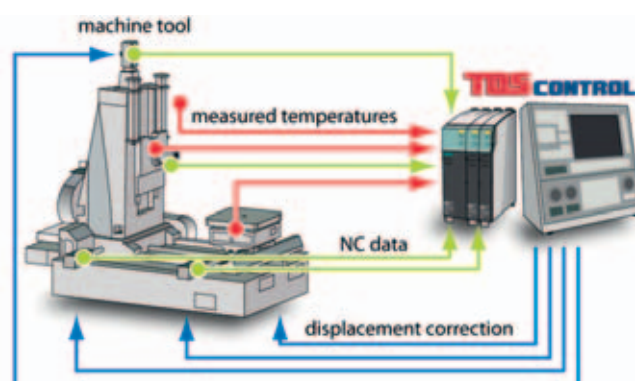
Thermal compensation

This is an application that depicts a virtual model of the machine tool's thermal behaviour and comparison of previously measured thermal deformation with the current thermal conditions of the machine. Based on this comparison, the application compensates the actual thermal deformation of the machine.



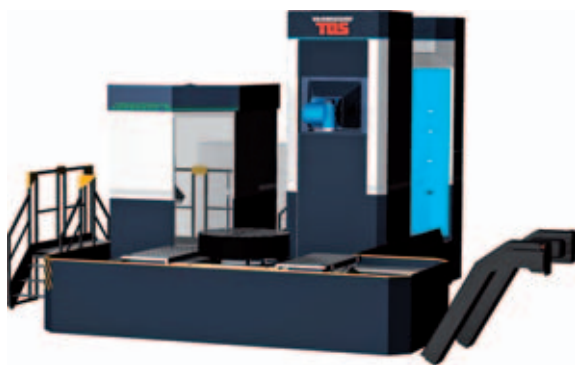
Predictive maintenance

Expands the machine monitor application to enable service intervention prediction to decrease maintenance costs and prolong machine operation.



WHT 110 / 130 (C)

Machine covering

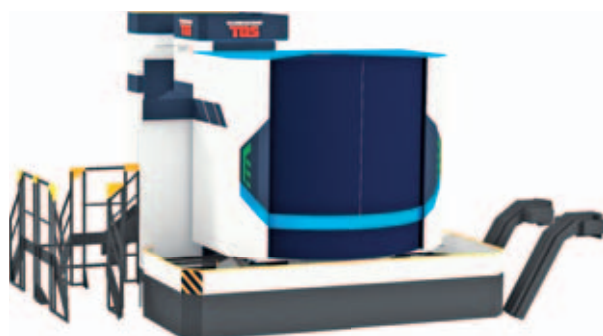


Horizontal machine tool

Covering basic version: the bed, column and operator's place covers

Optional version

Machine covers with the automatic tool change: bed, column, operator's place and automatic tool change covers



Protective covering of the workspace: the bed, column and operator's position covers and workspace protective covering that includes a removable sheet metal cab

„C“ cover: the beds, the column, the machine operator's station, and the workspace covering along the X and Z axes

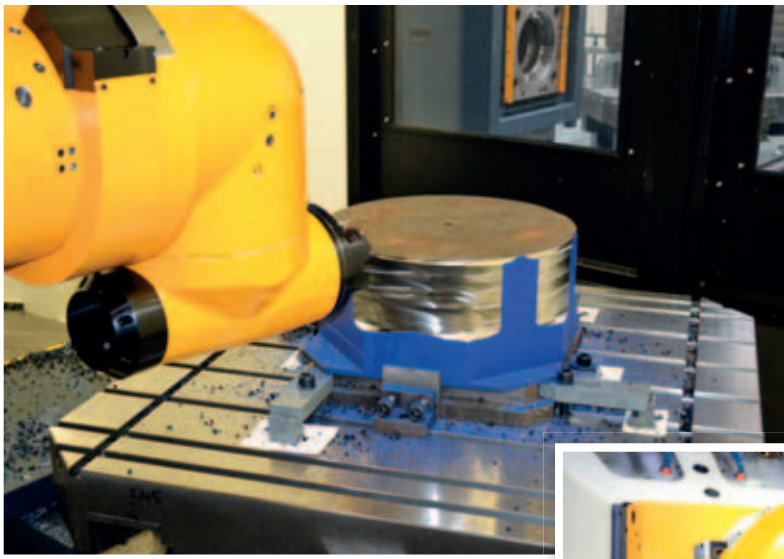


Horizontal machining centre



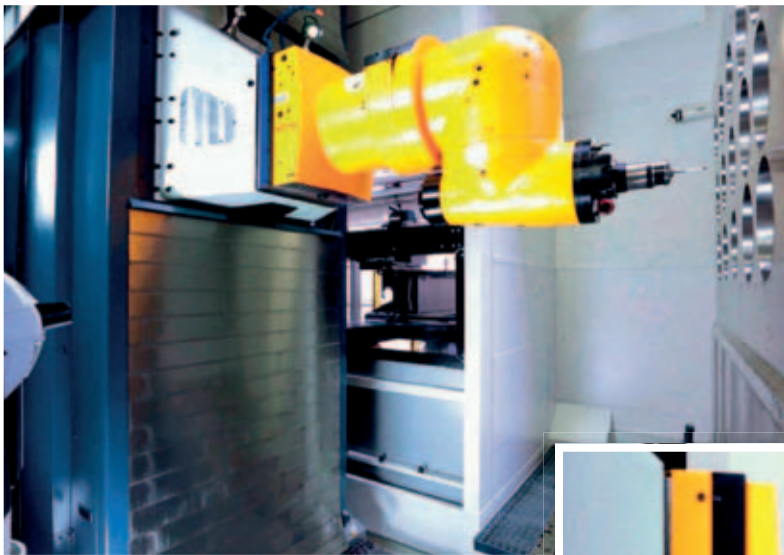
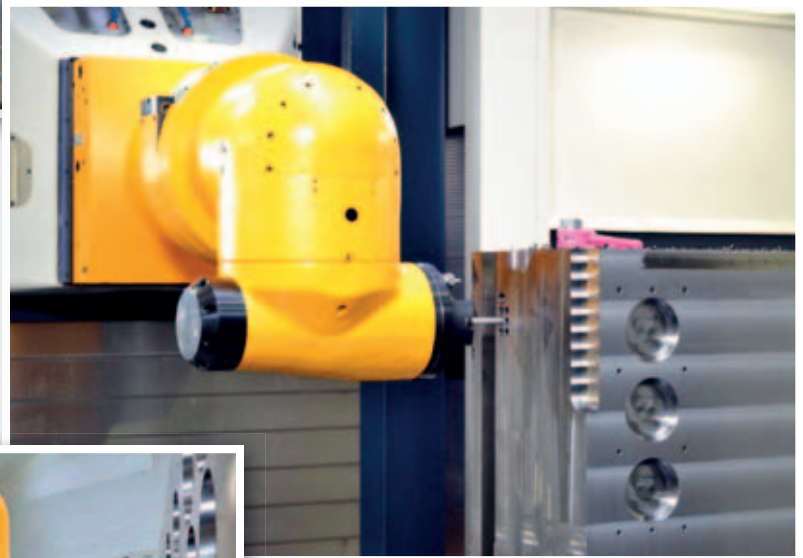
A complete covering of the machining centre. In addition to the covering, a chip washing option or the workspace exhaustion can be specified.

WHT 110 / 130 (C)



| Cylindrical surface milling using the HOIL 50 milling head.

| Coordinate drilling of 8 mm and 14 mm holes.



| In-process measurement with the touch probe and independent laser measurement.

| Carousel machining with special extension (magnetic work-piece clamping).



Portal milling machine WVM 2600 / 3600 T



Basic machine design without covering.

Vertical machining centers of the WVM 2600 / 3600 T series are designed as a unified series of machines for universal machining of steel and cast iron parts especially in the general engineering segment.

Thanks to its unique construction of a solid portal with a mobile headstock (Y), a vertically traveling RAM (Z) and a sliding table (X), the machines stand out with high precision and stiffness.

The high installed power of the machine (53 kW) is designed especially for power and productive machining.

Machines can be equipped with various types of milling heads, which are automatically installed and allow to further extend the technological possibilities of the machine. Machines can be supplemented by other types of accessories to increase machine efficiency, such as cooling system, machine monitoring, or tool change system.

Machine control is provided from the operator platform installed on the side of one of the columns, and the machines can be equipped with a cover around the table axis (X) to minimize flying of chips and splashing of cutting fluid into the environment.

WVM 2600 / 3600 T

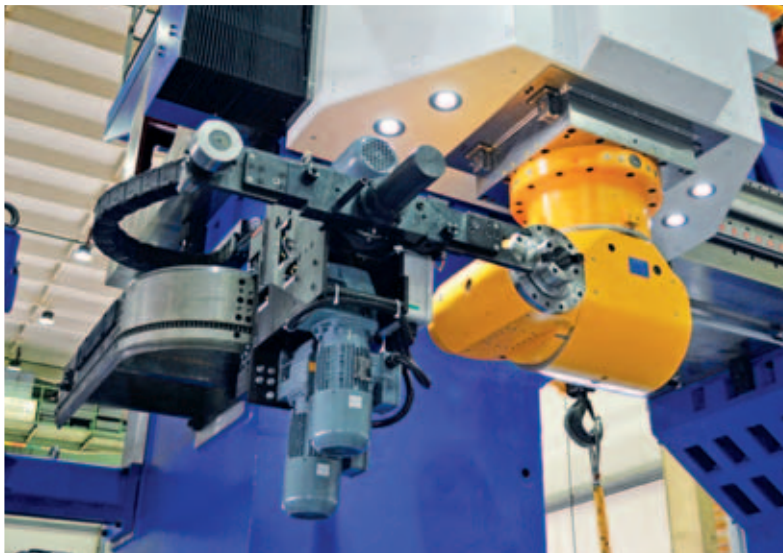


Complete view of the machine. There is horizontally moveable headstock with traveling RAM.

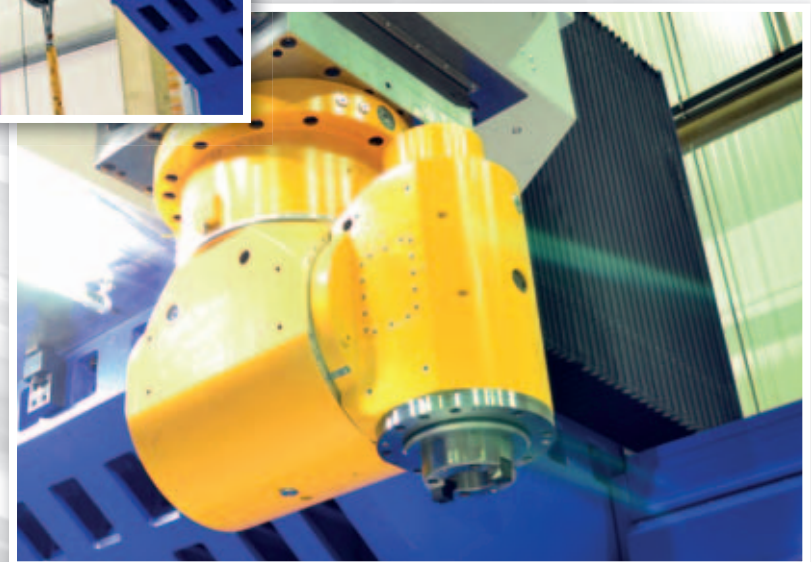
A view of the work area of the machine where the horizontal surface is milled.



Detail of automatic tool change system, which changes tools to the horizontally positioned milling head.



Detail of integrated orthogonal milling head SEMPUCO.

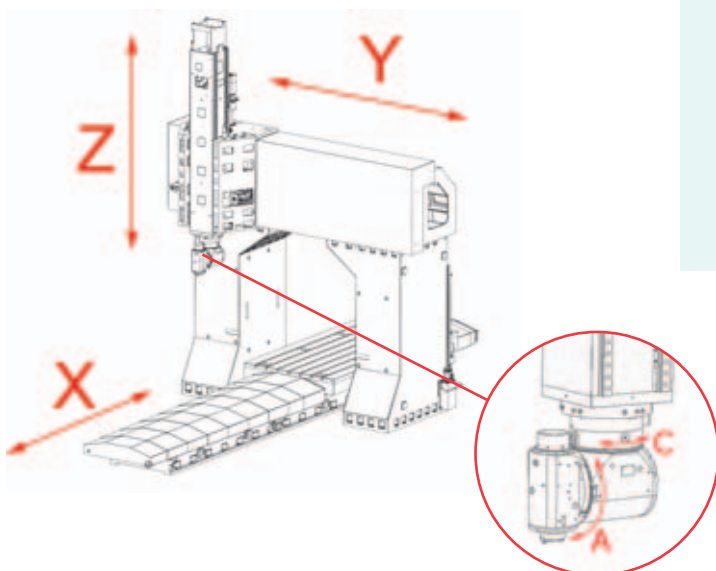


WVM 2600 / 3600 T

Basic machine design with covering.



Controlled axes schema



Machine configuration

- machine with integrated orthogonal milling head
- machine equipped with an automatic tool change
- machine equipped with an automatic special accessory change
- wide range of work table designs



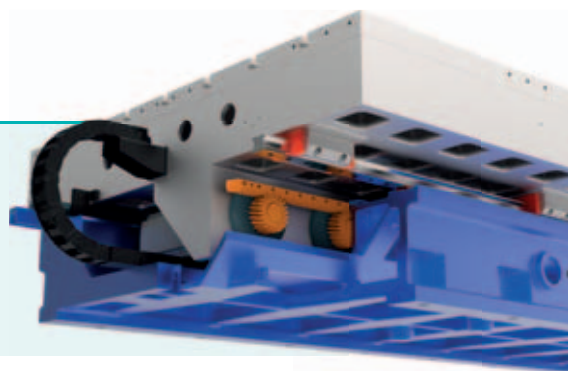
TECHNICAL PARAMETERS

Headstock		WVM 2600 T			WVM 3600 T	
Termination of RAM by an interface for application of technological accessories						
RAM size	mm (in)	500 x 500 (19.6850 x 19.6850)				
Main motor speed range	1/min	10 – 5 000				
Main motor power (S1)	kW (HP)	53 (72.1)				
Torque on driving shaft (S1)	Nm (ft lb)	1 375 (1014.1)				
Ram stroke Z	mm (in)	1500 (59.0551)				
Headstock horizontal transverse traverse Y	mm (in)	3 200 (125.9842)			4 200 (165.3543)	
– when AVTP system is applied	mm (in)	4 300 (169.2913)			5 300 (208.6614)	
Headstock with the integrated milling head						
Spindle tool hollow		ISO 50				
Max. spindle speed	1/min	5 000				
Max. transmitted power	kW (HP)	40 (54.4)				
Max. spindle torque	Nm (ft lb)	1 200 (885.1)				
Basic increment for positioning both dividing planes	°	1				
Range of rotation in the A axis	°	±180				
Range of rotation in the C axis	°	±180				
Work table for WVM 2600 T						
Table longitudinal traverse X	mm (in)	4 000, 5 000, 6 000, 7 000, 9 000 (157.4803, 196.8503, 236.2204, 275.5905, 354.3307)				
Distance between the columns	mm (in)	2 600 (102.3622)				
Width of table clamping area	mm (in)	2000 (78.7401)				
Length of table clamping area	mm (in)	3000 (118.1102)	4000 (157.4803)	5000 (196.8503)	6000 (236.2204)	8000 (314.9606)
Max. workpiece weight	tonnes (tons)	16 (17.6)	20 (22)	24 (26.5)	28 (30.9)	36 (39.7)
Size of the clamping T-slots	mm (in)	28H8 (1.1023)				
Spacing of the clamping T-slots	mm (in)	250 (9.8425)				
Work table for WVM 3600 T						
Table longitudinal traverse X	mm (in)	4 000, 5 000, 6 000, 7 000, 9 000, 11 000 (157.4803, 196.8503, 236.2204, 275.5905, 354.3307, 433.0708)				
Distance between the columns	mm (in)	3 600 (141.7322)				
Width of table clamping area	mm (in)	3 000 (18.1102)				
Length of table clamping area	mm (in)	3000 (118.1102)	4000 (157.4803)	5000 (196.8503)	6000 (236.2204)	8000 (314.9606)
Max. workpiece weight	tonnes (tons)	20 (22)	24 (26.5)	28 (30.9)	32 (35.3)	40 (44.1)
Size of the clamping T-slots	mm (in)	28H8 (1.1023)				
Spacing of the clamping T-slots	mm (in)	250 (9.8425)				
Travels						
Range of traverse (working and rapid travel) – X, Y, Z	mm/min (ipm)	1 – 25 000 (0.0393 – 984.2519)				
Max. traverse forces in the X, Y, Z, W axes	kN (lbf)	20 (4496.2)				
Automatic tool change						
Number of storage sites – chain type magazine	pcs	60				
Number of storage sites – meander type magazine	pcs	80, 100, 120				
Tool change time	s	20				

WVM 2600 / 3600 T

X, Y, Z axis drives

Drives of all the linear axes are fitted with separate electric regulating actuators. The Z axis is driven via a ball screw with pre-loaded nuts. The X and Y axes are driven via a rack and two pre-loaded pinion gears controlled by a "Master-Slave" system.



Machine frame

The frame consists of a bed with a traversing table, above which a transversely housed headstock moves on the crossbeam that is attached to two vertical stands. All the frame parts are designed as rigid and optimally sized castings.

Guiding of movable groups

Linearly traversing groups of the X, Y, and Z machine axes are guided using linear roller guides. Bed guideways are covered with telescopic steel covers. A crossbeam guideway is protected by folded fabric bellows.



WVM 2600 / 3600 T

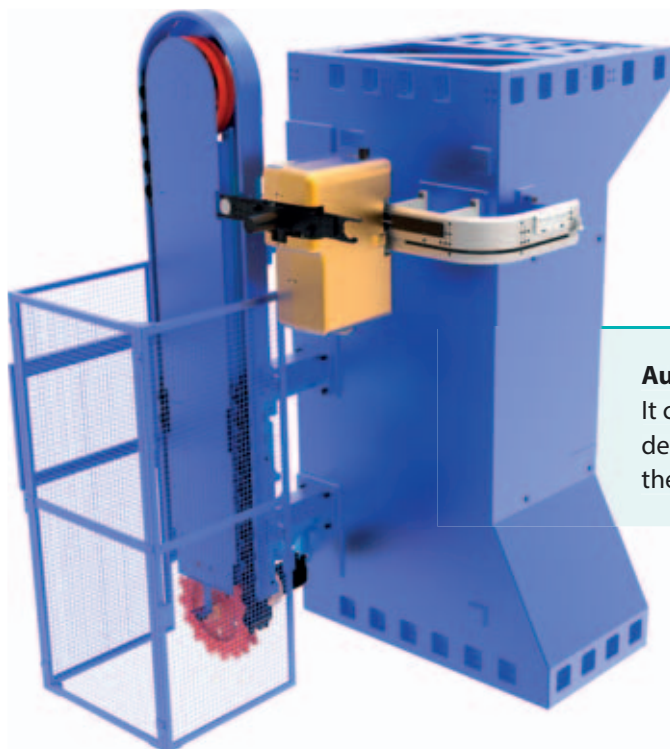


Headstock

The basic body is a rigid casting of ductile cast iron, in which a horizontally traversing RAM made of cast steel is mounted. The main spindle rotation drive is transmitted from a powerful electric drive via a robust two-speed gearbox with automatic shifting.

Balancing

Ram weight is compensated hydro-mechanically (with a hydraulic cylinder) using a standalone hydraulic unit.



Automatic tool change

It consists of a chain tool magazine, a manipulator guide-way on the stand, and a custom manipulator that allows the tool to be exchanged in the milling head.

Rotating tables

The additional work tables with horizontal adjustment are designed as special accessory for horizontal floor-type boring machines (the WRD series) and 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.

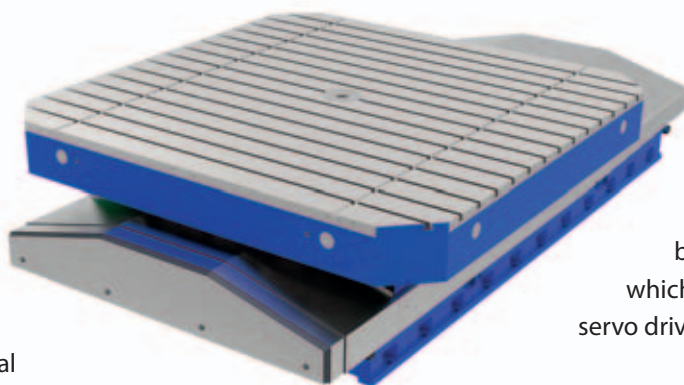


Table control as a full-fledged CNC axis.
In this case used for machining the inner surface of curved armature.



TECHNICAL PARAMETERS

Additional rotating table		S 5	S 10	S 20
Max. workpiece weight	kg (lbs)	5 000 (11023.1)	10 000 (22046.2)	20 000 (44092.5)
Table clamping area	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 2 500 x 2 500
	(in)	(39.3700 x 49.2125)	(49.2125 x 49.2125) (49.2125 x 62.9921)	(70.8661 x 70.8661) (70.8661 x 86.6141) (70.8661 x 98.4251) (98.4251 x 98.4251)
Size of clamping T-slots	mm (in)	28H8 (1.1023)		
Size of table adjustment	mm	0, 1 600, 2 000	0, 1 500, 2 000, 3 000	0, 1 500, 2 000, 3 000, 4 000
	(in)	(0, 62.9921, 78.7401)	(0, 59.0551, 78.7401, 118.1102)	(0, 59.0551, 78.7401, 118.1102, 157.4803)
Feed range – V	mm/min (ipm)	1 – 20 000 (0.0393 – 787.4015)	1 – 15 000 (0.0393 – 590.5511)	
Feed range – B	1/min	0.003 – 1.5		
Rapid traverse – V	mm/min (ipm)	30 000 (1181.1023)	24 000 (944.8818)	20 000 (787.4015)
Rapid traverse – B	1/min	7	5	3.5
Min. programmable positioning increment – in the V coordinate – in the B coordinate	mm (in) °	0,001 (0.0000393) 0,001		

Additional rotating table		S 16	S 30	S 50	S 80
Max. workpiece weight	kg (lbs)	16 000 (35274)	30 000 (66138.7)	50 000 (110231.1)	80 000 (176369.8)
Table clamping area	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
	(in)	(70.8661 x 88.1889) (78.7401 x 98.4251)	(78.7401 x 78.7401) (78.7401 x 98.4251) (98.4251 x 118.1102)	(118.1102 x 137.7952) (118.1102 x 118.1102) (118.1102 x 157.4803)	(137.7952 x 137.7952) (137.7952 x 157.4803) (157.4803 x 157.4803) (157.4803 x 177.1653)
Size of clamping T-slots	mm (in)	28H8 (1.1023)			
Size of table adjustment	mm	0, 1 400, 1 800	0, 1 300, 1 800, 2 500, 3 000, 3 500	0, 1 500, 2 000, 2 500, 3 000, 3 500	2 000, 3 000, 4 000
	(in)	(0, 55.1181, 70.8661)	(0, 51.1811, 70.8661, 98.4251, 118.1102, 137.7952)	(0, 59.0551, 78.7401, 98.4251, 118.1102, 137.7952)	(78.7401, 118.1102, 157.4803)
Feed range – V	mm/min (ipm)	1 – 5 000 (0.0393 – 196.8503)	1 – 8 000 (0.0393 – 314.9606)	1 – 6 000 (0.0393 – 236.2204)	
Feed range – B	1/min	0.003 – 1	0.003 – 1.5	0.002 – 1	
Rapid traverse – V	mm/min (ipm)	10 000 (393.7007)	16 000 (629.9212)	15 000 (590.5511)	13 700 (539.3700)
Rapid traverse – B	1/min	1.75	3	2.5	1.6
Min. programmable positioning increment – in the V coordinate – in the B coordinate	mm (in)	0,001 (0.0000393) 0,001			



Automatic palette changer (APC)

The APC 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 110/130, WHN(Q) 13/15, WHR 13 (Q), MAXIMA I / II, WHT 110 (C) and WHT 130 (C).



TECHNICAL PARAMETERS

Type marking of the palettes		P 4	P 5	P 8	P 16
	mm	1 250 x 1 250 1 250 x 1 600	1 250 x 1 400 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 1 800 x 2 500
Palette clamping area	(in)	(49.2125 x 49.2125, 49.2125 x 62.9921)	(49.2125 x 49.2125, 49.2125 x 62.9921)	(62.9921 x 70.8661)	(62.9921 x 62.9921 62.9921 x 78.7401 70.8661 x 70.8661 70.8661 x 86.6141 70.8661 x 98.4251)
Max. workpiece weight	kg (lbs)	4 000 (8818.5)	5 000 (11023.1)	8 000 (17637)	16 000 (35274)
Size of clamping T-slots	mm (in)	22H8 (0.8661)			
Size of adjustment	mm (in)	1 500, 2 000, 2 500, 3 000 (59.0551, 78.7401, 98.4251, 118.1102)	1 600, 2 000, 2 500 (62.9921, 78.7401, 98.4251)	2 000, 2 500, 3 000, 3 500, 4 000 (78.7401, 98.4251, 118.1102, 137.7952, 157.4803)	3 000, 3 500, 4 000 (118.1102, 137.7952, 157.4803)
Number of palettes in the system	pcs	2 – 4	2	2 – 4	2
Palette change time	s	150	85	85	120

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30i-B Plus
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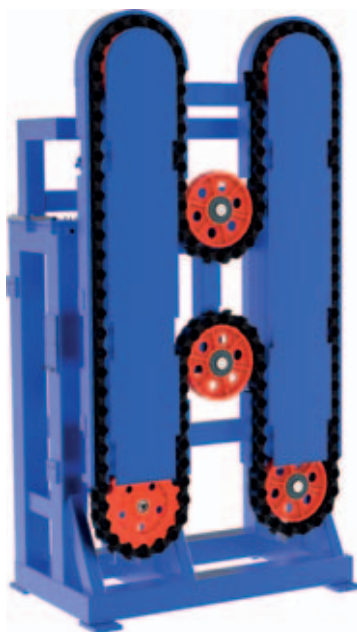
WWW.FANUC.CZ

Automatic tool change (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.

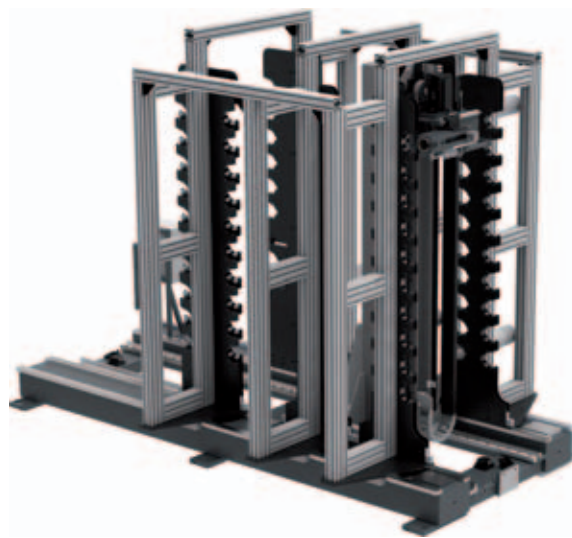
It is possible to choose a variable number of storage sites on customer demand.



Meander magazine



Chain magazine

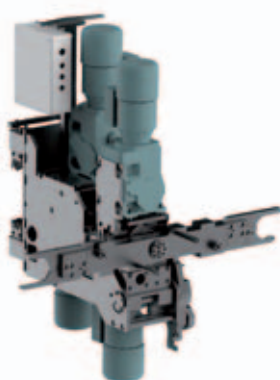


Rack magazine

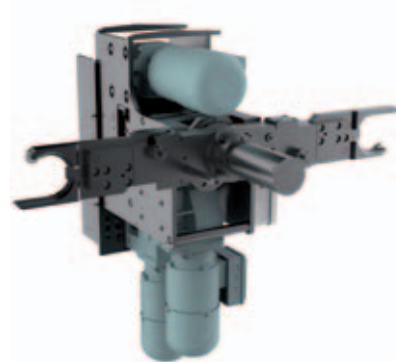
Robot application



Four-motor tilting tool manipulator



Three-motor untilting tool manipulator



TECHNICAL PARAMETERS

		TABLE-TYPE MACHINES	FLOOR-TYPE MACHINES
Number of storage sites in the magazine	pcs	40, 60, 80, 120	
Pitch of storage sites in the magazine	mm (in)	130 (5.1181)	
Max. tool diameter			
– with fully loaded magazine	mm (in)	125 (4.9212)	
– with free neighbouring storage sites	mm (in)	320 (12.5984)	
Max. diameter of a special flat tool	mm (in)	390 (15.3543)	
Max. tool length	mm (in)	500 (19.6850)	
Max. tool weight	kg (lbs)	25 (55.1)	
Max. tool weight in the chain	kg (lbs)	1 000 (2204.6)	
Max. tool imbalance in the chain	kg (lbs)	150 (330.7)	
Tool change time (tool-tool)	s	15	20

		MACHINING CENTRES		PORTAL MILLING MACHINES
		WHT 110	WHT 130	WVM 2600 / 3600 T
Number of storage sites in the magazine		40, 60, 80, 100+		40, 60, 80, 100, 120
Pitch of storage sites in the magazine	mm (in)	130 (5.1181)		
Max. tool diameter				
– with fully loaded magazine	mm (in)	125 (4.9212)		
– with free neighbouring storage sites	mm (in)	320 (12.5984)		
Max. tool length	mm (in)	500 (19.6850)		
Max. tool weight	kg (lbs)	25 (55.1)		
Max. tool weight in the chain	kg (lbs)	1 000 (2204.6)		
Tool change time (tool-tool)	s	8	16	20



Automatic tool change to the milling head by using a four-motor tilting manipulator.

Milling heads

Hand-adjustable heads

FP 40 / 50

The milling machine serves as an accessory to the WH(Q) 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): 600
- output (kW): 10
(HP): 13.6
- moment (Nm): 1 000
(ft lb): 737.6
- weight (kg): 140
(lbs): 308.6
- positioning: manual



UFP 40 / 50

Used as an accessory for the WH(Q) 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): 600
- output (kW): 10
(HP): 13.6
- moment (Nm): 1 000
(ft lb): 737.6
- weight (kg): 200
(lbs): 440.9
- positioning: manual



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. The adjustment angles have the increment of 0.1° on circumferential scales fitted with nonius.

- number of axes: 1
- speed (min⁻¹): 3 000
- output (kW): 25
(HP): 34
- moment (Nm): 1 200
(ft lb): 885.1
- weight (kg): 200
(lbs): 440.9
- positioning: manual



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
(HP): 27.2
- moment (Nm): 1 000
(ft lb): 737.6
- weight (kg): 330
(lbs): 727.5
- positioning: manual



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
(HP): 43.5
- moment (Nm): 1 000
(ft lb): 737.6
- weight (kg): 440
(lbs): 970
- positioning: index 2.5



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°.

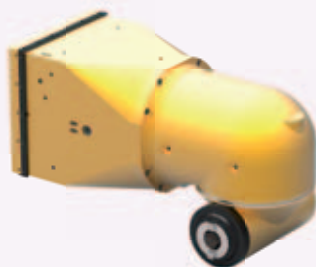
- number of axes: 2
- speed (min⁻¹): 3 000
- output (kW): 28
(HP): 38.1
- moment (Nm): 1 000
(ft lb): 737.6
- weight (kg): 610
(lbs): 1344.8
- positioning: 2x 0.001



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 ±185° in axis C, ±120°.

- number of axes: 2
- speed (min⁻¹): 4 000
- output (kW): 37
(HP): 50.3
- moment (Nm): 1 200
(ft lb): 885.1
- weight (kg): 1 100
(lbs): 2425.1
- positioning: index 1°



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): 3 000
- output (kW): 25
(HP): 34
- moment (Nm): 1 000
(ft lb): 737.6
- weight (kg): 450
(lbs): 992.1
- positioning: index 1°



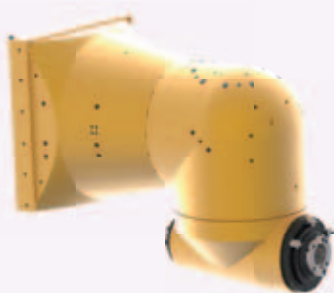
Milling heads

Automatically positioning heads

HOIT 50

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

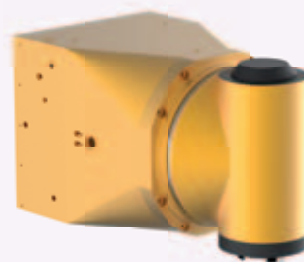
- number of axes: 2
- speed (min⁻¹): 2 000
- output (kW): 50
(HP): 68
- moment (Nm): 2 500
(ft lb): 1843.9
- weight (kg): 1 100
(lbs): 2425.1
- positioning: index 1°



HPI 50

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

- number of axes: 1
- speed (min⁻¹): 4 000
- output (kW): 37
(HP): 50.3
- moment (Nm): 1 200
(ft lb): 885.1
- weight (kg): 600
(lbs): 1322.8
- positioning: index 1°

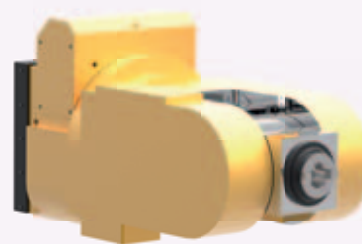


Automatically positioning – Continuously controlled heads

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
(HP): 29.9
- moment (Nm): 500
(ft lb): 368.8
- weight (kg): 800
(lbs): 1763.7
- positioning: 0.001°



Milling heads

Assortment of milling heads

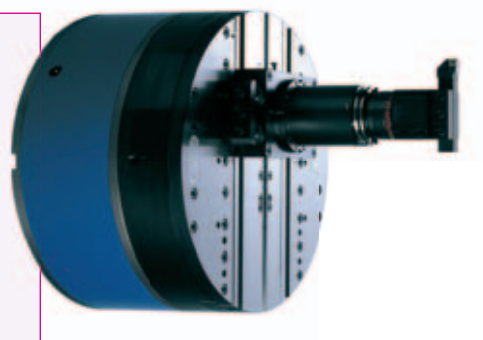
Head assortment	FP / UFP	HPR 50	HUR 50	HPI 50	HUI 50	HUF 50	HOI 50	HOIL 50	HOIT 50	HV/V
WH(Q) 10 CNC	✓	✓								
WH(Q) 105 CNC		✓	✓							
WHN 110 (Q,MC)		✓	✓							
WHN 130 (Q, MC)		✓	✓		✓			✓		
WHN(Q) 13/15 CNC	✓	✓	✓		✓	✓		✓		
WHR 13 Q	✓	✓	✓		✓	✓		✓		
MAXIMA I / II		✓	✓	✓	✓	✓	✓	✓		✓
WRD 13 (Q)	✓	✓	✓		✓	✓		✓		
WRD 130 / 150 (Q)		✓	✓	✓	✓	✓	✓	✓		✓
WRD 170 (Q)		✓	✓	✓	✓	✓	✓	✓	✓	✓
GRATA		✓	✓	✓	✓	✓	✓	✓		✓
WRD 180 H		✓	✓	✓	✓	✓	✓	✓	✓	✓
WHT 110 (C)		✓	✓		✓			✓		
WHT 130 (C)		✓	✓		✓	✓		✓		



Facing heads

D'Andrea

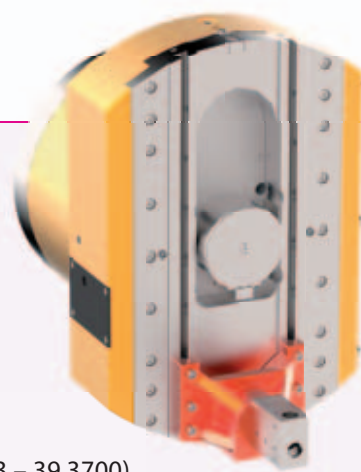
- **Maximum boring diameter:** 1 000 / 1 250 / 1 400 mm
39.3700 / 49.2125 / 55.1181 inch
- **Plate dimensions:** 500 / 600 / 800 mm
39.3700 / 49.2125 / 55.1181 inch
- **Traverse range:** 160 / 200 / 250 mm
6.2992 / 7.8740 / 9.8425 inch
- **Boring accuracy:** 0.01 mm (0.000393 inch)
- **Positioning:** 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.

• Diameter of the basic body	mm (in)	650 (25.5905)
• The slide's adjustment	mm (in)	170 (6.6929)
• Max. speed of the facing head	1/min	150
• Range of the slide's working traverses	mm/min (ipm)	1 – 1 000 (0.0393 – 39.3700)
• Slide's rapid traverse	mm/min (ipm)	1 000 (39.3700)
• Max. diameter of face turning	mm (in)	1 000 (39.3700)
• Range of the boring diameters	mm (in)	300 – 1 000 (11.8110 – 39.3700)



Application of LD 650 facing head, which is used for turning of valve flange.



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.



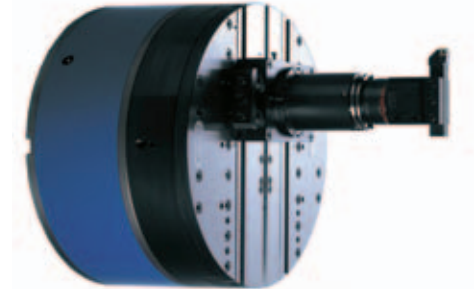
General features

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.

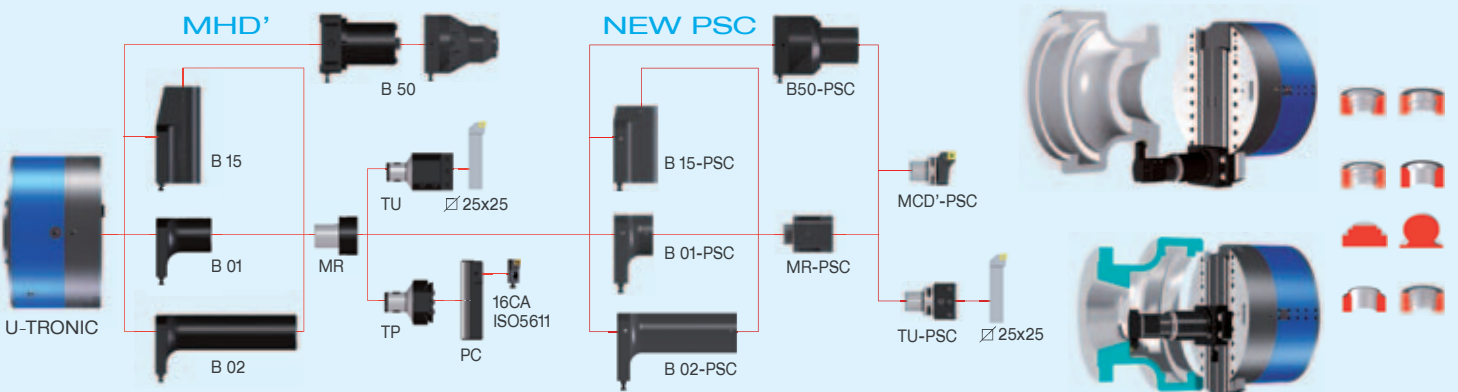
Fixed toolholders may be applied to the slide, with either manual or automatic tool change. Any application on machines that do not permit the connection to an axis of the NC, may be made by managing the motor of the drive unit with a practical, simple, and economical U-CONTROL positioner with wireless REMOTE-CONTROL.



STANDARD RANGE



SPECIAL SOLUTIONS



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.



The operator's platform and the machine covering

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



Basic covers – Operator covering and machine fencing

Additional KVR cover



Partial "C" type cover

Complete machine covering



Control systems

Specifications of the HEIDENHAIN TNC 640, Siemens Sinumerik 840D 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.

The control systems can also be operated by a manual wheel and control panel for automatic tool replacement.



HR510



HR520



HR550



Heidenhain TNC 640



HT2



HUBITRON



**Siemens
Sinumerik 840D sl**



HMOP



I-Pendant



Fanuc 31i



HEIDENHAIN



The TNC 640 and Extended Workspace Compact Keeping digital job management in view

In a fully digitalized and networked production environment, the user at the machine enjoys direct access to useful and relevant information. He can also bring his expertise to bear directly on the wider process chain. To make this possible, the TNC 640 with Extended Workspace Compact and a 24-inch widescreen offers an especially user-friendly workstation. The user can display additional applications alongside the control screen and organize his jobs fully digitally right on the control.

HEIDENHAIN s.r.o.

10200 Prague 10, Czech Republic

Phone +420 272 658 131

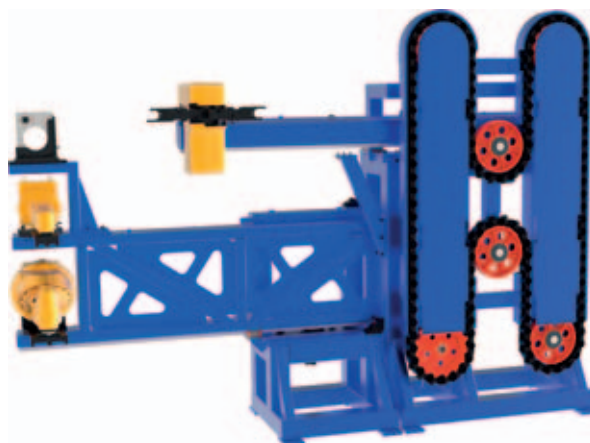
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Angle Encoders + Linear Encoders + Contouring Controls + Digital Readouts + Length Gauges + Rotary Encoders

Other accessories and services

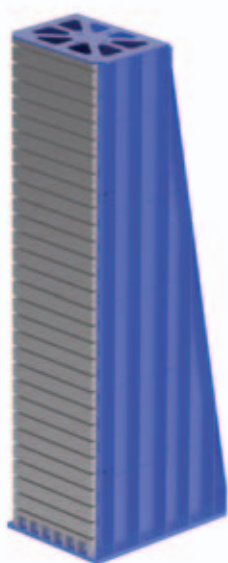
PICK UP system

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 floor-type machines have two versions of accessories magazine, 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.



Clamping equipment

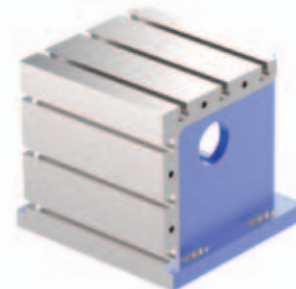
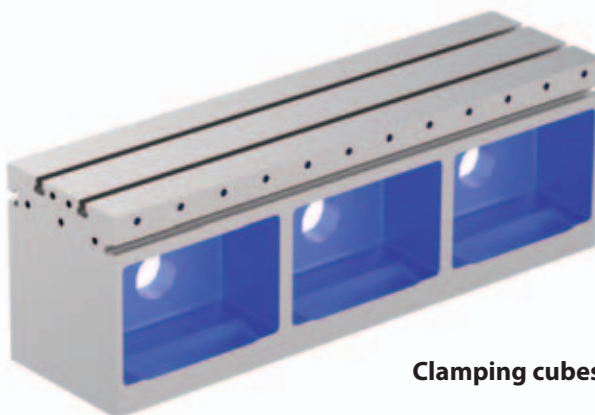
The clamping devices are used as special technological equipment for horizontal boring machines. They are used for clamping of the workpiece.



Clamping plates:
UD 2 000 – UD 5 000



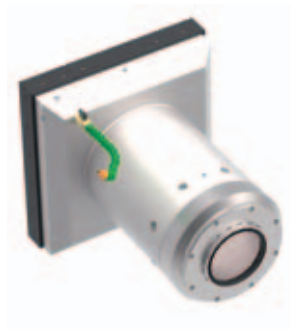
Clamping angles:
UU 800 – UU 6 000



Clamping 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).



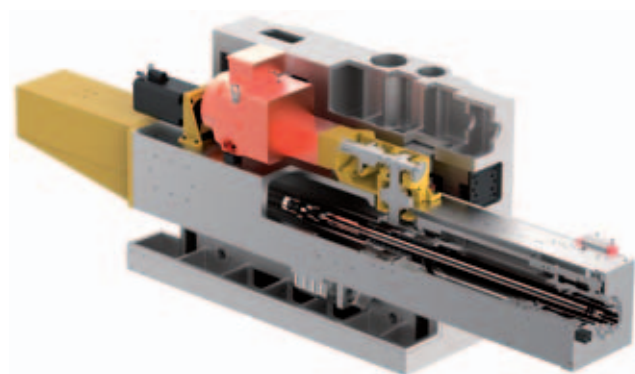
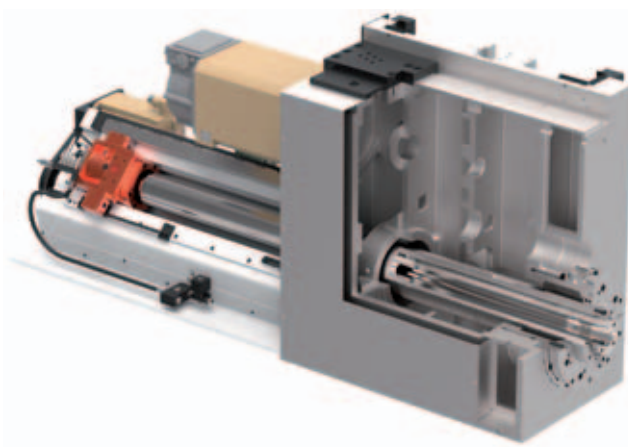
Headstocks

Headstocks for the WH machines:

10, 105, 110, 130, 13, 15

The headstocks 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 the WHR / WRD machines:

13, 130, 150, 160, 170, MAXIMA I / II

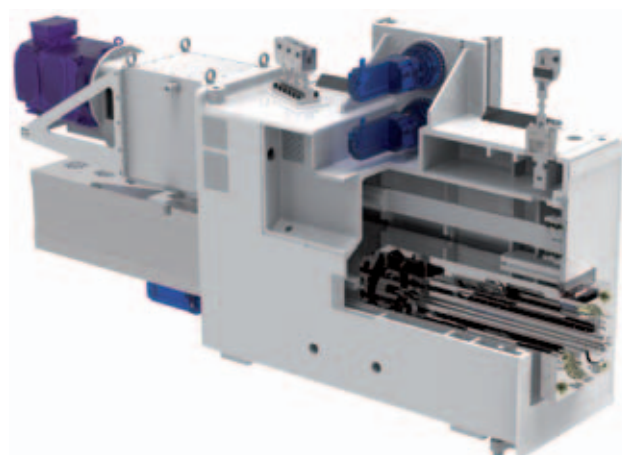
The basic body is a rigid casting from ductile iron; like other corresponding parts, they have an L shape, which creates a guide for the RAM. The concept of the WHR / WRD 13 – 170 headstocks allow electro-mechanical compensation of the RAM's drop during its traverse in the Z axis.

The drive of the work spindle is derived from the electric regulation drive through a two-speed gearbox. The weight of the WRD 13 – 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

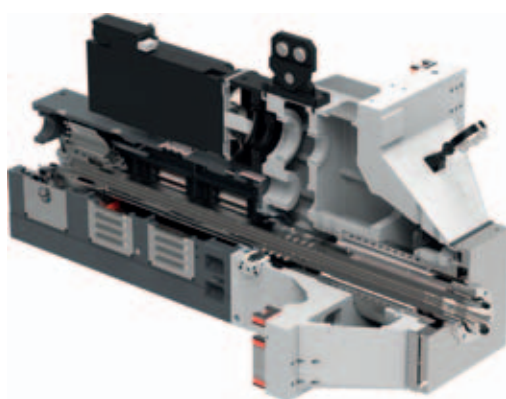
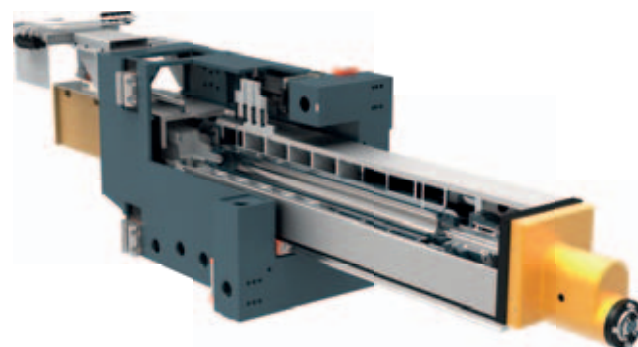
The headstock housing is a rigid casting from high-quality grey cast iron, which is followed by other groups of the machine. The internal area of the casting has a horizontal square tunnel with precisely machined surfaces for guiding the RAM. The drive of the work spindle is derived from powerful electric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



Headstocks for universal milling machines:

GRATA

The headstock is produced with centrally conducted traveling RAM. The driving shaft speed is derived from a powerful electric drive through the robust gearbox. Two mechanical gears are automatically engaged - by an electrically controlled shifter. The drive from the transmission to the drive shaft is made through a torsional rigid coupling. The coupling includes electromechanical compensation of the RAM movements.



Headstocks for machining centres:

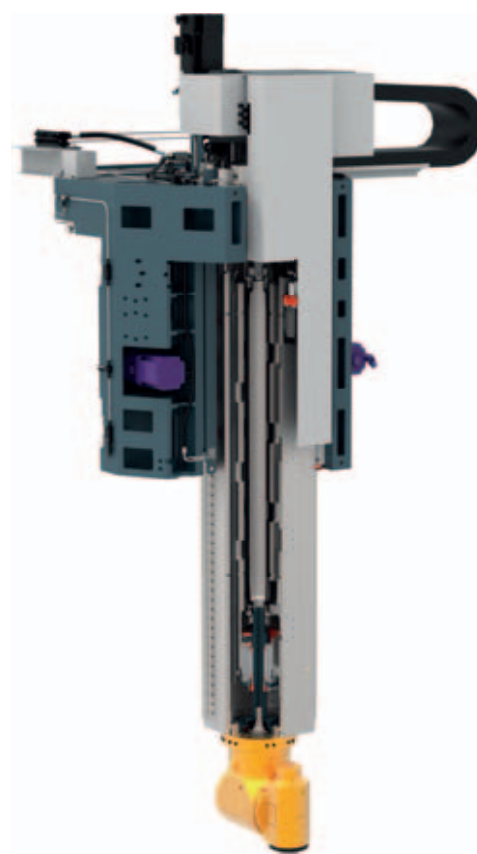
WHT 110 (C), WHT 130 (C)

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. In machines with traveling spindle the main housing consists of a set of hollow and work spindle. The traveling 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.

Headstocks for portal milling machines:

WVM 2600 / 3600 T

The basic body is a rigid casting of ductile cast iron, which creates a guideway for the horizontally traveling RAM of cast steel. The driving shaft in the RAM is driven by a powerful electrical control drive via a robust gearbox. The two mechanical gears are engaged mechanically by an electrically controlled shifter. The drive from the gearbox to the driving shaft has a torsionally rigid coupling. The headstock also incorporates a motor with a belt drive and a ball screw for the RAM travel, end switch, measuring gauge of the RAM and a RAM stroke safety brake. The RAM is guided by the four tracks of the linear guideways. On the sides, the RAM weight is symmetrically counter-balanced by hydraulic cylinders (plungers).



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 (Telemecanique, Merlin Gerin, Siemens).

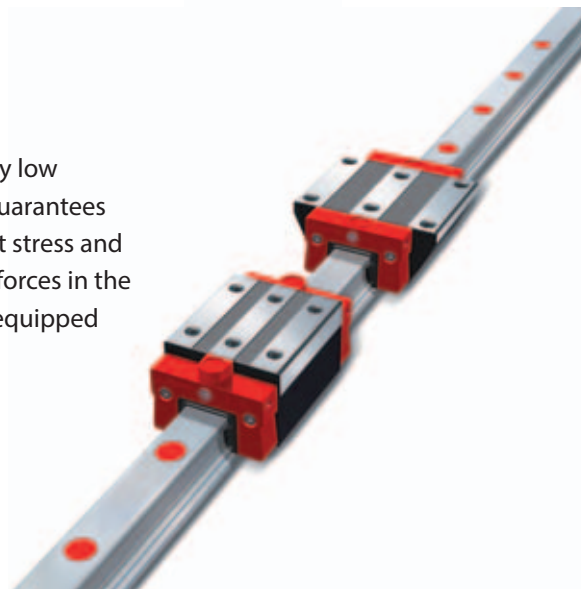
Hydraulic aggregate

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.



The background of the advertisement is a large, dark industrial hall with a high ceiling and exposed steel beams. In the center, a glowing blue digital interface is superimposed over the scene. This interface consists of a large screen displaying a 3D wireframe model of a mechanical part, and below it, a control panel with two numeric keypads and two rotary dials. To the left of the screen, a transparent blue rectangular box contains another 3D wireframe model of a similar mechanical part. The floor is dark and reflective, showing the glow of the digital interface. In the far background, a bright light source creates a strong lens flare, and a few silhouettes of people can be seen walking away from the viewer.

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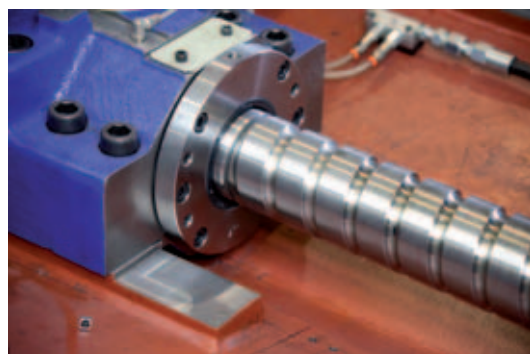
With SINUMERIK ONE, a new era begins. The CNC system revolutionizes everything that has gone before it – and unleashes the unbelievable power of digital transformation in the machine tool industry. This creates undreamt of new opportunities to realize ideas and business models. The seamless interaction between the virtual and real worlds facilitates a higher degree of freedom and allows innovations to be created in the shortest time. SINUMERIK ONE – the spark that ignites new ideas and allows them to quickly become reality.

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Other components

Gauging

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

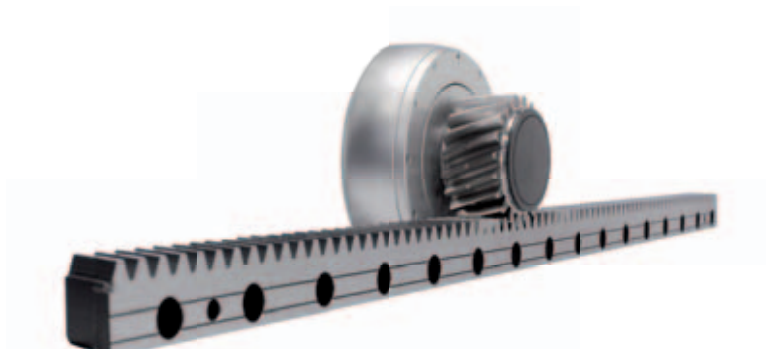


Ball screws

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.

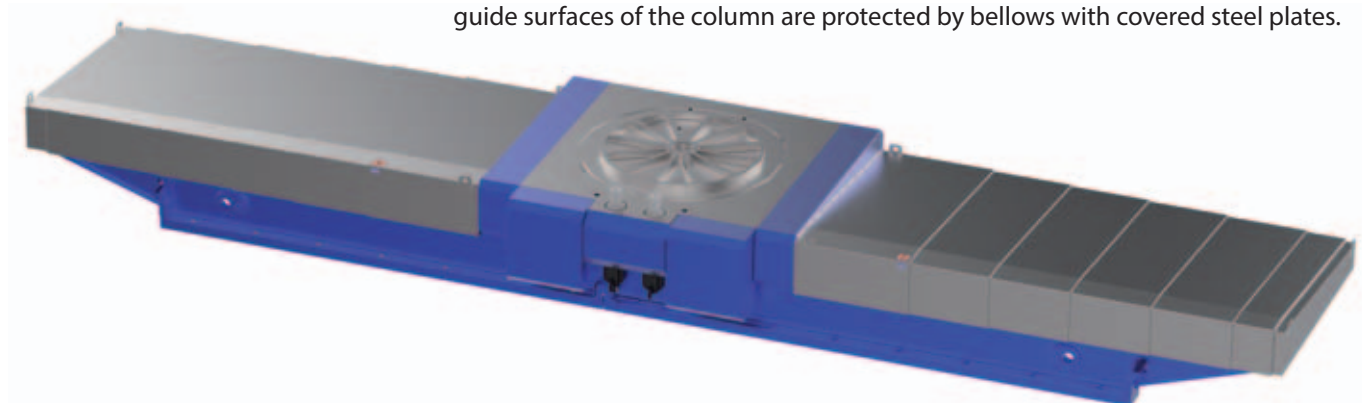
Toothed shaft

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 covers

The guides on the rails are protected against dirt by telescopic covers 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 (354.3307 inch)

Y = 2 500 mm (98.4251 inch)

ATC = 40

Table clamping surface

= 1 800 x 2 200 mm (20 tonnes)

70.8661 x 86.6141 inch (22.5 tons)



WRD 170 Q

GE CANADA – Canada

X = 13 000 mm (511.8110 inch)

Y = 4 000 mm (157.4803 inch)

ATC = 80

Table clamping surface

= 3 000 x 3 500 mm (50 tonnes)

118.1102 x 137.7952 inch (55.1 tons)



3x WRD 150 Q

Indian Railways - India

X = 11 000 mm (433.0708 inch)

Y = 3 000 mm (118.1102 inch)

ATC = 40



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



**WRD 150 Q
Tecnoweld Italia srl – Italy**
X = 11 000 mm (433.0708 inch)
Y = 4 500 mm (177.1653 inch)
ATC = 60
Table clamping surface
= 3 000 x 3 500 mm (50 tonnes)
118.1102 x 137.7952 inch (55.1 tons)



**WHQ 13 CNC
Hiecise Heavy
– duty Machines Co., Ltd. – China**
X = 3 500 mm (137.7952 inch)
Y = 2 500 mm (98.4251 inch)
Z = 1 600 mm (62.9921 inch)
ATC = 60
Table clamping surface
= 1 800 x 2 200 mm (12 tonnes)
70.8661 x 86.6141 (13.2 tons)



WHN 130 Q

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

X = 3 000 mm (118.1102 inch)

Y = 1 600 mm (62.9921 inch)

Z = 1 000 mm (39.3700 inch)

ATC = 40

Table clamping surface

= 1 800 x 2 240 mm (12 tonnes)

70.8661 x 88.1889 inch (13.2 tons)



WRD 130 Q

Strojírny Prostějov
– Czech Republic

X = 9 000 mm (354.3307 inch)

Y = 3 000 mm (118.1102 inch)

ATC = 40



WRD 170 Q

JOY Global Inc. – Chile

X = 17 000 mm (669.2913 inch)

Y = 6 000 mm (236.2204 inch)

ATC = 80 mm

Table clamping surface

= 5 000 x 5 000 mm (65 tonnes)

196.8503 x 196.8503 inch (71.6 tons)



WHN 130 MC

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

X = 2 000 mm (78.7401 inch)
Y = 2 240 mm (88.1889 inch)
Z = 1 250 mm (49.2125 inch)
ATC = 120
2x clamping pallette 1 600 x 1 800 mm,
(62.9921 x 70.8661 inch)



WHQ 105 CNC

Engcon – Poland

X = 1 800 mm (70.8661 inch)
Y = 1 250 mm (49.2125 inch)
Z = 1 250 mm (49.2125 inch)
ATC = 40
Table clamping surface
= 1 400 x 1 400 mm (5 tonnes)
55.1181 x 55.1181 inch (5.5 tons)



WHQ 13 CNC

Frydlantské strojírny
– Czech Republic

X = 3 500 mm (137.7952 inch)
Y = 2 500 mm (98.4251 inch)
Z = 1 250 mm (49.2125 inch)
ATC = 40
Table clamping surface
= 1 800 x 2 200 mm (12 tonnes)
70.8661 x 86.6141 inch (13.2 tons)



WRD 150 Q

S.E.P.F.A. – France

X = 8 000 mm (314.9606 inch)

Y = 3 000 mm (118.1102 inch)

ATC = 40

Table clamping surface

= 2 000 x 2 500 mm (25 tonnes)

78.7401 x 98.4251 inch (27.5 tons)



WH 10 CNC

**Škoda auto Mladá Boleslav
– Czech Republic**

X = 1 250 mm (49.2125 inch)

Y = 1 100 mm (43.3070 inch)

Z = 940 mm (37.0078 inch)

Table clamping surface

= 1 000 x 1 120 mm (3 tonnes)

39.3700 x 44.0944 inch (3.3 tons)



WRD 130 Q

Faymonville – Belgium

X = 11 000 mm (433.0708 inch)

Y = 4 000 mm (157.4803 inch)

ATC = 80

Milling head HOI 50



WRD 150 TANDEM

Hydra Arc – South Africa

common axis X = 33 000 mm
(1299.2125 inch)
Y = 2x 5 000 mm (196.8503 inch)
2x ATC 60



WHQ 105 CNC

AVL Moravia – Czech Republic

X = 1 800 mm (70.8661 inch)
Y = 1 600 mm (62.9921 inch)
Z = 1 250 mm (49.2125 inch)
ATC = 40
Table clamping surface
= 1 400 x 1 600 mm (3 tonnes)
55.1181 x 62.9921 inch (3.3 tons)



WHR 13 MC

DOOSAN Plzeň – Czech Republic

X = 3 000 mm (118.1102 inch)
Y = 2 500 mm (98.4251 inch)
Z = 3 200 mm (125.9842 inch)
ATC = 120
2x clamping pallet 1 800 x 2 200 mm,
70.8661 x 86.6141 inch

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 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 cover of the work space.



		FNGJ 40 A	FNGJ 50 A
Table	mm (in)	800 x 400 (31.4960 x 15.7480)	900 x 500 (35.4330 x 19.6850)
Working travels			
– longitudinal	mm (in)	600 (23.6220)	700 (27.5590)
– crosswise	mm (in)	400 (15.7480)	500 (19.6850)
– vertical	mm (in)	400 (15.7480)	500 (19.6850)
Tailstock travel	mm (in)	80 (3.1496)	80 (3.1496)
Spindle		ISO 40	ISO 40
Speed	1/min	50 – 4 000	50 – 4 000
Motor output	kW (HP)	4.0 (5.4)	4.0 (5.4)
Total input of the machine	kVA	22	22
Built-up area	mm (in)	2 070 x 2 120 (81.4960 x 83.4645)	2 170 x 2 120 (85.4330 x 83.4645)
Height	mm (in)	2 115 (83.2677)	2 115 (83.2677)
Weight	kg (lbs)	2 500 (5511.6)	2 600 (5732)

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 delivered with a vertical head 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 covering of the work space.



		FNG 40 CNC A	FNG 50 CNC A
Table	mm (in)	800 x 400 (31.4960 x 15.7480)	900 x 500 (35.4330 x 19.6850)
Working travels			
– longitudinal	mm (in)	600 (23.6220)	700 (27.5590)
– crosswise	mm (in)	400 (15.7480)	500 (19.6850)
– vertical	mm (in)	400 (15.7480)	500 (19.6850)
Tailstock travel	mm (in)	80 (3.1496)	80 (3.1496)
Spindle		ISO 40	ISO 40
Speed	1/min	50 – 4 000	50 – 4 000
Motor output	kW (HP)	5.5 (7.5)	5.5 (7.5)
Total machine input	kVA	20	20
Built-up area	mm (in)	3 623 x 2 845 (142.6377 x 112.0078)	3 623 x 2 845 (142.6377 x 112.0078)
Height	mm (in)	2 120 (83.4645)	2 120 (83.4645)
Weight	kg (lbs)	2 750 (6062.7)	2 850 (6283.2)

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. 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 (in)	360 x 1 400 (14.1732 x 55.1181)	360 x 1 400 (14.1732 x 55.1181)
Working travels			
– longitudinal	mm (in)	1 000 (39.3700)	1 000 (39.3700)
– crosswise	mm (in)	275 (10.8267)	300 (11.8110)
– vertical	mm (in)	420 (16.5354)	420 (16.5354)
Tailstock travel	mm (in)	–	75 (2.9527)
Spindle		ISO 50	ISO 50
Speed	1/min	31,5 – 1 400 45 – 2 000	31,5 – 1 400 45 – 2 000
Motor output	kW (HP)	5,5 (7.5)	5,5 (7.5)
Total machine input	kVA	13	13
Built-up area	mm (in)	2 995 x 2 000 (117.9133 x 78.7401)	2 995 x 2 000 (117.9133 x 78.7401)
Height	mm (in)	1 980 (77.9527)	2 100 (82.6771)
Weight	kg (lbs)	2 900 (6393.4)	2 860 (6305.2)

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.

		F2V-R
Table	mm (in)	300 x 1 300 (11.8110 x 51.1811)
Working travels		
– longitudinal	mm (in)	840 (33.0708)
– crosswise	mm (in)	376 (14.8031)
– vertical	mm (in)	420 (16.5354)
Tailstock travel	mm (in)	125 (4.9212)
Spindle		ISO 40
Speed	1/min	60 – 4 000
Motor output	kW (HP)	3 (4.1)
Total machine input	kVA	12
Built-up area	mm (in)	2 660 x 1 730 (104.7244 x 68.1102)
Height	mm (in)	2 270 (89.3700)
Weight	kg (lbs)	1 550 (3417.2)





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