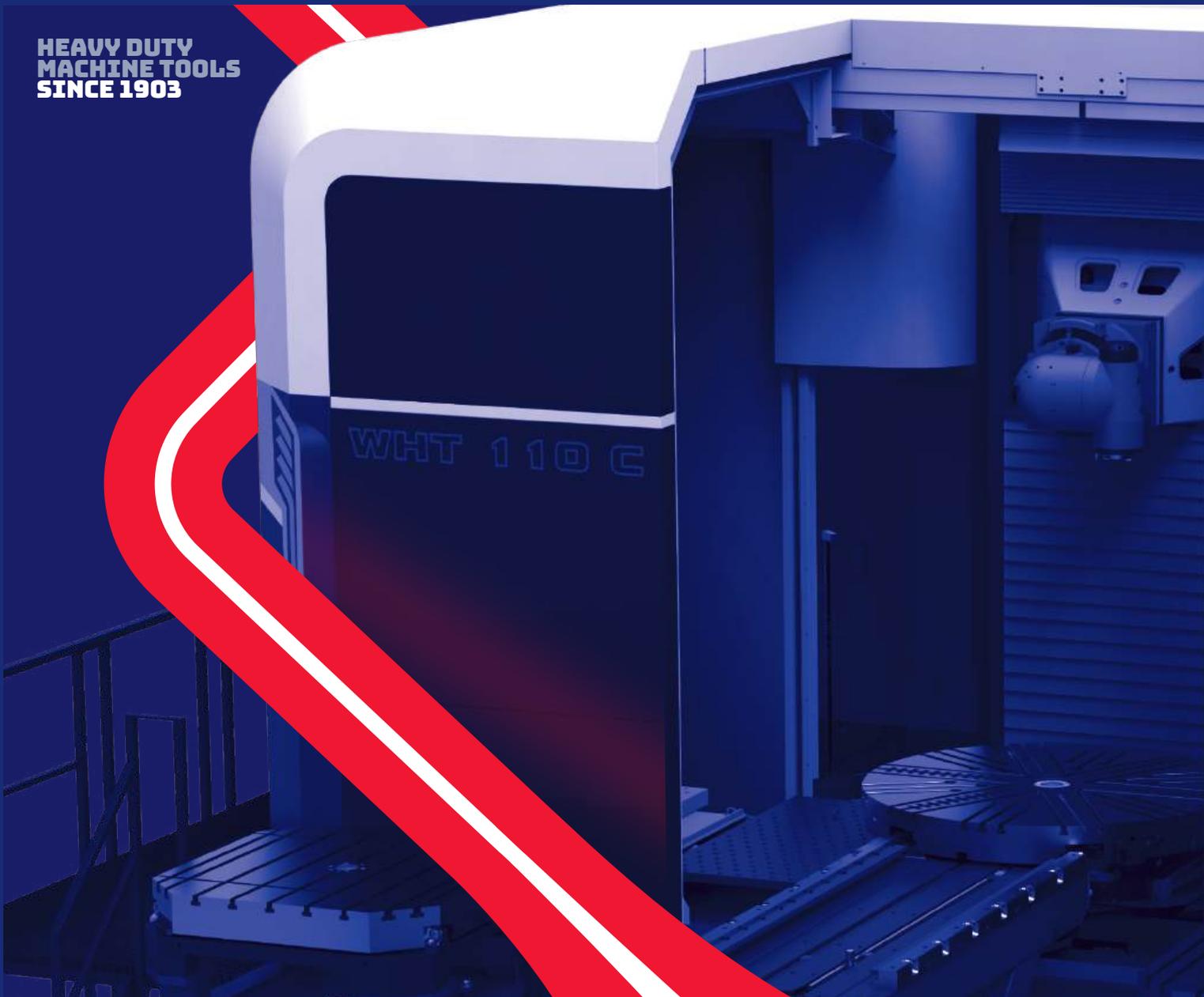


HEAVY DUTY  
MACHINE TOOLS  
SINCE 1903



# PRODUCTION PROGRAMME

HORIZONTAL MACHINING CENTERS

HORIZONTAL BORING MILLS

PORTAL MILLING MACHINES



**VARNSDORF**  
**TOS**

# 1903

The company  
was established

## 53,7

Milion EUR was the annual  
turnover of the company  
for the year 2022

## 30

Football pitches  
would fit on the land  
of TOS VARNSDORF a.s.

## 418

Is the number  
of employees

## 19 951

Machines sold  
between 1941 and 2022

## 7

Subsidiaries  
companies around  
the world

## 0,01

Machine accuracy  
in the order of hundreds  
of a millimeter

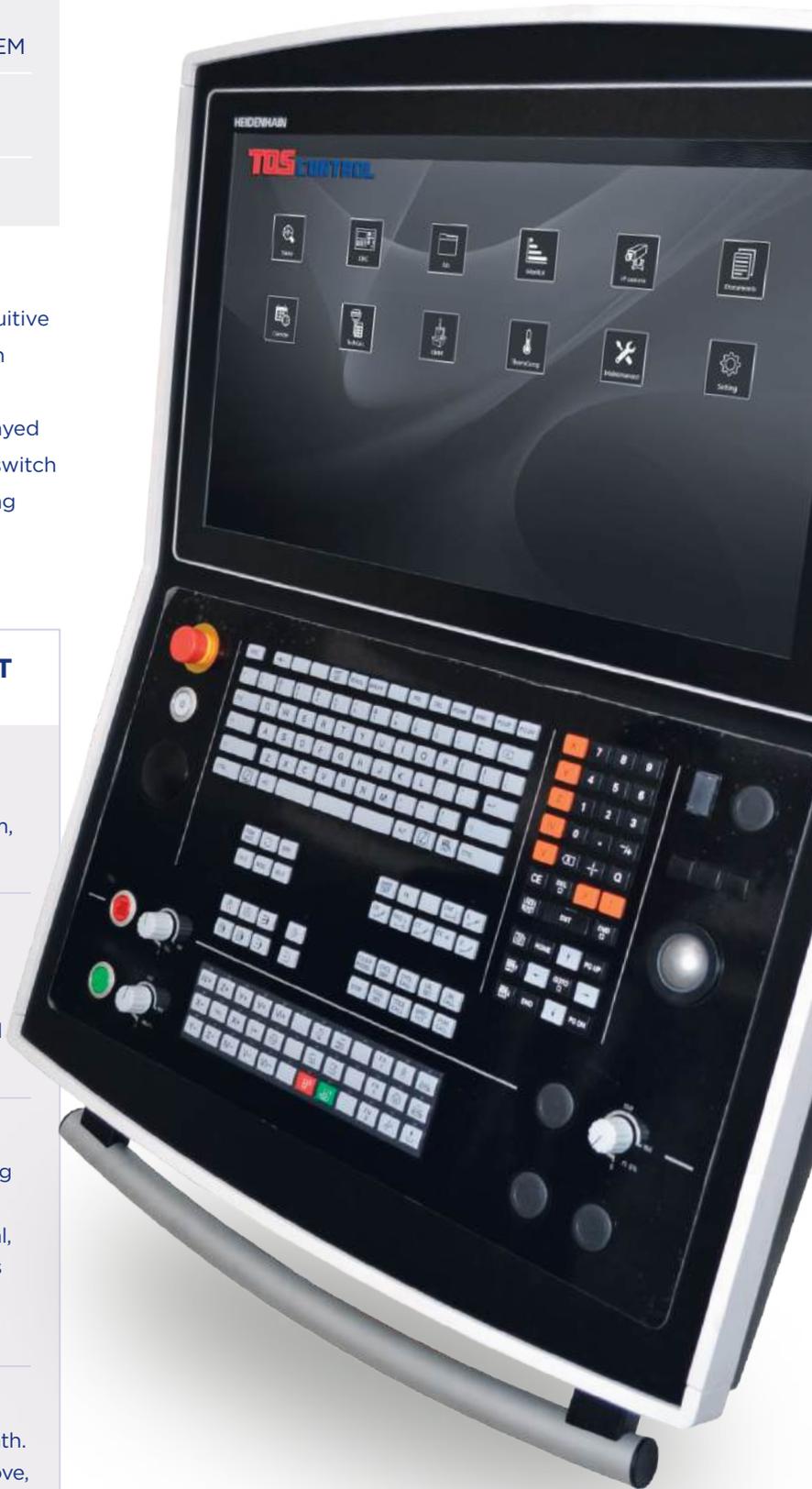


# TOScontrol

## MAIN ADVANTAGES OF THE SYSTEM

- ➔ ON-LINE DATA EXCHANGE WITH ERP SYSTEM
- ➔ SPECIALIZED APPS FOR EXTENSION OF FUNCTIONALITIES
- ➔ USER-FRIENDLY CONTROLS

**TOScontrol** is a set of applications and functions for advanced machine management. For easy and intuitive operation, the system consists of a default screen with icons for each application (similar to mobile device operating systems). The applications are clearly displayed on the machine's control panel and the operator can switch between them easily. The solution also includes, among other things, user account management. **TOScontrol** is part of the standard equipment of all machines.



## 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.



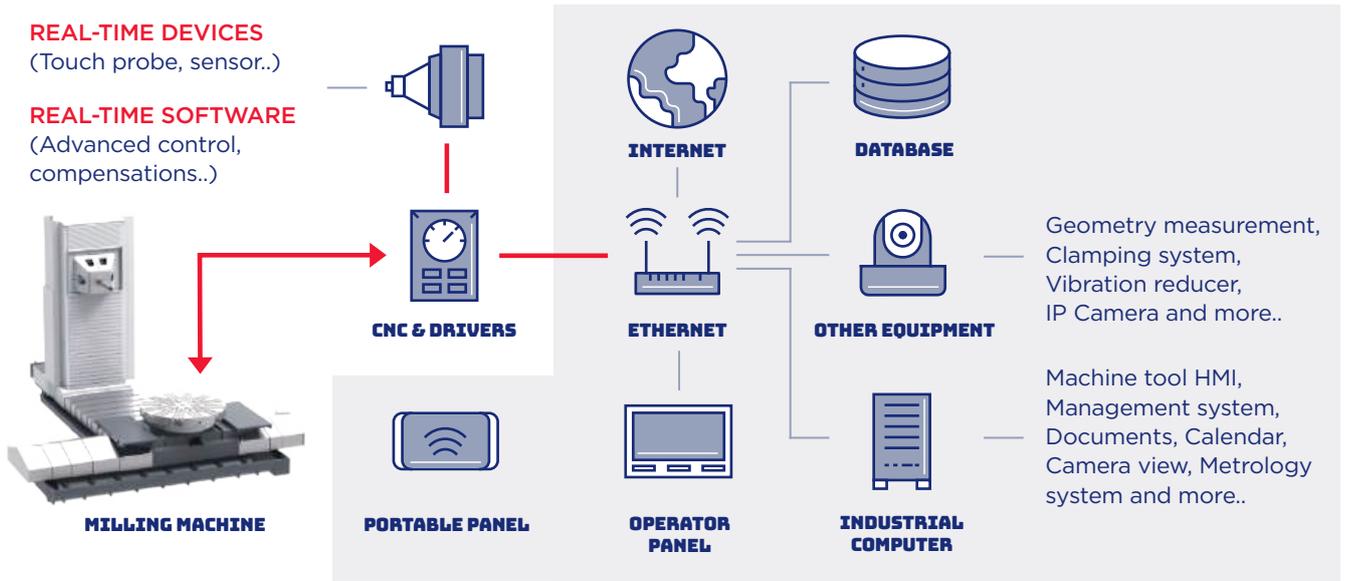
### DOCUMENTATION

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. Event/ service event - add, change, remove, remind. All data stored in the local database.



### OPTION APPLICATIONS

Not included in standard TOS 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.



#### JOB – 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.

### UPCOMING APPLICATIONS

Apps we are currently developing.



#### TECHNOLOGICAL CALCULATOR

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.



# HORIZONTAL MACHINING CENTERS

## WHT 110/130

- machines with excellent ergonomics and service readiness (applied smart solutions for easy access to service points on the machine)
- option to apply turning technologies with carousel table
- compliance with ecological standards (closed system for collection and removal of chips and cooling fluid from the work area)
- elimination of idle times, non-stop machining (high degree of automation and connection to the production system)
- highest cutting parameters – high productivity

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 spindle and special headstocks equipped with milling heads with automatically controlled angular position of the spindle.

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

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

These machines are built for demanding customers, who can apply very demanding technological procedures.



# WHT 110/130

## MAIN ADVANTAGES OF THE MACHINE

- ➔ TOP TECHNICAL PARAMETERS
- ➔ HIGH DEGREE OF AUTOMATION - SIGNIFICANT REDUCTION OF IDLE TIMES
- ➔ FULL CAROUSEL APPLICATION
- ➔ LOW REQUIREMENTS ON MACHINE INSTALATION
- ➔ MEETS THE MOST DEMANDING ENVIRONMENTAL REQUIREMENTS

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 palletes, 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 the single-piece and the batch production.

## 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.

## KEY MACHINE FEATURES

### 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. types of headstock:

#### 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 (1,014.1 ft lb)  
7,500 RPM, 40 kW (54.4 HP), 1,245 Nm (918.3 ft lb)

#### WHT 130

4,000 RPM, 41 kW (55.7 HP), 3,200 Nm (2,360.2 ft lb)  
4,500 RPM, 41 kW (55.7 HP), 1,500 Nm (1,106.3 ft lb)  
5,000 RPM, 41 kW (55.7 HP), 1,718 Nm (1,267.1 ft lb)  
7,500 RPM, 40 kW (54.4 HP), 1,245 Nm (918.3 ft lb)

### 3. temperature monitoring and compensation on the machine

### 4. a wide choice of clamping devices rotary table capacity:

**WHT 110** up to 6,000 kg (13,227.7 lbs)

**WHT 130** up to 20,000 kg (44,092.5 lbs)

carousel table:

**WHT 110** Ø 1,600 mm (62.9921 inch), 400 RPM

**WHT 130** Ø 2,000 mm (78.7401 inch), 250 RPM

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

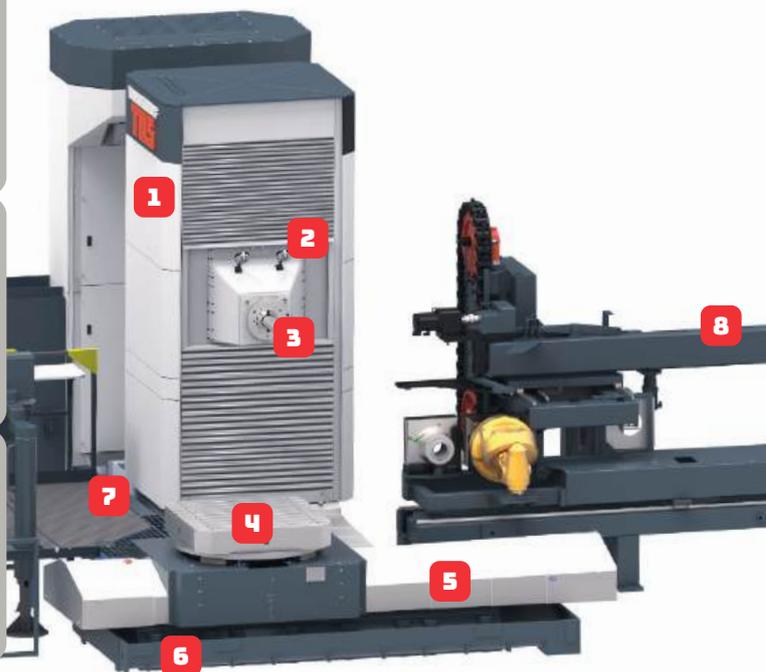
### 6. the basic parts of the frame (tables, pallets, longitudinal and transverse beds) are made of the highest quality grey cast iron of Czech origin

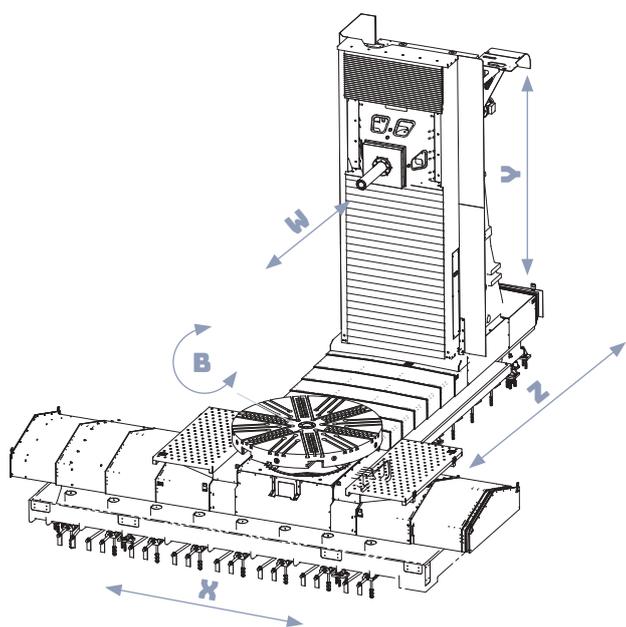
### 7. high feed speeds in X, Y, Z axes in two versions:

**WHT 110** 25,000 mm/min and 40,000 mm/min  
(984.2519 ipm and 1,574.8031 ipm)

**WHT 130** 25,000 mm/min and 36,000 mm/min  
(984.2519 ipm and 1,417.3228 ipm)

### 8. automatic replacement of special accessories with two storage sites and a cover plate





## MACHINE CONFIGURATION

- + basic machine version with a rotary table, rotation speed of work spindle up to 4,000 RPM
- + machining centre version (automatic pallets and automatic special accessory change, fully covered) with work spindle revolutions up to 6,000/5,000 RPM
- + **WHT 110** machines are equipped with work spindle diameter 112 mm
- + **WHT 130** machines are equipped with work spindle diameter 130 mm

## MAXIMUM MACHINE AUTOMATIZATION

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

## MULTIPLE MACHINE UTILIZATION

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



# WHT 110/130

## OPTIONAL MACHINE VERSIONS

MACHINE TYPE		WHT 110		
<b>HEADSTOCK</b>				
Work spindle diameter	mm (in)	112 (4.4094)		
Spindle taper		ISO 50 / ISO 50 BIG+		
Spindle speed range	RPM	10-4,000	10-6,000	10-7,500*
Main motor power (S1)	kW (HP)	31 (42.1482)		
Torque on spindle (S1)	Nm (ft lb)	1,205 (888.8)	1,375 (1,041.1)	1,245 (918.3)*
Spindle stroke W	mm (in)	650 (25.5905)		
<b>COLUMN</b>				
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)		
<b>ROTARY TABLE</b>				
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 (13,227.7)		
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)		
<b>TURNING TABLE</b>				
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 / max. pallet load	kg (lbs)	6,000 (13,227.7) / 4,000 (8,818.5)		
Table clamping area	mm (in)	Ø 1,600 (62.9921)		
Max. speed	RPM	400		
<b>AUTOMATIC PALLETTE CHANGE (APC)</b>				
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 (13,227.7)		
Pallet 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 pallets	pcs	2 to 4		
<b>AUTOMATIC TOOL CHANGE (ATC)</b>				
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		

\*Headstock with non-traveling spindle; \*\*Only for the **WHT 110** horizontal boring machine.

## OPTIONAL MACHINE VERSIONS

MACHINE TYPE		WHT 130			
<b>HEADSTOCK</b>					
Work spindle diameter	mm (in)	130 (5.1181)			
Spindle taper		ISO 50 / ISO 50 BIG+			
Spindle speed range	RPM	10-4,000	10-4,500	10-5,000	10-7,500*
Main motor power (S1)	kW (HP)	41 (55.7)			
Torque on spindle (S1)	Nm (ft lb)	3,200 (2,360.2)	1,500 (1,106.34)	1,718 (1,267.1)	1,245 (918.3)*
Spindle stroke W	mm (in)	800 (31.4960)			
<b>COLUMN</b>					
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)			
<b>ROTARY TABLE</b>					
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 (44,092.5)			
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 98.4252, 78.74016 x 118.1102, 98.4252 x 118.1102)			
<b>TURNING TABLE</b>					
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 / max. pallet load	kg (lbs)	10,000 (22,046.2)			
Table clamping area	mm (in)	Ø 2,000 (78.74016)			
Max. speed	RPM	250			
<b>AUTOMATIC PALLETTE CHANGE</b>					
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 (35273.96) / 10,000 (22,046.2)			
Pallet load 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 (78.74016)			
Max. number of pallets	pcs	2 to 4			
<b>AUTOMATIC TOOL CHANGE (ATC)</b>					
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			

\*Headstock with non-traveling spindle; \*\*Only for the **WHT 130** horizontal boring machine.



# WHT 110/130

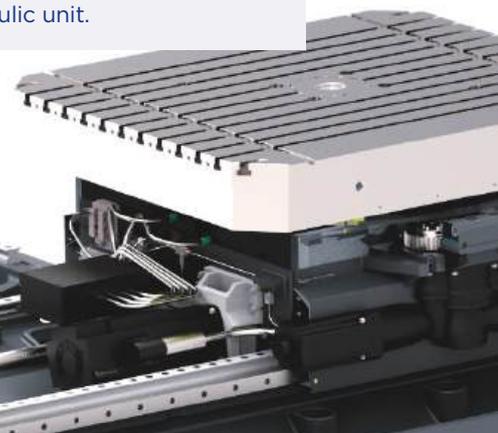
## MACHINE FRAME

Basic heavy machine parts (tables, palletes, 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.



## BALANCING

The headstock weight is hydro-mechanically compensated (by a hydraulic cylinder) using a standalone hydraulic unit.





### AUTOMATIC PALLET CHANGE

Conceptually, the pallet change equipment is based on the automatic change of the technological pallets between the stationary stowage stations and the pallet clamping base on the machine. With 2 pallets design, the pallets are exchanged directly between storage stations and the machine. In case of 3 or 4-pallet system.

### X, Y, Z, W AXIS DRIVES

Linear axes are driven by standalone servo-actuators with embedded belt gears and a high lead ball screw 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. Table is mounted on a large-dimensional radial-axial rolling bearing, which has a high load-bearing capacity and rigidity.



### CHIP CONVEYOR

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

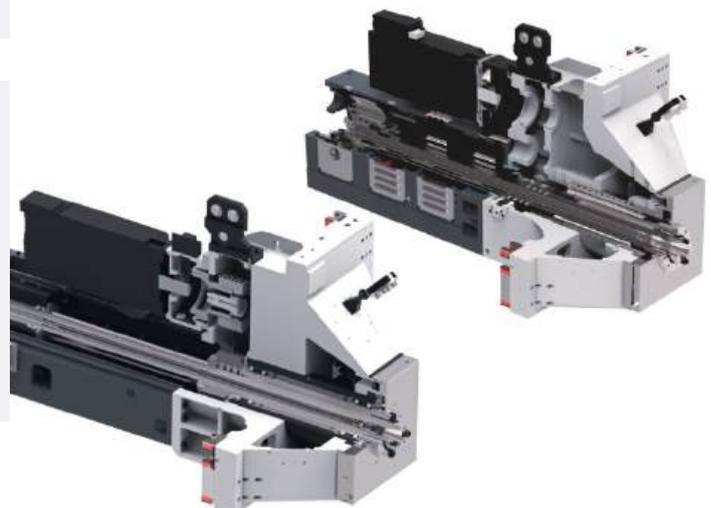


### MACHINE CONTROL

Machine control is concentrated on the main control panel. It is mounted on a rotary arm that can be adjusted vertically in the operators position.

### CENTRAL HEADSTOCK

The 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.





# WHT 110/130

## MACHINE COVERING

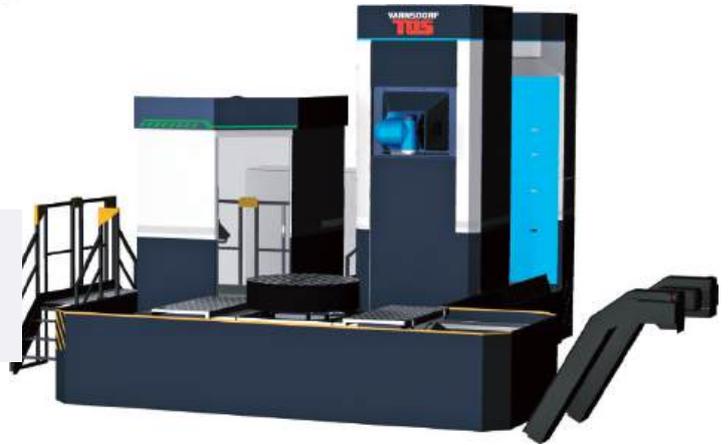


### COVERING OF THE MACHINING CENTRE

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

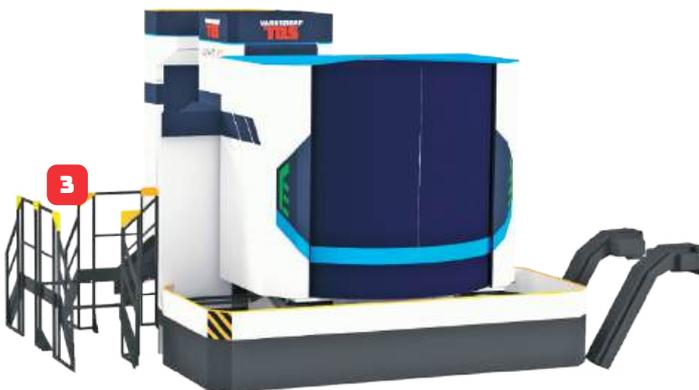
### BASIC MACHINE COVERING

Covering basic version: the bed, column and operators place covers.



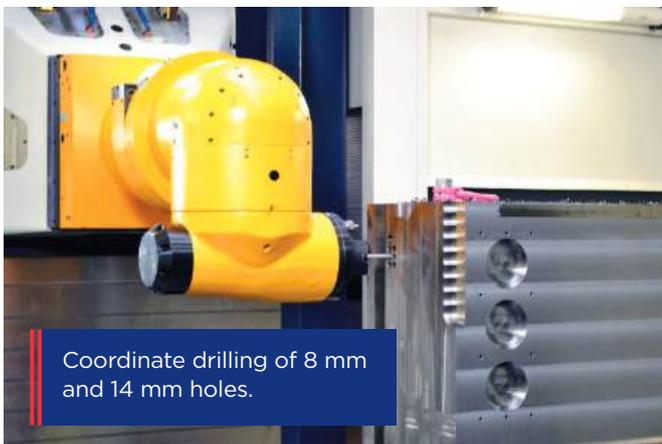
### OPTION DESIGN

1. machine covers with the automatic tool change: bed, column, operators place and automatic tool change covers
2. C cover: the beds, the column, the machine operators station, and the workspace covering along the X and Z axes
3. protective covering of the workspace KVR: the bed, column and operators position covers and workspace protective covering that includes a removable sheet metal cab





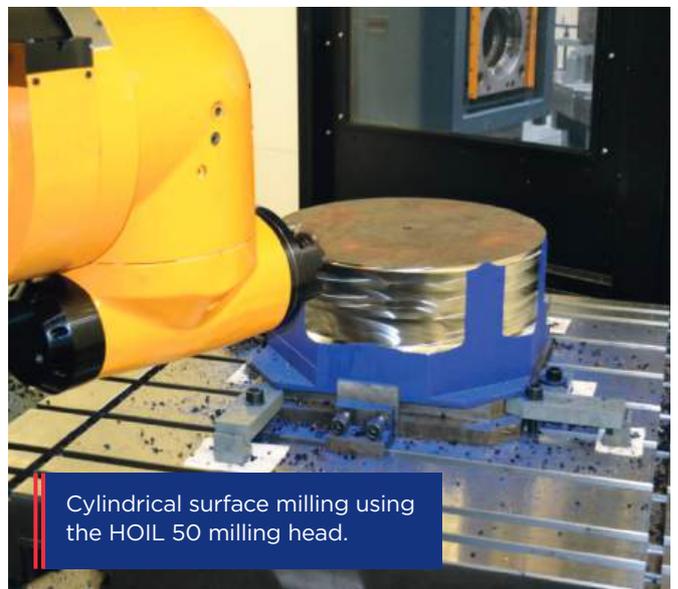
In-process measurement (workpiece inspection) with the touch probe and independent laser measurement.



Coordinate drilling of 8 mm and 14 mm holes.



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



Cylindrical surface milling using the HOIL 50 milling head.