



Editorial

Dear Customers, Dear EMO HANNOVER 2017 Visitors,

Two years have passed and we are pleased to meet you at the largest European trade fair EMO again.

The year 2017 has been extraordinary for TOS VARNSDORF. The company enlarged its portfolio of manufacturing plants abroad. In addition to our operations in Kunming, China, and Yekaterinburg, Russia, we have opened a third foreign manufacturing plant in Taiwanese Taichung. Our modern history, which dates back to the beginning of 1970, is marked with the production of over 8 000 numerical control machines, or NC machines. The secondary school of engineering TOS VARNSDORF celebrated its 1st anniversary and welcomed new students in September. The company does not lay emphasis only on the development of machines but also on highly trained and skillful professionals.

Currently, the market is clearly driven by the 4th industrial revolution, or Industry 4.0. The urgent need for complex solutions induces changes and movements. Today's topical issues are automation, robotization and digitalization. Industry 4.0 can be described as a permanent, never-ending series of innovations which have become an integral part of products by TOS VARNSDORF a.s.

Our company prepared a new multi-function machining centre marked WHT 110 C for this year's fair. This centre is the first product in a newly designed WHT line whose modular character allows for a number of configurations from simple horizontal milling and boring machines to multi-function machining centres with the automatic replacement of technological pallets, the automatic changing of tools, a turning option and the magnetic clamping of workpieces. We have developed a parameter which does not have a match worldwide: 6 000 revolutions per minute achieved by a headstock with traveling spindle which is 112 mm in diameter. The machine frame is fitted with temperature sensors to monitor machine behavior during operation and possible compensation of the effects of heat-induced deformities. Another novelty is our TOS CONTROL machine control system which responds to the current trends and requirements of Industry 4.0. The TOS CONTROL system offers more than the machine control system as it enables viewing of machine documentation as well as of the drawings of the pieces being machined, and contains machine diagnostic equipment. It also serves as the monitor of the camera installed inside and outside the machine. In-process measurements bring a substantially increased added value to our customers. Each workpiece is checked directly on the machine, which saves time required for workpiece transport to a 3D coordinate measuring machine. This type of measurement is absolutely resistant to the machine's inaccuracies. Measured values are converted in the form of position correction into the machine control system. It is possible to carry out subsequent final machining without having to change the NC program.

In conclusion, I would like to invite you to our stand No. B75 in Hall 013 where a team of TOS VARNSDORF professionals will provide you with more information.


Miloš Holakovský
TOS VARNSDORF
Commercial Director

TOS VARNSDORF Presents the New WHT 110 C Horizontal Machining Centre



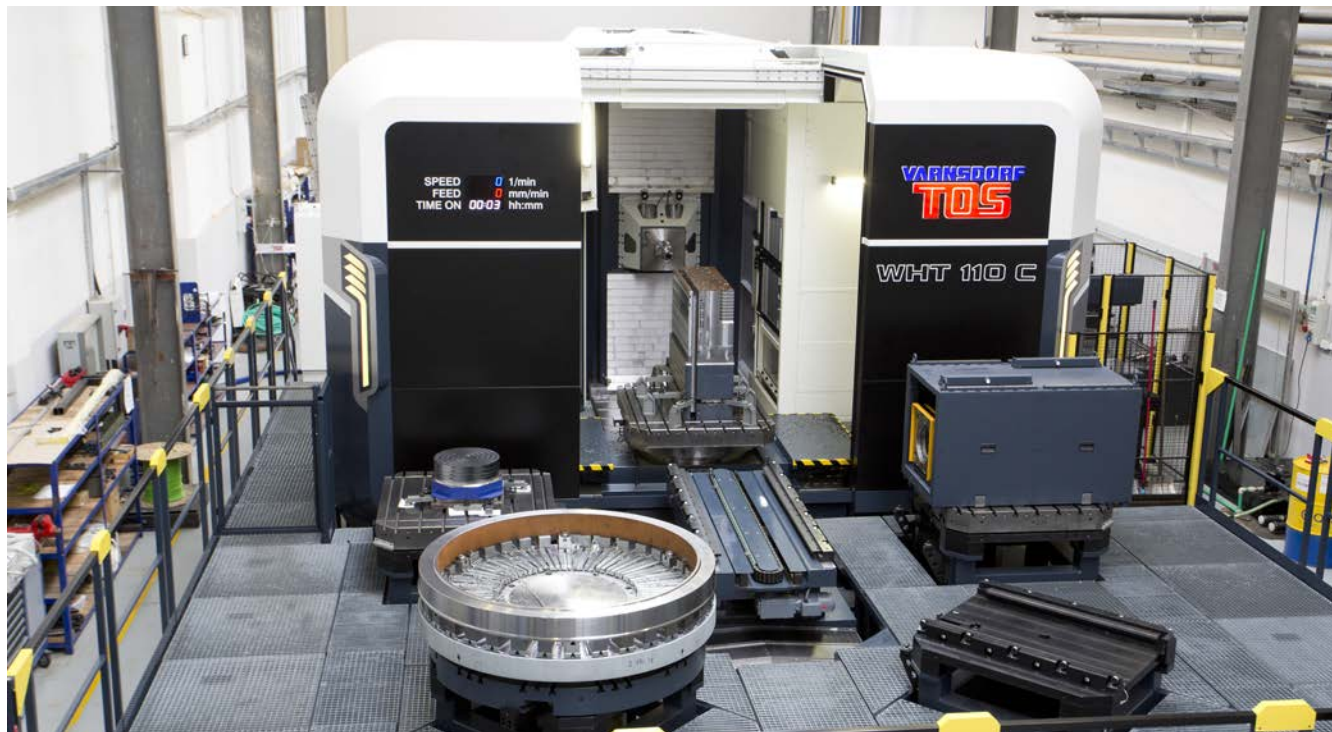
The WHT 110 C machining centre is the first product in a newly designed WHT 110/130 (C) machine tool line. This horizontal machining centre is suitable for the most demanding operations which require precise drilling, gear cutting, turning or milling.

The WHT line machines will prove successful even in the most complex applications in the aerospace industry, power industry, mining industry, oil industry and general engineering. These multifunctional machines are suitable for both single-piece and series production.

TECHNICAL PARAMETERS

Headstock		
Spindle diameter	mm	112
Spindle taper		ISO 50 / ISO 50 BIG+
Spindle speed range	1/min	10 – 6 000 (4 000)
Main motor power (S1)	kW	31 (28)
Rated torque on spindle (S1)	Nm	1 375 (1 200)
Work spindle stroke W	mm	650
Frame		
Headstock vertical travel Y	mm	1 250, 1 600, 2 000
Column longitudinal travel Z	mm	1 500, 2 000, 2 500
Cross table / pallet travel X	mm	1 500, 2 000, 2 500, 3 000
Table / pallet (turning)		
Max. table load	kg	6 000
Max. pallet load	kg	4 000
Table clamping area dimensions	mm	1 250 x 1 250, 1 250 x 1 600 (Ø 1 600)
Max. speed	1/min	3 (400)
Traverses		
Feed range and rapid traverse – X,Y,Z	mm/min	40 000 (25 000)
Feed range and rapid traverse – W	mm/min	20 000

WHT 110 C – Horizontal Machining Centre



WHT 110 / 130 (C) machine tools are fully enclosed milling and boring machines with a T-shaped bed configuration with a laterally adjustable rotary table, or a palette, or with a turning table and a longitudinally adjustable column. The machine has a compact design with integrated millings management and a coolant circuit. The basic machine model has 5 fully controlled axes, CNC controlled spindle revolutions and an angular positioning function. The standard control system is HEIDENHAIN iTNC 530 HSCI (or TNC 640). These machine tools are fitted with AC-digital actuators to drive machine feeds and with an AC digital spindle drive by Siemens. Upon request, another control system can be provided (e.g. Sinumerik 840 D SL). The machine has a "left-hand" design; i.e. its headstock is on the operator's left-hand side (when looking at a turning area from the operator's site).

Development of a new machine tool line

The new line of machine tools and machining centres was developed in response to customers' requirements for state-of-the-art production equipment. The development of these machines started in 2011 when the company defined – within its broader strategy – what machines can be competitive over a medium term. At the same time, innovative efforts centered on new headstocks which are a crucial component of every boring machine. In a few years, the company designed and manufactured new headstocks for new WHT machines and managed to eliminate all relevant parameters, including the effects of heat and the guarantee of the long-term operational reliability of the headstock. This enabled the further development of WHT machines whose first representative is the multifunctional centre presented here. The development stage was preceded by a period during which the comprehensive line of WHT machines, all parameters, necessary accessories, technological focus on specific industrial segments as well as on the general exploitation of the WHT machines were precisely and strictly defined. The resulting specifications did not need any adjustments or alteration during the implementation of the technical solution. After a nearly six-year period of development, which involved the development of headstock units, frame and accessory applications, the company launched truly unique machines whose performance, multifunctionality, comfort of operation and distinct design brings customers a substantial added value. The WHT 110 / 130 (C) machines stand out thanks to their performance, all-purpose characteristics, multifunctionality, easy operation and maintenance service, and the integration of the Industry 4.0 concept.

High added value

The machine's **production performance** which involves a feed range of up to 40 m/min, 6 000 revolutions of the traveling spindle per minute, and main motor power of 31 kW and which is further advanced with a cast iron frame, installed linear guides and the thermal compensation of the frame, makes it an ideal solution for high-performance and precise machining.

Another great feature of this machine is its **versatility** which is derived from the broad variability of axial configurations, type and manufacturing of the table (or palettes), application of tool change systems, milling heads and other accessories thanks to which the machines can be perfectly adjusted to meet the customer's needs. The added value of this machine is also reinforced with its **multifunctionality**. It can be fitted with two types of headstock units, various milling heads, including holders for turning tools and the turning-type manufacturing of the table (or palette) so that the machine can facilitate comfortable milling and turning operations.

Easy operation and maintenance service are other essential features of every high-quality machines today. The standard version of the operation workplace has an ergonomic control panel, including a portable manual control and a blow gun. The machine is designed to facilitate easy dismantling of covers in the stand area and along the anchoring of the machine frame and to provide a unique interplay of comfortable operation and maintenance.

The WHT 110 / 130 (C) machines stand out thanks to their performance, all-purpose characteristics, multifunctionality, easy operation and maintenance service, and the integration of the Industry 4.0 concept.

The current trend of increasing the added value of machine tools lies in the **integration of the Industry 4.0 concept**. In case of the WHT 110 / 130 (C) machining centers this means the application of a specially developed TOS Control program environment which integrates in itself – thanks to the company's original design and development – a standard machine control system and additional functions in the form of applications which further extend the range of machine use and facilitate its full integration with the Industry 4.0 concept.

Unique TOS Control system

The entire concept is based on the TOS Control program environment which works as a dashboard where all functions which are represented by individual icons are easy to use. The original control system has been integrated into the new design as well. It comes in the form of application and serves as a basic means of machine control.

All new functions are aimed at better operational conform closely following the operation of the machine, at increasing production process efficiency by optimizing machines settings and using interchangeable equipment, e.g. equipment for the independent measurement of the position.

The improved comfort of operation is supported with applications enabling the monitoring current machine parameters (its settings, the functions of the axes, position of the current NC program and reports produced by the machine). The system is also provided with integrated IP cameras which monitor the working area and the surroundings of the machine. It also contains an environment for easy viewing and making notes, e.g. in documentation regarding the use of the machine and in manufacturing drawings. Two applications are currently available to increase production efficiency. One of them facilitates interactive designing of suitable machining parameters on the basis of input technological requirements. The other one, which interacts with additional independent measurements, facilitates the measuring of a manufacturing workpiece directly on the machine. It is the independent nature of measurements that allows for the replacement of an independent coordinate measuring machine in practical applications and that secures the full control over the dimensions and geometrical precision of workpieces.

TOS Control is the open system

The open nature of this concept enables its further development. We have already started work on more applications to support remote control and planning of work on the machine, machine settings (optimization of parameters) and resetting of technological parameters with the aim to improve machining efficiency. Another area of advancement includes remote planning and control of work on the machine (e.g. DNC control).

The new WHT 110 / 130 (C) machine line will include the TOS Control as one of its standards features. Therefore, its integration with the Industry 4.0 concept will be commonplace. However, even the currently manufactured machines offer a vast potential thanks to a function which turns the machine into a coordinate measuring machine (CMM). The system of fully-fledged in-process measurements red by independent measuring helps to achieve the required precision of products while simultaneously eliminating the cost and time needed for the transport of workpieces and their measurement at an external workplace.

The TOS Control-based platform with installed applications allows complete integration with the Industry 4.0 concept and connecting of monitored and obtained data with the next links of the production chain. This applies mainly to the possible remote control of the machine, use of the machine for the checking and measuring workpieces and for the correction of technical parameters aimed at machining optimization.

The concept of this machine has the potential for success, which is evidenced by the fact that many business representatives expressed their genuine interest in this technology after seeing its single presentation and placed their orders. The EMO trade fair is another logical step towards advanced ways of metal machining. We can also tell you that the launch of the production of a more robust and more efficient version of the exhibited machine will overall with the EMO 2017 trade fair. The first WHT 130 C machining centre will be constructed and tested at the end of 2017 and introduced on the market in 2018.



Company TOS VARNSDORF

Company TOS VARNSDORF a. s. situated in Varnsdorf, Czech Republic has a years-lasting tradition in machine tool production. The company was founded, under the name of Arno Plauert machine Works, as early as 1903 and up to now it grew up into a big engineering company, known with its products all around the world.

The company develops, produces and sells machine tools, complemented by a wide range of services. It has its own design team to develop the machines and a strong manufacturing base to produce them.

The company's production program consists of three product groups: table type machines tools for universal use and heavy duty machining of parts from 5 to 30 tons, large WRD floor type machines for the most complicated technological operations for items weighing up to 130 tons and up-to-date machining centres using the latest technologies with the most advanced tools, with automatic exchange of tools, palettes, and integration into automated manufacturing systems.

The services provided for these products cover both training in controlling and programming the machines and technological studies as well as preparation and also consultation services for placing the machine in a shop or building and the foundation for the machine. The company has a strong service team to carry out all warranty requirements and customer services.

In addition, the company provides for the services in the form of outwork offers (Metalworking, Measuring services, Chemical and Heat Treatment of Metals).



TOS VARNSDORF invests basically continuously, including large investments in buildings. One of the latest investments consisted of the construction of a heavy assembly hall where large machines are assembled. In recent years a new training centre valued at 1.9 million EUR was built and the hall for production of spindle units was repaired for 700,000 EUR.

Every year, TOS VARNSDORF invests an average of 3.5 million EUR. The most interesting fact regarding the machine investments is that most of the production base of TOS VARNSDORF consists of machines of its own

production. This shows that the company trusts its own machines and creates an excellent starting position for the annual customer days. The so-called TOSday is always an excellent opportunity to meet with customers and get a deeper understanding of their needs. During TOSday, the possibilities and options of the company's products are presented directly in the production facility.

In 2016, the TOS VARNSDORF Secondary School was established. The school is located in the company area.

WHT 110 C – Ready for Industry 4.0

The WHT 110 C machining centre is equipped with a TOS Control programming environment which integrates in itself a standard machine control system and additional functions in the form of applications which further extend the range of machine use and facilitate its full integration with the Industry 4.0 concept.

TOS Control:

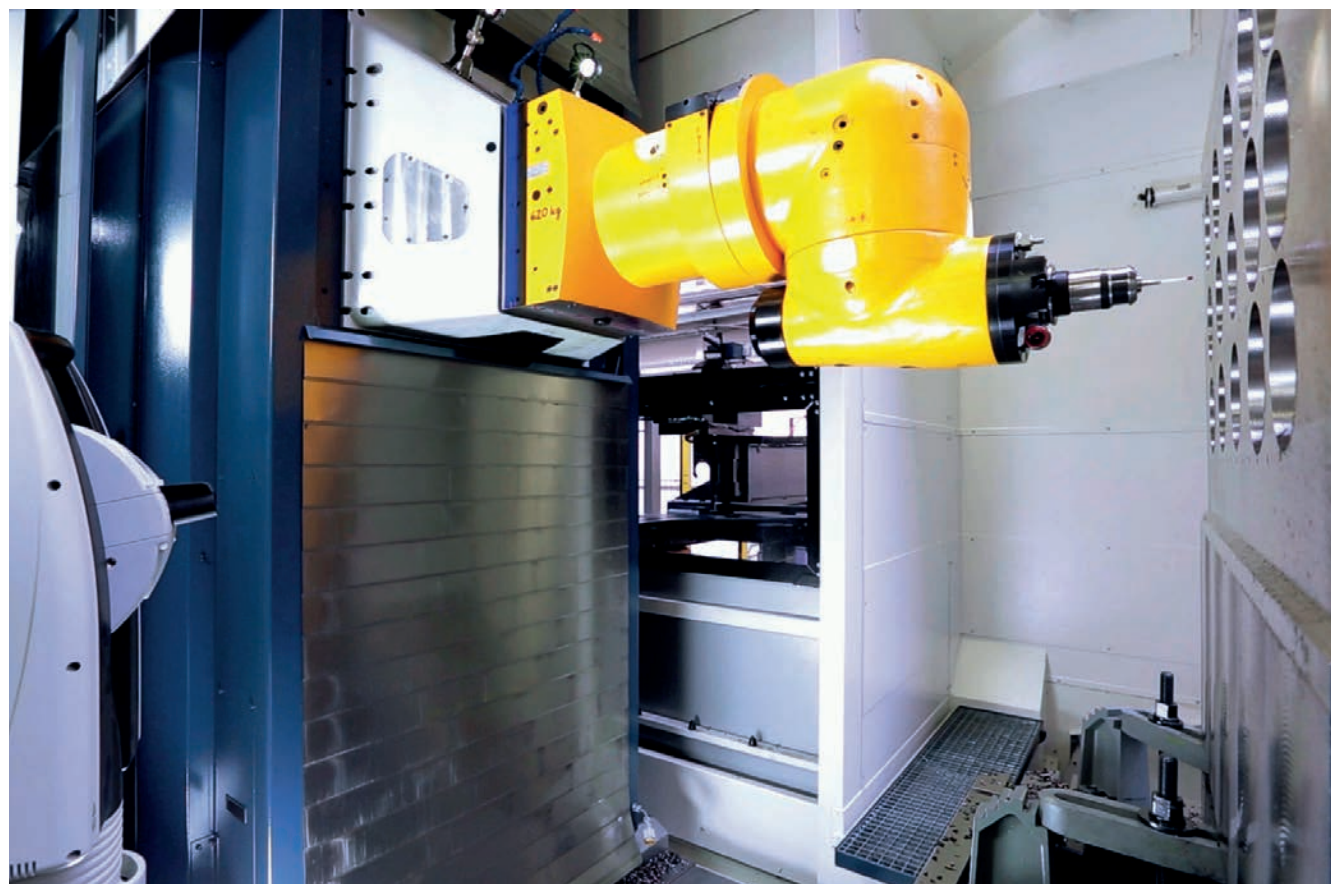
Machine control system – SIEMENS Sinumerik operate

Machine status – the current position of the controlled axes, the position of the program, alarms, etc., the State Monitor function, and remote diagnostics of the machine

Documentation – user manual, drawings, etc.

IP camera – displaying of images from installed IP cameras

In-process measurement – automatic measurement of workpieces, identification of corrections and possibility to re-machine workpieces directly on the machine



Unique added value:

Considerable cost and time savings

- The Industry 4.0 concept is fully integrated into the system
- Simple diagnostics of the machine status and easier operation
- Monitoring of the working area and the surroundings of the machine
- Integrated coordinate measuring machine (CMM) function
- The open nature of the concept allows for its further development

WHT 110 C – Horizontal Machining Centre Technology Examples

PLUNGE MILLING



Mill cutter Ø 66mm		
Mill cutter - M4257-050-B22-02-47		
Inserts - SDMT120408-F57 WKP355		
Cutting speed	m/min	250
Revolutions	RPM	1,206
Feed	mm/min	1,206
Feet per tooth	mm/tooth	0.25
Depth of cut	mm	5
Cutting volume	cm ³ /min	180
Power	kW	11
Torque	Nm	87.33

HOLE DRILLING



Drill Ø 8mm – Hole Drilling		
Drill - K3281TFT-8		
Cutting speed	m/min	74
Revolutions	RPM	2,900
Feed	mm/min	580
Feet per tooth	mm/tooth	0.2
Power	kW	1.7
Torque	Nm	4.4

Drill Ø 14mm – Hole Drilling		
Drill - KSEM140T5WN16M		
Inserts - KSEM1400HPGM		
Cutting speed	m/min	115
Revolutions	RPM	2,300
Feed	mm/min	560
Feet per tooth	mm/tooth	0.25
Power	kW	4.4
Torque	Nm	13.4

HOLE DRILLING



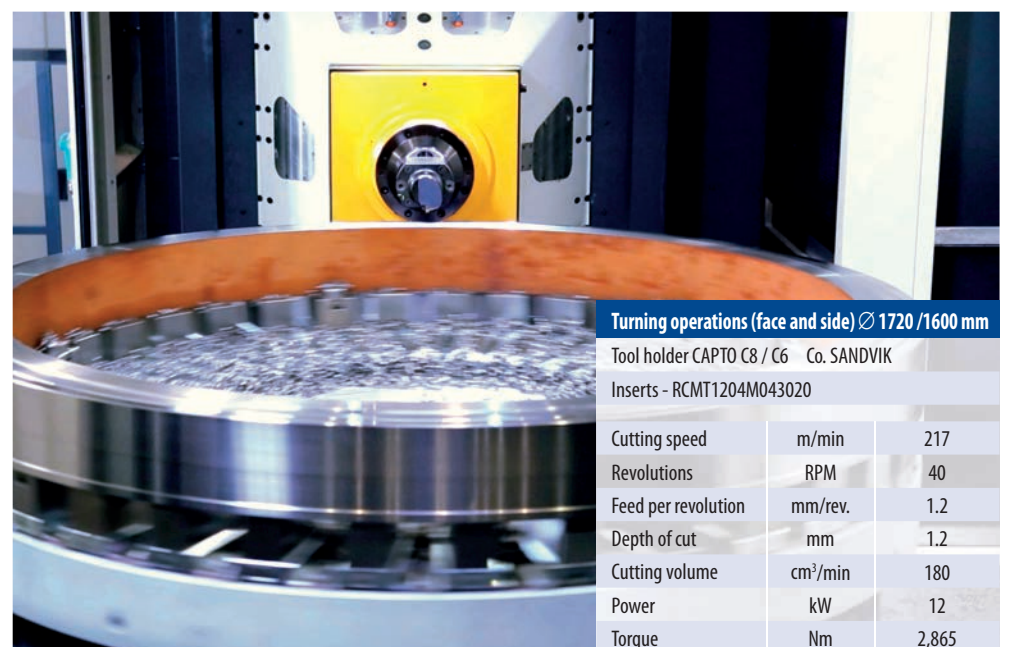
Drill Ø 53mm		
Drill - B3010.M0.80.175.53		
Inserts - SP28475-7 WTL74		
Cutting speed	m/min	113
Revolutions	RPM	680
Feed	mm/min	100
Feet per tooth	mm/tooth	0.145
Power	kW	10.8
Torque	Nm	152

HIGH FEED BORE (HELIX) MILLING



Mill cutter Ø 66mm – Hole Ø 115mm		
Mill cutter - M4257-050-B22-02-47		
Inserts - SDMT120408-F57 WKP355		
Cutting speed	m/min	250
Revolutions	RPM	1,200
Feed	mm/min	7,500
Feet per tooth	mm/tooth	1.5
Depth of cut	mm	57.5
Cutting volume	cm ³ /min	430
Power	kW	19.4
Torque	Nm	153

TURNING OPERATIONS (FACE AND SIDE)



Turning operations (face and side) Ø 1720 /1600 mm		
Tool holder CAPTO C8 / C6 Co. SANDVIK		
Inserts - RCMT1204M043020		
Cutting speed	m/min	217
Revolutions	RPM	40
Feed per revolution	mm/rev.	1.2
Depth of cut	mm	1.2
Cutting volume	cm ³ /min	180
Power	kW	12
Torque	Nm	2,865