TOS VARNSDORF Journal

Your partner for future machining

EMO Hannover 16-21·9·2019

Hall 013
Stand B29

Editorial

Dear Customers and Visitors to EMO Hannover 2019,

In today's fast-paced times, two years go by very quickly, so once again we are meeting at EMO—the largest European machining trade show.

Over these two years, TOS VARNSDORF has come a long way. On 2 September 2019, we opened a new company-owned school building for students of the TOS VARNSDORF Secondary Technical School, which was an investment of more than four million euros.

We have already enrolled students in the fourth grade. This year, we opened three A-level study programmes: machine design and machining technology, mechanic and setter – programmer for CNC machines, mechanical and electrical technician – mechatronic specialist. We have also opened three study programmes for vocational certificates – machine mechanic and fitter, metal machinist – CNC operator, electrical mechanic for machines and equipment. The study programmes are exceptionally popular, and we have not been able to satisfy even a full half of the demand for these courses.

We have also been active in developing new machines and extended our range with portal machines. WVM 2600/3600 T series vertical machining centres are designed as a unified series of machines for universal machining. These machines have high rigidity and precision because of their unique design using a fixed portal and mobile headstock, vertically ram and traversing table. WVM 2600/3600 T machines are designed for precise and highly productive milling, drilling, boring and threading, especially on heavy and large workpieces or pieces with complex shapes made of cast iron, cast steel, and other types of steel and modern materials used in the automotive and aviation industries.

For this year's trade show, we have prepared the very powerful WHT 130 machine. This machine has a robotic arm for automated tool exchange. The machine builds on the concept of the previously introduced WHT 110 machine and further expands our new product strategy.

We will also introduce an extended version of TOS Control – the operating software for control of the machine. We are currently working on additional applications, such as machine monitoring, temperature compensation, predictive maintenance, technology calculation, etc.

You are kindly invited to visit ***our stand number B29 in Hall 013****, where a team of TOS VARNSDORF employees is looking forward to welcoming you.*

Miloš Holakovský
TOS VARNSDORF
Commercial Director

TOS VARNSDORF Presents
the New WVM 2600 / 3600 T
Portal Milling Machine

The WVM 2600 / 3600 T machine is a new table version of the portal machine. It is designed for accurate and highly productive coordinate milling, drilling, boring, and thread cutting especially into large and heavy workpieces or shaped workpieces from cast iron, cast steel, and steel.

The portal machines are characterised by modern construction technology and high levels of performance parameters. They can be supplemented with a number of technological devices, which can greatly extend the technological capabilities of the machine.

TECHNICAL PARAMETERS

Headstock		**WVM 2600 T (WVM 3600 T)**					
Main motor speed range	1/min	10 – 5 000					
Max. power of main motor	kW	46					
Max. torque on the driving shaft	Nm	1 375					
Ram stroke Z	mm	1 500					
Headstock horizontal traverse Y	mm	3 200 (4 200)					
Work table							
Table longitudinal traverse X	mm	3 500, 4 500, 5 500, 6 500, 8 500, 10 500					
Distance between the columns	mm	2 600 (3 600)					
Width of table clamping area	mm	1 500, 2 000 (2 500, 3 000)					
Length of the table clamping area	mm	3 000	4 000	5 000	6 000	8 000	10 000
Maximum work-piece weight	t	16 (20)	20 (24)	24 (28)	28 (32)	36 (40)	40
Feeds							
Feed range and rapid traverse – X, Y, Z	mm/min	1 - 25 000					
Automatic tool change							
Number of pockets – chain type magazine	pcs	40, 60					
Number of pockets – meander type magazine	pcs	80, 100, 120					
Tool change time	s	16					

WHT 130L – Horizontal milling and boring machine

The WHT 130 (C) is a new addition to the product portfolio of TOS VARNSDORF a.s. and complements the WHT product line with a machine that has a work spindle diameter of 130 mm. This machine reflects the latest trends in machining and is intended for productivity, guaranteeing a very quick return on investment.

The flexibility of the machine's configuration offers a machine tailored to your needs. It includes the basic setup of a 4-axis horizontal drill with extending spindle right up to a full-fledged 5-axis multifunctional machining centre with lathe, milling and drilling operations. Its flexible technology is extended with a range of suitable accessories that can be attached to the machine manually or in fully automated mode. The machine is also complemented by automatic tool change, and of course, automatic pallet change for manufactured pieces. The machine can be used even under the most demanding applications in the aeronautical and automotive industries, energetics, the oil industry, and most importantly because of its universality, in general engineering applications.

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.

Development of the WHT 110/130 (C) machine emphasized design, ergonomics, safety and ease of use for users and service operators. The main design features make it easier to operate and maintain the machine. It is also environmentally friendly—the machine's design and additional equipment allow the removal of splinters, emulsions and aerosols without any negative impact on the surrounding environment of the production hall housing the machine. 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** 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.

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.

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 dismounting 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 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 TOS Control system offers further potential in the use of the machine. For example, this system allows in-process measurements to be made on the machine, automatically measuring parts without creating geometric errors and then (also fully automatically) creating corrective NC programs that significantly improve the accuracy of the machined part in its dimensions and geometry. The machine's screen can display PDF documents (manuals, drawings etc.) and IP camera outputs, monitor and diagnose the machine's status, or be used for many other functions that increase the overall utility of the machine. Finally, more applications are being developed and prepared every day.

TOS Control is an 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.

Headstock		
Spindle diameter	mm	130
Spindle taper		ISO 50
Spindle speed range	1/min	10 – 5 000 (4 000)
Main motor power (S1)	kW	41
Rated torque on spindle (S1)	Nm	1 718 (3 200)
Work spindle stroke W	mm	800
Frame		
Headstock vertical travel Y	mm	1 500, 2 000, 2 500, 3 000
Column longitudinal travel Z	mm	1 500, 2 000, 2 500, 3 000
Cross table / pallet travel X	mm	2 000, 3 000, 4 000, 5 000
Table / pallet (turning)		
Max. table load	kg	20 000
Max. pallet load	kg	16 000 (10 000)
Table clamping area dimensions	mm	1 800 x 1 800, 1 800 x 2 200, 1 800 x 2 500, 2 000 x 3 000, 3 500 x 3 000 / 1 600 x 1 600, 1 600 x 2 000 (Ø 2 000)
Max. speed	1/min	3 (250)
Traverses		
Feed range and rapid traverse – X, Y, Z	mm/min	36 000 (25 000)
Feed range and rapid traverse – W	mm/min	20 000

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 fourth group consists of the latest products – portal milling machines.

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. School building valued at 4.5 million EUR was repaired.

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.

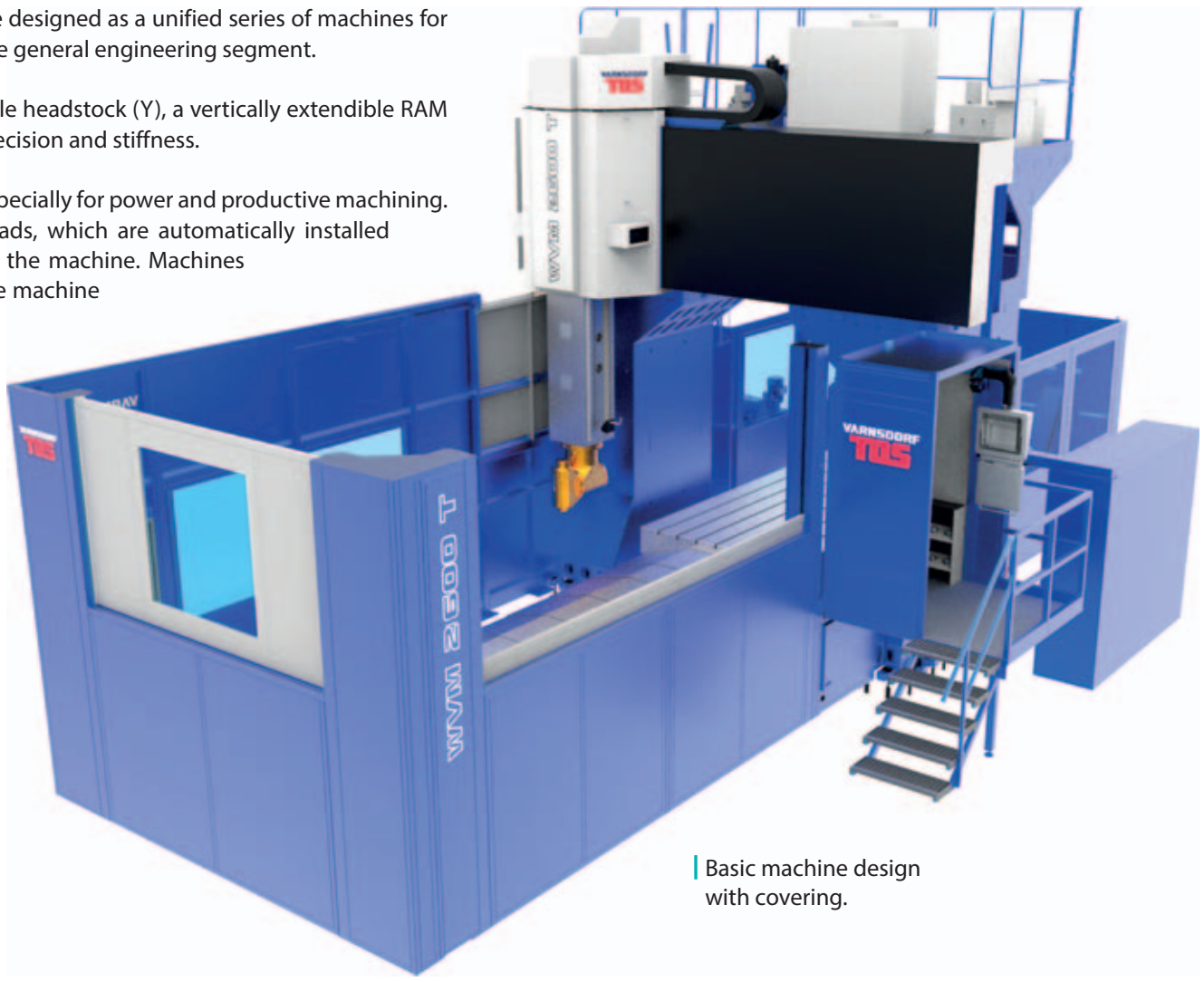
WVM 2600 / 3600 T

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 extendible RAM (Z) and a sliding table (X), the machines stand out with high precision and stiffness.

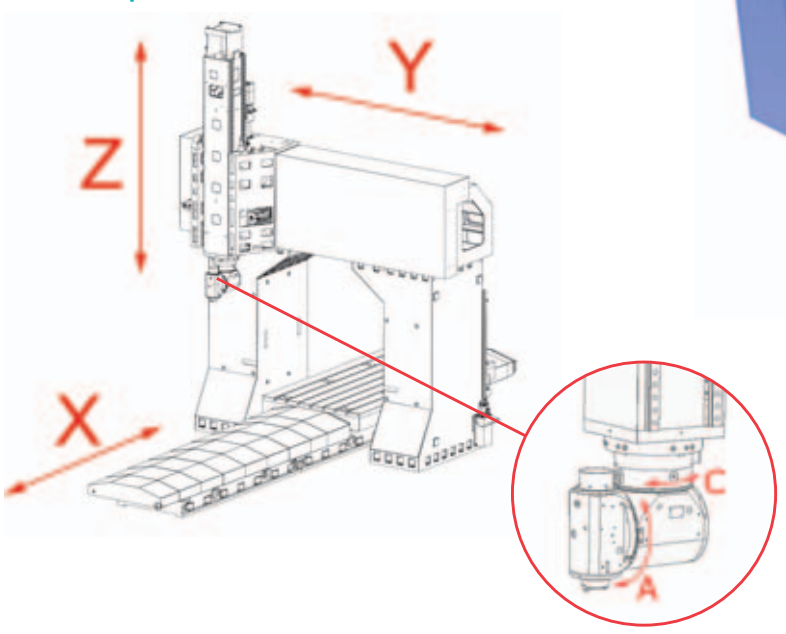
The high installed power of the machine (46 kW) is designed especially for power and productive machining. Machines can be equipped with various types of milling heads, which are automatically installed and allow to further extend the technological possibilities of the machine. Machines can be supplemented 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.



Basic machine design with covering.

Controlled axes schema



Machine configuration

- Machine with integrated orthogonal milling head
- Machine equiped with an automatic tool change
- Machine equiped with an automatic special accessory change
- The WVM 2600 / 3600 T machines are equiped with 5 continuosly controlled axes (X, Y, Z, C, A)

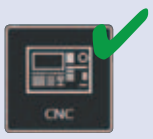
TOScontrol

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

TOS Control system default screen

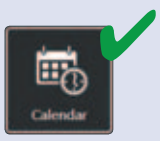
Standard applications

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
Service event planning
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

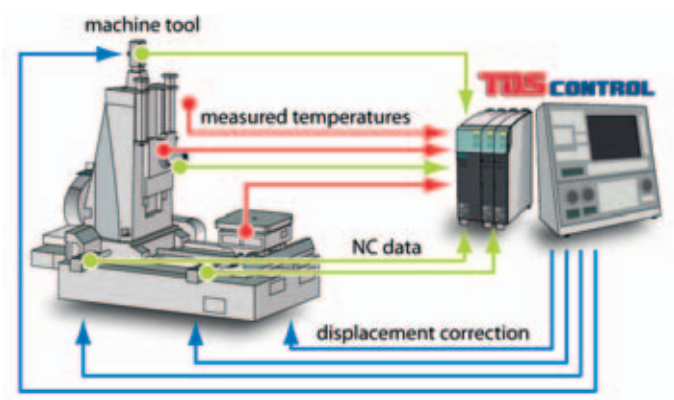
Work administrator
Displays the work order view and the overview of operations directly on the machine tool control panel, which is linked to the ERP system. It is also possible to add other documents into the application, e.g., operation description, photographs, tables of NC programs.

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.

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

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.



TOS VARNSDORF a.s.
Říční 1774, 407 47 Varnsdorf, Czech Republic
Tel.: +420 412 351 203, Fax: +420 412 351 269
E-mail: info@tosvarnsdorf.cz
www.tosvarnsdorf.com • www.tosvarnsdorf.eu • www.tosvarnsdorf.cz

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