

PRIMA·OPTIMA·VARIA

MACHINING CENTRES



PRIMA

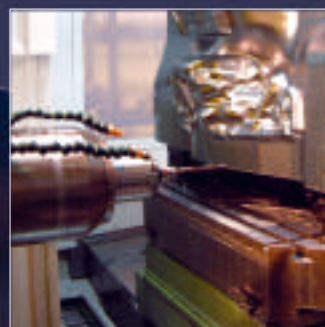
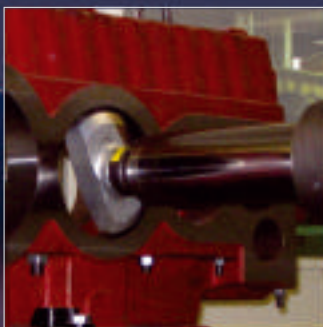
OPTIMA

VARIA

New goals need new solutions



TOS VARNSDORF a.s.



ABOUT COMPANY

www.tosvarnsdorf.com

VARNSDORF
TOS

MACHINING CENTRES TOStec



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's manufacturing program is based on the development, manufacture and sale of machine tools, integrated with a wide offer of services, such as:

- training for operators and maintenance workers
- technological studies
- installations of new machines
- warranty and after-warranty (extended) servicing
- spare parts sales
- overhauls and modernizations

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

High engineering standards of TOS VARNSDORF a. s. products were recognized in 1996 when the company was awarded the ISO 9001 certificate.



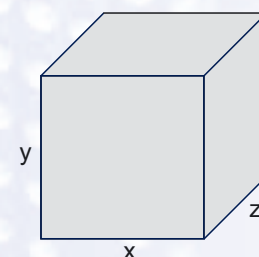
PRODUCTION PROGRAM

PRODUCTION OF MACHINE TOOLS

- HORIZONTAL MILLING AND BORING MACHINES
- FLOOR TYPE HORIZONTAL BORING MILLS
- MACHINING CENTRES
- PORTAL TYPE MACHINING CENTRES
- SPECIAL MACHINES
- ACCESSORIES

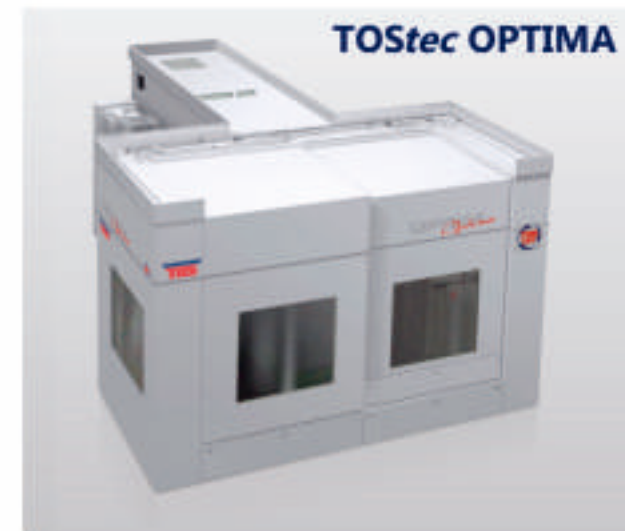
SERVICES

- TECHNOLOGICAL SUPPORT: TRAINING, TECHNOLOGICAL STUDIES, ETC.
- SPARE PARTS, OVERHAULS AND MODERNIZATIONS
- COOPERATION (METALWORKING, MEASURING SERVICES, CHEMICAL AND HEAT TREATMENT OF METALS)



$> 1 \text{ m}^3 (0,01\text{mm})$

$x > 1 \text{ m}$
 $y > 1 \text{ m}$
 $z > 1 \text{ m}$



The line of TOStec machines has been designated for various levels of automatically controlled technologies, from the simplest to the most advanced procedures in the sphere of modern machining of box and board shaped products as well as products of exceptional shapes and dimensions.

This line of machines has been designed as module kit from which, by selecting the modules, a large range of machines differentiating by configuration of coordinated axis, their dimensions, equipment of headstocks for various technological purposes, by applying of automatic technological accessories and application of various types of further peripheral devices such as automatic tool or pallet change, can be created.

The new production line of TOStec milling and boring machines is targeted to the most demanding operators of the new decade, that means it features the highest parameters and wide range of technological functions which enable application of the most sophisticated tools.

THE TYPICAL FEATURES OF THE TOStec MACHINE LINE:

- modular concept providing the highest variability by means of:
 - magnitude of travel of linear adjustable groups
 - types of headstocks
 - dimensions and load of clamping tables
 - periphery of automatic tool change
 - periphery of automatic pallet change
- application of the most advanced design and equipment
- standard concept of chip and water management including the fully covered execution - high comfort of operation
- large selection of special technological accessories
- minimum requirements as to the operation and maintenance
- minimum requirements as to the preparation of the machine base

The compact fully-covered machining centres PRIMA, OPTIMA and VARIA are designated for universal and special technologies of cutting operation including the most advanced technologies of five-axes and HSC machining. A large range of travel magnitude of individual groups, various variants of headstocks and the possibility to combine individual elements between the PRIMA, OPTIMA, VARIA machines create the prerequisite for finding the ideal technical solution of whatever technological problem.



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TECHNICAL PARAMETERS TOS^{tec}

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BASIC SPECIFICATIONS

	PRIMA	OPTIMA	VARIA
MODUL COLUMN			
Vertical travel Y [mm]	1,000; 1,300	1,300; 1,600	1,600; 2,000; 2,500
Longitudinal travel Z [mm]	1,600; 2,000	1,600; 2,000; 2,500	1,600; 2,000; 2,500
MODUL TRAVELLING ROTARY TABLES			
	PRIMA (100)	OPTIMA (110)	VARIA (130)
Clamping surface [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
Max. loading [t]	5	10	20
Cross travel X [mm]	1,600; 2,000	2,000; 3,000	2,000; 3,000; 4,000
MODUL AUTOMATIC PALLET CHANGE			
Pallet clamping surface [mm]	1,000 x 1,000 1,000 x 1,250	1,250 x 1,250 1,250 x 1,600	1,600 x 1,600; 1,600 x 2,000
Max. loading [t]	4	8	16
Axis travels for 2 pallets X [mm]	1,600; 2,000	2,000; 3,000	3,000; 4,000
Axis travels for 3 or 4 pallets X [mm]	1,600; 2,000	2,000; 3,000	-

HEADSTOCKS WITH HORIZONTAL SPINDLE AXIS

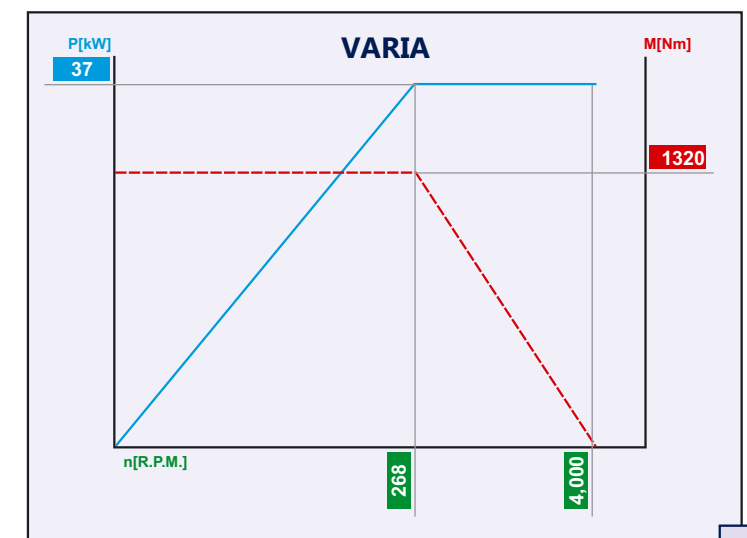
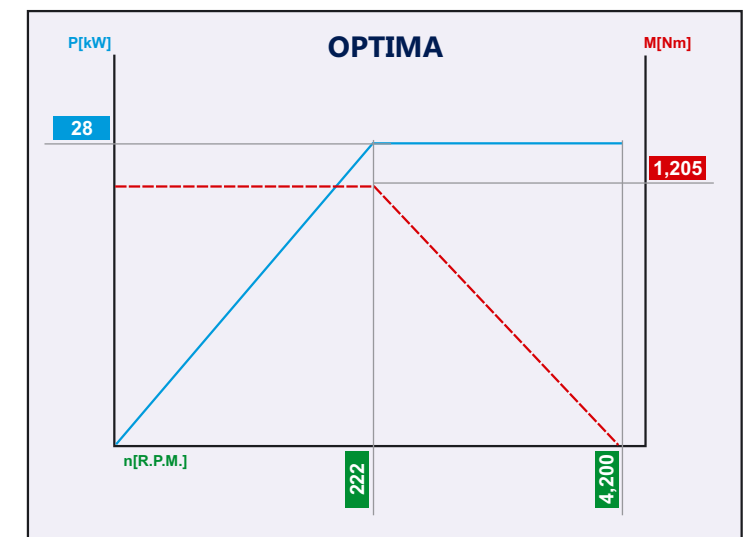
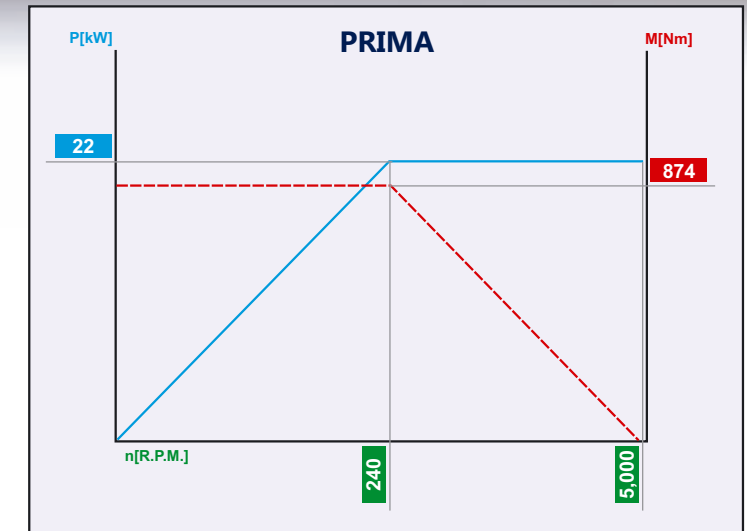
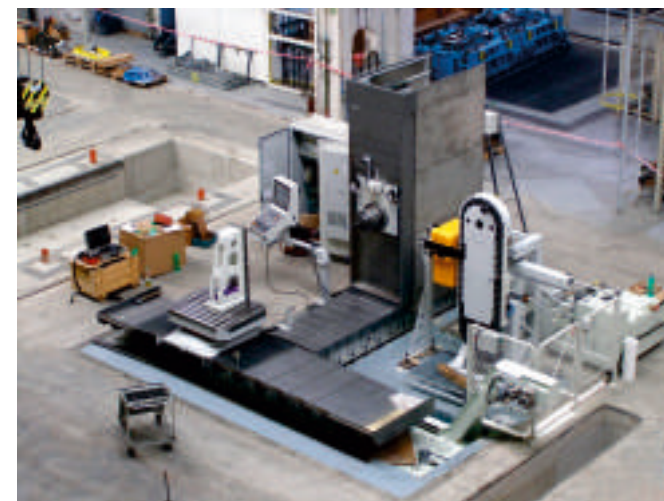
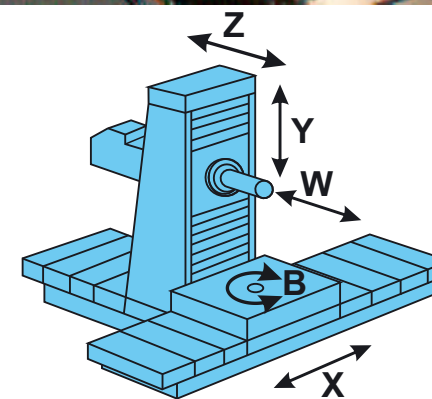
	PRIMA (100)		OPTIMA (110)		VARIA (130)	
	Traveling spindle	Non-traveling electro-spindle	Traveling spindle	Non-traveling electro-spindle	Traveling spindle	Non-traveling electro-spindle
Výsuv vřetena W [mm]	500		650		800	
Spindle diameter [mm]	100		112		130	
Spindle taper	ISO 50/ ISO 50 BIG+	HSK A 63	ISO 50/ ISO 50 BIG+	ISO 50 / B HSK A 63	ISO 50/ ISO 50 BIG+	ISO 50 / B HSK A 63
Max. spindle speed [min ⁻¹]	5,000	finishing 24,000	4,200	universal 10,000 finishing 24,000	3,500 4,000	universal 10,000 finishing 24,000
Main motor power (S1 / S6 - 60 %) [kW]	22 / 28	19	28 / 35	25.5 19	37 / 46	25.5 19
Max. spindle torque (S1 / S6 - 60 %) [Nm]	874 / 1,100	60	1,205 / 1,506	487 60	1,320 / 1,650	487 60

HEADSTOCKS WITH SPINDLE ORIENTATION FEATURE

	PRIMA (100)		OPTIMA (110)		VARIA (130)	
Type	Indexing milling head	Continuous milling head	Indexing milling head	Continuous milling head	Indexing milling head	Continuous milling head
Head spindle drive	from the machine spindle	build in electro-spindle	from the machine spindle	build in electro-spindle	from the machine spindle	build in electro-spindle
Milling head designation	HUI 50	HV/E-H	HUI 50 HOI 50	HV/E-H	HUI 50 HOI 50	HV/E-H
Spindle taper	ISO 50/ ISO 50 BIG+	HSK A 63	ISO 50/ ISO 50 BIG+	HSK A 63	ISO 50/ ISO 50 BIG+	HSK A 63
Max. speed [min ⁻¹]	3,000	10,000; 20,000	3,000 4,000	10,000; 20,000	3,000 4,000	10,000; 20,000

FEEDS

	PRIMA	OPTIMA	VARIA
Rapid traverse X, Y, Z, (W) [m.min ⁻¹]	30 (30)	24 (20)	20 (16)
Max. cutting feet rate [m.min ⁻¹]	20	15	15



HEADSTOCKS WITH SPINDLE ORIENTATION FEATURE



POSSIBILITY OF APPLICATION OF MILLING HEADS ONTO MACHINE

	HUI 50	HOI 50 / HOF 50	HV/E-H
PRIMA	✓		✓
OPTIMA	✓	✓	✓
VARIA	✓	✓	✓

HUI 50

- 2-axis milling heads with automatic positioning on two planes and indexed with the use of Hirth toothing with an increment of 2.5°. Both the axes are automatically clamped. Drive by the machine spindle.

The head serves for machining of surfaces tilted in any common angle to the basic coordinate system of the machine.

		PRIMA	OPTIMA	VARIA
Installation on the machine		fixed		fixed or mounted automatically
Spindle taper		ISO 50 / ISO 50 BIG+		
Max. speed	min ⁻¹	3,000	3,000	3,000
Power output	kW	22	28	28
Spindle torque	Nm	770	1,000	1,000
Clamping of axis		yes		

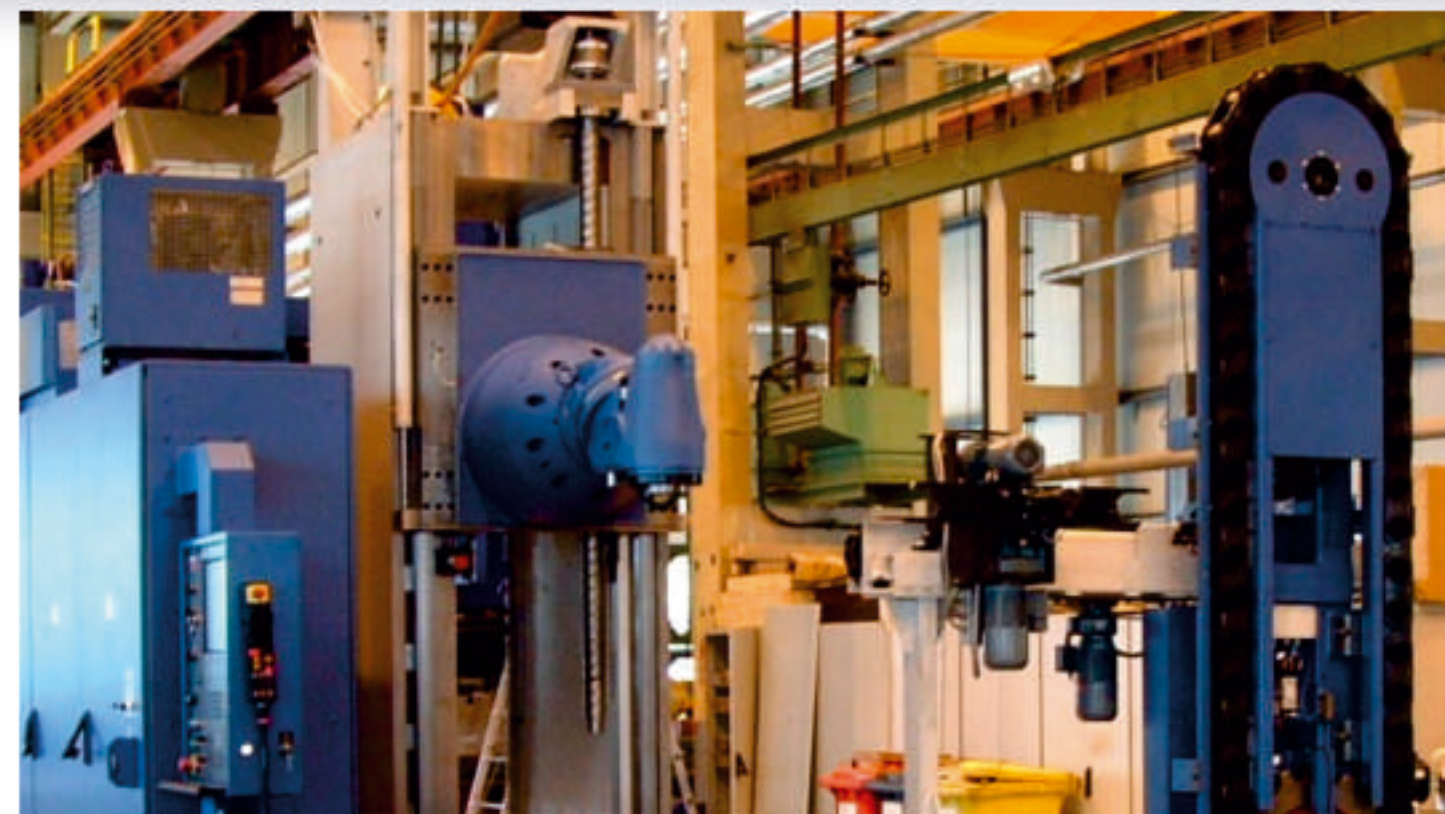
HOI 50 / HOF 50

- 2-axis "orthogonal" milling head with automatic positioning on two planes and indexed with the use of Hirth toothing with an increment of 1° / 0,001°. Both the axes are automatically clamped. Drive by the machine spindle.

The head is optimal for roughing or universal machining of areas, which are oriented in basic orientations or generally against orthogonal coordinate system of the machine.



		OPTIMA	VARIA
Installation on the machine		fixed	
Spindle taper		ISO 50 / ISO 50 BIG+	
Max. speed	min ⁻¹	4,000	4,000
Power output	kW	28	37
Spindle torque	Nm	1,070	1,200
Clamping of axis		yes	



HV/E-H

- 2-axis "fork" milling head with continuous control on two planes. Drive by the integrated electric spindle.

The head is suitable for roughing of light compositions and for finishing of work pieces from steel at positioning to the general angle (upon strengthening of both axes it provides for higher carrying capacity), also for machining of currently shaped surfaces at continuous movement of both axes of the head.



		PRIMA, OPTIMA, VARIA
Installation on the machine		fixed
Spindle taper		HSK A63
Max. speed	min ⁻¹	10,000; 20,000
Power output	kW	28, 43
Spindle torque	Nm	90, 60
Clamping of axis		yes

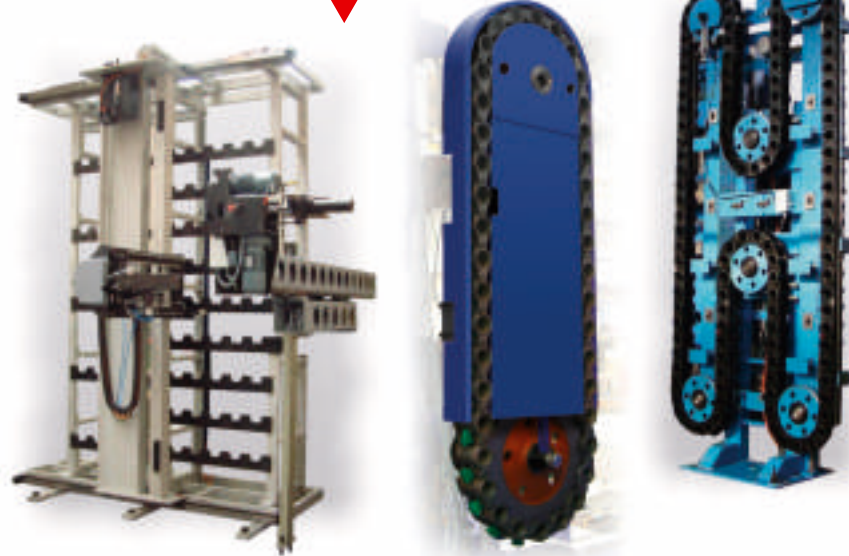
HEADSTOCKS VERSIONS WITH INTEGRATED MILLING HEADS.



AUTOMATIC TOOL CHANGE

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LOOP MAGAZINE
CHAIN MAGAZINE
RACK MAGAZINE



Automatic tool change is, in its concept, designed as an independent structural element which consists of tool magazine and manipulator with rotating two-arm hand.

In standard execution the machine is produced for tool shanks in accordance with the norm DIN 69871/2. Based on customer's requirement the machine can be produced also for tool shanks in accordance with other norms, e.g. BT 50, CAT, HSK 100 etc.

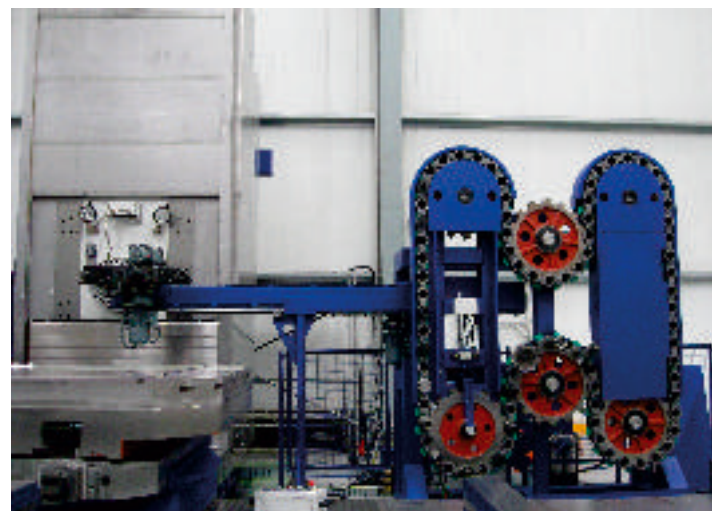
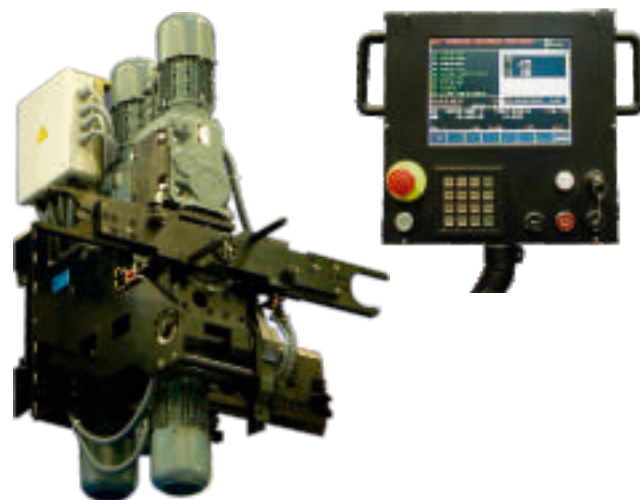
The equipment also enables the automatic tool change into the milling heads with CNC controlled spindle position (HUI 50, HOI 50, HOF 50, HV/E-H).

BASIC TECHNICAL PAREMETERS

			PRIMA	OPTIMA	VARIA
Number of storage places in magazine	- chain			40, 60	
	- loop			80, 100, 120	
	- rack			150 - 300	
FURTHER TECHNICAL DATA FOR LOOP AND CHAIN MAGAZINE					
Pitch of storage places		mm		130	
Max. tool diameter	- with fully loaded magazine	mm		125	
	- with free neighbouring places	mm		320	
Tool length max.		mm		500	
Tool weight max.		kg		25	
Tool change time		sec		14	

TOOL MANIPULATOR

AVN (ATC) CONTROL PANEL



AUTOMATIC PALLET CHANGE

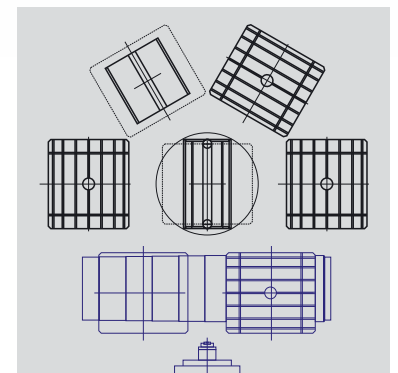
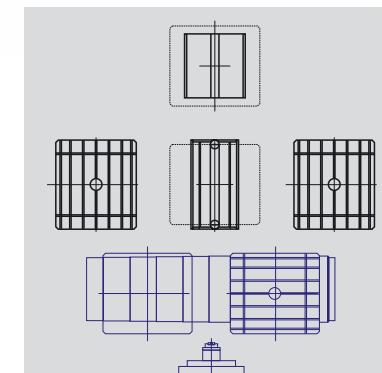
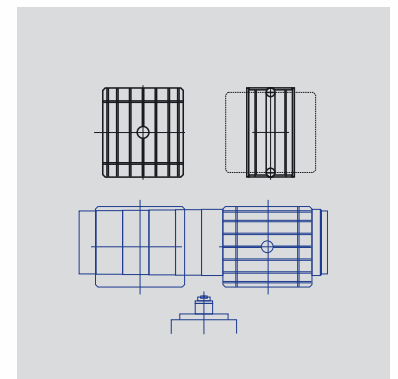


Concept of the pallet change system is based on automatic change of production pallets between pallet stations, which are equipped with pallet changing mechanism, and a pallet clamping base on the machine saddle. Pallet is arrested on the clamping base by means of two centering pins and locked by hydraulic mechanism.

Dimensions of pallet and T-slots are based on ISO standard. When two pallet system is used, pallets are changed directly between stations and the pallet base. In case 3 or 4 pallet system is used, pallets are changed by the help of rotary manipulator placed between stations and the pallet base.



AN EXAMPLE OF WORKPLACE ARRANGEMENTS FOR AUTOMATIC WORKPIECE CHANGE

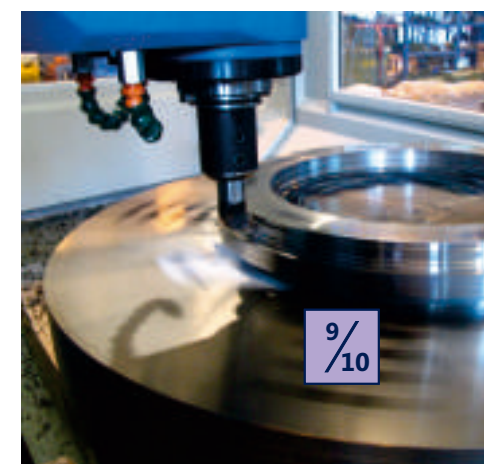


		PRIMA	OPTIMA	VARIA
Number of pallet in system (incl. stationary pallet manipulators)		2 - 4	2 - 4	2
Workpiece weight max.	kg	4,000	8,000	16,000
Pallet clamping area	mm	1,000 x 1,000, 1,000 x 1,250	1,250 x 1,250, 1,250 x 1,600	1,600 x 1,600, 1,600 x 2,000
Size of T-slots	mm	22H8	22H8	22H8
Time of pallet change	sec	80	80	90

TABLE / PALLETS FOR TURNING APPLICATION

		PRIMA	OPTIMA
Table / pallet clamping surface	mm	1,000 x 1,000, Ø 1 250	
Table / pallet max. loading	t	4 / 2,5	
Number of pallet in system		2, 3, 4	
Max. circular working feed	min ⁻¹	250	
B-axis working torque	Nm	3,000	
Max. holding torque of clamped B-axis	Nm	10,000	

Option of milling machine with higher circular working feed of table / pallet with possibility of vertical lathe-turning.



DESIGN OF MACHINE GROUPS

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MEASUREMENT

Linear axes **X**, **Y**, **Z** are fitted with sealed direct electro-optical linear scales HEIDENHAIN.

LINEAR GUIDE

Guiding of all linear movable machine groups in axes **X**, **Y**, **Z**, **W** comprises of preloaded compact roller-bearing linear guideways.

DRIVE OF FEEDS

All linear axes are controlled in permanent close loop. **B** axis (rotary table) is clamped automatically by hydraulic pressure. Servodrives are AC digital made by Siemens. Spindle is driven by Siemens AC digital drive.

COLUMN

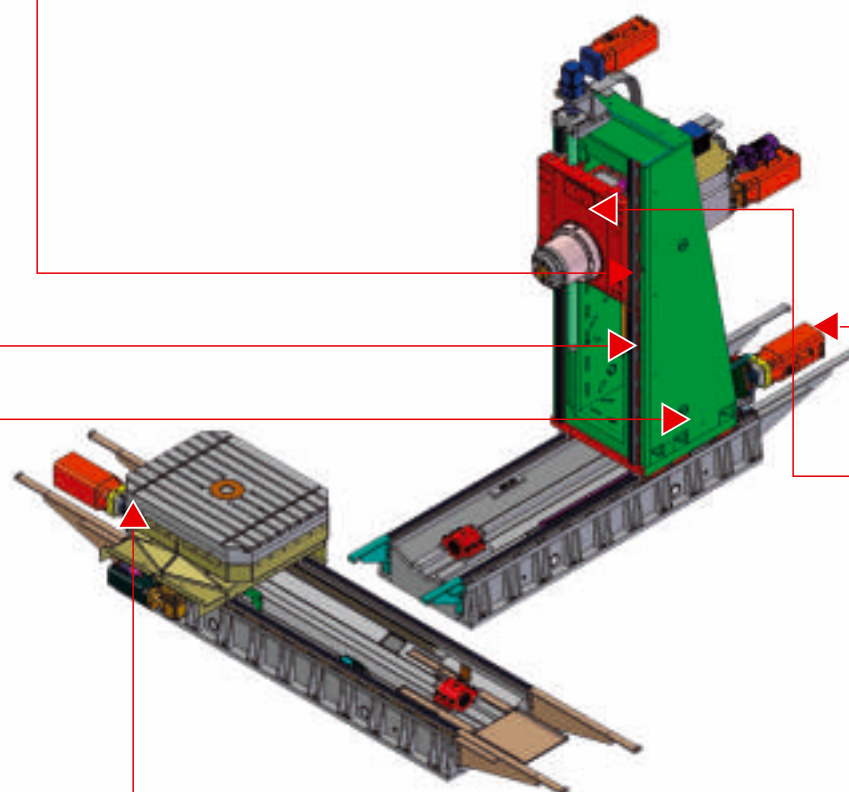
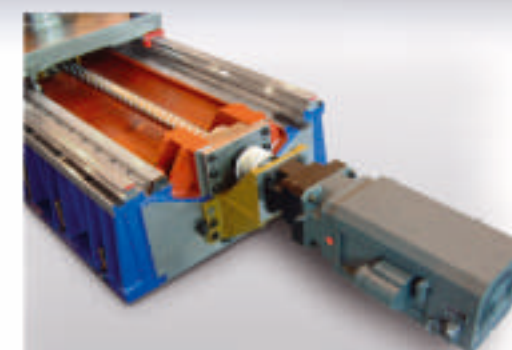
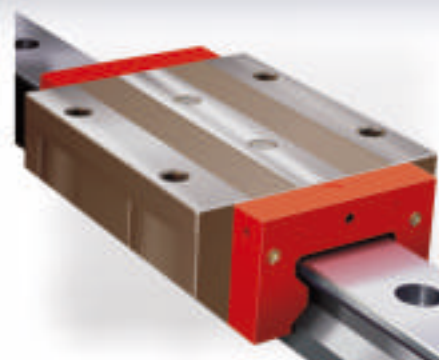
Fundamental parts of the machine (column and bed) exploit the new technology COMBitec. They are fabricated as a close ribbed welded steel structure filled by the special damping substance. This solution provides a high dynamic and static stability of machine frame and thanks to a low weight of moveable groups it enables to reach of peak values of acceleration.

TABLE

As a standard all machines are equipped by rotary tables with controlled **B** axis. According to the customers demand it is possible to choose positioning **B** axis (drive is designed by one pinion), or continuously controlled **B** axis (drive is designed by two electronically tensioned pinions, Master-slave system).

CENTRAL HEADSTOCK

TOStec machine are equipped with centrally guided headstock. This is the best solution from view of balanced stress of the machine skeleton by forces and thermal load.



MACHINE COVERS

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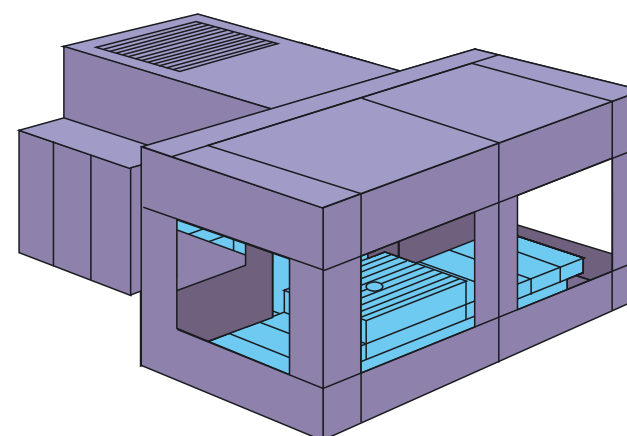
The PRIMA, OPTIMA, VARIA machines are standardly equipped with covers that ensure a high level of safety for the machine operator, protect the surroundings of the machine from flying chips and from sprayed cooling liquids and guarantee the high environment-friendliness of operations. On the customer's request we deliver these types of covers:

- COMPLETE COVERING
- 2/3 COVERING
- INDIVIDUAL COVERING



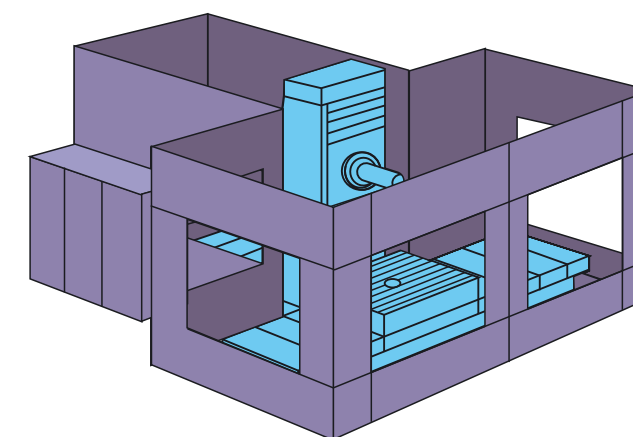
COMPLETE COVERING

Complete covering deals with water and chip management in a comprehensive way. The cooling liquid and chips are removed from the working area with the use of guiding metal sheets continuing the askew telescopic covering of the X or Z axis and other adjacent elements inclined to the chip conveyor.



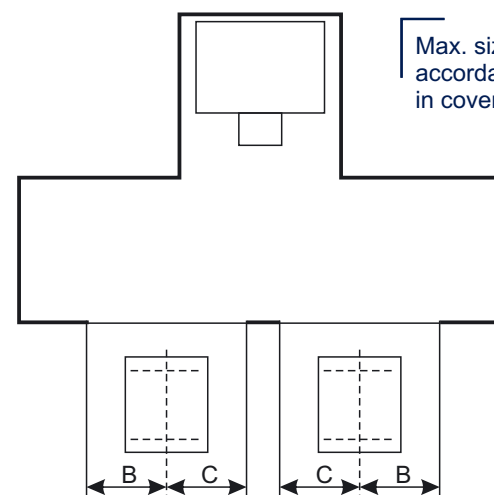
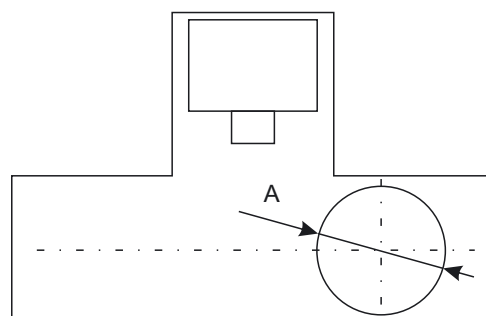
2/3 COVERING

If the customer wants to process large workpieces, we deliver a standard 2/3 covering, which does not contain the roof and is lowered to exceed the top position of the spindle axis on the Y axis.



Max. size of workpiece/limiting in accordance with maximal diameter of workpiece turning-over in complete and reduced covering.

Max. size of workpiece/ limiting in accordance with opening passage in covering.

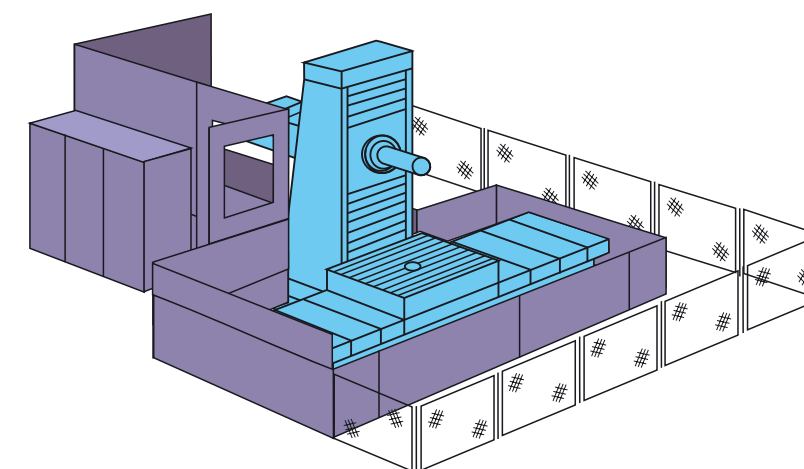


PRIMA		OPTIMA		VARIA	
Clamping surface [mm]		Clamping surface [mm]		Clamping [mm]	
1,000 x 1,250		1,250 x 1,250	1,250 x 1,600	1,800 x 1,800	1,800 x 2,000
A = 1,500		A = 2,000		A = 2,900	
Table cross travel X [mm]		Table cross travel X [mm]		Table cross travel X [mm]	
1,600	2,000	2,000	3,000	3,000	4,000
B = 750 C = 650	B = 750 C = 750	B = 1,000 C = 1,000		B = 1,450 C = 1,000	



INDIVIDUAL COVERING

We also provide special covering in the event of other special requirements from customers.



OPTIONAL ACCESSORIES

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MANUALLY OR AUTOMATICALLY APPLIED MILLING HEADS

HPR 50



The HPR 50 and HUR 50 heads are designed for manual application on the machine headstock; when used with the VARIA machine they may be applied automatically depending on the needs of the operation procedure. The heads are used for machining the surfaces that are oriented in the basic direction (also generally) with regard to the orthogonal coordinate system of the machine.

HUR 50



The HUI 50 head is automatically indexed on both the planes with an increment of 2.5°, providing higher efficiency during the turning of the head spindle with regard to the orthogonal coordinate system of the machine.

HUI 50



FACING HEAD

The facing head serves for facing and outside turning or boring of cylindrical, conical and otherwise shaped surfaces of large diameters. The equipment is particularly useful for the demanding technological operations where the full CNC control of the slide may be exploited.



FACING HEAD	PRIMA	OPTIMA	VARIA
D'Andrea UT3-360S - max. speed of facing head 500 RPM - slide stroke 120 mm - max. bore/ face diameter 800 mm	manually or automatically mounted on headstock with traveling spindle		
D'Andrea UT3-500S - max. speed of facing head 315 RPM - slide stroke 160 mm - max. bore/ face diameter 1,000 mm	-	-	manually or automat. mounted on headstock with traveling spindle
ITS 8 - max. speed of facing head 500 RPM - slide stroke 38 mm - max. bore/ face diameter 308 mm	manually or automatically mounted on headstock with traveling spindle		
ITS 16 - max. speed of facing head 300 RPM - slide stroke 89 mm - max. bore/ face diameter 640 mm	manually or automatically mounted on headstock with traveling spindle		

Upon the customer's request it is possible to apply other types of facing heads or automatic mounting on the headstock.

MANUAL AND AUTOMATICALLY ADJUSTABLE MILLING HEADS	PRIMA	OPTIMA	VARIA
HPR 50 - headstock adjustable in vertical plane - max. spindle speed 1,800 RPM - maximum spindle torque 1,000 Nm	manually or automatically mounted on headstock with traveling spindle		
HUR 50 - universal - spindle orientation is adjustable in two planes - max. spindle speed 3,000 RPM - maximum spindle torque 1,000 Nm	-	manually or automatically mounted on headstock with traveling spindle	
HUI 50 - universal - spindle orientation is adjustable in two planes with increment of 2.5° - max. spindle speed 3,000 RPM - maximum spindle torque 1,000 Nm	-	manually or automat. mounted on headstock with traveling spindle	

WORKPIECE AND TOOL PROBES

WE DELIVER THE FOLLOWING PROBES AS STANDARD:

MEASURING TOOL PROBE for the system:		
iTNC 530	HEIDENHAIN TT 140	measuring touch probe with cable transport
iTNC or Sinumerik 840D	RENISHAW TS 27 R	measuring touch probe with cable transport
MEASURING WORKPIECE PROBE for the system:		
iTNC 530	HEIDENHAIN TS 220	measuring touch probe with cable transport
	HEID. TS 640 + SE 640	measuring touch probe with optical transport
TNC or Sinumerik 840D	RENISHAW OMP 60 - set	measuring touch probe with optical transport
	RENISHAW RMP 60 - set	measuring touch probe with wireless transport
	M+H 20.41 Multi	measuring touch probe with wireless transport



The use of manually or automatically applied milling heads considerably increases the technological usability and versatility of TOS tec machines.



OPTIONAL ACESSORIES

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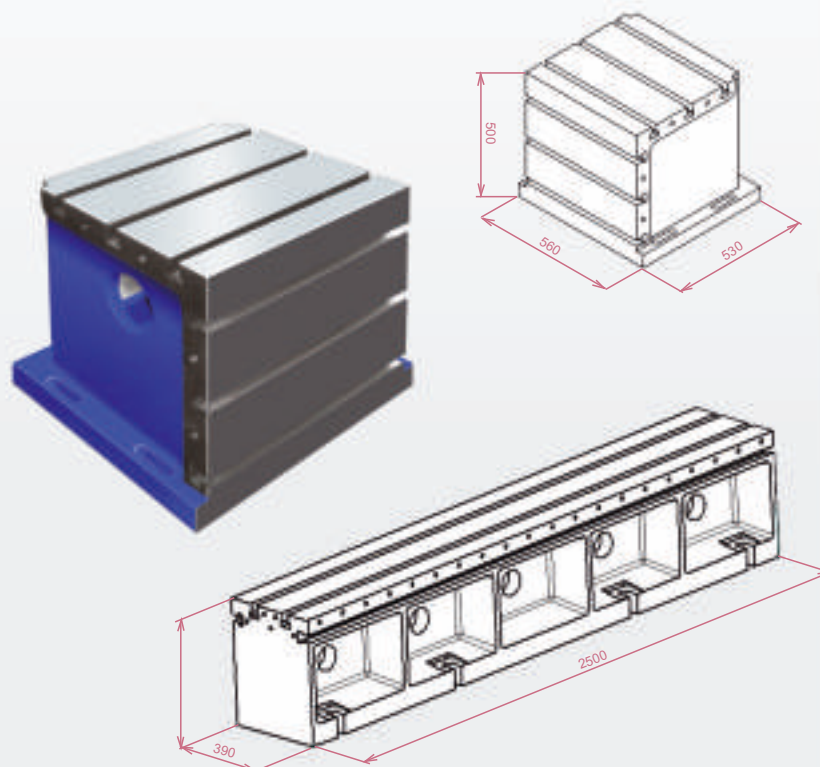
CLAMPING PLATES

The clamping plates are supplied in the following sizes as standard: 800; 950; 1,120; 1,450; 1,620; 2,000; 2,500 mm.



CLAMPING CUBES

UK 500, UK 1000, UK 2000, UK 2500



TOOL COOLING AND WATER MANAGEMENT



- CHZ / tool cooling with external inlet (2 nozzles) of cooling liquid including the filtration.
- CHOV / tool cooling through spindle as well as by external inlet including the filtration.

Possible choose in offer 10, 20, 30 or 40 bar. This range could be declined about 10 %. „Rinsing of telescopic covers“ /chip washing off into the conveyor from the space of telescopic splashguards of the cross bed (X) and downtake metal sheets of longitudinal bed (Z).



MACHINE CONTROL

HEIDENHAIN iTNC 530



SINUMERIK 840 D



The PRIMA, OPTIMA, VARIA machines are normally controlled by the HEIDENHAIN iTNC 530 or SINUMERIK 840 D control systems.

ELECTRIC CABINET

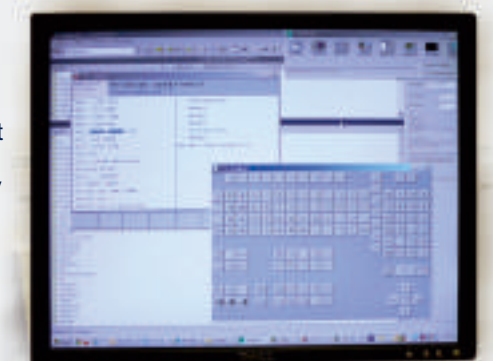
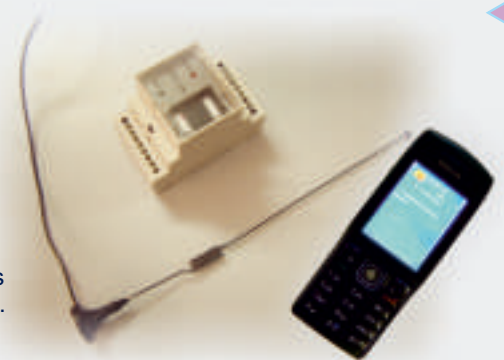
Electric outfit and other power supply units are located in electro cabinet. According to the customer's request the electro cabinet can be placed on right or left side of the machine.



We also offer a system of services for the permanent support of customers:

TOSmessage ensures communication between the machine's control system and the customer's mobile phone. The customer is informed about the predefined statuses of the machine, e.g. the completion of an automatic cycle or possibly program interruption.

TOSwide - the remote diagnostic system allows our service engineer to obtain required data about the status of the machine necessary to specify possible diagnostic messages about the non-standard condition of the machine's control system.

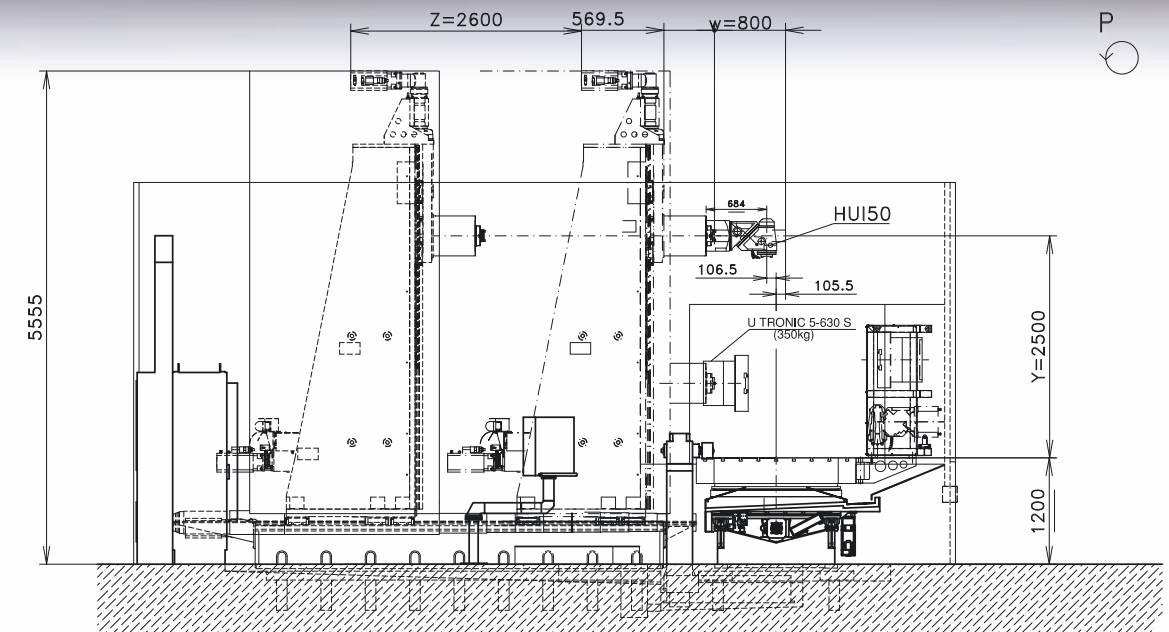
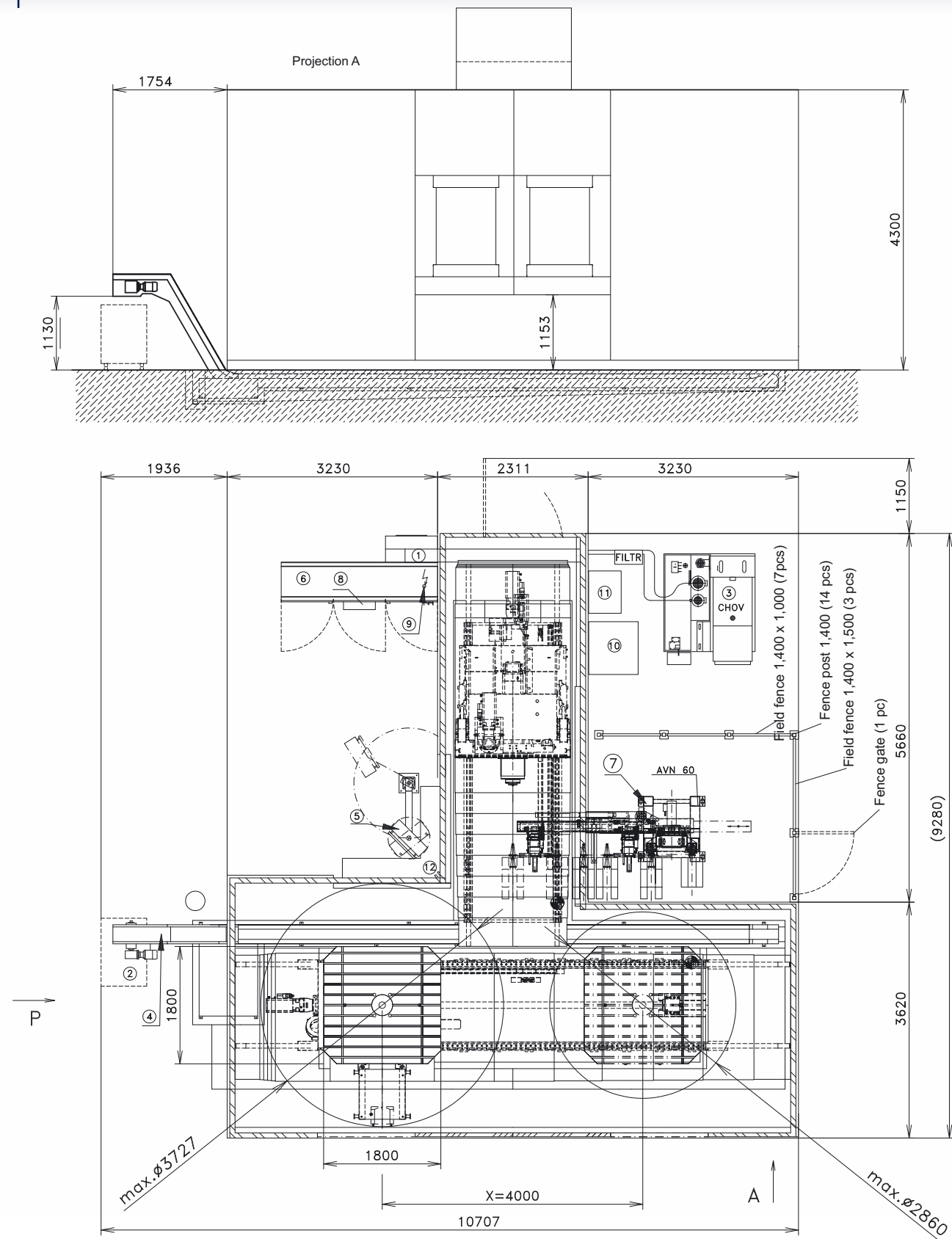


ANOTHER OPTIONAL ACCESSORIES
YOU CAN FIND ON www.tosvarnsdorf.cz/en/products/accessories/

MACHINE LAYOUT

www.tosvarnsdorf.com

INFORMATIV MACHINE LAYOUT



1	Hydraulic pover pack	5	Control panel	9	Main cable
2	Swarf container	6	Switch cabinet	10	Chiller
3	Filtration unit	7	Automatic tool change	11	Cooling oil tank
4	Swar conveyor	8	Airconditioning	12	A step for access into work area

MACHINE FOUNDATION SKETCH

Percolation pit (-600)

Foundation block for the machine

Circular openings for anchoring the machine drilled after casting to the foundation block

Cable trough (-120)

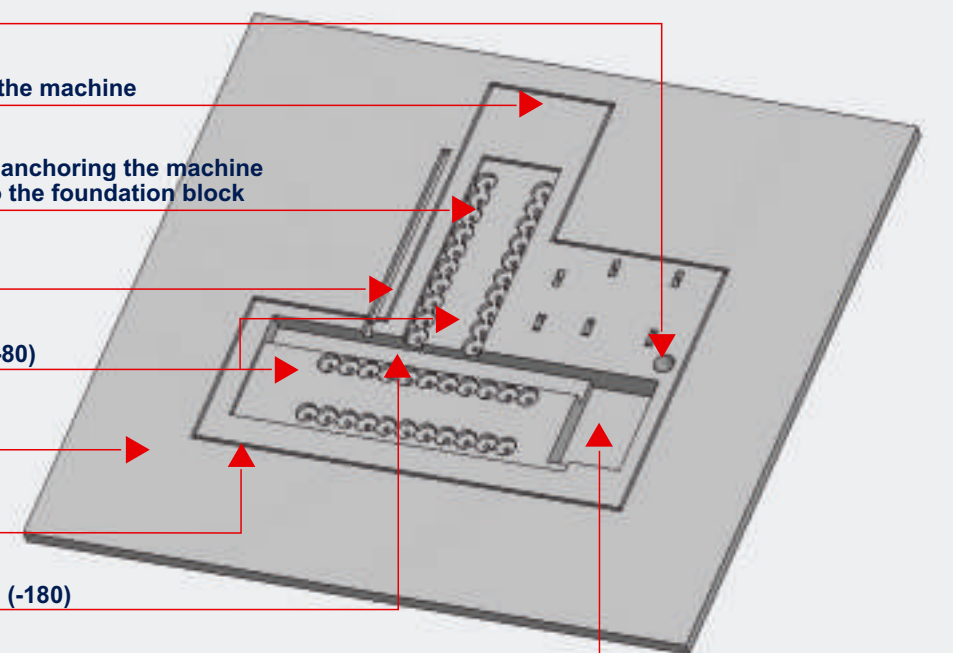
Tub for the machine (-80)

Surrounding floor (0)

Insulating gap

Chip conveyor trough (-180)

Tub of the chip conveyor tank (-420)



TECHNOLOGIES

www.tosvarnsdorf.com

PRODUCTION OF A WORKING FOR LOGGING MACHINES



PRODUCTION OF A WORKING FOR LOGGING MACHINES



MILLING OF INCLINED SURFACES



MILLING OF AN INJECTION MOULD



PRODUCTION OF A BUILDING MACHINE (JIB-CRANE)



MILLING OF A WORKPIECE FROM EXTRA-HARD STEEL



UPON THE CUSTOMER'S REQUEST, IT IS POSSIBLE TO EQUIP THE MACHINE WITH ADDITIONAL DEVICE OR PROCES ACCESSORIES.



Data and features in the present catalogue are not binding. The producer reserves the right to alter them without advance notice at any time.

REFERENCES

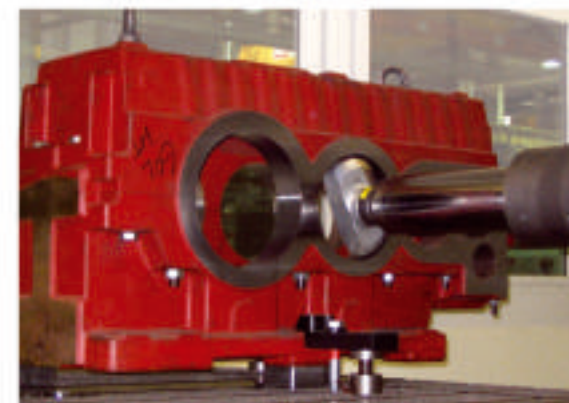
MACHINING OF A GEARBOX BODY OF A WIND-POWER STATION



MILLING AND DRILLING OF A COMPRESSOR BODY



MACHINING OF A GEARBOX BODY



MACHINING OF ROTOR SHAFT FOR WIND-POWER STATION



MORE TECHNOLOGIES YOU CAN FIND ON www.tosvarnsdorf.cz/en/technologies/



34 STATISTICS OF SOLD TOStec MACHINES OF ALL TYPES: 2003 – SEPTEMBER 2011

SORTING BY COUNTRY

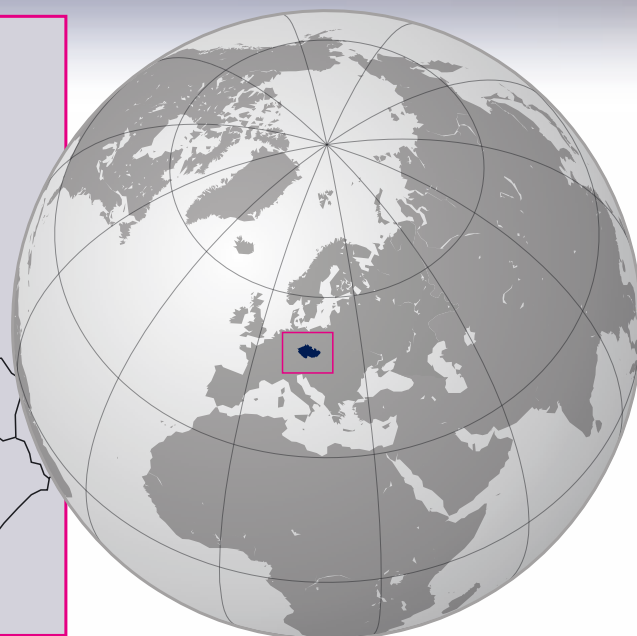
	Czech Republic	15
	Germany	4
	Belarus	2
	India	2
	Kuwait	2
	Russia	2
	Austria	1

	Belgium	1
	China	1
	France	1
	Poland	1
	Spain	1
	Switzerland	1
Total		34

SORTING BY MACHINE TYPE

PRIMA	16
OPTIMA	7
VARIA	11
Total	34

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