

Your partner for future machining

VARNSDORF
TOS

Floor type horizontal boring mill WRD 170 (Q)



Milling machine manufacturer
TOS VARNSDORF a.s.

BASIC CHARACTERISTICS

Basic machine characteristics:

WRD 170 (Q) is the biggest and heaviest representative of floor type machines with linear guiding from the production portfolio of the company TOS VARNSDORF a.s. The machines are designed for precise 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 flexibility.

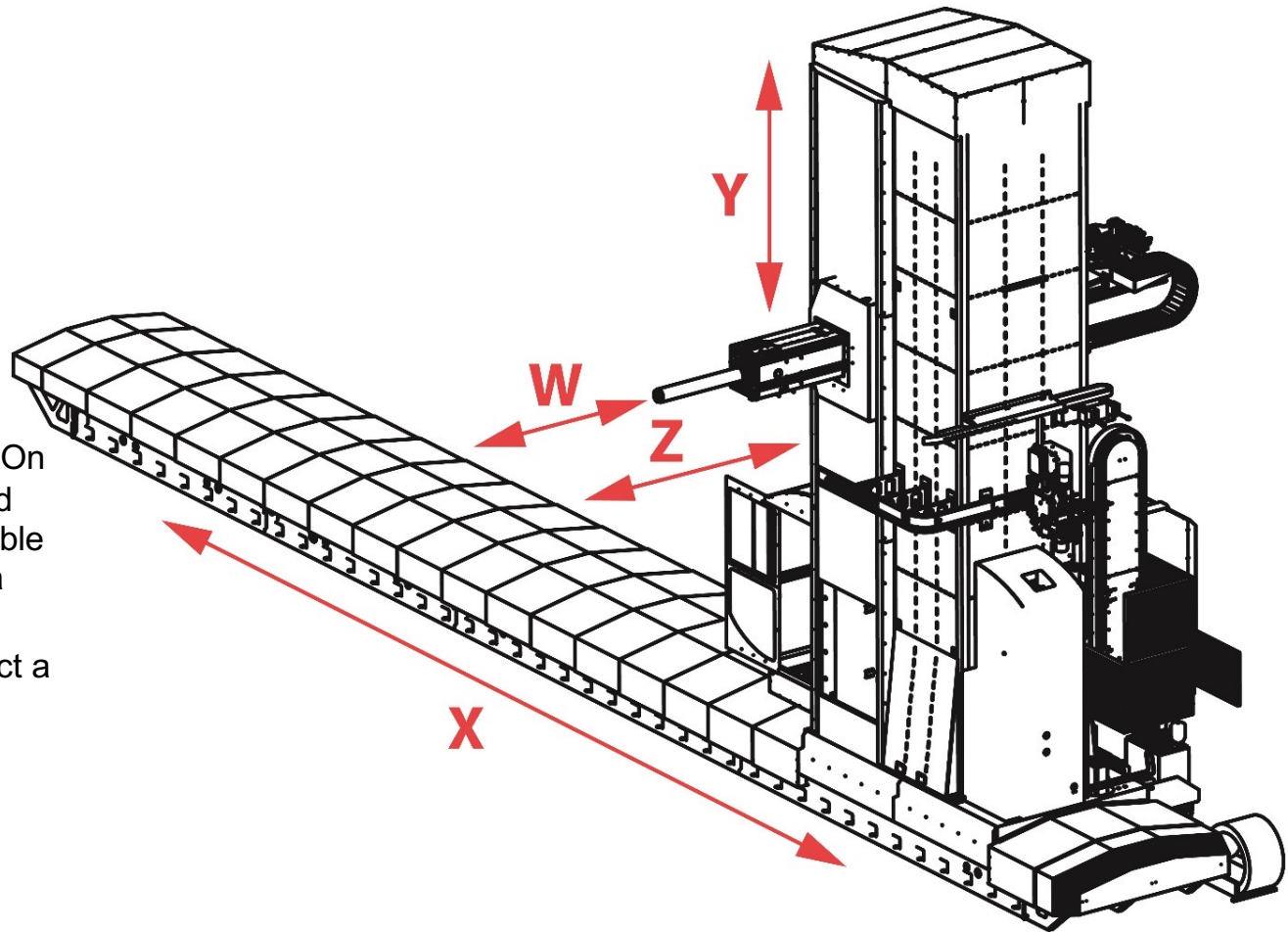


BASIC CONCEPTS

Basic concept of the machine:

WRD 170 (Q) are a floor type horizontal boring mills - left-hand version, with a extensible RAM, extensible work spindle and a transverse column (X coordinate). On the column guiding is a vertically adjusted headstock (Y coordinate) with an extendible horizontal RAM (Z coordinate) and with a sliding work spindle (W coordinate).

For controlling the machine you can select a control system HEIDENHAIN TNC 640, Sinumerik 840D-SL or FANUC 30i /31i.

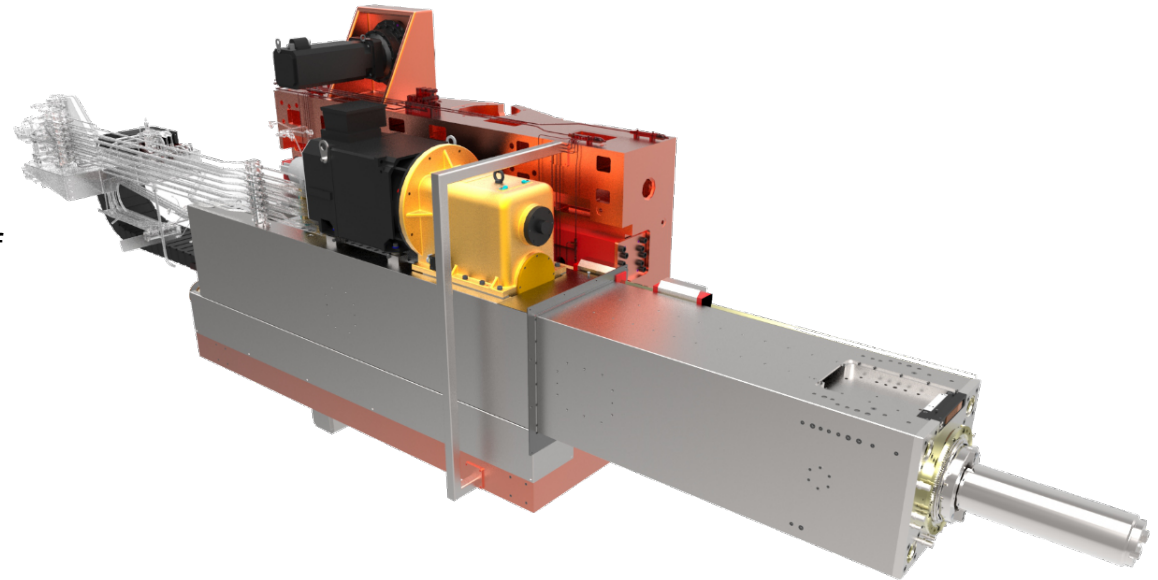


HEADSTOCK

Headstock:

The spindle body is divided, its inner part carries a massive slider (RAM) equipped with electromechanical compensation of deformations when the slider extends. The spindle speed is derived from a powerful electric drive through a robust gearbox. Two mechanical gears are automatically engaged - by an electrically controlled shifter. The drive from the gearbox to the hollow shaft of the working spindle is designed by cogged wheels. Nitrided work spindle with minimal sliding will be stored in nitrided hollow spindle dampened in front with a bronze case. The hollow spindle is fitted into the pre-stressed spindle ball bearings. The tools are clamped by the use of a bundle of disc springs their release is made hydraulically.

Two sliding motors built in the outer part drive the headstock at the Y coordinate.



FEED DRIVES AND STABILIZATION

Feed drives and stabilization:

Each of the four axes (X, Y, Z, W) has its independent electric control motor operator available. The X-axis and Y-axis movement is realized by a pair of electric servomotors with reducers. The gear pinion pre-stressing force on the reducing gear outputs against the toothed ridge is generated by wiring the drives in the "master-slave" function. (requires two driven axes).

Conversion to the linear motion of the W and Z axes is realized by means of ball gears. Primary drive degree of the Z and W axes is solved by gears.



COMPENSATION

Balancing the weight of a headstock:

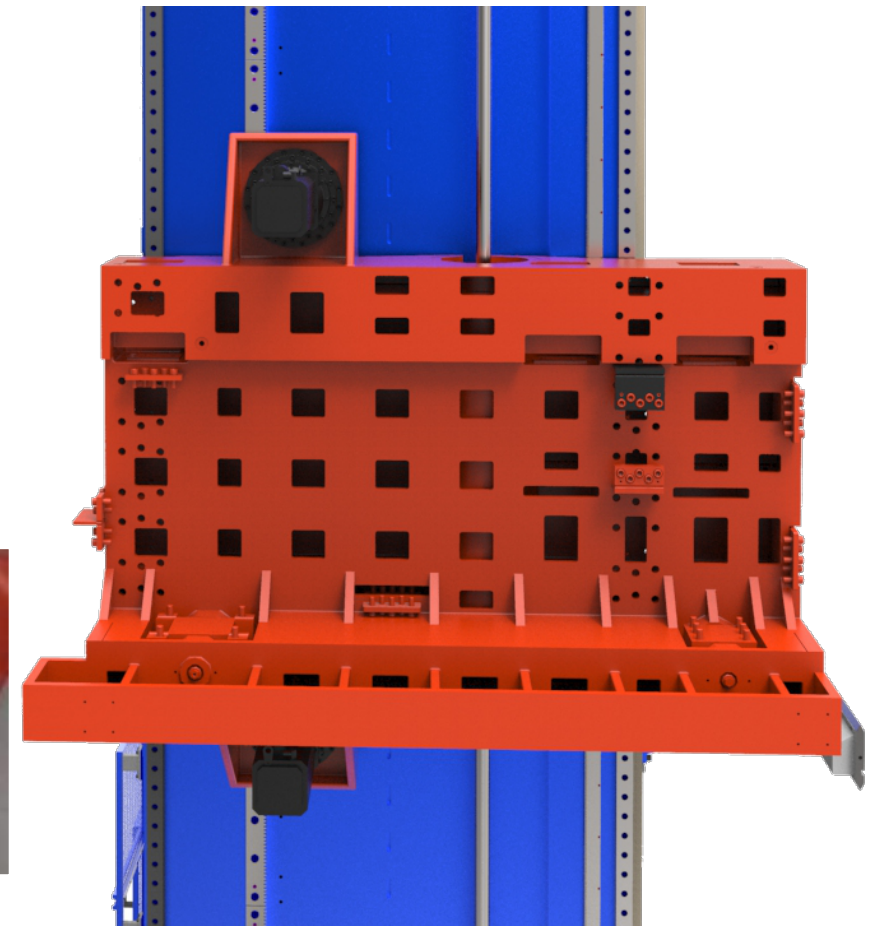
The weight of the headstock is balanced by the telescopic cylinder from the hydro-pneumatic system. This headstock weight-balancing system only requires minimal feed rates and reduces power consumption during the machining process compared to solutions without balancing mechanisms, for example, with a ball screw couple.



COMPENSATION

Compensation of the slope descending:

This solution of the RAM descending compensation is unique and patented. The entire headstock is designed to compensate for the descend of the RAM head when it is slid in the Z axis. The descend of the slider is compensated by a special electro-mechanical system (see the fig.), when the stepping motor rotates an excenter, on which the entire group of the slider and the spindle plate is stored (the second storage of the spindle bearing and the spindle plate are solved by a rotary pin). This solution allows a high level of compensation without silting additional force on the linear guide. This way of compensated balancing the RAM contributes to the longer life of the linear guide.



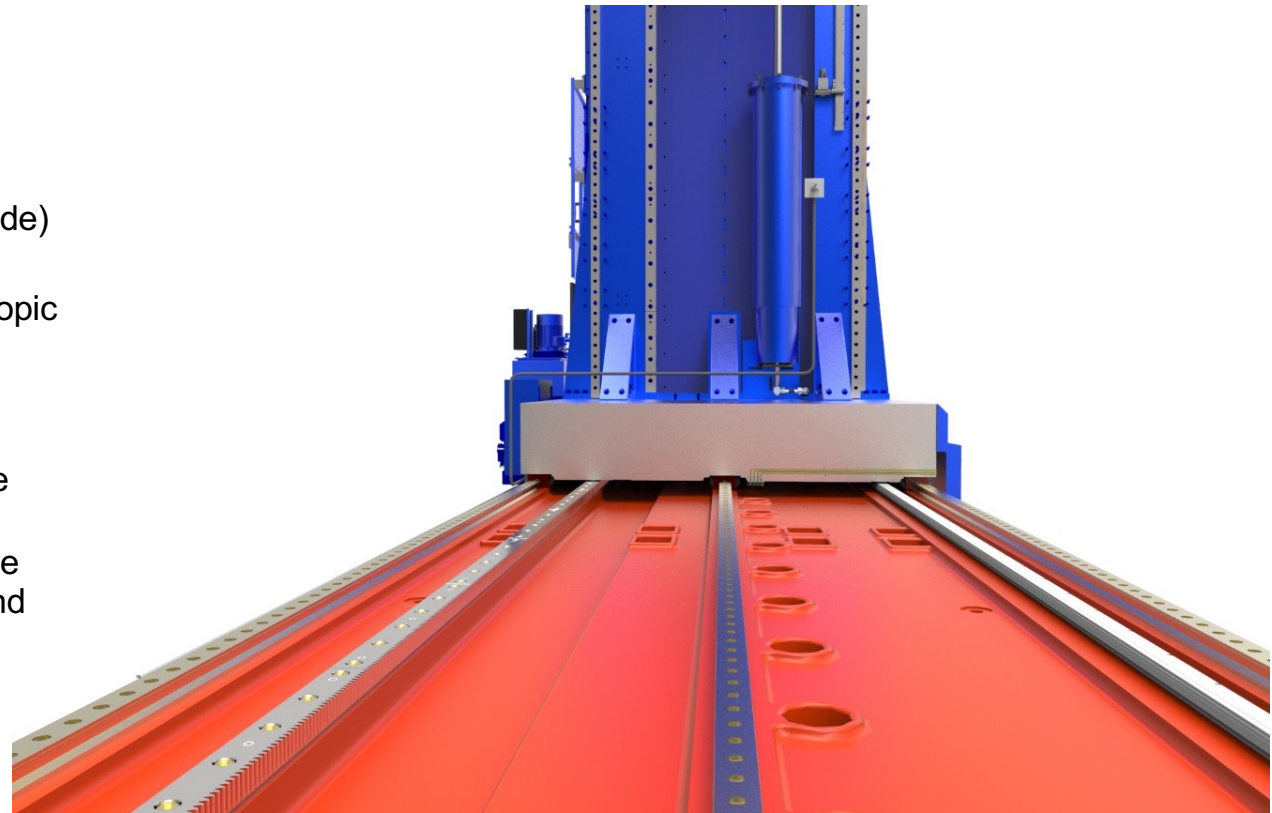
GUIDING OF MOVABLE GROUPS

Guiding of movable groups:

The control of all linearly adjustable machine groups is executed as pre-tensioning roller (spindle guide, sliding column guide, RAM guide) based on compact linear rolling guide.

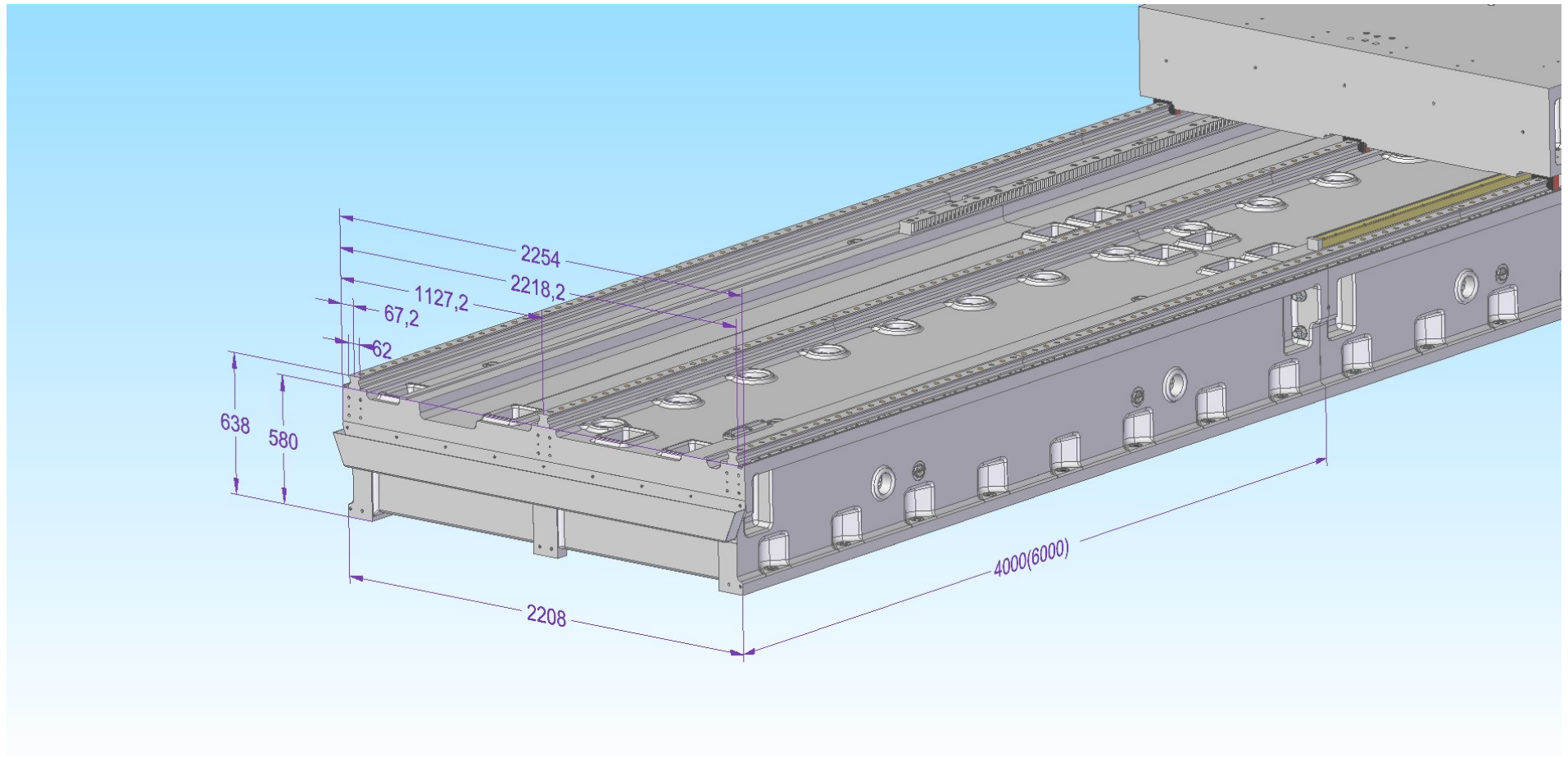
The bed guides are provided with steel telescopic covers.

The guide on the column is protected with an overall case covering the whole space of headstock travel – at the machine head, in the direction to the workpiece by a steel lamellae, while on the side of the operator's platform, the whole space is protected with a fixed cover and covering bellows in the rear.



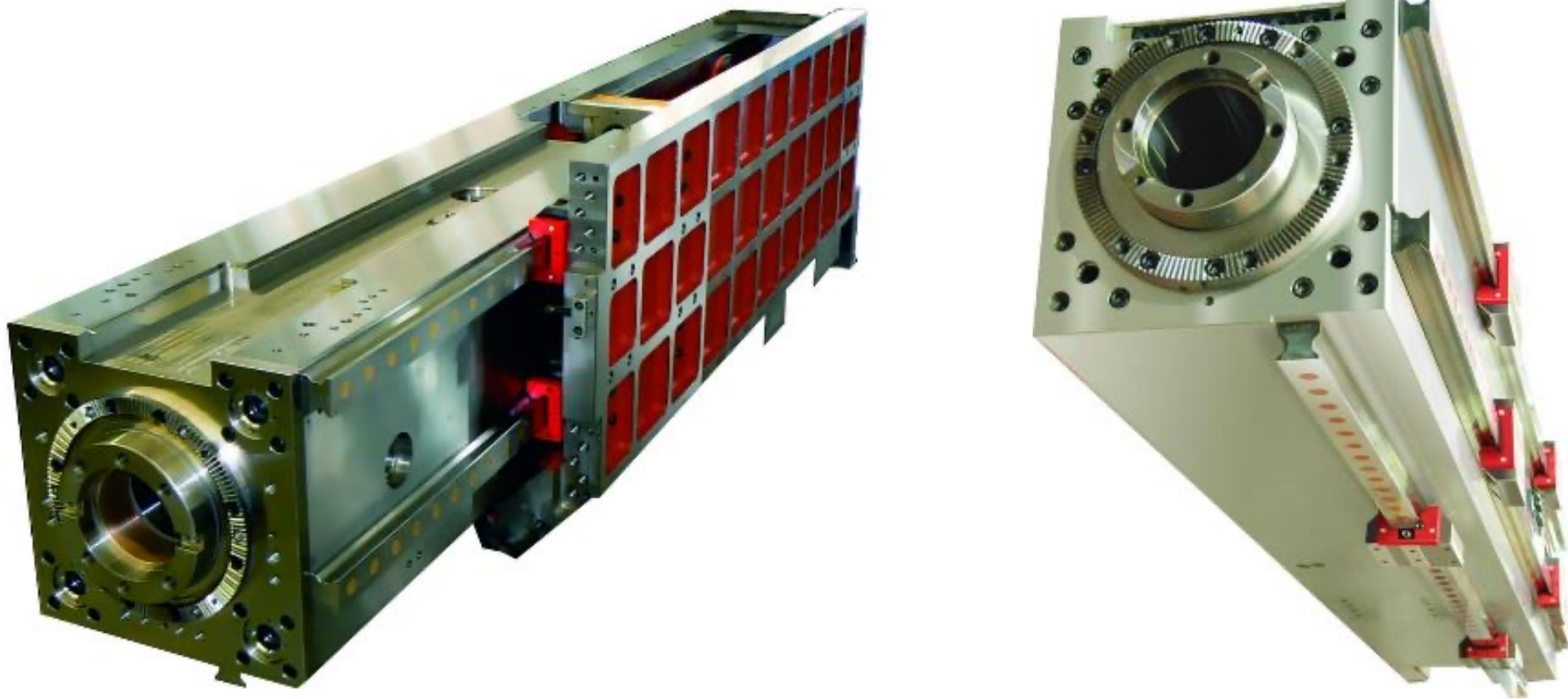
The bed of the machine - X-axis

GUIDING OF MOVABLE GROUPS



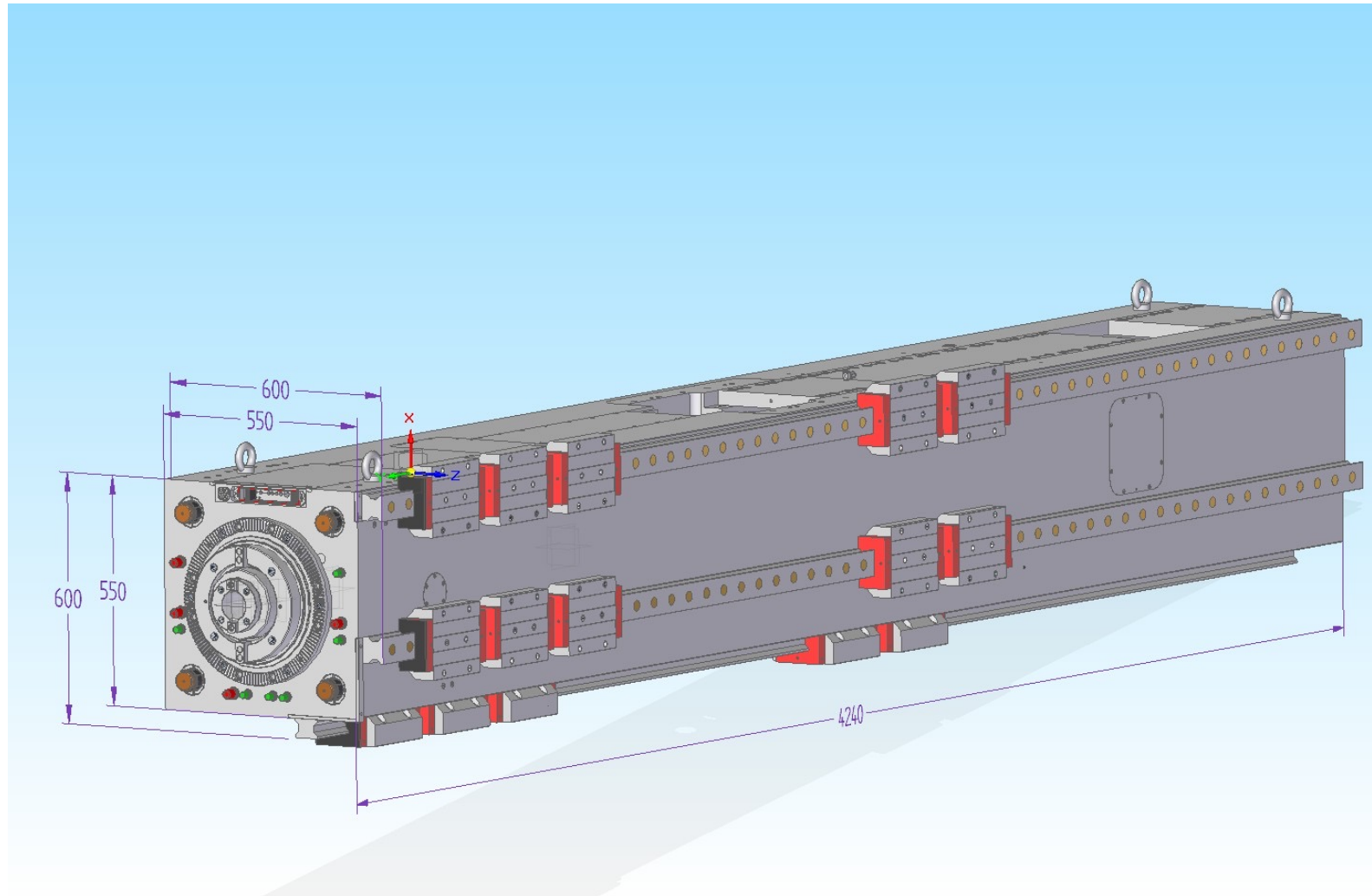
The bed of the machine - X-axis

GUIDING OF MOVABLE GROUPS



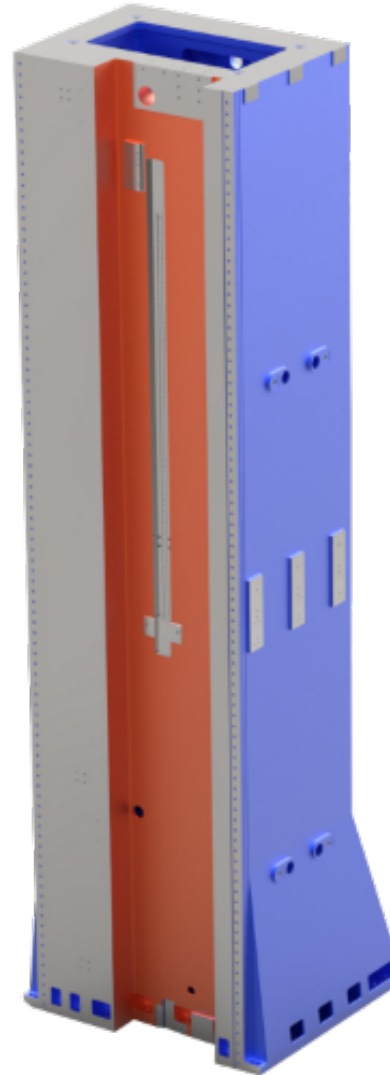
RAM and the machine's spindle - Z-axis and W-axis

GUIDING OF MOVABLE GROUPS



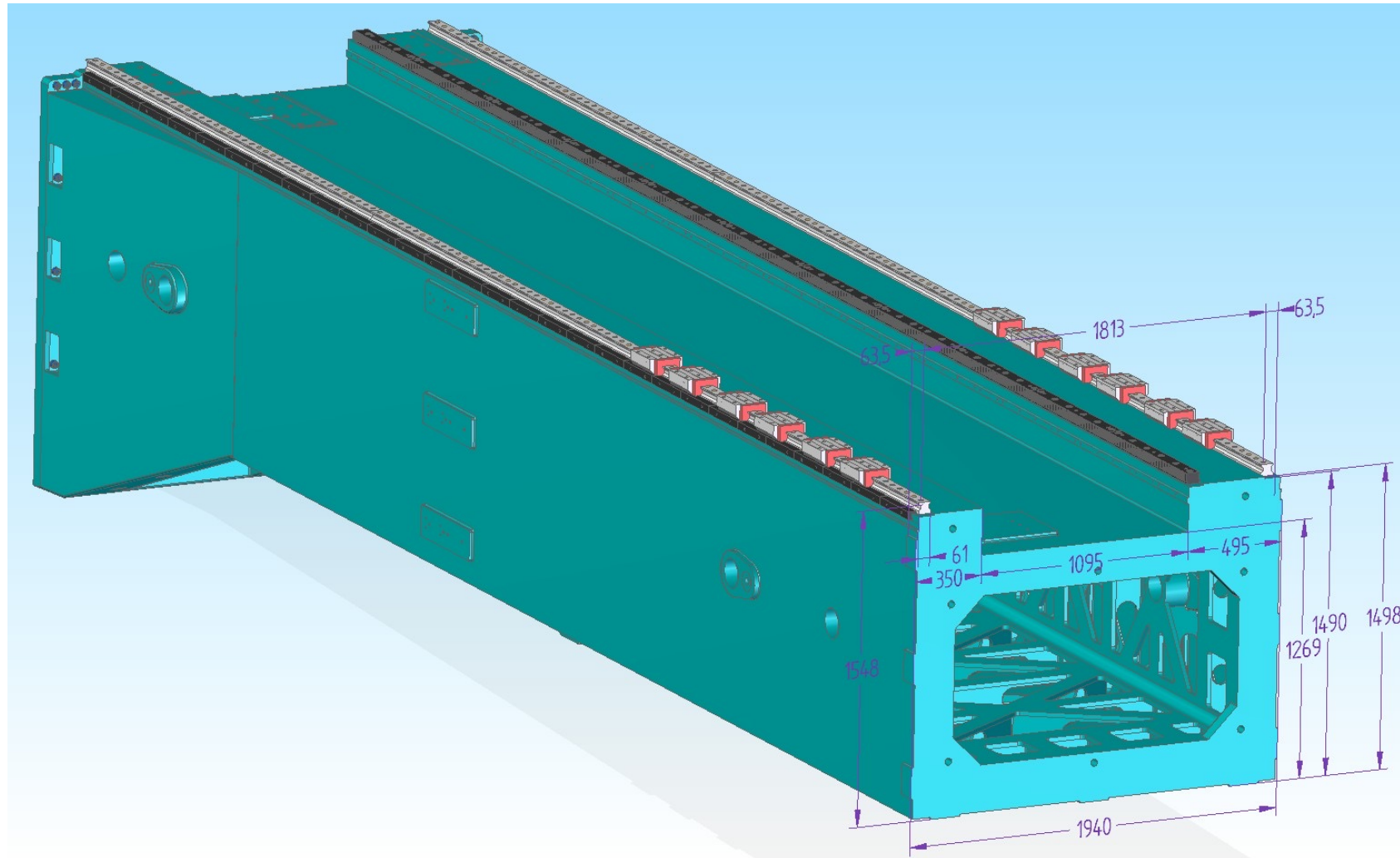
RAM and the machine's spindle - Z-axis and W-axis

GUIDING OF MOVABLE GROUPS



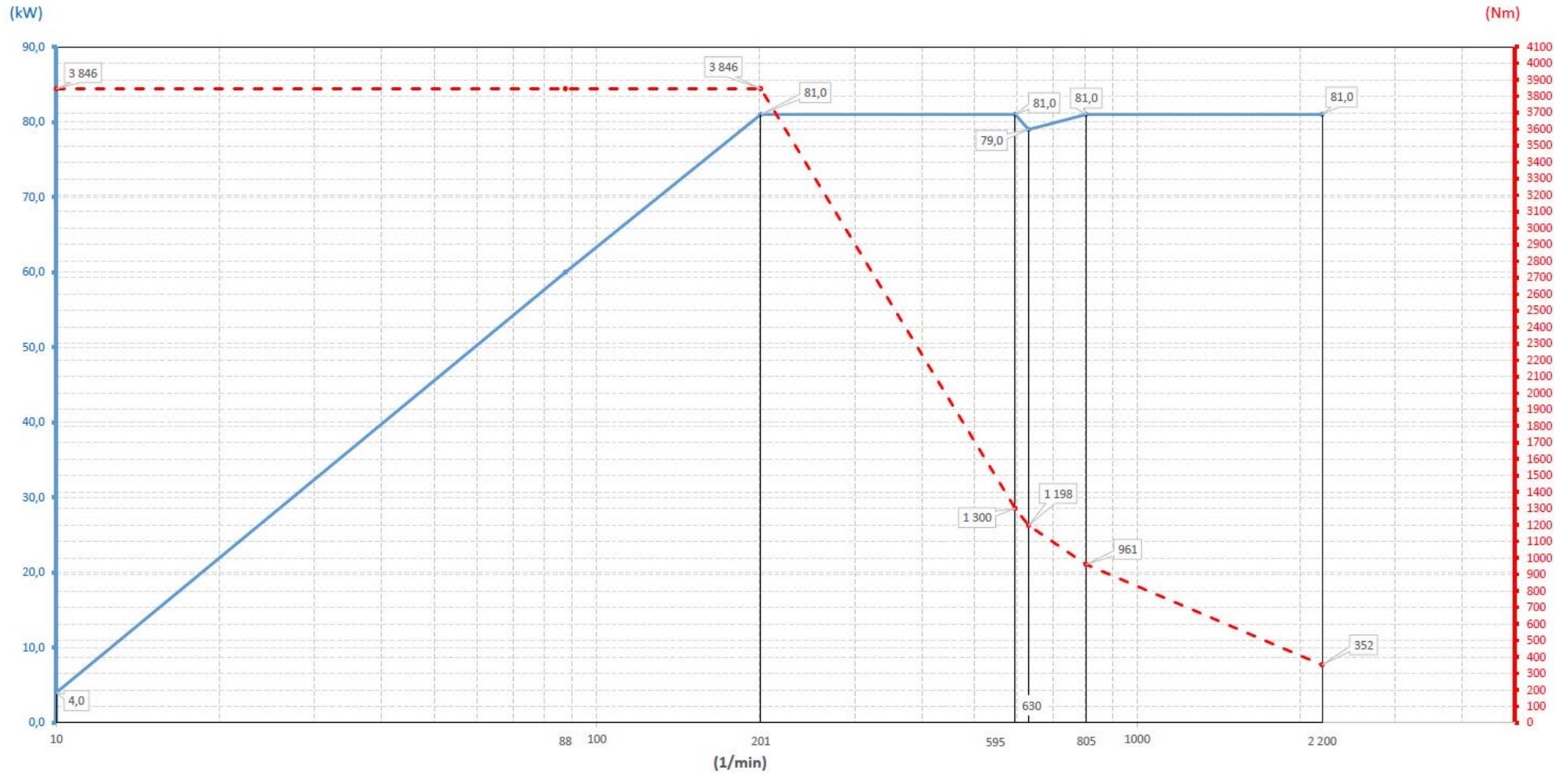
The machine's column Y-axis

GUIDING OF MOVABLE GROUPS



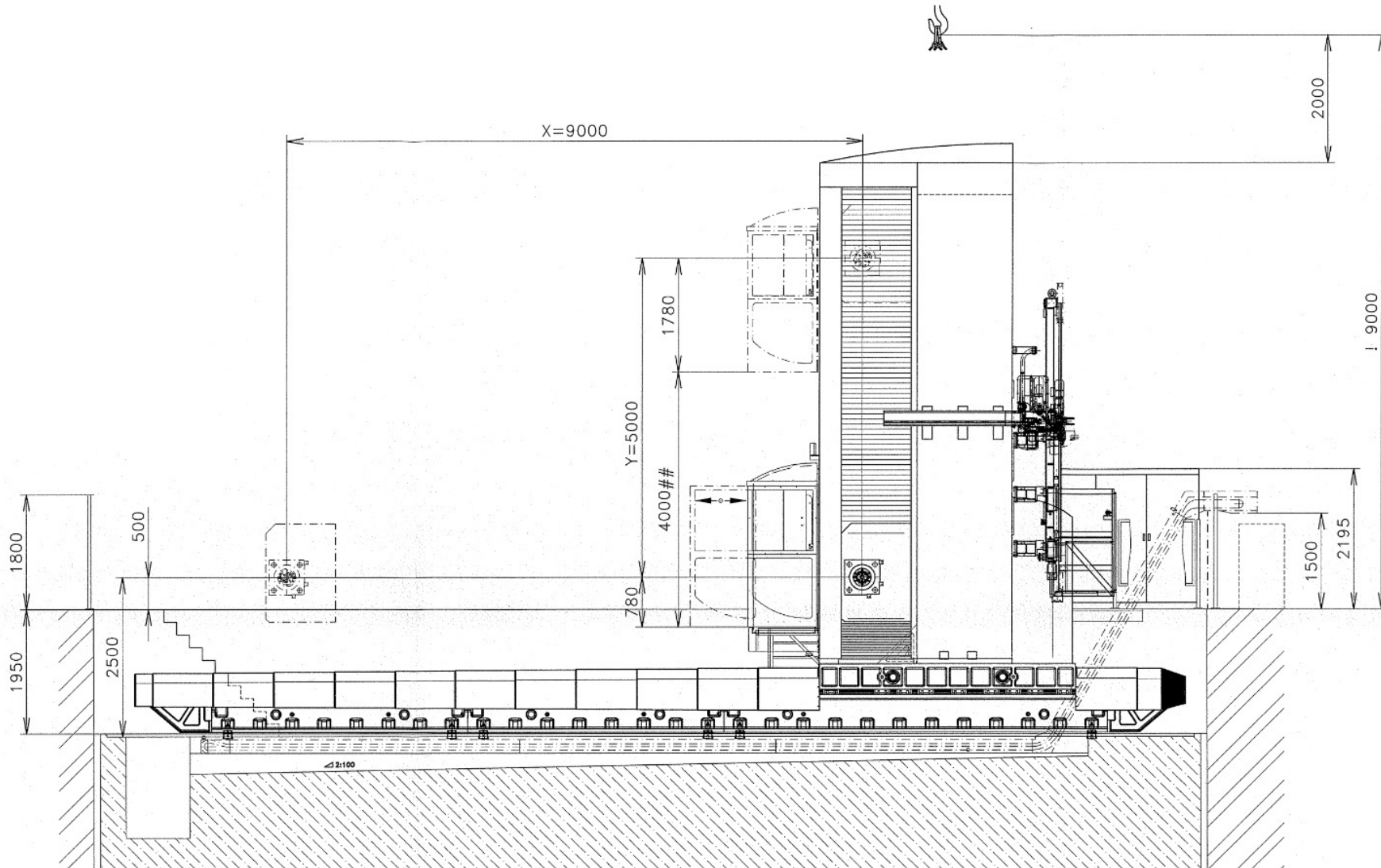
The machine's column Y-axis

PERFORMANCE CHART

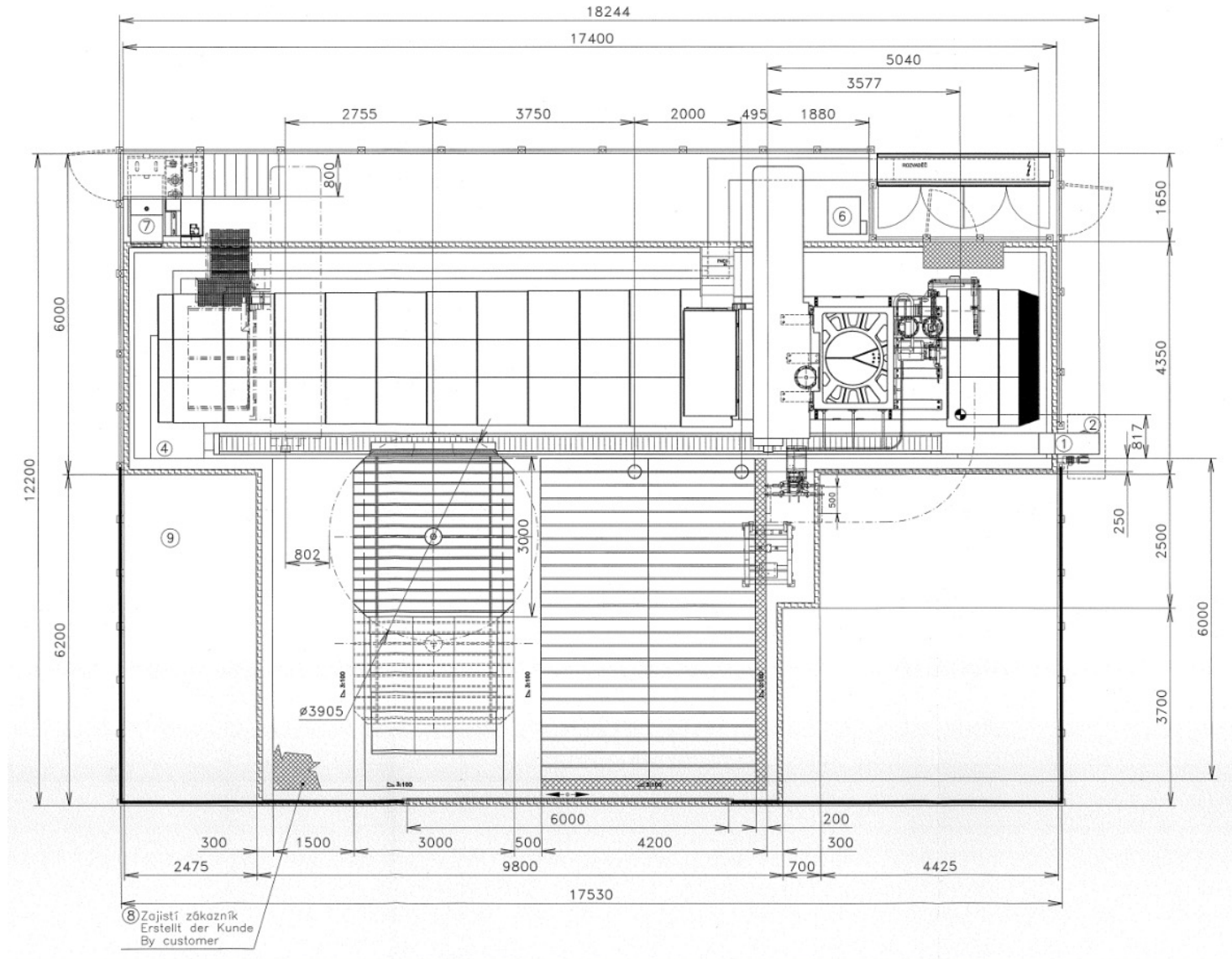


WRD 170 - 81 kW

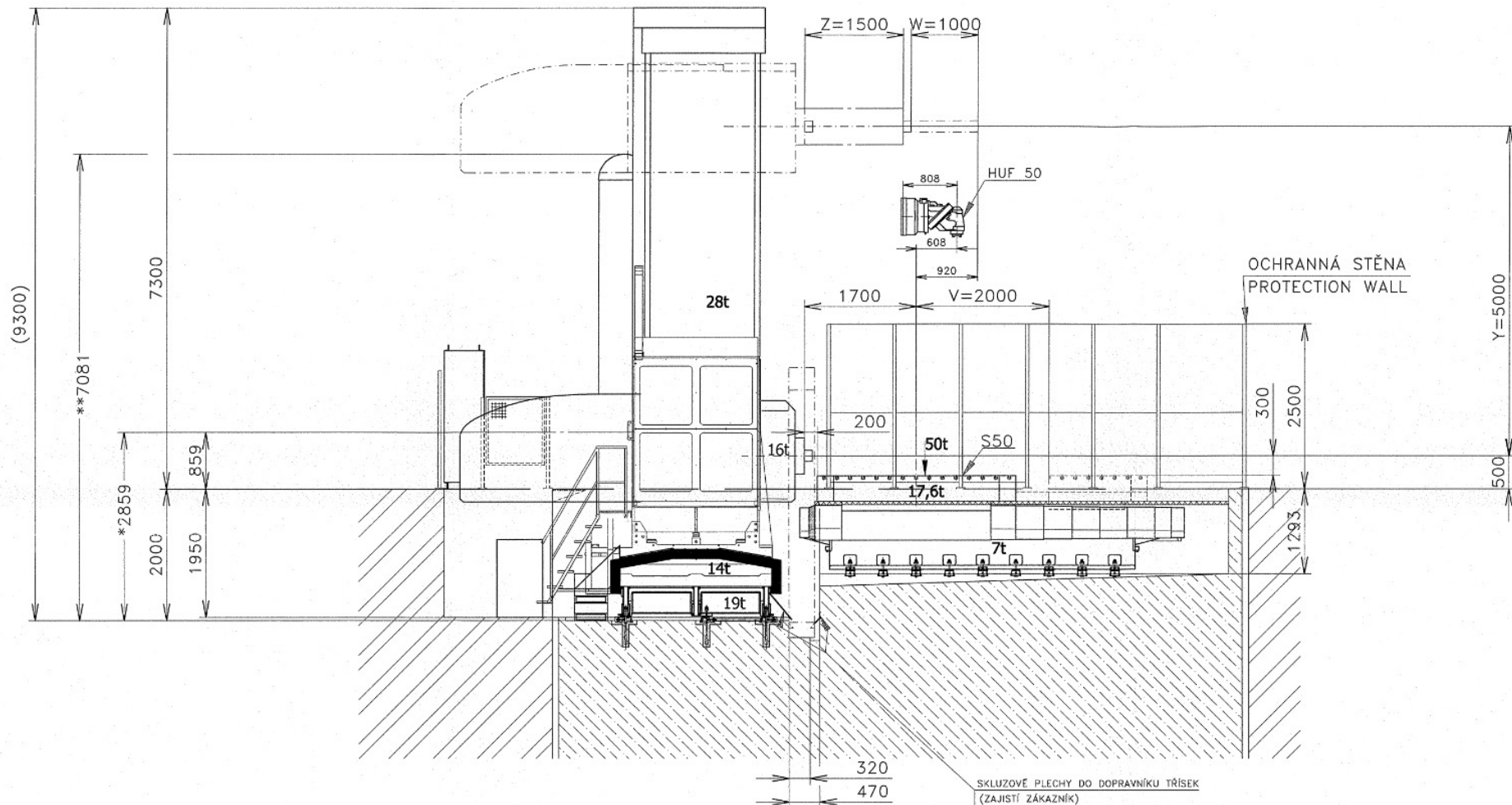
AN EXAMPLE OF A DIMENSIONAL SKETCH



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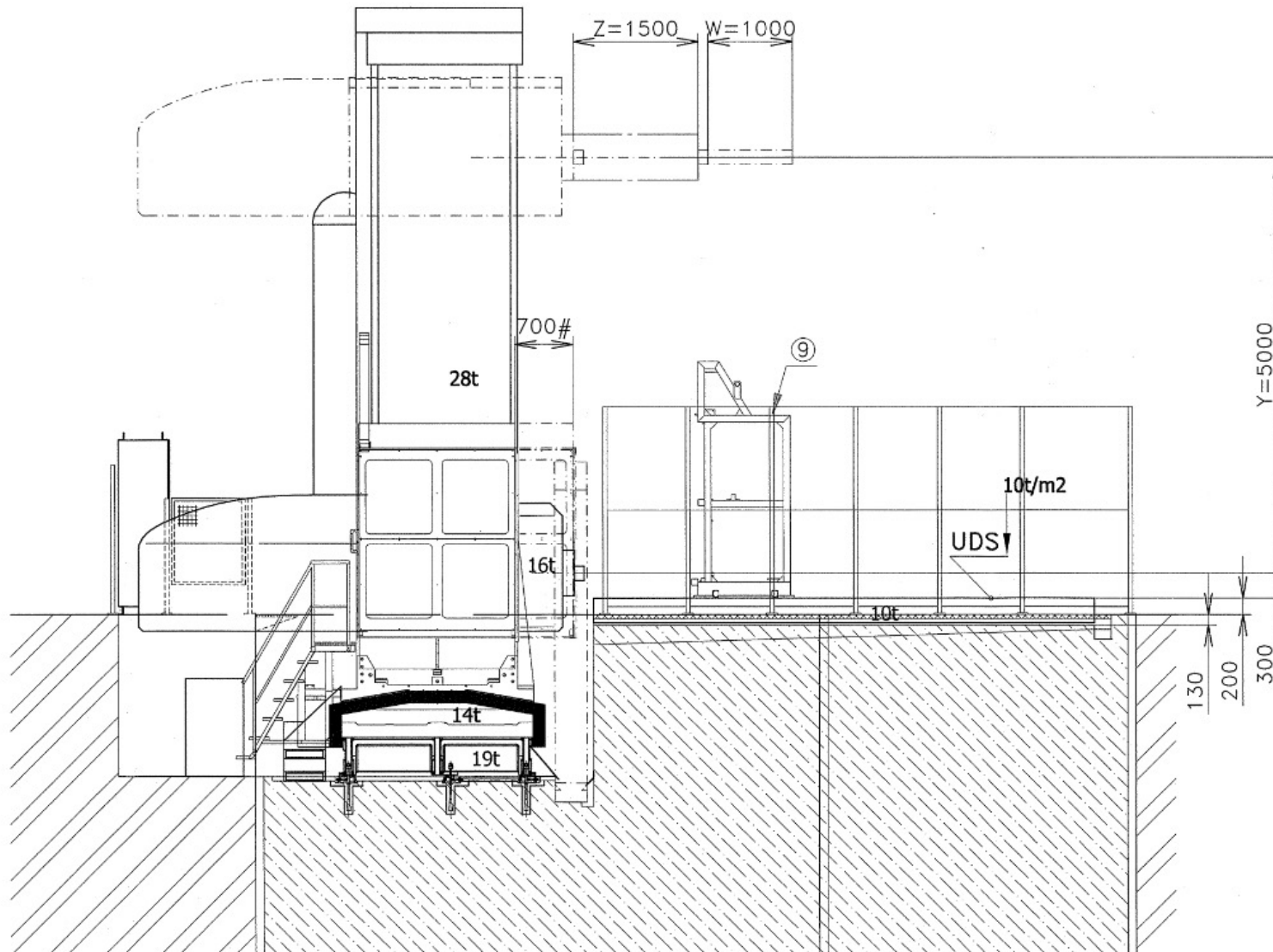


AN EXAMPLE OF A DIMENSIONAL SKETCH



SKLUZOVÉ PLECHY DO DOPRAVNÍKU TRÍSEK
(ZAJISTÍ ZÁKAZNÍK)
ABGLEITBLECHE IN DEN SPÄNEFÖRDERER
(ERSTELLT DER KUNDE)
CHUTE SHEETS INTO CHIP CONVEYOR
(PROVIDED BY CUSTOMER)

AN EXAMPLE OF A DIMENSIONAL SKETCH



BASIC PARAMETERS

Machine type		WRD 170	∅ 160 mm	∅ 200 mm
Spindle diameter	mm	170	160	200
RAM dimensions	mm	550 x 550		
Spindle taper		ISO 50 / ISO 50 BIG+		
Taper standards available		DIN 69871/A (bez chlazení osou vřetena) DIN 69871/AD (chlazení osou vřetena) BT 50 MAS 403-1982 CAT ANSI/ASME B5		
Clamping force	kN	25		
Spindle flange outside diameter	mm	280	280	310
Spindle speed range	1/min	10 – 2 200	10 – 2 200	10 – 1 800
Main motor power, rated (continuous load operation S1)	kW	81		
Main motor power max. (operation S6 - 60% of the load time)	kW	88		
Spindle revs, rated	1/min	201		
Spindle torque, rated (S1)	Nm	3 846		
Spindle torque max. (S6-60%)	Nm	4 800		
RAM stroke Z	mm	1 500		
Spindle stroke W	mm	1 000		

BASIC PARAMETERS

Headstock vertical travel Y	mm	3,000 – 6,000 (modules of 500 mm)
Traverse Column travel X	mm	5,000 – 29,000 (modules of 2,000 mm)

Feed range (working and rapid traverse) – X	mm/min	1 – 16,000
– Y, Z, W	mm/min	1 - 12,000
Max. feed forces in X, Y, Z, W axes	kN	40

Number of pockets in magazine		40, 60, 80, 120*
Pitch of pockets in magazine	mm	130
Tool dia max		
- with fully loaded magazine	mm	125
- with free neighboring places	mm	320
Dia max. of a special flat tool	mm	390 (600)
Tool length max	mm	500
Tool weight max	kg	25 (35**)
Total weight of tools in magazine	kg	1 000
Imbalance of tools in magazine max	kg	150
Tool change time (tool – tool)	sec	20

* The device is mounted on a concrete base on the edge X coordinate.

** Option

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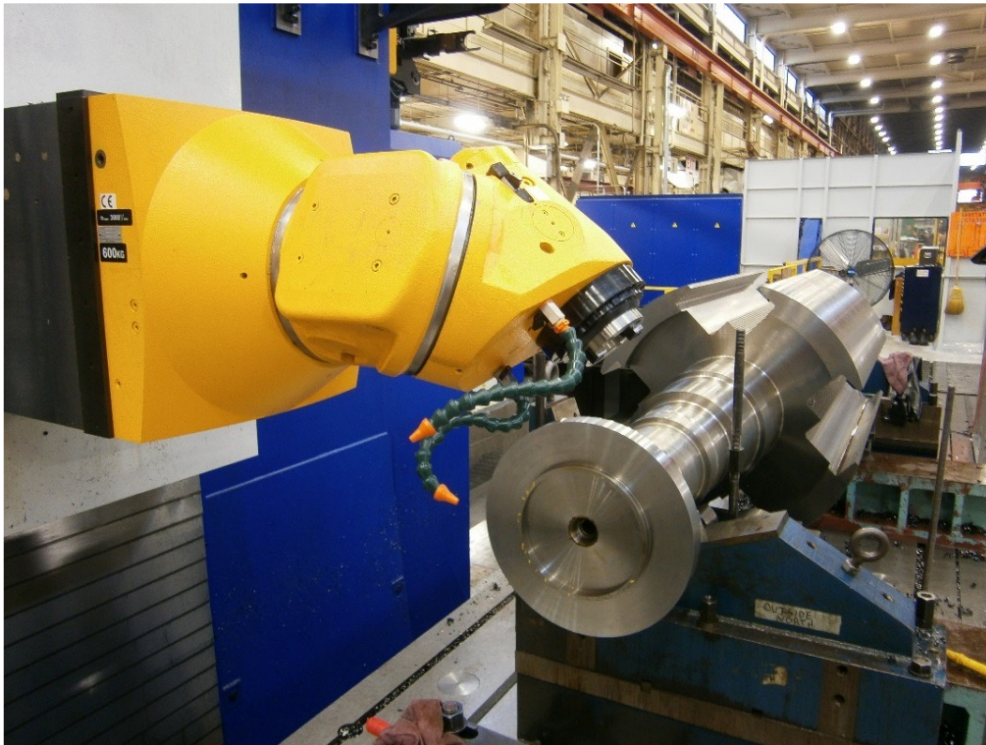
TECHNOLOGICAL DEMONSTRATIONS



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TECHNOLOGICAL DEMONSTRATIONS



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