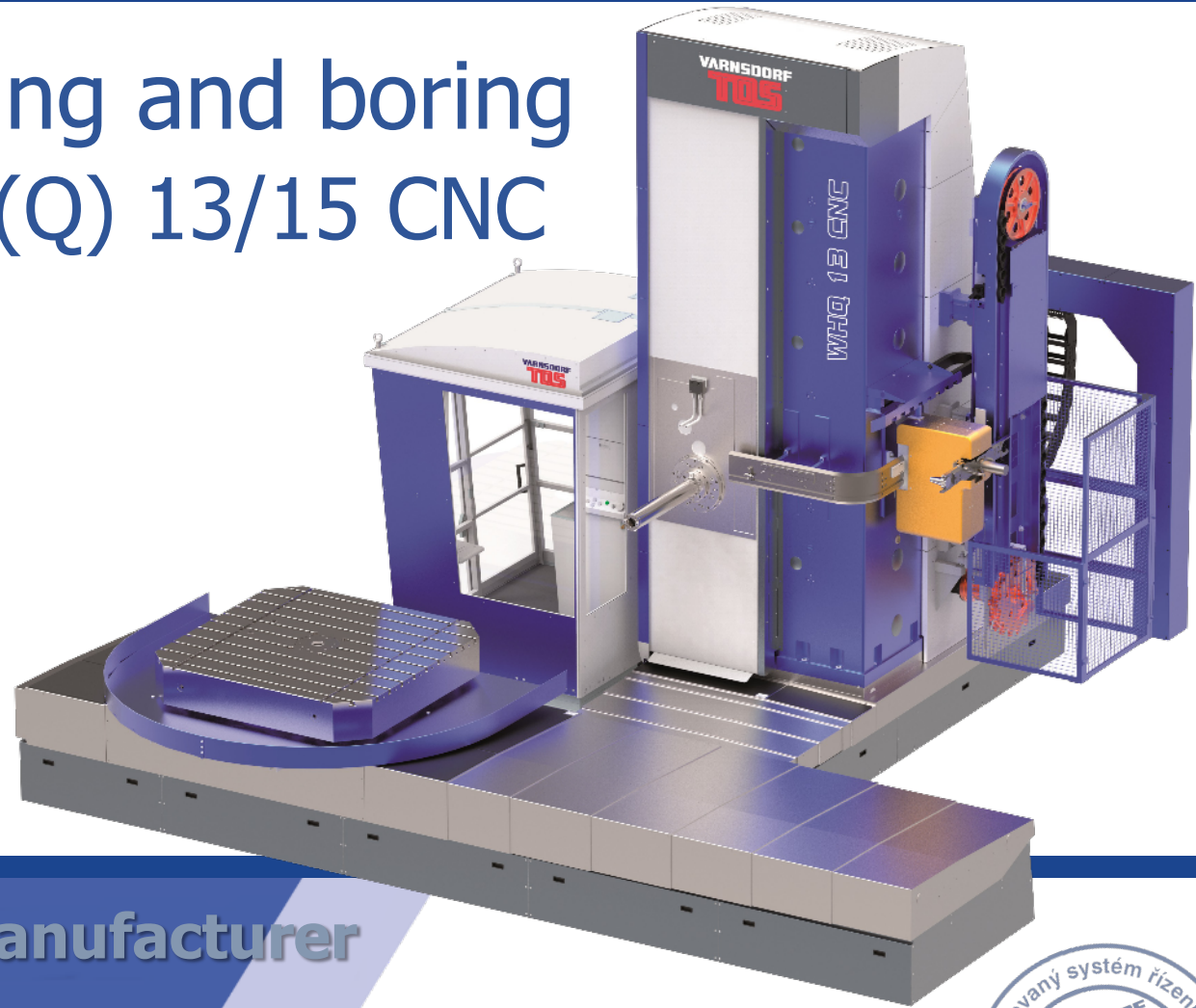


# Horizontal milling and boring machine WHN(Q) 13/15 CNC



**Milling machine manufacturer**

**TOS VARNSDORF a.s.**



# BASIC CHARACTERISTIC

## Basic characteristic:

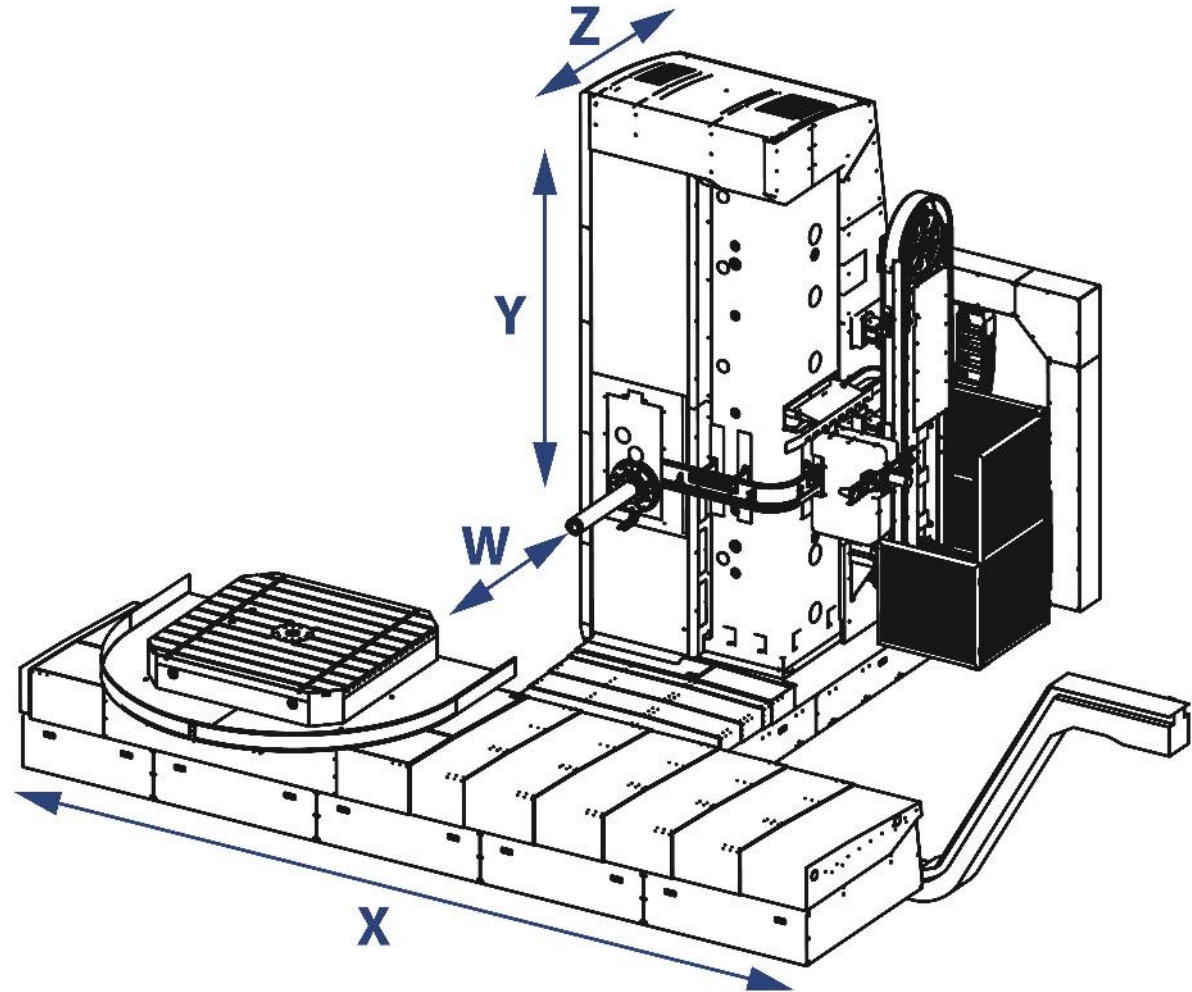
WHN(Q) 13/15 CNC table type, cross bed, live spindle horizontal boring mill is the biggest type representative of the original line of the CNC horizontal borers of TOS VARNSDORF a.s. For the current, technically advanced design, the machine has undergone a long-term process of development. Its well appreciated feature is the rigid, almost robust frame design, long-term accuracy and extensive working space. The machine design is based on optimally selected technical-design elements of extended lifetime and CNC controlling and driving technology always kept up-to-date. This resulted in a technically modern machine tool with an advantageous and user-attractive price-to-utility value ratio based on the machine relatively low cost demand. The machine is intended for a universal metal-cutting work (boring and boring-out operation, milling operations and thread cutting) of non-rotating large work-pieces made of cast-iron, steel and cast steel. A wide selection of dimensional and functional options as well as a generous range of process accessories enables to offer to the customer an optimum machine assembly meeting the relevant process requirements.



# BASIC CONCEPTION

## Basic conception:

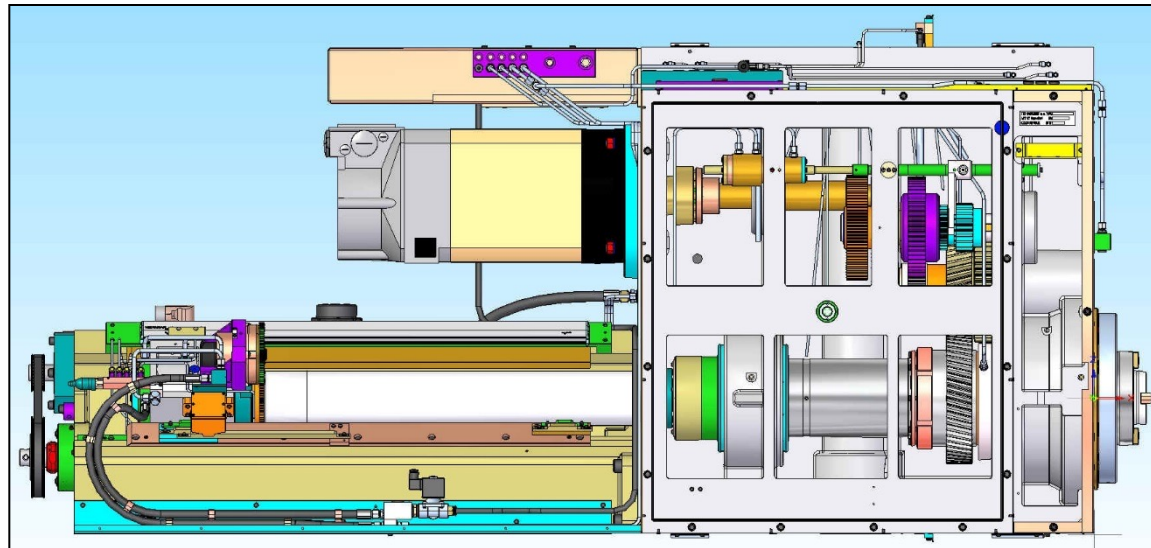
WHN(Q) 13/15 CNC horizontal boring mill is milling and boring machine tool with bed arrangement into shape T with transversally movable rotary table and longitudinal movable column. The machine has got 5 controlled axes. Linear axes (**X** - cross travel of the table, **Y** - vertical travel of the headstock, **Z** - longitudinal travel of the column, **W** - spindle travel) are full controlled. **B** axis (rotary table) is possible to choose as positioning or continuously controlled



# HEADSTOCK

## Headstock:

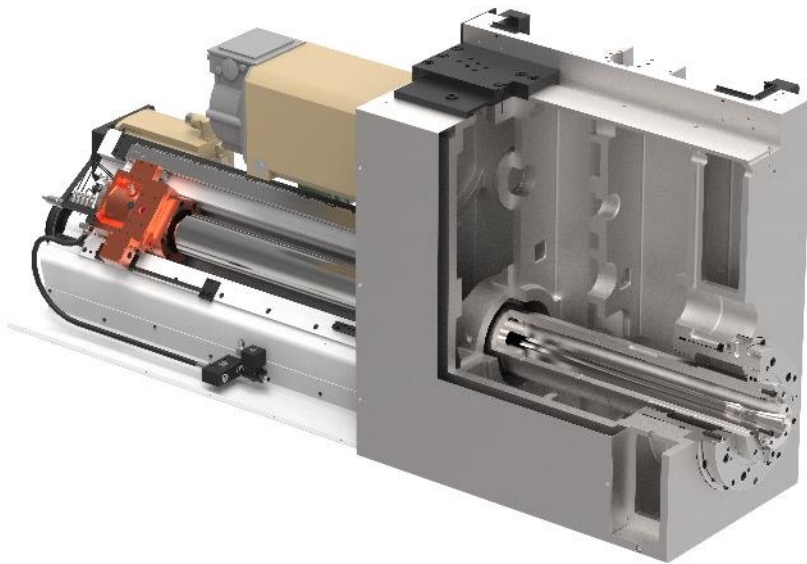
The headstock contains all the spindle bearings and the spindle driving mechanism as well as the ones for the longitudinal travel of the live spindle (W-axis). The main housing of spindle heads consists of an assembly of hollow and work spindles. The hollow spindle (quill) is housed in precision spindle oblique-contact ball bearings in a multiple pre-stressed design. The spindle speed is controlled in two mechanical series automatically sequenced by a hydraulic circuit. The work spindle is nitrided, hardened and mounted to slide with a minimum clearance in the hollow spindle.





# HEADSTOCK

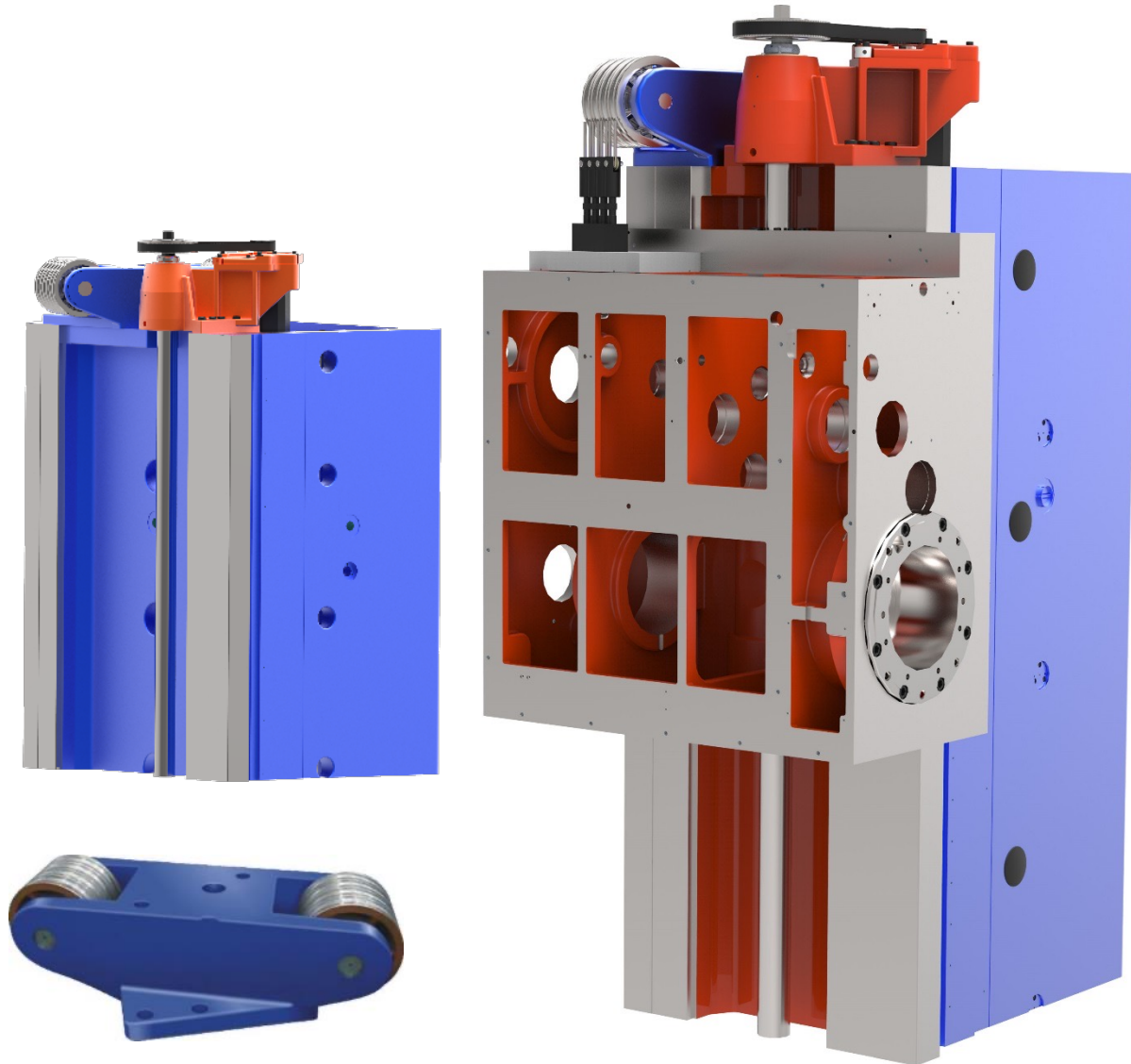
Headstock of WHN(Q) 13/15 CNC machine



# BALANCE AND DRIVE OF AXIS Y

## **Balance and drive of axis Y:**

The linear axis Y drives is designed through independent AC-digital servo-drives and cogged-belt transmissions to ball bolts with pre-stressed nuts. After reaching that target positions the Y linear axis is kept live in a closed positional feedback. The headstock weight is balanced with a counter-balance suspended on ropes and guided in the machine frame.

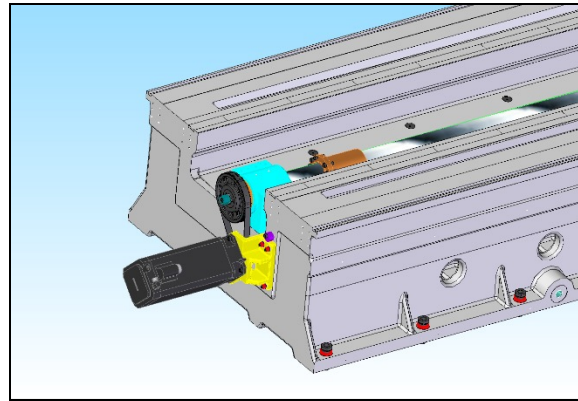


# FEED DRIVES AND CLAMPING

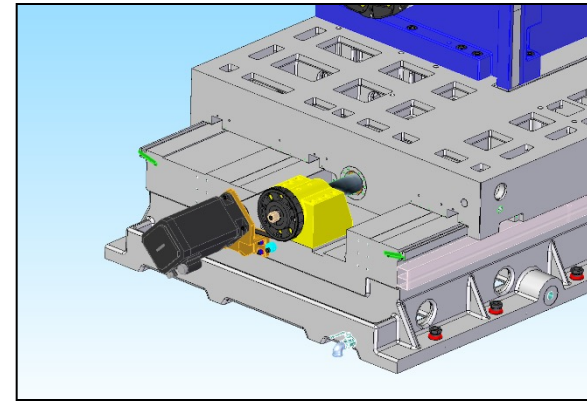
## Feed drives and clamping:

The linear axes drives are designed through independent AC-digital servo drives and cogged-belt transmissions to ball bolts with pre-stressed nuts. If the axis  $x = 6000$  drive is executed by AC-digital servo drives and transfers by pinion to sprockets rack (system master slave).

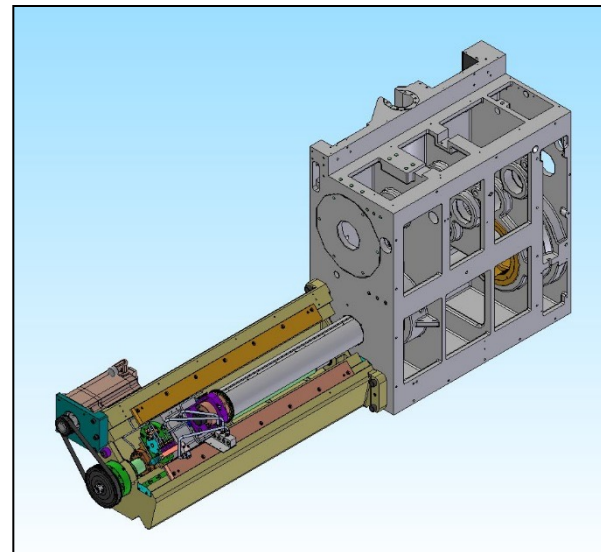
The drive of the table positioning is provided by a pair of mechanically pre-stressed pinions engaging in a ring with external teeth. When the table is in position, the axis is automatically hydraulically reinforced.



Axis X



Axis Z



Axis W

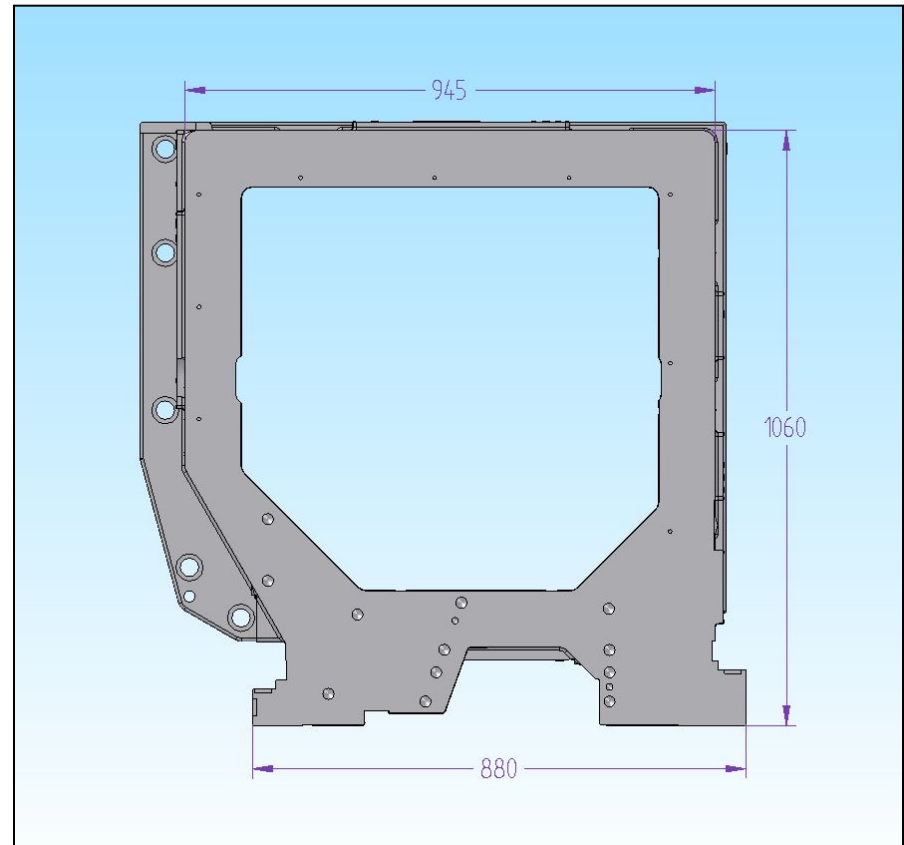
# GUIDEWAYS OF MOVABLE GROUPS

## Guideways of movable groups:

Guides of working spindle W (spindle is nitrided) is sliding with minimum backlash in the hollow spindle.

Guides of all linear axes X, Y, Z assemblies are mounted to slide. The main guideways are laser-hardened. Hardened steel rails on guideways are placed under the bearings and on the other stressed places. The counter-surfaces are provided with artificial sliding low-friction materials.

The table is laid on external circular sliding housing and – near the centre – on a circular antifriction bearing. At their beds, the guides are protected against dirt with retractable covers, while the machine frame guiding surfaces are protected with bellows covered with steel slats.



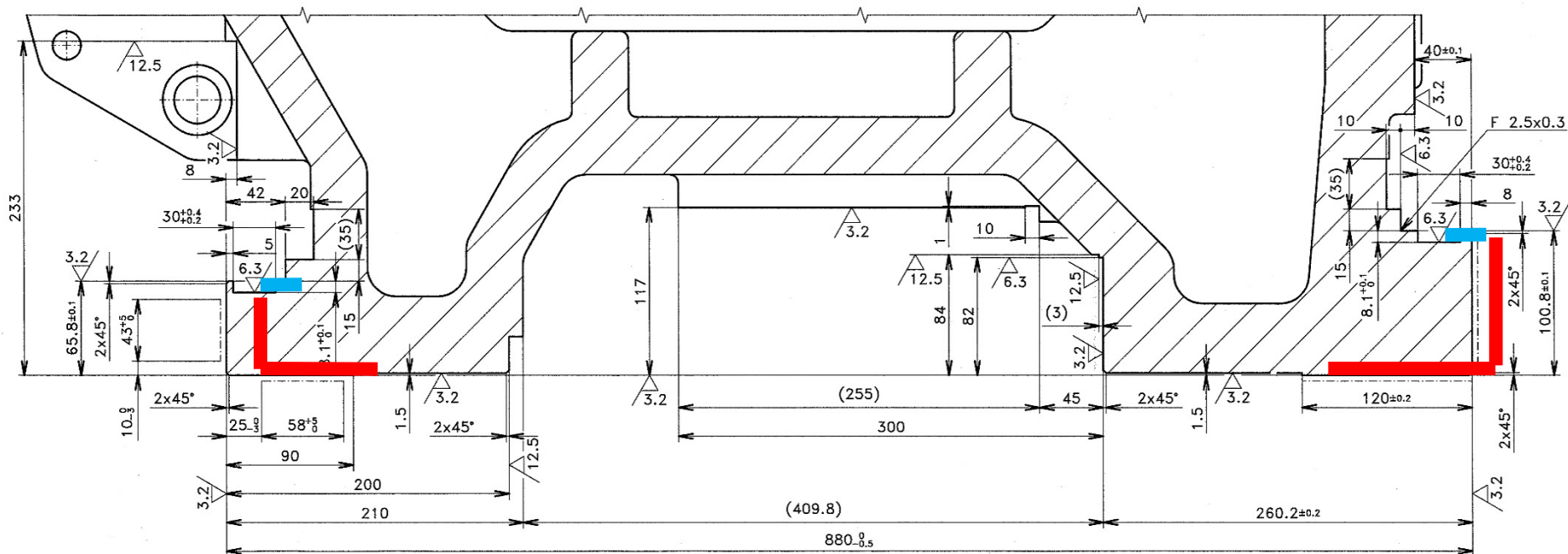
Column (axis Y) WHN(Q) 13/15 CNC



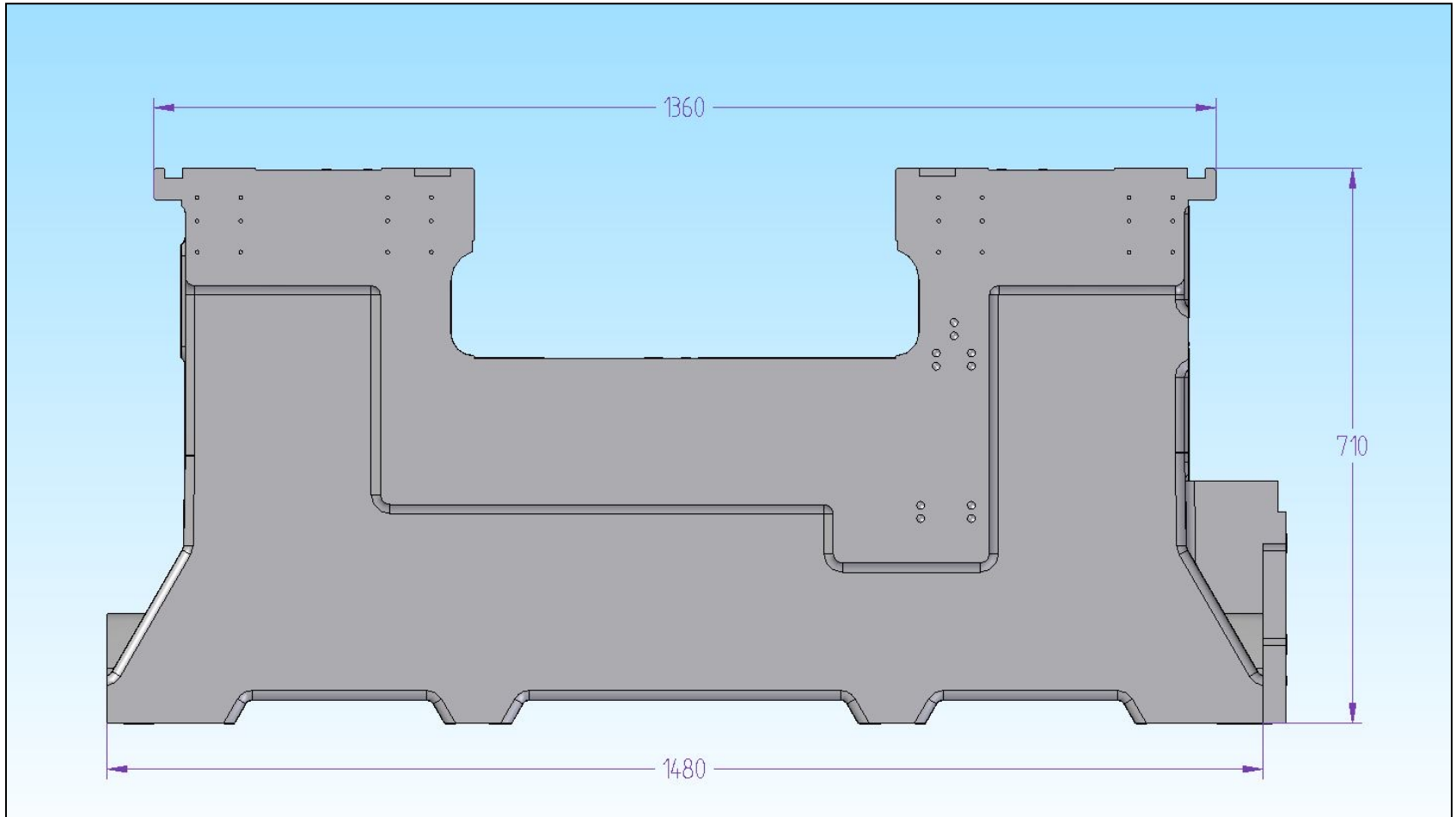
# GUIDEWAYS OF MOVABLE GROUPS

Column (axis Y) WHN(Q) 13/15

- Hardened steel rails
- Laser-hardened surface



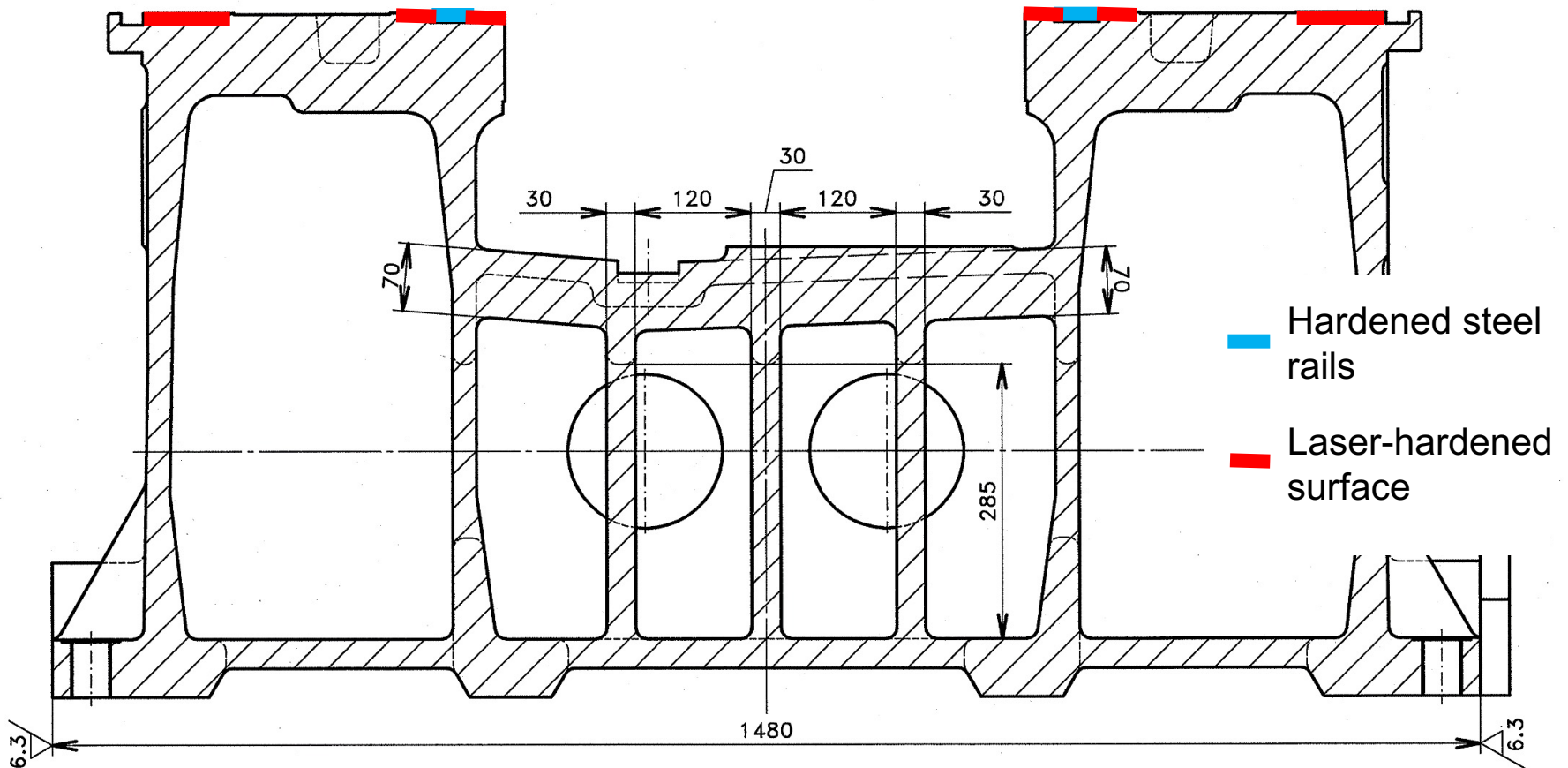
# GUIDEWAYS OF MOVABLE GROUPS



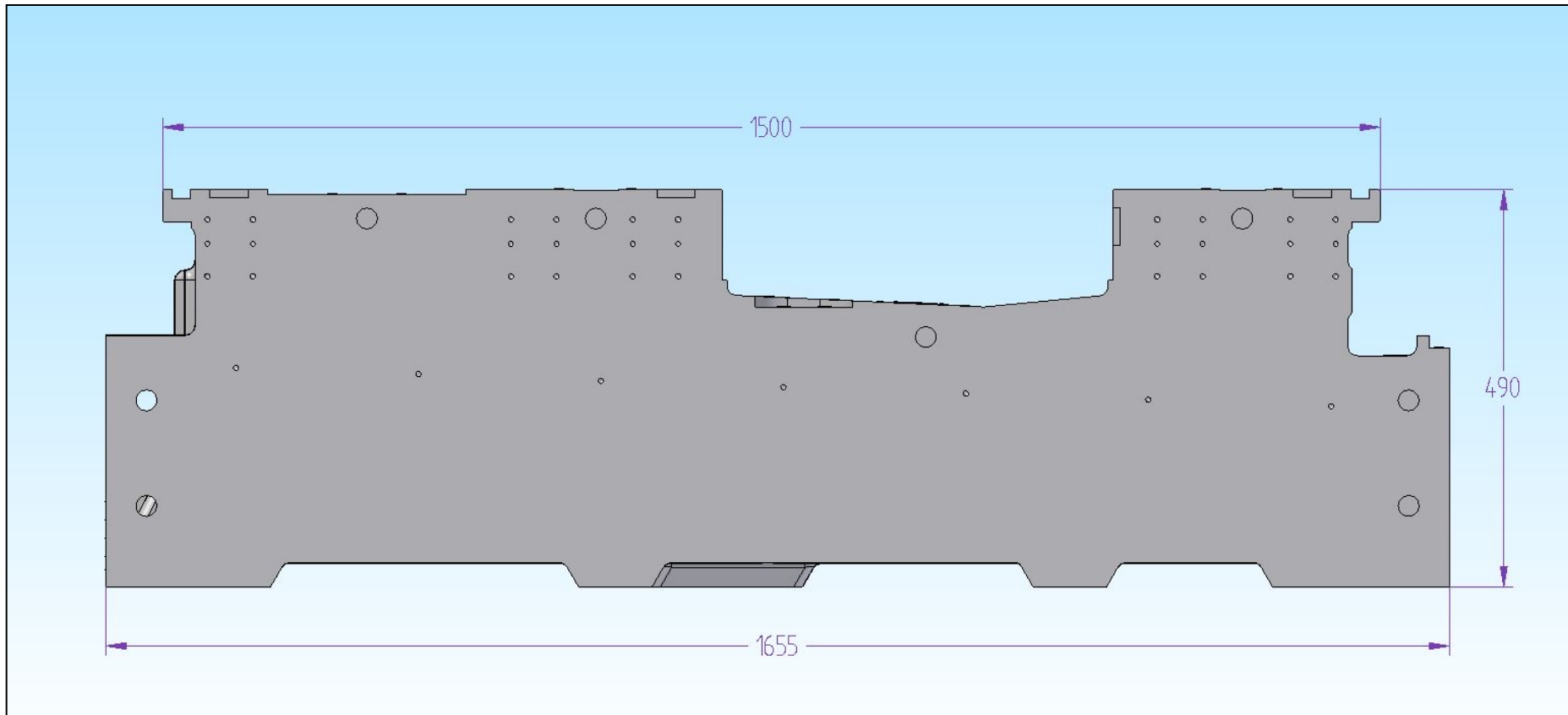
Asix X of WHN(Q) 13 CNC

# GUIDEWAYS OF MOVABLE GROUPS

asix X of WHN(Q) 13/15 CNC



# GUIDEWAYS OF MOVABLE GROUPS

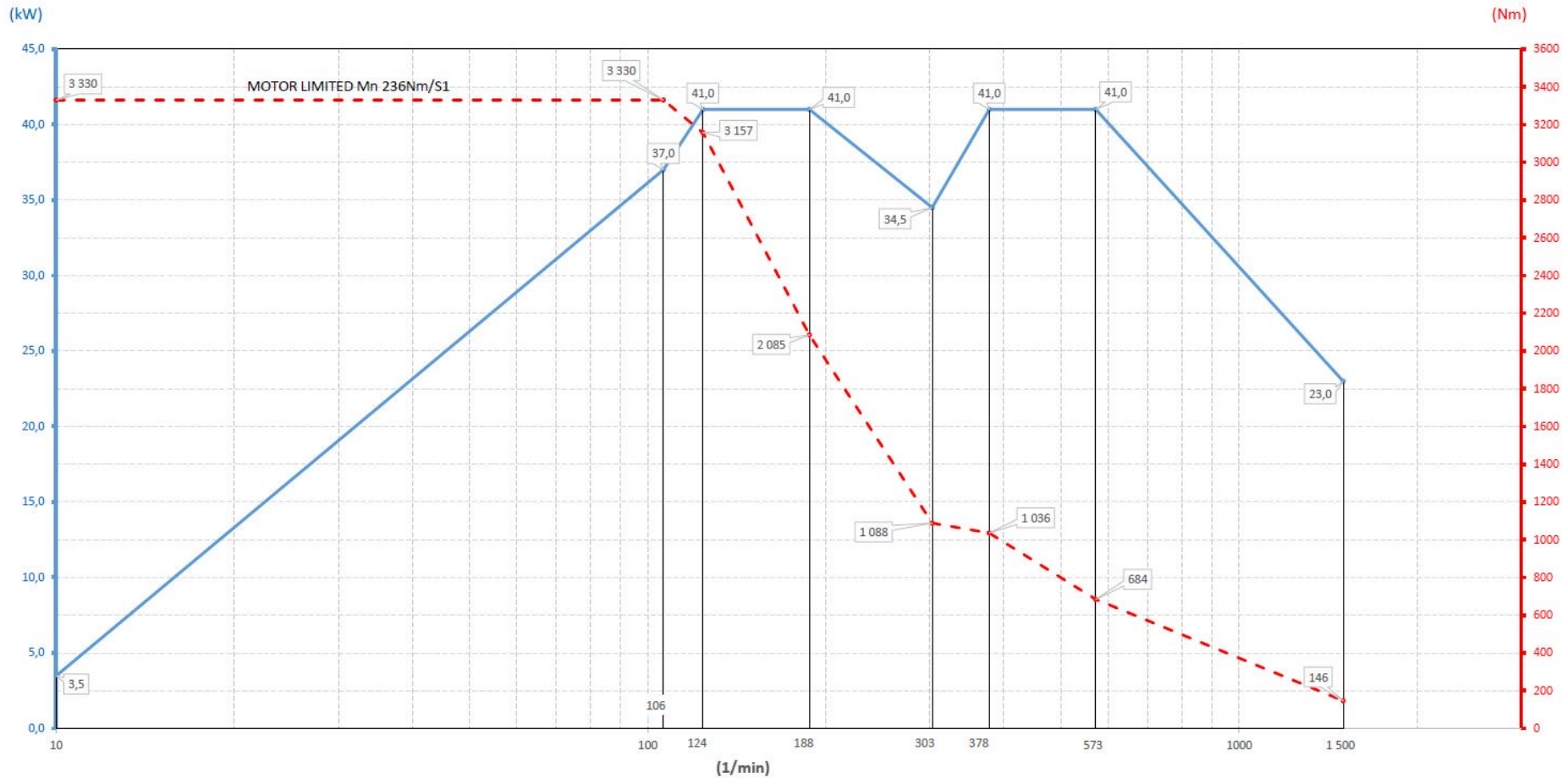


Axis Z WHN(Q) 13/15 CNC

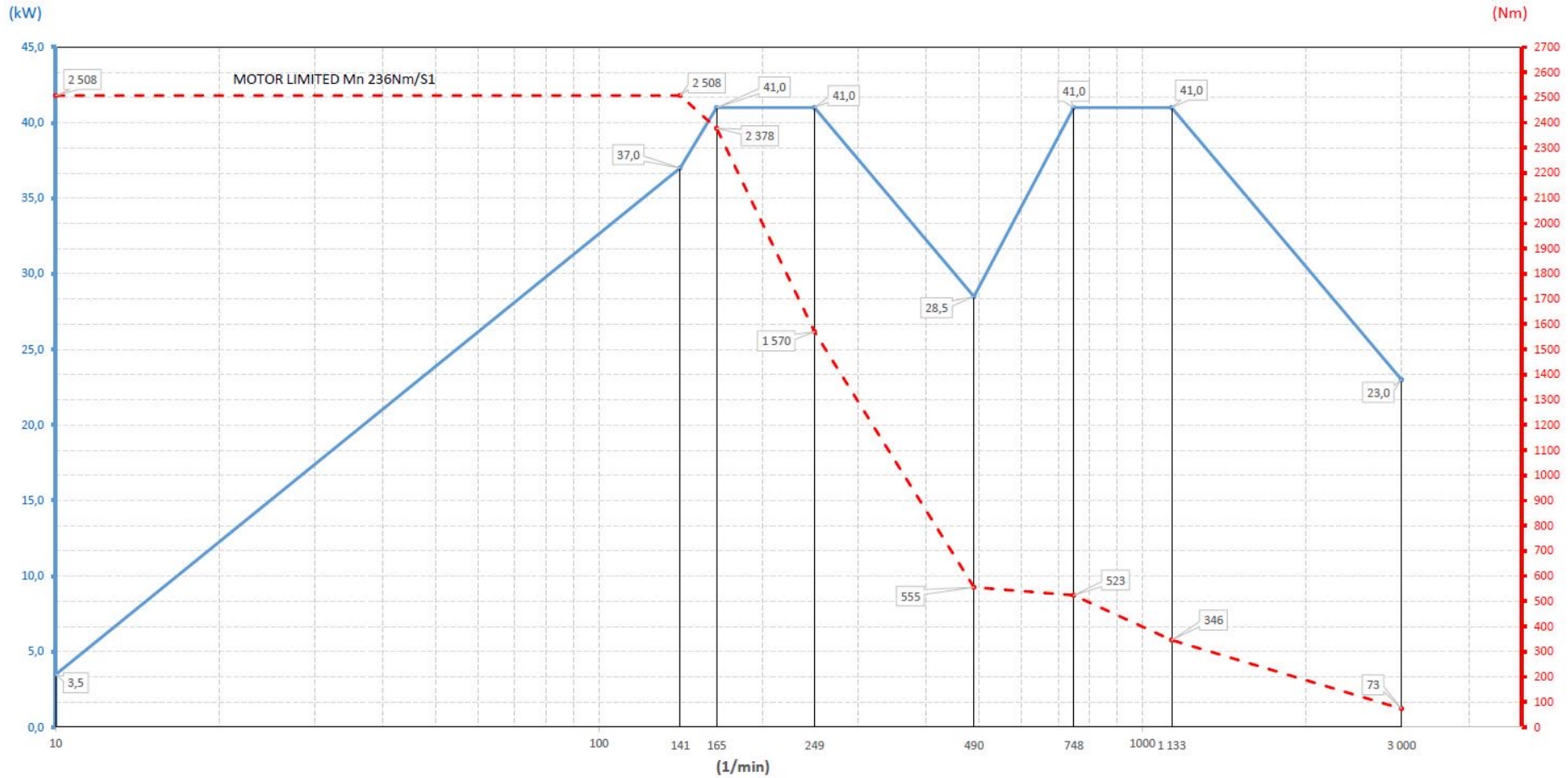




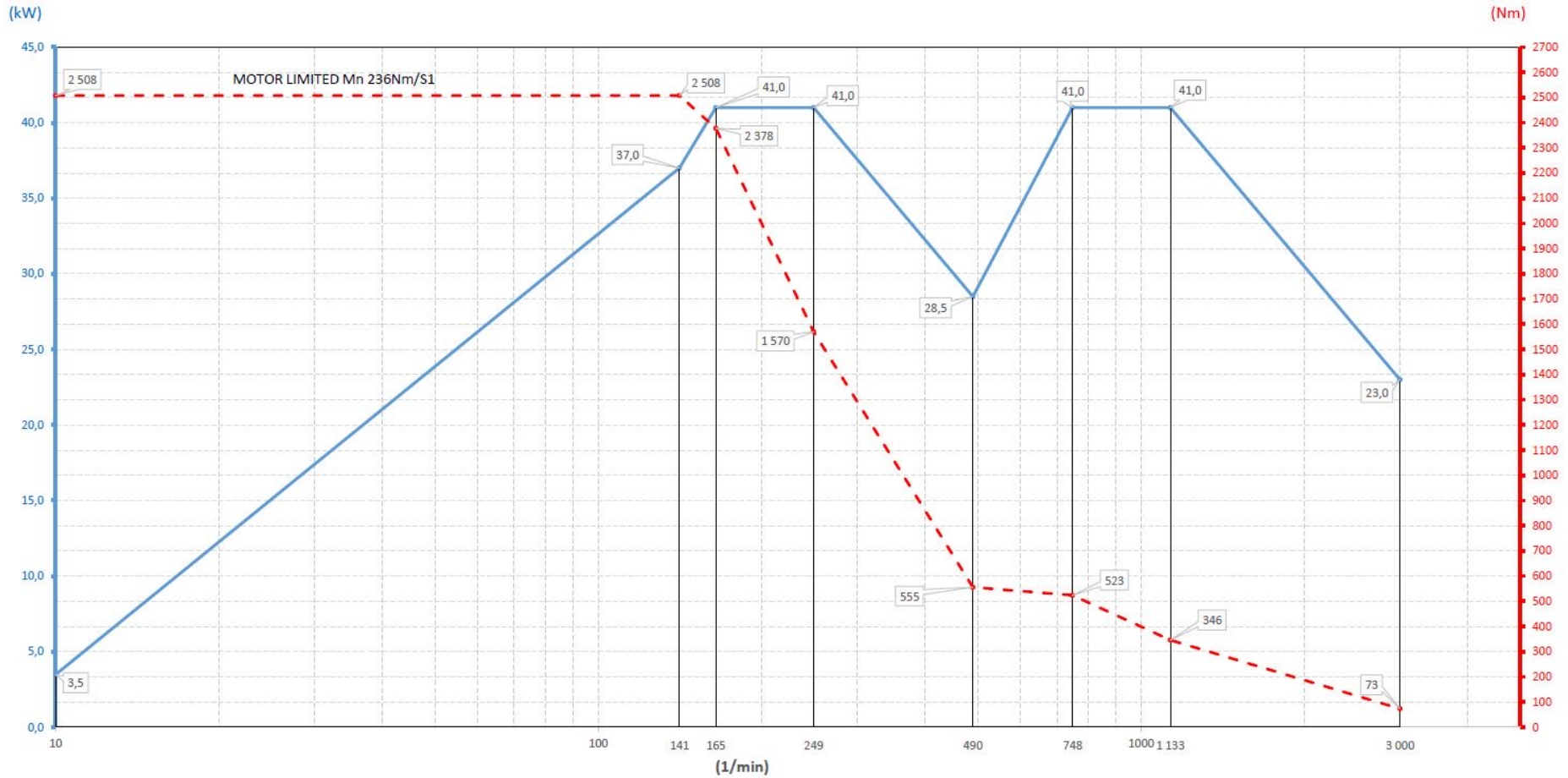
# CURCUIT DIAGRAM – HEADSTOCK 13 N



# CURCUIT DIAGRAM – HEADSTOCK 13 R

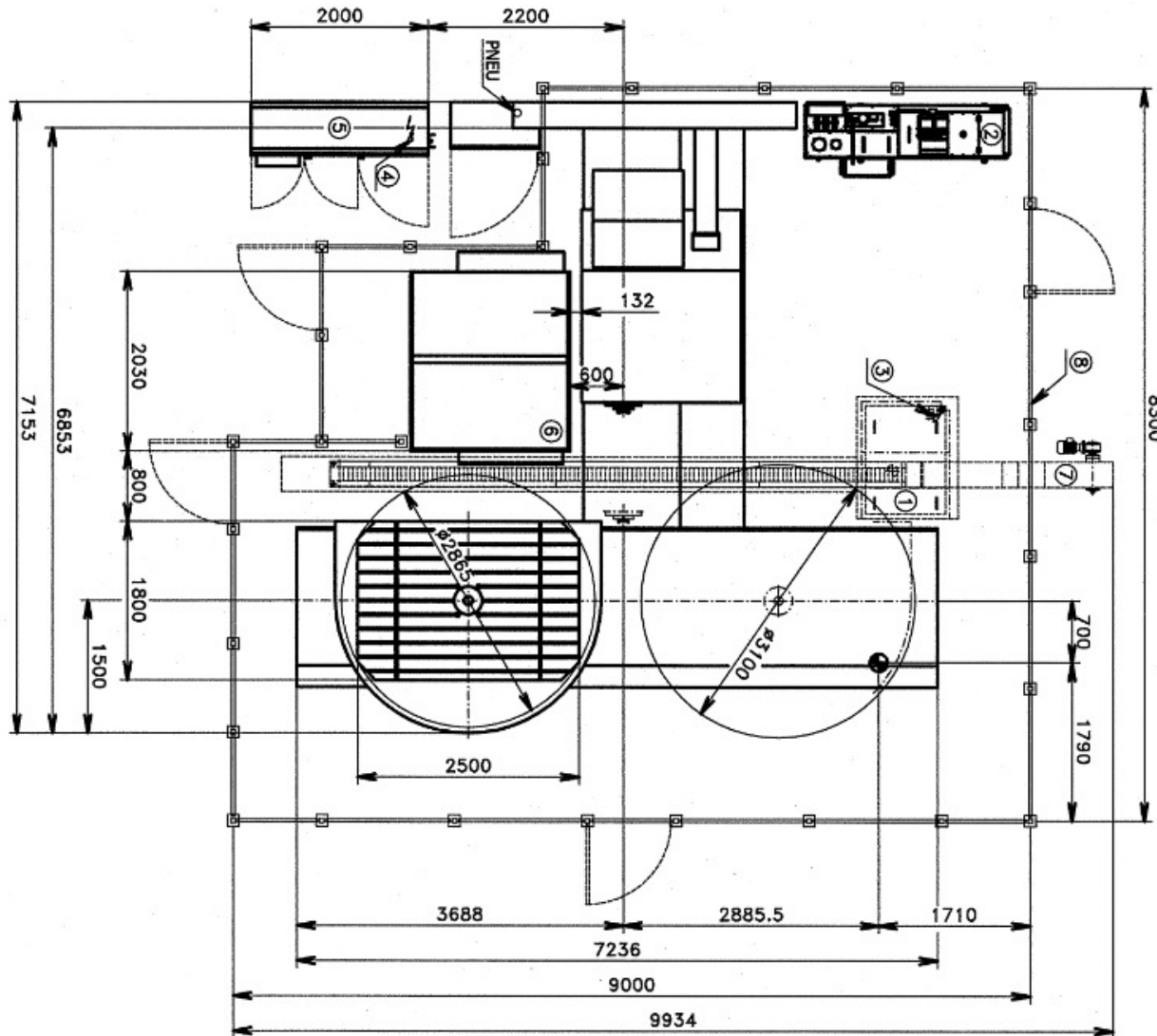


# CURCUIT DIAGRAM – HEADSTOCK 15

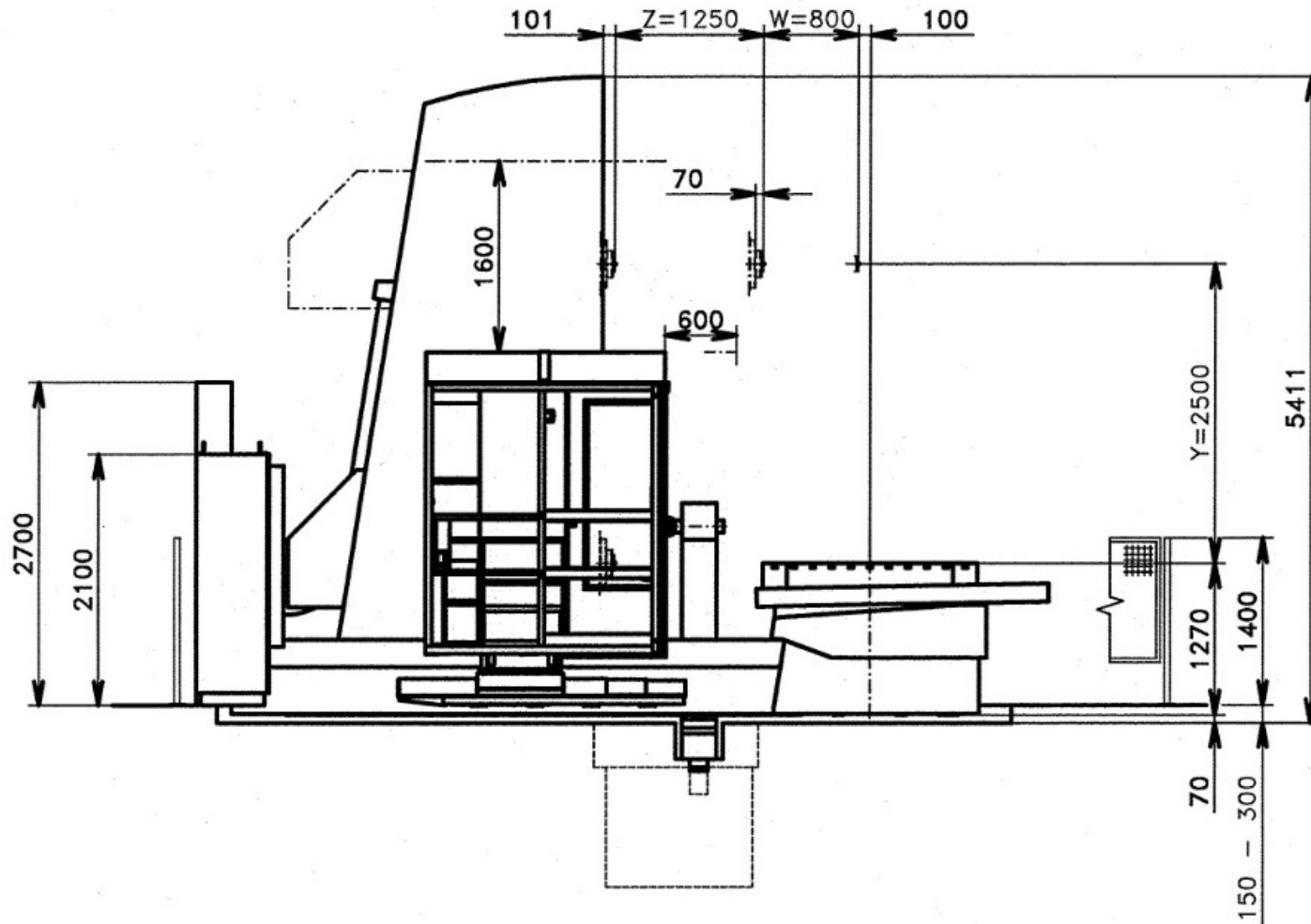




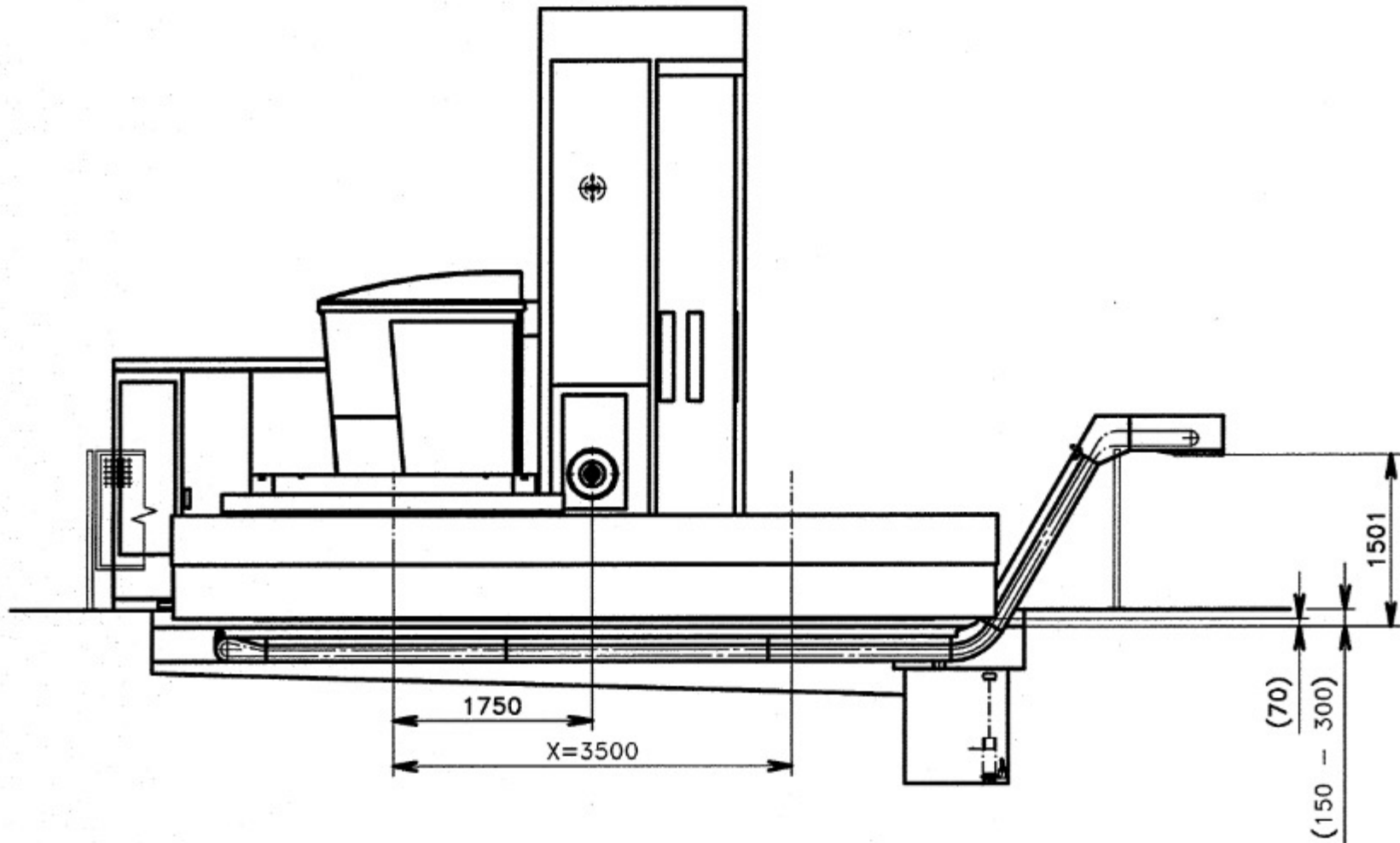
# EXAMPLE OF A DIMENSIONAL SKETCH



# EXAMPLE OF A DIMENSIONAL SKETCH



# EXAMPLE OF A DIMENSIONAL SKETCH



# BASIC PARAMETERS

<b>Headstock type</b>		<b>„R“</b>	<b>„N“</b>
Spindle diameter	mm	130	130
Spindle taper		ISO 50 / ISO 50 BIG+	
Taper standards available		DIN 69871/A (without tool cooling kit) DIN 69871/AD (with tool cooling kit) BT 50 MAS 403-1982 CAT ANSI/ASME B5	
Spindle speed range	R.P.M.	10 – 3 000	10 – 1 500
Main motor power, rated (continuous load operation S1)	kW	41	41
Main motor power max. (operation S6 - 60% of the load time)	kW	46	46
Spindle revs, rated	R.P.M.	165	124
Spindle torque, rated (S1)	Nm	2 508	3 330
Spindle torque max. (S6-60%)	Nm	3 111	4 132
Spindle stroke <b>W</b>	mm	800	



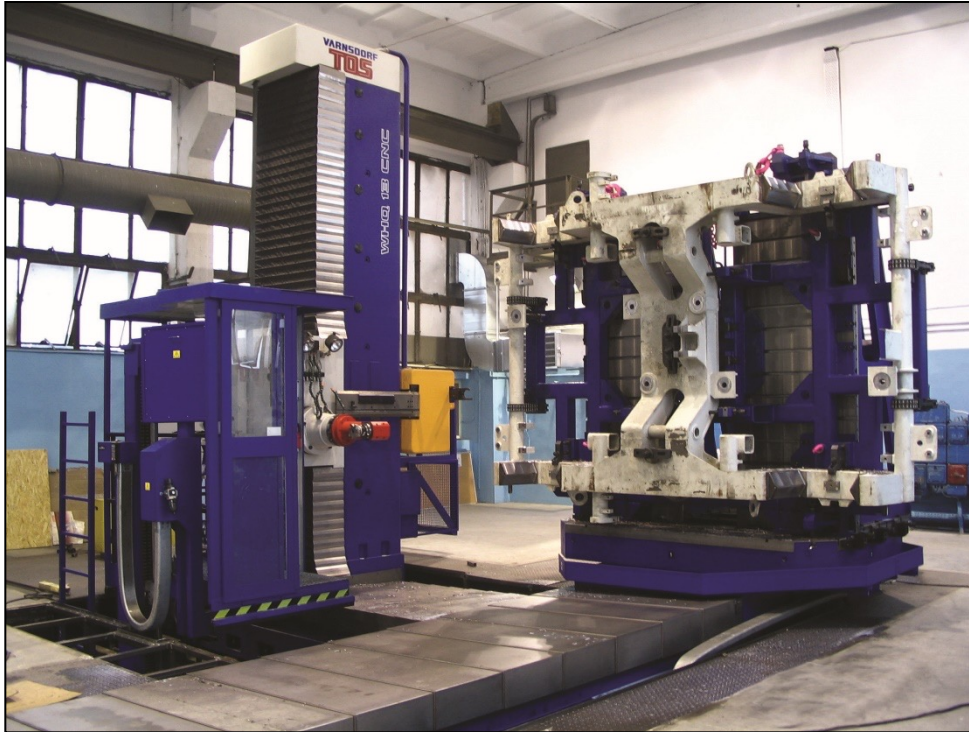
# BASIC PARAMETERS

<b>Headstock type</b>		<b>„15“</b>
Spindle diameter	mm	150
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
Spindle speed range	R.P.M	10 – 3 000
Main motor power, rated (continuous load operation S1)	kW	53
Main motor power max. (operation S6 - 60% of the load time)	kW	55
Spindle revs, rated	R.P.M	165
Spindle torque, rated (S1)	Nm	3 114
Spindle torque max. (S6-60%)	Nm	3 720
Spindle stroke <b>W</b>	mm	880

# BASIC PARAMETERS

Headstock vertical travel <b>Y</b>	mm	2 000, 2 500, 3 000, 3 500
Column longitudinal travel <b>Z</b>	mm	1 250, 1 600, 2 200, 3 200
Standard table:		TABLE
Workpiece weight max.	kg	12 000 / 25 000
Table clamping surface	mm	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
T-slots on the table		
- dimension	mm	22H8
- pitch	mm	160
- number		11, 13, 15
Table centering hole diameter	mm	100H6
Table transverse travel <b>X</b>	mm	3 500, 4 000, 5 000, 6 000
Feed range (working and rapid traverse) – <b>X, Y, Z</b>	mm/min	4 - 10 000 (12 000)
– <b>W</b>	mm/min	4 - 10 000
– <b>X</b> = 2 000, 3 500 mm (max. load 12 000 kg)	mm/min	4 - 10 000 (12 000)
– <b>X</b> = 2 000, 3 500 mm (other tables)	mm/min	4 - 8 000
– <b>X</b> = 4 000, 5 000, 6 000 mm	mm/min	4 - 8 000
– <b>B</b> 12 000 kg / other tables	1/min	0,003 - 2 / 1,5
Max. cutting forces		
- In axes <b>X, Y, Z, W</b>	kN	25
Clamping strength for <b>B</b> axis on R = 1 m	kN	25
Max. feed spindle torque in <b>B</b> axis fully CNC	kNm	15

# TECHNOLOGICAL EXAMPLES



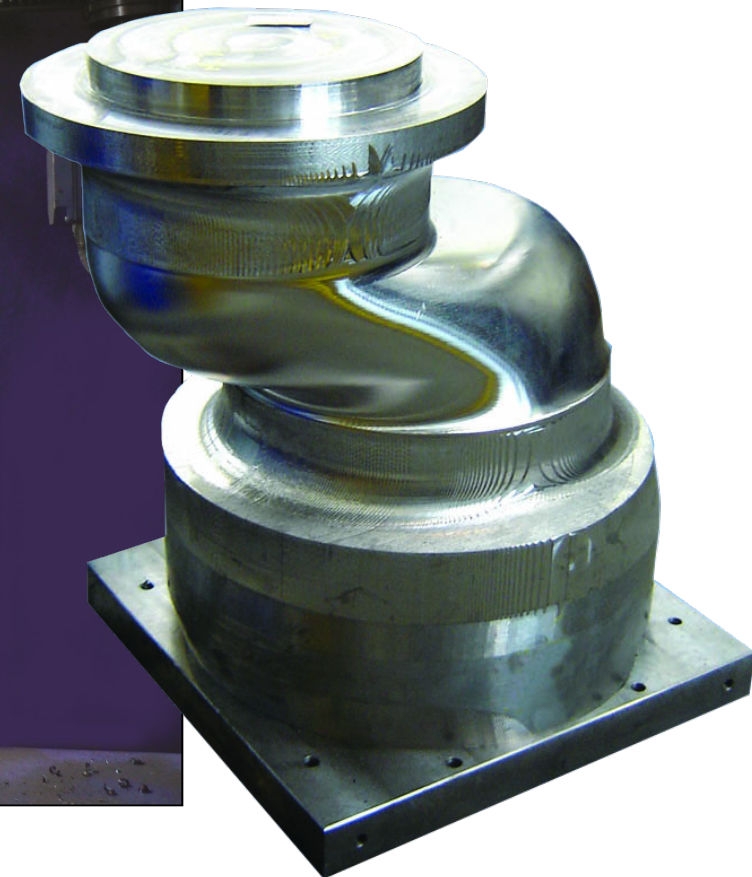


# TECHNOLOGICAL EXAMPLES





# TECHNOLOGICAL EXAMPLES





# TECHNOLOGICAL EXAMPLES



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