Your partner for future machining

VARNSDORF TOS

Horizontal milling and boring machine WHR 13 (Q)

Milling machine manufacturer

TOS VARNSDORF a.s.

Certifikovaný systém řízení VARNSDORF TOS SKQS ISO 9001:2015

BASIC CHARACTERISTIC

Basic characteristic:

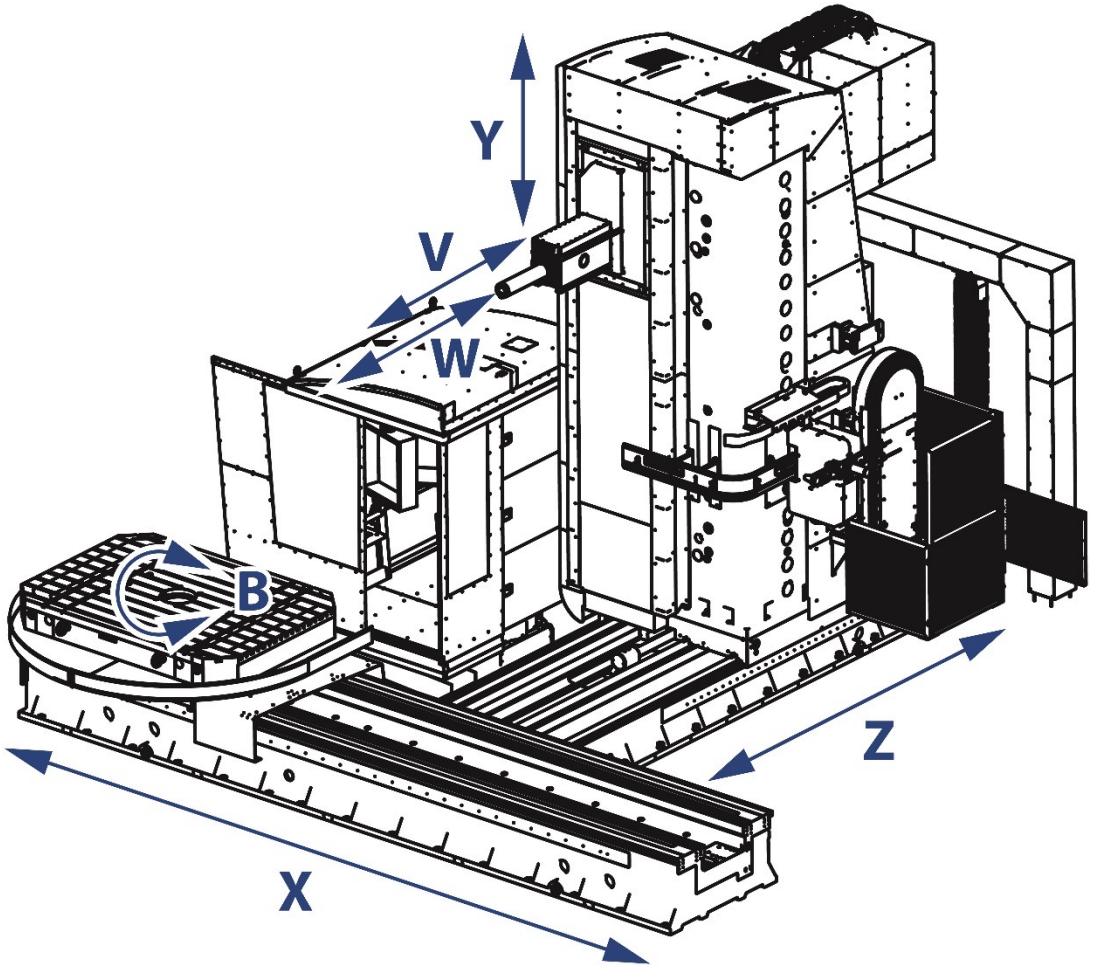
WHR 13 (Q) is cross-bed table type horizontal milling and boring machine. is based on the original generation of CNC horizontal milling and boring machines WHN (Q) 13 CNC of TOS VARNSDORF a.s. The machine WHR 13 (Q) won its respect thanks to its great power, large travel spans and a progressive and wisely simple design that lends it an amazing reliability. In this machine the high manufacture quality and the up-to-date design are in excellent balance with the price. It is an ideal machine for effective, heavy duty, complete machining of larger workpieces at the workshops where high cutting power, broad application, high reliability and user-friendly operation are the priorities. The technological performance of the machine may be expanded by the use of special technological accessories.

BASIC CONCEPTION

Basic conception:

The machine WHR 13 (Q) is continuously controlled in five axes (**X** - base cross travelling, **Y** - headstock vertical adjustment, **V** - RAM longitudinal travel, **Z** longitudinal travel of the column and **W** - working spindle longitudinal travel).

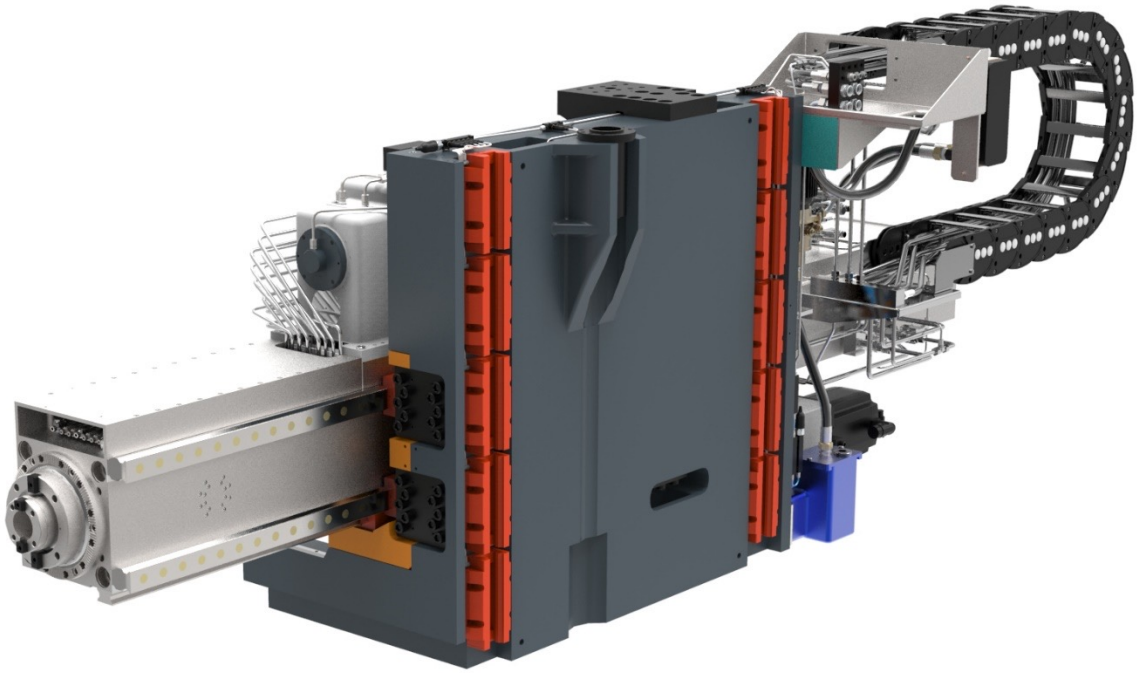
HEIDENHAIN TNC 640, Sinumerik 840 D-SL or FANUC 30i/31i control system can be selected for controlling the machine.



HEADSTOCK

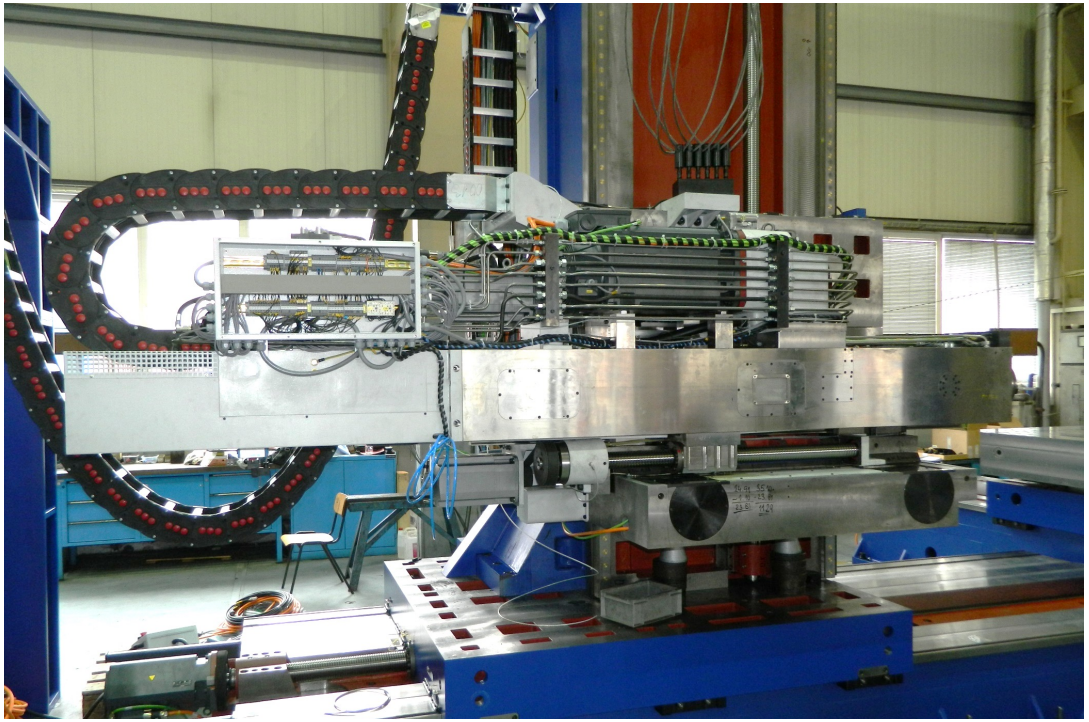
Headstock:

The main casing is a rigid gray iron casting of L shape which is directly integrated lines for ram. Ram tilting compensation is realized by means of adjustable plate at the back of the headstock. The main spindle assembly is an assembly of a hollow and working spindle. The hollow spindle runs in precision spindle ball bearings with angular contact design with multiple preloaded. The spindle speed is thus controlled in two mechanical sequences.



HEADSTOCK

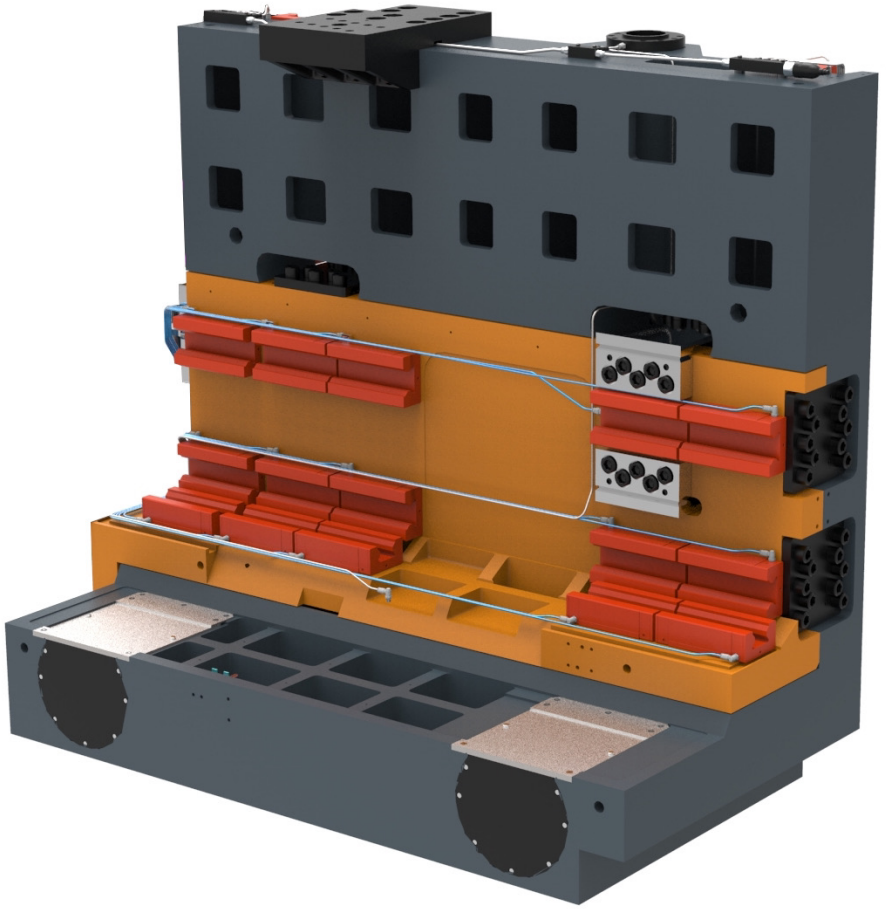
Headstock of WHR 13 (Q) machine



COMPENSATION OF RAM TILTING

Compensation of ram tilting:

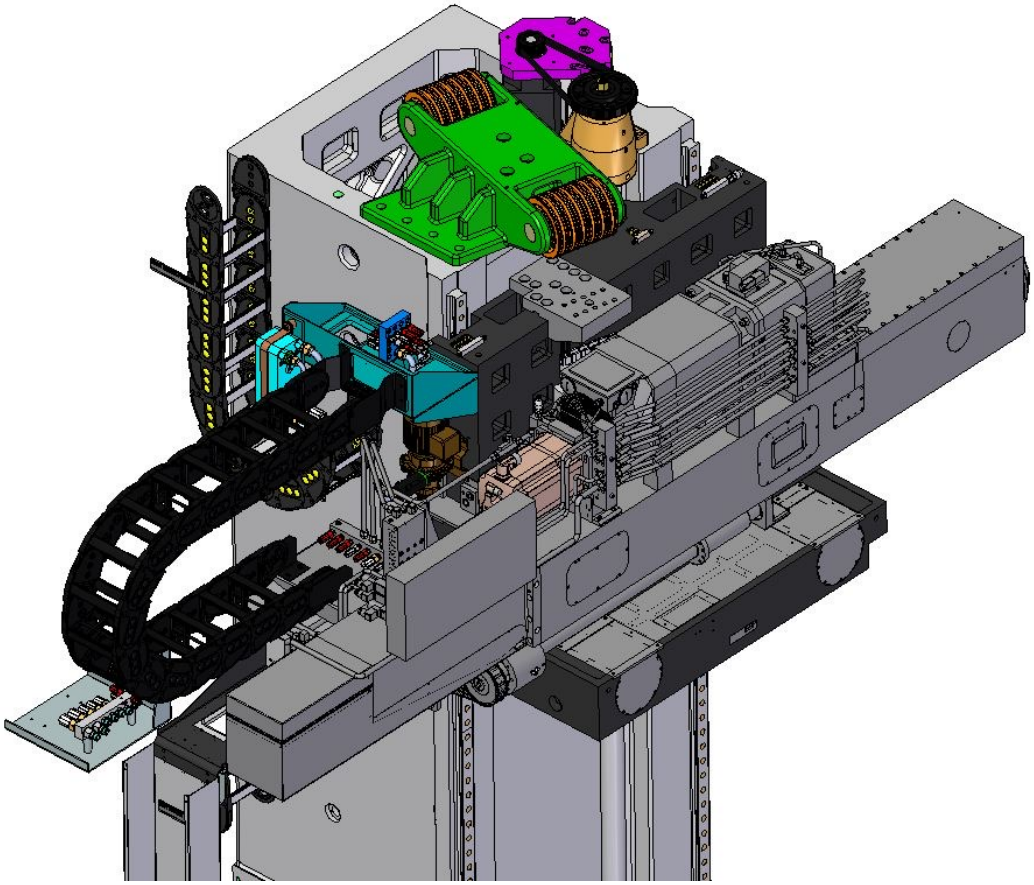
This design of slide falling compensation is unique and is patented.
The entire headstock is designed in such a way that it makes it possible to compensate falling of the slide face when it is extended along the V axis. Slide falling is compensated with a special electro-mechanical system, when an electric stepping motor turns an eccentric on which the whole group of the slide and headstock plate is mounted (a pivot is used for the second mounting of the slide and headstock plate). This design provides a high compensation range without loading the linear guideway with additional forces. This design of slide falling compensation contributes to a longer service life of the linear guideway.



BALANCE AND DRIVE OF AXIS Y

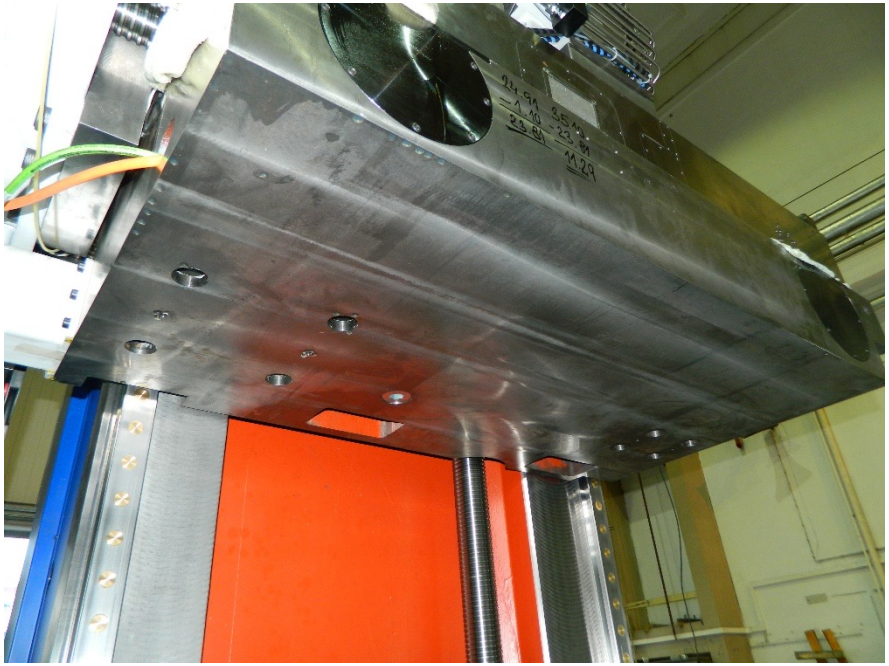
Balance and drive of axis Y:

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 spindle head weight is balanced with a counter-balance suspended on ropes and guided in the machine frame.



BALANCE AND DRIVE OF AXIS Y

Balance and drive of axis Y on WHR 13 (Q) machine

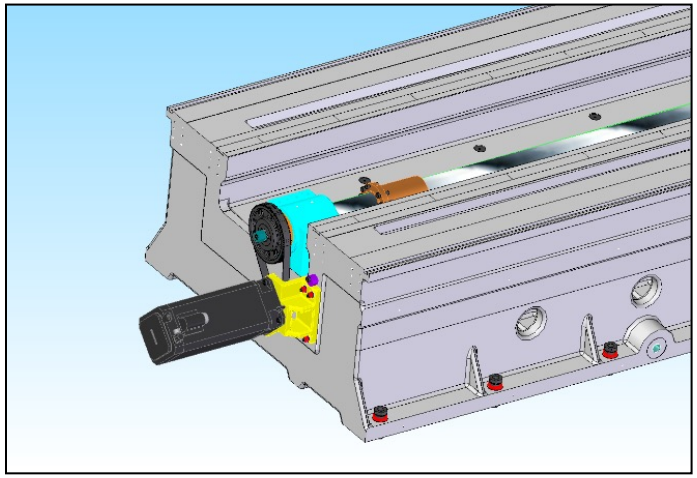


FEED DRIVES AND CLAMPING

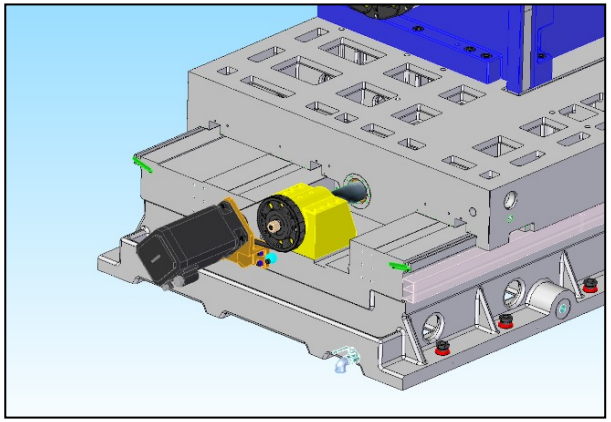
Feed drives and clamping:

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

GUIDEWAYS OF MOVABLE GROUPS

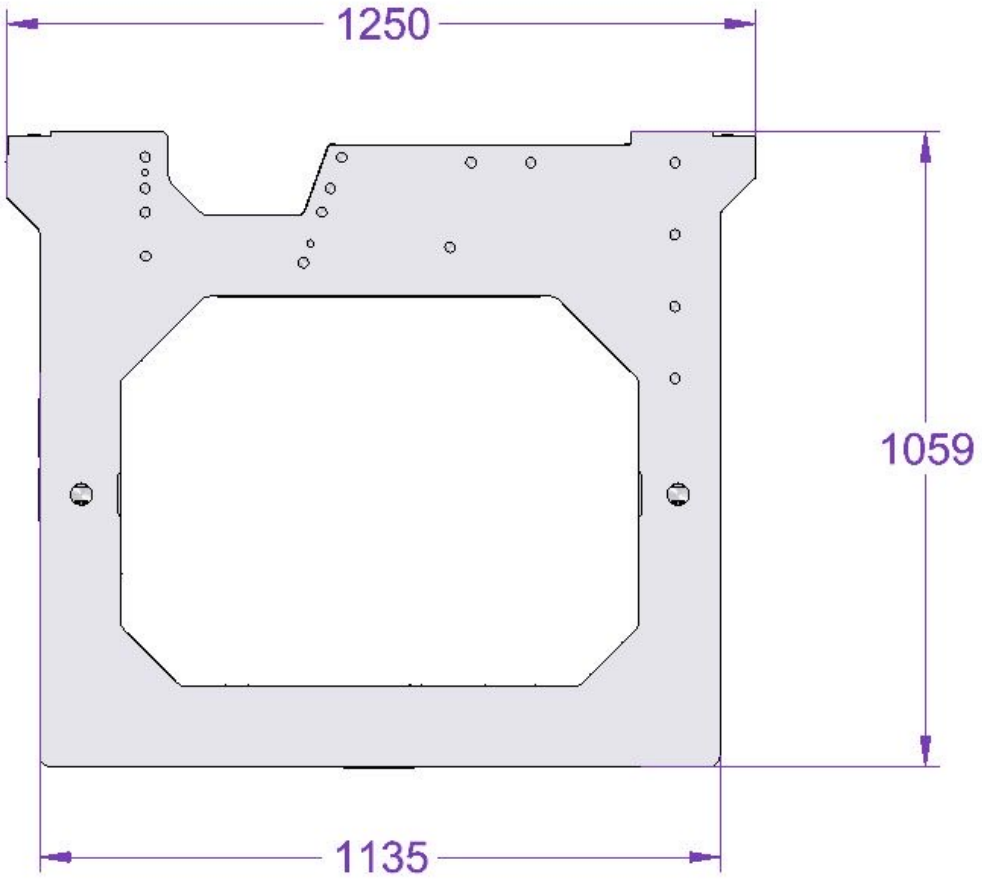
Guideways of movable groups:

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

Guiding of traveling axes V and Y have been designed as rolling type, preloaded, employing the compact linear roller pads.

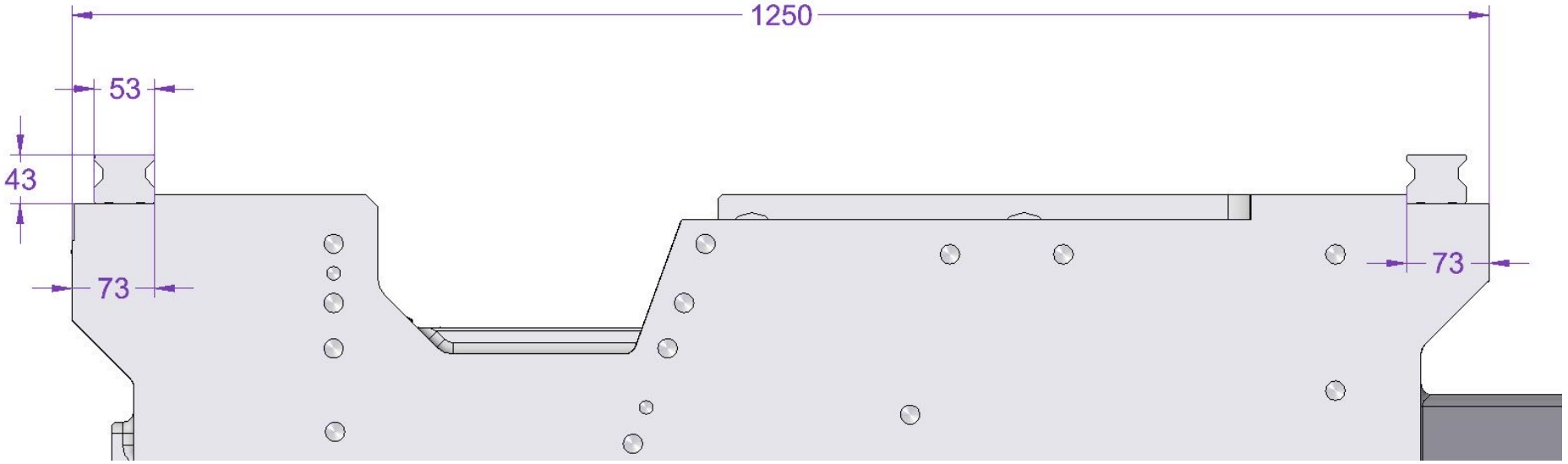
Guides of all linear axes X, Z assemblies are mounted to slide. The main guideways are laser-hardened. Hardened steel rails on guideways are placed under the bearings and on the other stressed places. The counter-surfaces are provided with artificial sliding low-friction materials.

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) WHR 13 (Q)

GUIDEWAYS OF MOVABLE GROUPS



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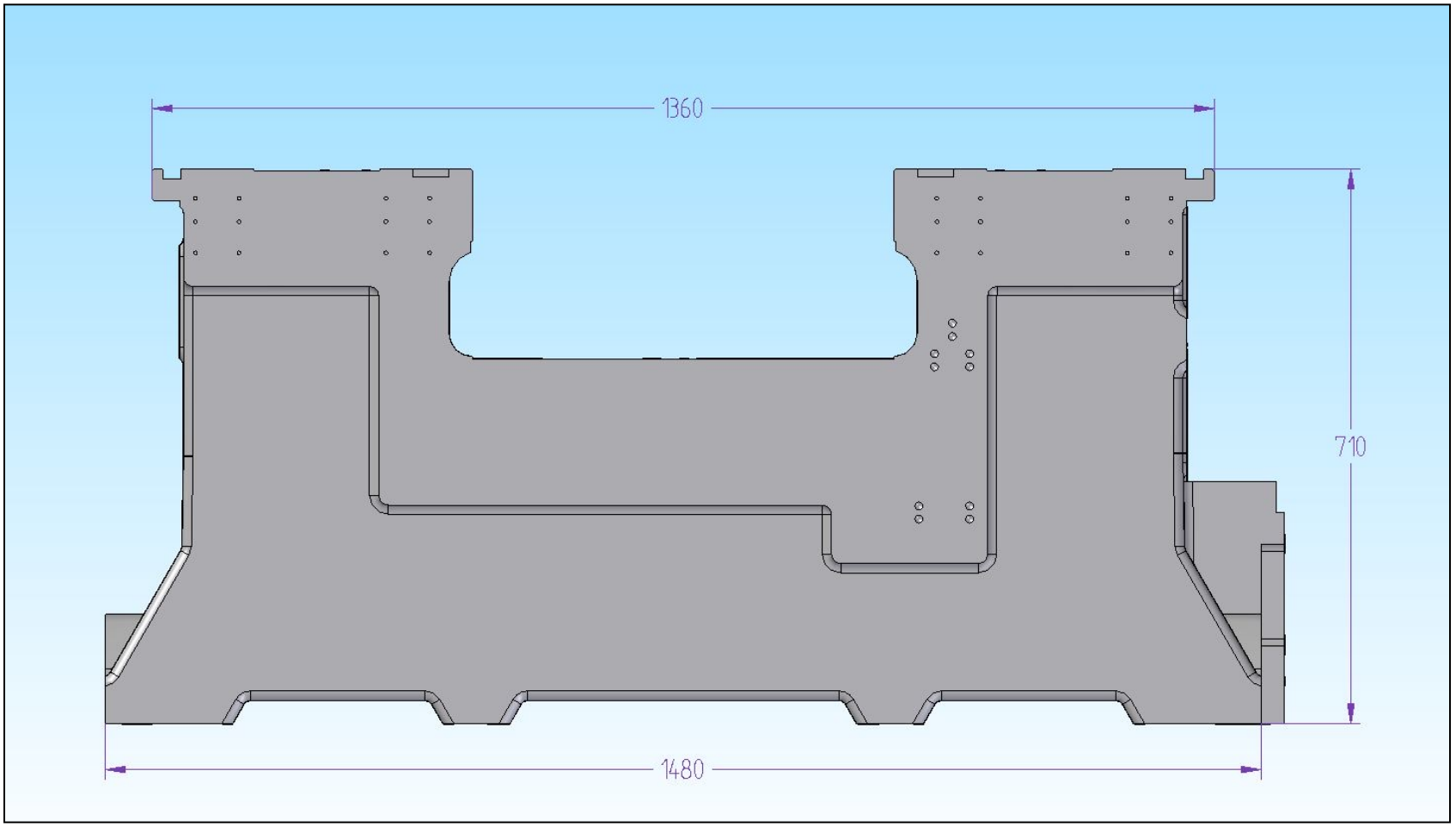

Asix X of WHR 13 (Q) machine

GUIDEWAYS OF MOVABLE GROUPS

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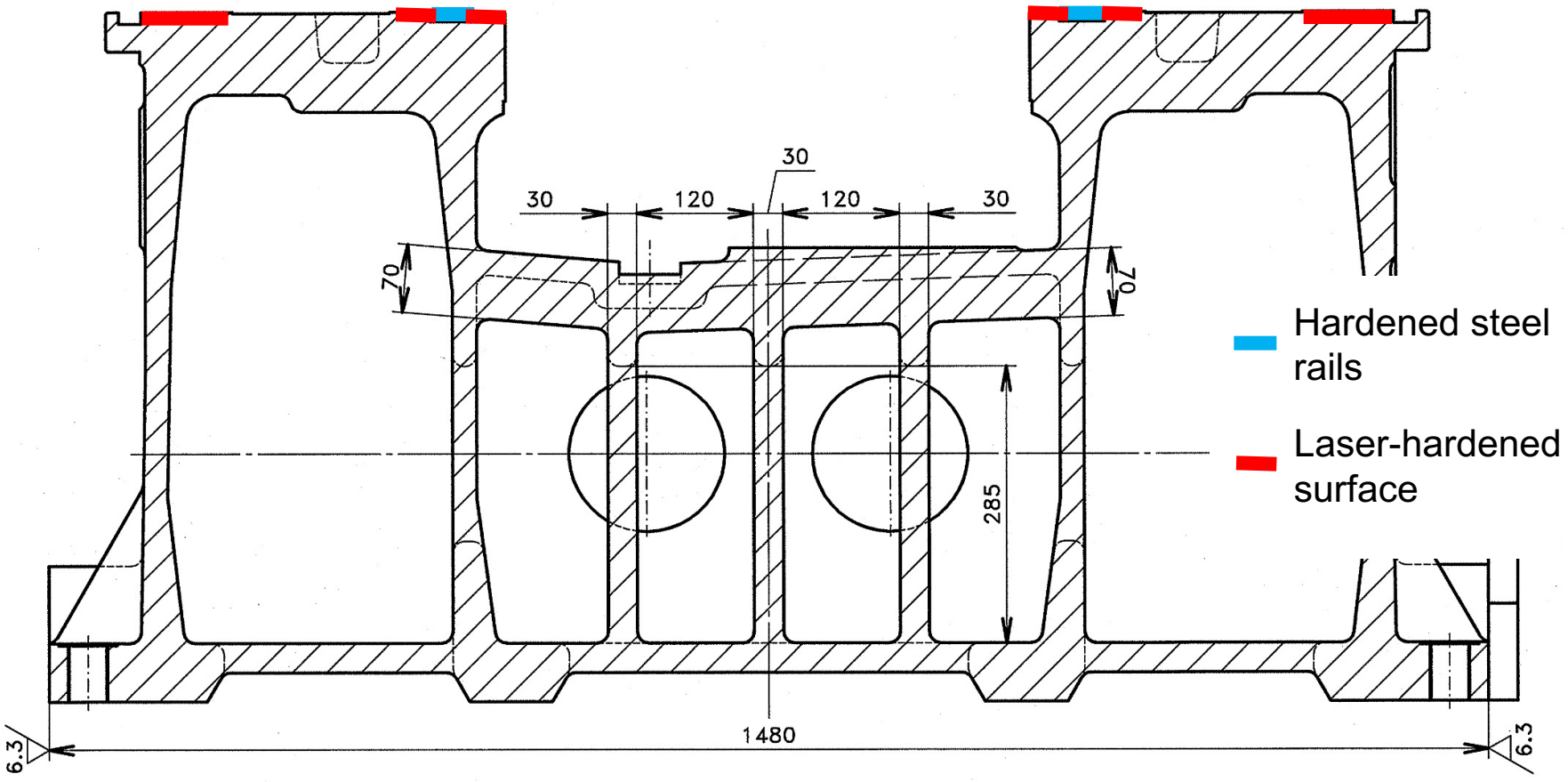

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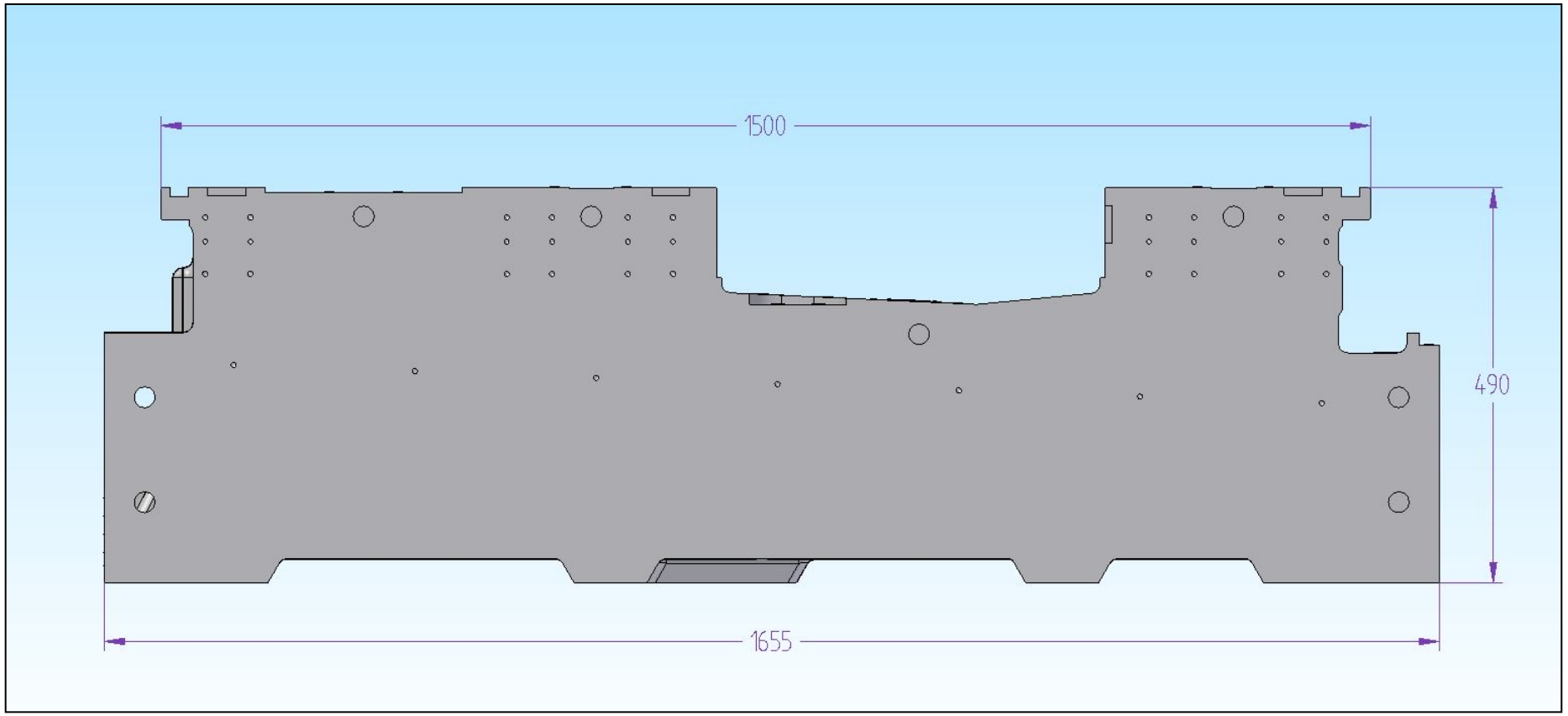
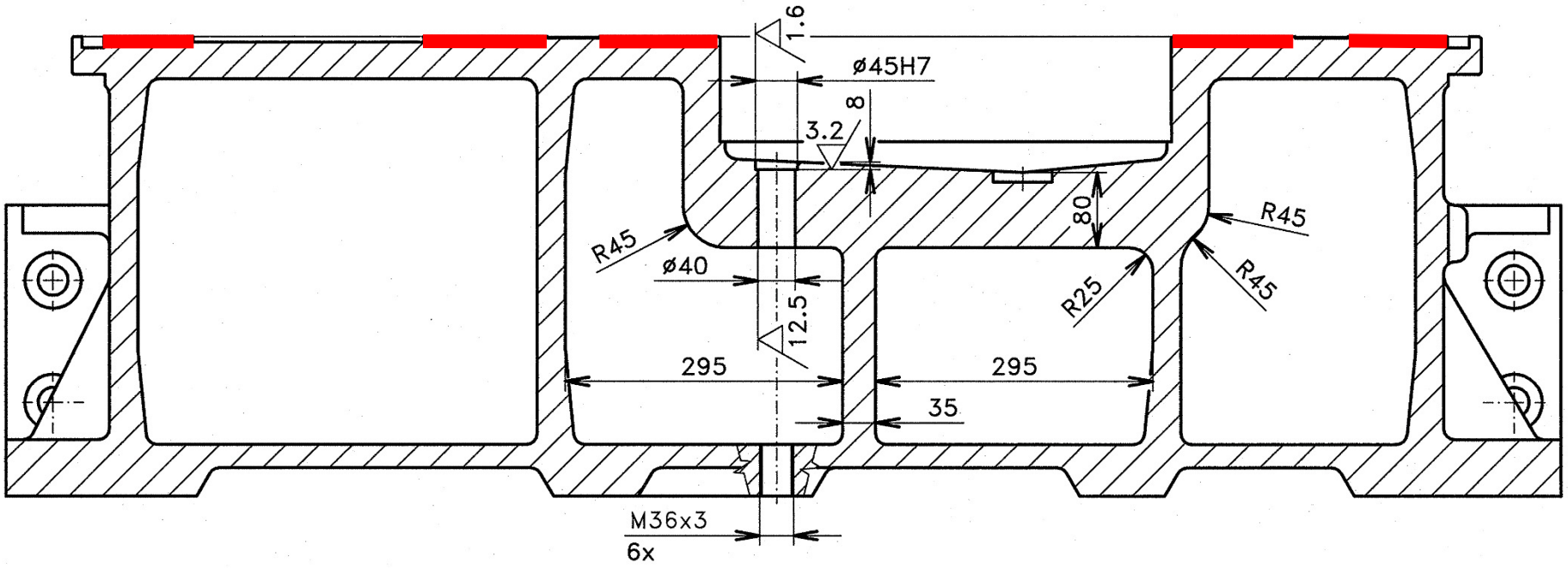


Axis Z of WHR 13 (Q) machine

GUIDEWAYS OF MOVABLE GROUPS

Laser-hardened surface

axis Z of WHR 13 (Q) machine



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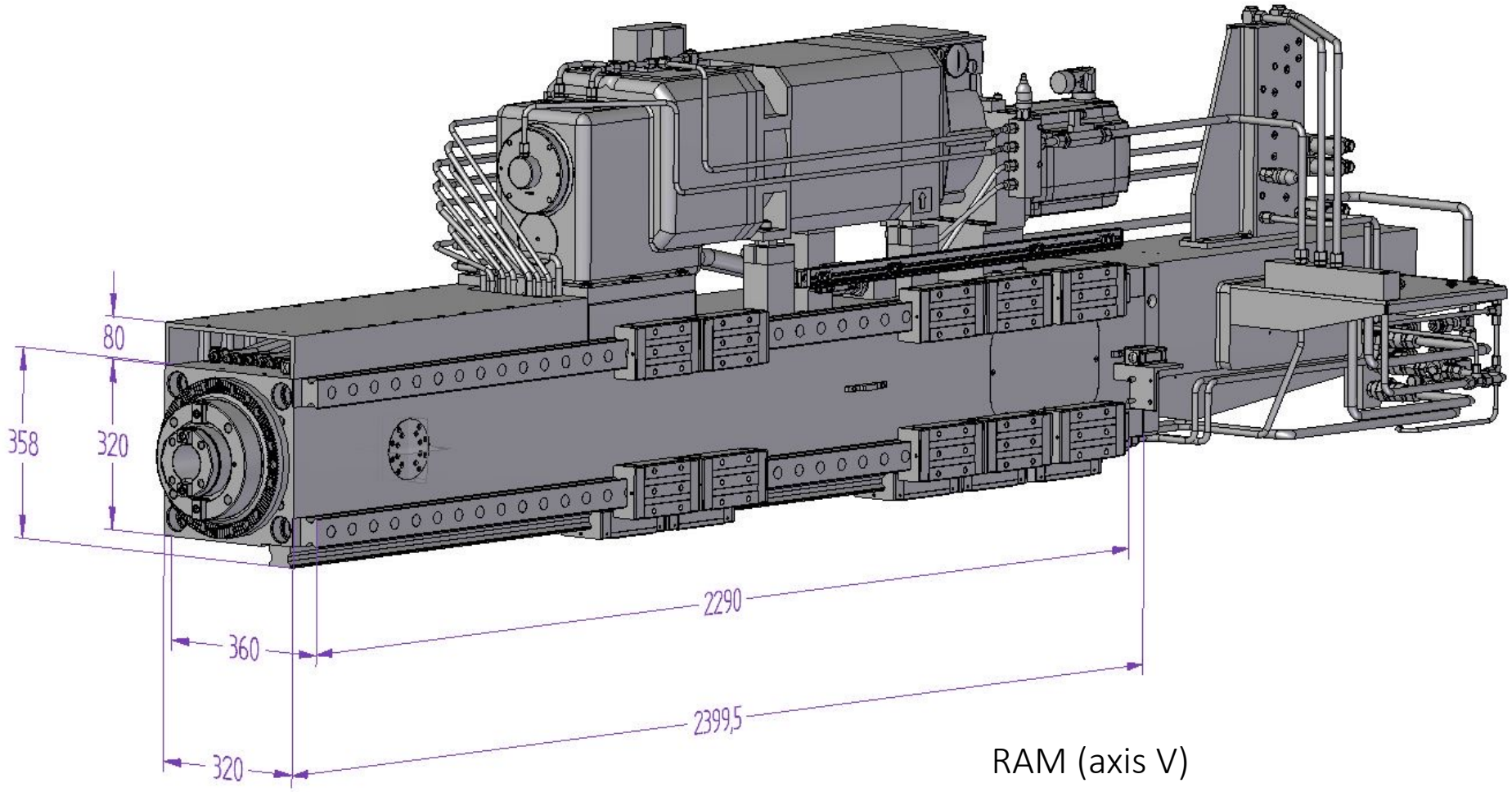
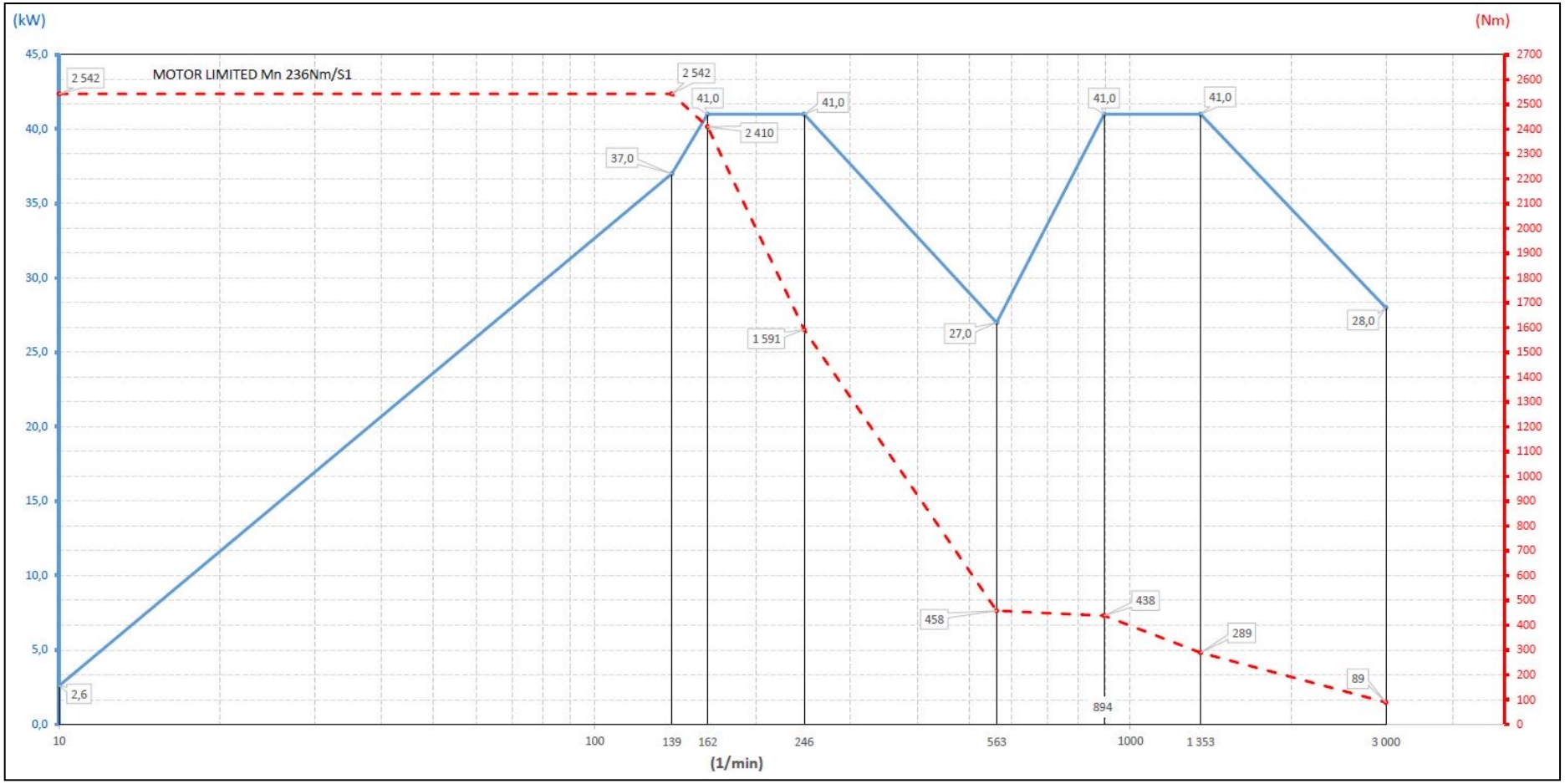
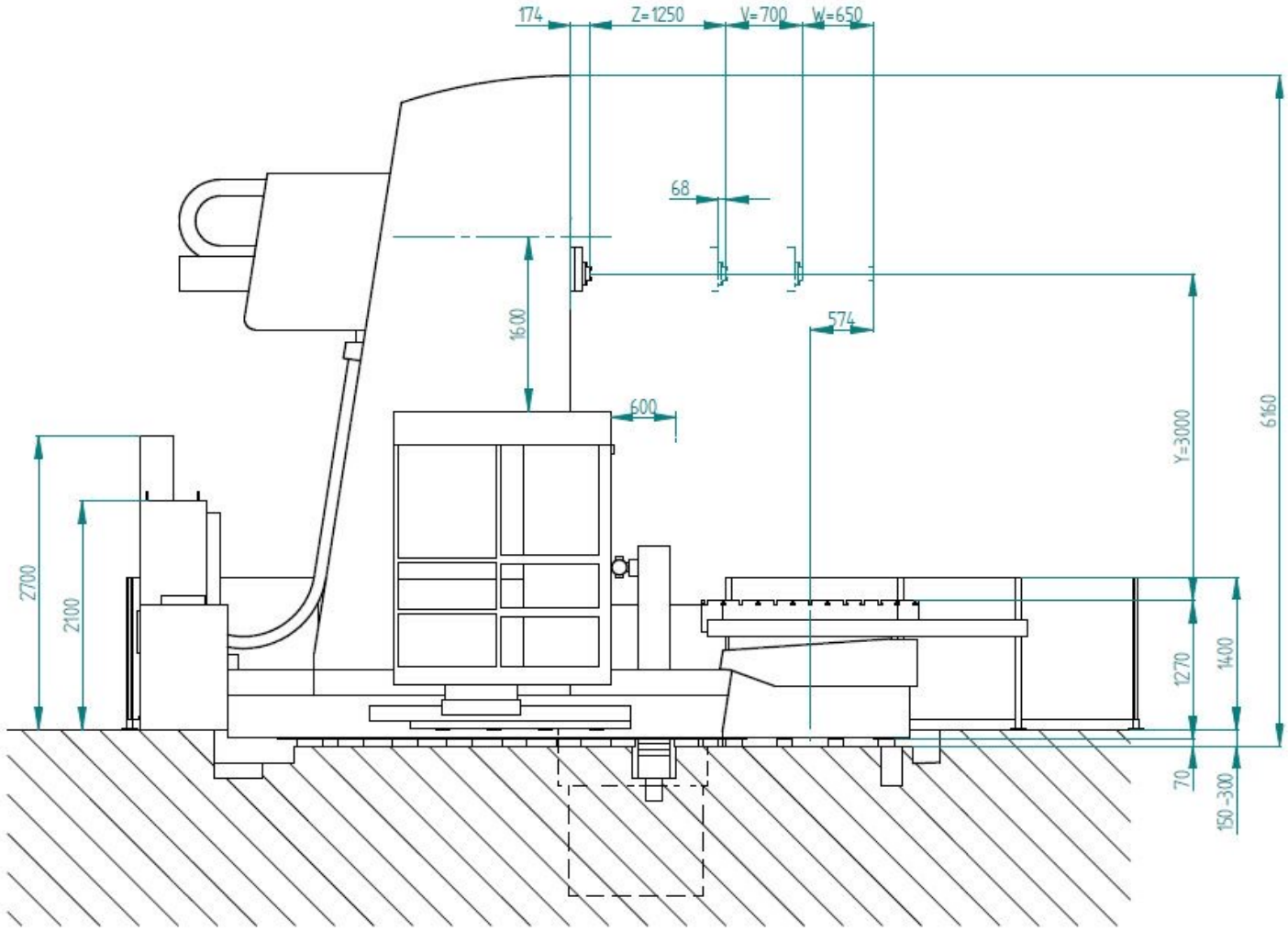


RAM (axis V)

CURCUIT DIAGRAM



EXAMPLE OF A DIMENSIONAL SKETCH



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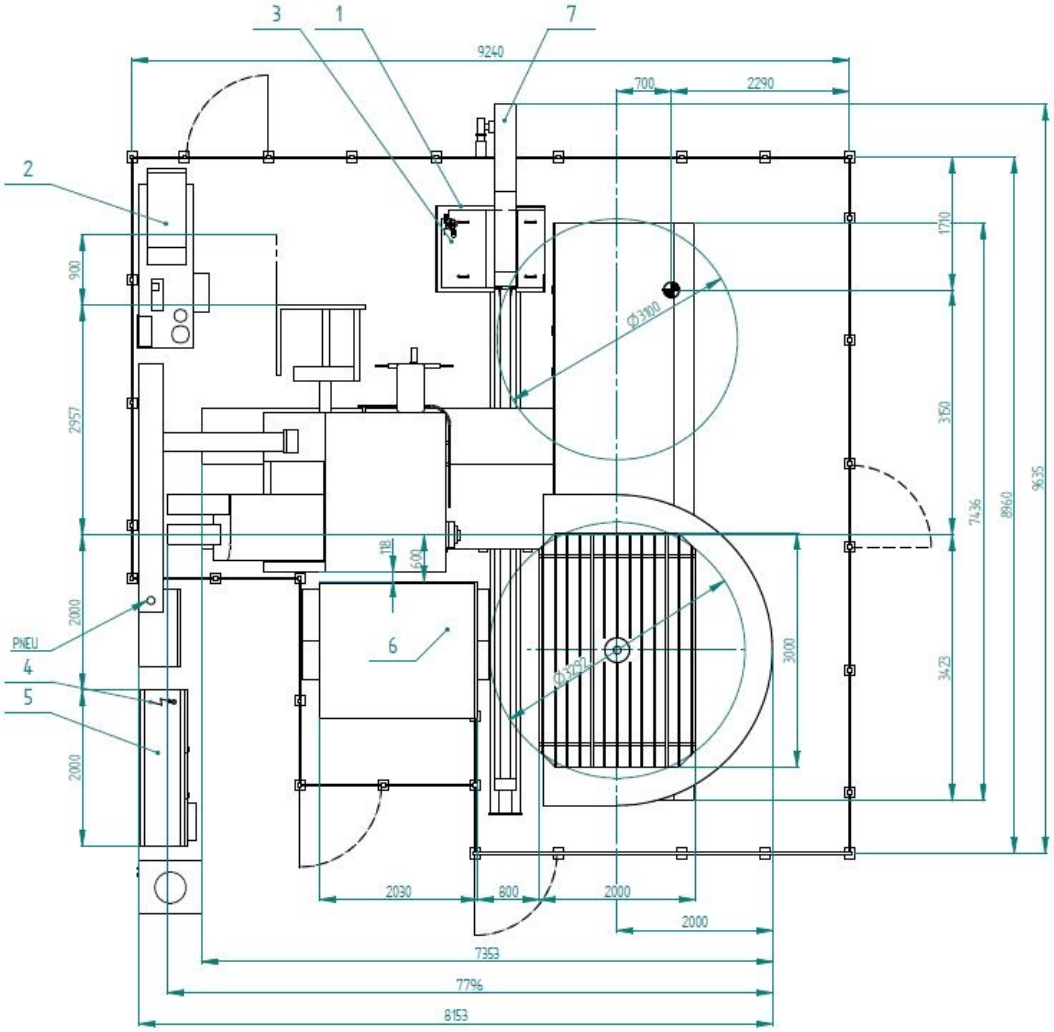


BASIC PARAMETERS

Machine		WHR 13
Spindle diameter	mm	130
Spindle taper		ISO 50 / ISO 50 BIG+
Clamping strengh of tool	kN	25
Spindle speed range	1/min	10 – 3 000
Main motor power (continuous load operation S1)	kW	41
Main motor power max. (operation S6 - 60% of the load time)	kW	46
Rated working spindle speed	1/min	162
Spindle torque, rated (S1)	Nm	2 542
Spindle torque max. (S6-60%)	Nm	3 111
The outer diameter of the flange of the hollow spindle	mm	221,44
Spindle stroke **W**	mm	650
RAM dimensions	mm	320 x 400
RAM stroke **V**	mm	700

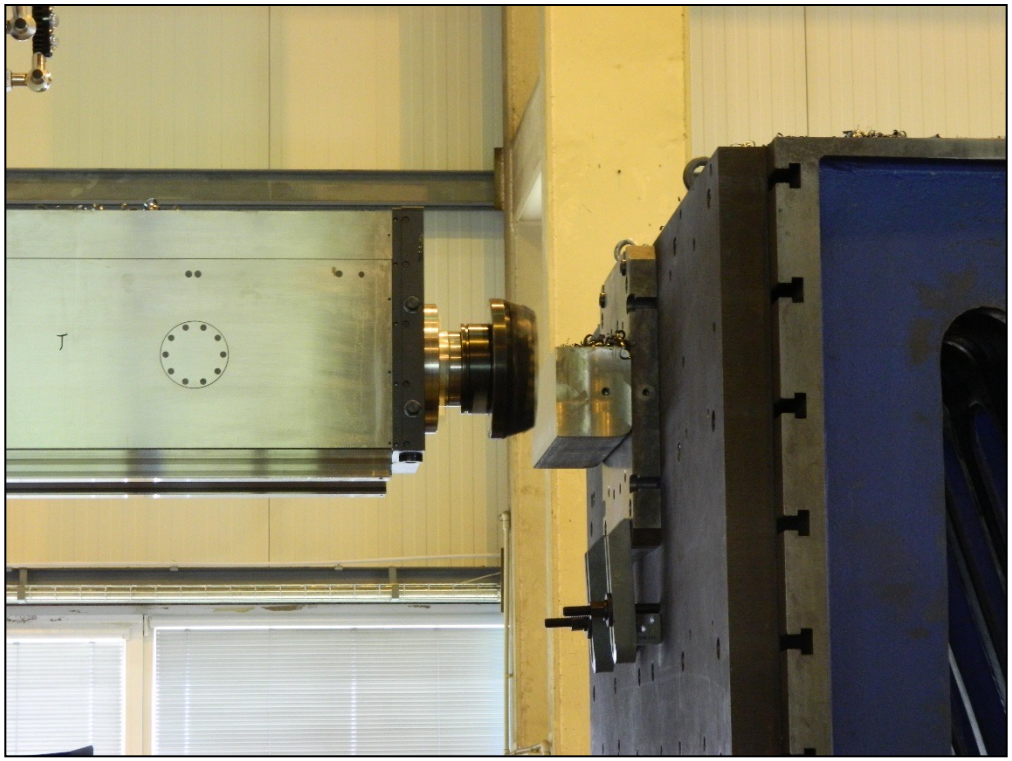
BASIC PARAMETERS

Headstock vertical travel **Y**	mm	2 000, 2 500, 3 000
Column longitudinal travel **Z**	mm	1 250, 1 600, 2 200, 3 200

Standard 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
T-slots on the table		
- dimension	mm	22H8
- pitch	mm	160
- number		11, 13, 15
Table centering hole diameter	mm	100H6
Table transverse travel **X**	mm	2 000, 3 500, 4 000, 5 000, 6 000

Feed range (working and rapid traverse) – **Y, Z, W, V**	mm/min	5 – 10 000
– **X** = 2 000, 3 500 mm (max. load 12 000 kg)	mm/min	4 – 10 000 (12 000)
– **X** = 2 000, 3 500 mm (other tables)	mm/min	4 - 8 000
– **X** = 4 000, 5 000, 6 000 mm	mm/min	4 - 8 000
Rapid traverse **B** 12 000 kg / other tables	1/min	0,003 - 2 / 1,5
Max. cutting forces		
- In axes **X, Y, Z, V, W**	kN	25
Clamping strength for **B** axis on R = 1 m	kN	25
Max. feed spindle torque in **B** axis fully CNC	kNm	15

EXAMPLES OF MACHINING



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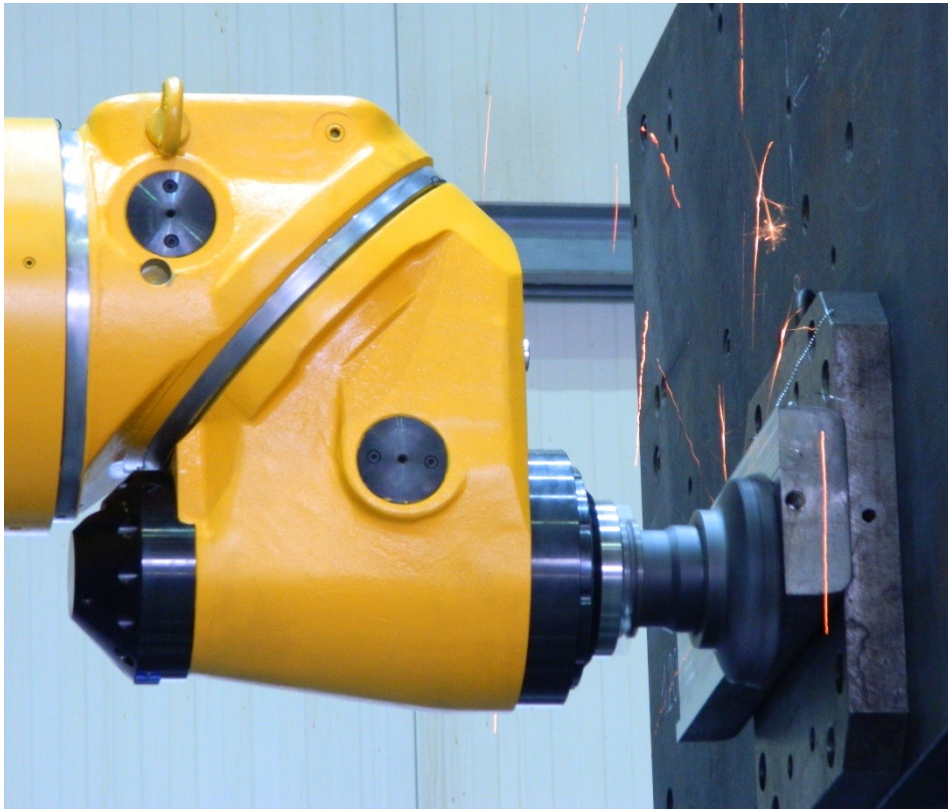

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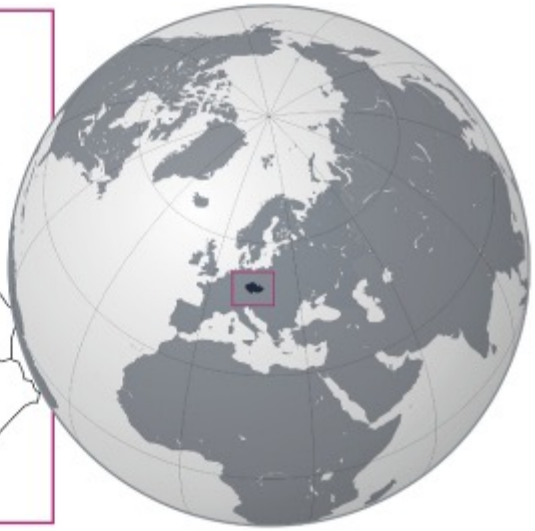

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