Horizontal milling and boring machine WH(Q) 105 CNC

Milling machine manufacturer

TOS VARNSDORF a.s.

BASIC CHARACTERISTIC

Basic characteristic:

The WH 105 CNC table type, live spindle, fixed column horizontal boring mill as the CNC model of the company complements the whole TOS VARNSDORF product line on its lightest end. The machine has inherited some of the subassemblies and design features, including the technological equipment, from the advanced generation of the advanced CNC borers of TOS VARNSDORF a.s.

The machine, including its standard equipment and peripherals etc., is intended for broadly universal chip removal machining of non-rotational parts of smaller size and weight particularly of cast iron, cast steel and steel, employing the most sophisticated part-programs.

BASIC CONCEPTION

Basic conception:

The machine is of the classical longitudinal setup with fixed column fitted upon a rigid longitudinal bed. Along the bed travels the longitudinal slide (Z-axis) with the transverse guideways on its top. Along these travels the saddle crosswise (X-axis) bearing the machine's indexing table (B-axis). The headstock travels vertically (Y-axis) along the column.
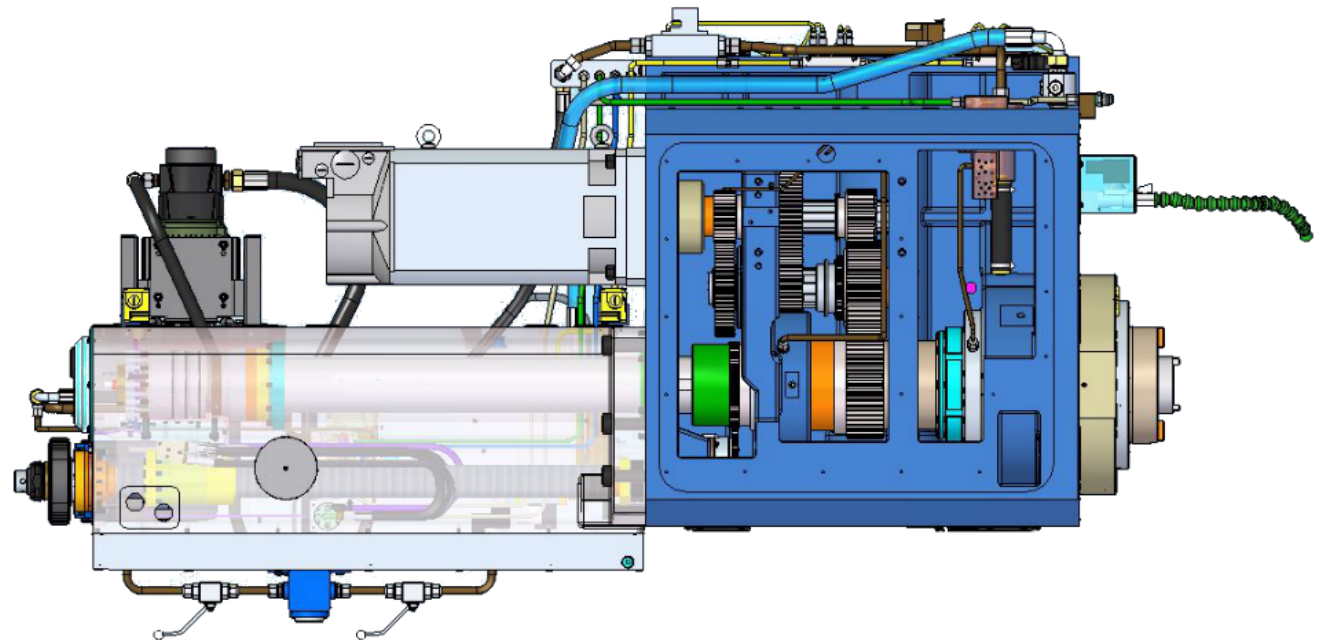
The headstock contains all the spindle bearings and the spindle driving mechanisms (C-axis) as well as the ones for the longitudinal travel of the live spindle (W-axis). The tool clamping system is also there.
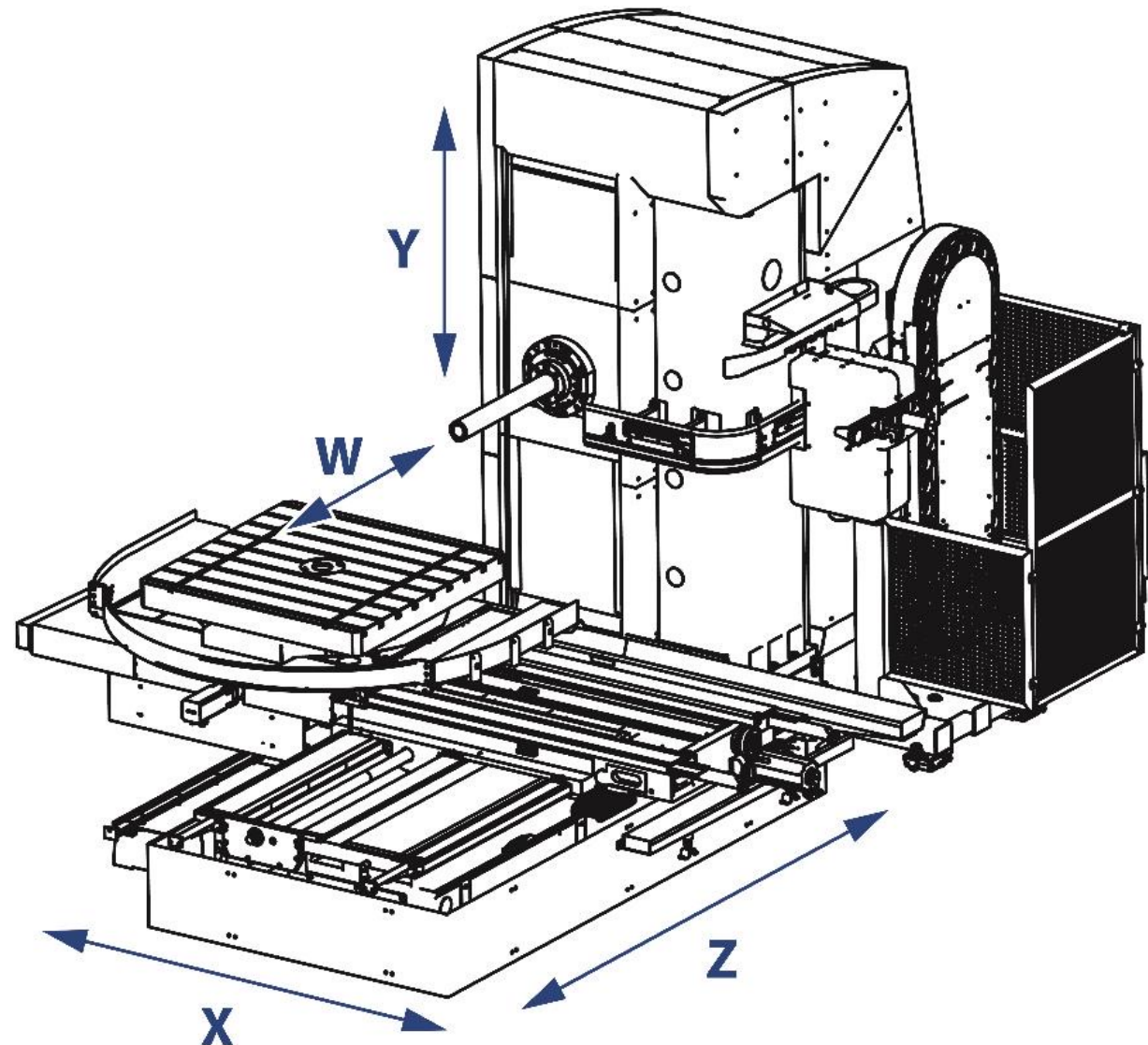
HEADSTOCK

Vřeteník:

The headstock contains all the spindle bearings and the spindle driving mechanisms (C-axis) as well as the ones for the longitudinal travel of the live spindle (W-axis). The tool clamping system is also there. Various items of standard or optional equipment such as spindle guiding support, facing or milling head etc., may be mounted on the headstock face. Precise spindle type, preloaded, multiple setup ball bearings have been used for the spindle. The spindle is driven via two sets of gears changed over with hydraulic actuated shifters.
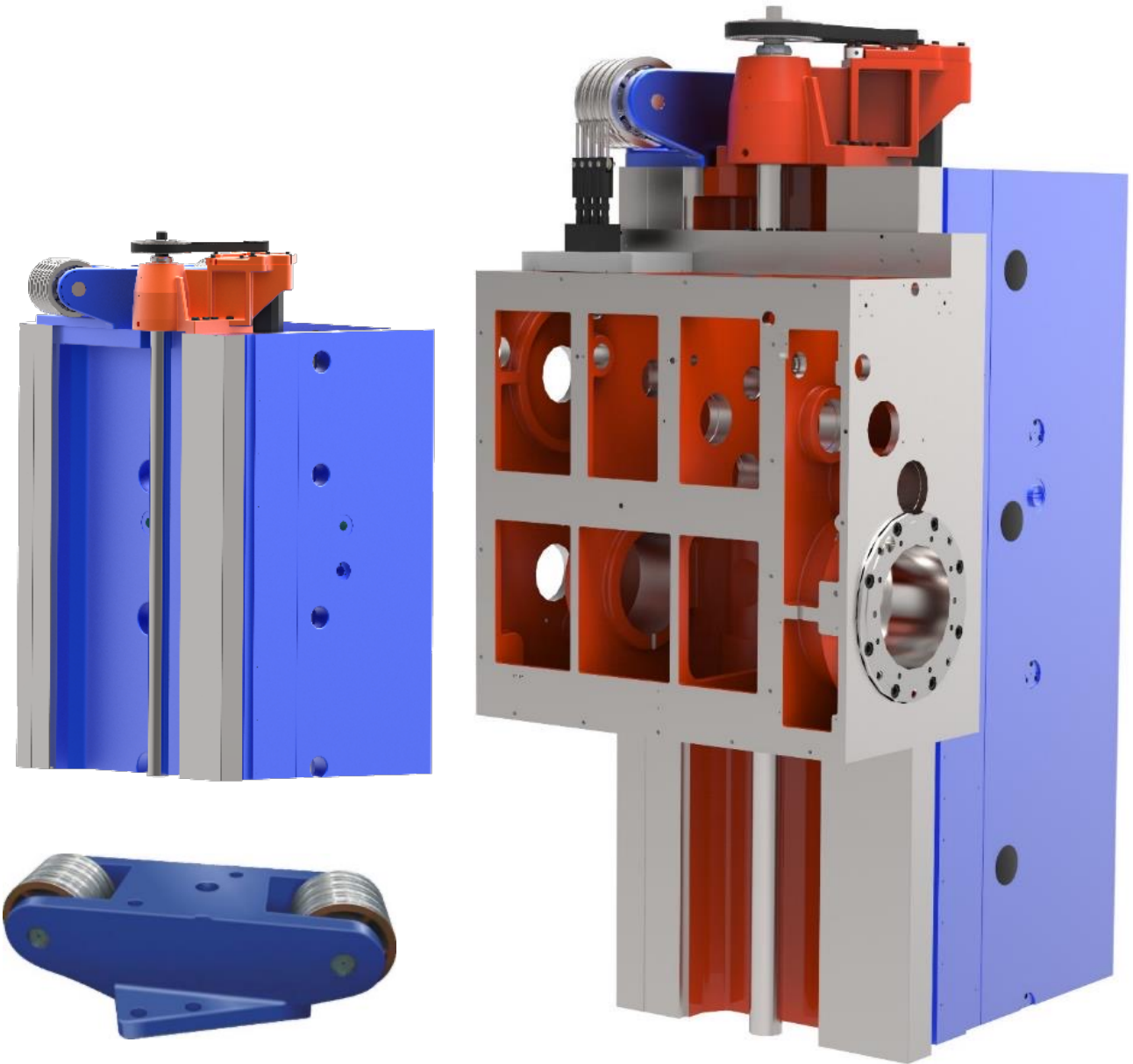
HEADSTOCK
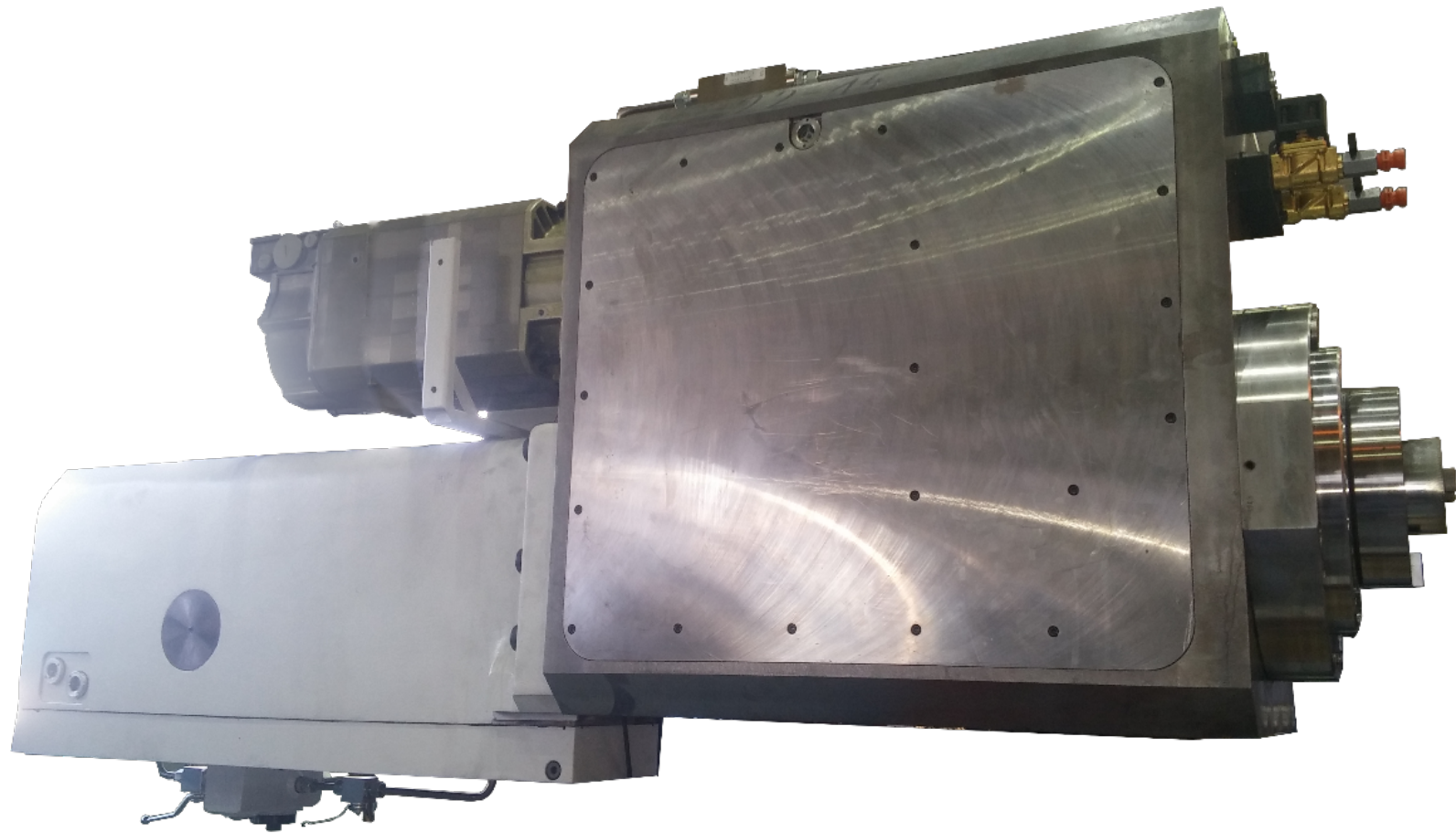
BALANCE AND DRIVE OF AXIS Y

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.
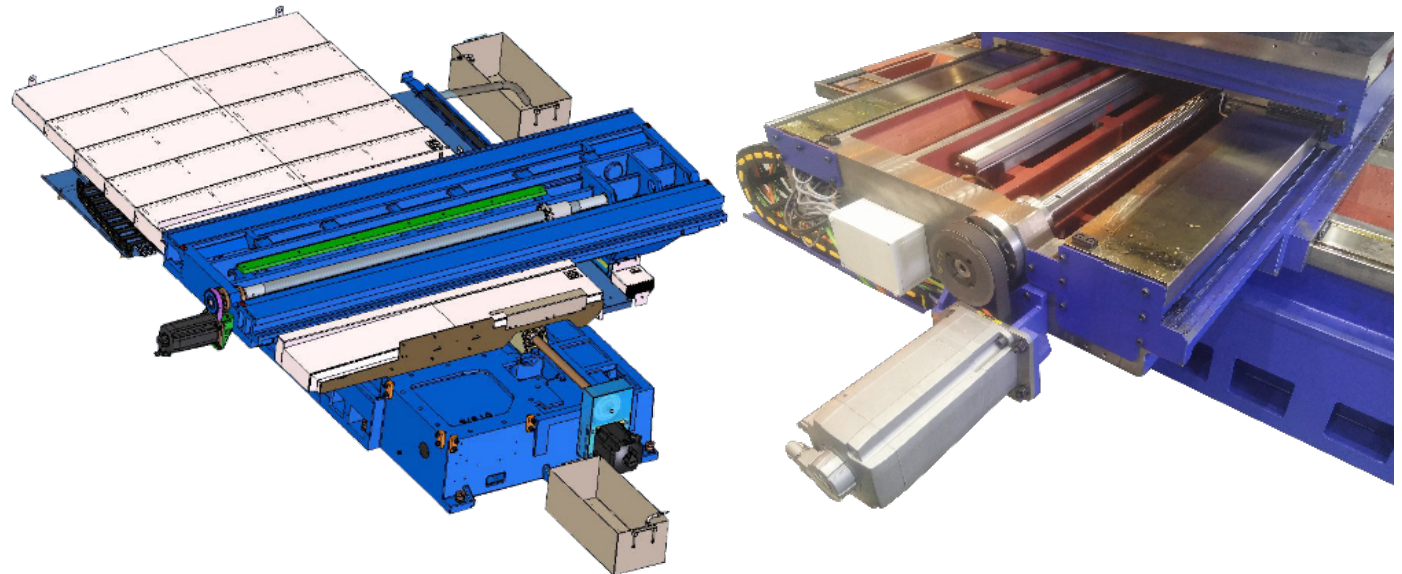
FEED DRIVES AND CLAMPING

Feed drives and clamping:

The feed drive mechanics at all the CNC coordinates has been designed as backlash-free and preloaded, consisting of:
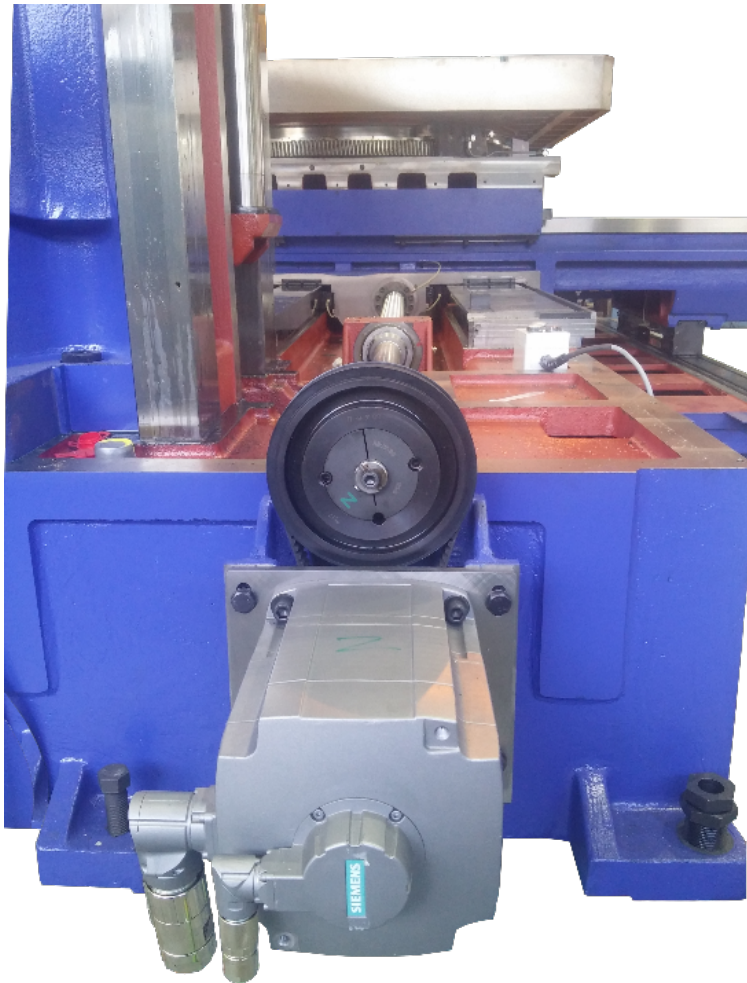
- ballscrew and nut –
  longitudinal slide, table saddle, headstock and spindle travels

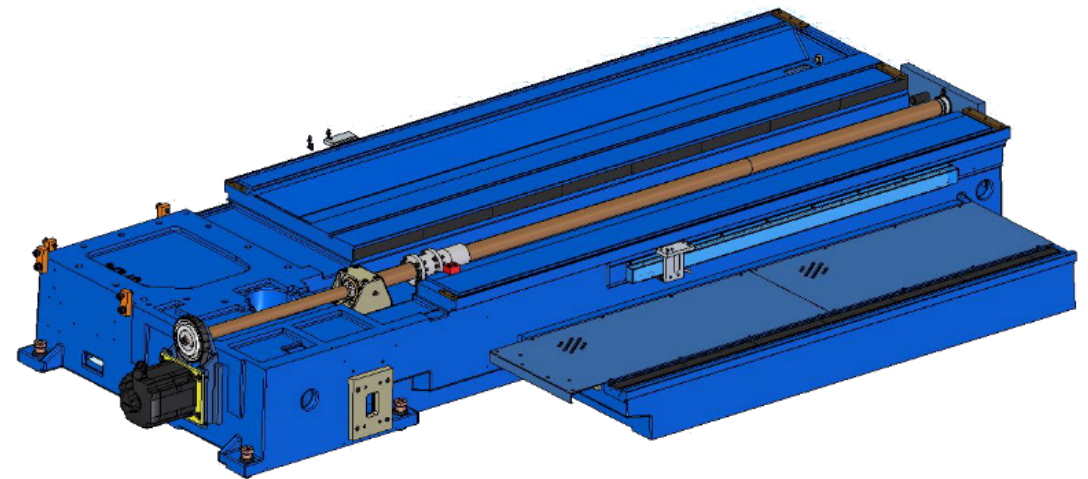The table rotation (B-axis) is designed by means of a toothed ring and one pinion.
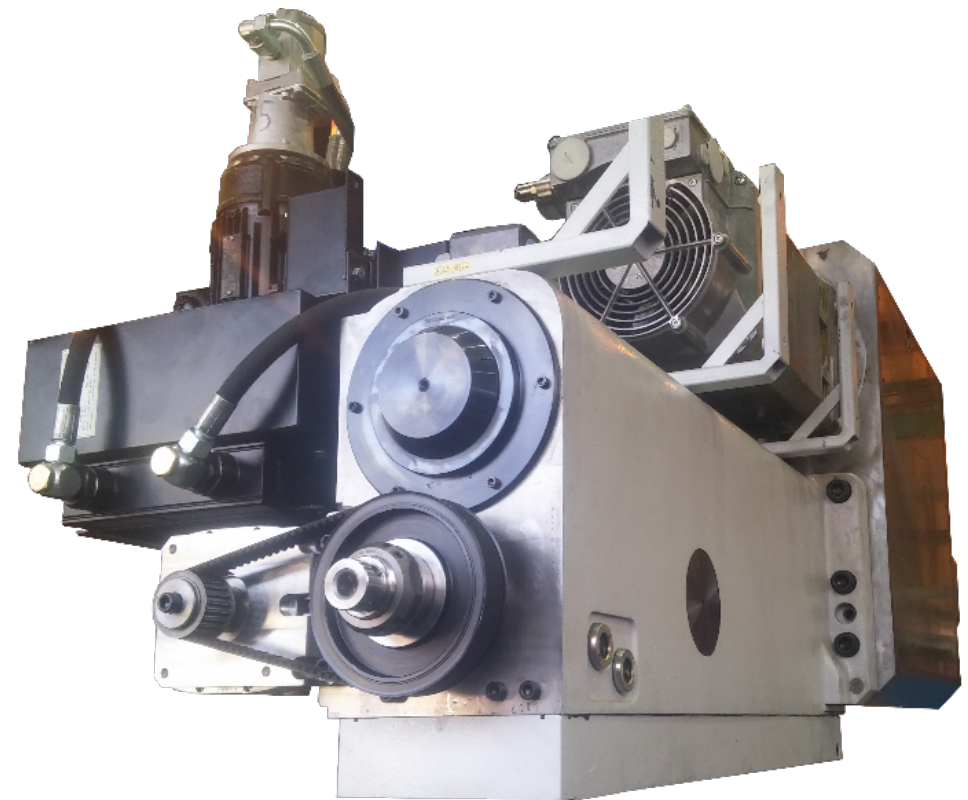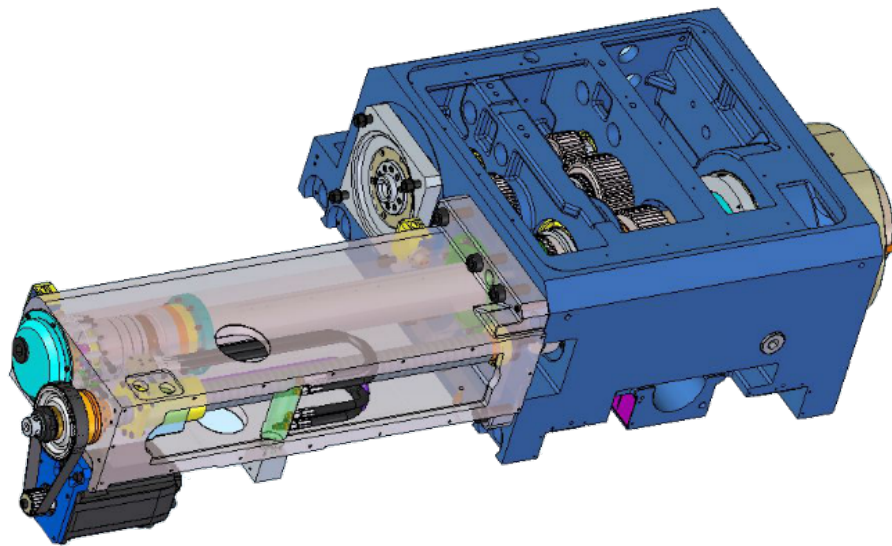

Axis X

FEED DRIVES AND CLAMPING

Axis Z

FEED DRIVES AND CLAMPING

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.
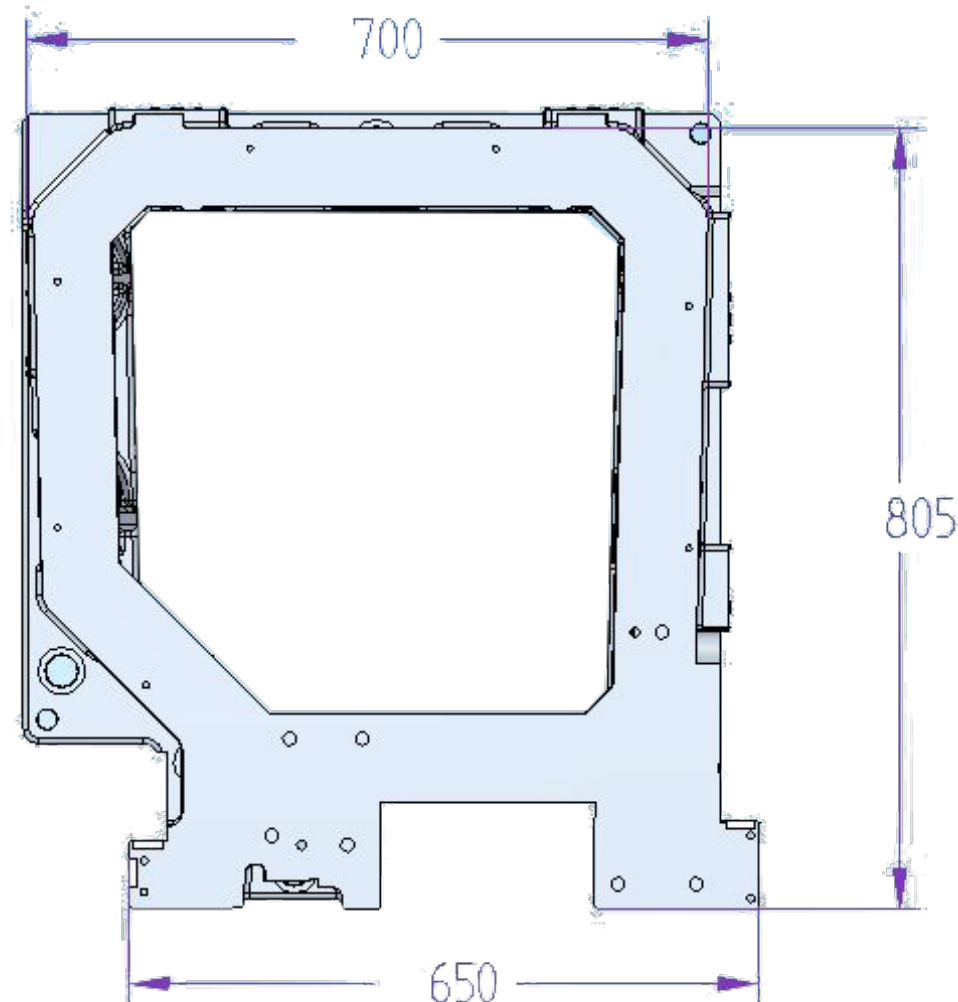
Column (axis Y): WHQ 105 CNC

GUIDEWAYS OF MOVABLE GROUPS

Column (Axis Y) WHQ 105 CNC
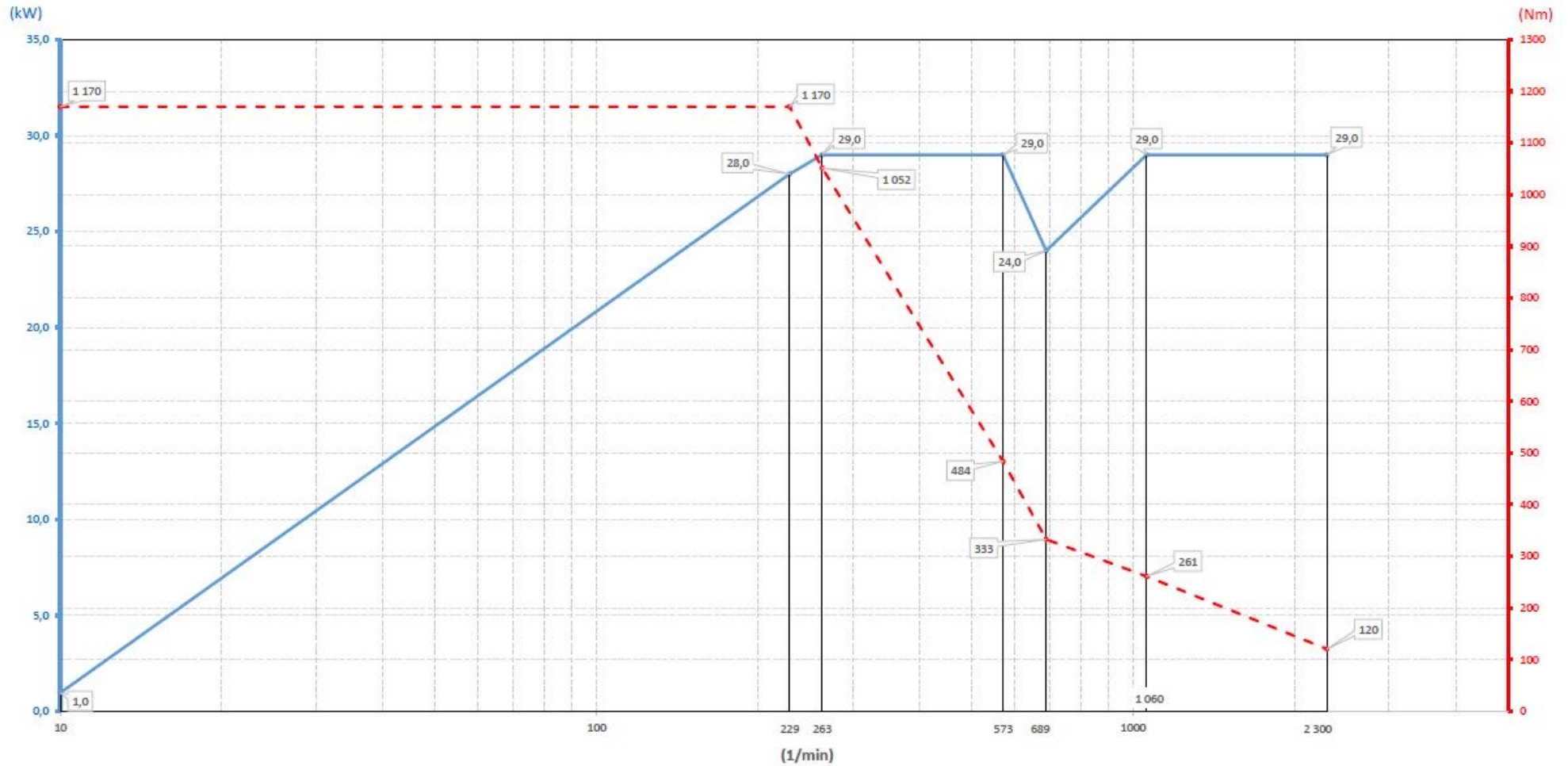
Hardened steel rails

Laser-hardened surface

GUIDEWAYS OF MOVABLE GROUPS

Hardened steel rails

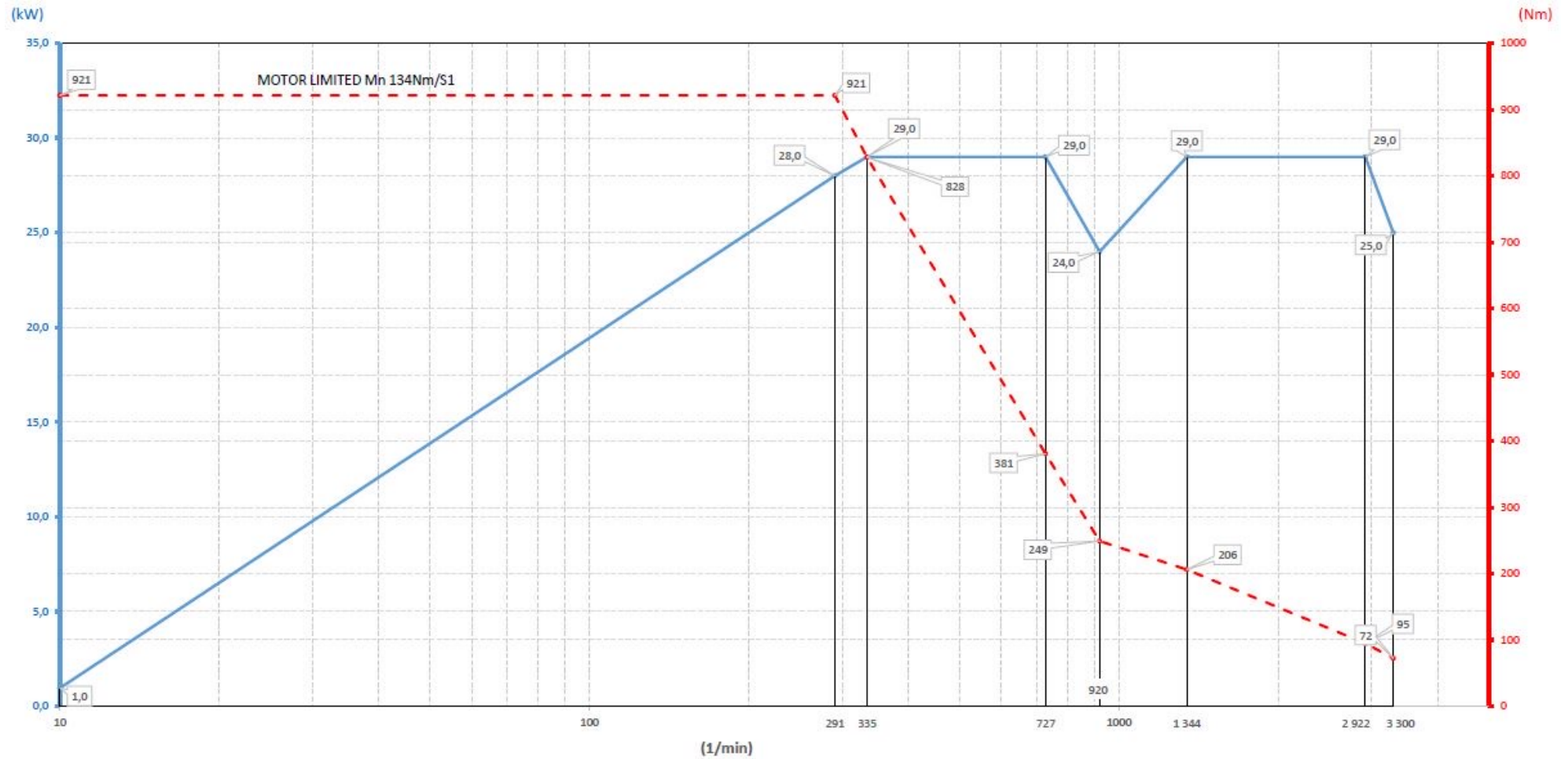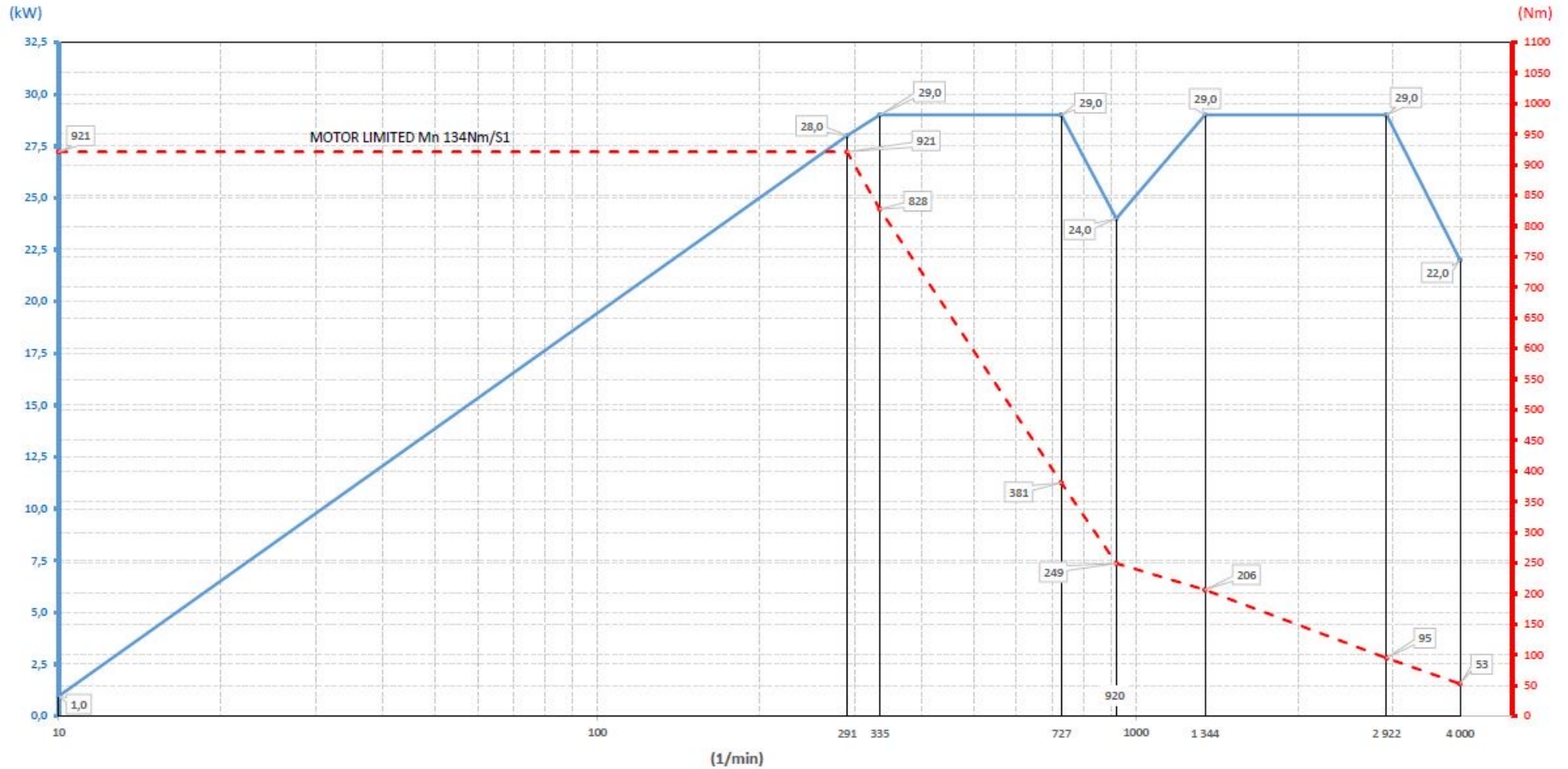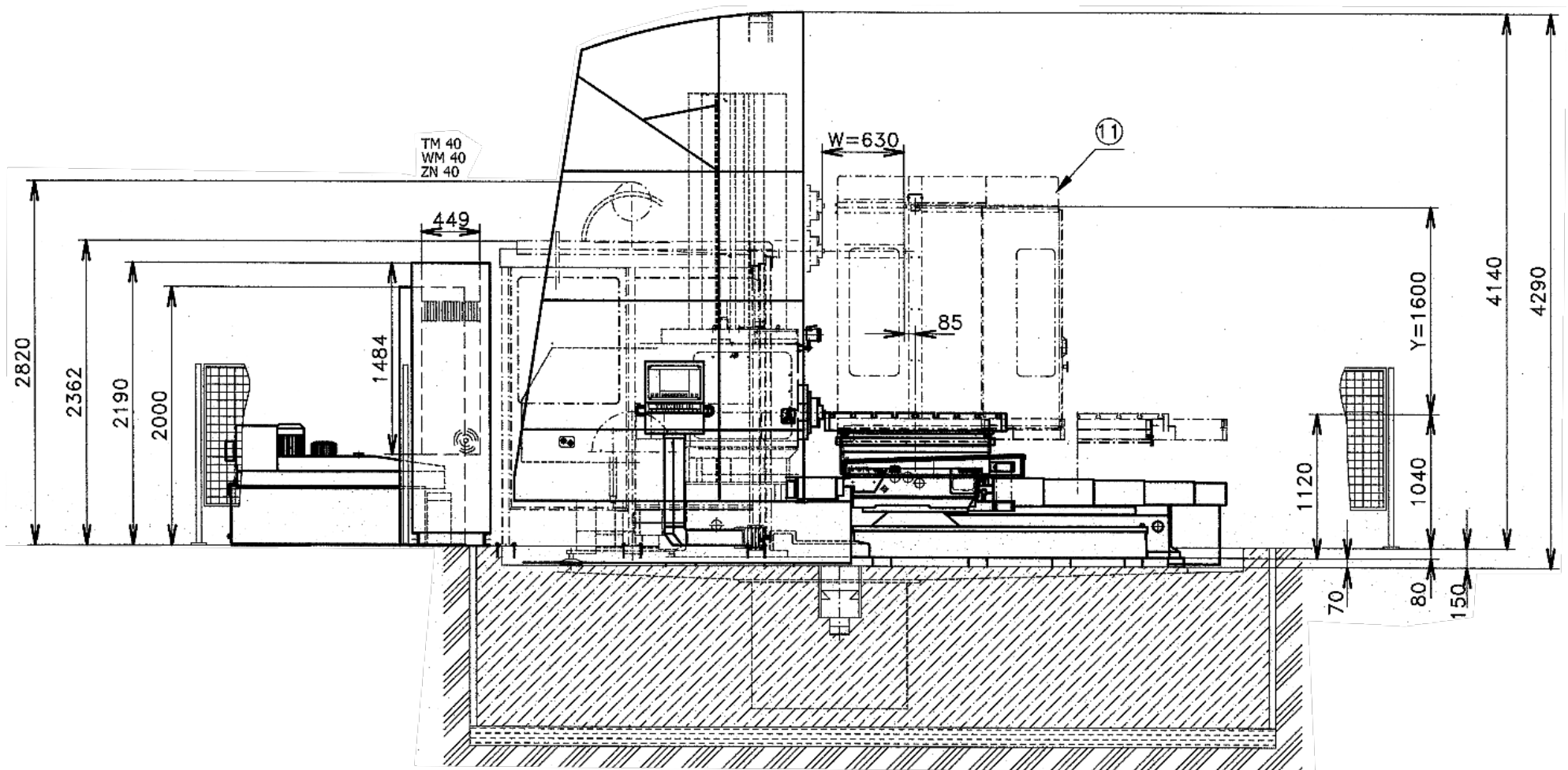Laser-hardened surface
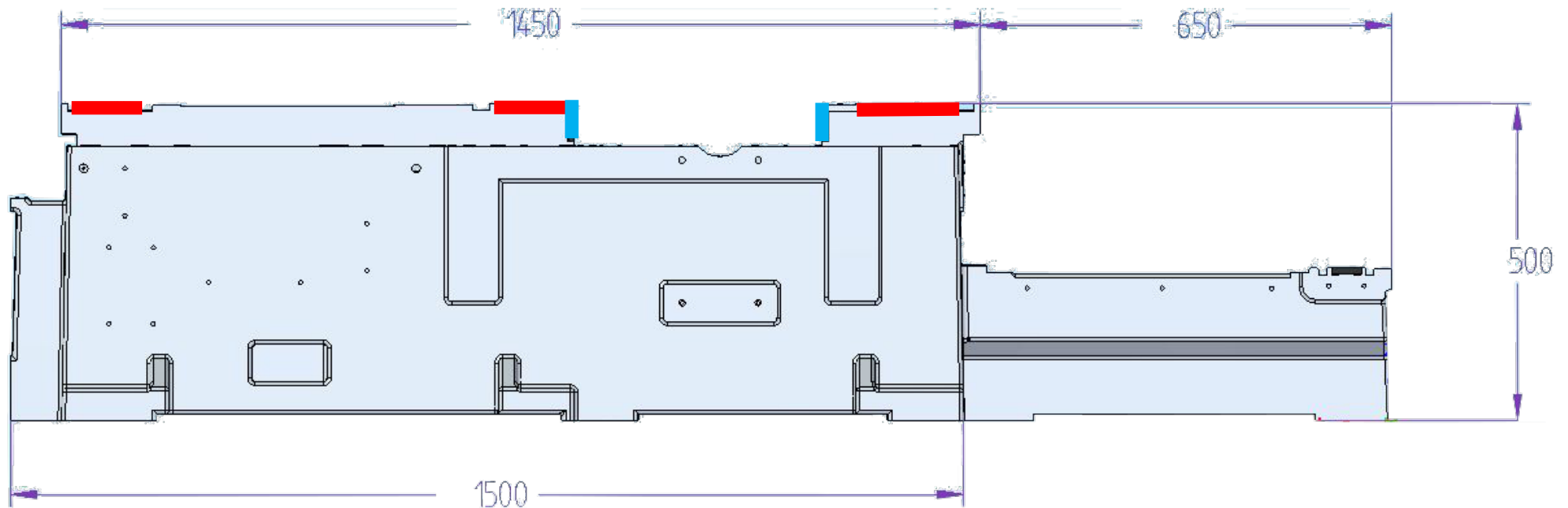
Axis Z

WHQ 105 CNC – HEADSTOCK N

WHQ 105 CNC – HEADSTOCK R
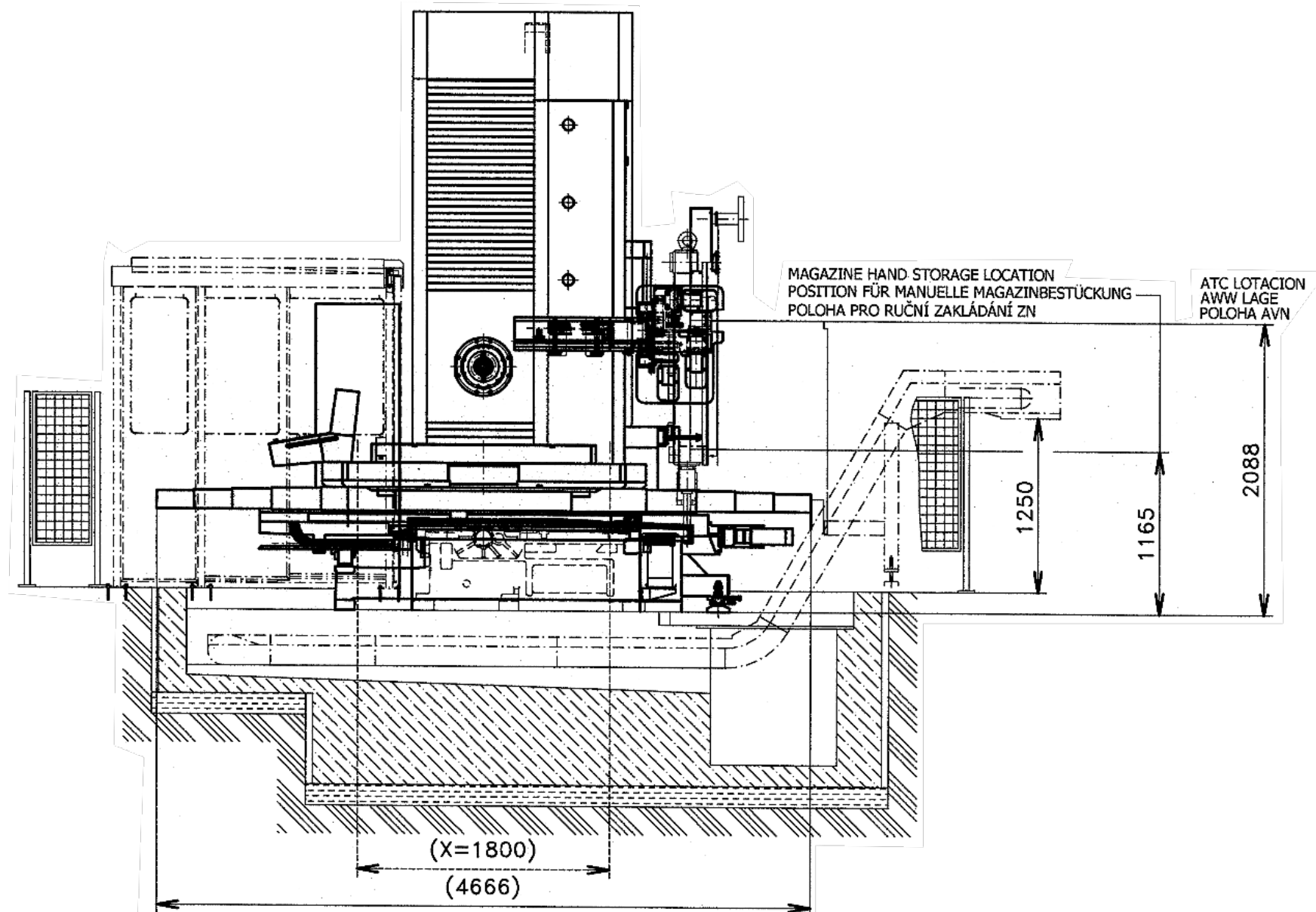
WHQ 105 CNC – HEADSTOCK R4

EXAMPLE OF A DIMENSIONAL SKETCH

EXAMPLE OF A DIMENSIONAL SKETCH

EXAMPLE OF A DIMENSIONAL SKETCH

MAGAZINE HAND STORAGE LOCATION
POSITION FÜR MANUELLE MAGAZINBESTÜCKUNG
POLOHA PRO RUČNÍ ZAKLÁDÁNÍ ZN

ATC LOTACION
AWW LAGE
POLOHA AVN

2088

1250

1165

(X=1800)

(4666)

BASIC PARAMETERS WH(Q) 105 CNC

Headstock type		„N"	„R"	„R4"
Spindle diameter	mm	105	105	105
Spindle taper		ISO 50		
Spindle speed range	R.P.M.	10 – 2,300	10 – 3,300	10 – 4,000
Main motor power, rated (continuous load operation S1)	kW	29	29	29
Main motor power max. (operation S6 - 60% of the load time)	kW	35	35	35
Spindle revs, rated	R.P.M.	263	335	335
Spindle torque, rated (S1)	Nm	1,170	921	921
Spindle torque max. (S6-60%)	Nm	1,462	1,148	1,148
Spindle stroke **W**	mm	630		

Headstock vertical travel **Y**	mm	1,250; 1,600
Min. distance of the spindle axis above table	mm	0

Workpiece weight max.	kg	5,000, 3,000*
Table clamping surface	mm	1,400 x 1,400; 1,400 x 1,600
T-slots on the table		
- dimension	mm	22H8
- pitch	mm	160
- number		9
Table centering hole diameter	mm	100H6
Table longitudinal travel **Z**	mm	1,250
Table transverse travel **X**	mm	1,800, 2,000*

* For axis x = 2,000 mm, max. Workpiece weight 3,000 kg

BASIC PARAMETERS WH(Q) 105 CNC

Range of feeds (working and rapid traverse) – **X, Y, Z**	mm/min	5 - 10,000
– **W**	mm/min	5 - 8,000
– **B**	1/min	0,003 - 2
Min. programmable positioning increment		
- **X, Y, Z, W**	mm	0,001
- **B**	grad	0,001
- **C**	grad	0,1
Max. feed forces		
- **X, Y**	kN	15
- **Z, W**	kN	20
Clamping strength for **B** axis on R =0,5 m	kN	25

Quantity of pockets in stationary magazine		40, 60, 80, 120
Pitch of pockets in magazine	mm	130
Tool dia max		
- with fully loaded magazine	mm	125 – 150
- 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
Total weight of tools in magazine	kg	1 000
Imbalance of tools in magazine max	kg	150
Tool change time (tool – tool)	sec	15
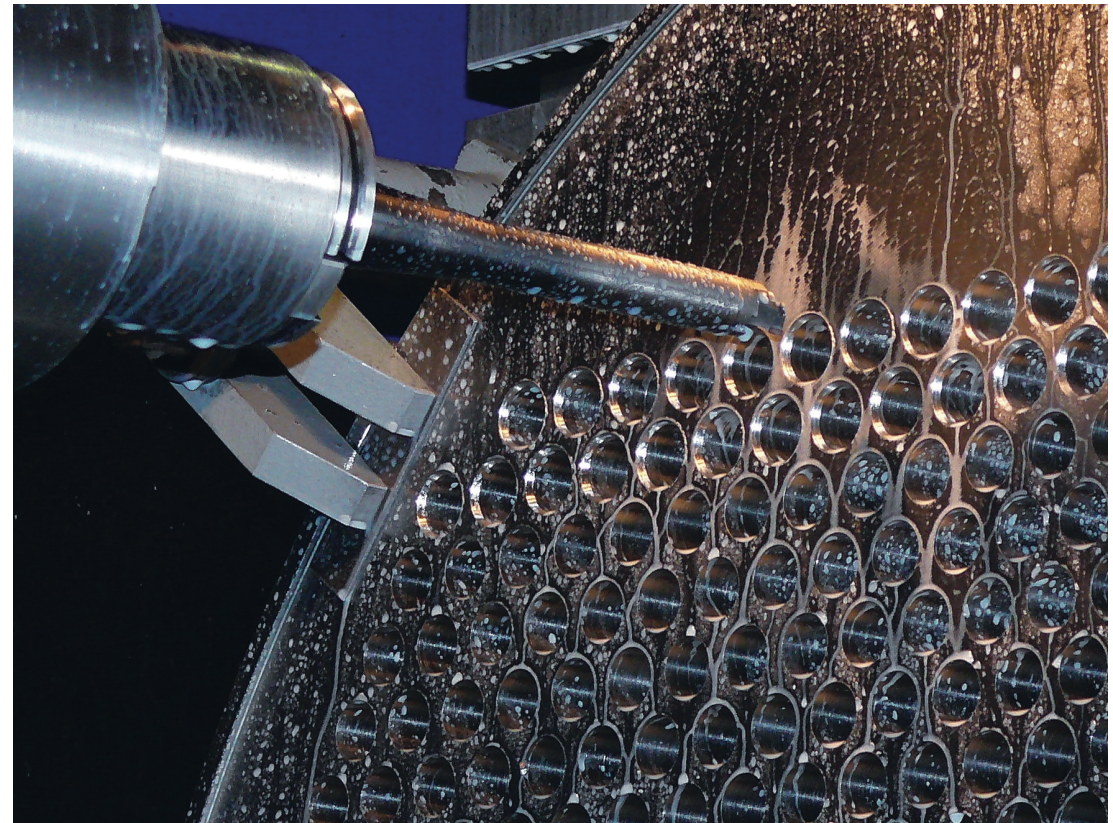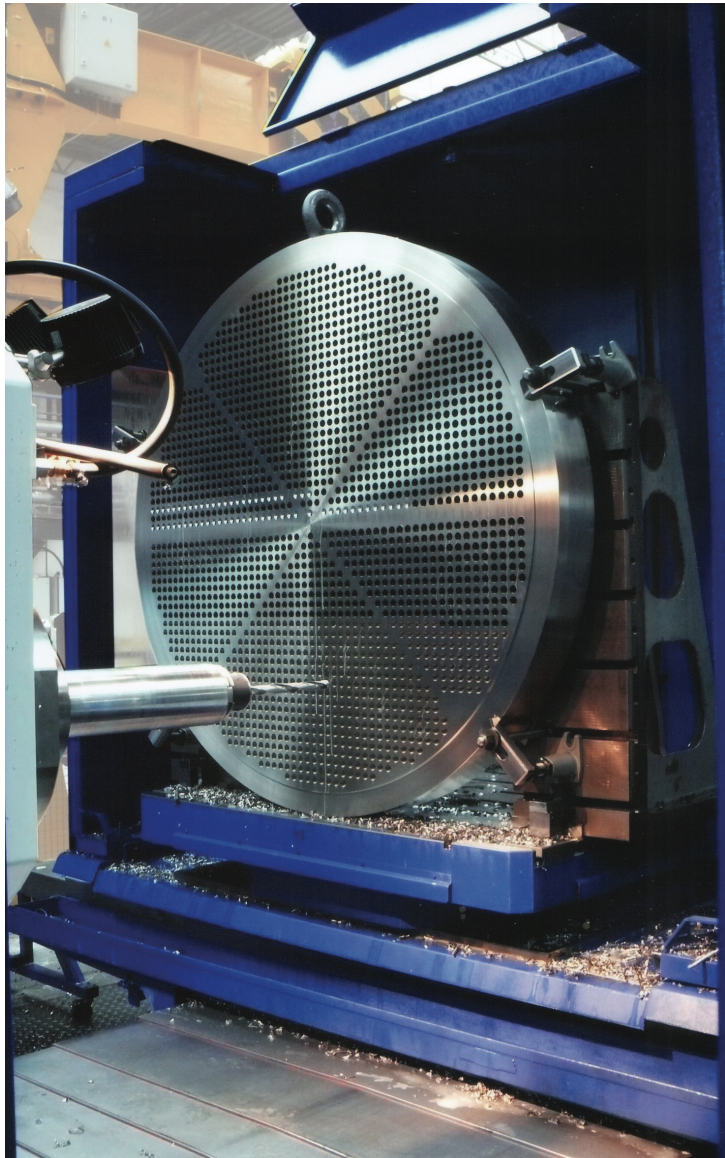
TECHNOLOGICAL EXAMPLES

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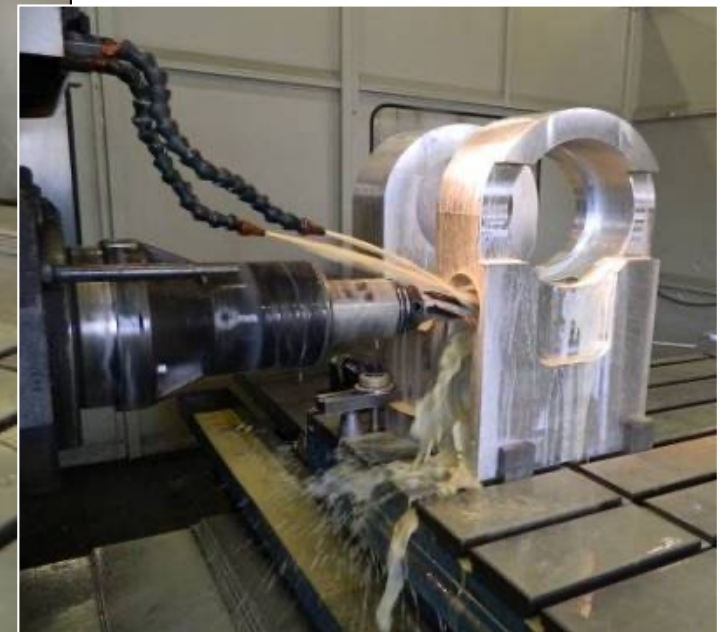
TECHNOLOGICAL EXAMPLES

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