Floor type milling machine
WRD 130 / 150 (Q)

Milling machine producer

TOS VARNSDORF a.s.

FEATURES OF THE PRODUCT

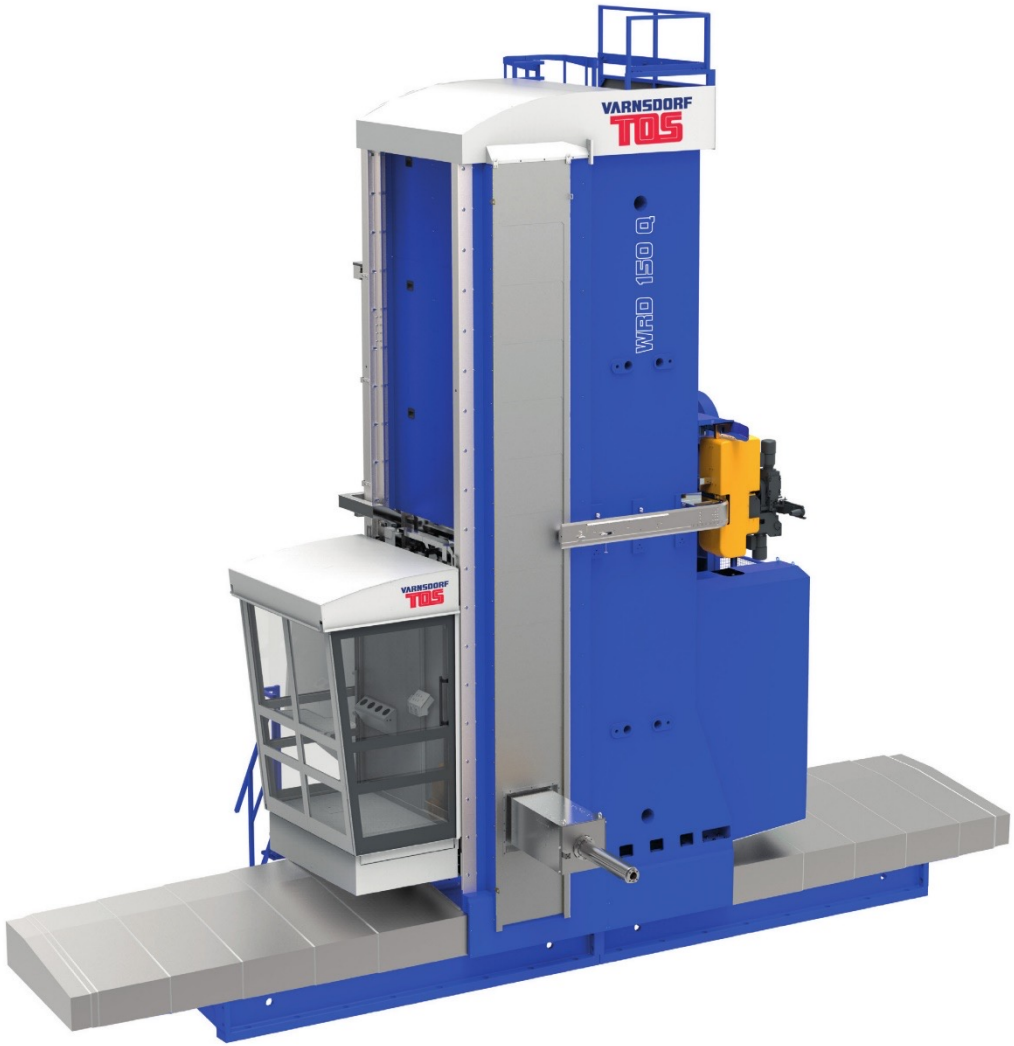
Features of the product:

WRD 130 / 150 plate horizontal boring machines represent a twin-type of machines of the same concept and frame, but different main motor outputs, different headstocks and spindle revolutions.

The machines are intended for precision and high-efficient coordinate boring, drilling, milling and thread-cutting particularly in the case of large-scale, heavy and structurally difficult work-pieces made of cast iron, cast steel and steel.

According to concrete process needs, the machines can be extended with a clamping field consisting of clamping plates or with one of more additional tables.

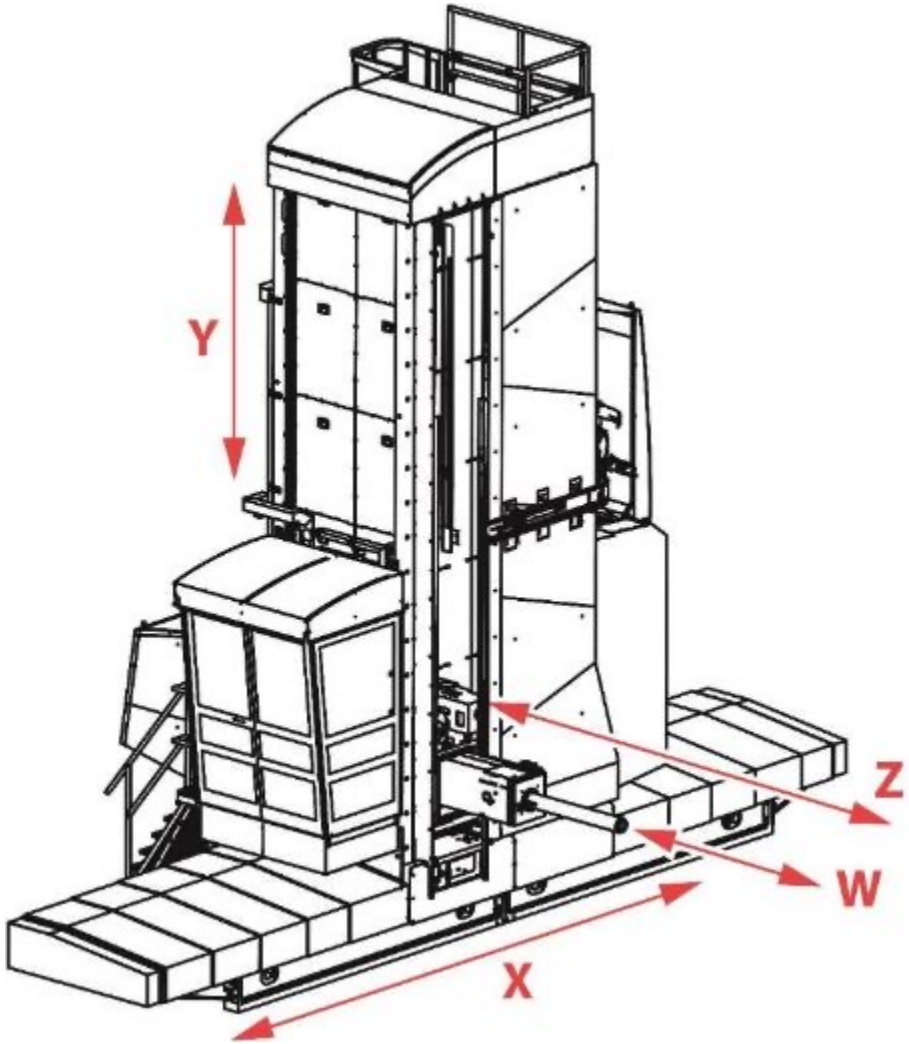
WRD 130 and 150 horizontal boring machines are typical for their modern, state-of-art design stage and top level of performance parameters. They can be extended with a wide selection of technological accessories that significantly widen the machine technological utility value.



BASIC CONCEPT OF THE MACHINE

Basic concept of the machine:

WRD 130 / 150 (Q) are floor type horizontal boring machines of a left-had design with a tail-stock barrel (sliding block) and telescopic working spindle. The machines are offered in three different spindle diameters (130, 150 and 160 mm) and other correspondingly different parameters. The machines are continuously controlled in four axes (**X** - base cross travelling, **Y** - headstock vertical adjustment, **Z** - sliding block longitudinal travel 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.

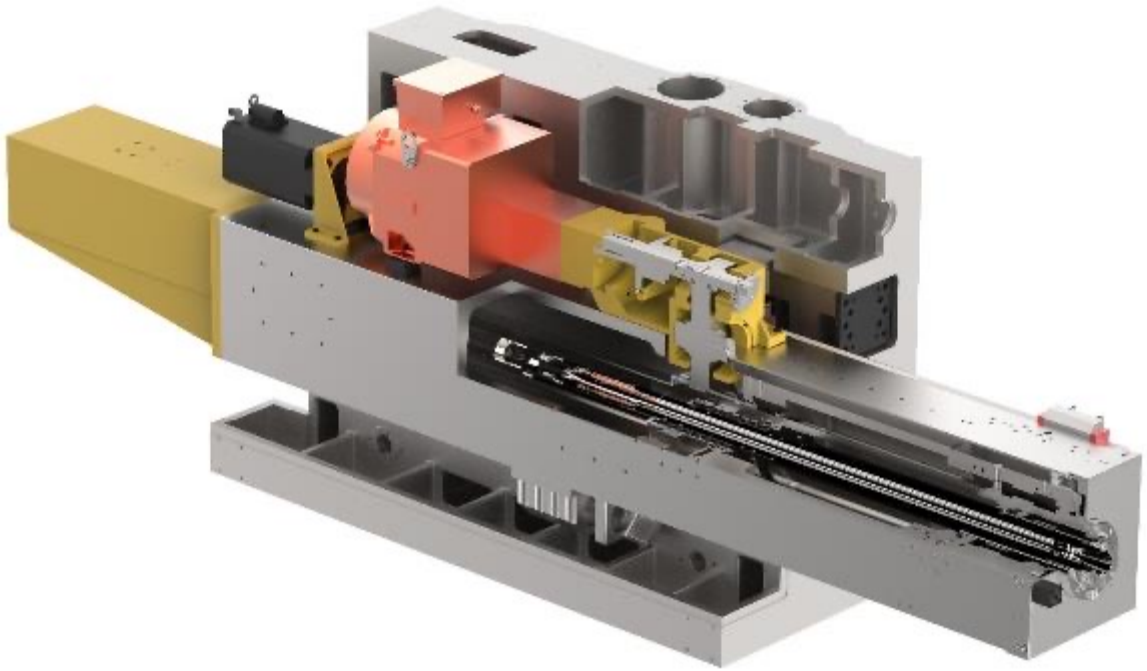


HEADSTOCK

Headstock:

The main casing is a rigid gray iron casting, as well as the other connected L-shaped part, which forms a guide for the sliding block. At the same time, this assembly is designed in a manner allowing for electro-mechanic compensation of sliding-block head dropping during its extension travel within the Z axis.

The working spindle rev drive is derived from the electric control drive over a two-speed gearbox. The spindle speed is thus controlled in two mechanical sequences. In the 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. The working spindle is nitrided and it is push-fit with a minimum clearance into a nitrided hollow spindle with bronze bushing in its front. The hollow spindle is fitted into the pre-stressed spindle ball bearings.



FEED DRIVES AND CLAMPING

Feed drives and clamping:

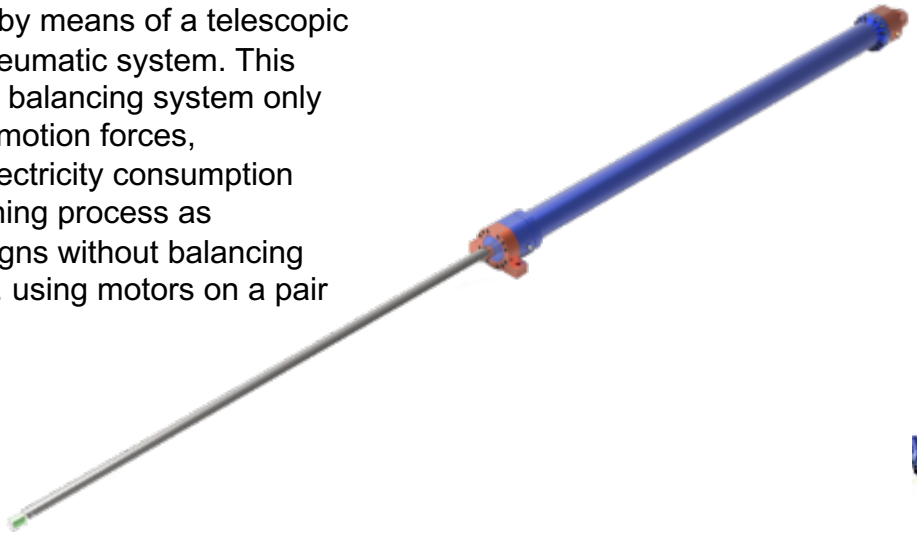
Each of the four axes (X, Y, Z, W) has its independent electric control motor operator available. The conversion to the linear motion at Y, Z and W axes is designed through ball bolts with pre-stressed nuts; the X-axis movement is carried out by the use of a pair of electric servomotors with reducers. The gear pinion pre-stressing force on the reducing gear outputs against the rack bar is generated by wiring the drives in the "master-slave" function.

The first gear of the drive gears for the Z and W axes is designed in cogged belts and reducer for the Y axis

COMPENSATION

Headstock weight balancing:

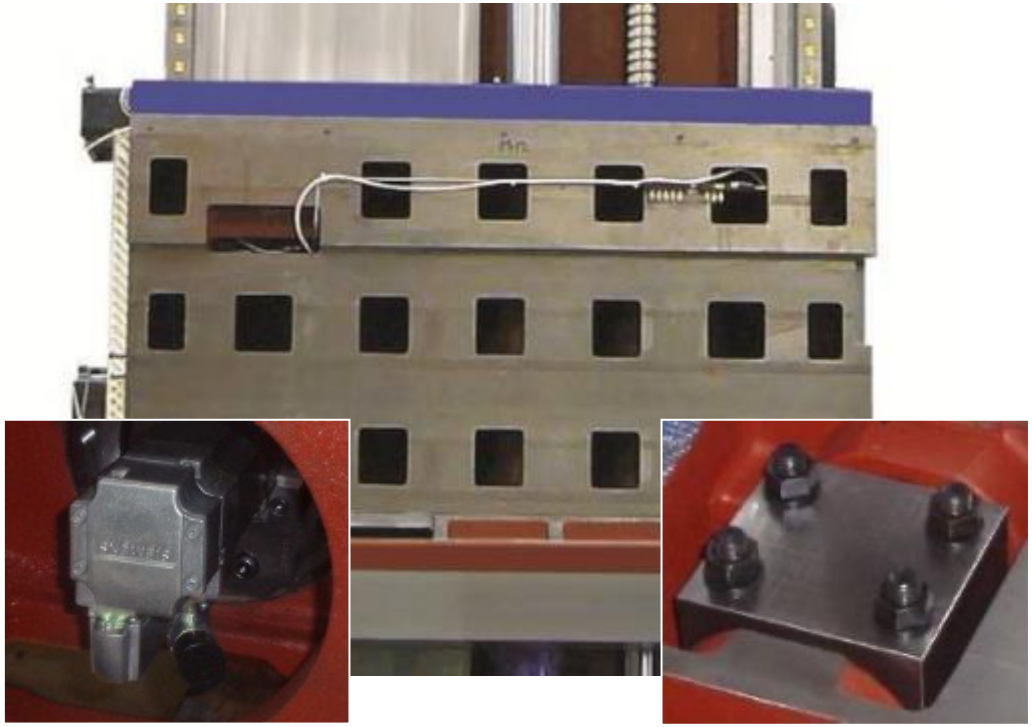
The weight of the headstock is counterbalanced by means of a telescopic cylinder of the pneumatic system. This headstock weight balancing system only requires minimal motion forces, decreasing the electricity consumption during the machining process as compared to designs without balancing mechanisms, e.g. using motors on a pair of ball screws.



COMPENSATION

RAM falling compensation:

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 Z axis. Slide falling is compensated with a special electro-mechanical system (see fig.) 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.



GUIDEWAYS OF MOVABLE GROUPS

Guideways of movable groups:

Guiding of the CNC controlled traveling axes have been designed as:

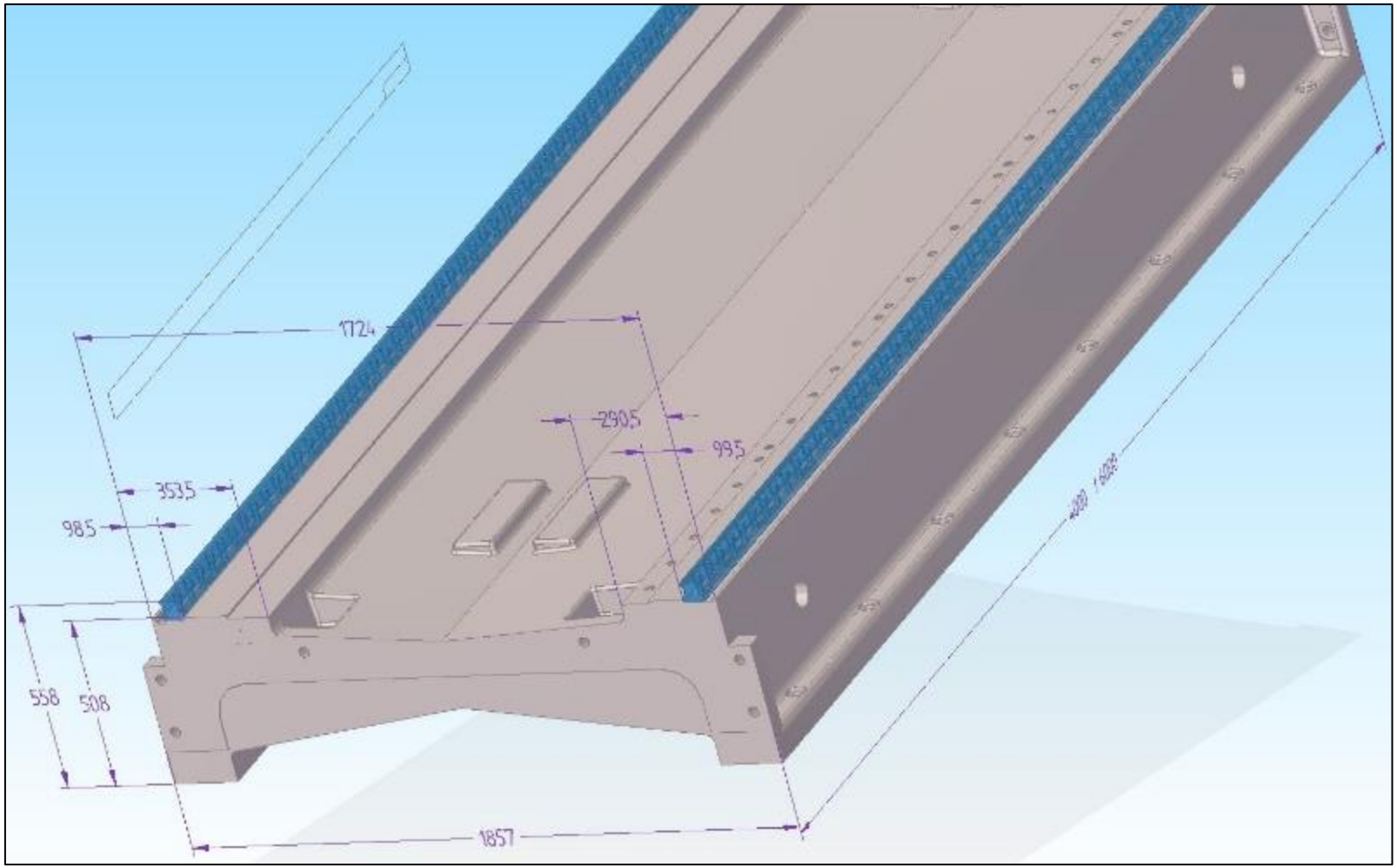
- rolling type, preloaded, employing the compact linear roller pads - headstock guiding, ram guiding, column slide ways.

The bed guides are provided with steel telescopic covers.

The guide on the base is protected with an overall case covering the whole space of headstock travel; at the machine face, in the direction to the workpiece, the covering is made of steel segments, while on the side of the operator's platform, the whole space is protected with a fixed cover and covering bellows in the rear.

Axis X

GUIDEWAYS OF MOVABLE GROUPS



Axis X

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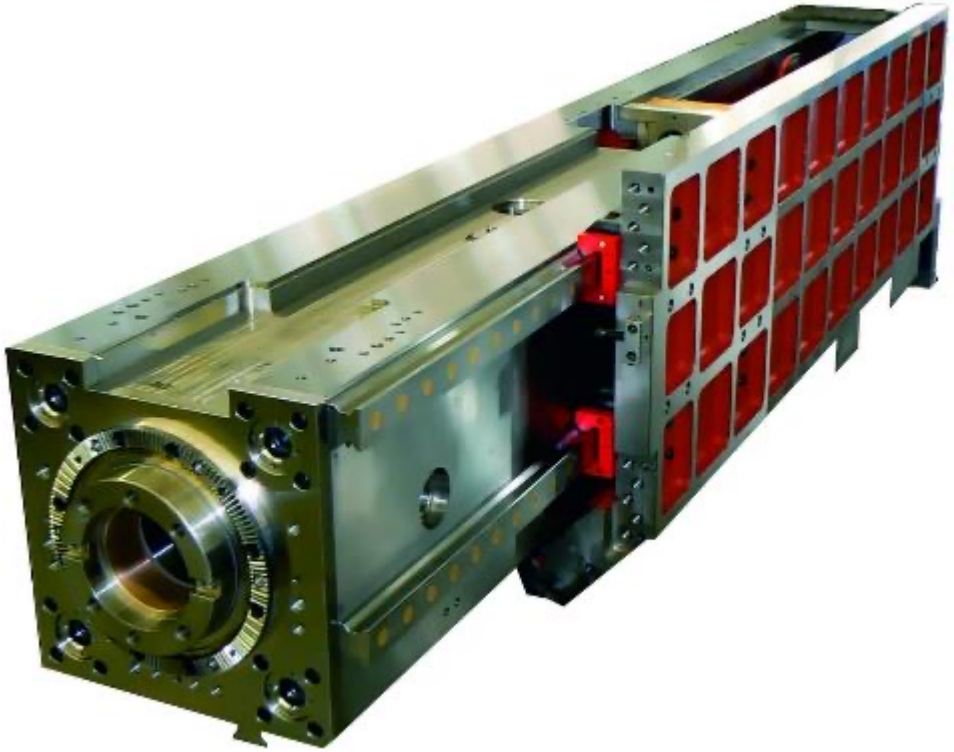
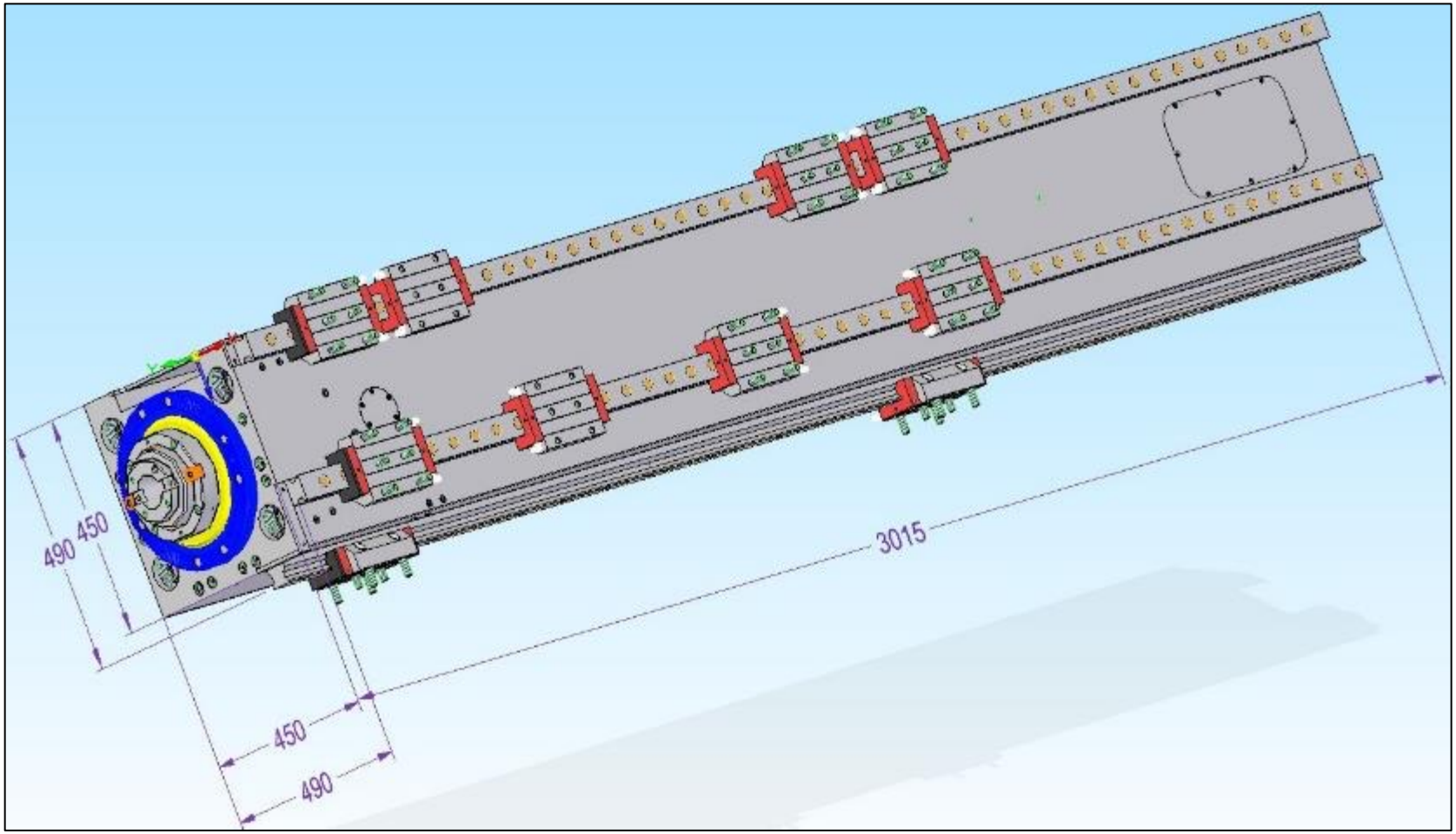


Axis W and Z

GUIDEWAYS OF MOVABLE GROUPS



Axis W and Z

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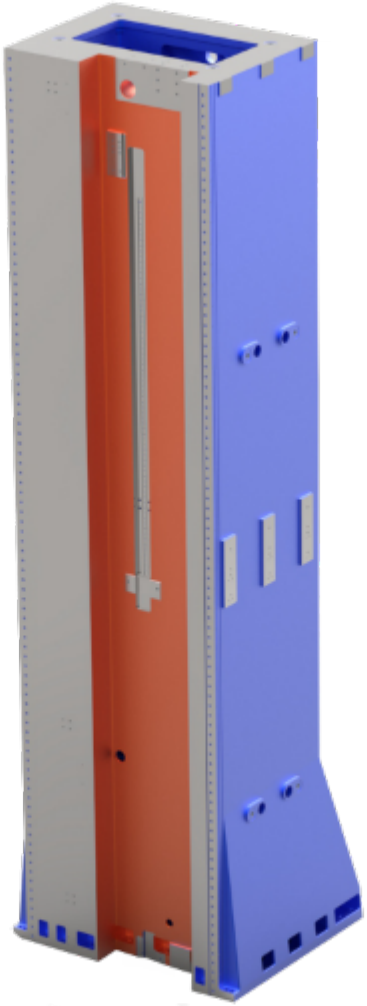
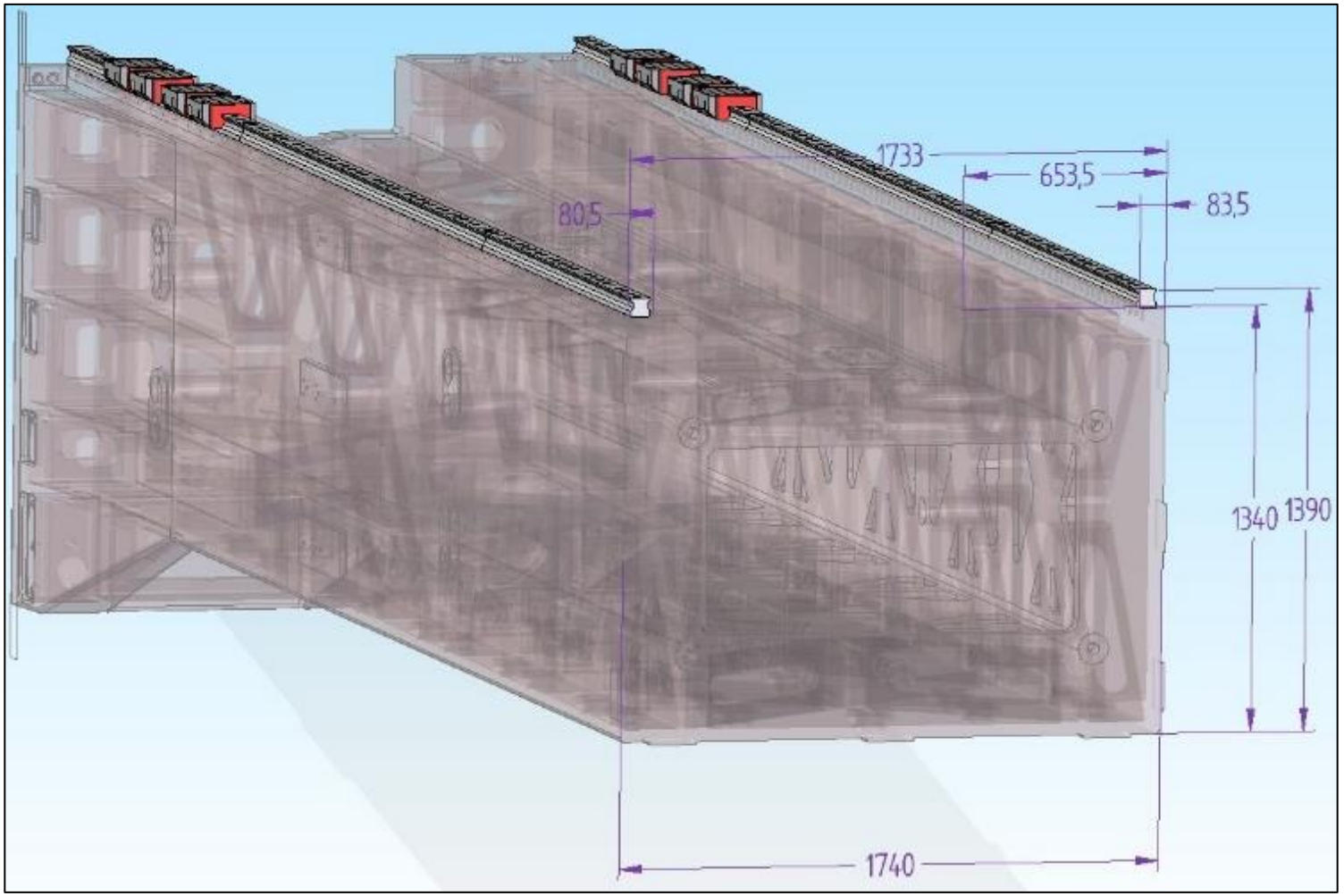


Axis Y

GUIDEWAYS OF MOVABLE GROUPS



Axis Y

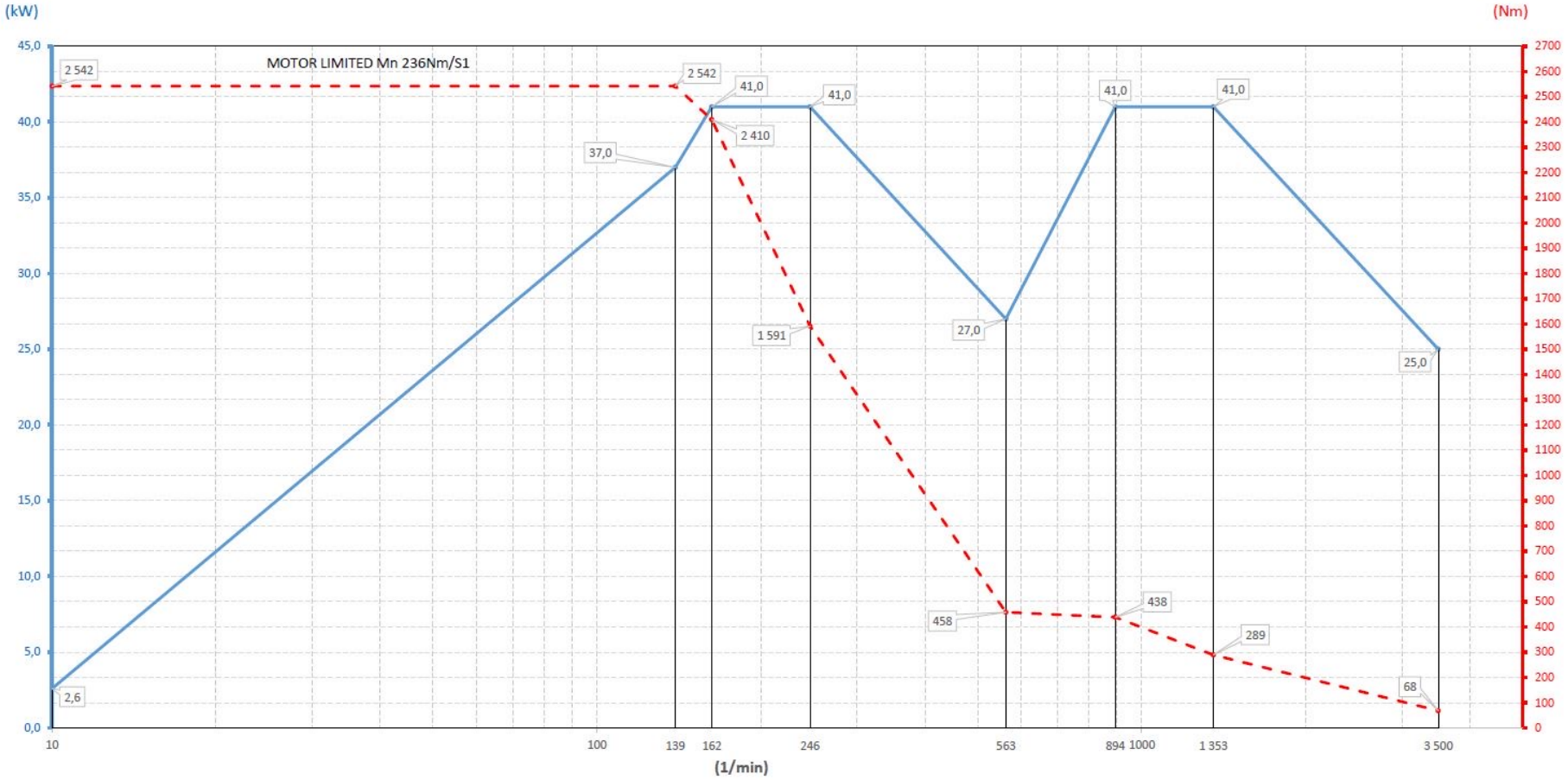
WRD 130 / 150 DUO

Alternative solution for portal machines technology

- Spindle diameter 2 x 150 mm
- RAM stroke (Z1, Z2) = 1 000 mm
- Spindle stroke (W1, W2) = 800 mm
- Max. spindle speed 2 500 RPM
- Max. motor power 60 kW

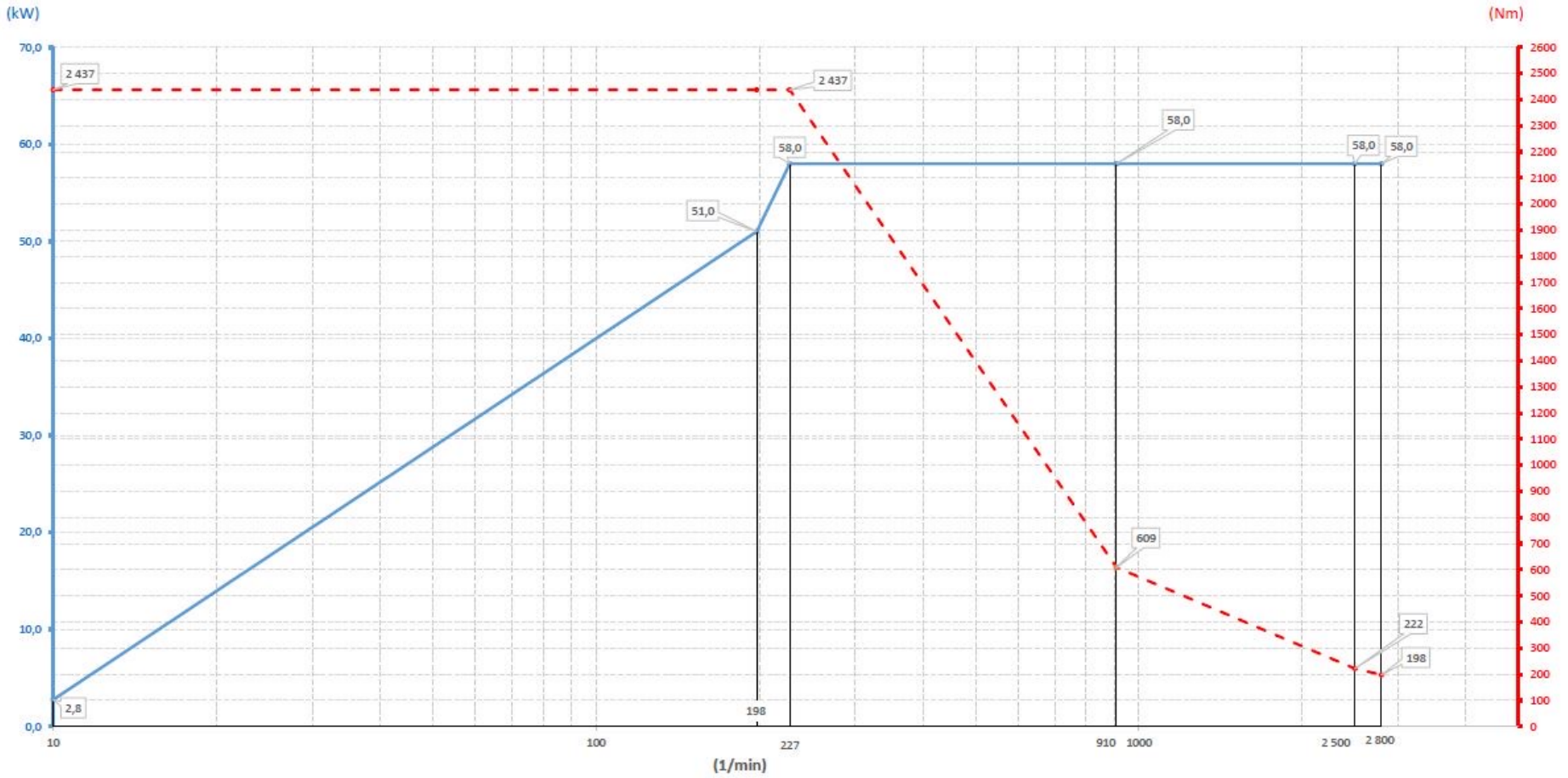
- Horizontal column travel (X1) = 16 000 mm
- Horizontal column travel(X2) = 9 000 mm
- Vertical headstocks travel (Y1, Y2) = 2 500 mm
- Maximal workpiece (table) = 30 000 kg
- Maximal workpiece (clamping plate) = 80 000 kg

CURCUIT DIAGRAM



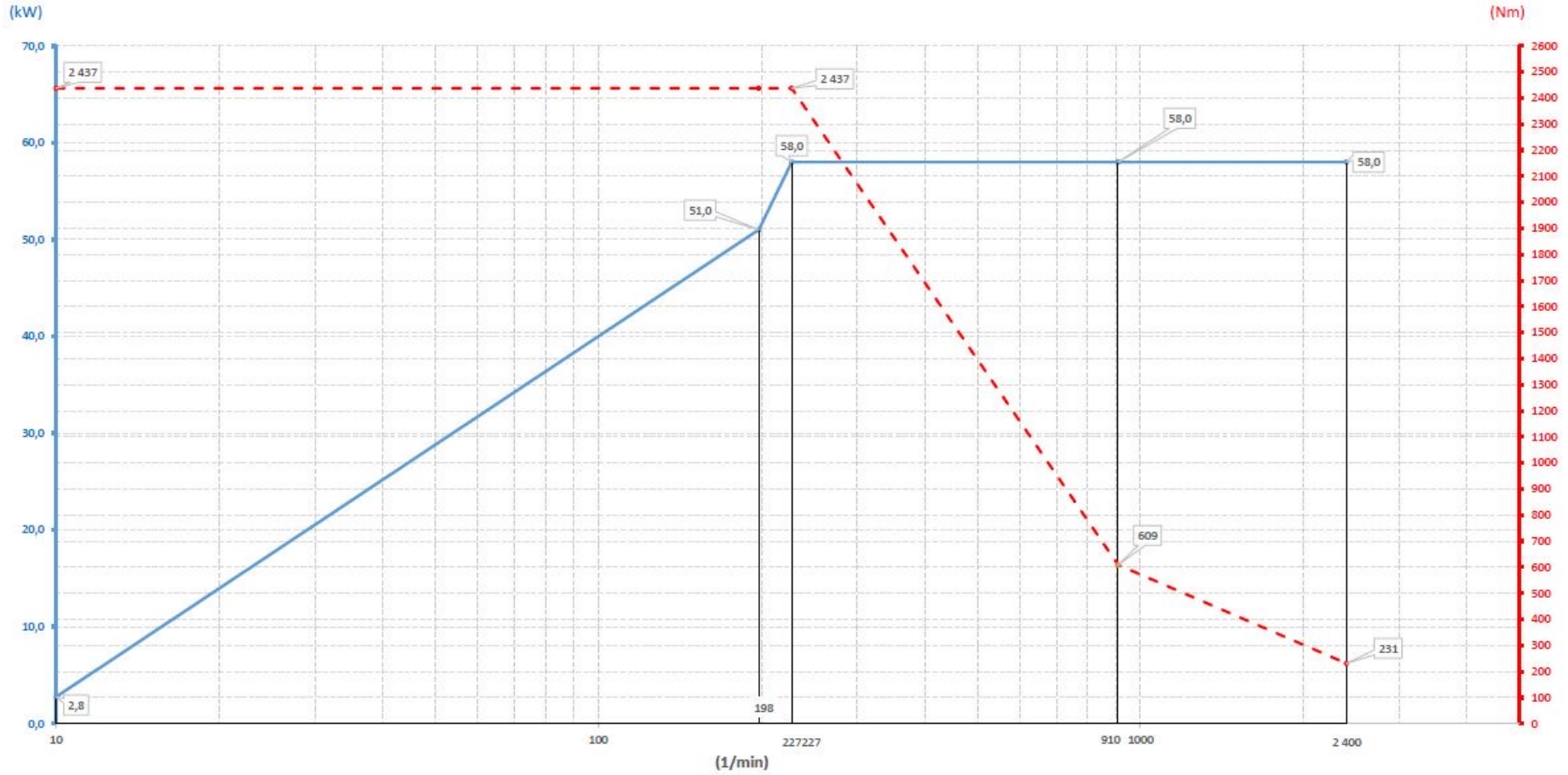
WRD 130 - 41 kW

CURCUIT DIAGRAM



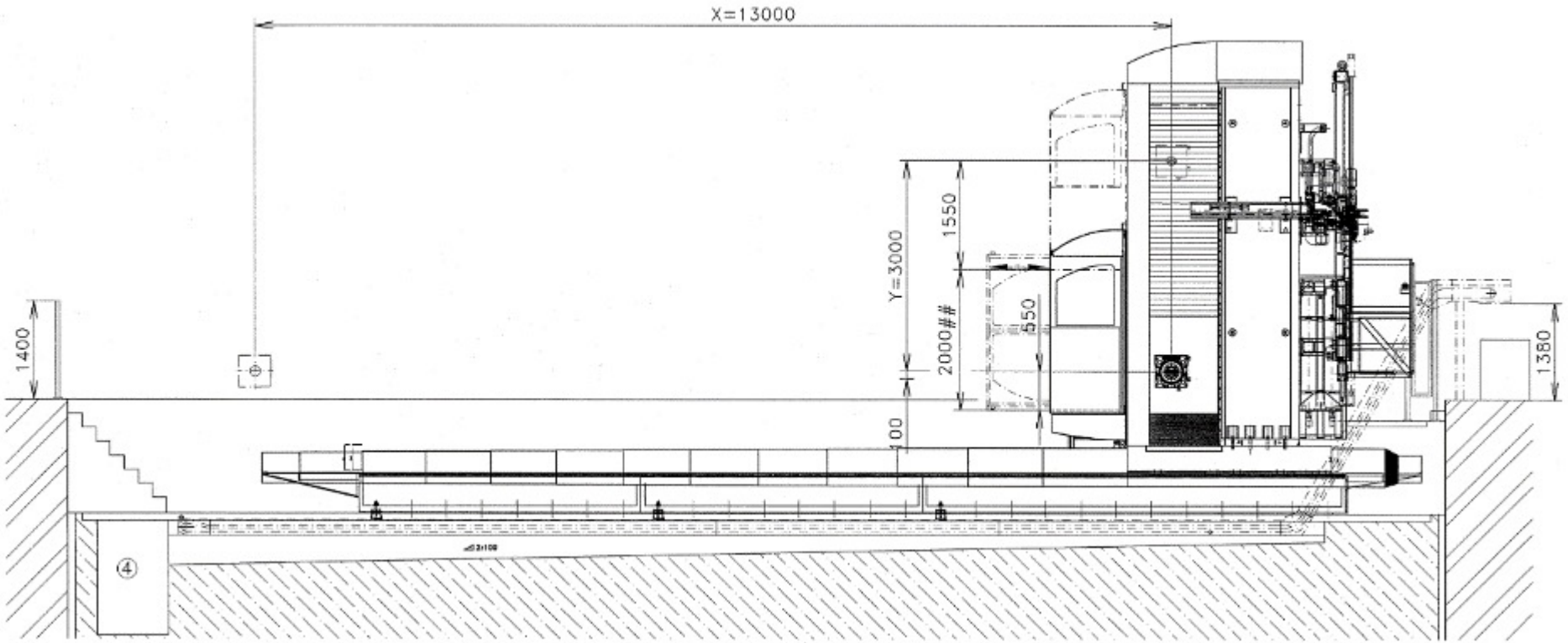
WRD 150 - 58 kW

CURCUIT DIAGRAM



WRD 160 - 58 kW

EXAMPLE OF A DIMENSIONAL SKETCH



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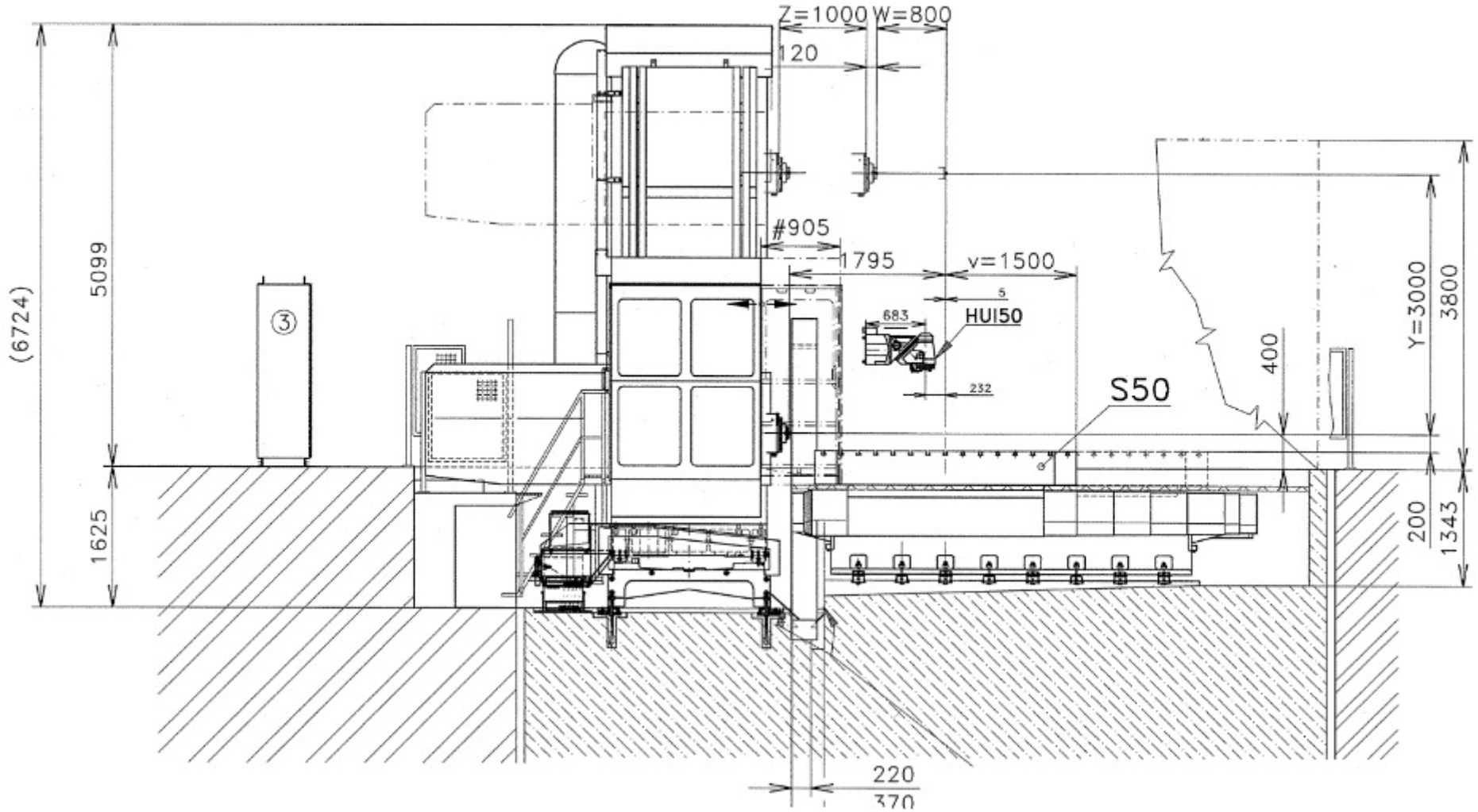

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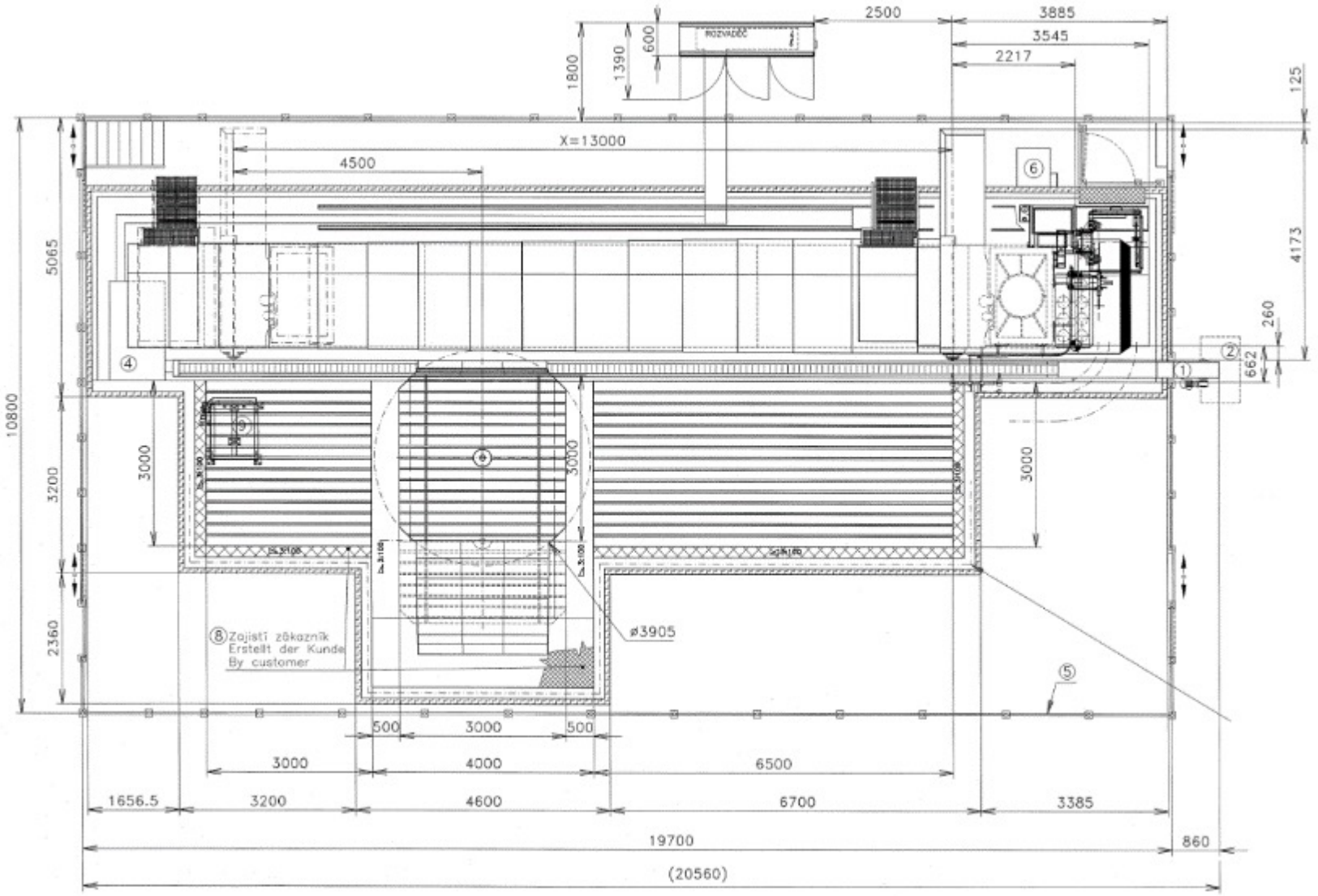


BASIC PARAMETERS

Machine		**WRD 130**	**WRD 150**	**Ø 160 mm**
Spindle diameter	mm	130	150	160
RAM size	mm	450 x 450		
Spindle taper		ISO 50 / ISO 50 BIG+		
Clamping strengh of tool	kN	25	25	25
The outer diameter of the flange of the hollow spindle	mm	221,44	221,44	221,44
Spindle speed range	1/min	10 – 3 000	10 – 2 500 (2 800) (10 – 1 500*)	10 – 2 400
Main motor power (S1)	kW	41	58	58
Max. motor power (S6 – 60%)	kW	46	65	65
Torque (S1)	Nm	2 535	2 437 (2 500/4 870)	2 437
Max. torque (S6-60%)	Nm	3 152	3 138	3 138
RAM travel **Z**	mm	1 200		
Spindle travel **W**	mm	700	800	800

BASIC PARAMETERS

Headstock vertical travel **Y**	mm	2 500 – 6 000 (step 500 mm)
Column transverse travel **X**	mm	5 000 – 27 000 (step 2 000 mm)

Feed range (working and rapid traverse – **X, Y, Z**	mm/min	1 - 24 000
- **W**	mm/min	1 - 12 000
Max. feeds force: **X, Y, Z, W**	kN	40

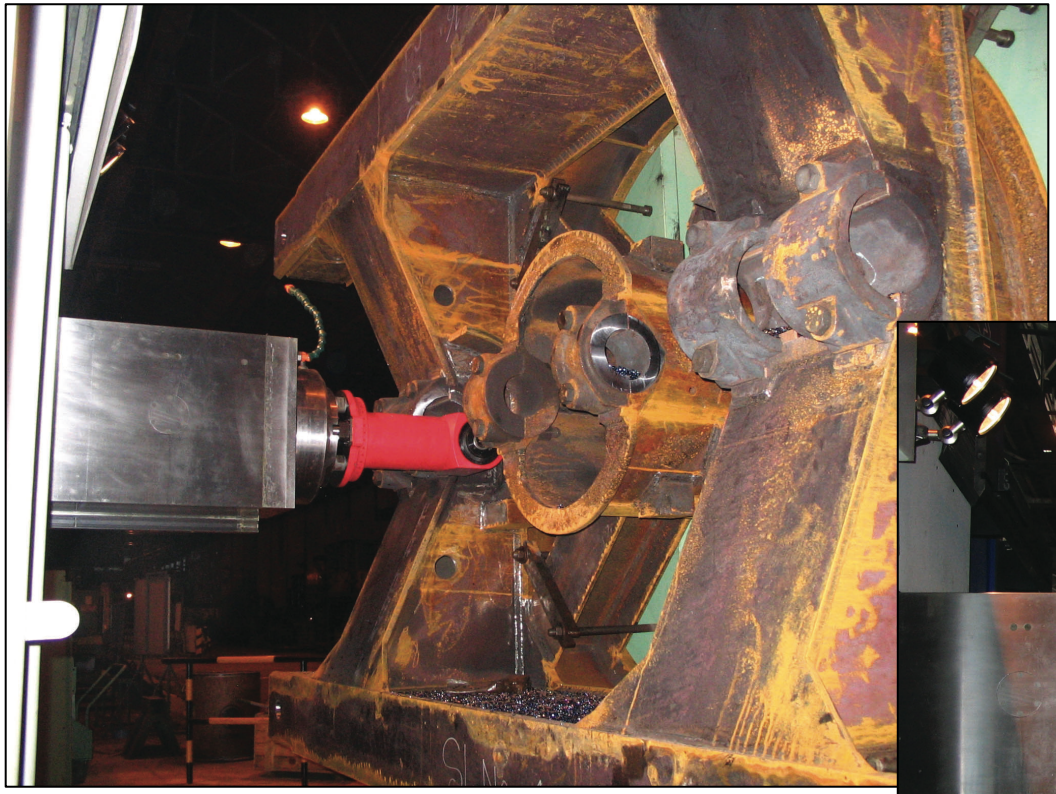
Number of pockets in magazine		40, 60, 80*, 120**
Pitch of pockets in magazine	mm	130
Tool dia max		
- with fully loaded magazine	mm	125
- with free neighboring places	mm	320
Dia max. of a special flat tool	mm	390 (600)
Tool length max	mm	500
Tool weight max	kg	25 (35***)
Total weight of tools in magazine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

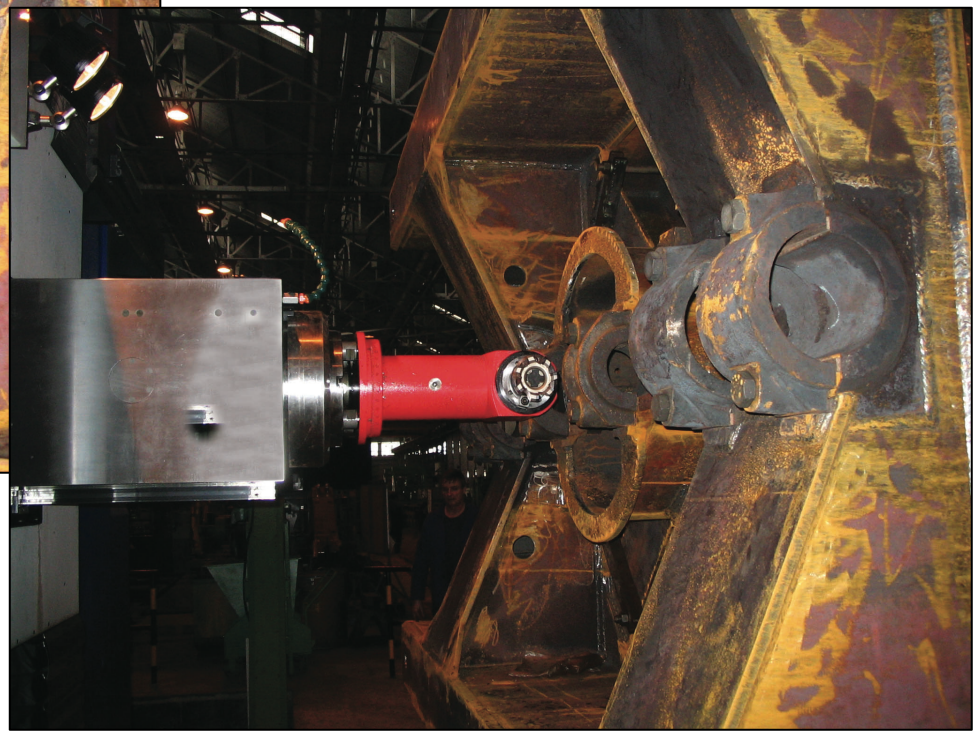
* Only for machine design Y = 3 000 and more.

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

*** Option

TECHNOLOGICAL EXAMPLES





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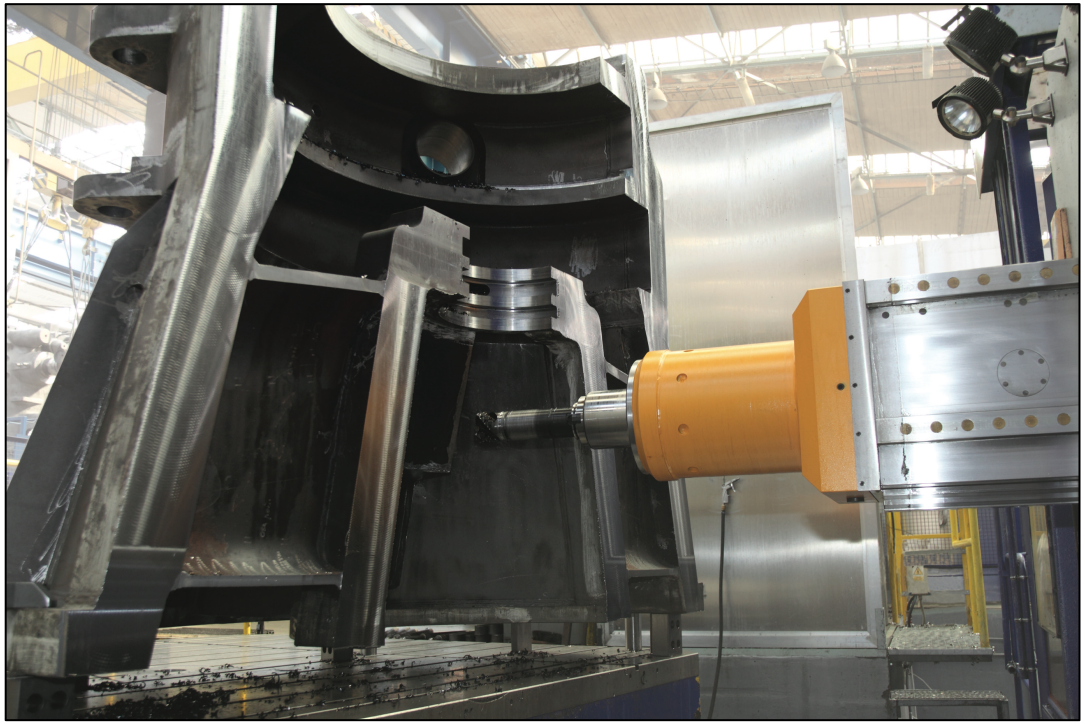

TECHNOLOGICAL EXAMPLES

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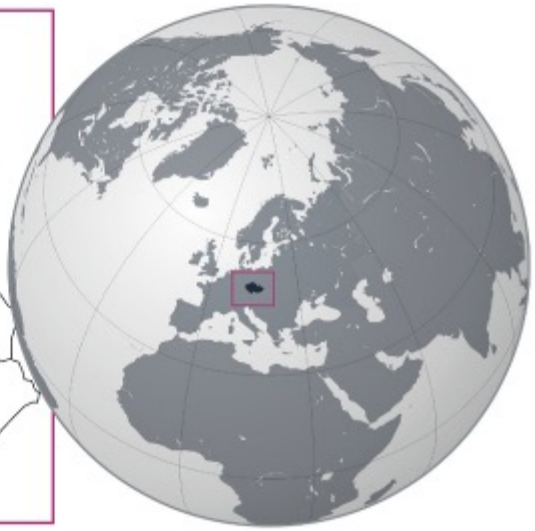

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