

Complete Machining Promotes Growth



The main and counter spindles of the Hyperturn 110 are equipped with hollow clamping cylinders. Thanks to this feature, it is possible to fully machine bars in lengths of up to 5000 mm without the need for manual interventions.

[Stahl Judenburg GmbH]

A leader in the processing of high-grade engineering steel into steel and bright steel bars, Stahl Judenburg is a globally renowned manufacturer of high-quality steel products which are used in areas subjected to maximum loads and forces as well as in areas where safety is of paramount importance. Founded in 1906, the traditional company today employs 450 staff. In the previous year, its revenues amounted to EUR 108 million. With 70 percent, the largest share of revenues can be attributed to the company's core businesses: the automotive and commercial vehicle industries. Exports represent 92 percent of production.



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[Requirements Profile]

- Complex complete machining
- Complete machining including retraction, cutting to length, turning, milling, processing as well as marking on the face and preparation for removal
- Automatic loading and unloading
- Repeatability and solid processes



Among Stahl Judenburg's successful specialties are chromium-plated, stainless steel piston rods for hydraulic applications. Amongst other things, these have to be marked on the face side.

Amidst an impressive mountain landscape in the Styrian city of Judenburg, you will find one of Austria's hubs for the processing of engineering steel. A specialist in the area of stainless steel and engineering steel, Stahl Judenburg provides customers from all over the world with high-quality rolled and bright steel bar products. When it comes to the production of components, the company from Upper Styria has moreover made a name for itself in the area of high-quality end products: the high quality is due to the uninterrupted process chain from the raw material to the finished product. Thanks to the Hyperturn 110 – Emco's turning and milling centre with automated loading and unloading – the company was able to integrate all processing steps into automated series production. This improved the competitiveness of the Styrian company to such extent that it only took two years until a second, similar machine was bought.

Continuous Process Chain

As the leading company in the processing of high-quality engineering steel into steel and bright steel bars, the Styrians have been producing half-finished bright steel products (as ball screw drives) for several years. Apart from that, Stahl Judenburg also produces finished products such as steering elements for the automotive industry and piston rods with hard chrome plating for stationary and mobile hydraulic applications, as is the case with construction machinery. These already account for 10% of the annual revenue of EUR 108 million and have emerged into one of the company's specialties. 'We control the entire process chain, be it rolling, bar peeling, heat treatment, polishing, chrome plating – which is taken care of by our subsidiary VTK Veredelungstechnik Krieglach – and finishing,' explains Franz Klingsbigl, head of Stahl Judenburg's department for piston rods and components. 'Thus, our customers may rest assured that they are provided with consistently high quality.'

Focus on Production

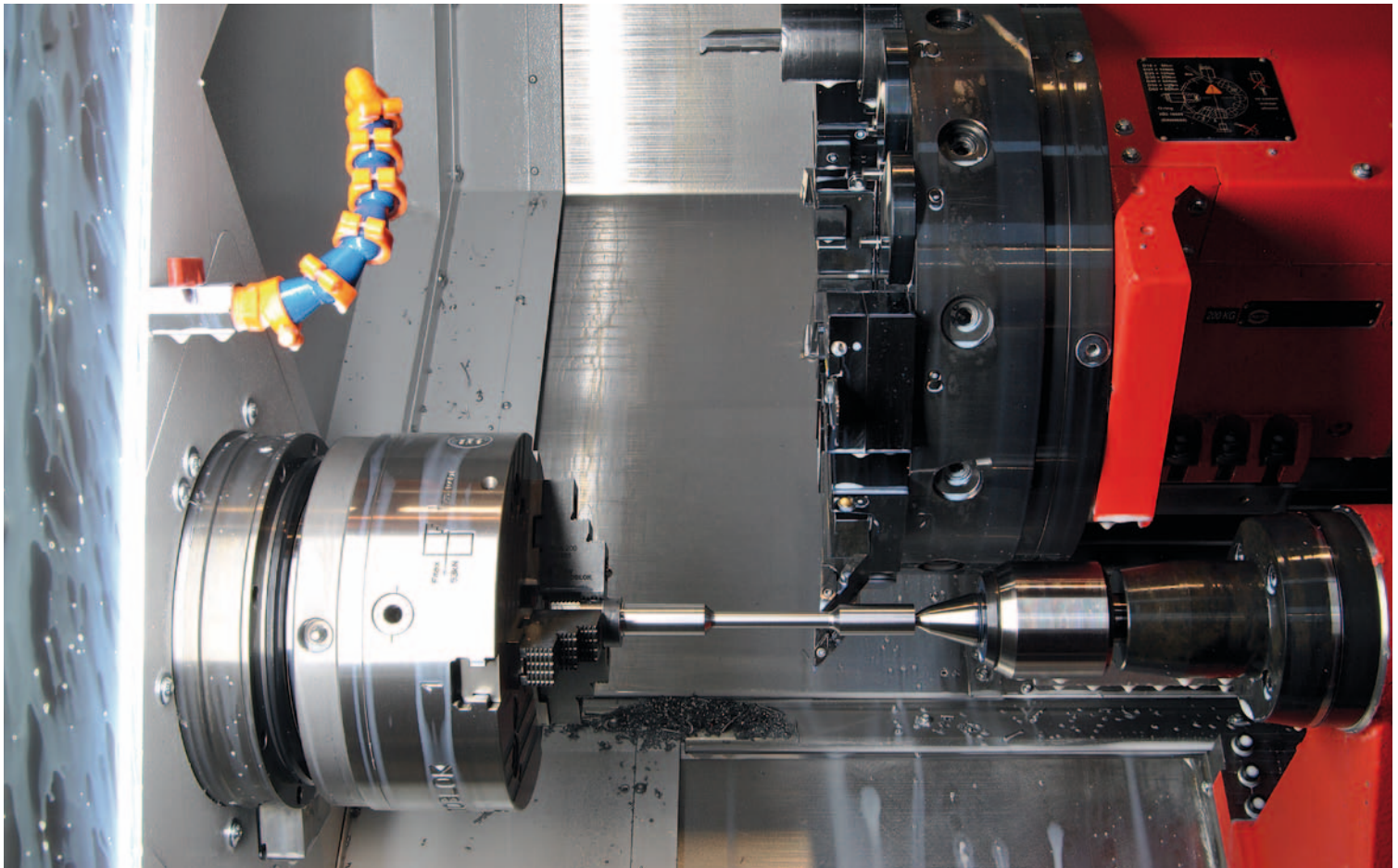
In 2010, Stahl Judenburg began to modernise the existing production in order to enhance its added value. The modernisation involved the equipment of a CNC turning machine with automated loading and unloading. 'This measure resulted in a significant raise of our productivity level,' remembers the production professional. 'The resulting increase in competitiveness gave us access to large-scale orders from renowned users.'

In order to be able to meet the increasing demand, the company's production was successively expanded. In 2015, the company decided to purchase a lathe with two separate spindles. The main reason for this decision was the company's intention to fully machine the piston rods directly from the bar material without changing the set-up. 'Previously, we would cut the blanks to length outside the machine before clamping,' remembers foreman Manuel Kogler. 'Lots of workpieces had to be lifted out with a slewing crane, and often we had to move the steady rests manually inside the machine room.'

The Challenge: Automation

'The individual marking of the finished parts, too, had to be done outside the machine, namely by etching immediately before packing the parts,' adds Franz Klingsbigl, who was substantially involved in the elaboration of the specifications. 'This procedure, too, was to be integrated into the machining process. Our aim was to increase our process reliability even further.'

The company's range of parts is very wide. The lengths of the piston rods vary from approx. 50 to 6,500 mm. Their diameters range from 12 to 120 mm. Weighing up to 500 kg apiece, the long bars present a challenge as regards complete automation. Precision plays a decisive role in the achievement of the desired surface finishes. Besides, the bar surfaces must not be damaged during loading and unloading.



An Emcoturn E65 MY featuring a VDI 40 tool system with twelve axially arranged tools and an additional Y-axis for milling operations is used for the production of tensile and notched specimens.

Expectations: Met

‘The Hyperturn 110, Emco’s turning and milling centre with main and counter spindle, turned out to be the best solution for our requirements,’ Franz Klingsbigl reports. ‘A special feature of the machine is that the counter spindle, too, is equipped with a hollow clamping cylinder. As is the case with the main spindle, its opening width is sufficient for 100 mm bars.’ The machine is able to retract, cut, turn, mill, machine and mark the material in a single, fully-automated pass.

Two servo turrets with short switching times and twelve stations each (VDI 40 interface) allow for highly productive working cycles. The additional Y-axis in the upper tool system makes milling operations (such as wrench size marking) possible. Stahl Judenburg uses it for engraving the bars on the face side.

Ergonomic Overall Control

A highly productive machine for the production of different lot sizes, the Hyperturn 110 requires powerful peripherals. The loading and unloading system of the Hyperturn 110 is a unique, custom-made unit implemented by Hage Maschinenbau, a nearby manufacturer of special purpose machinery.

In cooperation with the latter, Emco’s application engineers developed a device-specific port for the Siemens Sinumerik 840D SL control including operator interface. Further special features created for Stahl Judenburg are a programme upgrade for triggering the bar feeding grippers as well as customised entry screens for the input of processing parameters. With the Hyperturn, all the machine operator needs to do to determine the programme parts is setting the respective parameters. Compared to previous machines, the operator is moreover provided with significantly clearer visualisation and far better ergonomics. Thanks to the machine, Stahl Judenburg’s overall productivity has been increased to a significant extent. Apart from time

savings, the company may also benefit from high and reliable repetition accuracy. Another advantage is the fact that the machine does not have to be opened for interventions as frequently as previously.

Growth due to Automation

‘Our investment in the automated Hyperturn 110 has resulted in a significant increase in our capacity,’ Franz Klingsbigl says. ‘Thanks to this machine, we were able to manufacture 17,000 parts in the first three quarters of 2017.’ These numbers prove that the advanced production possibilities are having a very favourable effect on the orders received by Stahl Judenburg.

And the trend continues, which is why the company already bought another turning and milling centre. The positive experiences with Emco led to the acquisition of the somewhat smaller Hyperturn 65 Duoturn. Apart from the slightly smaller opening width, the machine primarily distinguishes itself by its loading and unloading system. Since the system is a Breuning

The top-class SINUMERIK 840D SL controls the two highly automated lathes are equipped with are used for both programming and creating a simulation for collision avoidance.





Hyperturn 65 Duoturn with standard automation for loading and unloading

Irco serial product, it could easily be integrated into the machine programme via the standard interface.

Emco in all Areas

The Hyperturn 65 Duoturn was not the only machine the company acquired. At the same time, the machinery was expanded by an additional Emcoturn E65 MY equipped with VDI 40 tool turret with twelve axially arranged tools and an extra Y-axis for the machining of tensile specimens. Apart from that, the company also upgraded its training workshop: The Emcoturn E45 is equipped with a Siemens control. With hands-on training, the company's apprentices acquire the skills they need for the production of piston rods.

„Thanks to the automated Emco turning centres, we could improve our competitiveness to a significant extent,“ Franz Klingsbigl concludes. „The resulting increase in demand led to the recruitment of additional production staff. And since the trend continues, we have planned further investments.“



The job quality has increased considerably. Some of the physically demanding process steps are no longer necessary so that the machine operators can focus on keeping the processes stable and the quality high.

Stefan Wilding, employee, Stahl Judenburg



The reason we finally invested in the Hyperturn 110 was Emco's willingness to customise the machine to suit our special needs, and all that at an outstanding price-performance ratio.

Franz Klingsbigl, head of Stahl Judenburg's department for piston rods and components



When it comes to the machine configuration, the challenge was to include the enormous range of workpiece dimensions and to create a perfect interplay between the automated loading and unloading systems.

Andreas Pichler, sales Southern Austria, Emco

HYPERTURN 65

Technical Data

Working range

Swing over bed	660 mm
Swing over cross slide	540 mm
Distance between spindle noses	1050 / 1300 mm
Maximum turning diameter	500 mm
Maximum workpiece length	750 / 1000 mm
Maximum bar diameter	65 (76,2 / 95) mm

Travel range

Travel in X1 / X2 (HT65 DUOTURN)	260 / 210 mm
Travel in X1 / X2 / X3 (HT65 TRIPLETURN)	260 / 260 / 210 mm
Travel in Z1 / Z2 (HT65-1000 DUOTURN)	800 / 800 mm
Travel in Z1 / Z2 (HT65-1300 DUOTURN)	1050 / 1050 mm
Travel in Z1 / Z2 / Z3 (HG65 TRIPLETURN)	460 / 460 / 1050 mm
Travel in Y-axes	100 (+/- 50) mm

Main spindle

Speed range (infinitely variable)	0 – 5000 (4000/3500) rpm
Maximum torque	250 (250 / 360) Nm
Spindle connection, DIN 55026	A2-6 (A2-8)
Spindle diameter in front bearing	105 (130 / 140) mm
Spindle bore (without drawbar)	Ø 73 (86 / 106) mm

Counter spindle

Speed range (infinitely variable)	0 – 5000 (4000 / 3500) rpm
Maximum torque	250 (280) Nm
Spindle connection, DIN 55026	A2-6 (A2-8)
Spindle diameter in front bearing	Ø 105 (130/140) mm

C-axes

Resolution of the round axes	0,001°
Rapid traverse	1000 rpm

Drive performance

Main spindle (AC hollow spindle motor)	29 (37) kW
Counter spindle (AC hollow spindle motor)	29 kW

Tool turret with VDI interface

Number of tool positions	2/3 x 12
Tool shaft according to VDI (DIN 69880)	30 (40) mm
Tool cross-section for square tools	20 x 20 (25 x 25) mm
Shaft diameter for boring bars	32 mm
Tool change time	0,7 sec

Driven tools

Speed range	0 – 5000 (4500) rpm
Maximum torque	25 Nm
Maximum drive performance	6,7 kW
Driven tools	2/3 x 12

Tool turret with BMT interface and direct drive

Number of tool positions	2/3 x 12
Precision interface	BMT-55P
Tool cross-section for square tools	20 x 20 (25 x 25) mm
Shaft diameter for boring bars	40 mm
Tool change time	0,5 sec.
Speed range	0 – 12000 rpm
Maximum torque	30 Nm
Maximum drive performance	10 kW

Feed drives

Rapid traverse speed X1 / X2 / X3	30 m/min
Rapid traverse speed Z1 / Z2 / Z3	30 m/min
Rapid traverse speed Y1 / Y2 / Y3	12 m/min
Feed force X1 / X2 / X3	5000 N
Feed force Z1 / Z2 / Z3	8000 N
Feed force Y1 / Y2 / Y3	7000 N

Tailstock

Travel	800 / 1050 mm
Maximum contact force	8000 N
Internal taper for live centre	MK 4

Coolant system

Tank capacity	400 / 450 l
Pump capacity	2 / 3 x 2,2 kW

Power consumption

Connected load	50 kVA
Compressed air connection	6 bar

Dimensions

Height above ground, rotary axis	1300 mm
Total height	2360 mm
Footprint (incl. chip conveyor) W x D	5060 / 5300 x 2850 mm
Total weight	approx. 9500 kg

Safety devices according to CE

HYPERTURN 95/110

Technical Data

Working range

Swing over bed	720 mm
Distance between spindle noses	1700 – 2300 mm
Maximum bore in drawbar (A2-6)	95 mm

Travel range

Travel with milling spindle in X1 / Z1	550 / 1300–1900 mm
Travel in X2 / Z2	300 / 1340–1940 mm
Travel in Y	240 mm (+/- 120 mm)

Main & counter spindle (A2-8)

Maximum speed	3500 rpm
Maximum performance	33 kW
Maximum torque	800 Nm

Main & counter spindle (A2-11)

Maximum speed	2500 rpm
Maximum performance, main spindle	52 kW
Maximum torque, main spindle	2480 Nm
Maximum performance, counter spindle	42 kW
Maximum torque, counter spindle	1040 Nm

Tailstock

Clamping cone (integrated bearing)	MK5
Travel	1100 / 1600 mm
Quill stroke	150 mm
Quill diameter	150 mm

Top and bottom tool turnover device

Number of tool positions	2 x 12
Tool shaft according to VDI (DIN 69880)	40 mm

Driven tools

Speed range	0 – 3000 rpm
Torque	40 Nm
Drive performance	10,5 kW
Driven tools	2 x 12

B-PowerMill

Swivel range	210°
Number of tools in the magazine	40 (optionally: 80)
Tool holder	HSK-T63 (optionally: PSC63)
Maximum torque	128 Nm
Maximum drive performance	21,5 (26) kW
Maximum speed	7000 (12000) rpm
Tool change time (tool – tool)	2,2 sec

Feed drives

Rapid traverse speed X / Z counter spindle	30 m/min
Rapid traverse speed Y	15 m/min

Coolant system

Tank capacity	690 / 740 l
Pump capacity	14 bar / 17 l/min

Dimensions

Height above ground, rotary axis	1364 mm
Total height	2890 mm
Footprint incl. tool magazine	8500 / 9100 x 3150 mm
Total weight	18000 – 22000 kg

Safety devices according to CE

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