

Efficient simultaneous HSC-5-axes machining



**HSC-turn-milling centre
HSTM 150 HD**

**HAMUEL
REICHENBACHER**
Members of the SCHERDELgroup



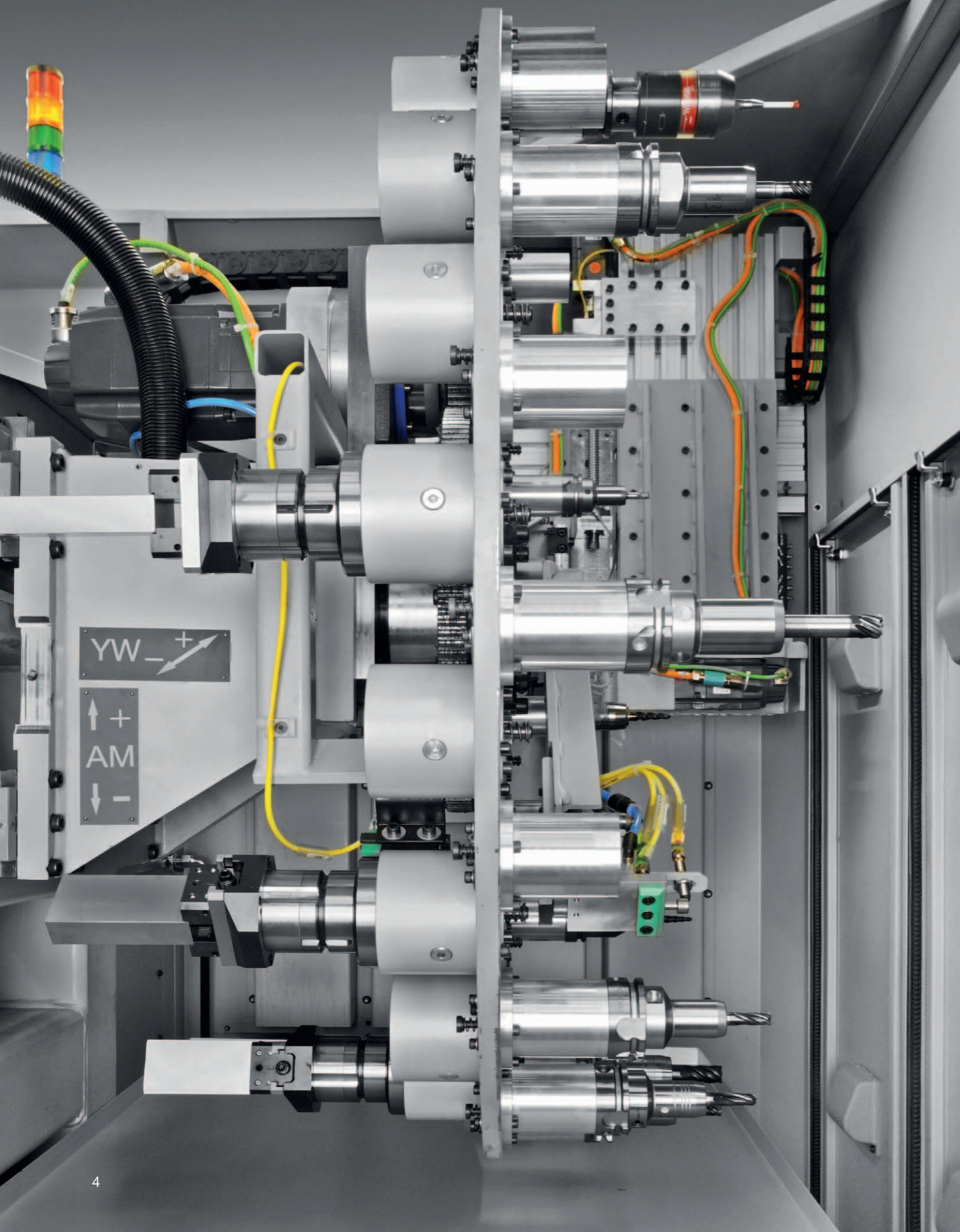
High-precision 5-axes machining of your components

The turn-milling centre featuring a horizontal part arrangement is especially suited for the machining of turbine and compressor blades, blisks or radial compressors. Here, the configuration of the working area ensures optimum mass distribution, as well as excellent loading possibilities, and good visibility of the machining situation. The machine meets the highest demands of modern blade machining, where the attainable accuracies and surface qualities are concerned. Its sturdiness and rigidity, along with the integrated HSC-support, warrant for utmost productivity. The compact machine design permits its quick and flexible installation at the customer factory – without any special requirements regarding the foundation.

Your advantages in short:

- Excellent surface quality owing to the rigid, low-vibration design
- Separation of work-piece (A, C, U) and tool axes (X, Y, Z, B) for utmost machine dynamics
- Identical kinematic and dynamic conditions for the X-, Y- and Z-axis
- Very good chip removal from the working area
- Quick installation and commissioning
- Maximum acceleration values up to 1g
- Mineral cast machine bed for excellent damping
- Consideration of the latest know-how for all operating and control elements





Tool / work-piece magazine

The magazine is a disc with a standard capacity of 20 tools and 20 work-pieces. The operator can load and unload them while machining is in progress. Here, the safety-interlock of the access opening will be released upon a demand from the operator, while at the same time the access from the machine side to the magazine will be blocked – and vice versa.

Tool changer with double gripper

The patented changer is equipped with a spring-loaded double gripper with the purpose of taking the tools and the work-pieces from the magazine to the milling spindle and back again during primary processing time.

A-axis (Rotary axis for work-piece)

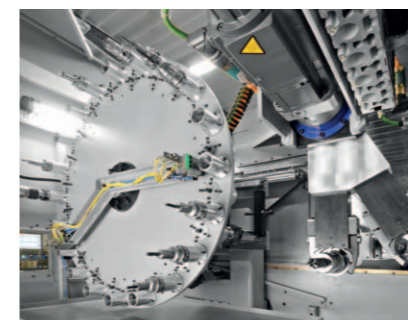
Direct drive (torque motor) free from backlash equipped with direct measuring system. Standard HSK 63 interface for clamping devices and the screw-in fixing with indexing bolt for the correct positioning of the devices.

B-axis (Pivot axis for tool)

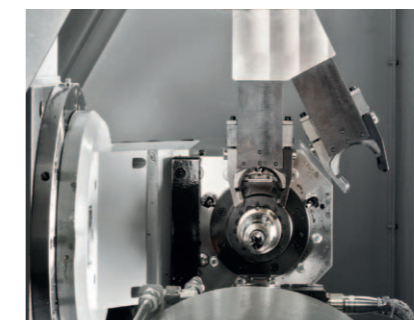
The tool axis B is equipped with a direct drive (torque motor) free from backlash and with a direct measuring system.

CNC-control system Siemens 840 D solution line

CNC-system with PLC integrated to control all automatic sequences. Design for the simultaneous multi-axes control of the axes X, Y, Z, A, B and of the counter-spindle (C-axis).



Tool gripping



Tool change



Work-piece change



The closed machine housing improves noise protection and prevents chips from leaving the machine's working area. A protective enclosure at the rear side of the machine blocks the access to moving machine parts. The components of these cover panels can easily be removed for service and maintenance.

Absolute scales are used in the linear X-, Y- and Z-axes and direct absolute encoders in the A-, B- and C-axes. They permit highest demands to the 5-axes machining of the work-pieces, particularly of turbine blades, to be met.

Deflector plates direct the accruing chips into the scraper conveyor at the machine front.

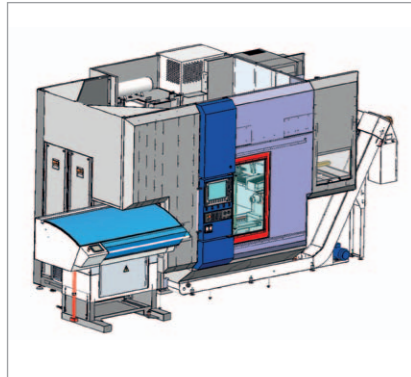
The very powerful motor milling spindle provides a great potential for the machining of all the various work-pieces.

Heat from the milling spindle and from the A-axis is dissipated by means of an industrial cooling unit.

Tool and work-piece magazine with 20 pockets, each. A pneumatically actuated door separates the magazine and the tool changer from the working area.

Sturdy machine bed made from mineral cast material with particularly good damping characteristics – for excellent surfaces along with a reduction in machining time.

Maintenance-free three-phase motors with frequency control and a digital interface with the CNC-control system provide the direct drive for all the linear axes.



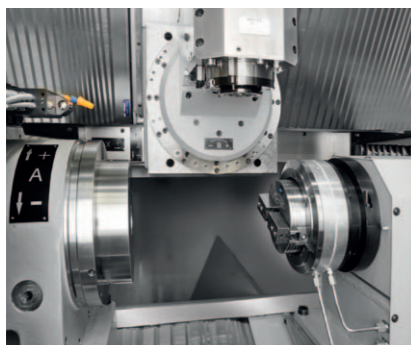
Bar loading magazine

One option is the configuration “HSTM 150 HD bar loading magazine”. This efficient expansion permits the completion of an entire turbine blade in one machining cycle without intervention of the operator. Here, the bar material can have varying geometries and lengths. All the geometries will be machined in a reliable, economic, and fully-automatic way by the combination of the two rotary axes with a particularly developed work-piece gripper and support unit. An integrated work-piece automation system safely removes the finished product from the machine and places it onto a conveyor, if necessary. An amply-dimensioned tool magazine takes care for a sufficient number of sister tools to be available for fully-automatic production in multi-shift operation.



Laser cladding

Apart from traditional milling, the HSTM 150 HD can also perform repair work by 3D laser cladding. The process concerned is a welding-based 3D printing technique (also known as additive manufacturing), where metal is molten using a laser and deposited onto the work-piece. This will be possible for almost all conventional welding metals. Moreover, the focused heat input and little influence on the material will allow for the cladding of difficult to weld materials.



Counter-spindle with CNC-controlled U-axis

As an option, the counter-spindle can replace the tailstock and be used for supporting and clamping a work-piece (turbine blade) during finishing. The counter-spindle is mounted on a slide and can thus be displaced independently from the A-axis for clamping and un-clamping the work-piece (U-axis).

HSTM standards:

- Sturdy machine bed from mineral cast material
- Linear axes X, Y and Z
- Roller guide-ways in all axes
- Tool changer + work-piece changer
- Low-pressure lubricant supply with paper band filter
- Control cabinet with air-conditioning
- Central lubrication system

HSTM options:

- High-pressure cooling through spindle
- Tool and work-piece measuring
- ROTOCLEAR
- Minimum quantity lubrication
- Hand-held control unit

HSTM 150 HD design

The machine consists of a one-piece machine base, where all the components are arranged in an optimum way for machining horizontally clamped work-pieces. Standard interfaces at the rotary axes and peripheral components are essential features of this machine designed for utmost productivity.

Machine dimensions	HSTM 150 HD
Length x width x height	3,400 x 2,600 x 3,200 mm
Weight	~ 12.5 metric tons
Working area	
Travel (X x Y x Z)	X +600 / 0 mm Y +150 / - 150 mm Z +395 / - 10 mm
Milling spindle	
Speed range	16,000 rpm
Rated speed	4,200 rpm
Spindle power (S1)	28 kW
Spindle torque (S1)	63 Nm
Travel speeds	
X-axis	62 m/min
Y-axis	62 m/min
Z-axis	62 m/min
B-axis	100 rpm
A-axis	200 rpm
C-axis	200 rpm
Positioning accuracy per VDI / DGQ 3441	
X-axis	0.009 / 0.005 mm
Y-axis	0.009 / 0.005 mm
Z-axis	0.009 / 0.005 mm
B-axis	0.003°
A-axis	0.003°
C-axis	0.003°

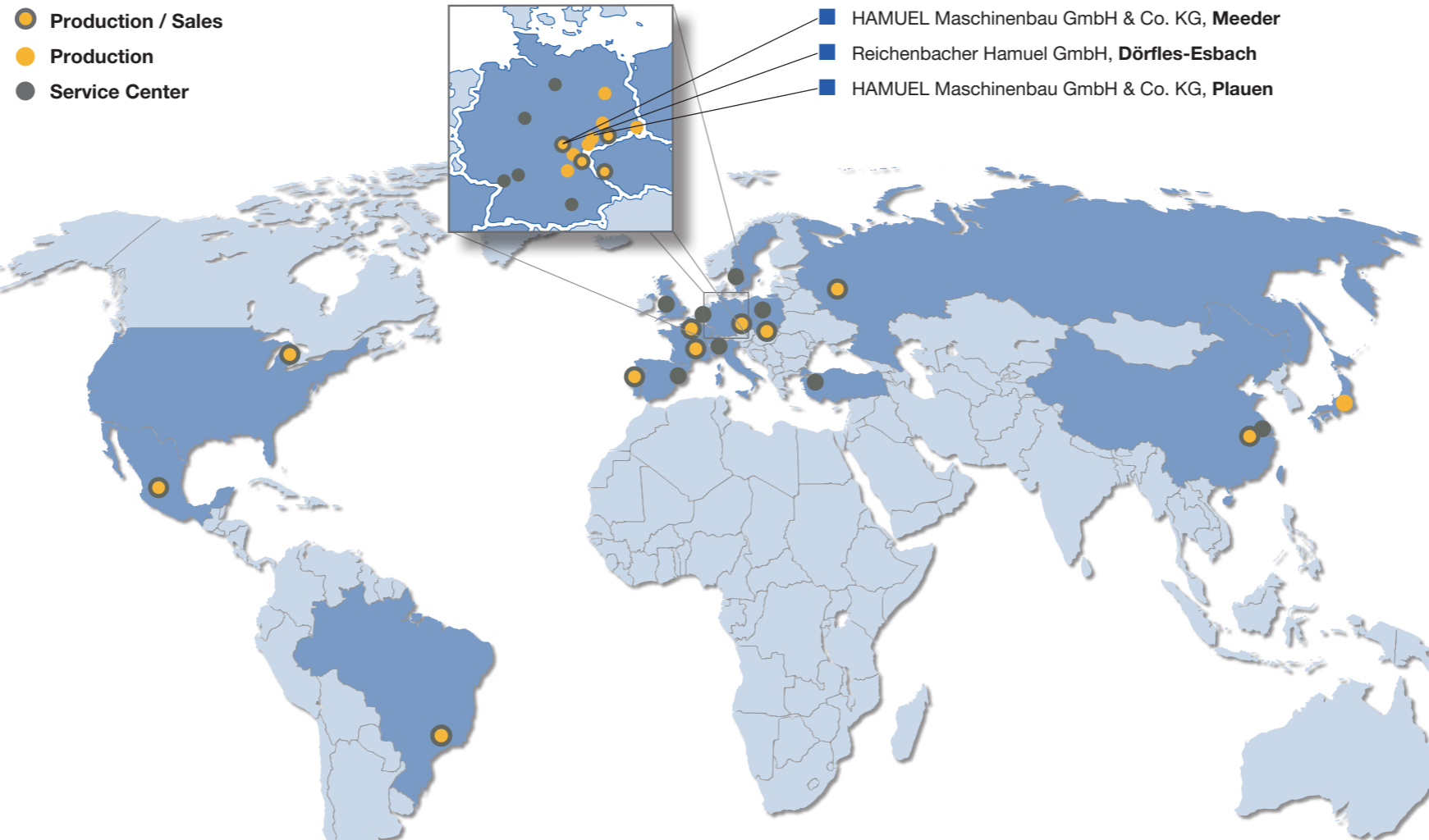


**Local roots,
worldwide presence**

The SCHERDEL group of companies with its headquarters at Marktredwitz in the North-East of Bavaria has gone global featuring 29 locations with 37 production sites and more than 4,500 employees. The members of the SCHERDEL group offer to the market a wide range of products and services, while the individual companies are operating flexibly and autonomously in the market.

Each of these companies can resort to the longstanding experience and the know-how of the other members of the group. This results in precious synergies that will not only save the customer's time and money, but also present him with entirely new perspectives.

Only in the fields of mechanical and plant engineering, as well as tool manufacture, the SCHERDEL group employs more than 600 people. Our customers appreciate the strong synergies inherent in our group of companies, as in accordance with the "full-service-principle", they provide them with comprehensive solutions to their problems.



Our production sites:

AMERICA

- Brazil, Sorocaba
- Mexico, Leon
- USA, Muskegon

EUROPE

- France, L'Arbresle
- France, Beauvais
- Portugal, S.J. da Madeira
- Russia, Kaluga
- Slovakia, Myjava
- Czech Republic, Bor

GERMANY

- Berlin
- Chemnitz
- Coburg
- Erlangen
- Marktredwitz
- and its region
- Marienberg
- Plauen
- Röslau
- Seiffenndorf
- Treuen

ASIA

- China, Anqing
- Japan, Aichi



**The HAMUEL REICHENBACHER
group of companies**

The HAMUEL Maschinenbau GmbH & Co. KG is part of the HAMUEL Reichenbacher group of companies. The other companies are the Reichenbacher Hamuel GmbH, as well as the HAMUEL Maschinenbau Plauen GmbH & Co. KG. These three companies operate under the name of HAMUEL Reichenbacher.

Almost 100 years of experience in mechanical engineering, as well as about 30 years of know-how in CNC-machining are self-explanatory: nearly 4,000 CNC-machines produced by this group are in use in the most diverse industries all over the world. Many in-house developments and patents document the great inventive capacity of this group of companies.

Our products:

- **HSC-TURN-MILLING CENTRES**
- Machining centres
- Multi-technology milling machines
- Portal milling machines
- Component manufacturing
- Mineral casting
- Software
- Machine installation
- Retrofit



