

Linearmill 600 HD: The ideal solution for sophisticated machining of milled parts

[Technical data]

FAMUP LINEARMILL 600 HD

Work area	
Travel in X	600 mm (23.6")
Travel in Y	500 mm (19.7")
Travel in Z	500 mm (19.7")
Min./max. distance spindle nose-table	170 - 670 mm (6.7 - 26.4")
Axis data	
Work feed X, Y, Z	20 m/min (787 ipm)
Rapid motion speed X, Y, Z	60 m/min (2362 ipm)
Axis acceleration X, Y, Z	10 m/s ² (394"/s ²)
One-sided positioning accuracy in entire stroke area	3 μm (0.00012")
One-sided repeating accuracy	1.5 μm (0.000059")
Spindle	
Max. spindle power (S6)	35 kW (47 hp)
Max. speed (S6)	120 Nm (80 ft/lbs)
Standard spindle speed	15000 rpm
Tool cone	HSK 63 A
Tilting table	
Table dimensions	600 x 600 mm (23.6 x 23.6")
Max. table load	600 kg (1320 lb)
Tilting range	+120/-120°

Tilting table	
Max. speed tilting axis	50 rpm
Max. speed table plate	100 rpm
Positioning precision of the pivoting axis	+/- 5"
Positioning precision of the table axis	+/- 5"
Tilting torque	1600 Nm (1179.2 ft/lbs)
Tilting torque max. acceleration (S6)	2000 Nm (1474 ft/lbs)
Table torque	500 Nm (368.5 ft/lbs)
Table torque max. acceleration (S6)	1100 Nm (810.7 ft/lbs)
Clamping torque of the tilting axis	5000 Nm (3685 ft/lbs)
Clamping torque of the table axis	2500 Nm (1842.5 ft/lbs)
Tool change	
Number of tool stations	40
Tool selection	random
Max. tool diameter (lateral empty positions)	125 mm (4.9")
Max. tool length	250 mm (9.8")
Max. tool weight	6 kg (13.2 lb)
Length of tool changer S-arm	500 mm (19.7")
Time for tool change (tool/tool)	1.7 sec



[Brand Werkzeug- und Maschinenbau GmbH]

As a manufacturer of punch forming tools, in-mold assemblies, and machine components for the food industry, Brand has been offering complete tool and engineering solutions since 1992: from design, through construction and manufacturing, to the end product. Brand Werkzeug- und Maschinenbau has brought together all the key technologies under one roof: eroding, 5-axis milling, turning, and grinding. The company is a family-run enterprise, with key positions held by Mr. and Mrs. Brand, their daughter Juliane Brand and brother Sirko Brand. 32 employees
Sales of € 2.5 million (2009)

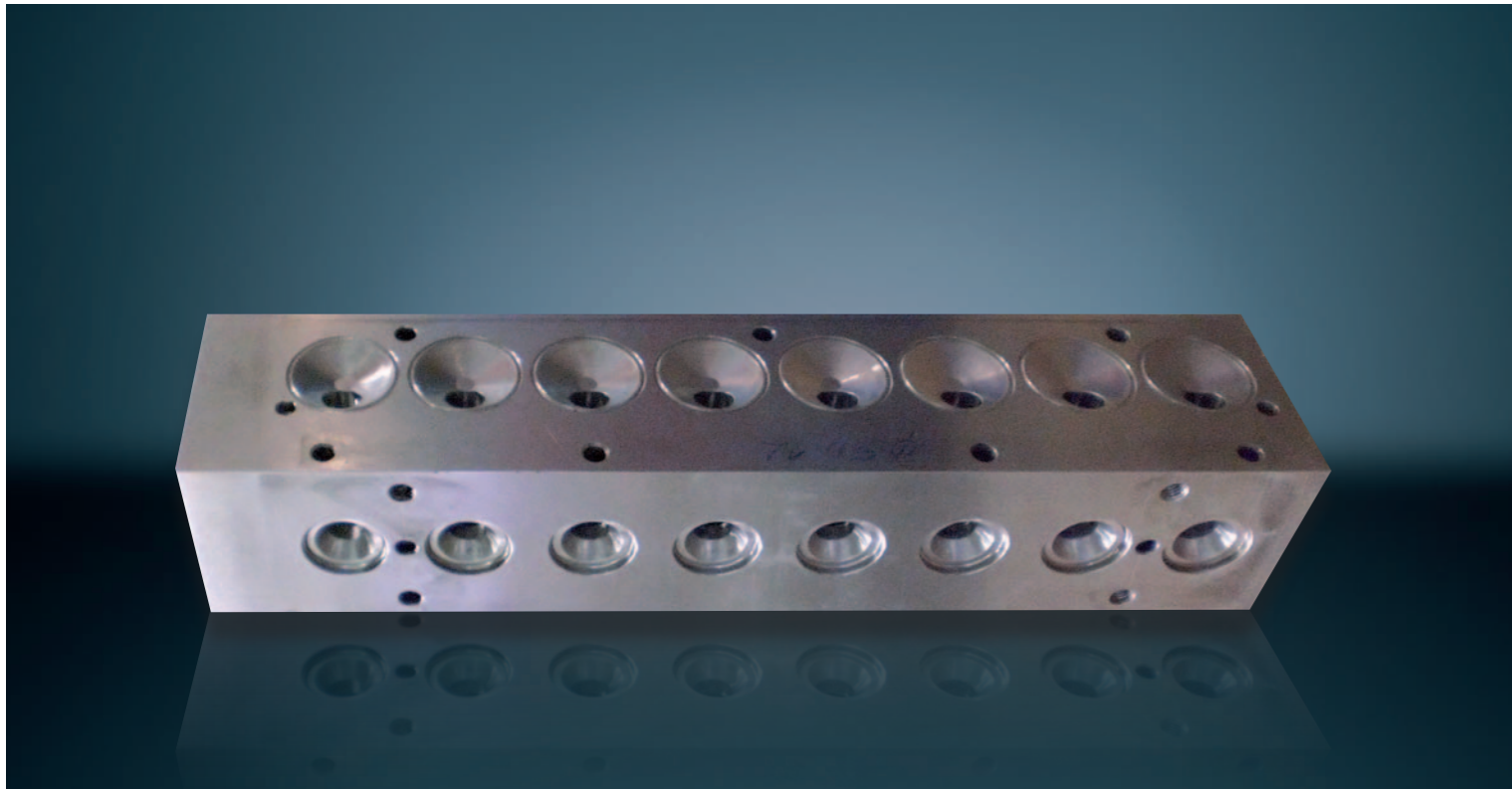
BRAND

BRAND Werkzeug- und Maschinenbau GmbH, Ringstrasse 3, 09569 Oederan, Germany, www.Brand-Werkzeugbau.de



[Requirements profile]

- Manufacture of high-precision components for the food industry (valve casings)
- Short machining times
- High level of accuracy
- Technical solution with swiveling bridge



Highly precise component for the food industry

Precision, reliability, and top-quality service...

... characteristics that not only apply to the owner-managed company Brand, but that were also key factors in the decision to invest in an EMCO Linearmill and EMCOTURN E45 TCM. Brand received bids from three different manufacturers during the tendering stage. Following a presentation by EMCO at its Technology Center in Hallein, company owner and founder Dieter Brand was highly impressed by the machining times, accuracy, and the precision of the swiveling bridge solution. The machines have now been running without problems in two or three-shift operation since August 2007.

5-axis milling center with an impressive price/performance ratio

The 5-axis milling center from EMCO FAMUP uses linear drives and torque motors. The sophisticated machine design enables an exceptionally high level of machining accuracy for workpieces. And all at the impressive price/performance ratio typical of EMCO machines.

The milling center enables dynamic machining of medium-sized workpieces over five axes. A swivel rotary table equipped with torque motors serves two of the axes, the remaining three axes are used for movement of the spindle head. The structure of the machine is designed as a classical traveling column machine.

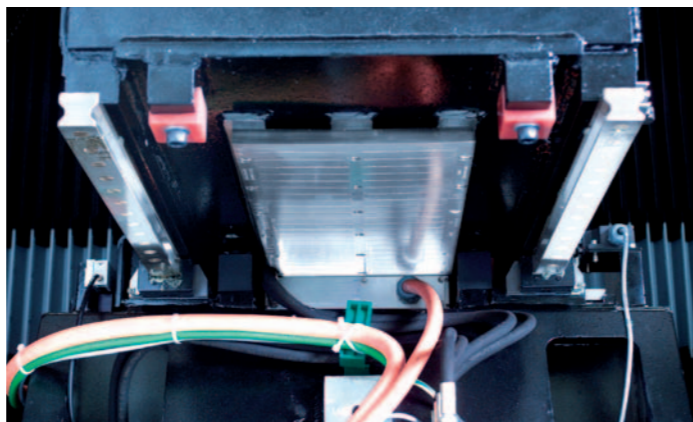
Machine construction

The LINEARMILL 600 HD is set apart by its highly intelligent geometry. The Y and Z-slides are arranged to provide very short distances from the tool bit to the 35 mm linear guides. Even when the spindle is fully lowered, machining force is applied to the construction to almost optimal effect, representing an excellent solution which greatly contributes to the high level of machining accuracy.

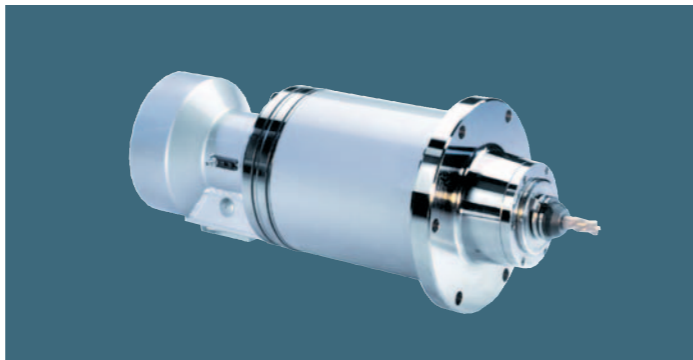
The drive technology is also impressive: Linear drives not only provide high dynamics and rapid speeds, they also improve accuracy and the surface finish during machining. The swivel table has also been fitted with state-of-the-art torque motors for the same purpose. And to ensure that this high level of precision can be fed back to the control unit accurately, the X, Y, and Z axes are fitted with glass scales as standard.

The LINEARMILL 600 HD is fitted with an interpolatable 4th and 5th axis. For this, the swivel table forms a very solid bridge that pivots

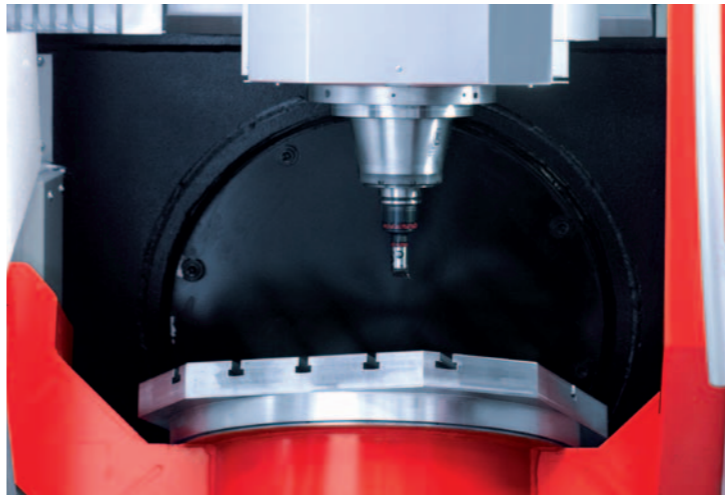
around two points. This version offers dynamic machining across all five axes and is therefore ideally suited to workpieces of any complexity. The rapid, local customer service provided by EMCO and Heidenhain prevents long downtimes and provides a further guarantee for high productivity.



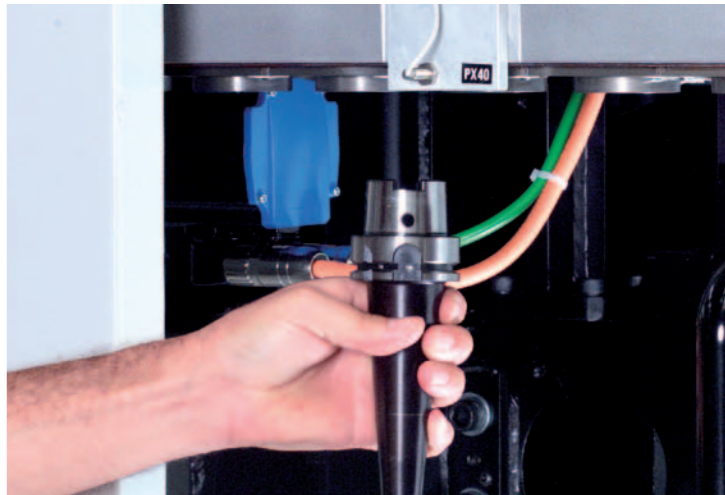
Linear drive. The three linear axes are driven directly using linear motors. This results in the following benefits: High dynamics of 10 m/s², quick rapid traverse of 60 m/min, fast and extremely accurate radius transitions, high precision of 1.5 µm, high level of contour accuracy due to absence of backlash and hysteresis, high thermal consistency through water cooling, no wear, accuracy for life.



Motor spindle. The LINEARMILL 600 HD is fitted with a motor spindle. Its performance data speaks for itself: 15000 rpm with liquid cooling. Top performance: 35 kW at a maximum torque of 120 Nm. Acceleration: from 0 to 15000 rpm in just 1.5 seconds.



Swivel table. The swivel rotary table is controlled by state-of-the-art torque motors. This technology guarantees highly-precise positioning and interpolation throughout the machine's entire service life. As opposed to worm gears driven axis, it does not cause any wear on the machine. Backlash and positional hysteresis are entirely eliminated. The integrated water cooling system provides a constant temperature, even in highly dynamic applications.

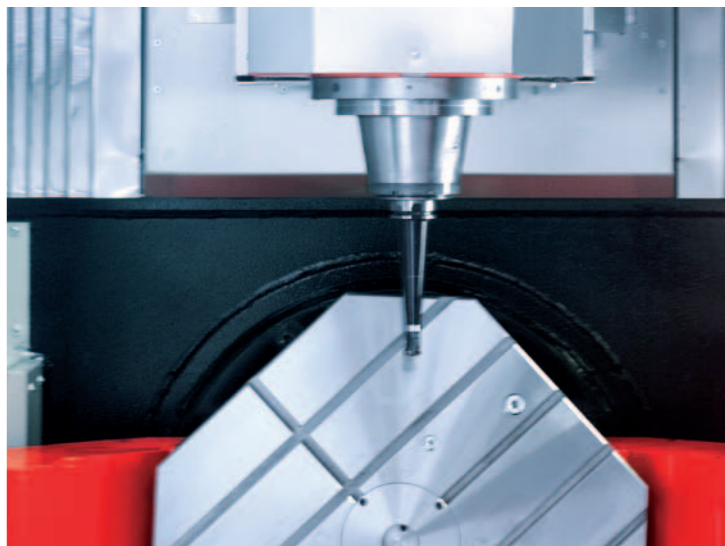


Tool loading. The tool magazine is loaded using a separate loading door to the side of the machine. Tools can also be inspected or changed during the machining cycle without needing to shut down the machine. The magazine can hold up to 40 tools.



High accuracy during multi-sided machining is of crucial importance when manufacturing highly precise components for the food industry.

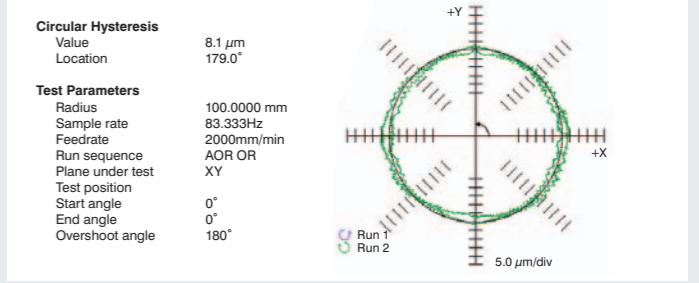
Thomas Wegert, CNC programmer and operator, and Mr. Brand, owner of Brand Werkzeug- und Maschinenbau



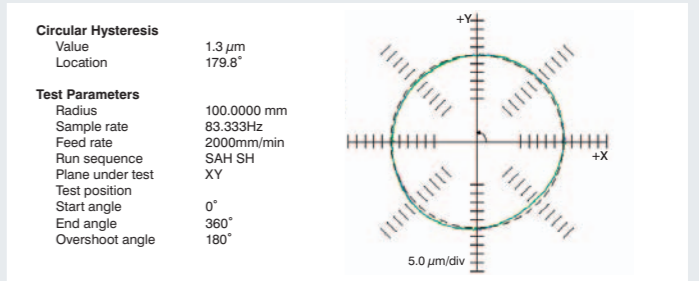
Swivel rotary table. The clamping area of 600 x 600 mm allows for the clamping of a large number of typical, medium-sized work pieces. The table includes 6 T-slots with the dimension 14 mm H8 for standard clamping devices. Connections for 1 pneumatic line and 2 hydraulic lines can be attached to the center of the table. The "rotary coupling" option also allows workpieces to be clamped hydraulically or pneumatically.

BALLBAR TEST to DIN standard 100 mm

Positions on the linear axes are measured using glass scales. Combined with the linear motors, this provides perfect contour accuracy. Dynamic direct drives in the linear axes and the rotary table enable rapid, accurate transitions, even for small radii. This results in excellent surface quality and eliminates or reduces the need for subsequent machining. With a one-sided positioning accuracy of 3 µm in the entire stroke range and a one-sided repeat accuracy of 1.5 µm, the Linearmill 600 HD is firmly at the top of the class in terms of accuracy.



Result with circulating ball spindle 8.1 µm hysteresis



Result with linear drives 1.3 µm hysteresis