



ZIMMERMANN

PORTAL MILLING MACHINES



FZ 100



M3 ABC



FZ 42



VH 6



FZ 38



VH 30



FZ 37



VH 20



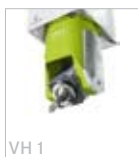
FZ 33



VH 12



FZ 32



VH 1



FZ 30 / FZ 35



FZ 25

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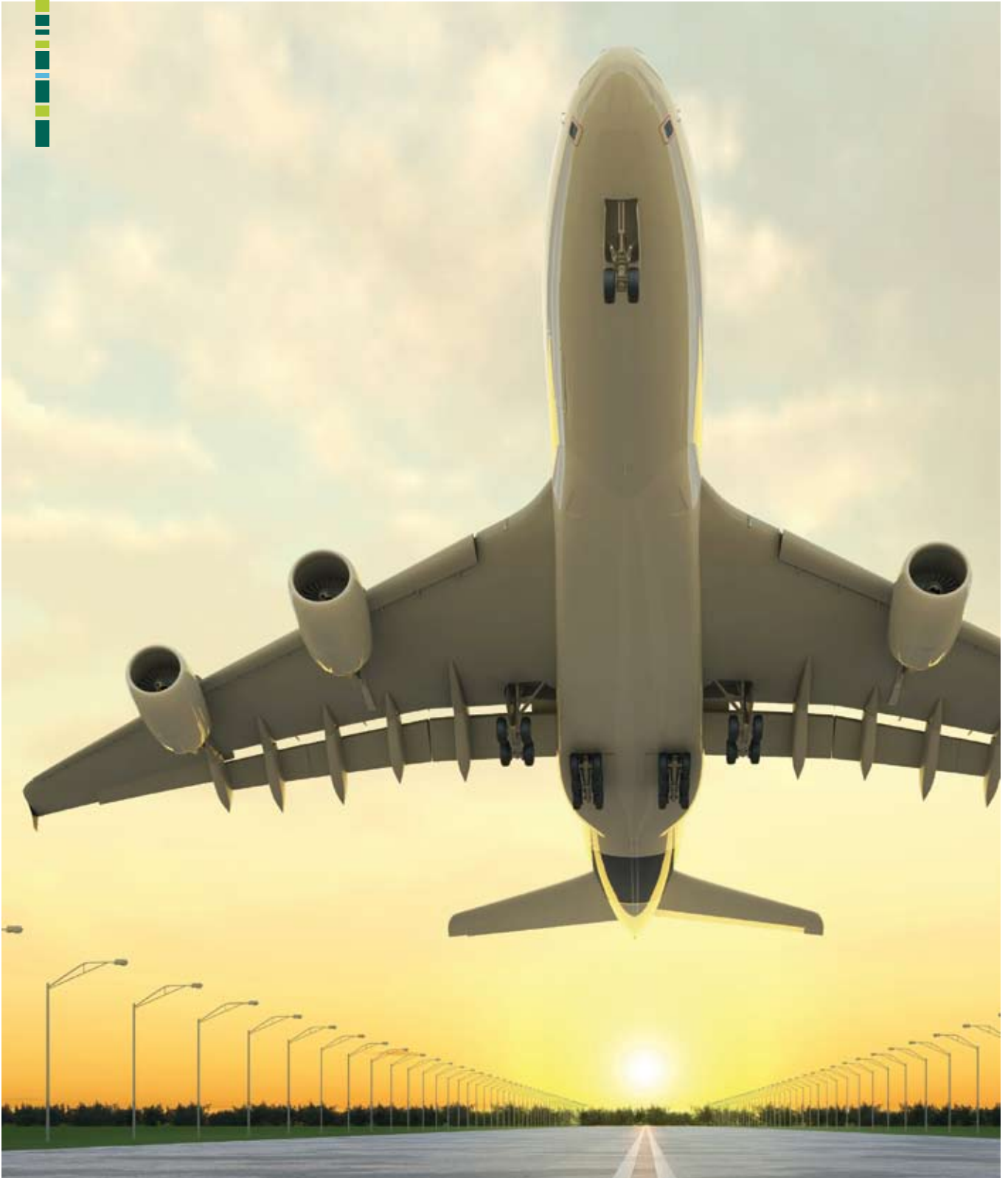
PORTAL MILLING MACHINES

FZ 37
Portal Milling Machine



THE PORTAL TO SUCCESS

THE MODUL **n** R PRINCIPLE



FOR ALL-ROUNDERS AND SPECIALISTS

Flying – mankind’s dream. High-tech and emotion side by side. Air travel is and remains the safest means of transport. Its versatility and extensive range of applications ensure that the FZ 37 is widely used in the aerospace industry. The confidence of aircraft manufacturers in Zimmermann Portal Milling Machines is unbeatably built on the solid quality of the FZ 37.

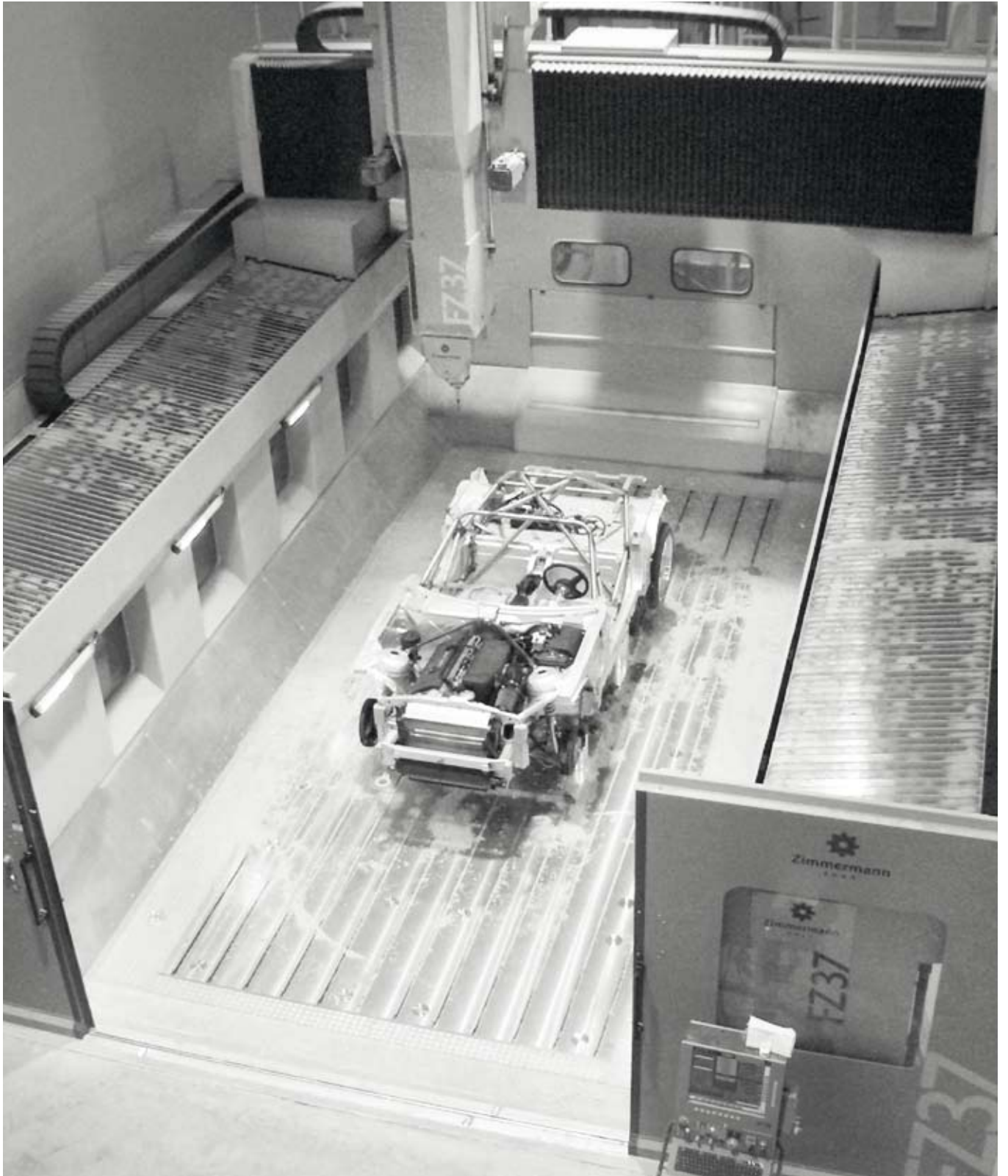
Whether for large, voluminous components, such as fuselage parts, panels etc., or high chip rates for structural components of fuselages or wings, through to delicate operations on rudders and flaps, the continuously developed FZ 37 Portal Milling Machine is always at your service. Similar challenges are to be found in automobile production, boatbuilding and in many other fields.

Learn more about the sophisticated concepts behind this Portal Milling Machine on the following pages.



Contents

- ▬ Applications
- ▬ Advantages
- ▬ Technical details
- ▬ Milling heads
- ▬ Technical data



The FZ 37 Portal Milling Machine can be customized to highly complex tasks

The FZ 37 Portal Milling Machine is famous for its outstanding flexibility and extreme cost-effectiveness. Innovative technologies are the basis for the popularity of the FZ 37 as a high-precision universal machine tool. When machining aluminum, it ensures high chip removal rates, while for composites the very large working area available, in combination with smooth and harmonious guidance of movement during simultaneous operation, are inestimable advantages. Thanks to its powerful drives, strong spindles and, not least, its carefully designed structure, the FZ 37 offers substantial capability for the machining of steel and cast alloys* to round off the wide scope of its potential applications. It demonstrates its mastery in the following applications in particular:

- In pattern making, for example, for producing inspection gauges / high-accuracy data reconfirmation models.
- In the manufacture of design models, for machining 1:1 models.
- In tool and mold making, for example, machining sheetmetal forming tools and injection molds.
- In aircraft production, for removing large volumes from aluminum structural parts, and machining ambitious composite materials for fuselage and wing parts etc.

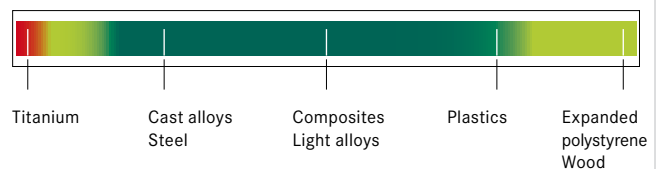
Prototyping



Are you looking for a machine that meets these requirements? Then the FZ 37 is the right choice for you:

- Large work area with up to 40 000 mm on the X-axis, 4 500 mm on the Y-axis and 2 500 on the Z-axis.
- Very high chip removal rates.
- Exceptional accuracy and surface finish.

Maximum economy



*Machining performance for these materials depends on the cutting parameters recommended by the tool manufacturer.

Inspection gauge





Vertical ram for positioning the milling head on the Z- and C-axes, optional infinite rotation about the C-axis

In the X-direction: structurally stiff overhead gantry for highly complex tasks

Lamella covers with sloping surfaces protect the slideway and drive systems, optionally pressurized in case of dusty environments

Encapsulated toolchanger outside the work area with pick-up or chain magazine

Milling heads in the 4th generation: VH 20 or VH 30 2-axis

Heavy, fixed, cast machine table with sheet-metal covers all round

Integral protective enclosure, optional work area covers

Fixed sidewalls filled with DemTec® reinforced concrete



The advantages of a remarkable design

The gantry design, with fixed machine bed and an upper driven portal along the X-axis, offers special advantages, not just for aerospace and automobile production.

The extremely stiff machine structure is a prerequisite for high accuracy while following free-form contours at high feed rates, and, not least, for long tool life.

Features such as dual guideways on the X-axis enable the FZ37 to meet such high quality demands. This design ensures outstanding straightness for portal motion. In particular for machines with very long travels, it is important to achieve excellent, basic mechanical accuracy and repeatability, upon which electronic compensation procedures can be superimposed to optimize accuracy. The optional temperature control device in the portal and Z-ram reduces the impact of thermal influences from the environment on the machine structure.

The FZ37 can be used for wet or dry machining. The return flow of coolant is taken care of by an intelligent sheet-metal guard concept with overlaps.



Highlights

- Outstanding price-performance ratio
- Very wide range of potential applications
- High quality universal milling head for 5-axis simultaneous machining

The intelligence is in the detail



Modularity

The FZ 37 Portal Milling Machine with overhead gantry is based on a modular machine concept, on which various versions with different strokes, drive technologies and equipment levels can be realized.

Measuring systems

The three linear axes, X, Y and Z, have direct length measuring systems with Heidenhain glass scales (for axes over 3.0 m long steel measuring tapes are employed). The measuring systems are pressurized to protect them against dirt.

Safety and reliability

The sidewalls are an integral part of the machine's enclosure. The slideways, drives and measuring systems for the Y- and Z-axes are covered by dust-proof bellows to protect them against dirt. As standard the X-axis is equipped with lamella covers. The sidewalls optionally can be supplied with windows. For loading, at the front, there are sliding doors, or alternatively folding doors. The rear is closed off either by a fully encapsulated toolchanger, or by an additional sliding door.

Drives

Regardless of the control system supplier, all axes are equipped with Siemens "Simodrive" digital drives. On all linear axes power transmission is performed by means of modern gear-rack drives; the X- and Y-axes have four (or respectively two) electronically pre-loaded servomotors to eliminate backlash, while the Z-axis has a water-cooled servomotor with holding brake. The control system gantry function ensures that the two X-axis drives are perfectly synchronized. The powerful drive is especially suitable for high chip removal rates.



Rack and pinion

The highly dynamic rack and pinion drives offer an extraordinarily well-balanced ratio between cost and performance. Any practical axis length can be provided and the system suits the widest possible spectrum of applications. Full power is available even while moving with lower feed rates – no "turbo-lag".



Control systems

Basically the FZ 37 can be combined with control systems and types from several different manufacturers. Modern control systems offer functions such as "look ahead", jerk limitation, spline interpolation, and 5-axis machining. Numerous software options are available for many additional tasks.

VH 20 and VH 30 – newly developed 2-axis Milling Heads

The VH 20 and VH 30 Milling Heads set new standards. They combine high torque with transitional rotation speeds of up to 360°/s around the A- and C-axes. These two new milling heads have been developed to extend the application spectrum of Zimmermann Portal Milling Machines.



The A-axis drive employs dual torque motors with electronic backlash elimination. The C-axis has a direct torque drive. This enables rapid and, in conjunction with a high-resolution measurement system, high precision positioning.

With their symmetrical and compact design, which tapers towards the tool, the VH 20 and VH 30 Milling Heads have a low interference contour and can be combined with spindles from various manufacturers.



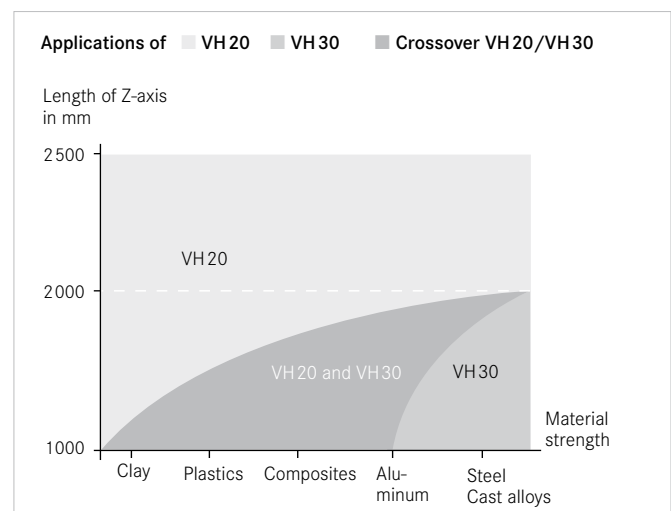
Milling head VH 20



Milling head VH 30

Highlights of the VH 20 and VH 30

- High torque in the rotary axes in simultaneous operation
- Holding torque 3 000 Nm on the swiveling axes included
- Positioning accuracy of 12" or better, repeatability of 8" or better (DIN 3441)
- Supply of coolant, minimum quantity lubrication (MQL), cooling air external or through the tool possible
- Compact design makes setting up and machining complex workpieces easier



FZ 37

Technical Data

Machine	FZ 37
Working ranges	
X-axis	3 000 – 40 000 mm ^①
Y-axis	2 500 – 4 500 mm ^①
Z-axis	1 000 – 2 500 mm ^{① ②}
Table size	
Length	3 000 – 40 000 mm
Width	2 500 – 4 500 mm
Height	370 mm
Table load	max. 30 000 kg/m ² ^③
T-slots (longitudinal)	18 ^{H12} (optional 18 ^{H8})
Pitch of T-slots	250 mm
Feed drives	
Feed rate on X-, Y-, and Z-axis	up to 60 000 mm/min.
Acceleration on linear axes	upt to 4 m/s ²
Accuracy^④	
Positioning accuracy on X-axis	0.030 mm
Positioning accuracy on Y- and Z-axis	0.020 mm
Repeatability X-axis	0.015 mm
Repeatability Y- and Z-axis	0.010 mm
Resolution for measuring systems (A, C)	0.0001°

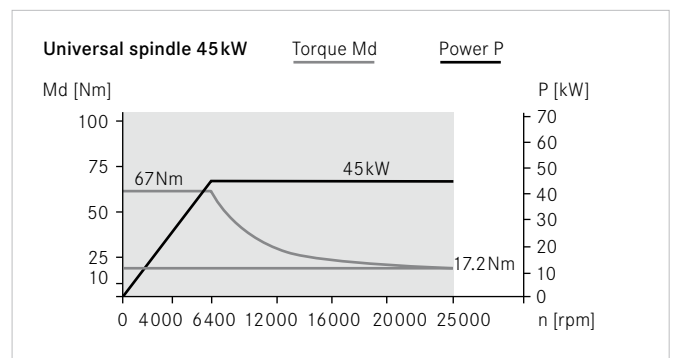
Milling head	VH 20	VH 30
Swiveling range		
A-axis	± 110° or + 125°/-95°	
C-axis	up to ± 360°, opt. ∞	
Performance		
Torque, A-axis	min. 1 200 Nm	
Torque, C-axis	1 047 Nm opt. 1 279 Nm	
Holding torque (champed)	3 000 Nm	
Feedrate about A-, C-axes	360°/s	
Accuracy^④		
Positioning accuracy A-, C-axes	12" = 0.0033° ^④	
Repeatability A-, C-axes	8" = 0.0022° ^④	

- ① Other dimensions on request
 ② Z-axis from 2000 mm in combination with VH 20 Milling Head
 ③ Max. 15.000 kg/m², as reference for surface precision according to DIN 876
 ④ According to VDI 230 - 2 / DGQ 3441, based on basic machine, depending on the length
 ⑤ Permanent grease lubrication with automatic replenishment system (opt. oil-air lubrication)

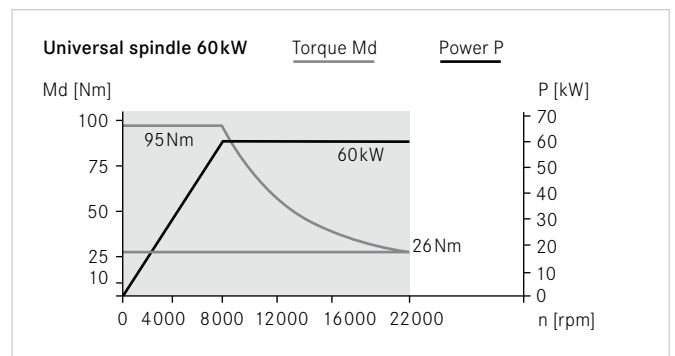
We reserve the right to make technical changes

Milling spindle	VH 20	VH 30
Power S1 max. (100% duty cycle)	45 kW	60 kW
Torque S1 max. (100% duty cycle)	67 Nm	95 Nm
Speed max.	25 000 rpm	22 000 rpm
Constant power	6 400 – 25 000 rpm	6 000 – 22 000 rpm
Tool holder	HSK 63 A	HSK 63 A
Swivel axis – spindle nose	326 mm	301 mm
Tool clamping	spring clamp	spring clamp
Tool release	hydraulic	hydraulic
Lubrication	permanent grease lub. ^⑤	permanent grease lub. ^⑤
Coolant supply	Both external and through the tool	Both external and through the tool
Minimum-quantity lubrication		
Air blowing		

VH 20 Milling spindle torque diagram



VH 30 Milling spindle torque diagram



Equipment options

FZ 37

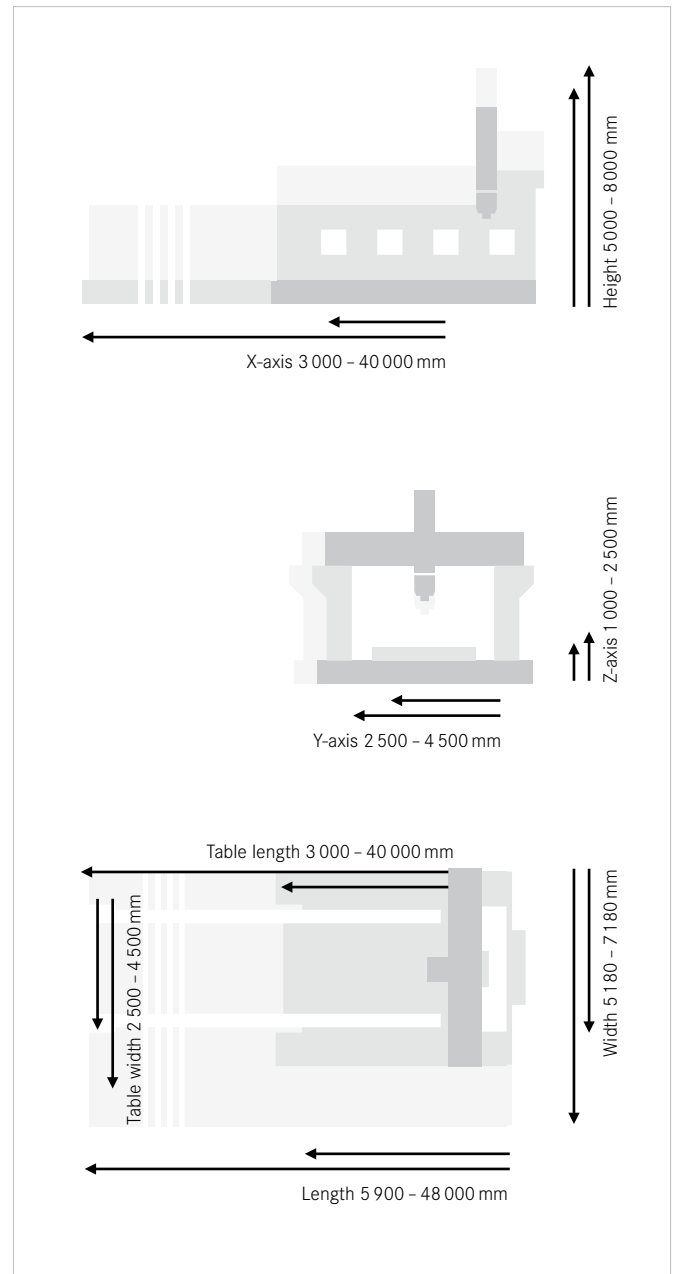
Simultaneous A-axis	■
Simultaneous C-axis	■
A-, C-axis clamping	■
Infinite C-axis	■
Control cabinet air conditioning	■
Minimum quantity lubrication	■
Toolchanger 15 up to 200 positions	■
Measuring probe	■
Tool measurement	■
Special painting	■
Chip conveyors	■
Extraction systems	■
Partitioned work area	■
Work area cover	■
5-sided control device	■
Temperature control device	■

■ Standard ■ Option



Work area cover

Dimensions



All dimensions given are examples for the FZ 37 in the minimum or maximum sizes realized to date.