

**VDF BOEHRINGER**

**VDF T SERIES**



**Horizontal Turning Centers**



## THE VDF T-SERIES



### How to save money while you work

The innovative VDF T series design lets you achieve high productivity in conjunction with low part costs and offers high reliability, availability, ease of service, excellent maintainability and flexibility. The VDF T series is the ideal solution for high volume production at automotive OEMs and tier suppliers as well as for manufacturers and job shops in the medium- and small-batch size production. The range of applications covers shafts and chuck parts. The platform allows for a productivity boost with auxiliary capacities and functions for complete machining of complex parts.

### Distinctively VDF

The robust construction of every VDF T machine is designed to meet the highest demands for stability, allowing for complex and simultaneous machining operations. The beds are made e.g. of polymer concrete to provide maximum rigidity and damping. High-quality linear roller guides ensure precision and a long service life which is the only way to guarantee constant high precision over many years – part after part. Drives and guideways are state-of-the-art, providing long-term high performance and precision.

### Turning centers



VDF 250 T



VDF 450 T

### Application range of the VDF T series

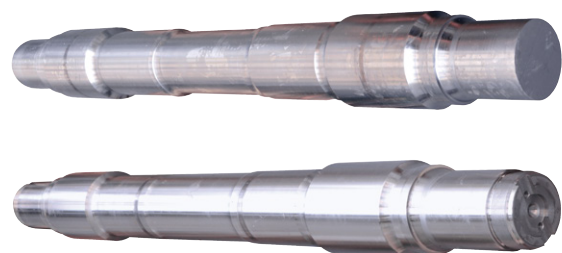
- ▶ High volume production – short cycle times
- ▶ Large variety of parts sizes (depending on machine type)
- ▶ Fully-automated production, including process monitoring
- ▶ Heavy machining
- ▶ Hard and soft turning (replacing grinding operations)

### Technologies on board

- ▶ Hard turning
- ▶ Superfinishing
- ▶ Lead-free turning
- ▶ High pressure coolant
- ▶ Turning with minimal quantity lubrication (MQL)
- ▶ Dry machining
- ▶ Drilling, milling
- ▶ Complete machining
- ▶ Cutting to length and centering
- ▶ Hobbing

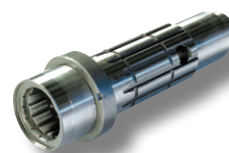
### Your advantage

- ▶ Machine concept tailored towards optimized part costs
- ▶ Configure the VDF T machine in line with your specific requirements
- ▶ Robust machine design ensures reliable, lifetime precision in production
- ▶ Excellent accessibility to all modules provides easy setup and operation
- ▶ High technology competence
- ▶ Long-term security for your investment
- ▶ Easy operation and service
- ▶ Easy integration of automation features



Wheelset shaft – raw and finished part

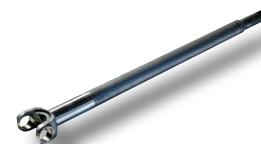
### Work piece range examples



Drive shaft



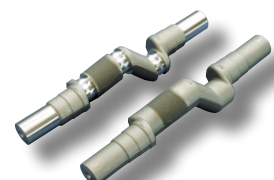
Electric motor shaft



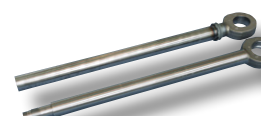
Universal shaft



Pump shaft



Special crankshaft



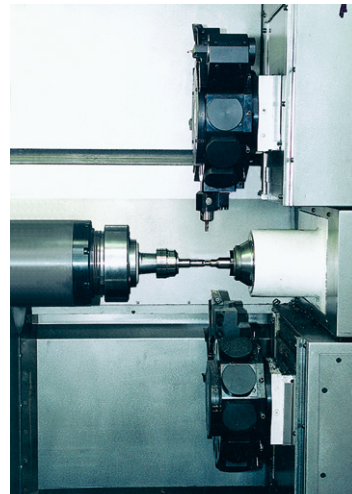
Piston rod



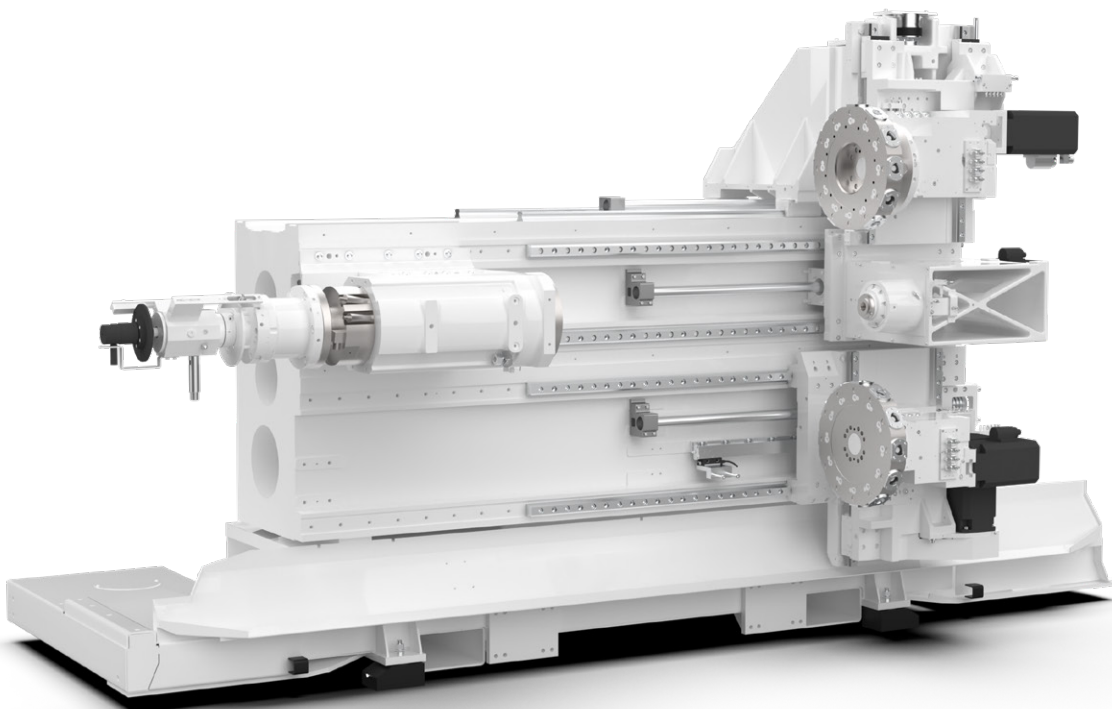
## VDF 250 T

### MODULAR DESIGN FOR COMPLEX MACHINING

- ▶ Minimize cycle times with up to three tool turrets
- ▶ The 3-guideway bed allows free by-pass of upper as well as lower carriage between tailstock or opposed spindle. This provides high machine uptime and operational safety
- ▶ The mineral casting machine bed with optimized damping properties is the basis for long tool life and reduced tool costs
- ▶ Up to two independent travelling steady rests and enhanced turning length allow for machining of long workpieces
- ▶ Upper slides can be equipped with a Y-axis for complete machining
- ▶ All active machine axes utilize absolute linear measuring systems for high accuracy



Work zone: Tool turrets on upper and lower slide



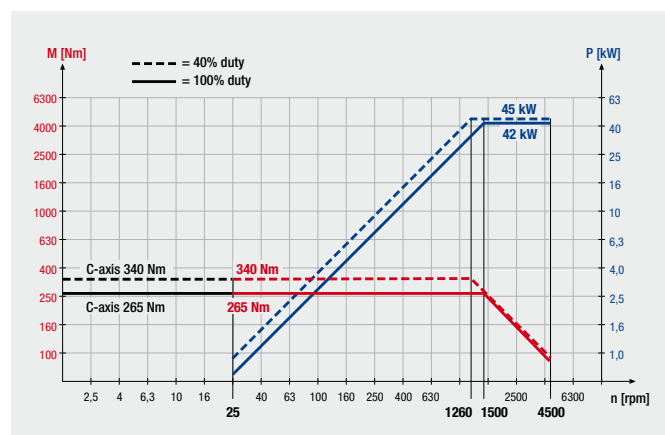
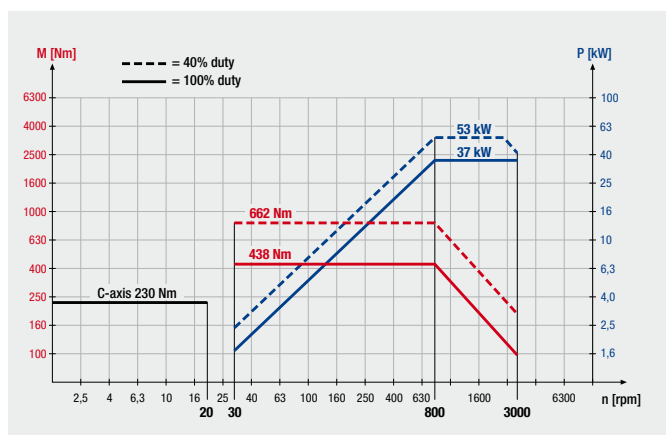
VDF 250-2/2 T



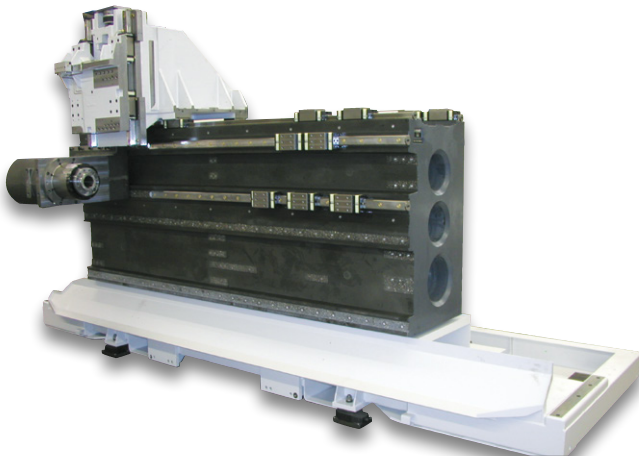


## Technical Data

Technical Data		VDF 250 T
Turning length	mm	850 / 1850
Turning diameter	mm	290
Swing diameter over bed max.	mm	620
Main spindle	type	motor spindle
Spindle nose	size	A6 / A8
Turret		VDI 40 radial



## VDF 250 T COMPONENTS



Machine bed with standard turning length

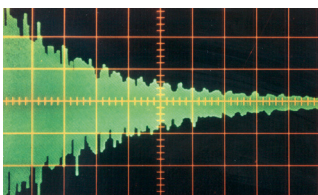
The machine bed of the VDF 250 T DL 850 is made of mineral casting

- ▶ Bonding agent approx. 7 – 8% epoxy resin
- ▶ Fillers / aggregates: quartz rock, granite

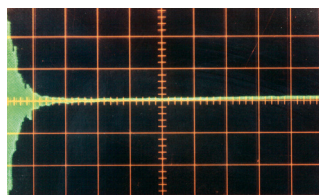
Bed sits on a basic tray construction used as collector for fluids and oil

- ▶ 3 guideway bed
- ▶ Common, modular components used in all variants including multi-axis machines

Headstock and tailstock were optimized for thermal symmetry. During hard turning operations both headstock and tailstock are controlled thermally by a cooling device preventing geometry variations.

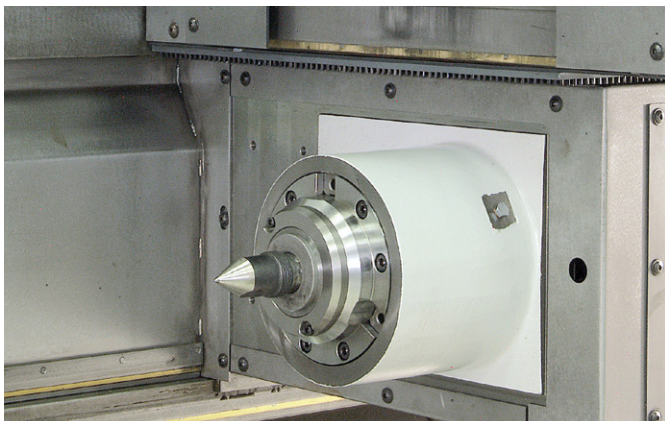


Attenuation curve / casting

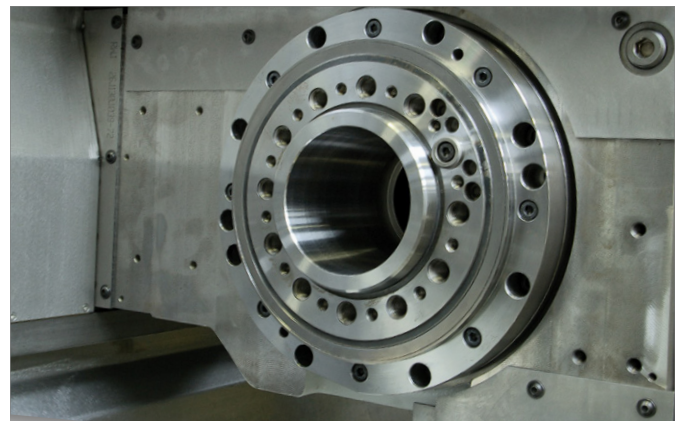


Attenuation curve / concrete

The mineral casting machine bed with optimized damping properties and high cutting rates are the basis for high surface quality, long tool life and reduced tool costs.

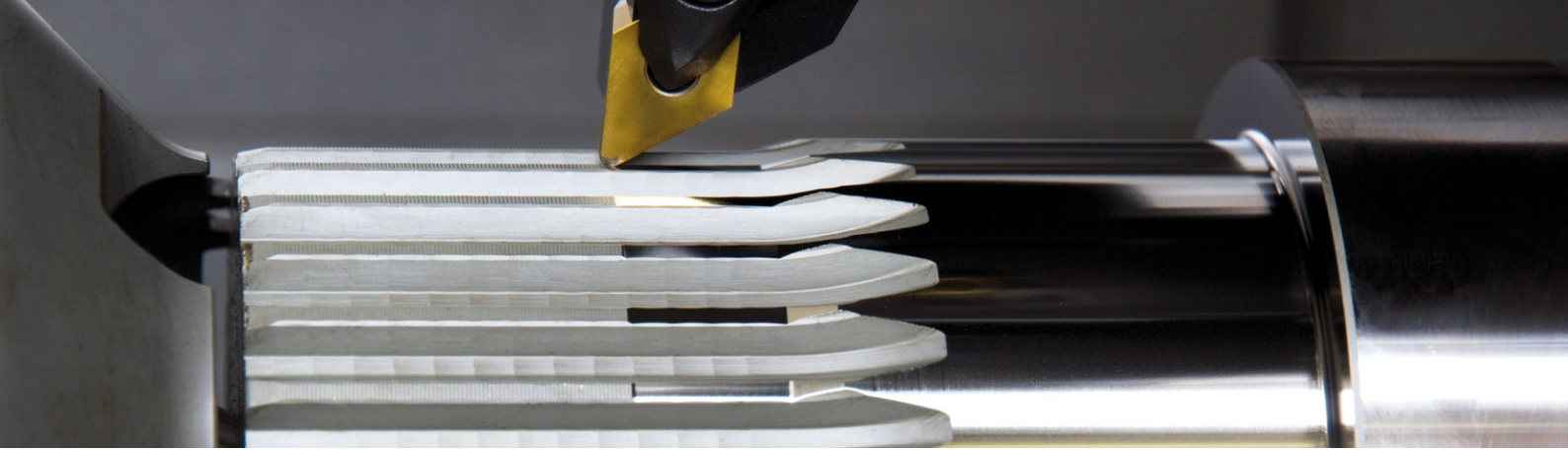


Tailstock



Opposed spindle



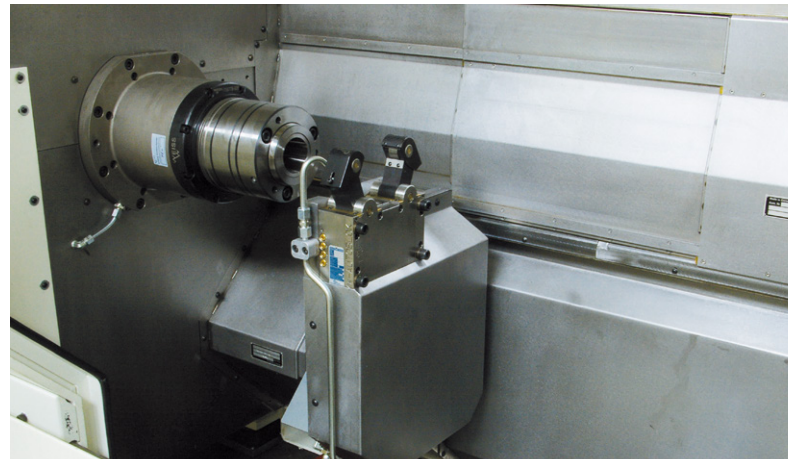


### NC steady rests

Up to two NC driven steady rests are available, travelling independently.

### Your advantage

- Flexible, quick and precise machining even of long and thin workpieces

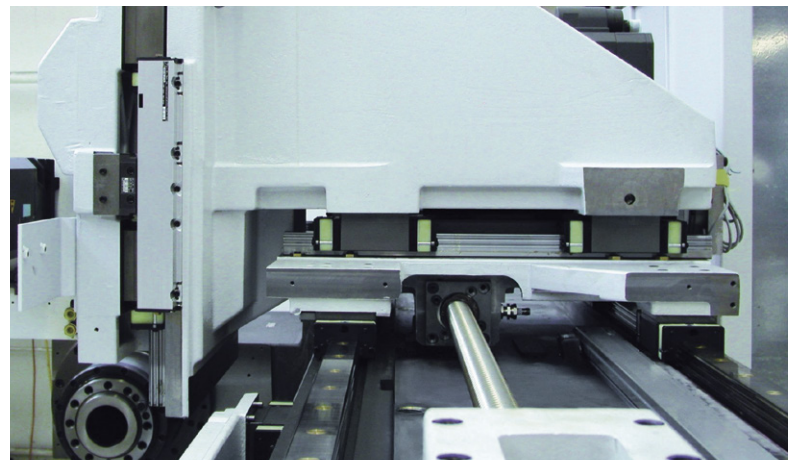


### Y-axis

Ideal supplement for driven tools performing excentric drilling and milling operations.

### Your advantage

- Complete machining in one setup

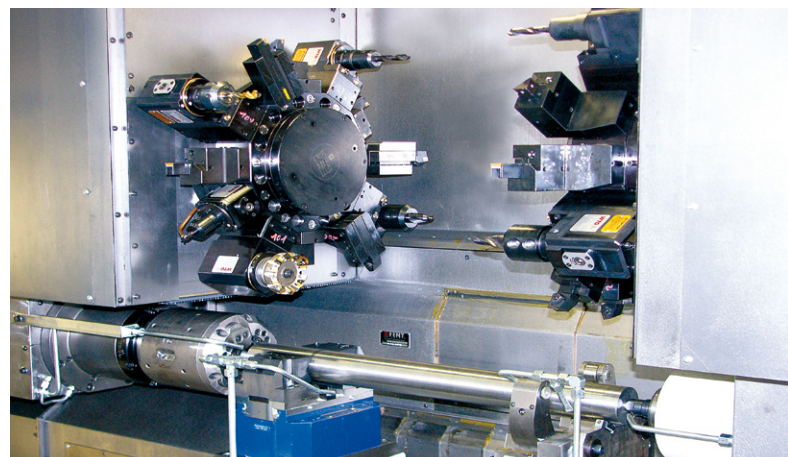


### Lowerable clamping unit

For face machining of both sides of a workpiece.

### Your advantage

- Cutting to length and centering of shaft components in one setup





# VDF 250 T

## THE MODULAR KIT

### Design your VDF T according to your requirements

You only order what you need to suit your requirements. With the VDF T series modular system we offer the ideal basis for high productivity and thus low part costs. Even after installation, the VDF T can be adapted to meet your current requirements with consummate ease.

### Upper slides

#### Left

### Tool turret

X, Y, Z-axis

### Motor spindle

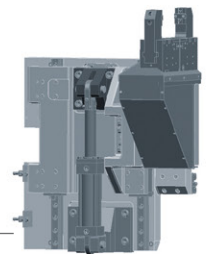
### Lower slides

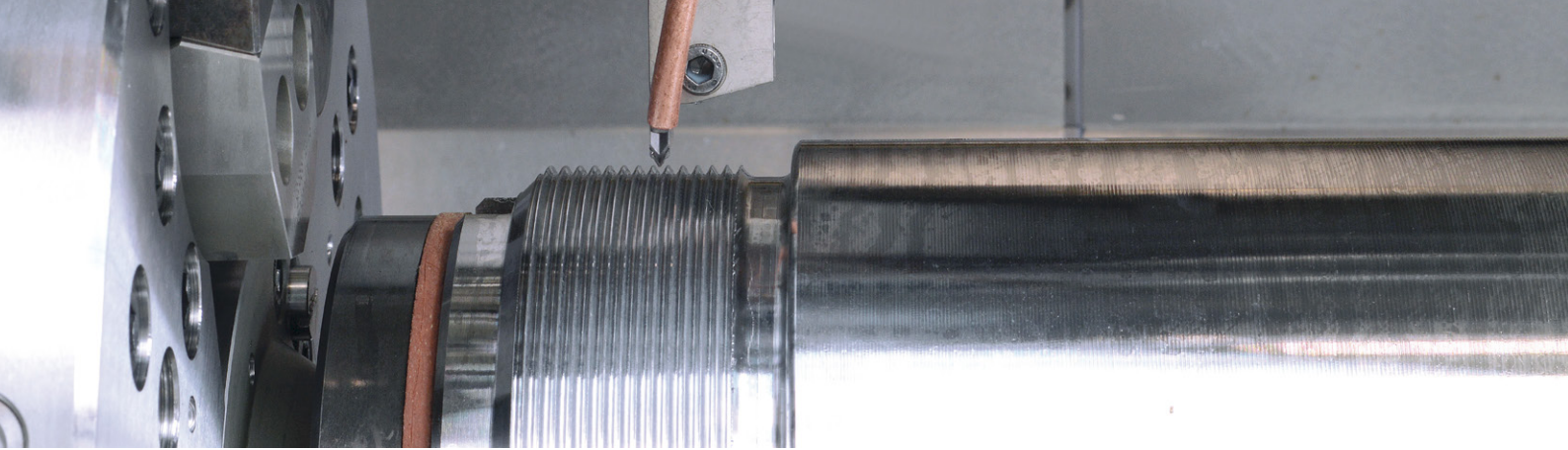
#### Left

Steady rest

Retractable steady rest

Retractable  
clamping unit



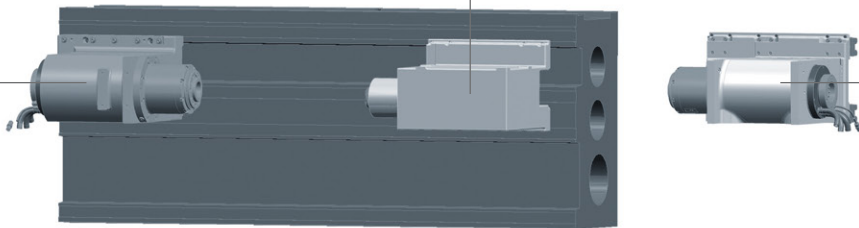


## Upper slides Right



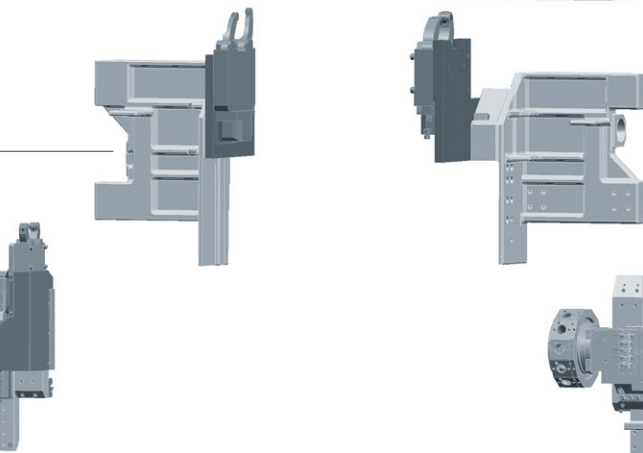
**Tool turret**  
X, Y, Z-axis

**Tailstock**



**Opposed spindle**  
Motor spindle

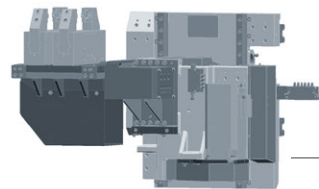
## Lower slides Right



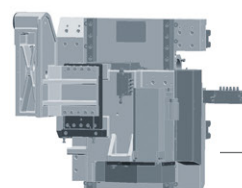
**Steady rest**

**Retractable  
steady rest**

**Tool turret**



**Retractable  
clamping unit**

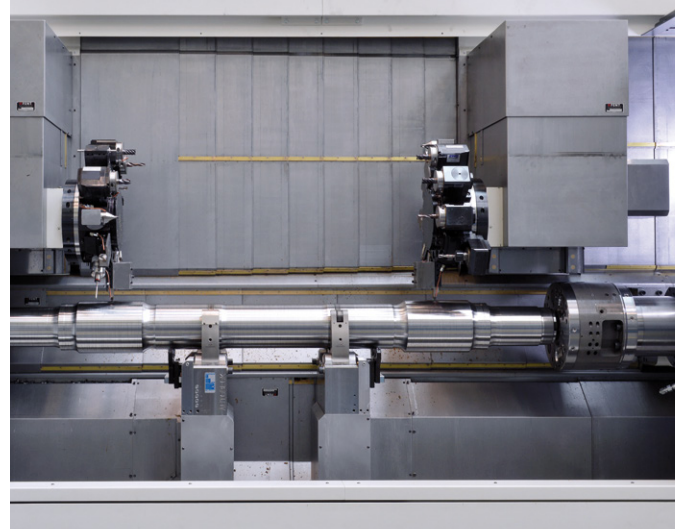


**Retractable  
tailstock**

## VDF 450 T

### COMPLETE MACHINING OF MEDIUM SIZED PARTS

- ▶ The modular design concept of the machines allows for flexible and effective adaptation to individual machining requirements
- ▶ Pre-stressed hydraulic concrete machine bed for high surface accuracy
- ▶ High torque geared spindle for powerful cutting performance
- ▶ Turning length up to 4.5 m
- ▶ Upper slides can be equipped with Y-axis for complete machining
- ▶ The 3-guideway bed allows free by-pass of upper as well as lower carriage between tailstock or opposed spindle



Work zone: two upper tool turrets



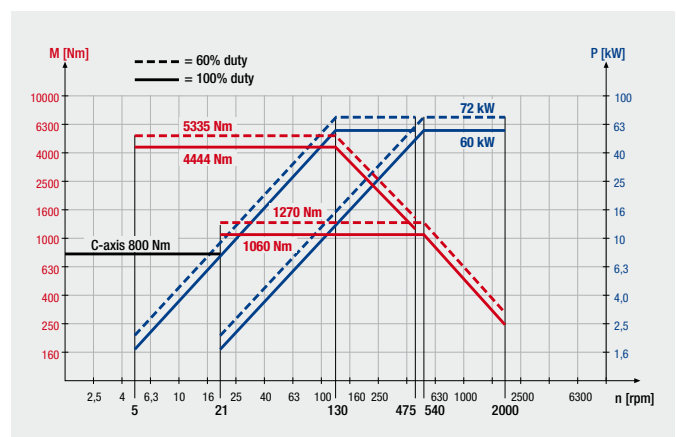
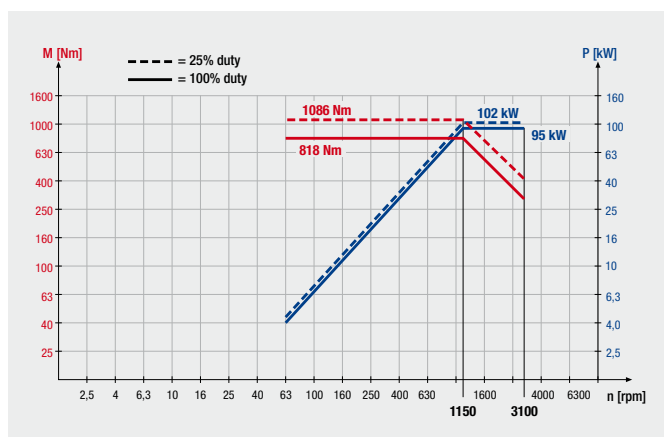
VDF 450-4 T





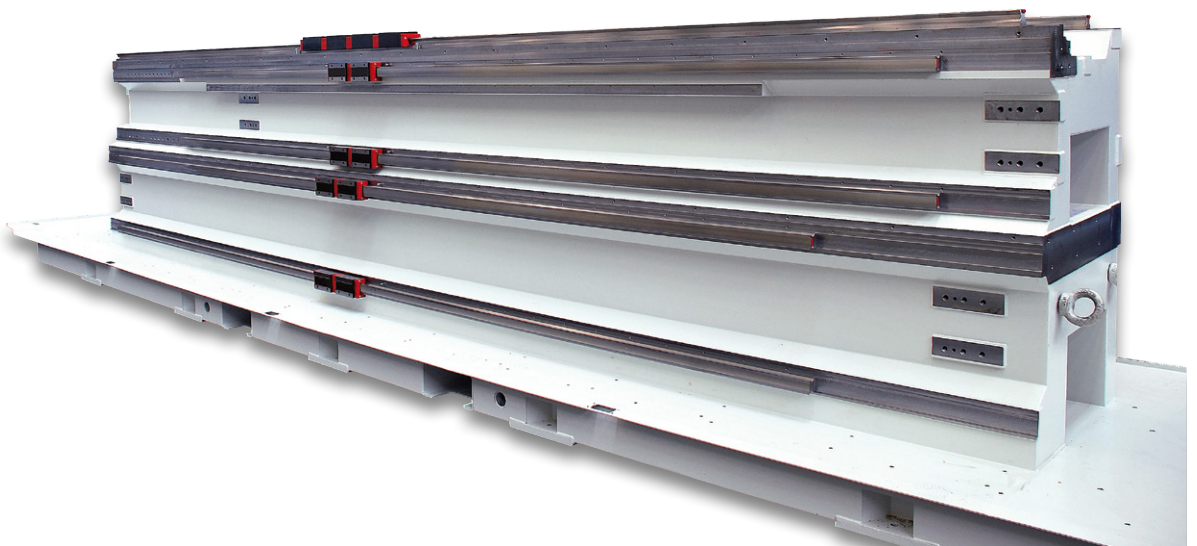
## Technical Data

Technical Data		VDF 450 T
Turning length	mm	1300 / 2200 / 3400
Turning diameter max.	mm	650
Swing diameter over bed	mm	700
Main spindle	type	geared spindle
Spindle nose	size	A11 / A15
Turret		VDI 50 radial

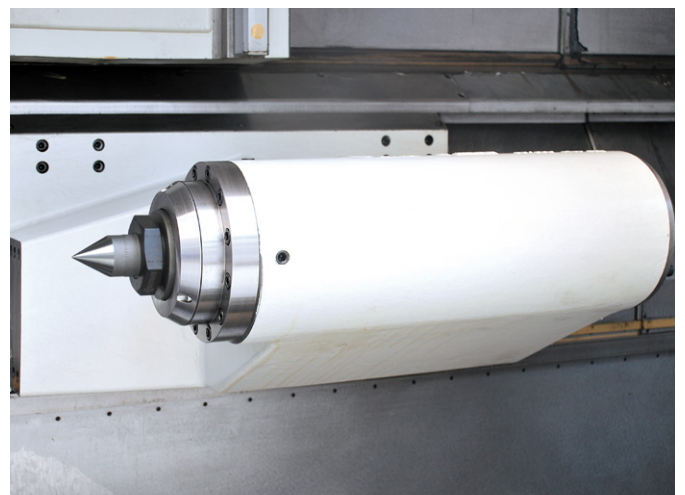


## VDF 450 T COMPONENTS

The VDF 450 T series machines are mounted on a pre-stressed hydraulic concrete machine bed for high mechanic and thermal stability. This results in an improved clamping characteristics.

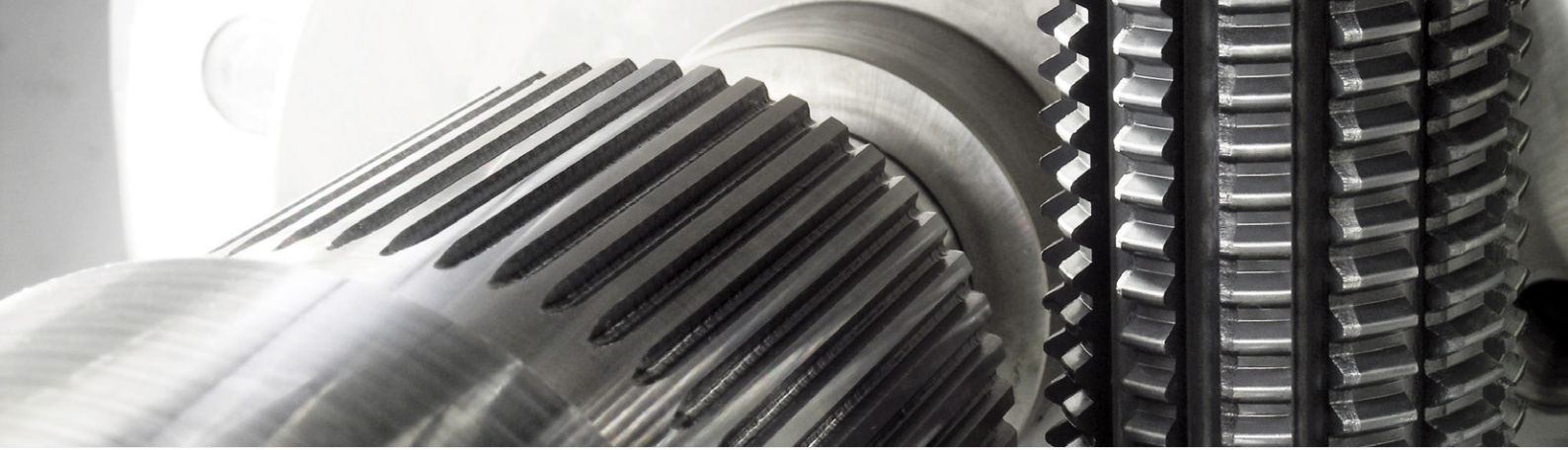


Steady rest

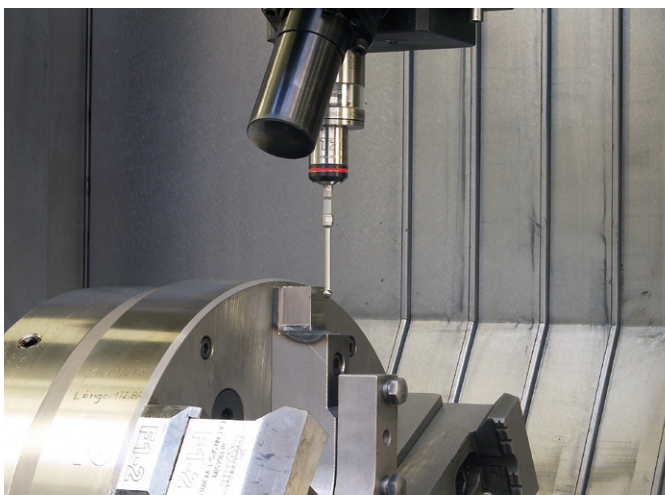
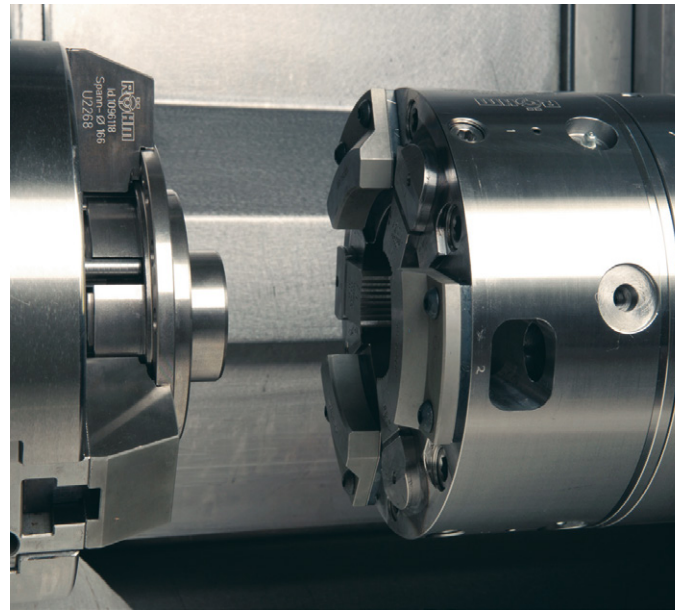
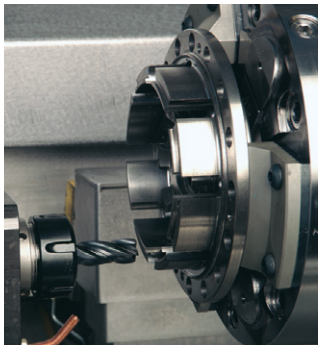


Tailstock

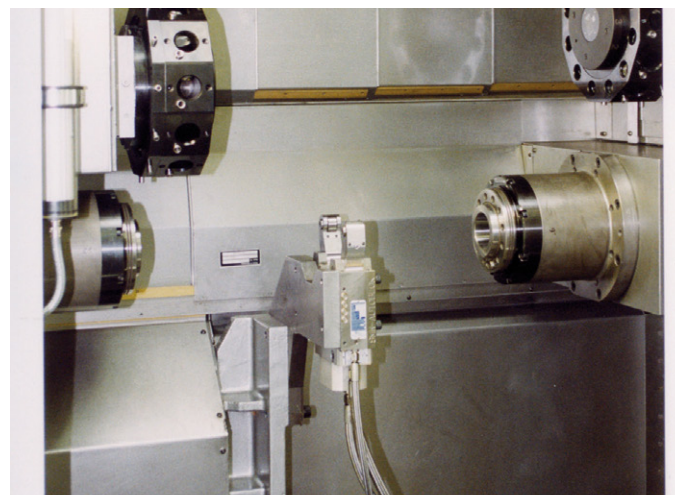




The main and opposed spindle can be equipped with motor spindles or separate drives for higher torque. A travelling opposed spindle adds capacity for automatic handling, transferring the workpiece into a new clamping position for machining the rear side of the part without operator intervention.



Calibration of a workpiece measuring probe



Optimized chip fall



## INTEGRATED TECHNOLOGY FEATURES

### Hard turning

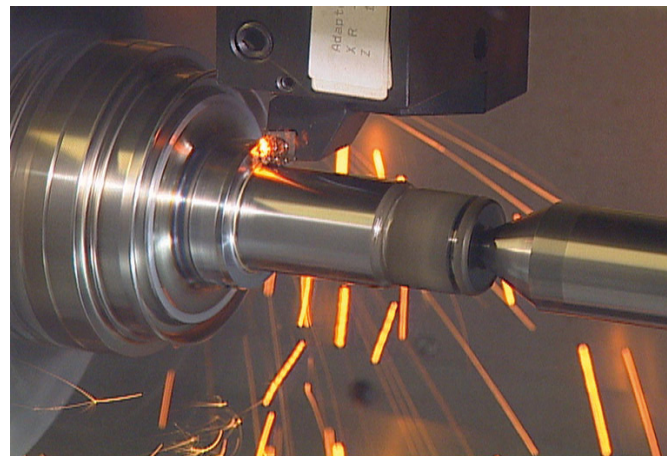
The extremely rigid machine design allows for vibration free hard turning with next generation CBN cutting inserts at high feed rates and excellent chip control.

### Application

- ▶ Manufacturing of shaft and chuck parts
- ▶ Machining of inner and outer diameter

### Your advantages

- ▶ Perform multiple operations simultaneously
- ▶ Complete machining in one set-up
- ▶ Short cycle times
- ▶ High flexibility
- ▶ Quick setup times



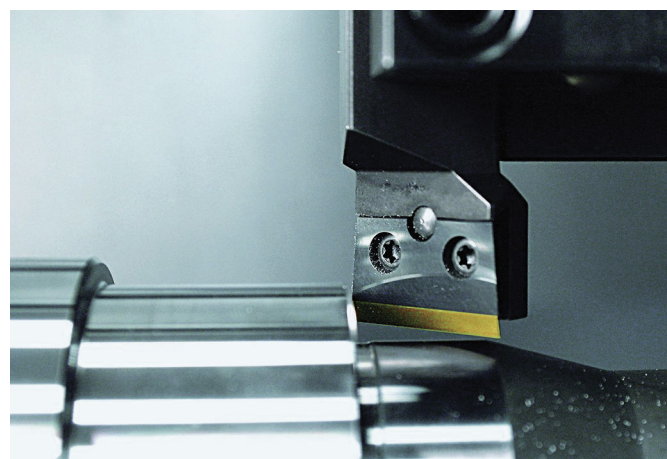
Hard turning

### Lead-free turning

This process technology is particularly important for seal seat surfaces on hardened or „soft“ components. You can achieve surface qualities of Ra 0.2–0.6  $\mu\text{m}$  or Rz 1–3  $\mu\text{m}$  without grinding.

### Your advantage

- ▶ Turning instead of grinding
- ▶ One machine instead of two
- ▶ Dry machining
- ▶ Short machining times / high output
- ▶ Low investment costs
- ▶ High process safety



Lead-free turning

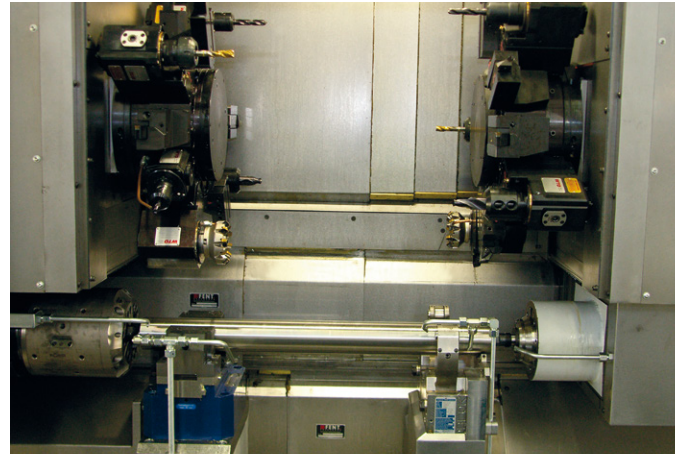
# HIGHLY EFFICIENT AND ECONOMIC MACHINING

## Cutting to length and centering

Both shaft ends are cut to length and centered simultaneously by driven tools while the part is held firmly in a clamping device. Turning operations are performed subsequently.

## Your advantage

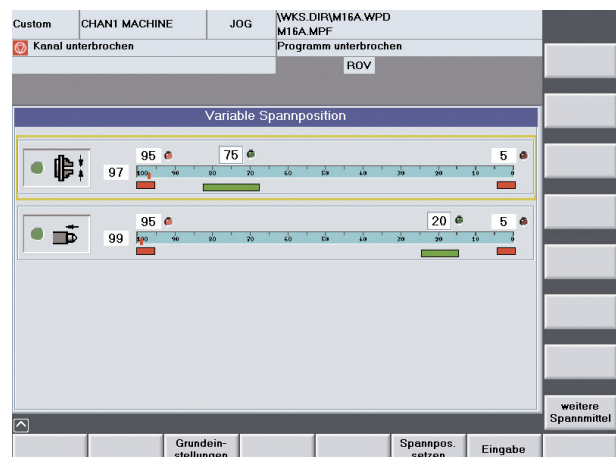
- ▶ Lower investment due to shorter process chain (save one machine)
- ▶ Reduce cycle and lead times



Facing and centering

## Reduced setup and idle times

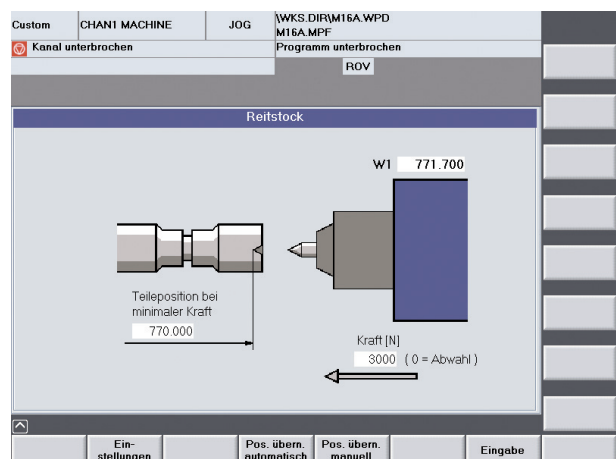
- ▶ Quick and easy change of tools and fixtures
- ▶ High traverse rates and dynamic drives
- ▶ Short indexing time on tool turret
- ▶ Programmable clamping stroke (option)
- ▶ Clamping stroke monitoring
- ▶ No tail stock quill stroke, programmable tailstock pressure
- ▶ Separate guideways: all modules travel simultaneously
- ▶ Tailstock and steady rest positioning via NC-axis
- ▶ No reference positioning required



Monitored clamping stroke

## Highly reliable process

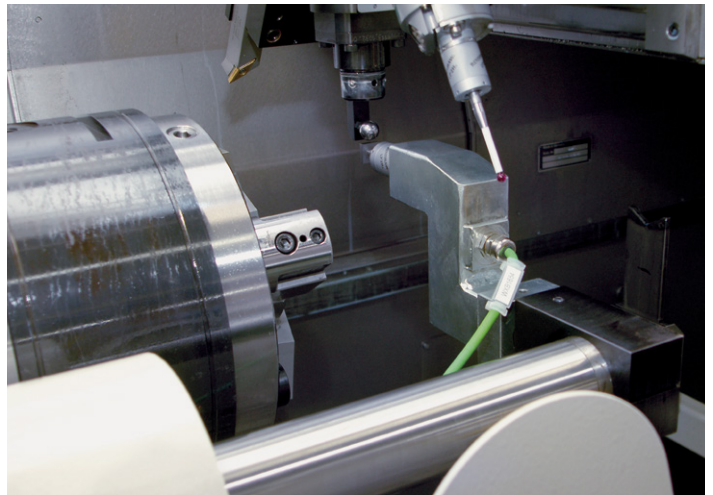
- ▶ Absolute measuring system on all axes
- ▶ FEM optimized machine for high rigidity and shock resistance
- ▶ Thermal stability
- ▶ Free chipfall
- ▶ Generously dimensioned linear guideways



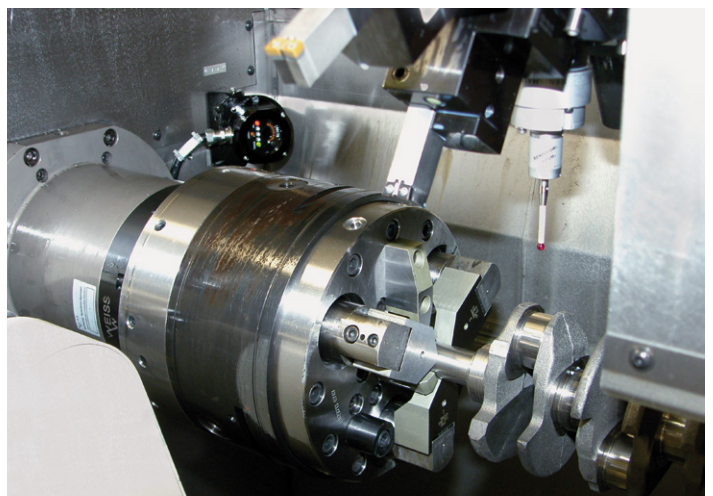
Programmable tailstock

# PROCESS MONITORING

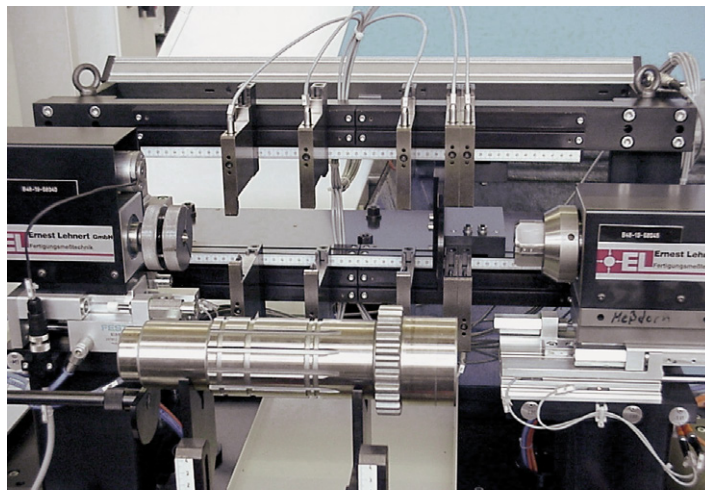
Automatic tool measuring in the work zone



Workpiece measuring in the work zone via infrared data transfer



Post-process workpiece measuring outside the machine





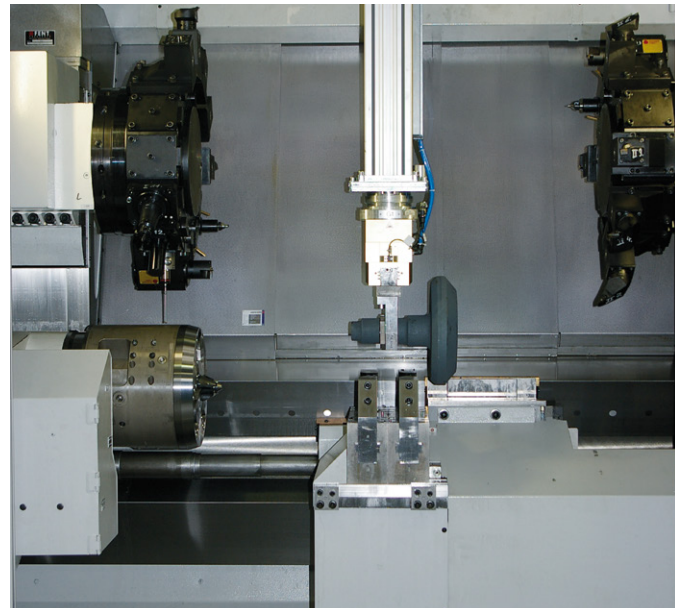
# AUTOMATION

## Gantry loading

For heavy workpieces, loading can be done via gantry. The machine can be equipped with one or two loading hatches. Flexible loading is guaranteed.

## Your advantage

- ▶ Quick loading for precise volume production
- ▶ Easy handling of large, heavy parts



# TECHNICAL DATA

## VDF T-SERIES

Machine type		VDF 250 T	VDF 450 T
<b>Working range</b>			
Turning length	mm	850 / 1850	1300 / 2200 / 3400
Swing diameter over bed	mm	620	700
Turning diameter (outside)	mm	290	650
Stroke Z-axis (1 turret)	mm	960 / 1943	1560 / 2460 / 3660
Stroke X-axis	mm	200	340
<b>Main spindle</b>			
Spindle nose	size	A6 / A8	A11 / A15
Chuck diameter	mm	200 / 250	315 / 400
Spindle bore	mm	65 / 103	103 / 132
Spindle diameter in front bearing	mm	120 / 150	150 / 190
Gear steps	no.	1 / 1	2 / 2
Speed range, max.	rpm	4500 / 3000	2800 / 2000
Power 40% DC	kW	45 / 53	36 (40%) / 56 / 72 (60%)
Torque max. 40% DC	Nm	340 / 662	3456 / 5335
<b>Tailstock</b>			
Center reception	no.	MK4 / MK5	MK5 / MK6
Tailstock force	kN	8 / 10	18
<b>Feed drives (AC motor)</b>			
Rapid traverse speed (X- / Y-axis)	m/min	25 / 10	15 / 15
Rapid traverse speed (Z-axis)	m/min	25 (15)*	30
Feed force when drilling	kN	8	10
<b>Tool turret</b>			
Number of turrets	no.	1 / 2 / 3 (1 / 2)*	1 / 2 / 3
Number of tool stations	no.	12	12
Driven tools per turret	no.	12	12
Cyl. shank location DIN 69880	Ø mm	40	50
Y-axis range	mm	-30 / +50****	±100
Connection load (single spindle)	kVA	65	75
Machine dimensions L x W (TL1000)***	mm	4280 x 2460 (5460 x 2360)*	5100** x 2800
Machine weight	ca. t	15	23 / 27 / 34
Machine height w / o automation	mm	2612 (2655)*	2860

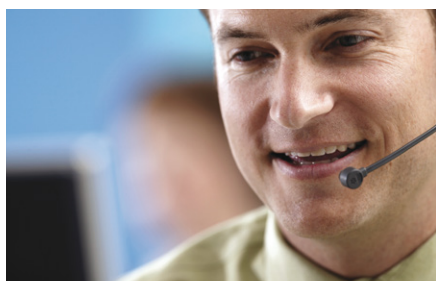
\* for turning length 1850    \*\* for turning length 2200    \*\*\* without chip conveyor    \*\*\*\* Figures subject to change depending on options

Technical data subject to change.

## SERVICE AND SUPPORT

The **services team at MAG** is your single source for maintenance and productivity solutions designed to optimize plant operations. Through comprehensive support and factory-direct expertise, manufacturers achieve maximum equipment availability and utilization reducing their cost per piece. By providing a proven and innovative service and support program, our customers maintain the lowest possible total cost of ownership of capital equipment throughout the machine's life cycle.

### After Sales Service



- ▶ Hotline / Tele service
- ▶ Repair
- ▶ Maintenance
- ▶ Service
- ▶ Relocations
- ▶ Service contracts

### Retrofit / Spindle Service



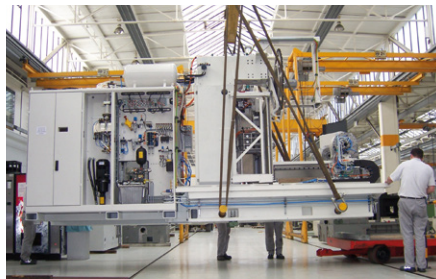
- ▶ Repair / Overhauling
- ▶ Loop concepts
  - Machines
  - Assemblies
  - Motor spindles
- ▶ Used machines
- ▶ Retrofit
- ▶ Control system upgrade

### Spare Solutions / Online Shop



- ▶ Availability 24/7
- ▶ Individual spare logistics
- ▶ Central warehouse

### Technology Solutions



- ▶ Energy Management
- ▶ Relocations
- ▶ Technical optimization
- ▶ OEE optimization
- ▶ Control upgrades
- ▶ Maintenance management
- ▶ General contractor

### Software Solution



- ▶ Capture machine data
- ▶ Machine diagnosis
- ▶ Condition monitoring
- ▶ Energy management
- ▶ Virtual machinet

### Training



- ▶ Operator training
- ▶ Fluid training
- ▶ Maintenance training
- ▶ Interactive training
- ▶ NC program training



**VDF BOEHRINGER****DIGITAL  
FACTORY****HESSAPP****MORARA****Pfiffner****TACCHELLA****Witzig & Frank**

## About FFG Europe & Americas

FFG Europe & Americas unite major players from the German, Italian, Swiss and American machine tool industry with a broad range of milling, turning, grinding, and gear manufacturing technology, and the knowhow of the renowned machine tool brands VDF Boehringer, Corcom, Digital Factory, Hessapp, IMAS, Jobs, MAG, Modul, Morara, Pfiffner, Rambaudi, Sachman, Sigma, SMS, Tacchella and Witzig & Frank. Since 1798, these brands have substantially contributed to the progress in industrial manufacturing and are well known as reliable and innovative equipment and systems solutions suppliers for the automotive and truck, aerospace, machine building, general machining, railway industry, energy and heavy engineering industries. While being an independent group, these entities benefit from the strengths and opportunities of the global Fair Friend Group. They stand for premium technology within FFG.



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