

VDF BOEHRINGER

VDF T AND VDF TM SERIES



Horizontal Turning and Turn/Mill Centers



The VDF T / VDF TM Series



How to save money while you work

The innovative VDF T / VDF TM 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 / VDF TM 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 / VDF TM 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 180 T



VDF 250 T, VDF 300 T



VDF 400 T, VDF 450 T

Turn-mill center



VDF 450 TM

Application range of the VDF T / VDF TM series

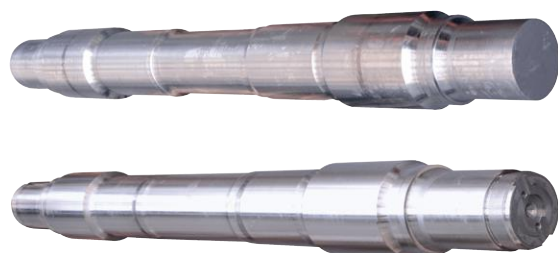
- ▶ High volume production – short cycle times
- ▶ Large variety of parts sizes (depending on machine type)
- ▶ Fully-automated production, including process monitoring
- ▶ Heavy machining
- ▶ Hard and soft turning (replacing grinding operations)

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

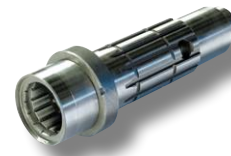
Your advantage

- ▶ 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



Railway axle – raw and finished part

Work piece range examples



Drive shaft



Electric motor shaft



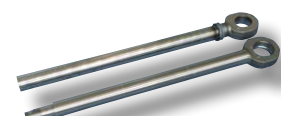
Universal shaft



Pump shaft



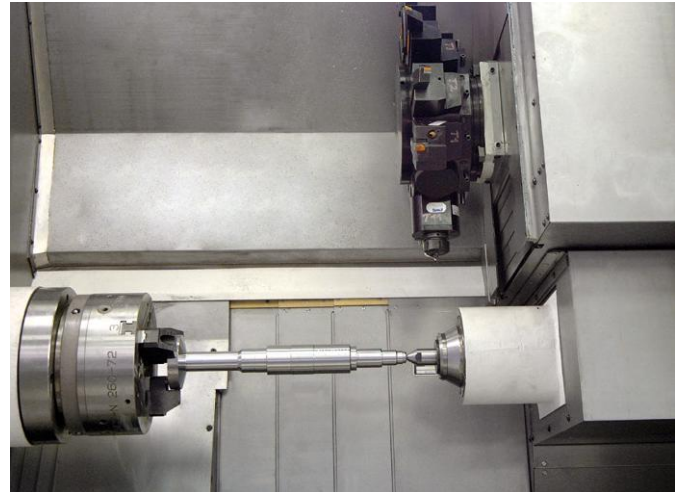
Special crankshaft



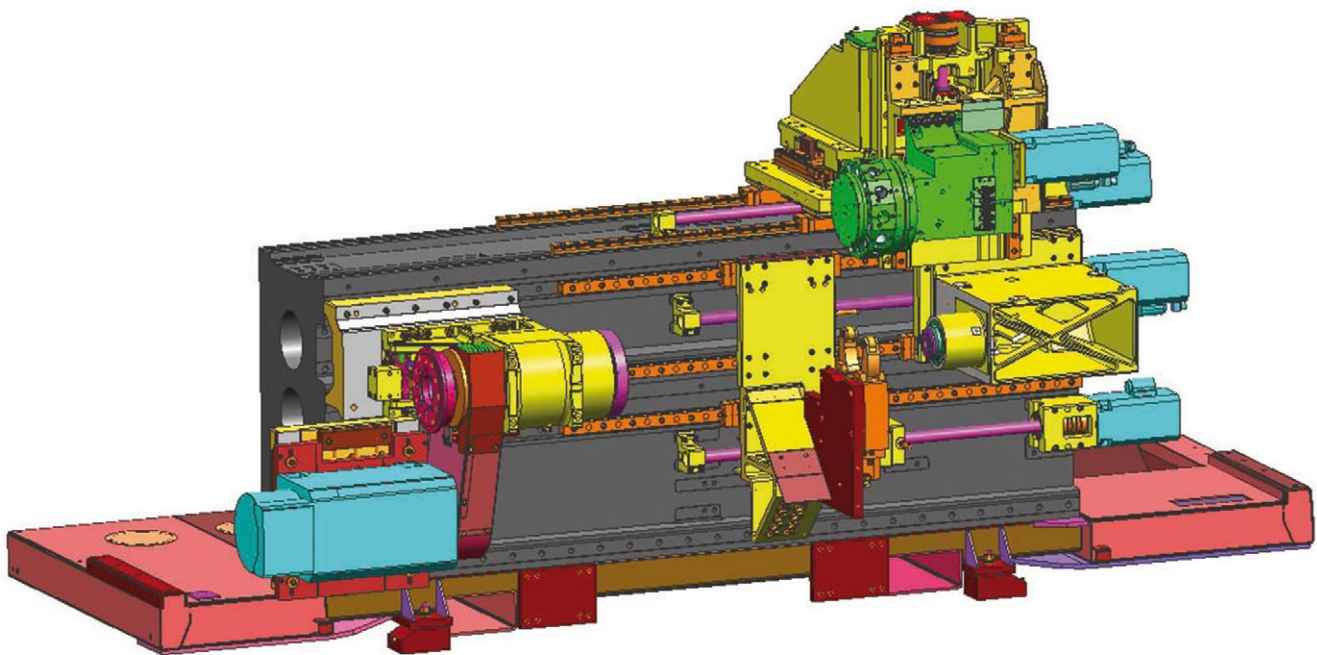
Piston rod

VDF 180 T – Standard High Performance

- ▶ Standard machine concept with one tool turret
- ▶ Straight wall interior and optimized positioning of components for free chip fall
- ▶ Ideal damping properties of mineral casting bed for longer tool life and reduced tooling costs
- ▶ Powerful main drive for high cutting rates



Work zone with one tool turret

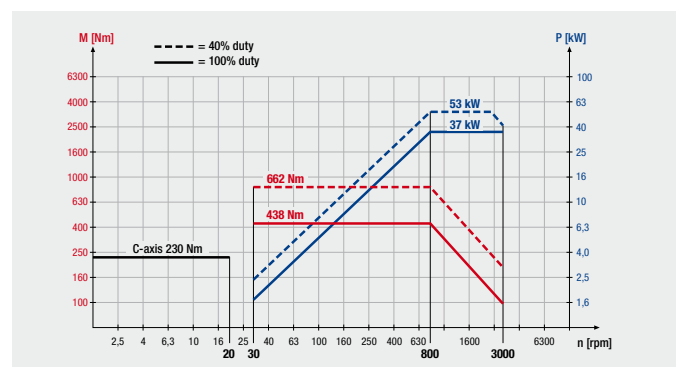


VDF 180 T



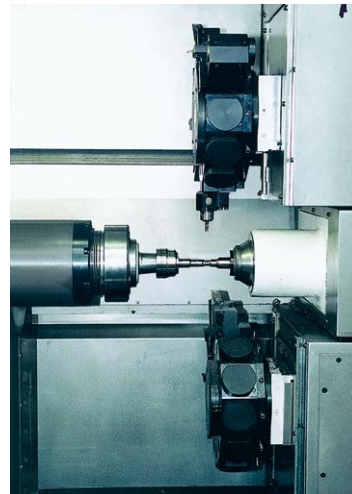
Technical Data

Technical data		VDF 180 T
Turning length	mm	900
Turning diameter	mm	290
Swing diameter over bed max.	mm	620
Main spindle	type	single-stage drive
Spindle nose	size	8
Turret		VDI 40 radial

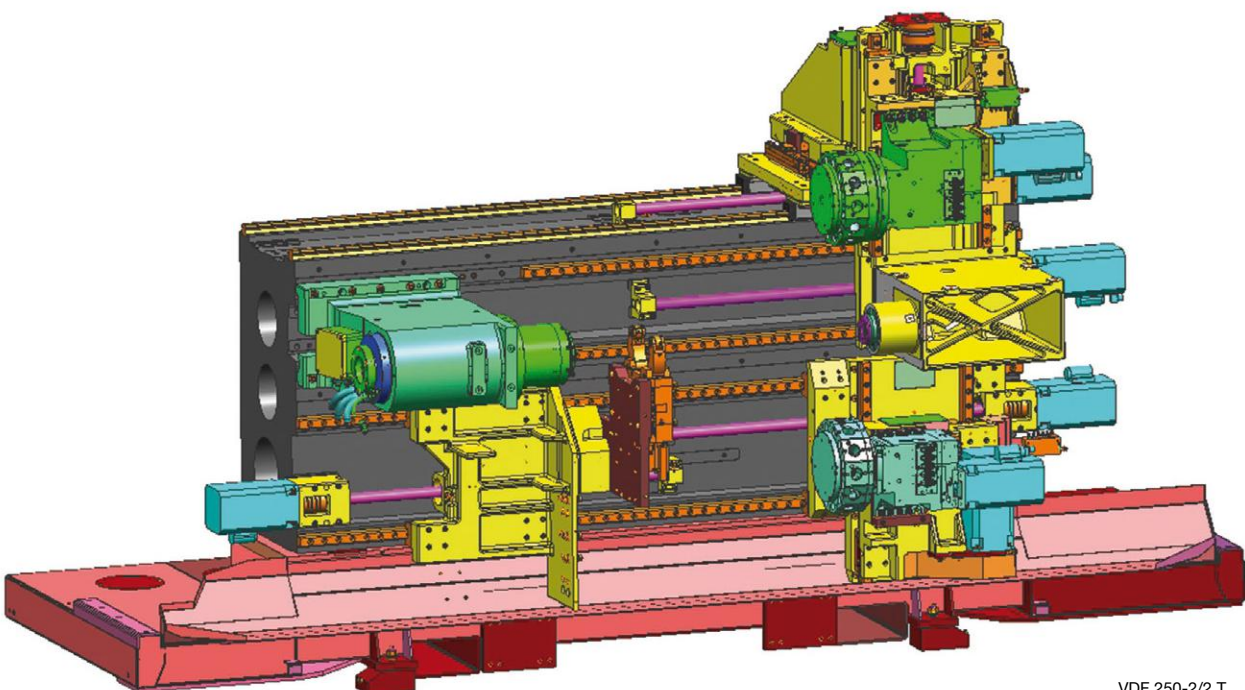


VDF 250 T – Modular Design for Complex Machining

- ▶ 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

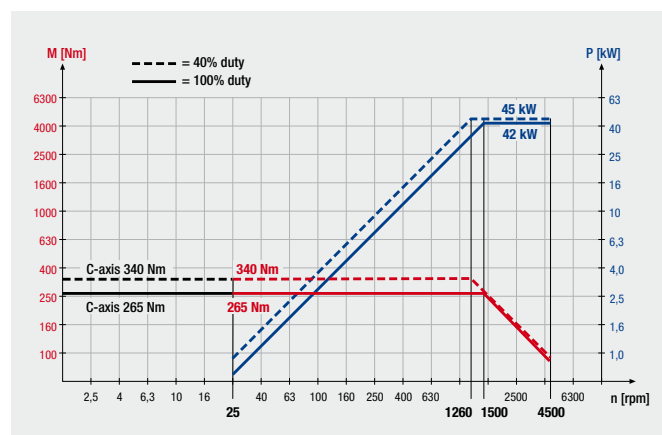
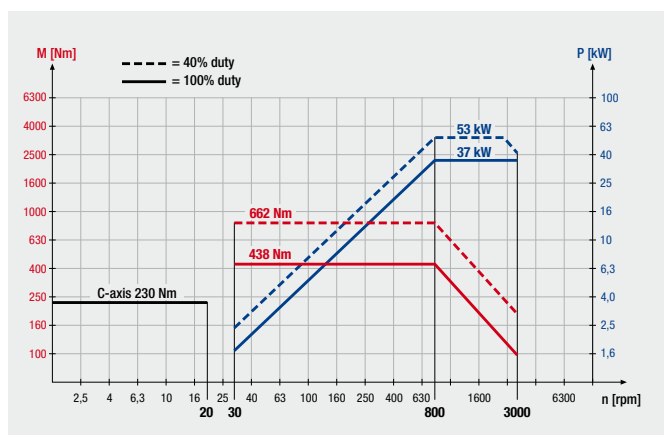


VDF 250-2/2 T



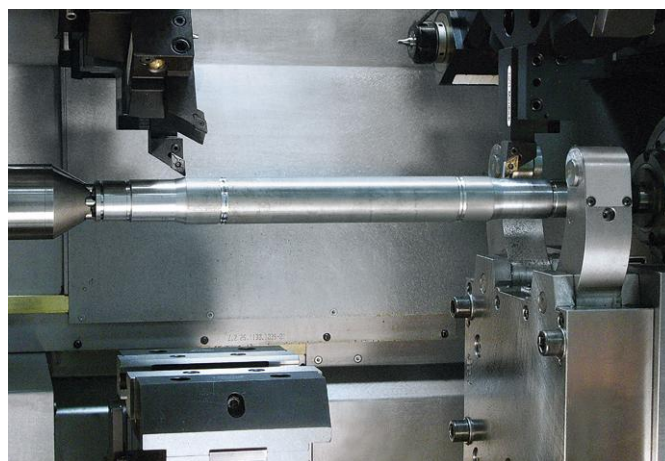
Technical Data

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	8
Turret		VDI 40 radial

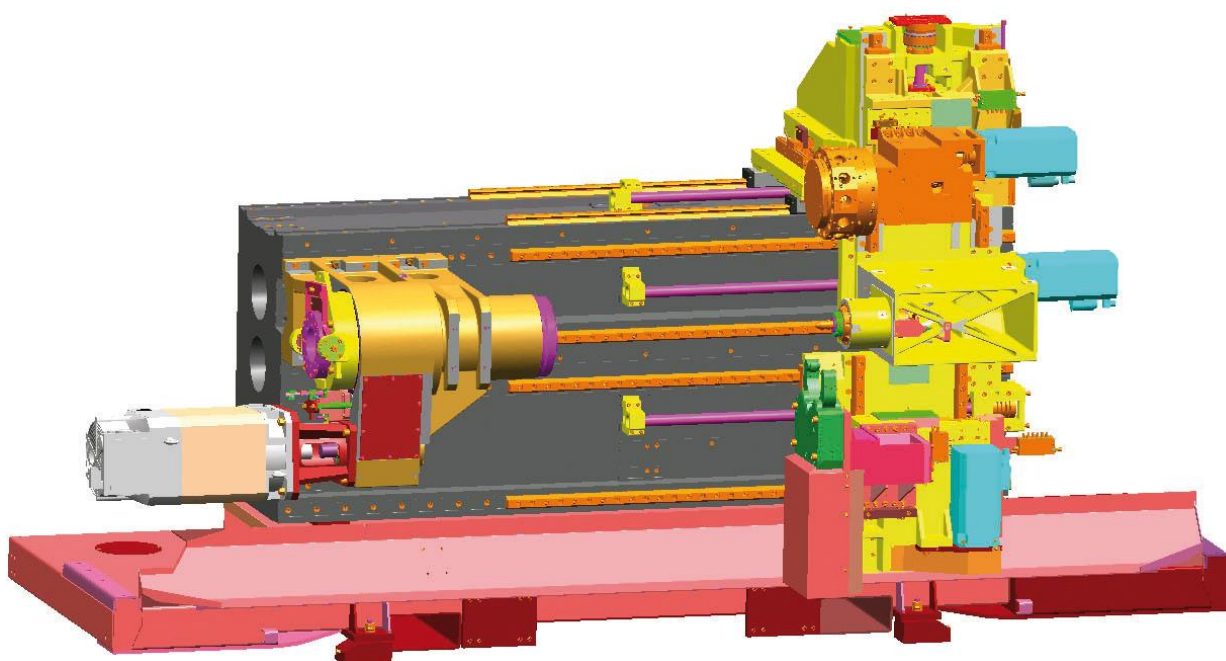


VDF 300 T – The Modular High Performance Machine

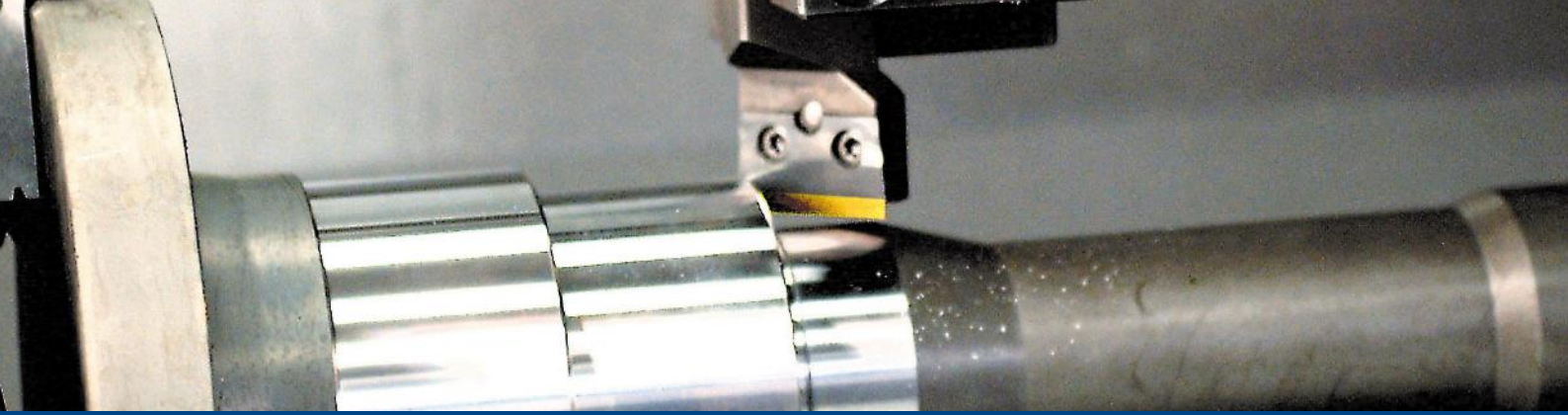
- ▶ Same machine design as the VDF 250 T with additional high performance features
- ▶ Enhanced application range with larger turning diameter
- ▶ Geared spindle for high cutting rates and high torque
- ▶ The mineral casting machine bed with optimized damping properties and high cutting rates are the basis for long tool life and reduced tool costs
- ▶ All active machine axes utilize absolute linear measuring systems for high accuracy



Work zone: Two upper tool turrets and retractable clamping unit on lower carriage

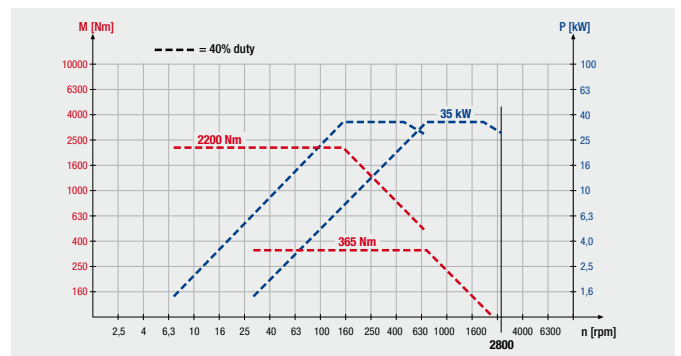


VDF 300-2 T

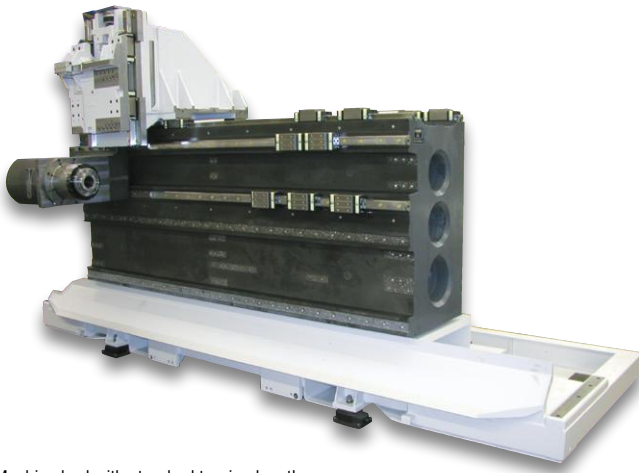


Technical Data

Technical data		VDF 300 T
Turning length	mm	850 / 1850
Turning diameter	mm	350
Swing diameter over bed max.	mm	620
Main spindle	type	geared spindle
Spindle nose	size	A11
Turret		VDI 40 radial



VDF 180 / 250 / 300 T – Components



Machine bed with standard turning length

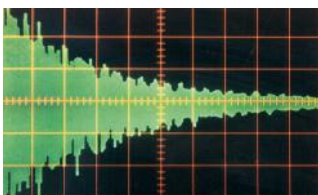
The machine bed of the VDF 180 / 250 / 300 T TL 850 is made of mineral casting

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

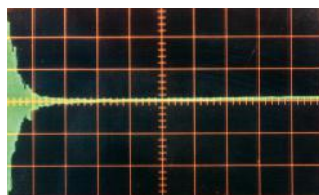
Bed sits on a basic tray construction used as collector for fluids and oil

- ▶ 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.

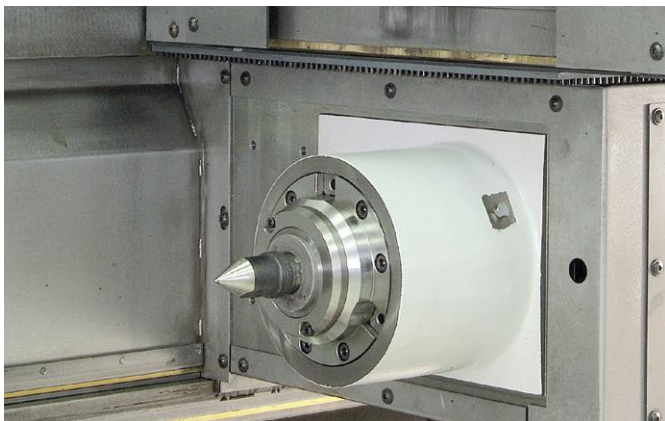


Attenuation curve / casting

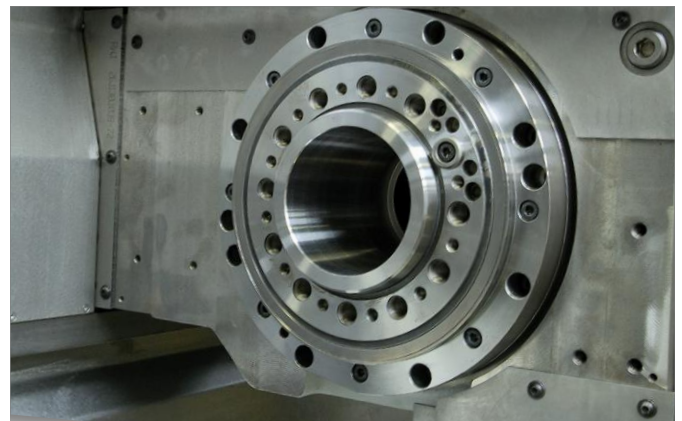


Attenuation curve / concrete

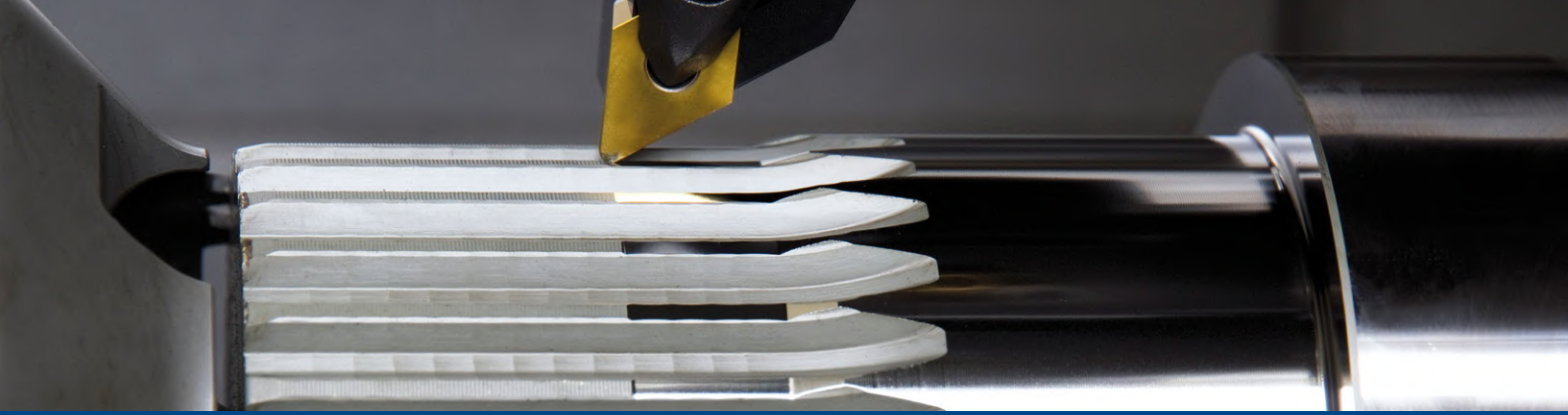
The mineral casting machine bed with optimized damping properties and high cutting rates are the basis for high surface quality, long tool life and reduced tool costs.



Tailstock



Opposed spindle

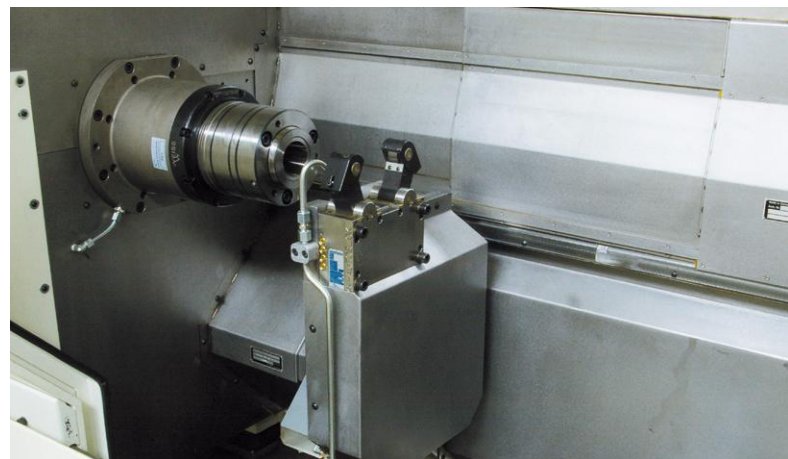


NC steady rests

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

Your advantage

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

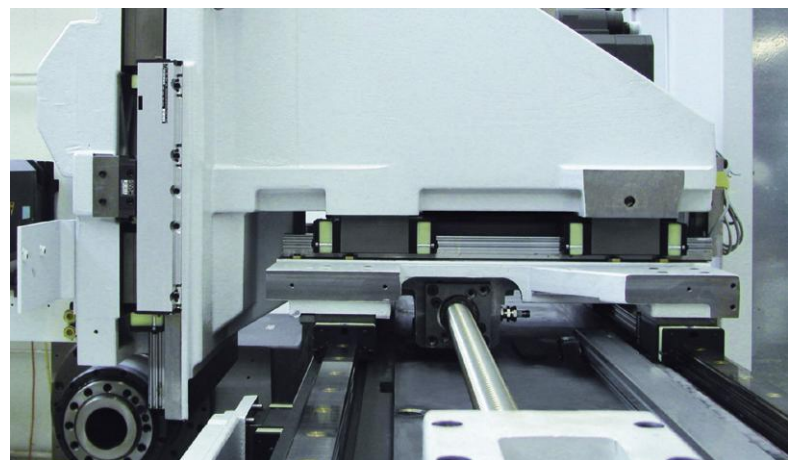


Y-axis

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

Your advantage

- Complete machining in one setup

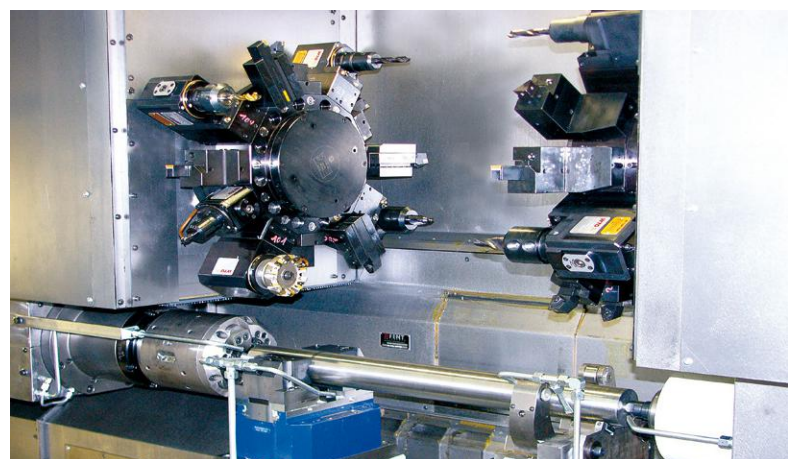


Lowerable clamping unit

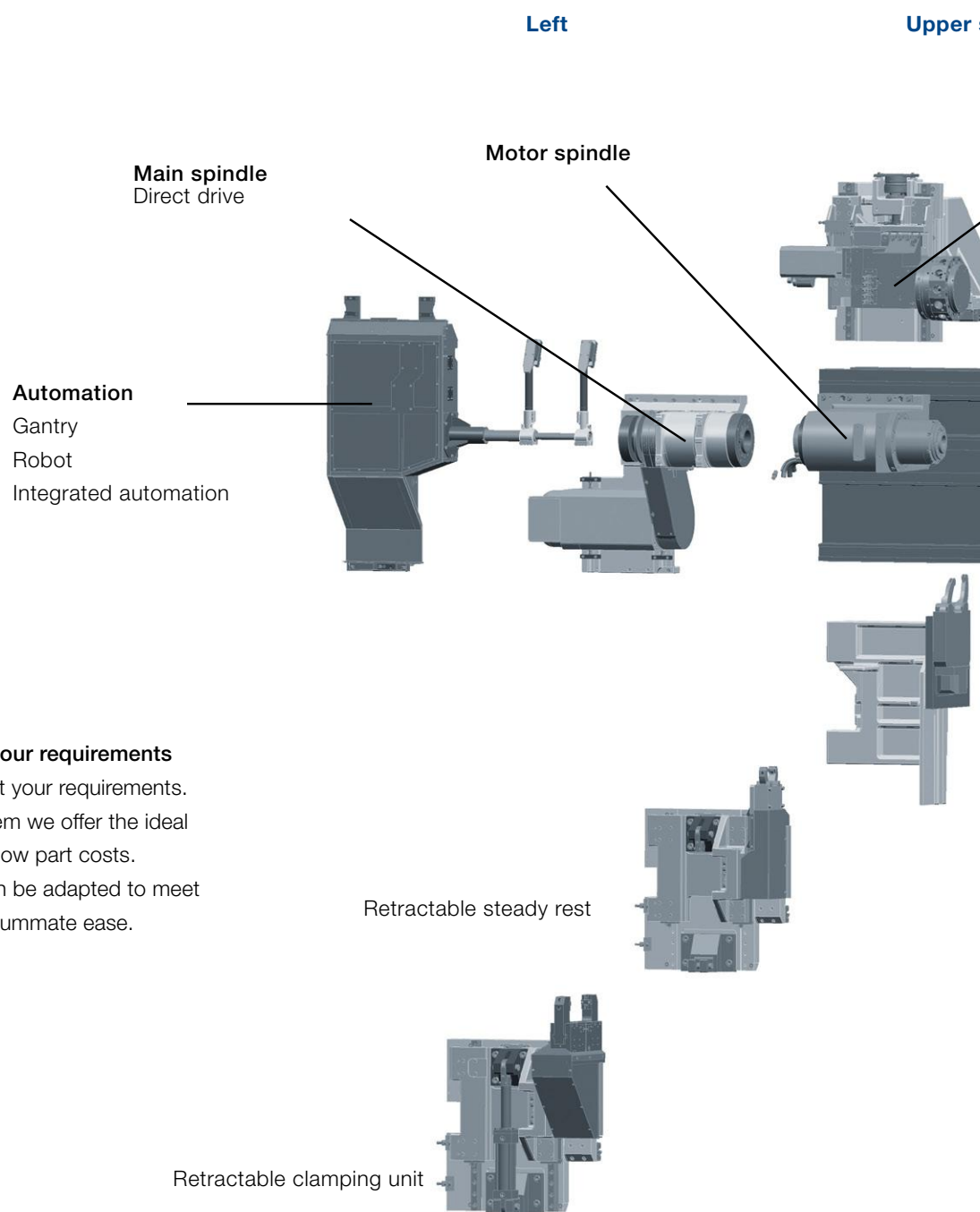
For face machining of both sides of a workpiece.

Your advantage

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

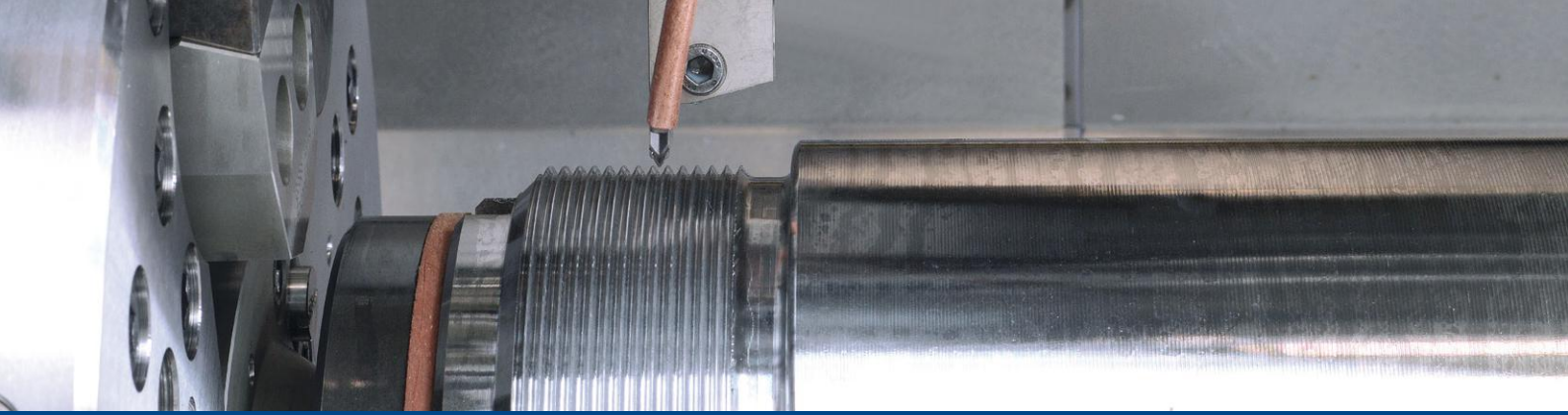


VDF 250 T – The Modular Kit



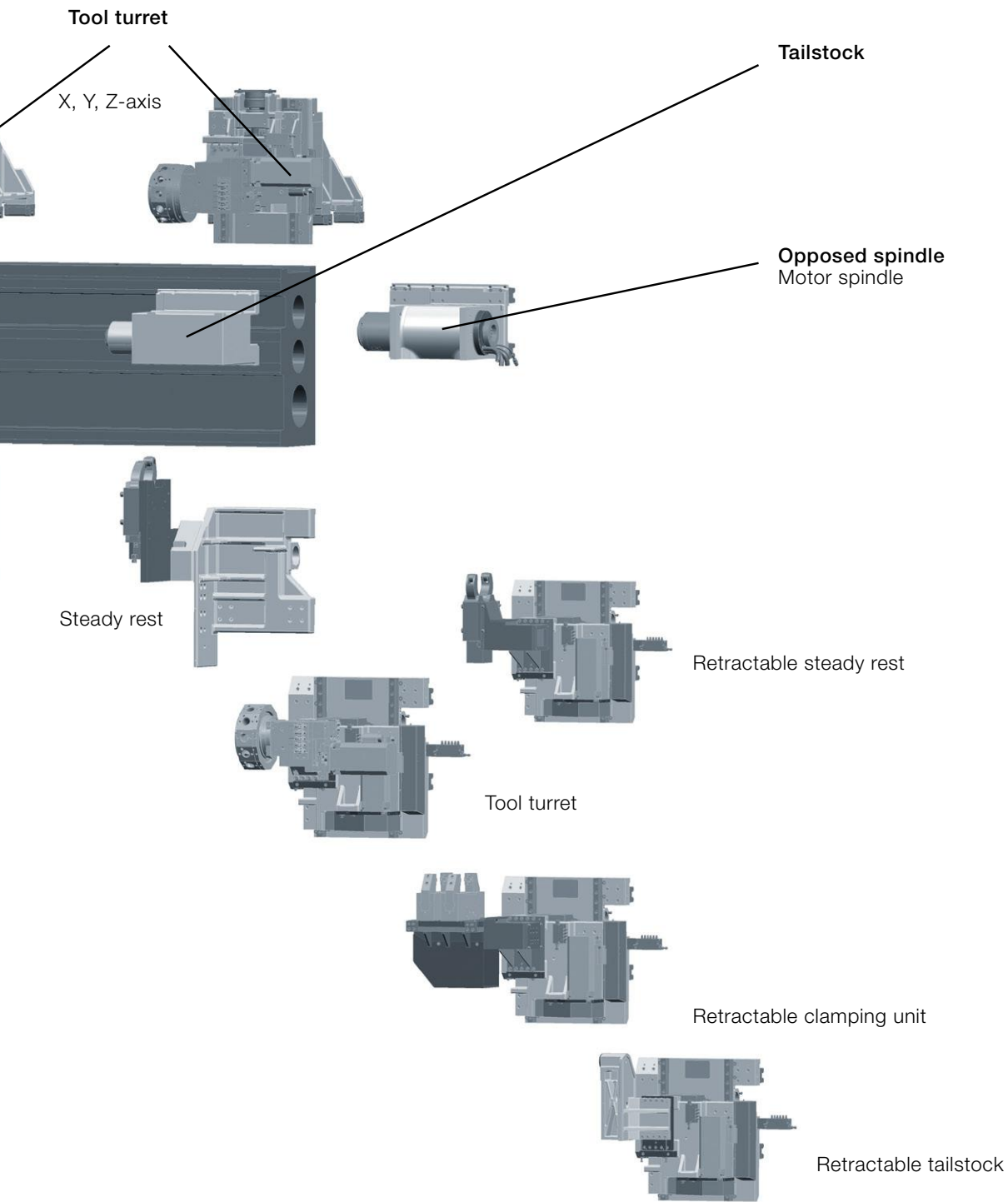
Design your VDF T according to your requirements

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.



slides

Right



slides

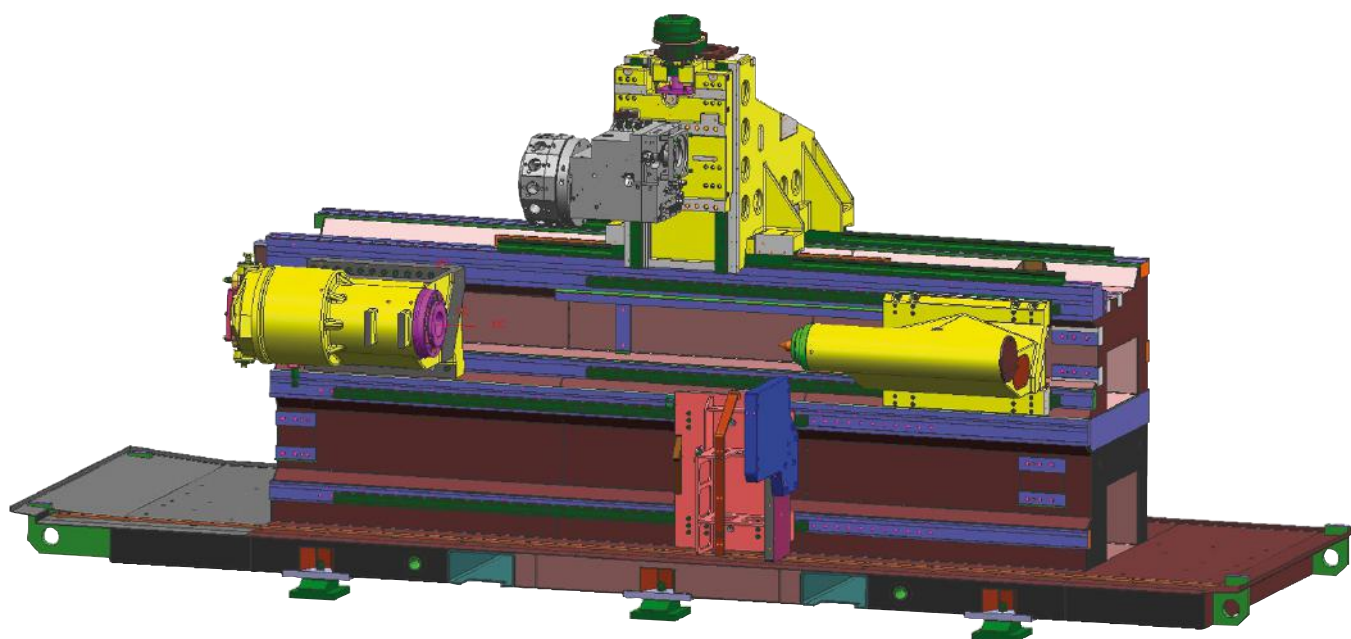
Right

VDF 400 T – High Performance Machining of Medium Sized Parts

- ▶ The cast iron machine bed is the base for the high accuracy and cutting capacity of the VDF 400 T
- ▶ In combination with a 2-step geared spindle the VDF 400 T provides up to 3480 Nm torque for heavy-duty machining
- ▶ Upper slide is equipped with power driven tools and Y-axis for complete machining
- ▶ For machining of long shafts, a steady slide is available on the lower guideways



Work zone: upper tool turret

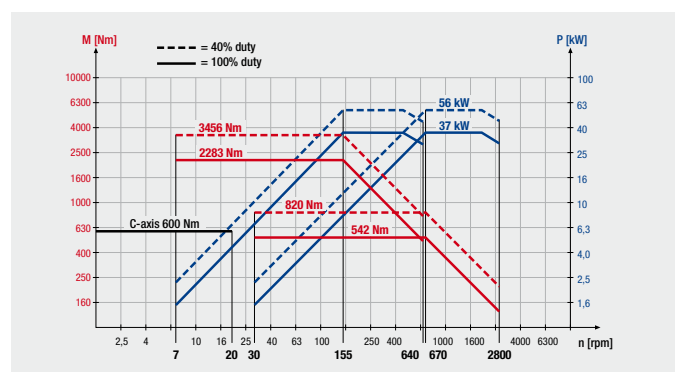


VDF 400-2 T



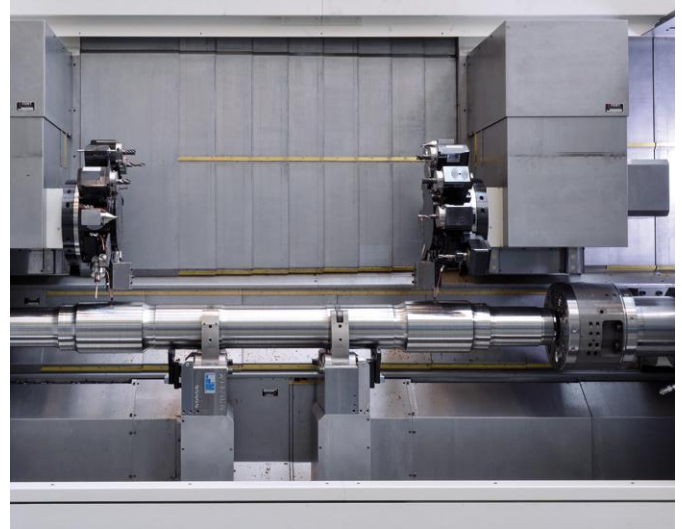
Technical Data

Technical data		VDF 400 T
Turning length	mm	1300 / 2200
Turning diameter max.	mm	650
Swing diameter over bed	mm	700
Main spindle	type	geared spindle
Spindle nose	size	A11
Turret		VDI 50 radial

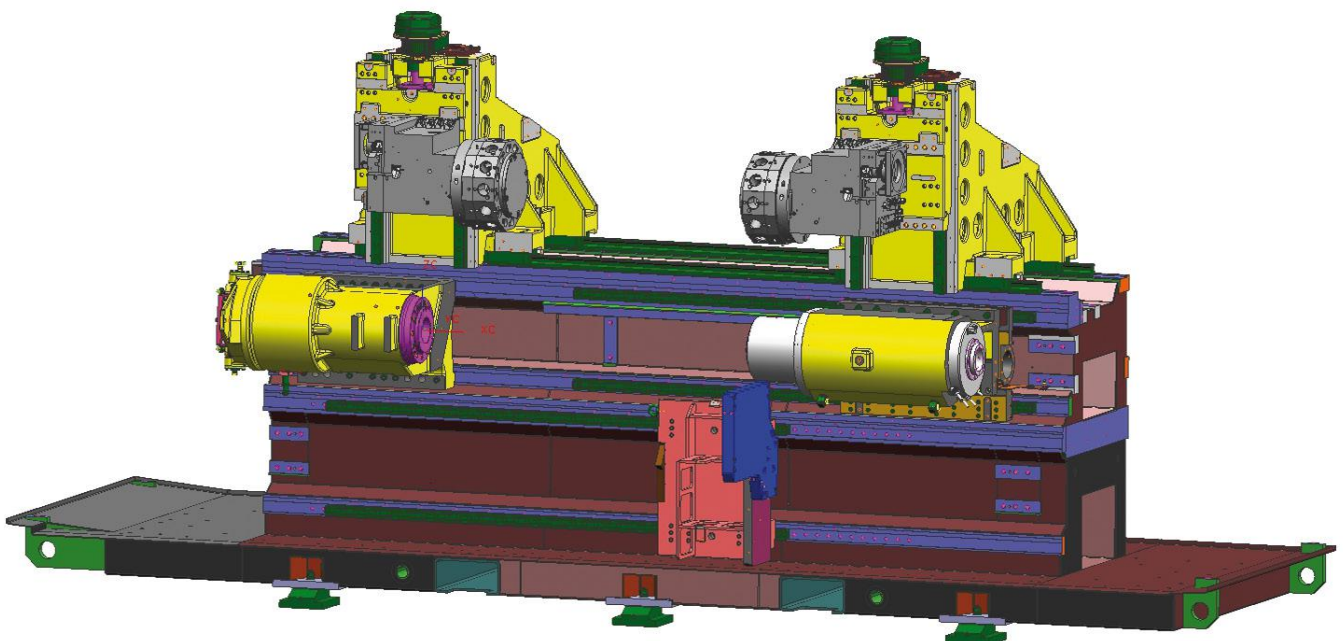


VDF 450 T – Complete Machining of Medium Sized Parts

- ▶ 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

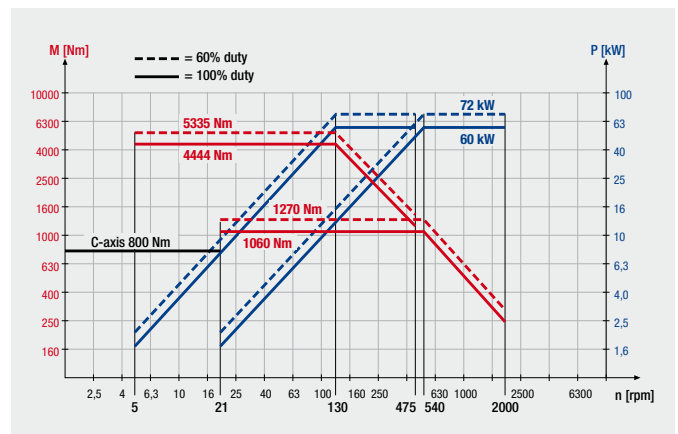
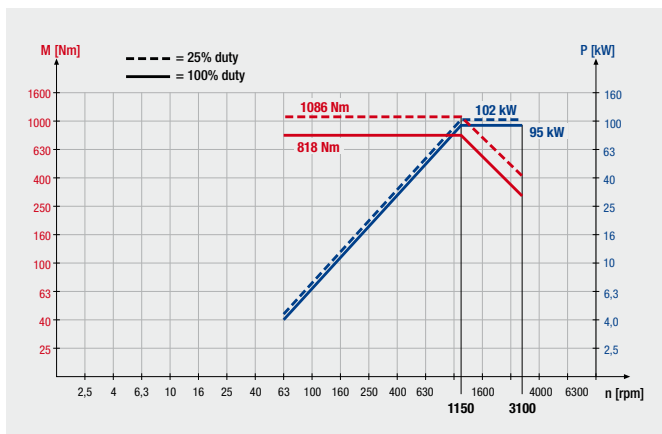


VDF 450-4 T



Technical Data

Technical data		VDF 450 T
Turning length	mm	1300 / 2200 / 3400 / 4500
Turning diameter max.	mm	650
Swing diameter over bed	mm	700
Main spindle	type	geared spindle
Spindle nose	size	A11
Turret		VDI 50 radial

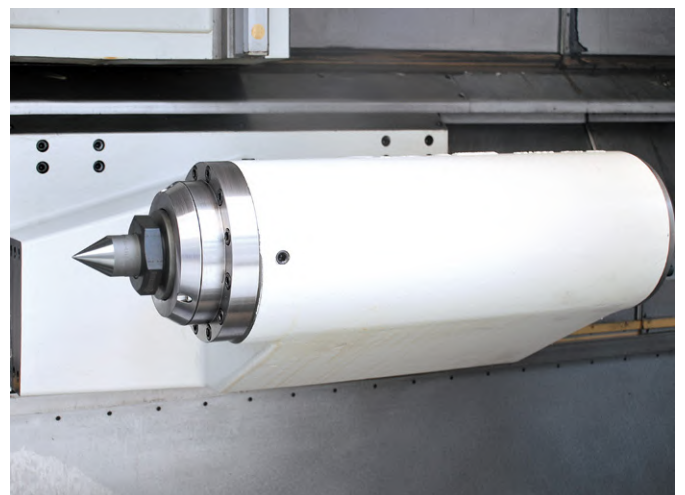


VDF 400 / 450 T – Components

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.



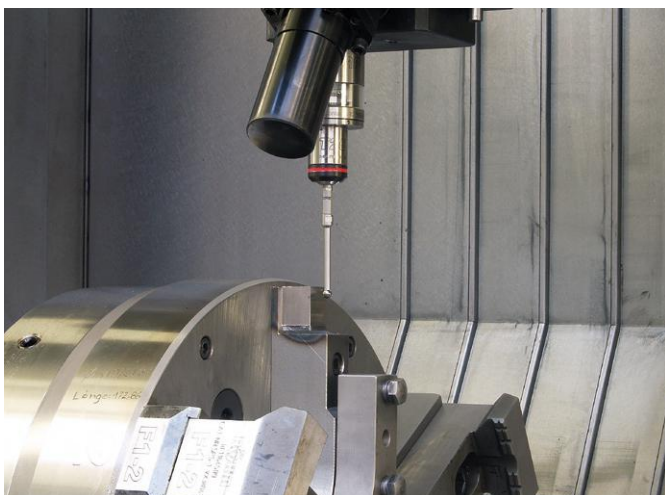
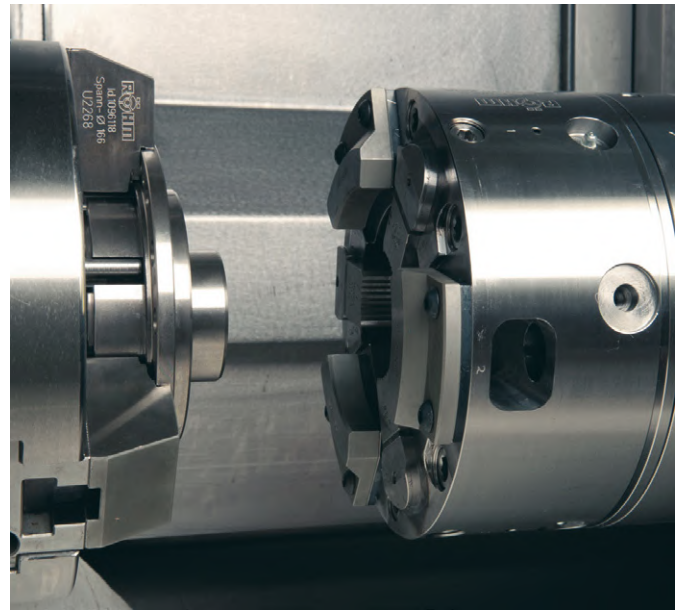
Steady rest



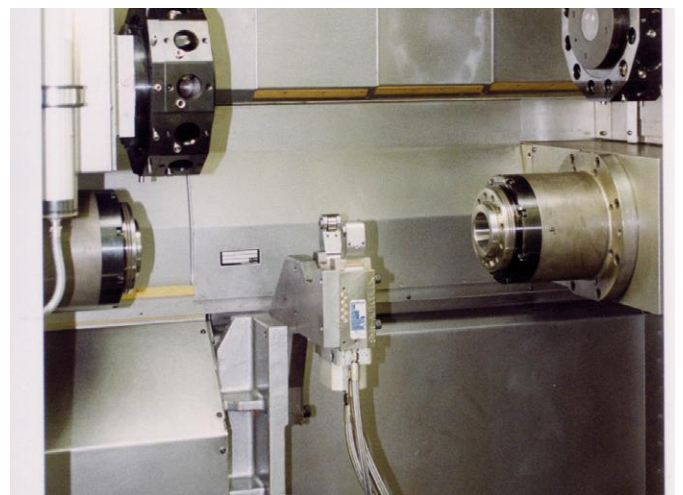
Tailstock



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



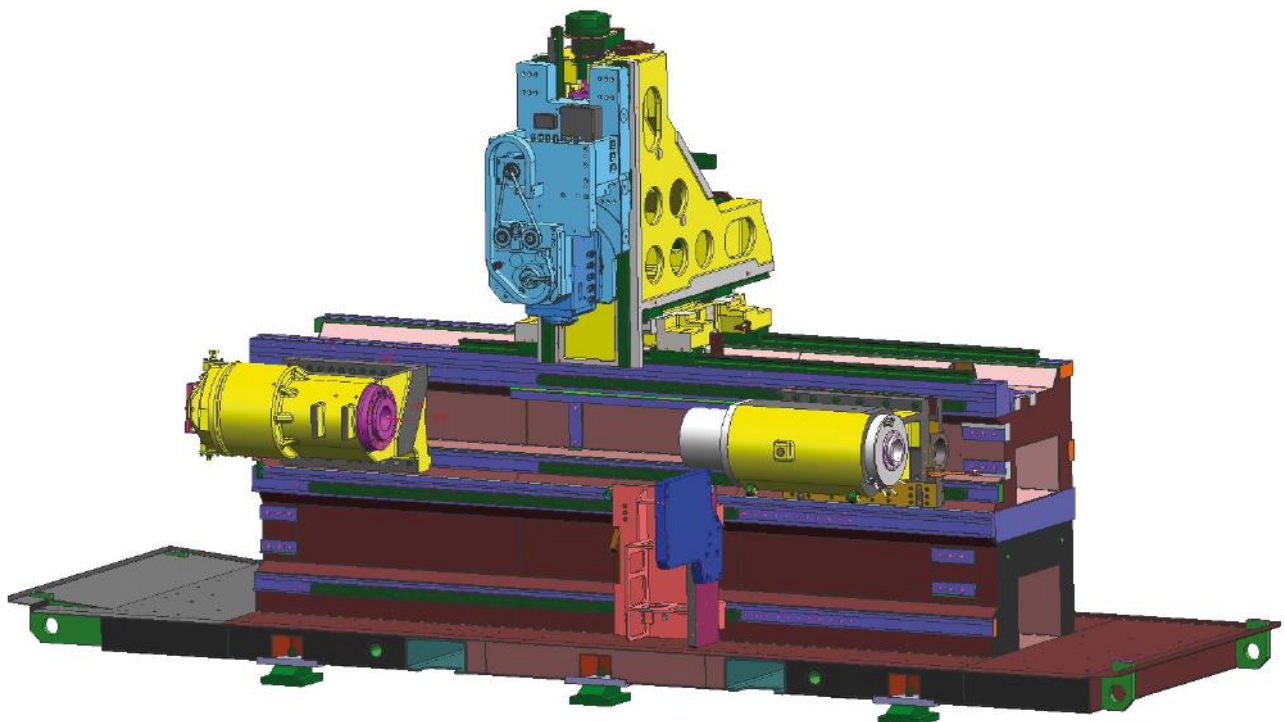
Optimized chip fall

VDF 450 TM – The Turn / Mill Center for Complete Machining of Medium-Sized Parts

- ▶ First VDF quality turn / mill center
- ▶ Large working range for highest demands
(X-stroke up to 700 mm / Y-stroke up to 385 mm)
- ▶ High-torque geared spindle (max. 5340 Nm)
- ▶ 4-axis machining with additional upper or lower tool turret as option
- ▶ Upper tool carrier with B-axis and powerful milling spindle
- ▶ Tool shuttle for quick tool change



VDF 450 TM work area

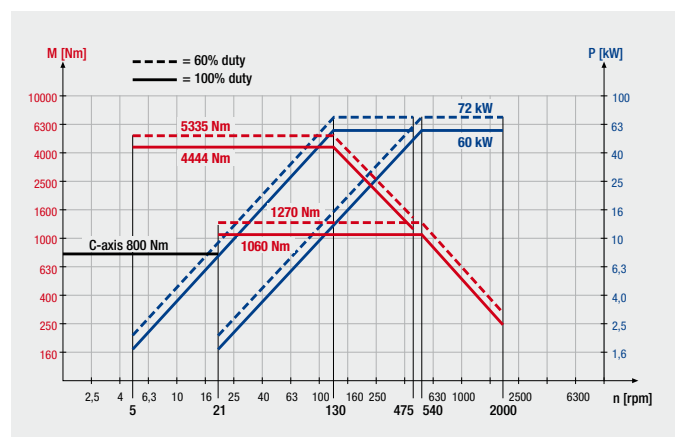
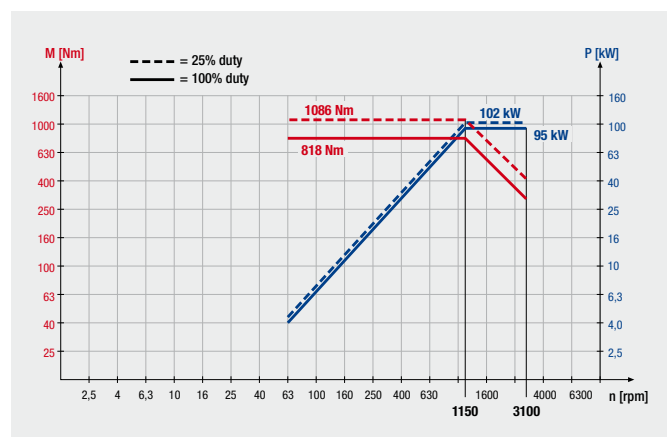


VDF 450-2 TM



Technical Data

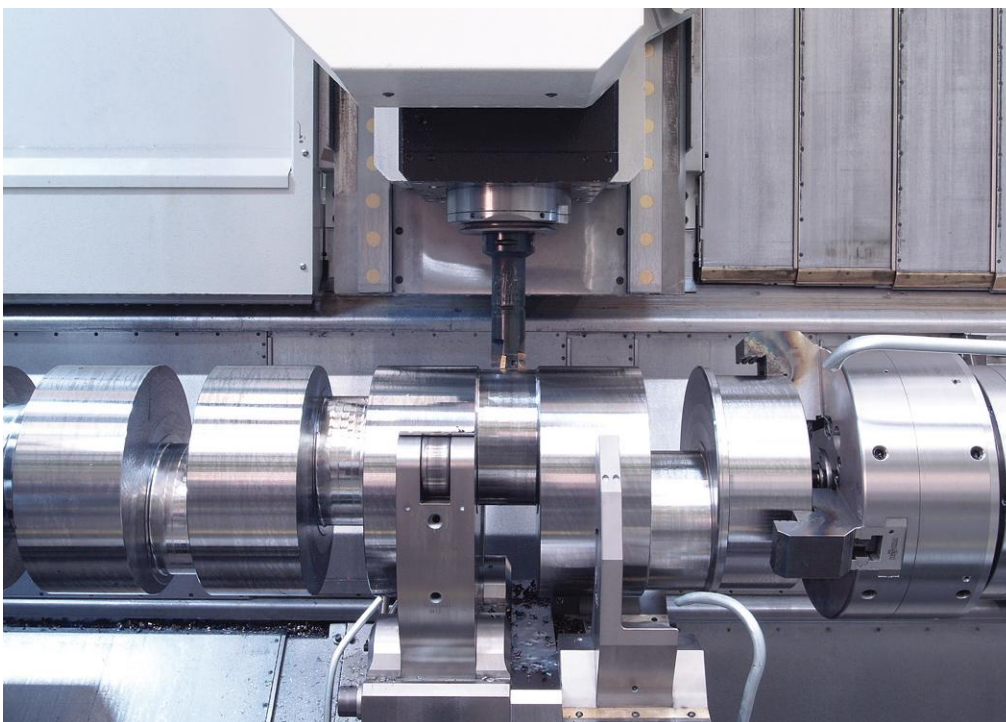
Technical data		VDF 450 TM
Turning length	mm	1300 / 2200 / 3400 / 4500
Machining diameter	mm	650
Swing diameter over bed	mm	700
Main spindle	type	geared spindle
Spindle nose	size	A11
Y-axis	mm	-175 / +210



VDF 450 TM – Complete Machining

Complete machining with B-axis

B-axis and tool magazine add productivity to the VDF 450 TM for highly efficient manufacturing of small batches and medium volumes. With these features, VDF Boehringer answers the industry's demand for complete machining capabilities, furthering productivity with additional milling, boring, drilling, hobbing and other capabilities beyond turning. A significant advantage of the B-axis is the single tool system, eliminating the common risks for collision that disc turret systems bring. The VDF TM concept with its independent upper and lower carriages allows for maximum flexibility.



Complete machining with B-axis

VDF 450 TM – Components (Magazine and Shuttle)

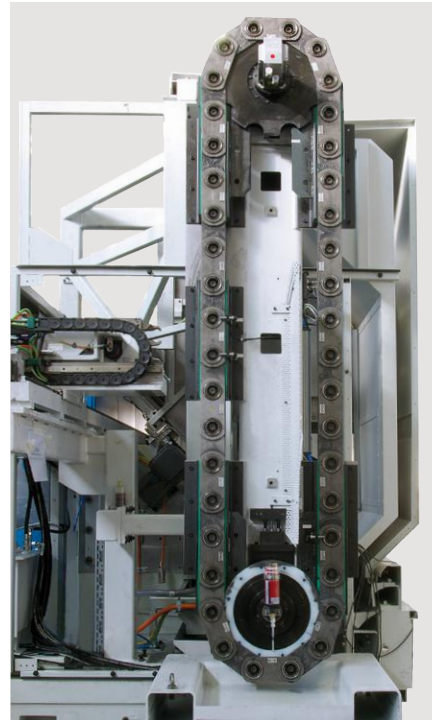
Tool magazine with tool shuttle

The VDF 450 TM has a tool magazine with a standard capacity for 40 tools.

The machine can be equipped with maximum 120 tools (Capto C6) as option.

Tool shuttle

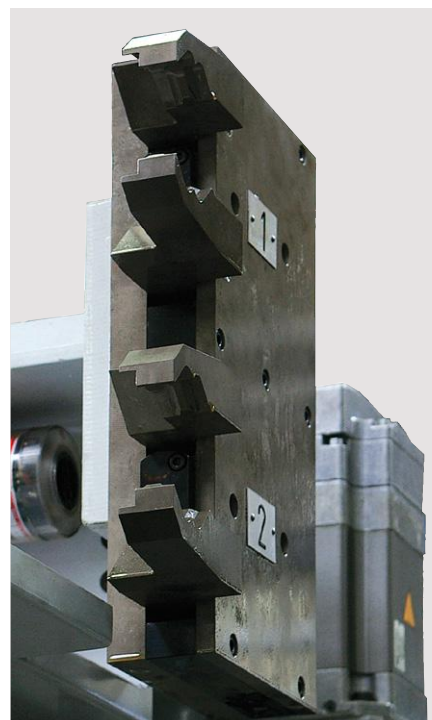
The tool shuttle allows for tool transfer from the magazine into the milling spindle during machine uptime. Tools can thus be changed in the current longitudinal position of the spindle, reducing idle times.



Tool magazine

Tool gripper

- ▶ Simple, intelligently designed change process
- ▶ Two grippers for quick change
- ▶ Hydraulic actuation for high process safety



Tool gripper

Integrated Technology Features

Hard turning

The extremely rigid machine design allows for vibration free hard turning with next generation CBN Wiper cutting inserts at high feed rates and excellent chip control. At the same time, the specially-designed cutting edge geometry of the Wiper insert provides for high surface quality.

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

Super finishing

Surface qualities of up to $Ra\ 0.10\text{--}0.15\ \mu\text{m}$ are achieved in a single set-up operation, including the preceding turning operation when machining friction type or roller bearing surfaces.

Your advantage

- ▶ Low investment costs
- ▶ Short cycle times
- ▶ One machine instead of two

Lead-free turning

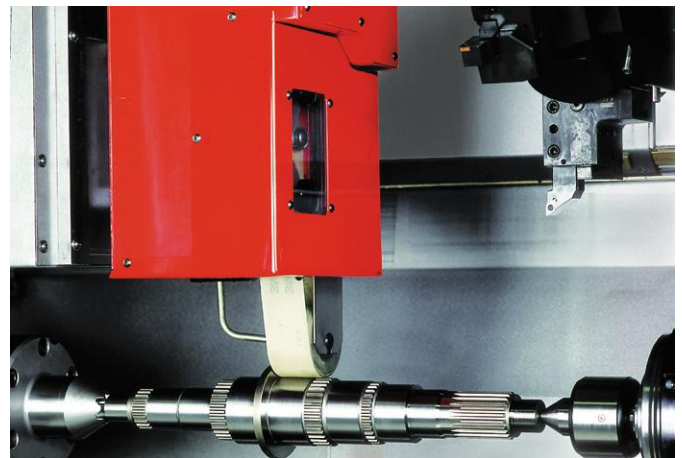
This process technology is particularly important for seal seat surfaces on hardened or „soft“ components. You can achieve surface qualities of $Ra\ 0.2\text{--}0.6\ \mu\text{m}$ or $Rz\ 1\text{--}3\ \mu\text{m}$ without grinding.

Your advantage

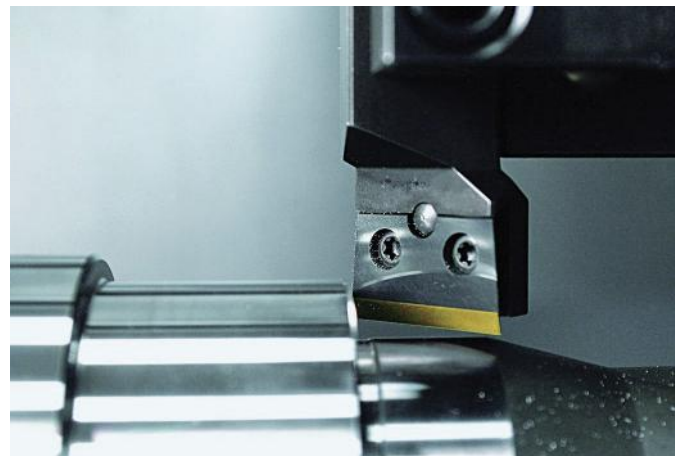
- ▶ Turning instead of grinding
- ▶ One machine instead of two
- ▶ Dry machining
- ▶ Short machining times / high output
- ▶ Low investment costs
- ▶ High process safety



Hard turning



Finishing



Lead-free turning

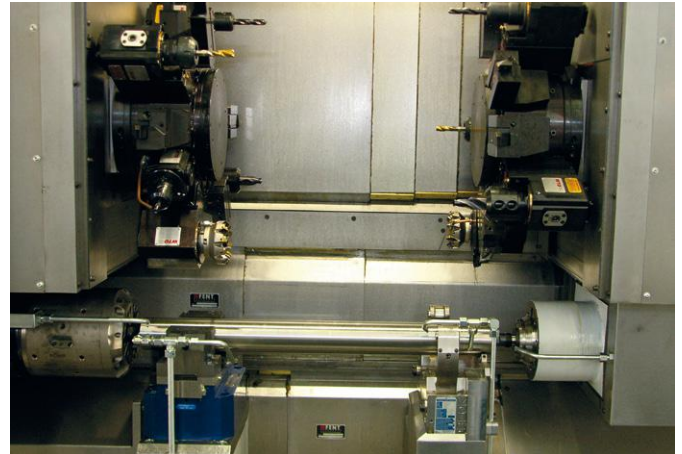
Highly Efficient and Economic Machining

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

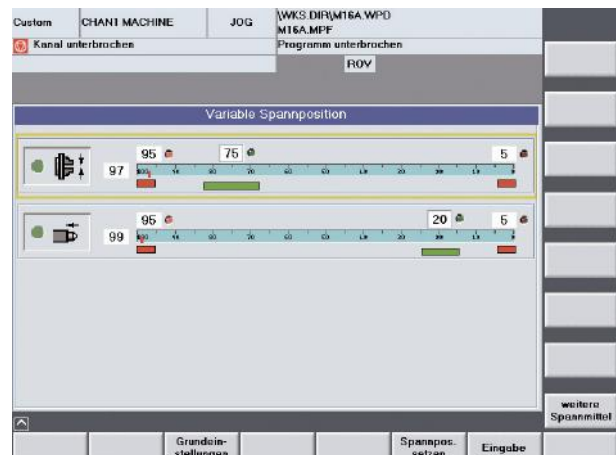
- ▶ Lower investment due to shorter process chain (save one machine)
- ▶ Reduce cycle and lead times



Facing and centering

Reduced setup and idle times

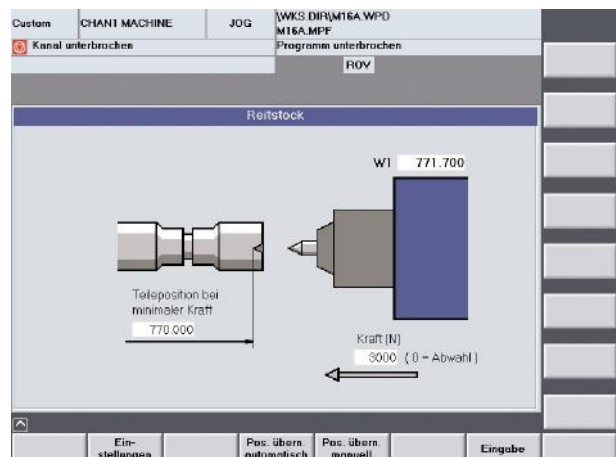
- ▶ Quick and easy change of tools and fixtures
- ▶ High traverse rates and dynamic drives
- ▶ Short indexing time on tool turret
- ▶ Programmable clamping stroke (option)
- ▶ Clamping stroke monitoring
- ▶ No tail stock quill stroke, programmable tailstock pressure
- ▶ Separate guideways: all modules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



Monitored clamping stroke

Highly reliable process

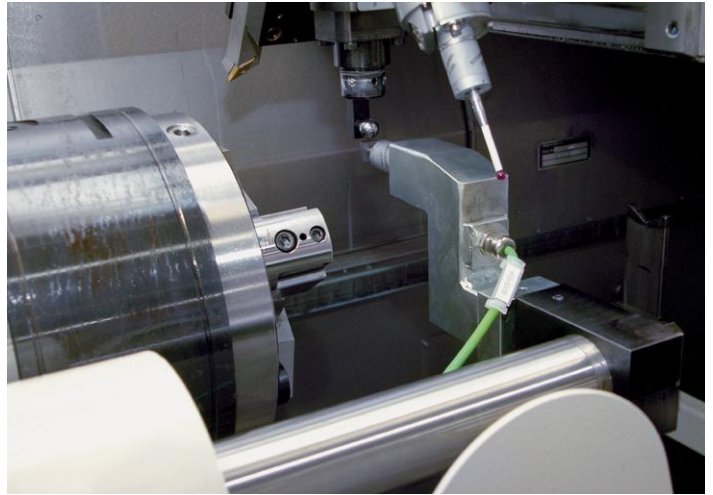
- ▶ Absolute measuring system on all axes
- ▶ FEM optimized machine for high rigidity and shock resistance
- ▶ Thermal stability
- ▶ Free chipfall
- ▶ Generously dimensioned linear guideways



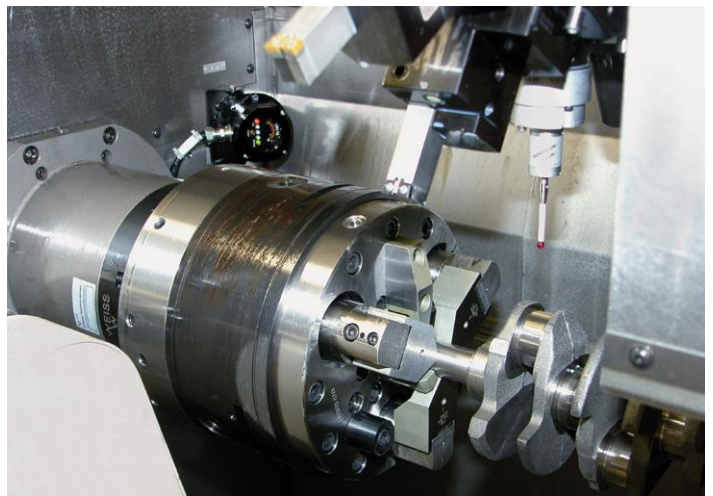
Programmable tailstock

Process Monitoring

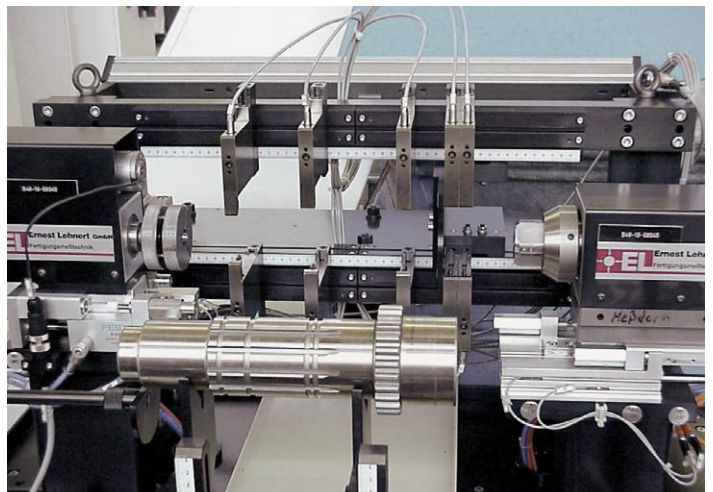
Automatic tool measuring in the work zone



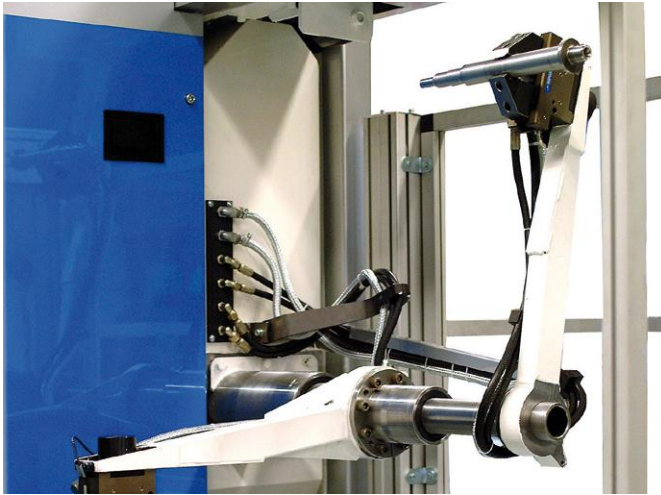
Workpiece measuring in the work zone via infrared data transfer



Post-process workpiece measuring outside the machine



Automation



Integrated automation

The automation device integrated in the machine allows quick and easy loading / unloading of the machine without opening loading hatches or doors.

Your advantage

- ▶ Loading and unloading in as little as five seconds
- ▶ Small space requirement

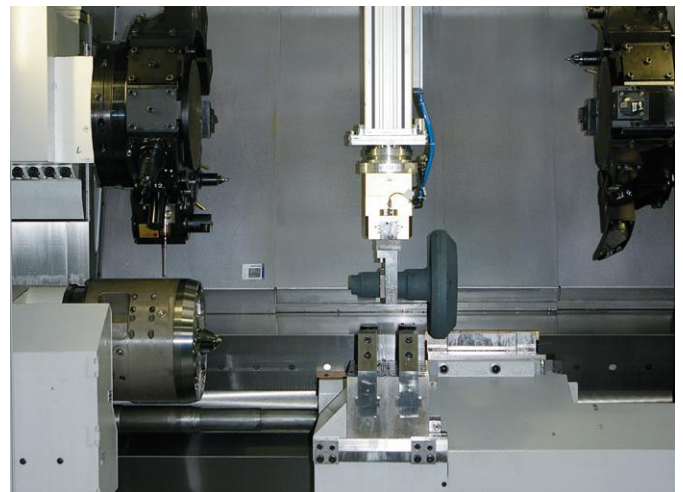
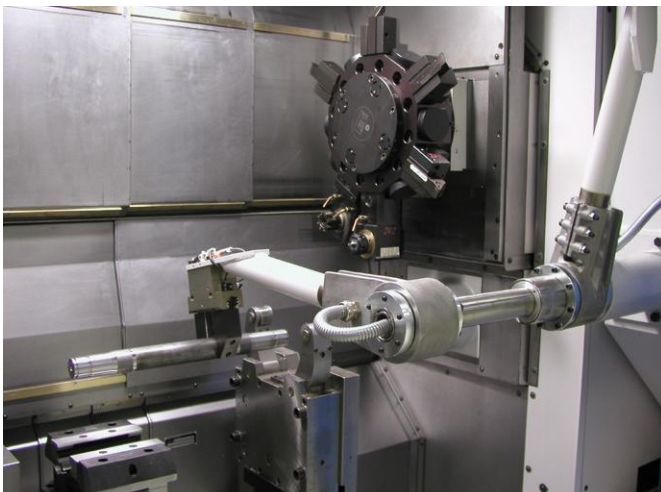


Gantry loading

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 and VDF TM Series

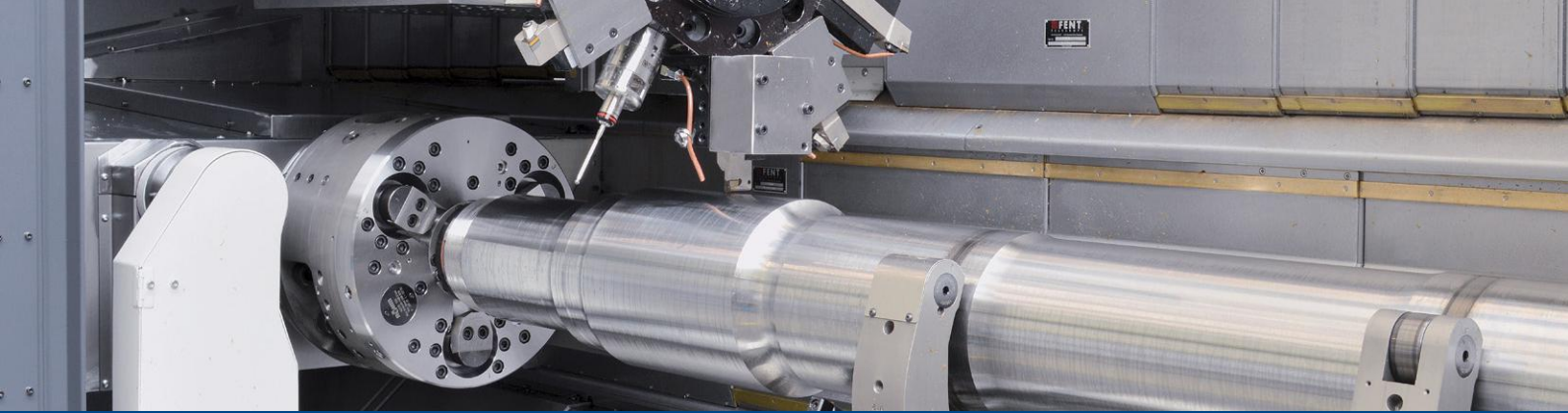
Machine type		VDF 180 T	VDF 250 T
Working range			
Turning length	mm	900	850 / 1850
Swing diameter over bed	mm	620	620
Turning diameter (outside)	mm	290	290
Stroke Z-axis (1 turret)	mm	1010	960 / 1943
Stroke X-axis	mm	200	200
Main spindle			
Spindle nose	size	A8	A6 / A8
Chuck diameter, max.	mm	200 / 250 / 315	200 / 250
Spindle bore	mm	103	65 / 103
Spindle diameter in front bearing	mm	150	120 / 150
Gear steps	no.	1	1 / 1
Speed range, max.	rpm	3000	4500 / 3000
Power 40% DC	kW	53	45 / 53
Torque max. 40% DC	Nm	662	340 / 662
Tailstock			
Center reception	no.	MT4	MT3 / MT4
Tailstock force	kN	8	8
Feed drives (AC motor)			
Rapid traverse speed (X- / Y-axis)	m/min	25 / 10	25 / 10
Rapid traverse speed (Z-axis)	m/min	25	25 (15)*
Feed force when drilling	kN	8	8
Tool turret			
Number of turrets	no.	1	1 / 2 / 3 (1 / 2)*
Number of tool stations	no.	12	12
Driven tools per turret	no.	12	12
Cyl. shank location DIN 69880	Ø mm	40	40
Y-axis range	mm	-30 / +50	-30 / +50****
Connection load (single spindle)	kVA	65	65
Machine dimensions L x W (TL 1000)***	mm	4280 x 2460	4280 x 2460 (5460 x 2360)*
Machine weight	ca. t	10	15
Machine height w / o automation	mm	2338	2612 (2655)*
B-axis			
Y-axis	mm	–	–
Swivelling range	degree	–	–
Tool System size	size	–	–
Torque max. 40% DC	Nm	–	–
Tool capacity	no.	–	–

* for turning length 1850

** for turning length 2200

*** without chip conveyor

**** Figures subject to change depending on options



VDF 300 T	VDF 400 T	VDF 450 T	VDF 450 TM
850 / 1850	1300 / 2200	1300 / 2200 / 3400 / 4500	1300 / 2200 / 3400 / 4500
620	700	700	700
350	650	650	620
960 / 1943	1560 / 2460	1560 / 2460 / 3660 / 4760	1560 / 2460 / 3660 / 4760
200	340	340	700
A11	A11	A8 / A11 / A11	A8 / A11
250 / 315	315 / 400	315 / 400	315 / 400
103	103	100 / 103	100 / 103
150	150	150 / 150	150 / 150
2	1 / 2	1 / 2	1 / 2
2800	2800	3100 / 2000	3100 / 2000
35	56	102 (25%) / 56 / 72 (60%)	102 (25%) / 72 (60%)
2200	3456	1086 (25%) / 3846 / 5335 (60%)	1086 (25%) / 5335 (60%)
MT4	MT5	MT5	MT5
13	18	18	18
25 / 10	15 / 15	15 / 15	15 / 15
25 (15)*	30	30	30
8	10	10	10
1 / 2	1	1 / 2	1
12	12	12	12
12	12	12	12
40	50	50	50
-30 / +50****	±100	±100	±100
65	75	75	80
4280 x 2460 (5460 x 2360)*	5100 ** x 2800	5100** x 2800	8035** x 3203
15	21 / 29	23 / 27 / 34 / 39	25 / 29 / 39 / 42
2612 (2655)*	2860	2860	3830
—	—	—	-175 / +210
—	—	—	±105
—	—	—	Capto C6 / HSK 63
—	—	—	128
—	—	—	40 / 80 / 120

Technical data subject to change

OEM Service for our Brands and Legacy Brands

VDF BOEHRINGER



LEADWELL



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HESSAPP

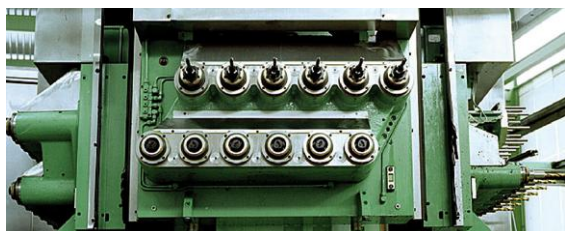


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WITZIG & FRANK



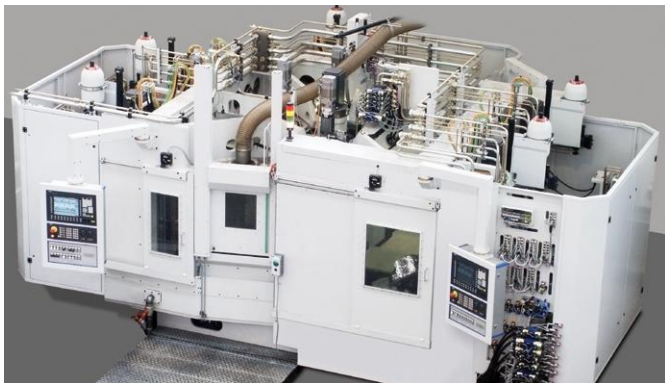
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FFG 24/7 Service and Support:
www.ffg-werke.com/24x7

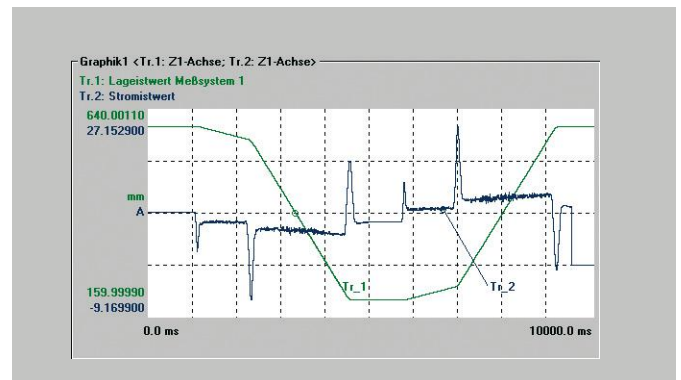
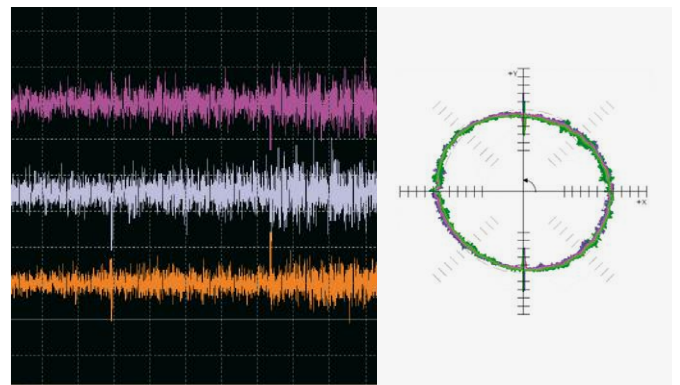
Service and support

- ▶ Commissioning
- ▶ Maintenance and inspections
- ▶ Repair service
- ▶ Spindle service
- ▶ Overhaul and retrofit
- ▶ Used machines
- ▶ Service contracts
- ▶ Machine relocation



Process and production optimization

- ▶ Process optimization
- ▶ Programming
- ▶ Software: machine data acquisition, diagnosis, condition monitoring, energy management, virtual machine



Machine condition monitoring "Finger print" via vibration analysis, ballbar test and trace measurement.

Spare parts

- ▶ 24/7 delivery
- ▶ Central warehouse
- ▶ Individual service concepts



Training

- ▶ Operator training
- ▶ Maintenance training (mechanical, electrical)
- ▶ Programming training

