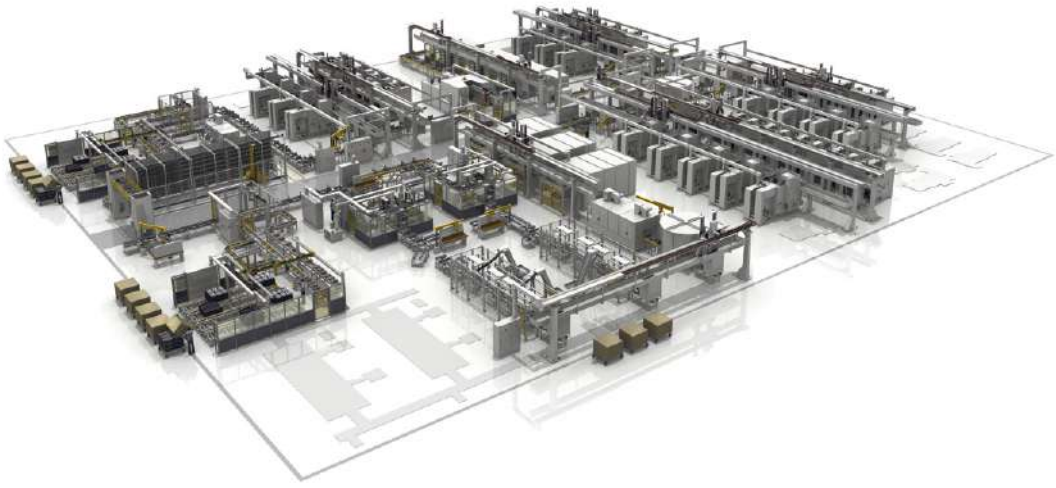
SPECHT® MACHINE SERIES



High-Performance CNC System Machines

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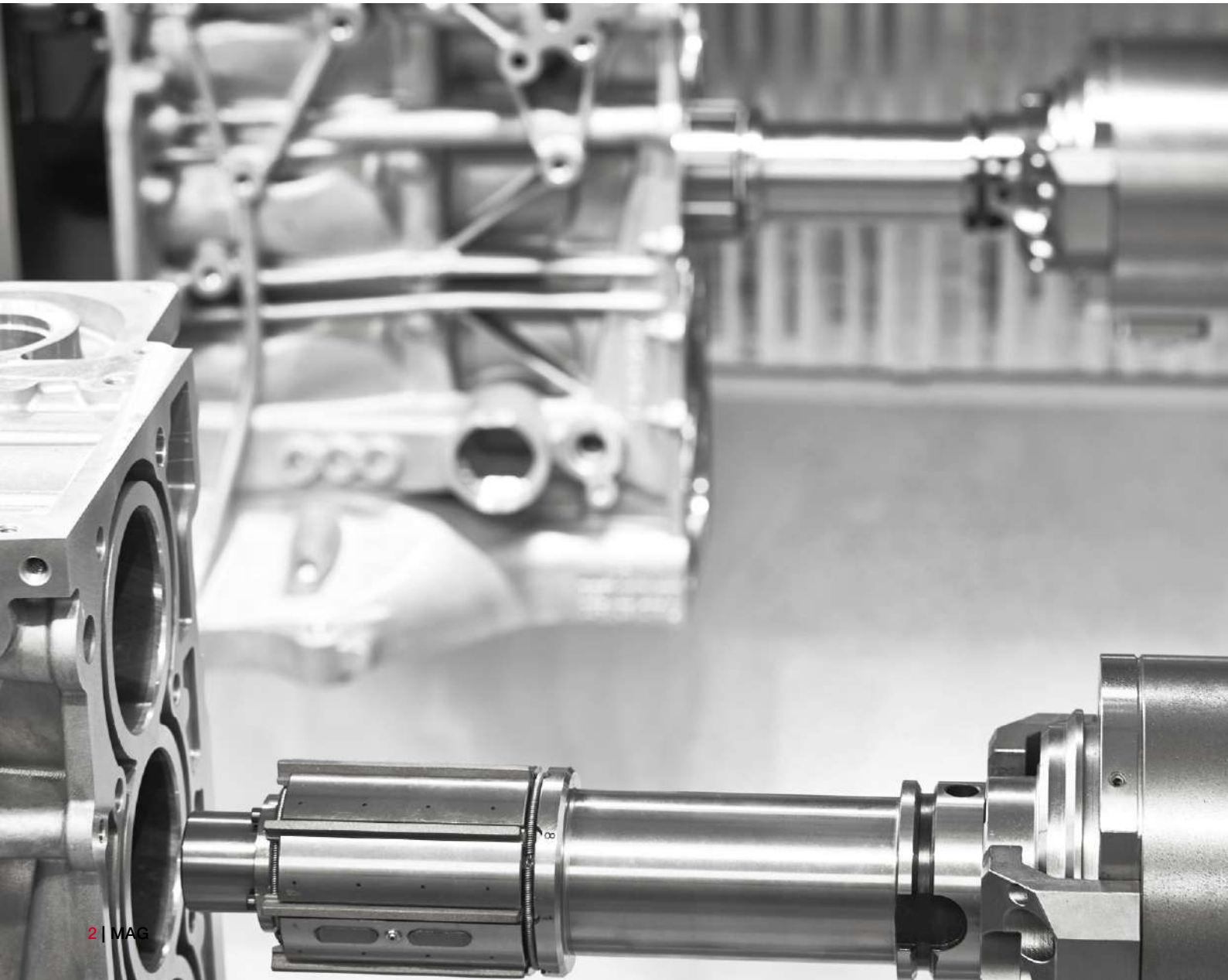


Precision and Flexibility in Volume Production

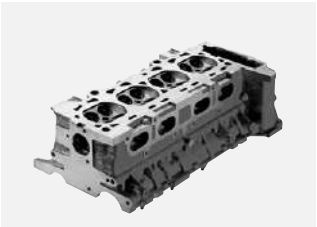
The SPECHT® series of process-configurable system machines from MAG

The SPECHT® machine series stands for a long tradition of progress in machine tool manufacture for the automotive industry. After milestones such as the agile volume production or dry machining, the SPECHT® today sets the standards for energy and environment management, technology integration and networked production. The agile or hybrid manufacturing systems from MAG are convincing with their work piece and volume flexibility, reliably high production quality, availability and productivity at optimum investment and operating costs.

In order to be able to configure the machines ideally for the respective application and production environment, MAG has developed a comprehensive modular system.
From a variety of standardised components, single or dual spindle SPECHT® machines are configured according to the technological and operational requirements of the customer. As single spindle machines, a complete range for workpiece lengths from 200 mm to 1400 mm, and as twin spindles with a spindle spacing of 540 mm to 810 mm, are available.

Inline cylinder block

V8 cylinder block



Cylinder head

Transmission housing

Steering housing

Electronic Stering Housing

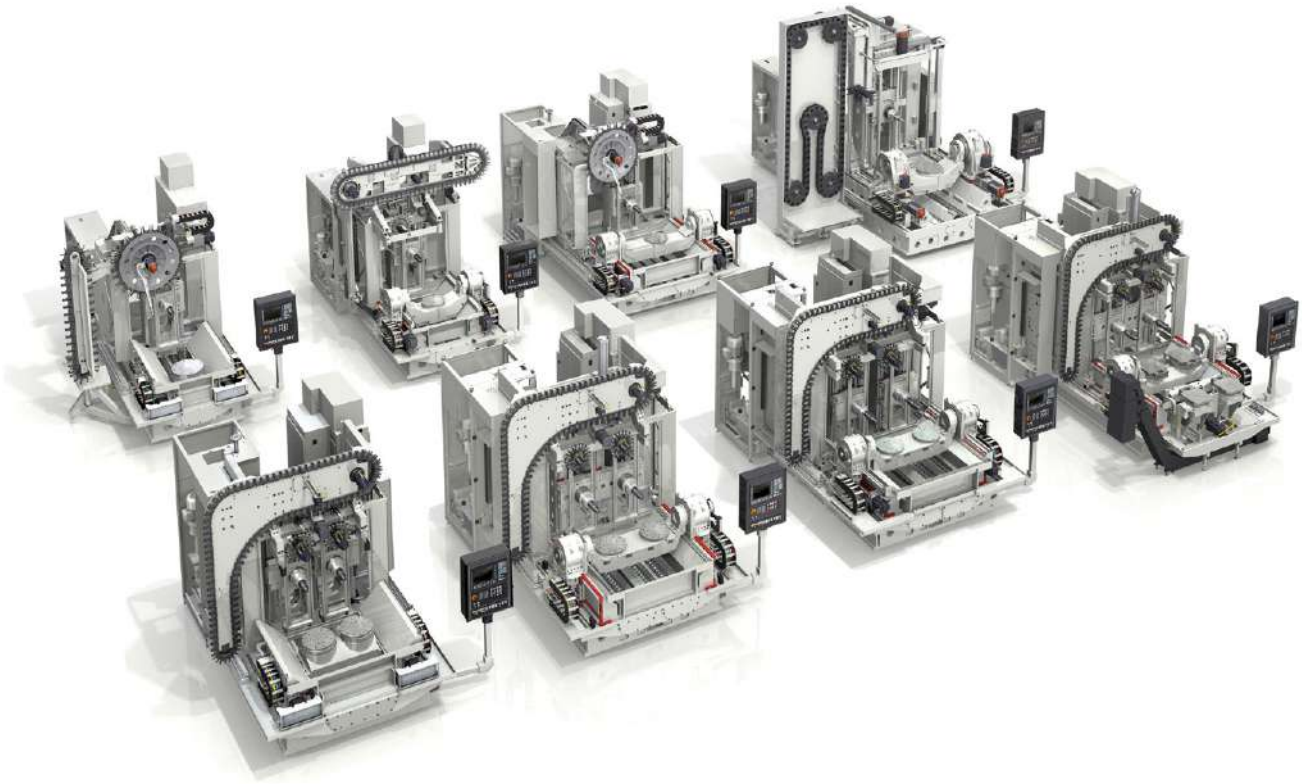
Steering knuckle/journal

Rear axle housing

The SPECHT® Series

The SPECHT® machine program –
Maximum stability through optimal axis arrangement
The intelligent axis layout with two axes (X/Y) in the tool and up to three possible axes (Z/A/B) in the workpiece movement ensure maximum stability. The jig boring machine principle stands for the highest accuracy and allows the use of longer tools. The optimum axis layout also ensures the shortest positioning times and minimum unproductive travel. Cost savings arise from the compact design and the resulting minimal space requirements.

The SPECHT® innovations –
Highest continuous accuracy thanks to intelligent technology
In order to fully benefit from the productivity advantages of dual spindle machines SPECHT® DUO units are equipped with a unique compensation system. With the measurement compensation in all linear axes, both spindles of the DUO-machine can be positioned with micrometer accuracy to one another.
In conjunction with the temperature compensation in the machine bed, on the axes, in the fixture and in the workpiece, constant and sustained accuracy is maintained.
The result: „First Part = Good Part“, without machine warm-up.



Axis travel (mm)	SPECHT 500	SPECHT 600	SPECHT 700	SPECHT 800	SPECHT 800+	SPECHT 450 DUO	SPECHT 500 DUO	SPECHT 500 DUO+	SPECHT 600 DUO
X-axis	630	900	1350	1400	1400	510	630	630	800
Y-axis	630	730	730	1050	1400	600	630	730	730
Z-axis (B)	900	900	900	1400	1400	700	900	900	900
Z-axis (A)	860	860	860	1400	1400	660	860	860	860
Spindle distance	-	-	-	-	-	540	720	720	810

Subject to change without notice

SPECHT® Single and Dual Spindle Machines

The SPECHT® series –
Unbeatably flexible and compact

- Variable and efficient through comprehensive modular assembly units
- All axis configurations are possible (A, B, A/B)
- Wide range of media ducts for all axis configurations
- Wide range of long-life motor and geared spindles, developed and produced in-house
- Numerous tool magazines for different requirements such as boring heads, cylinder boring tools or honing tools
- Fastest chip-to-chip times up to under 2.5 seconds via highly dynamic pick-up discs

The SPECHT® single spindle machine –
Highest stability and precision

- Axis drives with ball screw drive or linear motor
- Wide range of media ducts for all axis configurations
- Short chip-to-chip times at high tool capacity
- Highest process flexibility
- Best availability in the system
- Also ideal for manual front loading

SPECHT® single spindle machine

The SPECHT® duo spindle machine –
Uncompromising productivity

- Compensation in all axes (X / Y / Z) – worldwide unique precision for duo spindle machines
- Highest productivity per machine surface area
- Cost-effective periphery
- Synergy of multi-spindle implementation in one machine
- SPECHT® 500 DUO / 600 DUO also with linear motors
- Short chip-to-chip times at high tool capacity

SPECHT® dual spindle machine

SPECHT® 500 and SPECHT® 600 – Options for Every Requirement

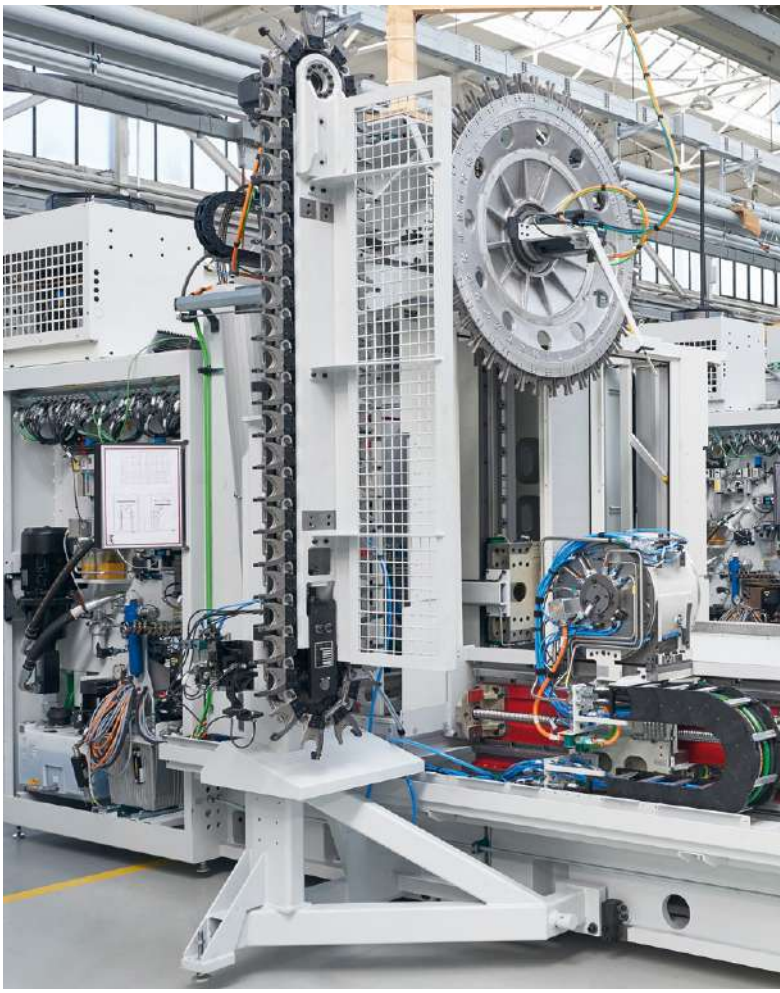
Configuration for every need

Due to the modular design, the high-performance SPECHT® machines can be individually configured, e.g., the main spindle can be selected from a variety of motor and geared spindles. For the axis drive, one or two ball screw drives, or linear motors are possible. Directly driven rotary tables with horizontal or vertical axes can be configured for 4-axis or 5-axis machining. That means that the SPECHT® can be adapted not only to meet the different processing requirements, but also fit to the surrounding infrastructure.
Thus, this series is ideally suited for use in production systems with widely varied loading concepts.

SPECHT® 600

Advantages of SPECHT® 500 and SPECHT® 600

- Configurable axis dynamics - both linear drive and one or two ball screw drives possible
- All drives outside the work area
- Manual floor, automatic top or front loading
- Direct loading, pallet or workpiece changer
- Tool magazines: disc, O-chain combined with disc (side or overhead), L-chain with 2 discs
- Magazine loading at ground level or with loading lift (disc, overhead O-chain)
- Unique chip-to-chip time of up to 2.8 seconds
- Long and heavy tools possible (550 mm/18 kg)
- Energy and environment management in the standard version
- Service-friendly electrical and fluid cabinet
- Dry machining (MQL) with optimal chip disposal through innovative machine design (no chip build-up), wet machining according to technological needs
- In-house long-life motor spindle production
- Cast machining with high torque (378 Nm) and HSC machining with up to 18 000 rpm
- Crane hook machine with naturally rigid cast bed and three-point support for easy transportation and fast implementation
- Integrated spiral conveyor (front or rear version)



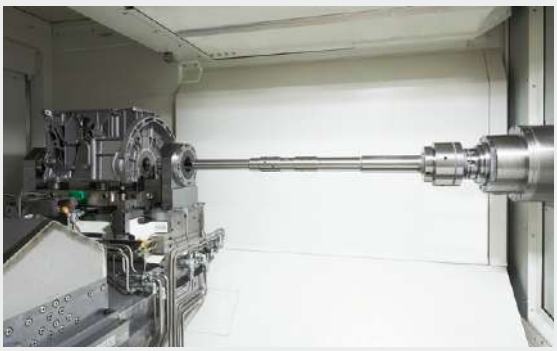
Production of SPECHT® machines with linear or ball screw drive in flow asembly

Configuration Options for Versatile Applications

Top performance in various industries

The SPECHT® series is very successfull as system machine for automotive applications. With a wide range of variants to choose from, the single and dual spindle machines with or without pallet changer, MAG also makes its top performer available to manufacturers of commercial vehicles, automotive components, structural parts, e-mobility parts, or aerospace vehicles.

From cost-optimized standard configurations to models with increased work space for larger parts, newly developed variants with two independent spindles or special configurations with high performance components – the SPECHT® has a lot to offer in various fields of application.



Crankbore machining on SPECHT® 600

5 axis milling on cylinder heads

Chip tray with steep edges for good chip discharge also for MQL machining

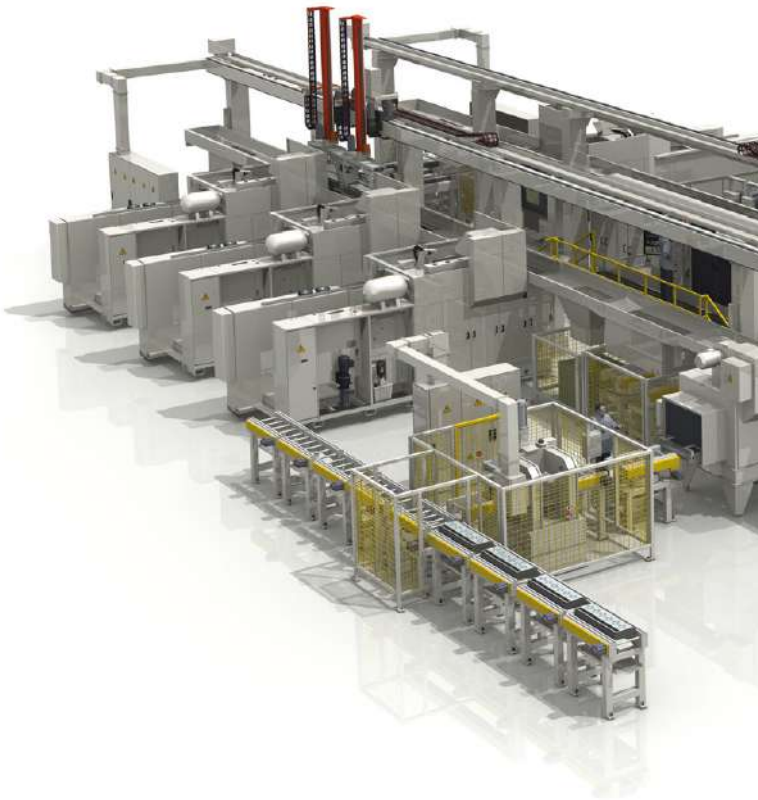
Oil and emulsion mist separators with cabinet cooling

Z axis with linear drive

SPECHT® 700 and SPECHT® 800 – The Big Guns for Flexibility in the Commercial Vehicle Industry

Produce large parts economically

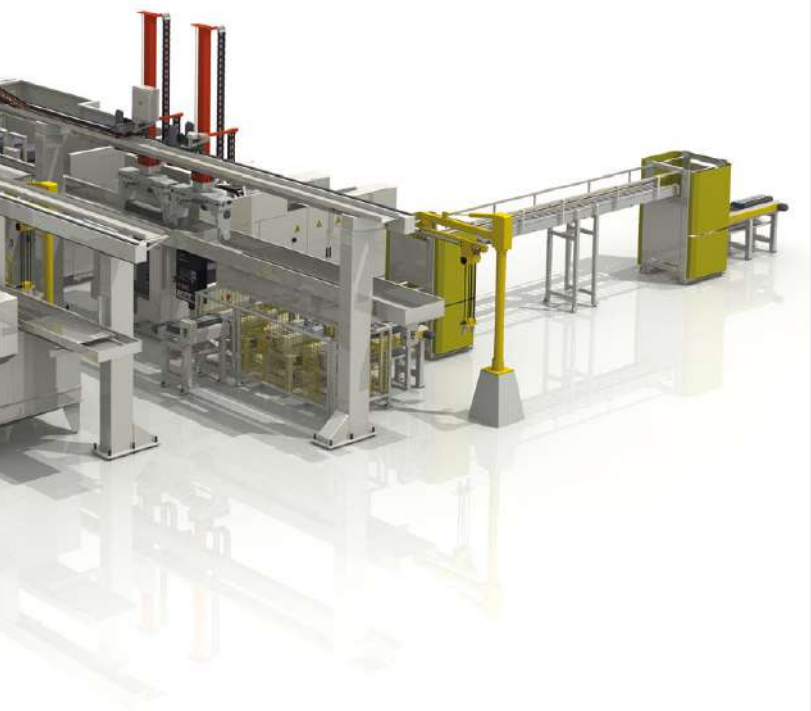
The sizes SPECHT® 700 und SPECHT® 800 complete the SPECHT® series upwards. Proven assemblies from the modular system are used for these machines, such as main spindles, rotary tables, tool magazines and axis modules from CORCOM. With one machine bed suitable for wet and dry machining and an extended column, the machines are the perfect complement to the series for application in the commercial vehicle industry. Operation, performance and availability optimally meet operator requirements.



Advantages

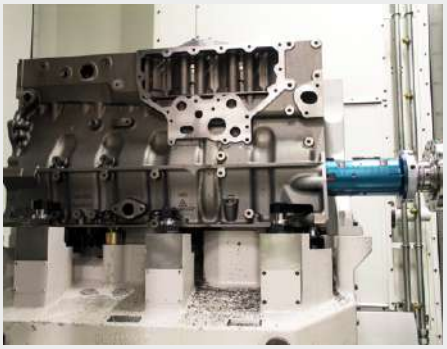
- Travelling workpiece (jig boring machine principle)
- Long and heavy tools (HSK-A63 / HSK-A100) possible (max. 690 mm / 30 kg)
- Manual floor, automatic top or front loading
- Direct loading or pallet changer
- Configurable process optimization
  – Tool holder in HSK-A100 standard (SPECHT® 700 also with HSK-A63 possible)
  – Dual axis drive
- Energy and environment management in the standard version
- service-friendly electrical and fluid cabinet
- Dry machining (MQL) with optimal chip disposal through innovative machine design (no chip build-up)
- Wet machining according to technological needs
- Tool magazine (disc or chain) with high check spacing capacity
- All drives outside the work area
- Long life motor and transmission spindles manufactured in-house, cast Iron machining with high torque (2000 Nm), high performance (78 kW), HSC machining with up to 18 000 rpm
- Rigid cast bed and three-point support for easy transportation and fast implementation
- Integrated spiral conveyor (front or rear version)

SPECHT® 800 with B- over A-axis



Jig with axle housing

Transport of larger and heavier components with robots



Machining crankshaft bore on a cylinder block

Manufacturing of crankcases for commercial vehicles

Truck cylinder head in jig

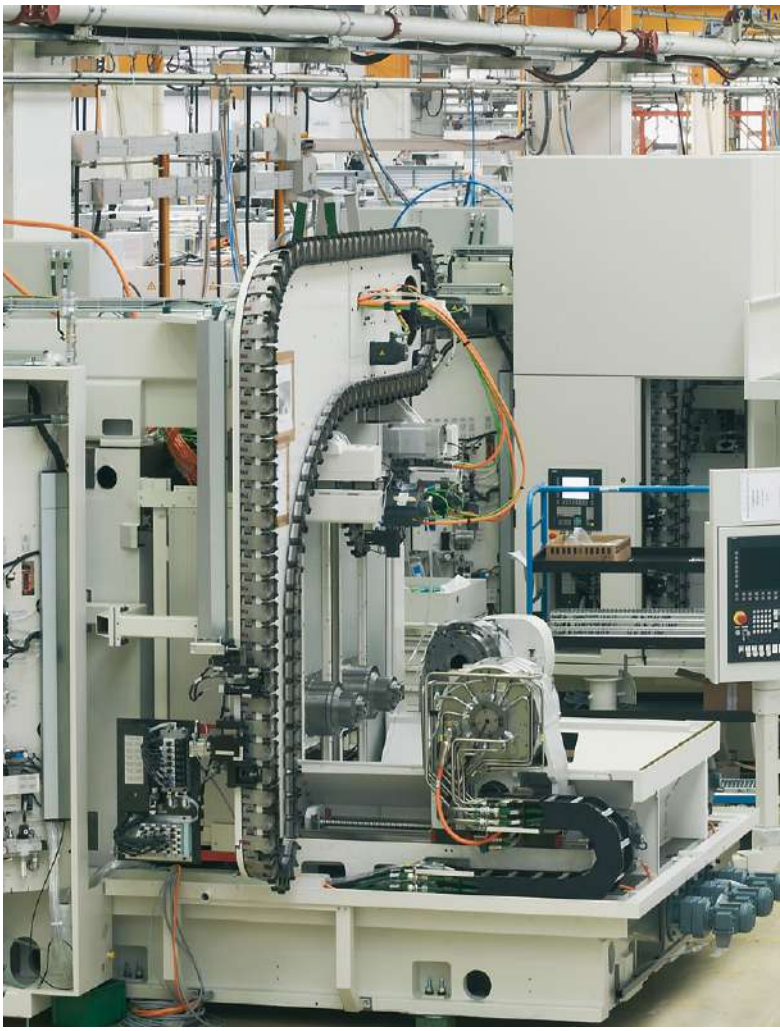
SPECHT® DUO Series – Double Productivity without Compromises

The SPECHT® DUO series with the accuracy of the single-spindle machine
With the „dynamic axis compensation“ in X/Y/Z, the two spindles are synchronized. Compensation of spindle displacement brings the accuracy of the single-spindle machine to the DUO machine. In combination with the temperature compensation from the machine to the workpiece, the SPECHT® DUO is the most accurate dual spindle machine of its class. The fast „Dynamic Disc“ tool magazine ensures minimal idle times. The choice of gantry, frontal or manual loading provides for additional high flexibility.
The SPECHT® 450 DUO, is especially qualified for machining of cylinder heads, cylinder blocks, housings and similar medium-sized components.

With lots of workspace and a comfortable 540 mm spacing between the spindles, the machine footprint of only 11.2 m² is achieved. Modern HSK-A63 motor spindles provide for high cutting performance in many diverse materials.
For the new SPECHT® 500 DUO+ the focus is set on the tier supplier market. The machine is based on the successful dual spindle machine used as module in automotive volume manufacturing systems. Equipped with a pallet changer, higher A-axis torque and longer Y-travel of 730 mm, the variant is ideally suited for this market segment. With all the advantages of the DUO base models, this compact CNC machining center will meet the needs of existing customers on the one hand, and on the other hand attract new customers in the components market.

Advantages of the SPECHT® DUO machines

- Large distances between the spindles for machining large workpieces (810 mm on the SPECHT® 600 DUO)
- HSK-A63 motor spindle with speeds up to 18 000 rpm
- HSK-A100 motor spindle with up to 378 Nm / 38 kW
- Fast tool magazine (L chain + 2 discs) with high capacity (112 usable tool spaces)
- Chain magazine allows fitting on ground level without a podest
- Unique chip-to-chip time of less than 2.5 seconds on the SPECHT® 450 DUO
- Smallest surface area requirement due to compact design (only 11.2 m² for the SPECHT® 450 DUO)
- Portal, frontal or manual loading possible
- Worldwide unique „dynamic axis compensation“ (X/Y/Z) brings the precision of the single-spindle machine to the DUO machine
- Wet processing to meet technological requirements possible just as 2-channel minimal quantity lubrication with highly precise dosing for environmentally friendly production
- Steep walls in the machine bed and chip tray ensure very good chip discharge in MQL machining
- Workpiece clamping with zero point clamping system or adapter plates – reduction of clamping elements, permanently high accuracy and fast changeover

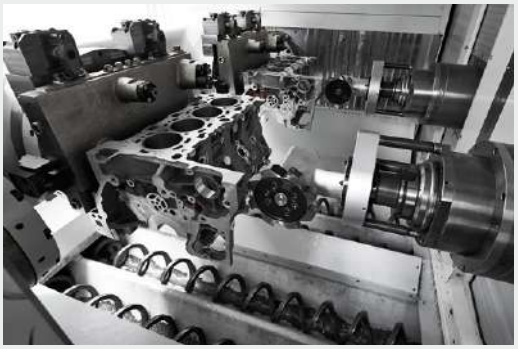


SPECHT® 500 DUO and SPECHT® 600 DUO

With the large spindle spacing of 810 mm or 720 mm, the SPECHT® DUO series for machining large components is completed. Large cylinder blocks (6 and 8 cylinder), cylinder heads, cases and other large components are as much a part of the range of applications as multiple clamping of steering knuckles and similar workpieces. The option of linear motors and strong spindles with HSK-A100 ensure high productivity in flexible systems. Technology precision machining (honing and fine boring) is available for the SPECHT® 500/600 DUO. Machines equipped with draw bar spindles are not only suitable for honing, but also for wear compensation, e.g. for precision boring, face turning on the machining center and thrust bearing processing.

Honing on dual spindle machines integrated into the system

Machining a cylinder head on a SPECHT® 450 DUO



Machining a cylinder block with an angular milling head

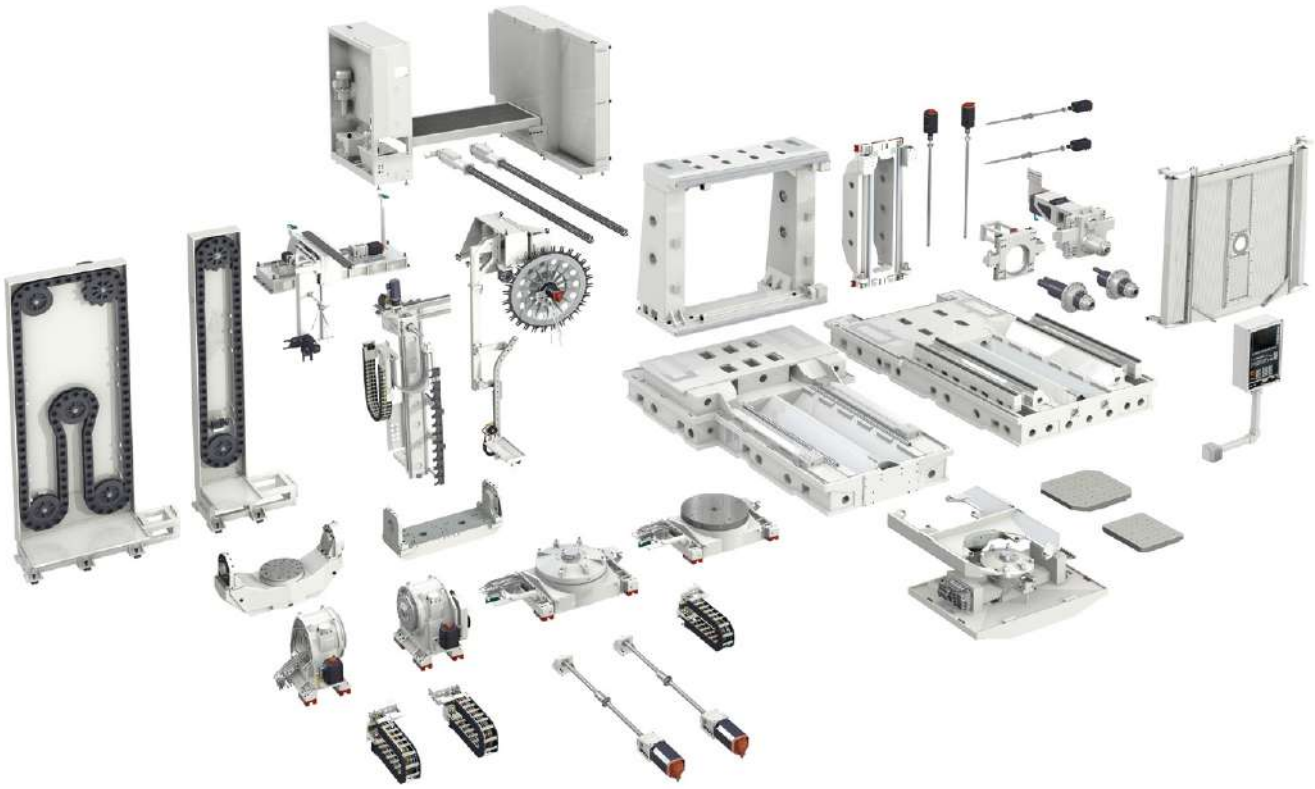
Drilling operations on a cylinder block

Easily accessible setup station on a SPECHT® 500 DUO+

SPECHT® Modular System –
Maximum Flexibility Through Modular Assembly Unit System

Modular assembly unit system

According to the requirements of high productivity with simultaneous minimum space requirements, the machines of the SPECHT® series can be built from a modular system of many standardized modules both as a single-spindle machine or as dual-spindle machines. Thus, MAG offers a precisely configurable machine program with the highest production quality and best reliability at the lowest investment and maintenance costs.



SPECHT® tool magazines

Machine		SPECHT 500		SPECHT 600		SPECHT 700		SPECHT 800		SPECHT 800+	
Tool holder		HSK 63	HSK 100	HSK 63	HSK 100	HSK 63	HSK 100	HSK 63	HSK 100	HSK 63	HSK 100
Disc	places	44	26	44	26	44	26	-	28	-	28
Chip to chip time (BS | Limo)	sec.	3.8 | 3.3	4.2 | 3.7	4.2 | 3.7	4.4 | 4.1	4.4 | 3.9	5.0 | 4.5	-	5.3 (BS)	-	5.3 (BS)
O-chain side	places	89	61	89	61	-	-	-	60 / 100	-	60 / 100
Chip to chip time (BS | Limo)	sec.	3.8 | 3.3	4.2 | 3.7	4.2 | 3.7	4.4 | 4.1	-	-	-	5.3 (BS)	-	5.3 (BS)
O-chain overhead	places	-	-	81	-	-	-	-	-	-	-
Chip to chip time (BS | Limo)	sec.	-	-	3.5 | 3.0	-	-	-	-	-	-	-

SPECHT® tool magazines

Machine		SPECHT 450 DUO		SPECHT 500 DUO		SPECHT 500 DUO+		SPECHT 600 DUO	
Tool holder		HSK 63	HSK 100	HSK 63	HSK 100	HSK 63	HSK 100	HSK 63	HSK 100
L-chain + disc	places	96+2x8	-	96+2x8	60+2x6	96+2x8	60+2x6	96+2x8	60+2x6
Chip to chip time (BS | Limo)	sec.	2.5 (BS)	-	3.3 | 2.8	3.5 | 3.0	3.3 | 2.8	3.5 | 3.0	3.6 | 3.0	3.8 | 3.2

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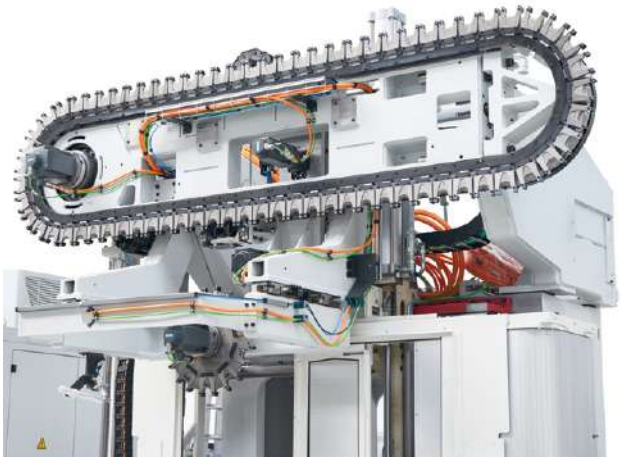
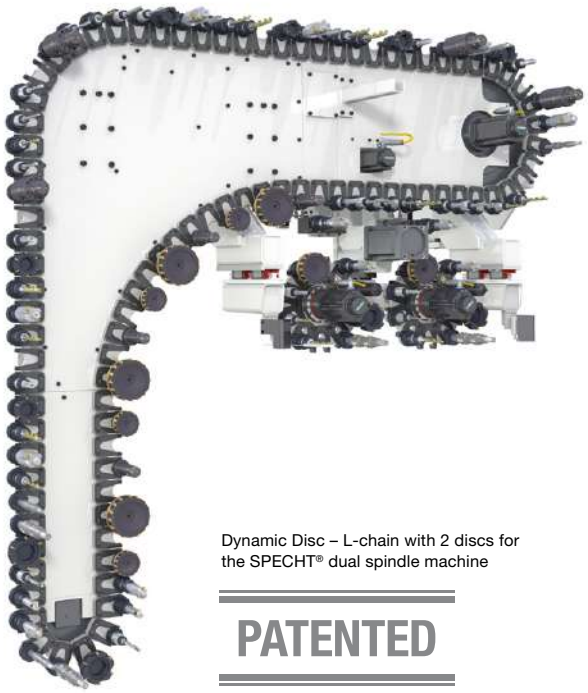
SPECHT® Series –
Modular Tool Magazines





Dynamic Disc – L-chain with 2 discs for the SPECHT® dual spindle machine

PATENTED

Dynamic Disc in combination with the L-chain – Fastest tool changer on the market

- Large, fast L-chain magazine with 2 discs and high storage capacity for DUO machines
  – Unique chip-to-chip time of less than 2.5 seconds
  – Tool change time less than 1 second
- Fast O-chain magazine with disc, lateral or overhead version for single spindle machines
  – Short chip-to-chip times of less than 3 seconds
- Easy magazine loading at ground level
- One or two buffer discs to avoid stand-by times
- Economic disc magazine with 44 HSK-A63 or 26 (28) HSK-A100 tool places in the standard version
- Tool diameter up to 250 mm possible (empty places)
- Tool lengths up to 550 mm
- Tool loading lift for disc and overhead magazine
- Optional disc magazine for 13 HSK-A100 tools up to 1000 mm long
- Automatic tool breakage monitoring and taper cleaning available on request

HSK-A100 disc magazin with 26 places

HSK-A63 taper cleaning

Automatic tool-breakage control

Tool magazine can be fitted during machining at ground level

SPECHT® Machining Spindles – The Right Solution for Every Application

Integrated spindle spectrum

MAG develops and manufactures spindles under its own CORCOM brand with a large range of speeds for machining various materials from aluminum via cast iron to magnesium, titanium or stainless steel. The wide spindle range offers the right spindle with high performance, high torque and a long service life, exactly according to your needs.

Complete documentation of the assembly process and the quality data

HSK-A63 motor spindle with holder for angular milling head

Overhead machining on a cylinder head on the SPECHT® DUO

Automatically interchangeable angular milling head

HSK-A63 motor spindle of a SPECHT® single-spindle machine

HSK-A100 motor spindles on the SPECHT® DUO

SPECHT® spindles

Typ No.	Spindle type / tool holder		Speed **Power** (40 % duty) **Torque** (40 % duty)	SPECHT 500	SPECHT 600	SPECHT 700	SPECHT 800 800 +	SPECHT 450 DUO	SPECHT 500 DUO 500 DUO+	SPECHT 600 DUO
1	**Motor spindle (HSK-A63) speed**	rpm	18 000							
	Power	kW	42	•	•	•	-	•	•	•
	Torque	Nm	67							
2	**Motor spindle (HSK-A63) speed**	rpm	16 000							
	Power	kW	52	•	•	•	-	•	•	•
	Torque	Nm	123							
3	**Motor spindle (HSK-A63) speed**	rpm	10 000							
	Power	kW	39	•	•	•	-	•	•	•
	Torque	Nm	180							
4/5	**Motor spindle (HSK-A100) speed**	rpm	8000 (10 000)							
	Power	kW	52	•	•	•	-	-	•	•
	Torque	Nm	250							
6	**Motor spindle (HSK-A100) speed**	rpm	8000							
	Power	kW	38	•	•	•	•	-	•	•
	Torque	Nm	378							
7	**Motor spindle (HSK-A100) speed**	rpm	8000							
	Power	kW	53	-	-	-	•	-	-	-
	Torque	Nm	516							
8	**Gear spindle (HSK-A100) speed**	rpm	8000							
	Power	kW	79	-	-	-	•	-	-	-
	Torque	Nm	2000							
8	**Gear spindle (HSK-A100) speed**	rpm	10 000							
	Power	kW	47	-	-	-	•	-	-	-
	Torque	Nm	1153 (332)							
	SPECHT® – draw bar spindle									
9	**Motor spindle (HSK-A100) speed**	rpm	6000							
	Power	kW	52	•	•	•	•	-	•	•
	Torque	Nm	250							

Subject to change without notice

SPECHT® Technology Integration – CNC Precision Machining

Synergies from pre-machining and finishing from a single source

MAG provides the process chain for the complete machining of precise bores including honing. Characteristics of the newly developed complete machining of high-precision bores on machining centres is a combination of fine boring and honing on one machine. The formerly independent honing machine can thus be omitted. By optimizing and combining the fine boring and honing processes, a significant shortening of the processing time and a reduction in machining operations arise.

State-of-the-art honing

A modern, regulated electromechanical and hydraulic infeed of the honing tools is integrated in the machining center. A pneumatic bore measurement regulates and terminates the honing process after reaching the desired dimensions. The entire honing-specific process technology, including control and regulation algorithms is available for conventional machining centres.

Process reliability and maximum machining precision

Today´s usual requirements for quality parameters such as size, form, position and surface tolerances can be achieved reliably.

References:

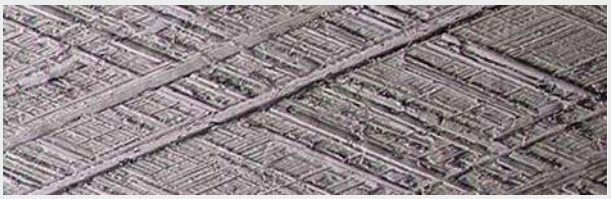
- In series production since 2012
- Cooperation with large OEMs
- Various honing specifications proven (also for coated bores)
- Engine test bench results show best values in terms of oil consumption, blow-by and wear

Advantages

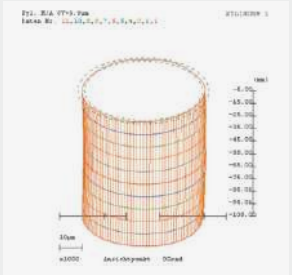
- Cost-effective solution (20% less cost)
- Shorter machining time (less hone machining allowance)
- Less honing operations
- Identical CNC machines in the production line
- No bottleneck at the honing machine (parallel processing)
- Complete machining without re-setup
- Simple conversion to other types of workpieces
- Dual-spindle honing on the SPECHT® DUO

Honing a 4-cylinder crankcase

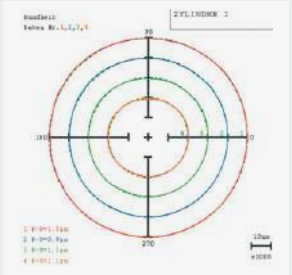
Spindle honing on the SPECHT® 600 DUO



Magnification of a diamond-honed bore surface



Cylindrical shape measurement



Roundness measurement plot

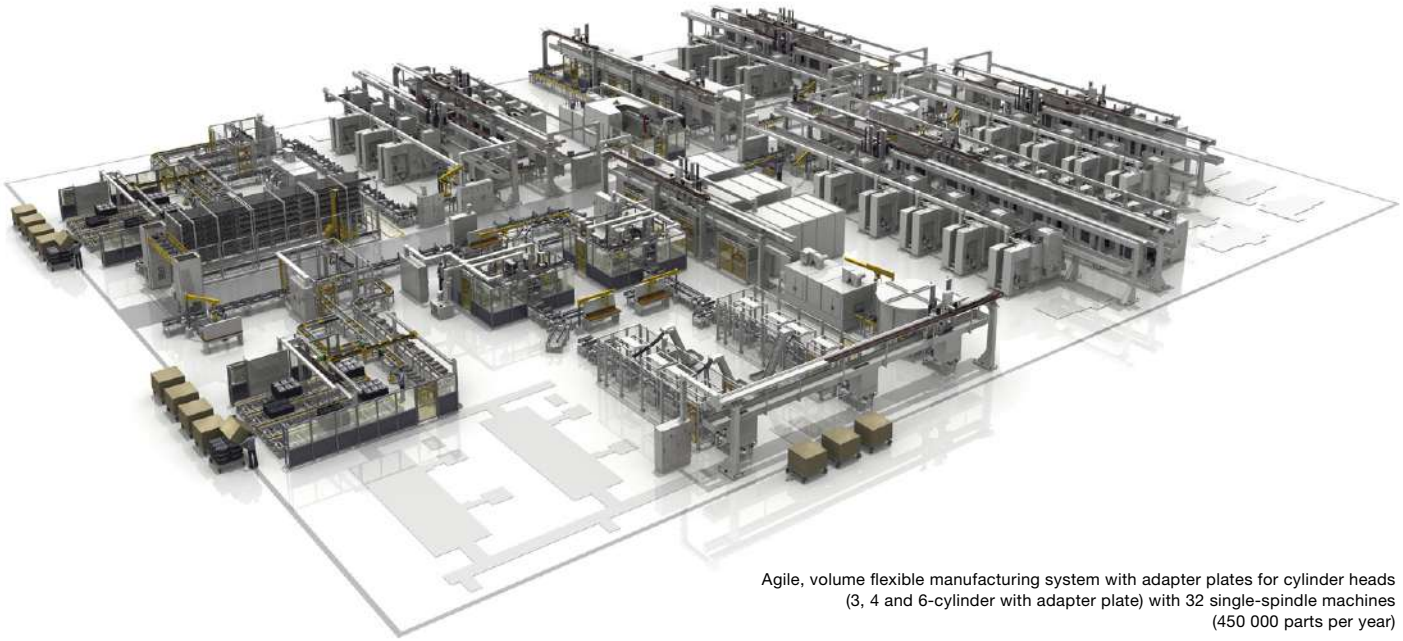
SPECHT® High-Performance Machines for Volume Production – Optimal for System and Process Integration

Maximum flexibility, also in volume production

Unlike the classical flexible manufacturing systems, in which the CNC machining center serves as a base and the highest possible content of work per machine is desired, in the agile systems, the modern high-performance processing unit dominates. MAG offers with these machines maximum efficiency in the periphery and software (high axis speeds and acceleration values, minimized downtimes, extremely short chip-to-chip and workpiece exchange times). In addition, high workpiece flexibility through standardized interfaces for automation and devices (adapter plates and zero-point clamping systems), which enhance the performance of all workstations in the system sustainably.

Agile manufacturing systems live through intelligent investment

The SPECHT® series machines can be integrated easily in any manufacturing process. This means automation concept and type of installation can be freely configured. Loading from above with the integrated protective tray of the gantry as well as manual or automatic loading from the front are alternatively executable. MAG systems with volume flexibility show their strength through their design with parallel processes for the integration of capacity machines in the initial installation and in other configuration levels.



Agile, volume flexible manufacturing system with adapter plates for cylinder heads (3, 4 and 6-cylinder with adapter plate) with 32 single-spindle machines (450 000 parts per year)

Parallel system that can be loaded by overhead gantries with linear lifting axes or robot arms

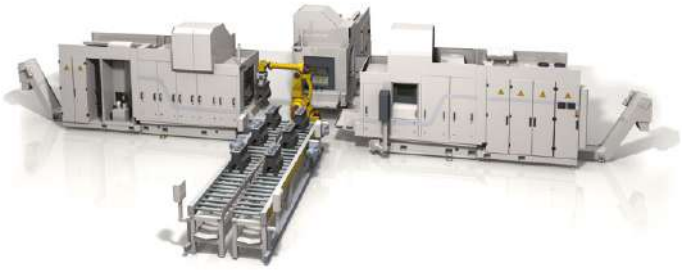
Sequential system with manual loading

Adapter plate

Cylinder head with zero point clamping system

Parallel or sequential ground operation

Above floor robot



Stationary or mobile robot

All system configurations in demand can be operated

- Parallel or sequential systems
- Front or overhead loading
- Manual or automatic workpiece loading
- Different workpiece materials (cast iron, aluminium, magnesium, etc.)
- Loading via gantries, robots or manual handling devices
- Adaptor Plate process or direct compnet clamping
- Zero-point clamping systems
- Centralized or decentralized supply
- Homogeneous system configuration (all processes operated)
- Wet, dry machining or MQL

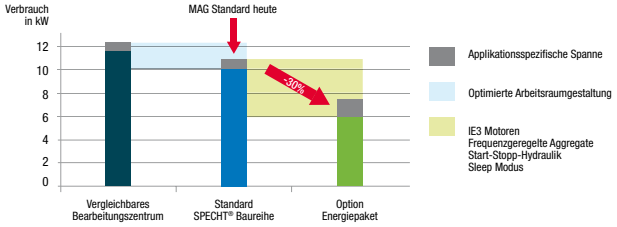
Robot loading on a SPECHT® 500 DUO+

Linked SPECHT® high performance machines with MAG gantry (overhead loading)

SPECHT® Energy Efficiency – MAG Energy and Environment Management

Energy efficiency

- Condition-based and configurable shutdown, lower power consumption > 25%
- MAG energy efficiency package as an option (interval-chip transport, start-stop hydraulics, controlled refrigerant high-pressure pump, compressor and cabinet cooling)
- New process technologies with up to 80% lower energy consumption (e.g. in hard fine-finishing)
- MAG energy monitor (also for mobile devices)



Consumption-optimized machine

- Minimal air consumption and optimised hydraulic control
- Reduced maintenance and disposal expenses
- Adjustable speed profile and higher dynamic response
- Improvement in energy efficiency approx. 3%
- Reduced noise levels

Dry machining

- Elimination of lubricant coolant reduces investment costs >15%
- Pumps, filters, motors omitted (approx. 30% energy savings)
- Disposal of hazardous waste falls away
- Less maintenance costs and effort
- Improvement of environment conditions
- Contamination and cleanliness (for 100 machines approx. 3.6 m³ loss of coolant daily)
- Recyclable chips because max. 0.3% impurity

Tools for MQL
(minimal quantity lubrication)

Reducing emissions in the environment

- Low noise level in the standard version (approx. 75 dBA)
- Additional noise reduction (approx. 3 dBA) through proactive measures (e.g. active damper)
- Avoidance of particle emissions through optimised work space design
- Reduction of heat emission through constructive equipment design

Ergonomic workplace design

- Ground operable machine (maintenance, operator panel and tooling)
- Intelligent tool management (easy tool exchange)
- Systematic learning – e-learning

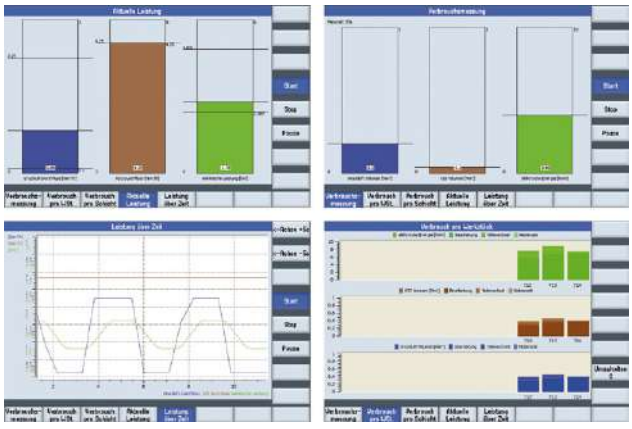
SPECHT® CNC-Steuerungen –
Moderne CNC-Steuerungen für hohe Produktivität

Siemens 840D sl or Fanuc 31i

- Idle current compensation
- Process monitoring
- Master spindle condition monitoring
- Warm-up and warming program
- Controlled stopping of the axes after power failure
- Remote diagnostics
- Temperature compensation for workpiece and machine
- 3D infrared probe
- RFID tool identification
- MAG energy monitor, also for mobile devices

MAG Energy monitor

- Consumption monitoring (processing time or standby time)
  – Electric power, compressed air and coolant
- HMI screens with consumption information in kWh or €
  – Current energy consumption
  – Cumulative energy consumption
  – Energy consumption per workpiece
  – Time signals of consumption (oscilloscope)
- All evaluations optionally also available online via mobile user devices or PCs



Digital factory and Industry 4.0

- Visualisation of the machining process, thereby highest transparency already in the planning or proposal phase
- Optimisation of process balancing and cycle time
- Early detection of interference between machine, fixture and tools
- Optimisation of NC programs at source of development
- Fastest implementation of program and product changes
- Process and plant simulation

Technical Data / Single Spindle SPECHT®

Machine type		**SPECHT 500**		**SPECHT 600**		**SPECHT 700**		**SPECHT 800 / 800+**
Axis drive		Ball screw	Linear motor	Ball screw	Linear motor	Ball screw	Linear motor	Ball screw
Linear axes								
Working range X	mm	630		900		1350		1400
Working range Y	mm	630		730		730		1050 / 1400 (SPECHT 800+)
Working range Z	mm	860 (A-axis) | 900 (B-axis)		860 (A-axis) | 900 (B-axis)		860 (A-axis) | 900 (B-axis)		1400
Axis speed max.	m/min	70	120	70	120	70	120	60
Axis acceleration X / Y / Z	m/s²	6	15	6	15	X / Y 10 | Z 6	X / Y 15 | Z 10	5
Axis acceleration X / Y / Z with speed package	m/s²	10	-	10	-	-	-	-
Rotary axes								
A-axis interference Ø max.	mm	Ø 900		Ø 1100		Ø 1100		Ø 1400
Workpiece / fixture width max.	mm	800		1100		1520		1680
A-axis load max.	kg	500		500		1200		2000
A-axis speed max.	rpm	80		80		80		40
B-axis interference Ø max.								
w/o pallet changer	mm	Ø 850		Ø 1150		Ø 1400		Ø 1500
with pallet changer	mm	-		Ø 1000		-		Ø 1300
B-axis workpiece height max.								
w/o pallet changer	mm	850		950		900		1475 / 1775
with pallet changer	mm	-		875		-		1300 / 1600
B-Achse surface Ø	mm	Ø 500		Ø 580		Ø 700		Ø 900
B-axis load max.	kg	500 / 600		500 / 600		1200 / 2000		3000
B-axis speed max.	rpm	80		80		80		40
A/B-axis interference Ø max.								
w/o pallet changer	mm	Ø 900 (A-axis) Ø 700 (B-axis)		Ø 1100 (A-axis) Ø 1000 (B-axis)		Ø 1100 (A-axis) Ø 1200 (B-axis)		Ø 1400 (A-axis) Ø 1400 (B-axis)
with pallet changer	mm	-		Ø 900 (B-axis)		Ø 1350 x 1100 *		-
A/B-axis workpiece height max.								
w/o pallet changer	mm	540		740		640		700
with pallet changer	mm	-		640		550		-
B-Achse surface Ø	mm	Ø 450		Ø 450		Ø 620		Ø 600
A/B-axis load max.	kg	250		250 / 200 **		800 / 650 **		1000
B-axis speed max.	rpm	80		80		80		40
Pallet changer								
Pallet change time (B-axis)	s	-		9		-		14.5
Pallet dimensions (B-axis)	mm	-		500 x 500 / 630 x 630		-		800 x 800
Pallet change time (A/B-axis)	s	-		12,5		15		-
Pallet dimensions (A/B-axis)	mm	-		500 x 500		630 x 630 / 630 x 800		-
Main spindle								
Motor spindle (HSK-A63)	rpm	18 000 / 16 000 / 10 000		18 000 / 16 000 / 10 000		18 000 / 16 000 / 10 000		-
Spindle power (40% duty)	kW	42 / 52 / 39		42 / 52 / 39		42 / 52 / 39		-
Spindle torque (40% duty)	Nm	67 / 123 / 180		67 / 123 / 180		67 / 123 / 180		-
Front bearing diameter	mm	Ø 80		Ø 80		Ø 80		-
Motor spindle (HSK-A100)	rpm	8000 (10 000) / 8000 / 8000		8000 (10 000) / 8000 / 8000		8000 (10 000) / 8000 / 8000		-
Spindle power (40% duty)	kW	52 / 38 / 53		52 / 38 / 53		52 / 38 / 53		-
Spindle torque (40% duty)	Nm	250 / 378		250 / 378		250 / 378		250 / 378 / 516
Front bearing diameter	mm	Ø 100		Ø 100		Ø 100		-
Motorspindel-Verstellspindel (HSK-A100)	rpm	6000		6000		6000		6000
Spindle power (40% duty)	kW	52		52		52		52
Spindle torque (40% duty)	Nm	250		250		250		250
Front bearing diameter	mm	Ø 100		Ø 100		Ø 100		Ø 100

* flattened, ** with pallet changer

Subject to change without notice

Machine type		**SPECHT 500**		**SPECHT 600**		**SPECHT 700**		**SPECHT 800 / 800+**
Axis drive		Ball screw	Linear motor	Ball screw	Linear motor	Ball screw	Linear motor	Ball screw
Main spindle								
Gear spindle 2 steps (HSK-A100)	rpm	-		-		-		8000
Spindle power (40% duty)	kW	-		-		-		78
Spindle torque (40% duty)	Nm	-		-		-		2000 (454)
Front bearing diameter	mm	-		-		-		Ø 120
Gear spindle 2 steps (HSK-A100)	rpm	-		-		-		10 000
Spindle power (40% duty)	kW	-		-		-		47
Spindle torque (40% duty)	Nm	-		-		-		1153 (332)
Front bearing diameter	mm	-		-		-		Ø 100
Tool magazines								
Disc-type tool magazine		Disc (HSK 63 / HSK 100)		Disc (HSK 63 / HSK 100)		Disc (HSK 63 / HSK 100)		Disc (HSK 100)
Storage capacity		44 / 26		44 / 26		44 / 26		28
Tool Ø max. – full	mm	Ø 90 / Ø 125		Ø 90 / Ø 125		Ø 90 / Ø 125		Ø 140
Tool Ø max. – adjacent empty positions	mm	Ø 125		Ø 250		Ø 250		Ø 300
Tool Ø max. – bridge tool	mm	Ø 250 x 100		Ø 250		Ø 250		Ø 300
Tool length max.	mm	550		550		550		690
Tool weight max.	kg	12 / 18		12 / 18		12 / 18		25
Chip-to-chip time Ball screw | Limo	s	3.8 / 4.2 (HSK 100)	3.3 / 3.7 (HSK 100)	4.2 / 4.4 (HSK 100)	3.7 / 4.1 (HSK 100)	5.0	4.5	5.3
Tool magazine O-chain sideward		(HSK 63 / HSK 100)		(HSK 63 / HSK 100)		(HSK 63 / HSK 100)		(HSK 100)
Storage capacity		89 / 61		89 / 61		89 / 61		60 / 100
Tool Ø max. – full	mm	Ø 80 / Ø 125		Ø 80 / Ø 125		Ø 80 / Ø 125		Ø 125
Tool Ø max. – adjacent empty positions	mm	Ø 125		Ø 250		Ø 250		4 x Ø 325
Tool length max.	mm	550		550		550		690
Tool weight max.	kg	12 / 18		12 / 18		12 / 18		30
Chip-to-chip time Ball screw | Limo	s	3.8 / 4.2 (HSK 100)	3.3 / 3.7 (HSK 100)	4.2 / 4.4 (HSK 100)	3.7 / 4.1 (HSK 100)	-		5.3
Tool magazine O-chain on top		-		(HSK 63)		-		-
Storage capacity		-		81		-		-
Tool Ø max. – full	mm	-		Ø 80		-		-
Tool Ø max. – adjacent empty positions	mm	-		Ø 250		-		-
Tool length max.	mm	-		550		-		-
Tool weight max.	kg	-		12		-		-
Chip-to-chip time Ball screw | Limo	s	-		3.5	3			-
Machine dimensions								
Machine width (sideward O-chain)	mm	2160		2260 (3120)		3200 / 3600		3300 / 4200 / 5100
Machine length (w/o pallet changer)	mm	4760		4760		4760		6500
Machine height	mm	3380		3540		3540		4400
Machine Weight	kg	12 000 – 14 000		14 000 – 16 000		18 000 – 22 000		27 000 – 29 000
Electrical system								
Connection load	KVA	24		24		24		40

Subject to change without notice

Technical Data / SPECHT® DUO

Machine type		**SPECHT 450 DUO**		**SPECHT 500 DUO**		**SPECHT 500 DUO+**		**SPECHT 600 DUO**	
Axis drive		Ball screw	Linear motor	Ball screw	Linear motor	Ball screw	Linear motor	Ball screw	
Linear axes									
Spindle distance	mm	540		720		720		810	
Working range X	mm	510		630		630		800	
Working range Y	mm	600		630		730		730	
Working range Z	mm	660 (A-axis) | 700 (B-axis)		860 (A-axis) | 900 (B-axis)		860 (A-axis) | 900 (B-axis)		860 (A-axis) | 900 (B-axis)	
Axis speed max.	m/min	70		70	120	70	120	70	120
Axis acceleration X / Y / Z	m/s²	6		6	10	6	10	6	10 / 10 / 9
Axis acceleration X / Y / Z with speed package	m/s²	9		-	-	-	-	-	-
Rotary axes									
A-axis interference Ø max.	mm	Ø 800		Ø 900		Ø 1100		Ø 1100	
Workpiece / fixture width max.	mm	1230		1520		1520		1780	
A-axis load max.	kg	2 x 450		2 x 600		-		2 x 600	
A-axis speed max.	rpm	50		80		50		50	
B-axis interference Ø max.	mm	2 x Ø 535		2 x Ø 710		-		2 x Ø 805	
B-axis workpiece height max.	mm	750		850		-		950	
B-axis surface Ø	mm	2 x Ø 450		2 x Ø 500		-		2 x Ø 500	
B-axis load max.	kg	2 x 350		2 x 600		-		2 x 600	
B-axis speed max.	rpm	80		80		80		80	
A/B-axis interference Ø max.	mm	800 (A-axis) / 2 x 535 (B-axis)		900 (A-axis) / 2 x 700 (B-axis)		1100 (A-axis) / 2 x 710 (B-axis)		1100 (A-axis) / 2 x 805 (B-axis)	
A/B-axis workpiece height max.	mm	490		540		640		640	
B-axis surface Ø / pallet	mm	2 x Ø 450		2 x Ø 450		400 x 400		2 x Ø 450	
A/B-axis load max.	kg	2 x 200		2 x 300		2 x 290		2 x 300	
B-axis speed max.	rpm	80		80		80		80	
Main spindle									
Motor spindle (HSK-A63)	rpm	18 000 / 16 000 / 10 000		18 000 / 16 000 / 10 000		18 000 / 16 000 / 10 000		18 000 / 16 000 / 10 000	
Spindle power (40% ED)	kW	42 / 52 / 39		42 / 52 / 39		42 / 52 / 39		42 / 52 / 39	
Spindle torque (40% ED)	Nm	67 / 123 / 180		67 / 123 / 180		67 / 123 / 180		67 / 123 / 180	
Front bearing diameter	mm	Ø 80		Ø 80		Ø 80		Ø 80	
Motor spindle (HSK-A100)	rpm	-		8000 / (10 000)		8000 / (10 000)		8000 / (10 000)	
Spindle power (40% ED)	kW	-		52		52		52	
Spindle torque (40% ED)	Nm	-		250		250		250	
Front bearing diameter	mm	-		Ø 100		Ø 100		Ø 100	
Motor spindle (HSK-A100)	rpm	-		8000		8000		8000	
Spindle power (40% ED)	kW	-		38		38		38	
Spindle torque (40% ED)	Nm	-		378		378		378	
Front bearing diameter	mm	-		Ø 100		Ø 100		Ø 100	
Motor spindle – draw-bar spindle (HSK-A100)	1/min	-		6000		6000		6000	
Spindle power (40% ED)	kW	-		52		52		52	
Spindle torque (40% ED)	Nm	-		250		250		250	
Front bearing diameter	mm	-		Ø 100		Ø 100		Ø 100	

Subject to change without notice

Machine type		SPECHT 450 DUO	SPECHT 500 DUO	SPECHT 500 DUO+	SPECHT 600 DUO
Tool magazines					
Tool magazine L-chain + 2 Discs		L-chain 96 positions + 2 discs per 8 positions	L-chain 96 positions + 2 discs per 8 positions	L-chain 96 positions + 2 discs per 8 positions	L-chain 96 positions + 2 discs per 8 positions
Storage capacity (HSK-A63)		112	112	112	112
Tool Ø max. – full	mm	Ø 75	Ø 75	Ø 75	Ø 75
Tool Ø max. – adjacent empty positions	mm	Ø 140	Ø 230	Ø 230	Ø 230
Tool length max. (Workpiece loading)	mm	550 (Front loading) 335 (Top loading)	550	550	550
Tool weight max.	kg	12	12	12	12
Chip-to-chip time Ball screw | Limo	s	2.5	3.3 2.8	3.3 2.8	3.6 3.0
Tool magazine L-chain + 2 Discs		-	L-chain 60 positions + 2 discs per 6 positions	L-chain 60 positions + 2 discs per 6 positions	L-chain 60 positions + 2 discs per 6 positions
Storage capacity (HSK-A100)		-	72	72	72
Tool Ø max. – full	mm	-	Ø 115	Ø 115	Ø 115
Tool Ø max. – adjacent empty positions	mm	-	Ø 230	Ø 230	Ø 230 / 250
Tool length max.	mm	-	550	550	550
Tool weight max.	kg	-	18	18	18
Chip-to-chip time Ball screw | Limo	s	-	3.5 3.0	3.5 3.0	3.8 3.2
Machine dimensions					
Machine width	mm	3100	3560 (A-axis) | 3410 (B-axis)	3560 (A-axis) | 3410 (B-axis)	3900 (A-axis) | 3750 (B-axis)
Machine length	mm	4150	4450 / 4950	5250 / 5650	4450 / 4950
Machine height	mm	3470	3650	3800	3700
Machine weight	kg	16 000 – 18 000	20 000 – 23 000	23 000 – 26 000	21 000 – 24 000
Electrical system					
Connection load	KVA	40	40	40	40

Machine type		SPECHT 700 TWIN
Axis drive	X/Y/Z	2 linear drives / 2 ball screw drives / 2 ball screw drives
Spindle distance	mm	380 – 580
Working range X	mm	870 – 670
Working range Y	mm	730
Working range Z (A-axis)	mm	860
Working range Z (B-axis)	mm	900
Axis speed max. X/Y/Z	m/min	70 / 70 / 60
Axis acceleration X/YZ	m/s^2	6
Rapid traverse A/B/BA-axis	rpm	50 / 80 / 80
Axis load max.	kg	A: 1200 / B: 1200 (2000) / AB: 600 (800)
A-axis	mm	ø 900 / length max.: 1520
B-axis	mm	ø 1400 / height max.: 850
A/B-axis	mm	ø 1100 / height max.: 640
Spindle		HSK 100
Spindle torque (40% ED)	Nm	50 – 126 / 200 – 289
Speed	rpm	8000 – 10 000
Tool magazine		L-chain 60 positions + 2 discs per 8 positions
Tool length max.	mm	550
Chip-to-chip time	s	3.8

Subject to change without notice

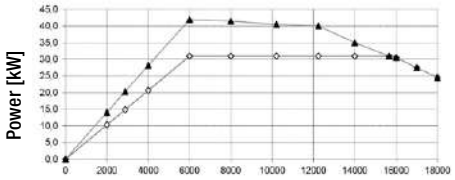
SPECHT® Spindle Diagrams – Long-Term High Performance

High performance spindles from in-house production

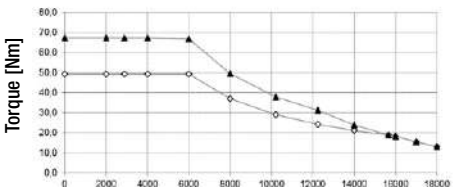
MAG develops and produces its own motorized spindles with a wide range of speed, torque and power values for processing very diverse materials such as cast iron, aluminum, magnesium, etc. All spindles, rotary tables, tool magazines and core components built into MAG machines are designed and built by the CORCOM internal division and set new standards for performance, quality and precision.

Motor spindle type 1

Power

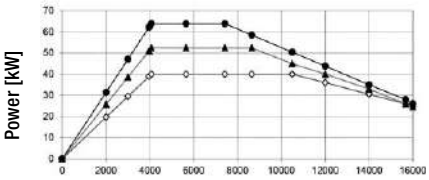


Torque

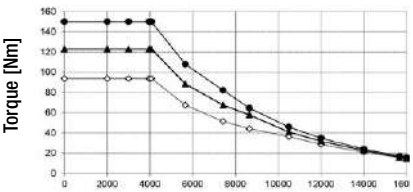


Motor spindle type 2

Power

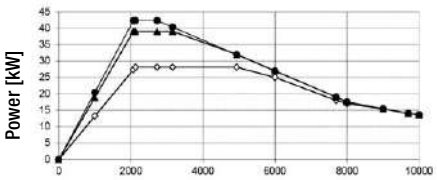


Torque

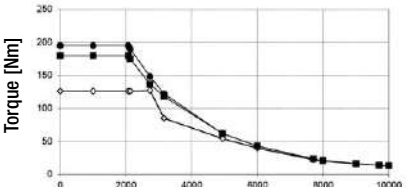


Motor spindle type 3

Power

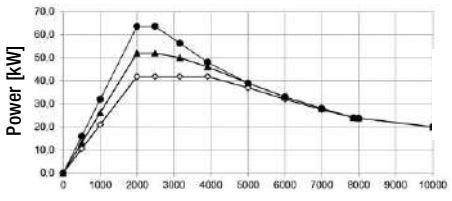


Torque

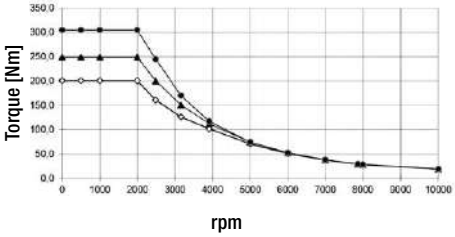


Motor spindle type 4

Power

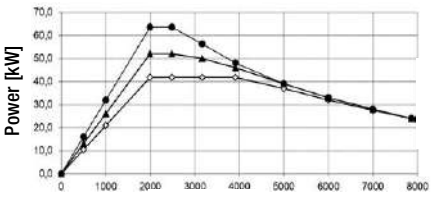


Torque

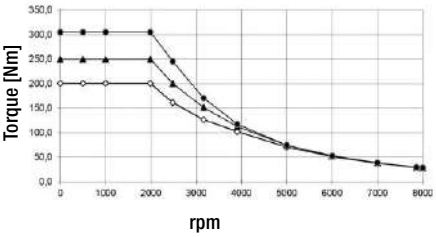


Motor spindle type 5

Power

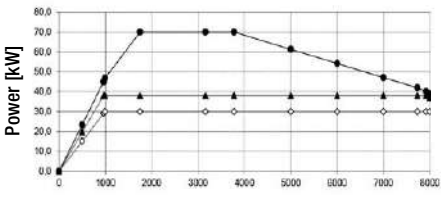


Torque

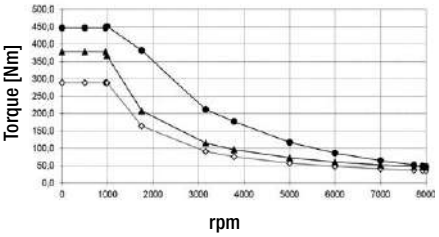


Motor spindle type 6

Power

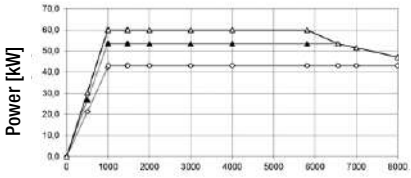


Torque

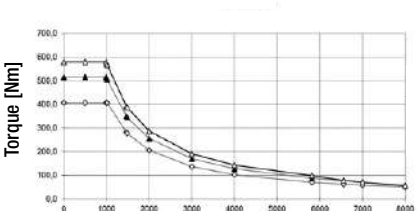


Motor spindle type 7

Power

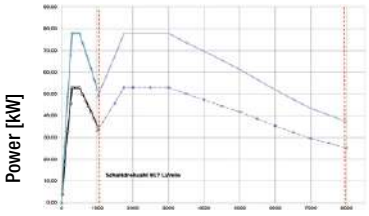


Torque

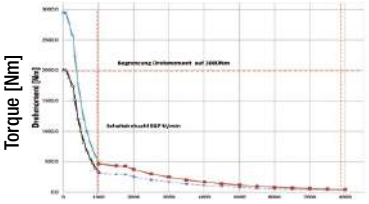


Gear spindle 2 steps type 8

Power

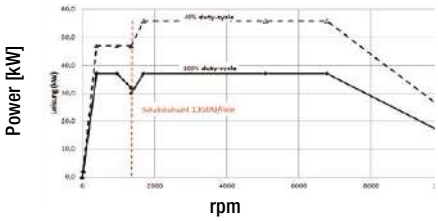


Torque

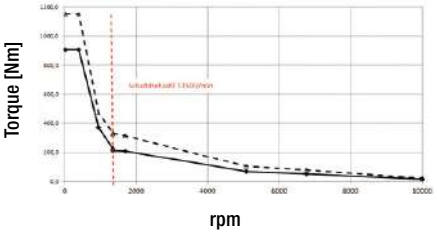


Gear spindle 2 steps type 9

Power

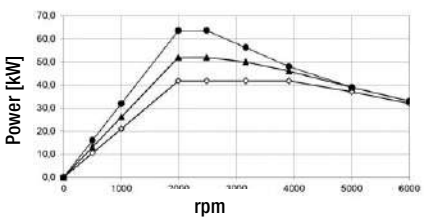


Torque

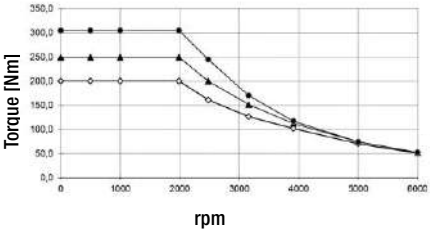


Motor spindle – draw-bar spindle type 10

Power



Torque



SPECHT® Series –
Compact Design, Even in the Switch Cabinet

Clear and clean service on SPECHT® machines

All machines of the SPECHT® series have a service and function oriented design and structure. A compact electric switch cabinet and a compact fluid box in which all hydraulic and pneumatic connections and controls are centrally located, allowing a clear, simple and clean service. In addition, this construction feature makes a large contribution to the small footprint of all machines from the entire SPECHT® series.

In case of service, easy and fast replacement of the motor spindle on SPECHT® machines

Also in the case of service you have considerable advantages over comparable machines because of the service and function oriented design of the SPECHT® series machines.
Easily and in no time you can disassemble the motor spindle towards the rear using the existing hoist and with the help of a crane and just as easily re-install it.

Universal spindle lifting device for single and dual spindle machines

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
- Overhauling / Retrofit
- Second-hand machines
- Relocations
- Service contracts

Spindle Service / Online Shop

- Repair / overhauling
- Loop concepts / reconditioned spindles

Spare Solutions

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

Technology Solutions

- Energy Management
- Relocations
- Technical optimization
- OEE optimization
- Overhauling and retrofit
- Control upgrades
- Maintenance management
- General contractor

Software Solutions

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

Training

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

About FFG Europe & Americas

The FFG entities in Europe and the 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, Hessapp, IMAS, Jobs, MAG, Meccanodora, 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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