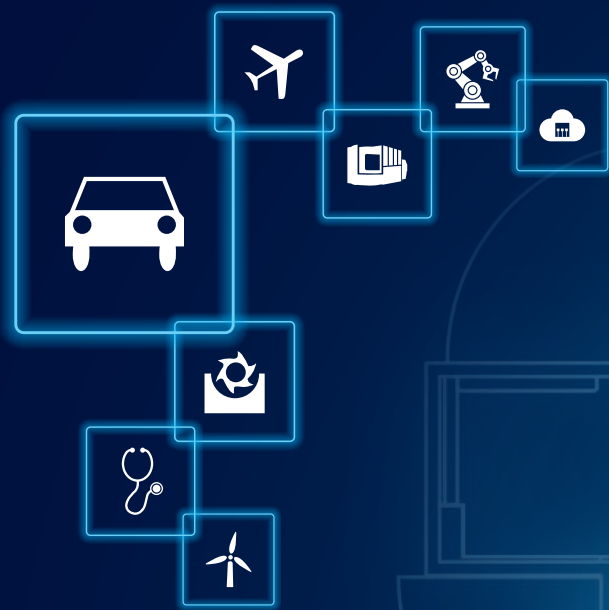


*#high5*



# 5-AXIS UNIVERSAL MACHINING CENTERS.





*This is who we are*  
**GROB-WERKE.**







*Technology at its best*

# STEP WITH US INTO A GREEN FUTURE.

At GROB, we strive for continuous progress and improvement. Not only do we strive to develop outstanding solutions and products for our customers, but we also seek to make a contribution to our environment and future generations. This is firmly anchored in our corporate philosophy and lived every day.

We therefore utilize photovoltaics and geothermal energy in our locations and support a wide variety of social projects. We also value SUSTAINABILITY in our internal departments. Our products are based on the highest energy efficiency and regenerative drive systems. We integrate our supplier network in reducing CO2 footprint.



OUR PRODUCT RANGE.

#machiningtechnology #universalmachiningcenters  
#assemblyplants #electromobility #automation  
#additivemanufacturing #digitalization  
#usedmachines #service



*Concentrated competence worldwide*

# INTELLIGENT TECHNOLOGY IS HUMAN.

For generations, we at GROB have lived and experienced this principle by making our customer's requirements the focus of our work. The result is sophisticated technology creating more efficient production processes worldwide and delivering highest quality.



## RESEARCH & DEVELOPMENT

With a high degree of creativity and technical intuition, as well as the best engineering expertise, our developers have worked hard to earn the reputation of being a technology leader.



## ASSEMBLY

From pre-assembly to machine assembly to process commissioning – our employees demonstrate their expertise with optimally coordinated workflows.



## ENGINEERING

With method development and structured problem solving, our employees in Engineering develop innovative concepts representing milestones for precision, dynamics, and reliability.



## COMMISSIONING

With simulation techniques and virtual commissioning, we achieve the highest adherence to delivery dates and product quality.



## PRODUCTION

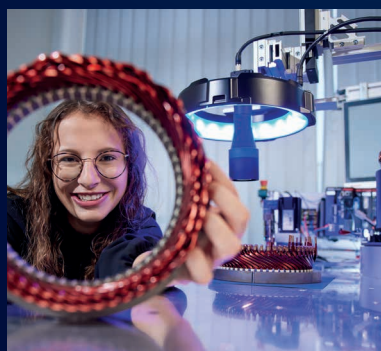
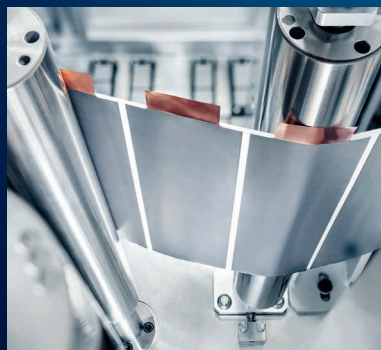
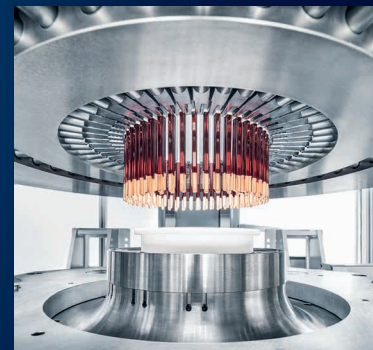
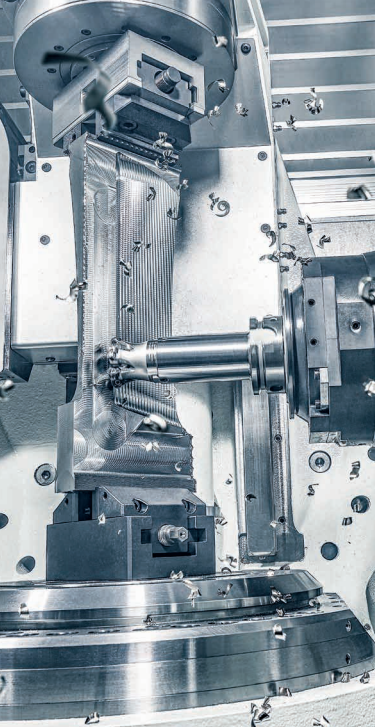
The high degree of vertical integration along the entire value creation chain, numerous machining technologies and our employees' distinctive specialist knowledge create the best conditions for state-of-the-art production.



## TECHNICAL APPLICATION CENTERS

Our production plants in Germany, Brazil, the USA, China, Italy and India have technical application centers for the machining and electromobility sectors, where our customers can experience GROB technologies up close.







*5-axis universal machining centers by GROB*

# THE RIGHT CONCEPT FOR YOUR INDUSTRY.

## 5-AXIS UNIVERSAL MACHINING CENTERS.

Machine concept

Machine components

Typical machining operations

Machine characteristics

Technical data

## AUTOMATION SOLUTIONS.

## DIGITALIZATION.

## SERVICE.





AUTOMOTIVE

DIE AND MOLD INDUSTRIES

MECHANICAL ENGINEERING

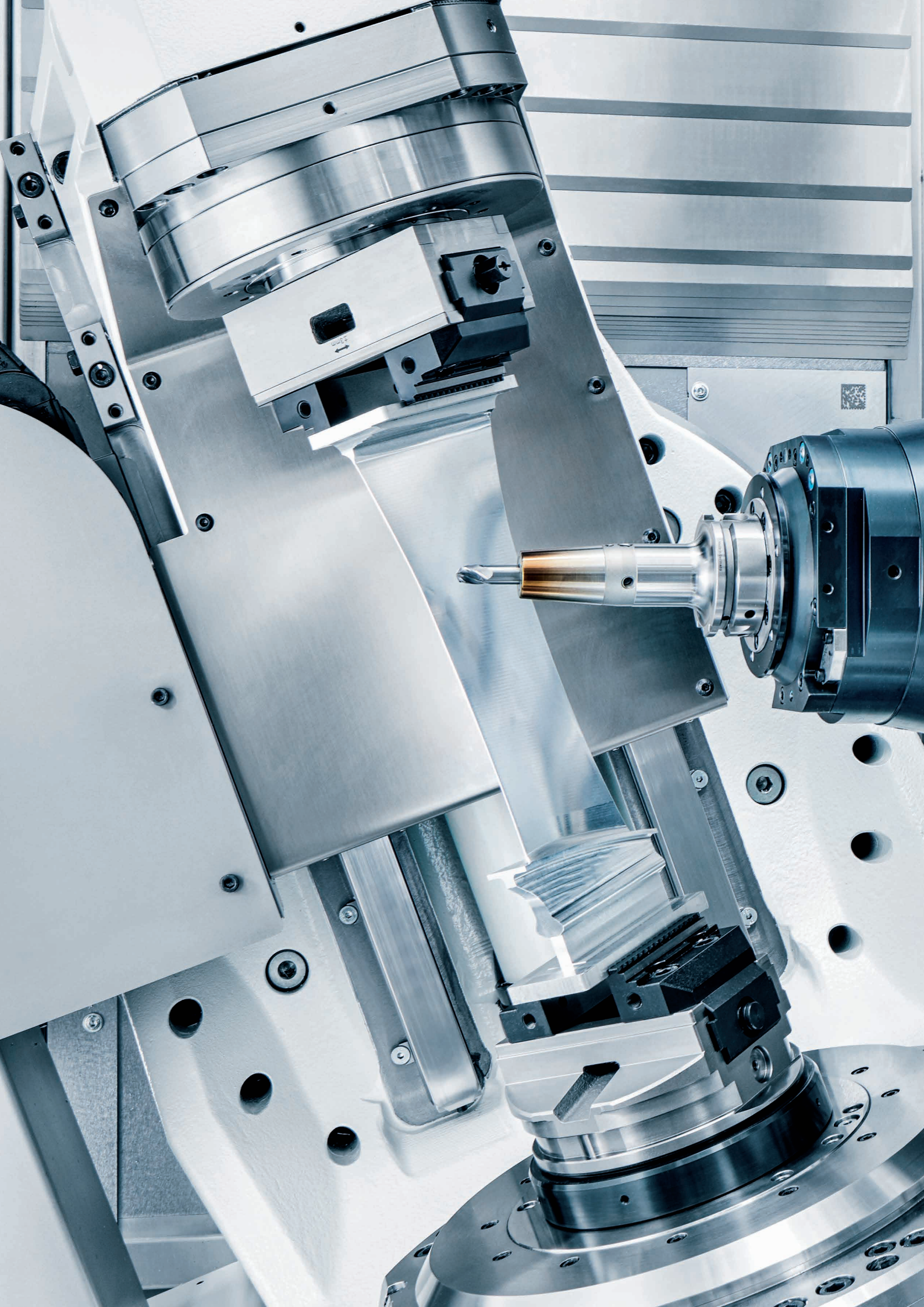
ENERGY TECHNOLOGY

MEDICAL TECHNOLOGY

AEROSPACE











*Pure technology in the smallest space*

# UNIVERSAL MACHINING CENTERS FOR OUTSTANDING MILLING PERFORMANCE.

The G150, G350, G550, and G750 5-axis universal machining centers provide almost limitless possibilities for milling parts made of the most diverse materials to all customers in the machining sector.

Whether aerospace, mechanical engineering, die and mold industries, automotive, medical or energy technologies – our 5-axis universal machining centers cover an impressively broad range of possible applications.

- ✦ High productivity and process reliability
- ✦ Optimized availability and durability
- ✦ Excellent maintainability
- ✦ Extensive configuration possibilities
- ✦ Designed for automation solutions
- ✦ Also available as mill-turn machines in the sizes G350T, G550T, and G750T



OUR PORTFOLIO.

#G150 #G350 #G550 #G750

*Maximum flexibility*

# MACHINING IN EVERY ANGULAR POSITION.

The machine's unique axis arrangement permits overhead machining. The large A-axis area offers you almost limitless possibilities for part machining. Three linear and two rotary axes as the basis for horizontal AB kinematics enable 5-sided machining as well as simultaneous 5-axis machining.

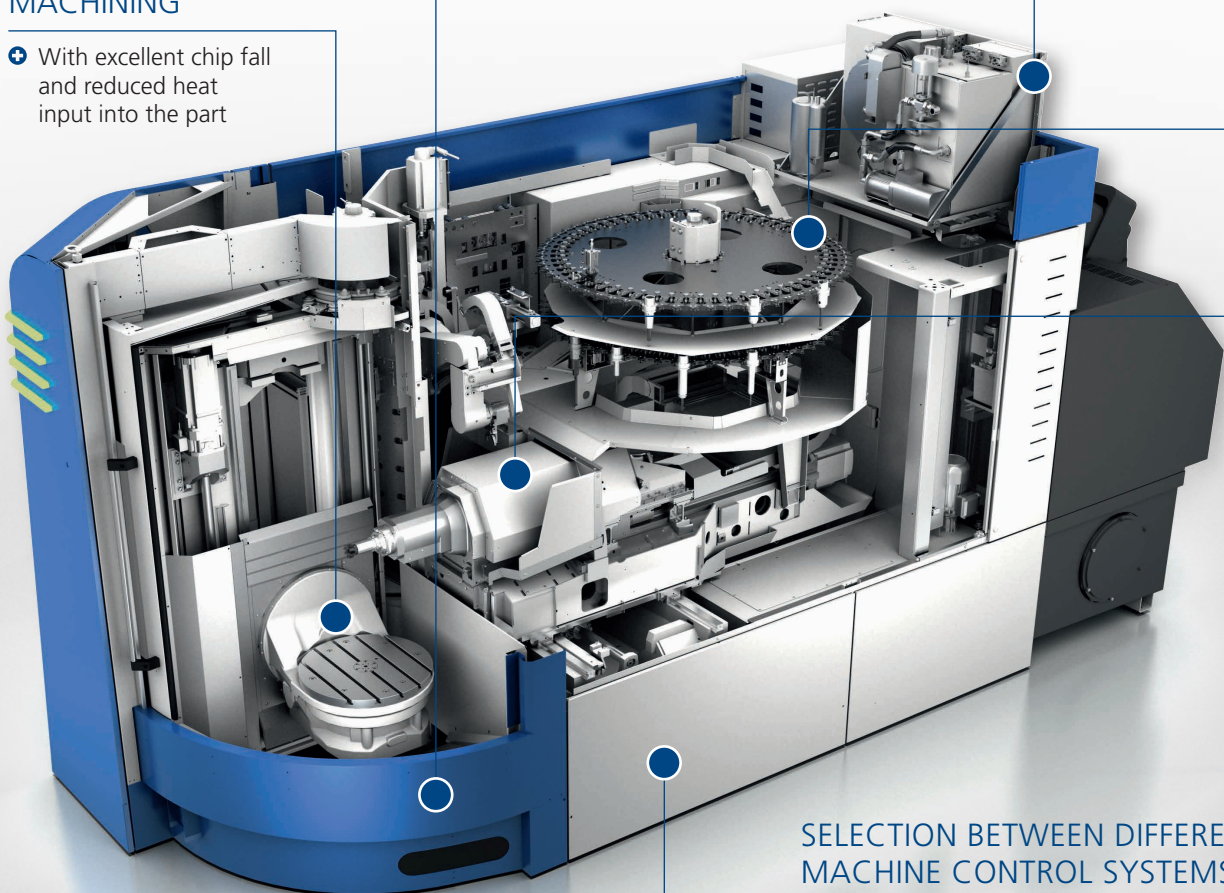
The drive concept is based on two symmetrically arranged ball screw drives and one weight compensation in the Y-axis. Torque motors in the A- axis and B-axis ensure dynamic and wear-free parts machining.

## ERGONOMIC AND SAFE

- + Perfect view of the machining operation through a laminated glass safety screen
- + Wide-opening work area doors for optimized accessibility and crane loading

## UNIQUE OVERHEAD MACHINING

- + With excellent chip fall and reduced heat input into the part



## SELECTION BETWEEN DIFFERENT MACHINE CONTROL SYSTEMS

- + Choice between SIEMENS and HEIDENHAIN machine control systems

The G350 illustration may include options; G150 I G750 with vertical magazine configuration



## OPTIONAL COOLING CONCEPT

- ⊕ Ensures exact temperature control of the part, tool, and machine, allowing precise part machining

## EFFICIENT MACHINE COOLING

- ⊕ Active temperature control of machine components

## DISK-TYPE TOOL MAGAZINE

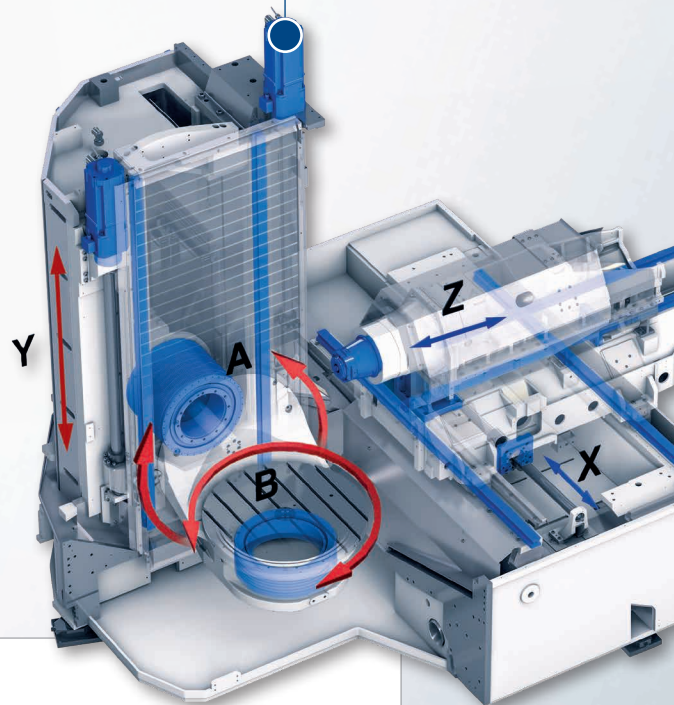
- ⊕ Fast chip-to-chip times thanks to the integrated disk-type tool magazine with double gripper technology

## STABLE SPINDLE AXIS

- ⊕ Special design for consistent stability in every machining position

## UNIQUE AXIS CONCEPT

- ⊕ Optimally designed machining point (TCP) for extreme stability
- ⊕ Longest Z-travel path of this machine class
- ⊕ Extremely large swivel range of 230° in the A-axis
- ⊕ Largest possible part in the work area can be machined with maximum tool length



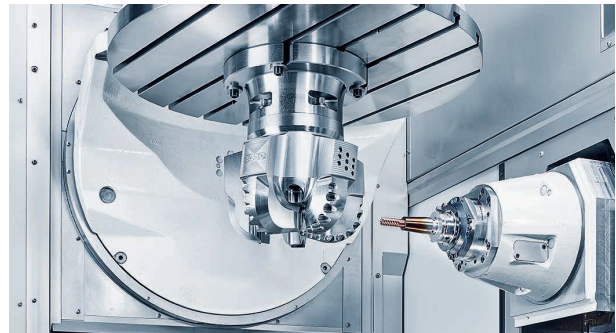
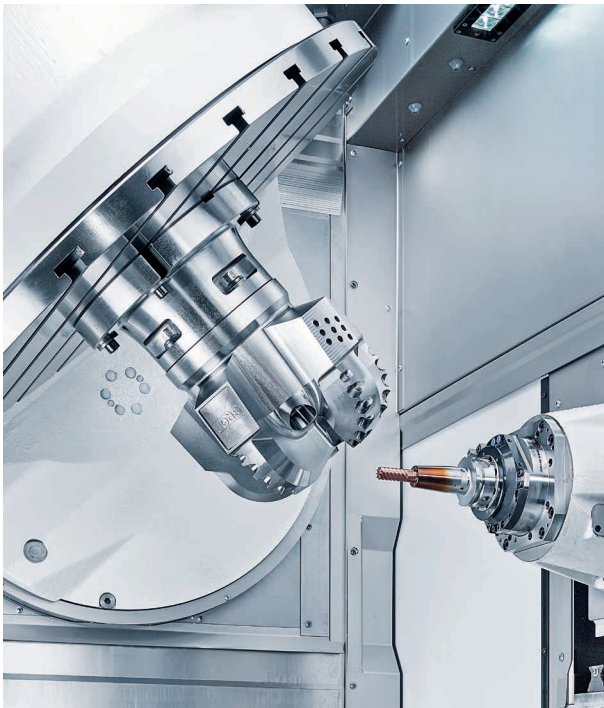


*Optimal chip fall*

# OVERHEAD MACHINING & ADDITIONAL ANGULAR POSITIONS.

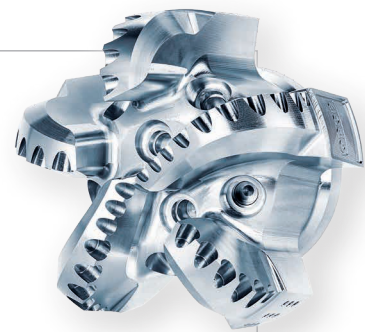
Due to the slim spindle design and the extremely large swivel range of the A-axis, the table can be positioned in various angular positions. This permits optimum accessibility to the part for the tool.

Thanks to the unique axis arrangement with horizontal spindle bearing, chips fall directly into the chip shaft and the part remains largely free of interfering chip accumulations.



## UNIQUE AXIS CONCEPT

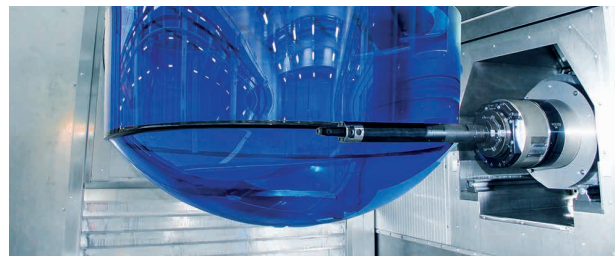
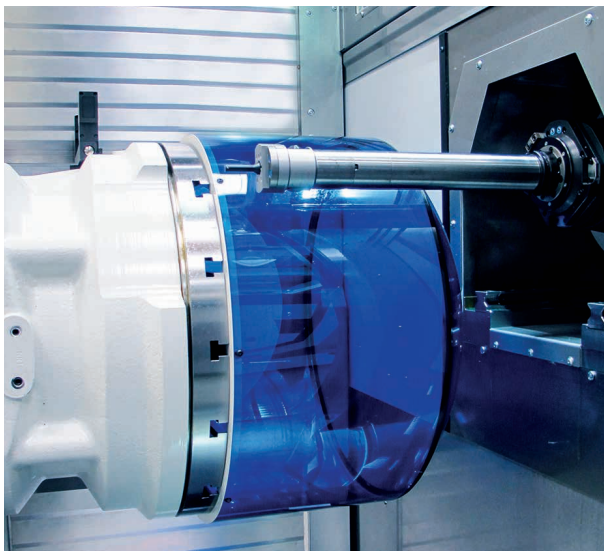
- ⊕ Best tool life due to perfect chip fall
- ⊕ Simple cleaning of components ahead of the part/pallet change
- ⊕ No cutting fluid residue in the part
- ⊕ No heat input into the machine from chips left on part, clamping equipment, and machine table



*Tunnel concept*

# PART MACHINING WITH MAXIMUM TOOL LENGTH.

Thanks to the special axis concept, the full tool length can be employed in any axis position, even with maximum part size. The "tunnel" concept allows the entire work area to be utilized, since the motorized spindle and tool can fully retract from the work area towards the rear.



MAX. TOOL LENGTH ▶ [mm]				
	G150	G350	G550	G750
Single disk-type tool magazine HSK-E40	265	—	—	—
Single disk-type tool magazine HSK-A63	265	365	465	—
Single disk-type tool magazine HSK-A100	—	—	500	—
Double disk-type tool magazine HSK-E40 (disk 1/disk 2/extra-long)	175/265/385*	—	—	—
Double disk-type tool magazine HSK-A63 (disk 1/disk 2/extra-long)	180/265/385*	365/180/550*	465/280/700*	400/400 (650)/650*
Double disk-type tool magazine HSK-A100 (disk 1/disk 2/extra-long)	—	—	500/260/750*	450/650*
Triple disk-type tool magazine HSK-E40 (disk 1/disk 2/disk 3/extra-long)	175/265/ 175/385*	—	—	—
Triple disk-type tool magazine HSK-A63 (disk 1/disk 2/disk 3/extra-long)	180/265/ 180/385*	—	—	400/270/ 400/650*

\*With restrictions in the work area



## Machine components

## MOTORIZED SPINDLES BY GROB.

## GROB SPINDLE DIAGNOSTICS (GSD) – OPTION

GROB Spindle Diagnostics is a system that automatically monitors the condition of the motorized spindle. It also monitors the vibrations that occur during machining.

- + System for automatic condition monitoring of the motorized spindle
- + Vibrations that occur are monitored during machining and switched off if they are exceeded
- + Service life of the motorized spindle extended through identification of critical operating states
- + Perfect process optimization is possible
- + Machine downtimes avoided through scheduled maintenance

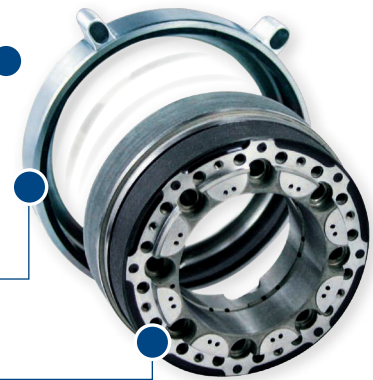
GROB CHIP-IN-SPINDLE  
DETECTION SYSTEM (SiS) – OPTION

The system is able to detect tool clamping faults at an early stage caused by 10 µm or larger chips caught between the contact surface of the HSK and the front edge of the spindle (detailed information upon request).

- + Reject components and radial runout avoided
- + Damage caused by machining faults prevented
- + Better process stability

STATOR WITH  
RADIO RECEIVER

ROTOR WITH  
INTEGRATED SENSOR TECHNOLOGY  
AND RADIO TRANSMITTER

MOTORIZED SPINDLE  
WITH CROSS-FEED UNIT

GROB motorized spindles with cross-feed units allow complex internal and external contours to be manufactured with controllable tools.

- + High system rigidity
- + No additional interference contour on the motorized spindle
- + No referencing required
- + High cutting speeds during contour machining
- + Low tool costs



## Spindle types – Availability at a glance!

SPINDLE TYPE ◀▶ MACHINE											
Tool interface* for hollow taper tools according to ISO 12164-1	HSK- E40	HSK- A63	HSK- A63	HSK- A63	HSK- A63	HSK- A63	HSK- A100	HSK- A100	HSK- A100	HSK- A100	HSK- A100**
Spindle type	32	5	9/25	1	24	13	29	7	3	6	22
Max. spindle torque at 100 %/40 % duty cycle [Nm]	13.3/ 17.4	63.7/ 82.8	159/ 206	34.6/ 46.6	34.6/ 46.6	48/ 63	226/ 265	470/ 575	262/ 340	262/ 340	301/ 344
Spindle bearing Ø at front bearing [mm]	50	70	80	70	70	65	100	110	100	100	100
Speed n <sub>max</sub> [rpm]	42,000	12,000	16,000	18,000	21,000	30,000	13,000	9,000	10,000	6,000	6,000
Max. drive power at 100 %/40 % duty cycle [kW]	23/ 30	40/ 52	25/ 32	29/ 39	29/ 39	40/ 53	64/ 75	54/ 65	20/ 26	20/ 26	32/ 36
Spindle bearing lubrication ▶ Lifetime lubrication	—	•	•	•	—	—	—	•	•	•	•
▶ Oil/air lubrication	•	—	○	—	•	•	•	—	—	—	—
<b>G150</b>	○	•	○	—	○	○	—	—	—	—	—
<b>G350</b>	—	•	○	○	○	○	—	—	—	—	—
<b>G550</b>	—	•	○	○	○	○	○	○	○	○	○***
<b>G750</b>	—	•	○	○	○	○	○	○	○	○	○***

\* Optional tool interfaces on request

\*\* Motorized spindle with cross-feed

\*\*\* In combination with a SIEMENS machine control system  
 • Standard    ○ Option    — not available

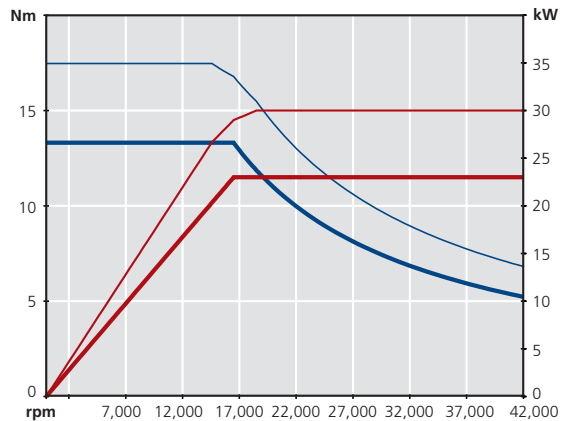


*Torque – rotational speed – output*

# MOTORIZED SPINDLE VERSIONS.

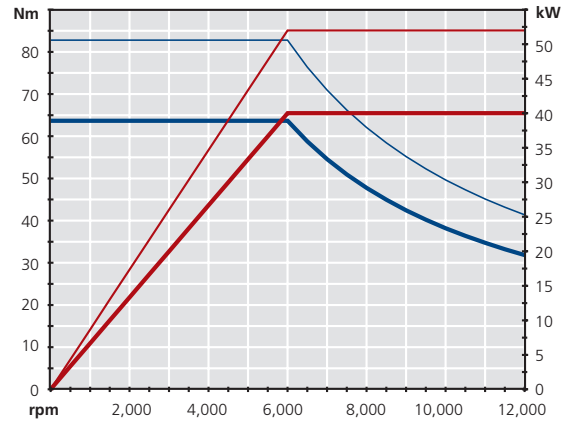
**TYPE 32:**

HSK-E40 ▶ Motorized spindle 17.4 Nm, 42,000 rpm



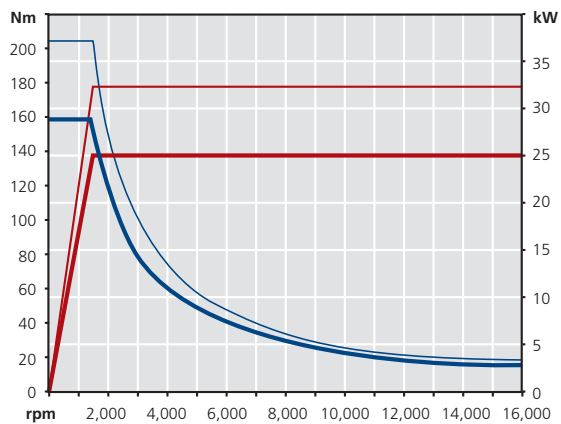
**TYPE 5:**

HSK-A63 ▶ Motorized spindle 83 Nm, 12,000 rpm



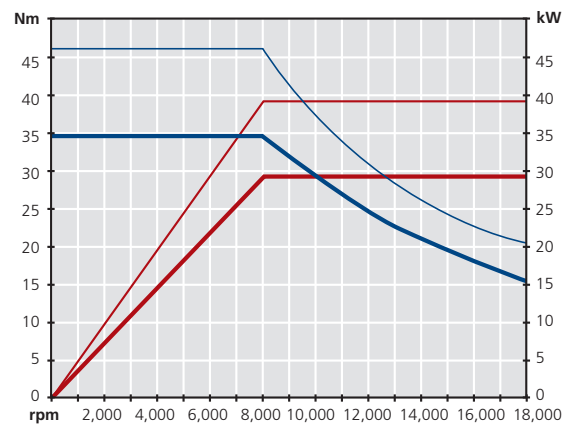
**TYPE 9/25:**

HSK-A63 ▶ Motorized spindle 206 Nm, 16,000 rpm



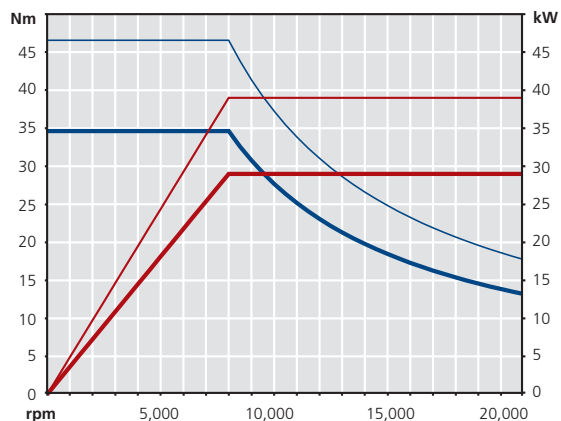
**TYPE 1:**

HSK-A63 ▶ Motorized spindle 47 Nm, 18,000 rpm



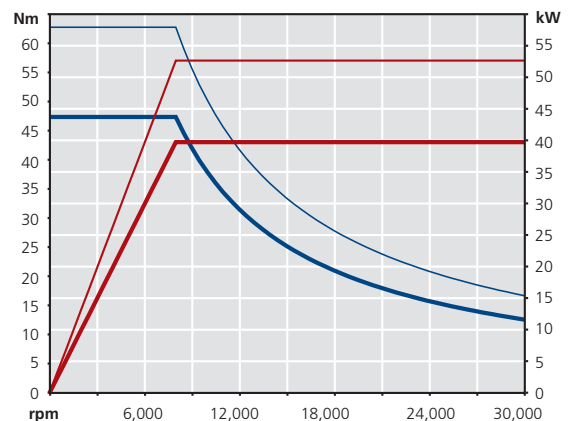
**TYPE 24:**

HSK-A63 ▶ Motorized spindle 47 Nm, 21,000 rpm

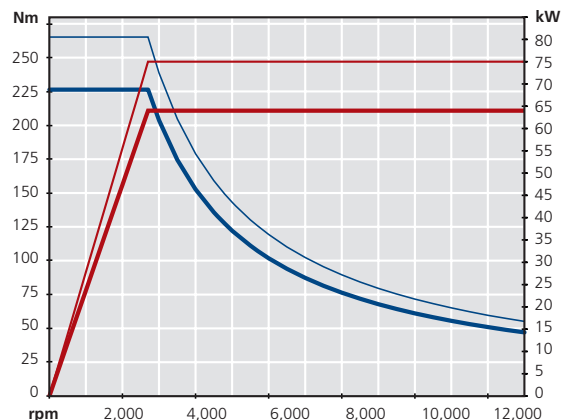


**TYPE 13:**

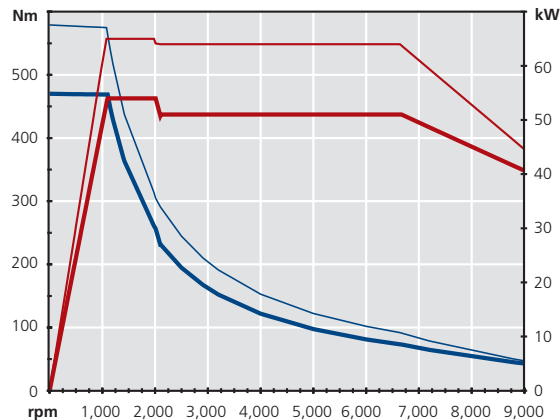
HSK-A63 ▶ Motorized spindle 63 Nm, 30,000 rpm



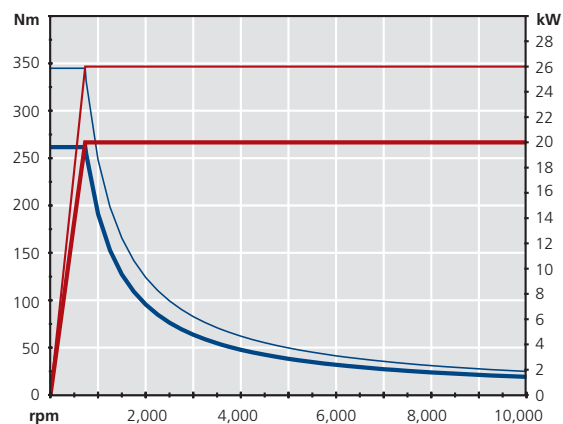
**TYPE 29:**  
HSK-A100 ▶ Motorized spindle 265 Nm, 13,000 rpm



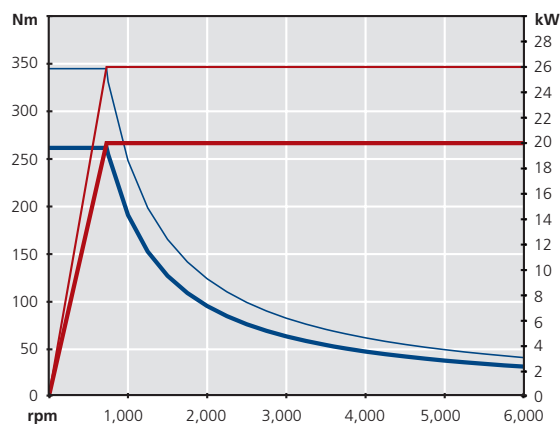
**TYPE 7:**  
HSK-A100 ▶ Motorized spindle 575 Nm, 9,000 rpm



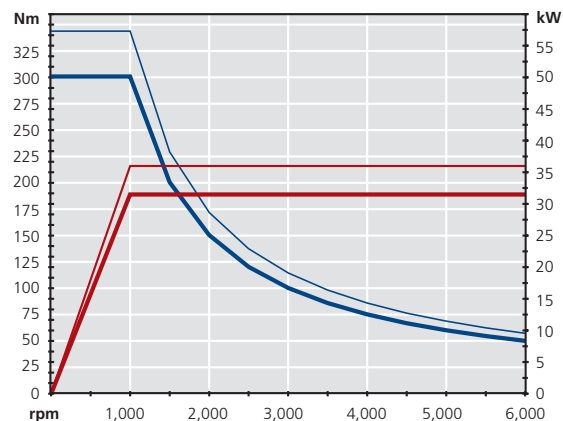
**TYPE 3:**  
HSK-A100 ▶ Motorized spindle 340 Nm, 10,000 rpm



**TYPE 6:**  
HSK-A100 ▶ Motorized spindle 340 Nm, 6,000 rpm



**TYPE 22:**  
HSK-A100 ▶ Motorized spindle 344 Nm, 6,000 rpm



— Power S1: 100 % duty cycle — Power S6: 40 % duty cycle  
— Torque S1: 100 % duty cycle — Torque S6: 40 % duty cycle



*Table versions*

# TILTING ROTARY TABLE, A-/B-AXIS ARRANGEMENT.

## GENERAL TECHNICAL DATA OF THE ROTARY AXES A / B

	G150	G350	G550	G750
Swiveling angle A-axis [°]	-185/+45	-185/+45	-185/+45	-180/+45
Max. rotational speed A-axis [rpm]	50	35	25	20
Type of drive for A-/B-axis	Torque motor	Torque motor	Torque motor	Torque motor
Angle of rotation B-axis [°]	n x 360	n x 360	n x 360	n x 360
Max. rotational speed B-axis [rpm]	80	50	50	50



### ❶ TILTING ROTARY TABLE WITH T-SLOTS ARRANGED IN PARALLEL (standard)

	G150	G350	G550	G750
Aligning slot (quantity/width/quality)	1 x 14 H7	1 x 14 H7	1 x 14 H7	1 x 18 H7
Clamping slot (quantity/width/quality)	6 x 14 H12	4 x 14 H12	6 x 14 H12	8 x 18 H12
Table diameter [mm]	380	570	770	950
Interference diameter [mm]*	580	720	900	1,280
Max. permissible loading weight incl. clamping fixture [kg]	250	400	800	1,500

### ❷ TILTING ROTARY TABLE WITH PALLET CLAMPING SYSTEM (option)

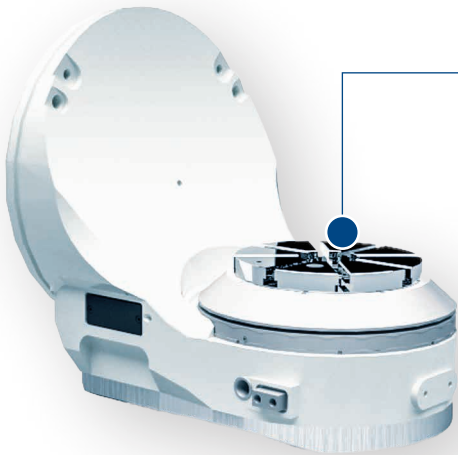
	G150	G350	G550	G750
Pallet size [mm]	320 x 320	400 x 400	630 x 630	800 x 800
Max. pallet load [kg]	220	340	700	1,000

\* Maximum part size with restrictions on machines with pallet changer

*More tilting rotary table options*

# FOR MACHINE SIZES G150 AND G350.

Optimum accessibility is achieved thanks to the compact designs of the compact and highly dynamic rotary table and the Vario rotary table versions being matched to the motorized spindle contour. Consequently, it is possible to use significantly shorter tools with greater stability and accuracy during part machining. This increases efficiency and enables longer tool lives.



## COMPACT ROTARY TABLE VERSIONS FOR MACHINE SIZE G150

- + Interference diameter [mm]: 300
- + Swiveling angle A-axis [°]: -185/+45
- + Angle of rotation B-axis [°]:  $n \times 360$
- + Max. rotational speed A-axis [rpm]: 50
- + Max. rotational speed B-axis [rpm]: 200
- + Maximum loading weight [kg]: 150
- + Table diameter [mm]: 250 (T-slots arranged in a star shape)
- + Pallet size [mm]:  $\varnothing 148$  (Erowa Power Chuck P  $\varnothing 150$ )

## COMPACT ROTARY TABLE VERSIONS FOR MACHINE SIZE G350

- + Interference diameter [mm]: 600
- + Swiveling angle A-axis [°]: -225/+135
- + Angle of rotation B-axis [°]:  $n \times 360$
- + Max. rotational speed B-axis [rpm]: 200
- + Maximum loading weight [kg]: 250 on pallet
- + Pallet size [mm]:  $\varnothing 320 / \square 350 \times 350$

Higher drive forces and dynamic values;  
lower friction values for the best results in simultaneous machining,  
e.g. for mold making, blisks





*Various rotary table versions*

# FOR MACHINE SIZE G350 (options).



## BASIC MODULE

- + Interference diameter [mm]: 300
- + Swiveling angle A-axis [°]: -185/+45
- + Angle of rotation B-axis [°]:  $n \times 360$
- + Max. rotational speed B-axis [rpm]: 200
- + Maximum loading weight [kg]: 230
- + Table diameter [mm]: 200

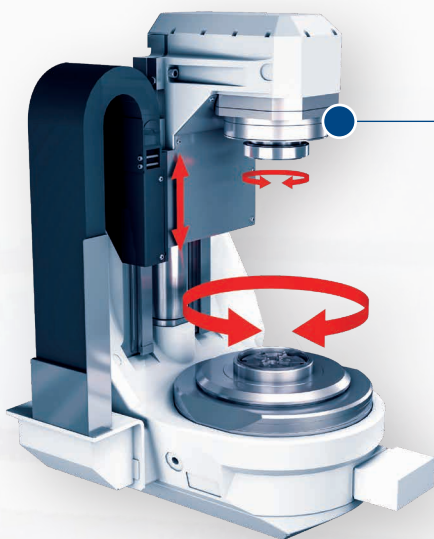
Designed for the modular construction of various steady rests and drives; for machining long, thin components; e.g. turbine blades or tools

## STEADY REST WITH TAILSTOCK CENTER

- + Interference diameter [mm]: 300
- + Swiveling angle A-axis [°]: -185/+45
- + Angle of rotation B-axis [°]:  $n \times 360$
- + Max. rotational speed B-axis [rpm]: 200
- + Maximum loading weight [kg]: 230
- + Table diameter [mm]: 200
- + Distance between centers [mm]: 485  
(measured from the top edge of the table to the tip of the steady rest)

For stable parts with a length of up to 300 mm; max. steady rest stroke 195 mm; for machining long, thin components; e.g. turbine blades or tools





## STEADY REST WITH TANDEM DRIVE

- + Interference diameter [mm]: 280
- + Swiveling angle A-axis [°]: -35/+45
- + Angle of rotation B-axis [°]:  $n \times 360$
- + Max. rotational speed B-axis [rpm]: 200
- + Maximum loading weight [kg]: 230
- + Table diameter [mm]: 200
- + Distance between centers [mm]: 555 (without clamping system)

Max. distance between the top edges of the rotary table 470 mm;  
 max. steady rest stroke 195 mm;  
 for machining long, thin components;  
 e. g. turbine blades or tools



*Versatile combinations*

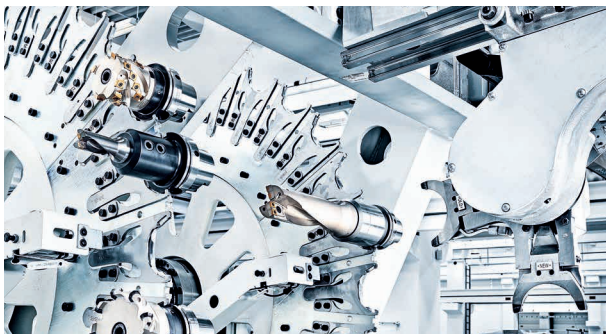
# TOOL MAGAZINES BY GROB.

GROB tool magazine technology is set apart by fast chip-to-chip times, a small space requirement, and optimized accessibility. You will also profit from fast tool change thanks to a highly dynamic tool changer arm with a swiveling double gripper, loading and unloading in parallel to machining operation, and permanent access to the tool magazine disk.



## SINGLE DISK-TYPE TOOL MAGAZINE

- + Horizontal magazine disk arrangement on G350 and G550
- + Vertical magazine disk arrangement on G150 and G750



## DOUBLE DISK-TYPE TOOL MAGAZINE

- + Horizontally stacked magazine disks on G350 and G550 (disks coupled)
- + Vertically adjacent magazine disks on G150 and G750 (disks can be rotated individually)

## ADDITIONAL TOOL MAGAZINE TM (option)

- + Increases the basic machine's tool capacity with block-wise setup of up to:
  - Six HSK-A63 tools for TM200, TM308, and TM373
  - Five HSK-A100 tools for TM180, TM250
- + The additional tool magazine can be equipped with tools during the machining operation
- + Tool provision in parallel with machining
- + Tool and magazine management through the control system of the machine



## Number of tool pockets

# G150 / G350 / G550 / G750

G150 ▶ BASIC MACHINE ◀▶ ADDITIONAL TOOL MAGAZINE TM							
Motorized spindle	Tool interface	Number of tool pockets <sup>(1)</sup>	Total number of tools of the basic machine and the TM				
Single disk-type tool magazine			TM200	TM308	TM373		
	HSK-E40	60	—	—	—		
	HSK-A63	50/42 <sup>(2)</sup>	235/245 <sup>(3)</sup>	343/351 <sup>(3)</sup>	408/416 <sup>(3)</sup>		
Double disk-type tool magazine			TM200	TM308	TM373		
For all spindle types	HSK-E40	93 <sup>(3)</sup>	—	—	—		
	HSK-A63	77 <sup>(3)</sup>	270	378	443		
Triple disk-type tool magazine			TM200	TM308	TM373		
For all spindle types	HSK-E40	141 <sup>(3)</sup>	—	—	—		
	HSK-A63	117 <sup>(3)</sup>	310	418	483		
G350 ▶ BASIC MACHINE ◀▶ ADDITIONAL TOOL MAGAZINE TM							
Single disk-type tool magazine			TM200	TM308	TM373		
For all spindle types	HSK-A63	60	251	359	424		
Double disk-type tool magazine			TM200	TM308	TM373		
For all spindle types	HSK-A63	117	311	419	484		
	HSK-A63	105 <sup>(3)</sup>	293	401	466		
G550 ▶ BASIC MACHINE ◀▶ ADDITIONAL TOOL MAGAZINE TM							
Single disk-type tool magazine			TM200	TM308	TM373	TM180	TM250
For all spindle types	HSK-A63	70	261	369	434	—	—
	HSK-A100	40	—	—	—	211	281
Double disk-type tool magazine			TM200	TM308	TM373	TM180	TM250
For all spindle types	HSK-A63	137	331	439	504	—	—
	HSK-A63	123 <sup>(3)</sup>	317	425	490	—	—
	HSK-A100	77	—	—	—	251	321
	HSK-A100	69 <sup>(3)</sup>	—	—	—	243	313
G750 ▶ BASIC MACHINE ◀▶ ADDITIONAL TOOL MAGAZINE TM							
Double disk-type tool magazine			TM200	TM308	TM373	TM180	TM250
For all spindle types	HSK-A63	117	311	419	484	—	—
	HSK-A100	65	—	—	—	241	312
Triple disk-type tool magazine			TM200	TM308	TM373	TM180	TM250
For all spindle types	HSK-A63	177	371	479	544	—	—
	HSK-A63	167	361	469	534	—	—

<sup>(1)</sup> Depending on the machine configuration

<sup>(2)</sup> Depending on spindle type

<sup>(3)</sup> Ability to store oversize tools across both magazine disks with double assignment



GROB<sup>4</sup>Pilot

# YOUR POWERFUL MACHINE CONTROL PANEL.

The innovative GROB<sup>4</sup>Pilot machine control panel offers the machine operator a convenient working environment on the machine through a multi-functional user interface. The entire production process – from the CAD model to the NC simulation – is now digitally mapped on the GROB<sup>4</sup>Pilot control system itself.

- ⊕ Enhanced user comfort thanks to simplified and intuitive machine operation
- ⊕ Access to the GROB-NET<sup>4</sup>Industry platform
- ⊕ Expanded applications for increased efficiency
- ⊕ Paperless production is possible

## OPTIMIZED KEYBOARD

- ⊕ For easy input

## 3D-SPACEMOUSE® (option)

- ⊕ For controlling CAD applications

### AVAILABLE CNC CONTROL PROVIDERS FOR GROB<sup>4</sup>PILOT

	SIEMENS 840D sl	HEIDENHAIN TNC 640	SIEMENS ONE
<b>G150</b>	•	•	•
<b>G350</b>	•	•	•
<b>G550</b>	•	•	•
<b>G750</b>	•	•	•

The implementation of GROB<sup>4</sup>Pilot can differ between SIEMENS and HEIDENHAIN

## FLEXIBLE DISPLAY LAYOUT

- ⊕ Free division into up to three apps

## 24" MULTI-TOUCH DISPLAY

- ⊕ For intuitive operation

## 2x POWERRIDE

- ⊕ Convenient operation thanks to multifunctional assignment

## TRACKBALL

- ⊕ For alternative screen use in addition to the multi-touch function



Example illustration



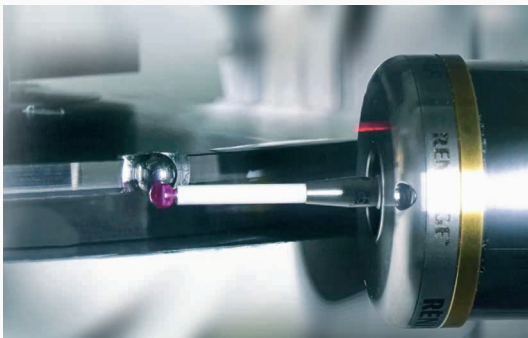
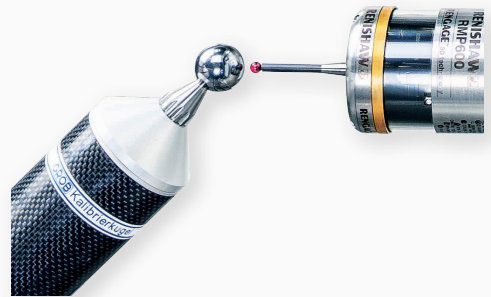
*Perfect accuracy – automatic – any time*

## SOFTWARE OPTIONS.

GROB has set the standard for machine calibration accuracy with the GROB swivel axis calibration (GSC). With the new GSC Advanced option, the machine calibrates itself fully automatically, permanently maintaining phenomenal accuracy.

### GSC CLASSIC (SWIVEL AXIS CALIBRATION)

- + Complete package for calibrating machine geometry, managing accuracy, and automating warm-up processes
- + Calibrates swivel axis errors and the perpendicularity of the main axes
- + Fast determination of machine accuracy by means of indicator measurement
- + Detection of sensing errors prevents miscalibration (only with SIEMENS control system and high-precision touch probe, e.g. RMP600)
- + Measurement of space accuracy using 5X check
- + Application via user-guided dialogs



### GSC ADVANCED (option)

- + Expansion of GSC Classic to make machine calibration even more intuitive and take it to the next level
- + The machine recognizes the need for calibration fully automatically and uses the non-removable calibration sphere for it (without operator interaction e.g. during pallet change)

### ENERGY EFFICIENCY PACKAGE

- + For efficient use of energy by reducing the power consumption of 5-axis universal machining centers with a SIEMENS control system
- + Shut-down strategies for machine cooling unit, chip conveyor, and various fans
- + Optimized control strategy for motorized spindle and axis drives
- + Timed machine shutdown



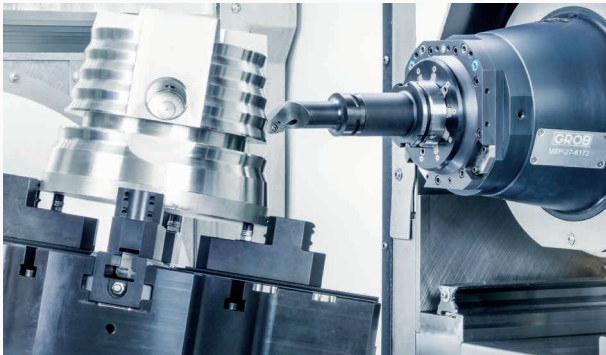
## GROB KINEMATICS SET

- + All measuring equipment needed for calibrating the machine or touch probe are included in this case. The parts are only used during calibration of the touch probe or machine. Therefore, only one set is sufficient for all machines.
- + Two carbon magnetic bases
- + Two high-precision calibration spheres with unique test IDs
- + Mounting material for the bases
- + Parallel gauge block
- + Calibration ring
- + Lever-type dial indicator



## Interpolation turning & gearing cycles

# SOFTWARE OPTIONS.



### INTERPOLATION TURNING PLUS

- ⊕ As a pure software solution, it enables any turning operations on GROB universal machining centers – including turning operations that are not coaxial to the B-axis
- ⊕ The software solution simulates a diameter axis (transverse slide) by means of simultaneous interpolation of the X-axis, Y-axis, and motorized spindle
- ⊕ Programming and handling correspond to that of a CNC turning machine and can be combined with a spindle operation

### GEARING CYCLES IN GENERAL

- ⊕ Axes coupled as on a gear wheel milling machine
- ⊕ Programming via NC cycles
- ⊕ Individual correction option (e. g. crowned, tapered, etc.)
- ⊕ Gear hobbing: For external gearing with gear hobbing tools; ideal for gearing on shafts; frontal part access not required
- ⊕ Gear skiving: For external and internal gearing with gear skiving tools; frontal part access required



### WAY MEASUREMENT SOFTWARE

- ⊕ The rough parts are positioned as on measuring machines – the clamping points can be freely selected without rough part alignment
- ⊕ WAY allows for probing geometric elements with any number of points and fitting them in with Best Fit. The additional sensing points also make it possible to determine shape accuracy (e. g. roundness)
- ⊕ Rough part deviations are identified directly in the machine and compensated for during machining



*Availability at a glance*

## CNC CONTROL SYSTEM (options).

	SIEMENS 840D sl	SIEMENS ONE	HEIDENHAIN TNC 640
Swivel axis calibration GSC	•	•	•
Swivel axis calibration GSC Advanced	•	•	•
Energy Efficiency Package EEP	•	•	—
Interpolation turning PLUS	•	•	—
Hobbing (G_GEAR_HOB)	•	•	—
Gear skiving (G_GSK)	•	•	—
WAY Coordinate measurement software	•	•	—
WAY Light Coordinate measurement software	•	•	—
Speed Feed Tools (G_SFT)	•	•	—
Extended tool change (G_UTL_TC)	•	•	—
Read & write Matrix code (G_UTL_MC)	•	•	—
Setup table height (G_GSC_TTH)	•	•	—
Setup touch probe (G_OCTC)(G_UTL_MC)	•	•	—
Tool sorting close to the spindle (SNS)	•	•	—
A / C Kinematics change	—	—	•

## Typical machining operations

# PERFORMANCE MILLING – DRILLING – TAPPING.

A selection of performance examples illustrates the diverse range of possible applications of GROB 5-axis universal machining centers.



### Motorized spindle 12,000 rpm (83 Nm)/HSK-A63 Machining on a G350

Machining type / tool	Steel – 16MnCrS5	
Drilling Ø 50 mm	$v_c = 160$	$n = 1,019$
	$f_u = 0.13$	$v_f = 132$
	$a_p/a_e = 50/50$	$Q = 330$
Tapping M24	$v_c = 15$	$n = 199$
	$f_u = 3$	$v_f = 597$
Milling with cutting head Ø 63 mm $z = 5$	$v_c = 300$	$n = 1,516$
	$f_z = 0.24$	$v_f = 1,743$
	$a_p/a_e = 3/55$	$Q = 288$



### Motorized spindle 16,000 rpm (206 Nm)/HSK-A63 Machining on a G350

Machining type / tool	Steel – 16MnCrS5	
Drilling Ø 60 mm	$v_c = 160$	$n = 849$
	$f_u = 0.18$	$v_f = 153$
	$a_p/a_e = 50/60$	$Q = 459$
Tapping M36	$v_c = 13$	$n = 115$
	$f_u = 4$	$v_f = 460$
Milling with cutting head Ø 100 mm $z = 12$	$v_c = 330$	$n = 1,050$
	$f_z = 0.18$	$v_f = 2,268$
	$a_p/a_e = 3/95$	$Q = 646$

Cutting speed:  $v_c$  [m/min]Spindle speed:  $n$  [rpm]Feed rate per revolution:  $f_u$  [mm/rev]Feed rate per tooth:  $f_z$  [mm/tooth]Feed rate:  $v_f$  [mm/min]Cutting depth:  $a_p$  [mm]Cutting width:  $a_e$  [mm]Cutting volume:  $Q$  [cm<sup>3</sup>/min]Number of tool edges:  $z$ 

Example illustrations



#### Motorized spindle 18,000 rpm (47 Nm)/HSK-A63 Machining on a G550

Machining type / tool	Aluminum – F7050	
Milling with end mill Ø 20 mm z = 3	$v_c = 1,131$	$n = 18,000$
	$f_z = 0.25$	$v_f = 13,500$
	$a_p = 13$	$a_e = 20$
	$Q = 3,510$	
Milling with cutting head Ø 32 mm z = 3	$v_c = 1,809$	$n = 17,994$
	$f_z = 0.18$	$v_f = 9,717$
	$a_p = 10$	$a_e = 32$
	$Q = 3,109$	



#### Motorized spindle 30,000 rpm (63 Nm)/HSK-A63 Machining on a G550

Machining type / tool	Aluminum – F7050	
Milling with end mill Ø 25 mm z = 3	$v_c = 2,120$	$n = 26,993$
	$f_z = 0.09$	$v_f = 7,288$
	$a_p = 19$	$a_e = 25$
	$Q = 3,462$	
Milling with cutting head Ø 50 mm z = 4	$v_c = 2,042$	$n = 13,000$
	$f_z = 0.24$	$v_f = 12,480$
	$a_p = 6$	$a_e = 50$
	$Q = 3,744$	



#### Motorized spindle 9,000 rpm (575 Nm)/HSK-A100 Machining on a G550

Machining type / tool	Steel – 16MnCrS5	
Drilling Ø 70 mm	$v_c = 150$	$n = 682$
	$f_u = 0.40$	$v_f = 273$
	$a_p = 50$	$Q = 955$
Milling with milling cutter Ø 50 mm z = 4	$v_c = 80$	$n = 509$
	$f_z = 0.12$	$v_f = 244$
	$a_p/a_e = 40/50$	$Q = 488$
Milling with cutting head Ø 125 mm z = 14	$v_c = 250$	$n = 637$
	$f_z = 0.3$	$v_f = 2,675$
	$a_p/a_e = 5/90$	$Q = 1,204$

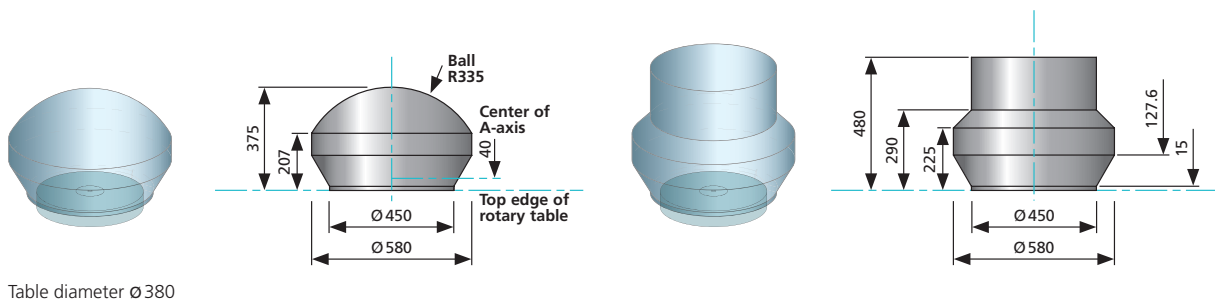
Example illustrations



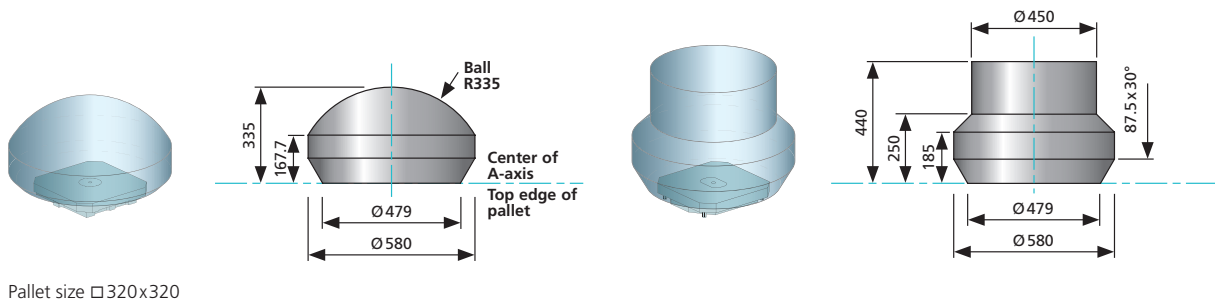
# Maximum part size Footprint

## G150

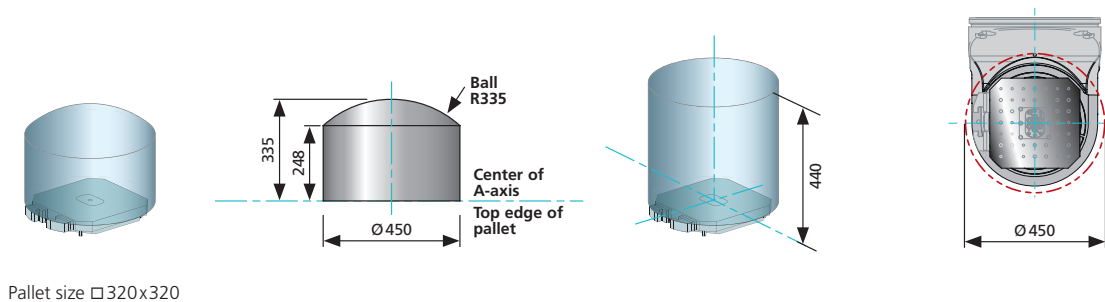
A- / B-axis (max.) [mm]	B-axis (max.) [mm] (for A-axis 0°)
<b>Basic machine</b>	



### Basic machine with pallet clamping system (without pallet changer, incl. design for PSS-R)

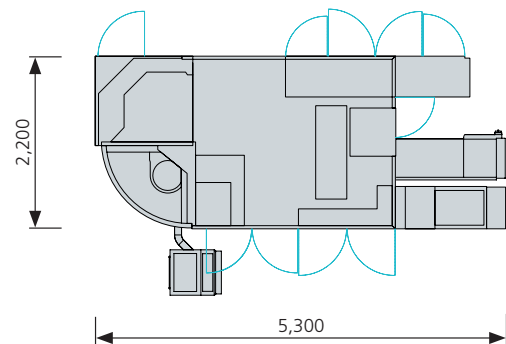
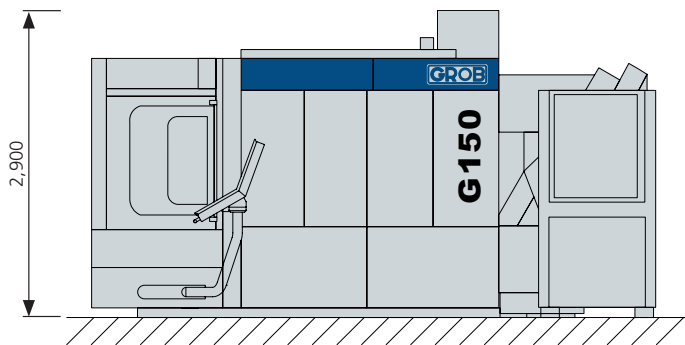


### Basic machine with pallet changer

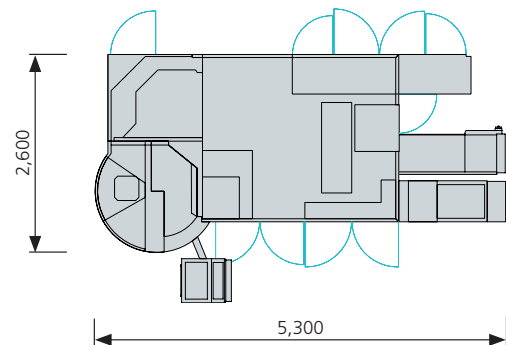
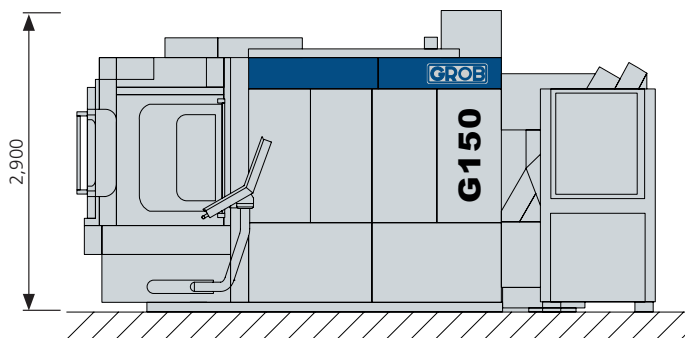


Side view / top view  
max. [mm]

Basic machine



Basic machine with pallet changer



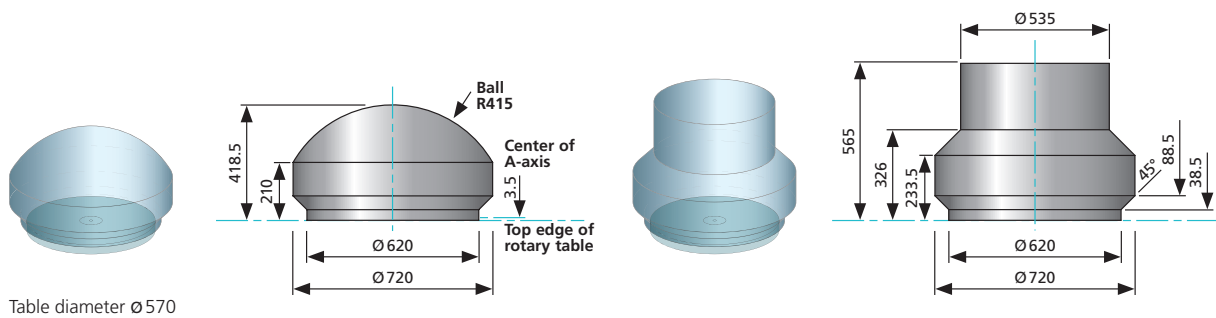
Dimension values [mm] not taking into account preventive maintenance and operating areas or emulsion and chip disposal

Illustrations may contain options

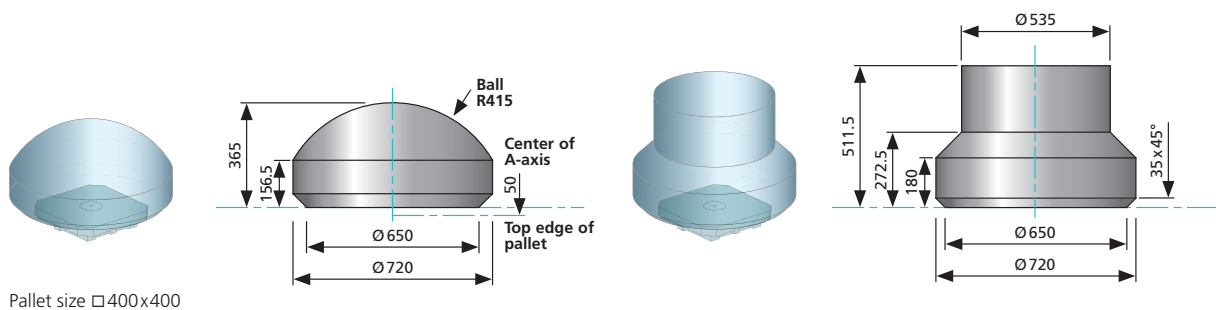
Maximum part size  
Footprint

# G350

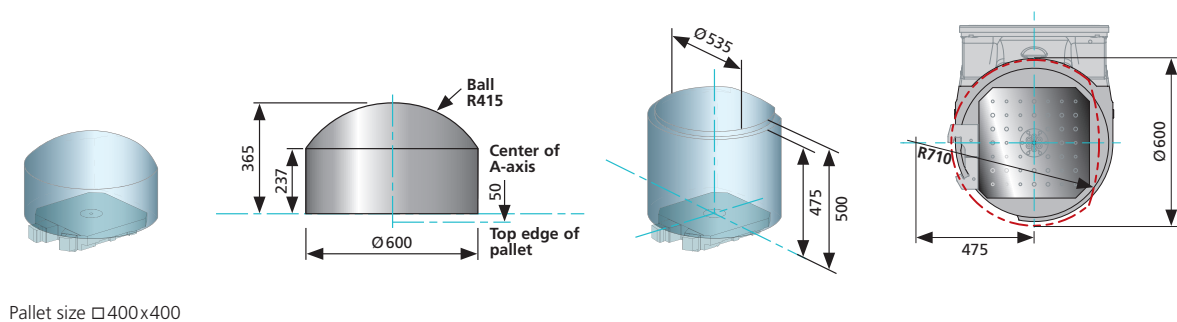
A- / B-axis (max.) [mm]	B-axis (max.) [mm] (for A-axis 0°)
<b>Basic machine</b>	



## Basic machine with pallet clamping system (without pallet changer, incl. design for PSS-R)



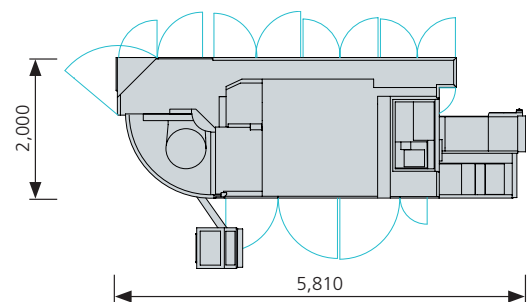
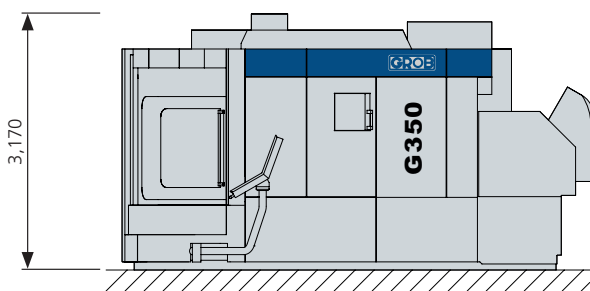
## Basic machine with pallet changer



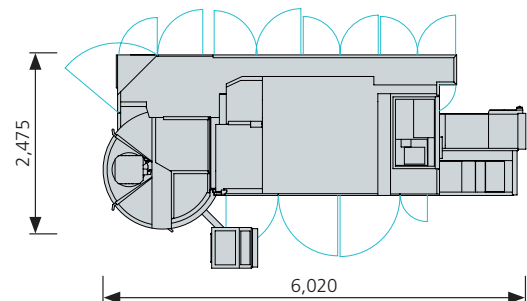
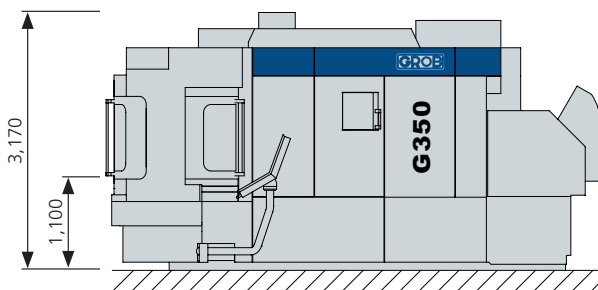


Side view / top view  
max. [mm]

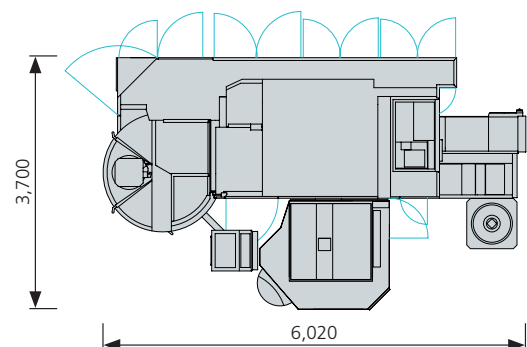
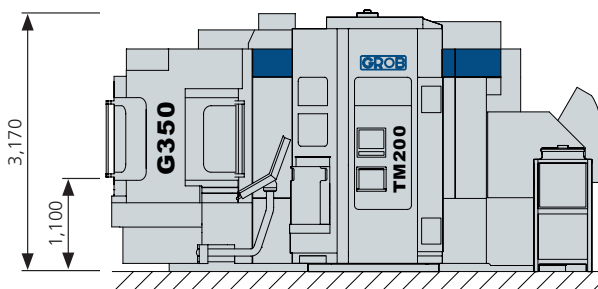
#### Basic machine



#### Basic machine with pallet changer



#### Basic machine with additional tool magazine and cooling unit



Dimension values [mm] not taking into account preventive maintenance and operating areas or emulsion and chip disposal

Illustrations may contain options

# Maximum part size Footprint

## G550

A- / B-axis (max.) [mm]	B-axis (max.) [mm] (for A-axis 0°)
<b>Basic machine</b>	

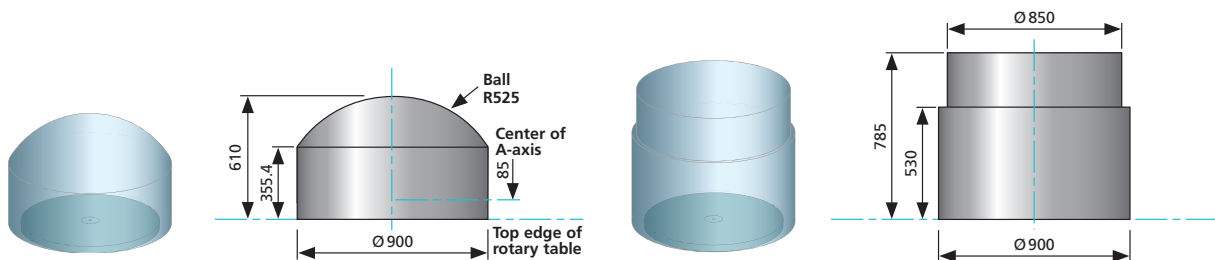
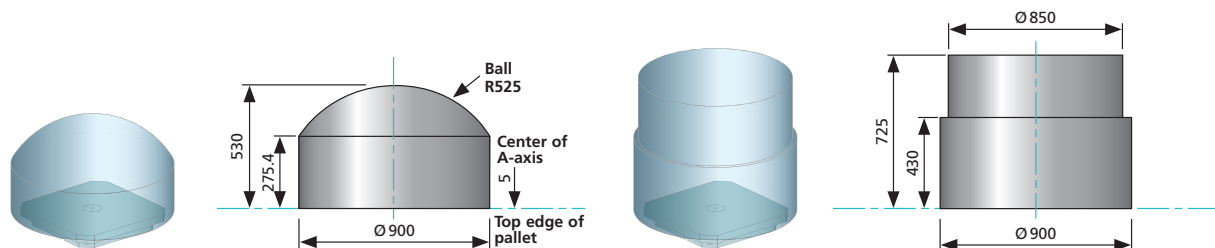


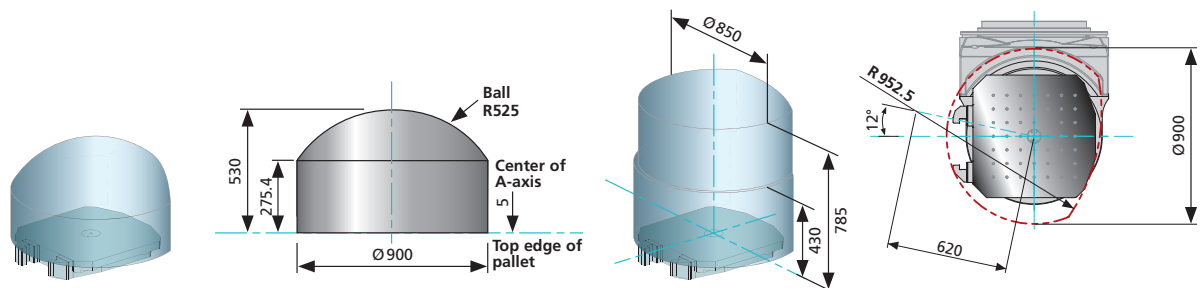
Table diameter  $\varnothing 770$

### Basic machine with pallet clamping system (without pallet changer, incl. design for PSS-R)



Pallet size  $\square 630 \times 630$

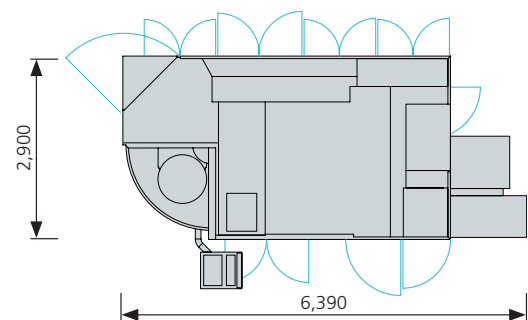
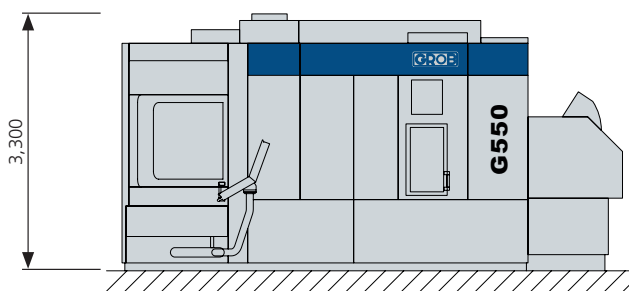
### Basic machine with pallet changer



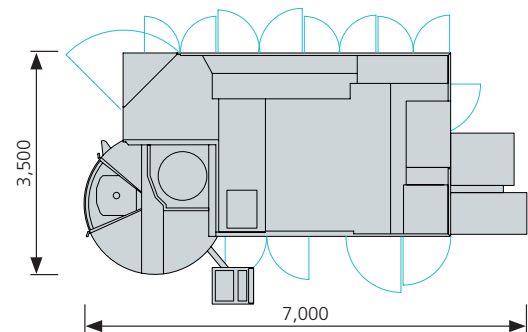
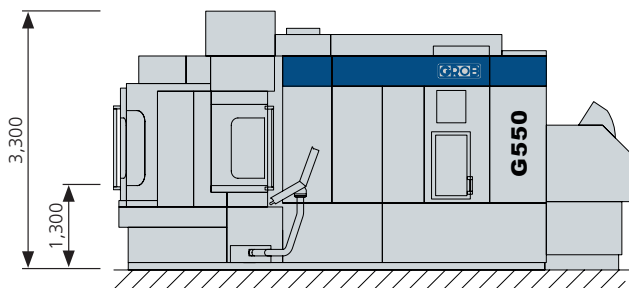
Pallet size  $\square 630 \times 630$

Side view / top view  
max. [mm]

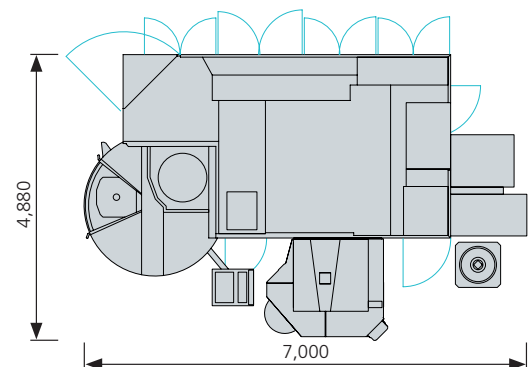
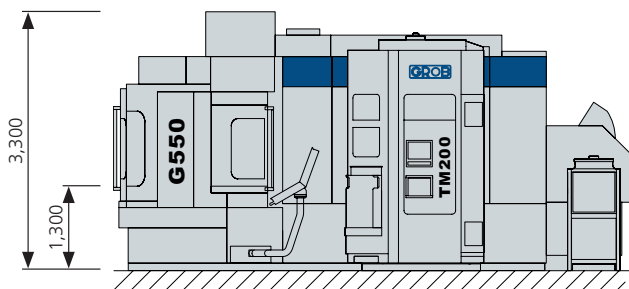
Basic machine



Basic machine with pallet changer



Basic machine with additional tool magazine and cooling unit



Dimension values [mm] not taking into account preventive maintenance and operating areas or emulsion and chip disposal

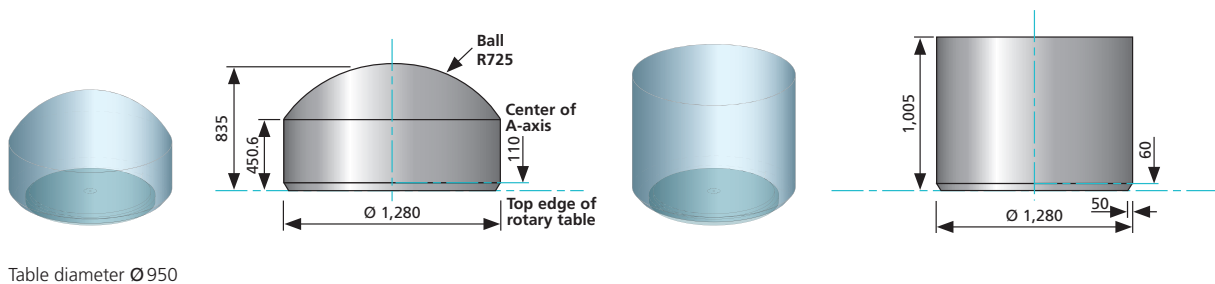
Illustrations may contain options



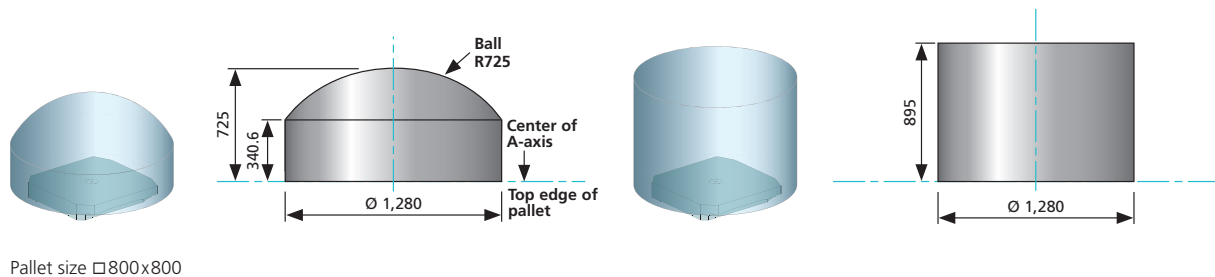
# Maximum part size Footprint

## G750

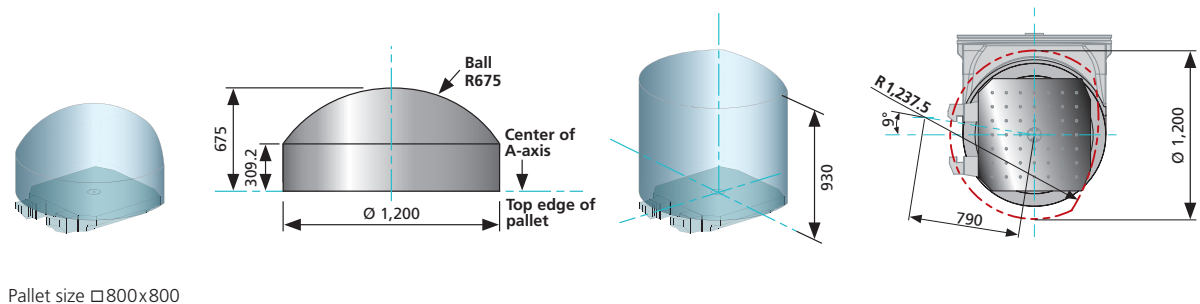
A- / B-axis (max.) [mm]	B-axis (max.) [mm] (for A-axis 0°)
<b>Basic machine</b>	

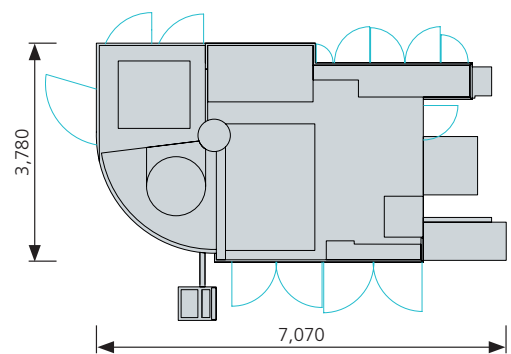
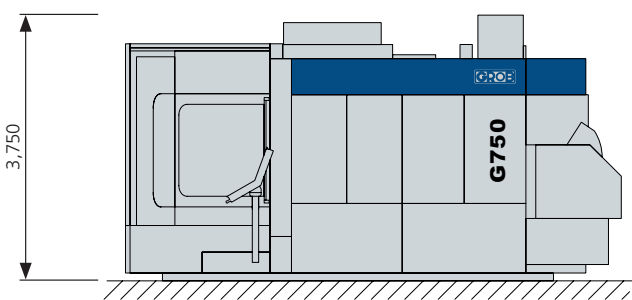


### Basic machine with pallet clamping system (without pallet changer, incl. design for PSS-R)

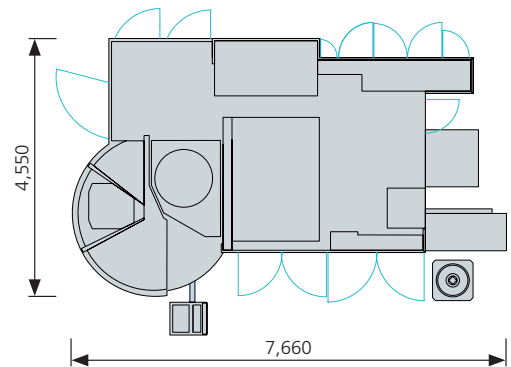
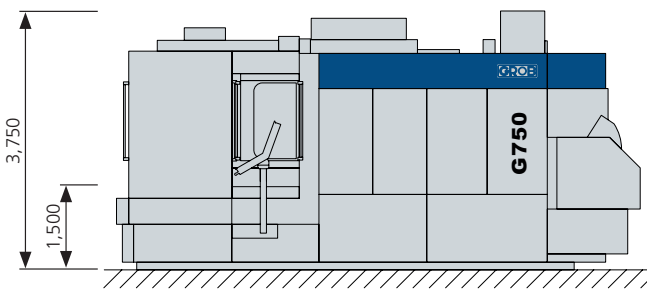


### Basic machine with pallet changer

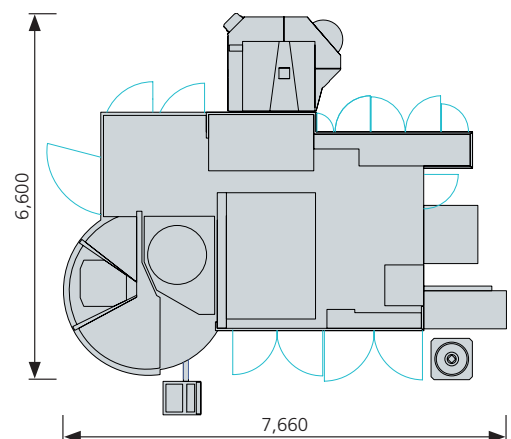
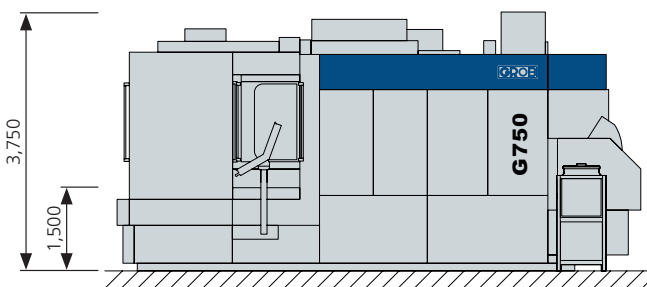




**Basic machine with pallet changer**



**Basic machine with additional tool magazine and cooling unit**



Dimension values [mm] not taking into account preventive maintenance and operating areas or emulsion and chip disposal

Illustrations may contain options

## Technical data – overview

## G150/G350/G550/G750

MACHINE TYPE		G150					G350			
SLIDE										
Working travels in X-/Y-/Z-axis [mm]		450/670/665					600/855/750			
Max. speeds in X-/Y-/Z-axis [m/min]		50/40/60 (70/50/80) <sup>(2)</sup>					70/45/90			
Max. accelerations in X-/Y-/Z-axis [m/s <sup>2</sup> ] <sup>(1)</sup>		5/6/8 (6/6/11) <sup>(2)</sup>					5/4/7			
Max. feed forces in X-/Y-/Z-axis [kN] <sup>(1)</sup>		5/5/6					8/8/8			
Positioning accuracy* in X-/Y-/Z-axis [mm]		0.006					0.006			
Repeat precision of positioning* in X-/Y-/Z-axis [mm]		<0.0025					<0.0025			
MAIN SPINDLE										
Drive: Standard	Tool interface for short hollow taper tools according to ISO 12164-1 <sup>(3)</sup>	HSK-A63					HSK-A63			
	Diameter at front bearing of spindle bearing [mm]	70					70			
	Speed n <sub>max</sub> [rpm]	12,000					12,000			
	Max. drive power at 100 %/40 % duty cycle [kW]	40/52					40/52			
	Max. spindle torque at 100 %/40 % duty cycle [Nm]	63.7/82.8					63.7/82.8			
	Chip-to-chip time t <sub>1</sub> according to VDI 2852 [s] relative to speed [rpm] SIEMENS control system and tool changer arm (dynamic package)	2.6					2.7			
Drive: Options	Tool interface for short hollow taper tools according to ISO 12164-1	HSK-E40	HSK-A63	HSK-A63	HSK-A63	HSK-A63	HSK-A63	HSK-A63		
	Diameter at front bearing of spindle bearing [mm]	50	70	65	80	70	80	65		
	Speed n <sub>max</sub> [rpm]	42,000	21,000	30,000	16,000	18,000/21,000	16,000	30,000		
	Max. drive power at 100 %/40 % duty cycle [kW]	23/30	29/39	40/53	25/32	29/39	25/32	40/53		
	Max. spindle torque at 100 %/40 % duty cycle [Nm]	13.3/17.4	34.6/46.6	48/63	159/206	34.6/46.6	159/206	48/63		
	Chip-to-chip time t <sub>1</sub> according to VDI 2852 [s] relative to speed [rpm] SIEMENS control system and tool changer arm (dynamic package)	2.6	2.6	2.6	2.6	2.7	2.7	2.7		
DISK-TYPE TOOL MAGAZINE		Single-disk~		Double-disk~		Triple-disk~		Single-disk~	Double-disk~	
TOOL INTERFACE		HSK-E40	HSK-A63	HSK-E40	HSK-A63	HSK-E40	HSK-A63	HSK-A63	HSK-A63	HSK-A63
Number of tool pockets <sup>(8)</sup>		60	50/42	93	77	141/131	117/107	60	117	105
Max. tool length [mm]		—	—	—	—	—	—	365	365/180	365/180/550 <sup>(6)</sup>
► Horizontal disk arrangement (disk 1/disk 2/disk 3/extra-long)		—	—	—	—	—	—	365	365/180	365/180/550 <sup>(6)</sup>
► Vertical disk arrangement (front/rear) (disk 1/disk 2/disk 3/extra-long)		265	265	175/265/385	180/265/385	175/175/265/385	180/180/265/385	—	—	—
Max. tool diameter [mm]		60	72/86	60	72	60	72	70	70	70
► No diameter restrictions for adjacent pockets		60	72/86	60	72	60	72	70	70	70
► Diameter restrictions for adjacent pockets		135	135	135	135	135	135	170	170	170
Max. tool weight [kg]		3	8	3	8	3	8	8	8	8
Max. tilt moment around gripper groove [Nm]		3	12	3	12	3	12	12	12	12
PART										
Table diameter [mm]		380					570			
Max. table load [kg] (with/without pallet)		250/220					400/340			
Interference diameter [mm]		580					720			
CONNECTION RATINGS										
Power requirements at 3 AC 400 V/50 Hz [kVA]		at least 42					at least 42			
Compressed air [bar]		5					5			
WEIGHT (approx.)										
Total weight [kg] (without/with pallet changer)		13,400/15,400					15,300/17,500			
PROCESS STAGES										
Automatic pallet changer		2-fold					2-fold			
Pallet size [mm]		320x320					400x400			
Pallet change time according to VDI 2852 [s] <sup>(9)</sup>		12.0					12.0			
Tool magazine expansion		—		TM200; TM308; TM373 (HSK-A63)			TM200; TM308; TM373 (HSK-A63)			

<sup>(1)</sup> Depends on motorized spindle type<sup>(2)</sup> Can be achieved in combination with the dynamic package<sup>(3)</sup> Optional tool interfaces on request<sup>(4)</sup> Available only in combination with a SIEMENS machine control system<sup>(5)</sup> During a facing slide tool change, chip-to-chip time increases by 0.8 seconds<sup>(6)</sup> With restrictions in the work area



G550							G750						
800/1,020/970							1,000/1,100/1,175						
65/50/80 (90/50/90) <sup>(2)</sup>							60/50/75						
6/4.5/8 (8.5/4.5/14) <sup>(2)</sup>							4.5/3.0/7.5						
8/8/8							8/8/8						
0.006							0.006						
<0.0025							<0.003						
HSK-A63							HSK-A63						
70							70						
12,000							12,000						
40/52							40/52						
63.7/82.8							63.7/82.8						
2.8							3.3						
HSK-A63	HSK-A63	HSK-A63	HSK-A100	HSK-A100	HSK-A100	HSK-A100 <sup>(4)</sup>	HSK-A63	HSK-A63	HSK-A63	HSK-A100	HSK-A100	HSK-A100	HSK-A100 <sup>(4)</sup>
70	80	65	100	100	110	100	70	80	65	100	100	110	100
18,000/21,000	16,000	30,000	13,000	6,000/10,000	9,000	6,000	18,000/21,000	16,000	30,000	13,000	6,000/10,000	9,000	6,000
29/39	25/32	40/53	64/75	20/26	54/65	31.5/36	29/39	25/32	40/53	64/75	20/26	54/65	31.5/36
34.6/46.6	159/206	48/63	226/265	262/340	470/575	301/344	34.6/46.6	159/206	48/63	226/265	262/340	470/575	301/344
2.8	2.8	2.8	3.6	3.6	3.7	4.8 <sup>(5)</sup>	3.3	3.3	3.3	3.8	3.8	3.8	3.8
Single-disk~			Double-disk~				Double-disk~			Triple-disk~			
HSK-A63		HSK-A100		HSK-A63		HSK-A100		HSK-A63		HSK-A63		HSK-A100	
70		40		137		123		77		69		117	
465		500		465/280		465/280/700 <sup>(6)</sup>		500/260		500/260/750 <sup>(6)</sup>		—	
—		—		—		—		400/400		400/650 <sup>(6)</sup>		450/650 <sup>(6)</sup>	
70		118		70		70		118		118		68	
170		260		170		170		260		260		170	
8		22		8		8		22		22		12	
12		40		12		12		40		40		12	
770							950						
800/700							1,500 <sup>(7)</sup> /1,000						
900							1,280						
at least 42							at least 42						
5							5						
24,800/27,500							34,500/40,500						
2-fold							2-fold						
630x630							800x800						
13.0							16.0						
TM200; TM308; TM373 (HSK-A63)			TM180; TM250 (HSK-A100)				TM200; TM308; TM373 (HSK-A63)			TM180; TM250 (HSK-A100)			

<sup>(7)</sup> Higher values of up to 2,000 kg without pallet and up to 1,500 kg with pallet on request

<sup>(8)</sup> Number of tool pockets depends on machine configuration

<sup>(9)</sup> Time value without seating check system

G350, G550 and G750 also available as mill-turn machining centers

Subject to technical changes without prior notice

\* according to ISO230-2:2014







*The ideal automation  
solution for your project*

# AUTOMATION MADE BY GROB.

Our customers in small, medium, and large-scale production have been relying on GROB automation solutions for decades. The experience gained is fed straight into our automation solutions, making GROB a strong partner – for solutions with pallet or part storage systems to highly flexible, turn-key manufacturing lines. GROB automation technology allows you to flexibly adapt to capacities and guarantees pallet and part handling perfectly in tune with your needs.

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OUR AUTOMATION PORTFOLIO.

#PSS-R #PSS-T #PSS-L #GRC  
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## Automation overview

# THE IDEAL AUTOMATION SOLUTION FOR YOUR MACHINE.

GROB offers components manufactured in-house for the entire product portfolio for semi- to fully-automatic manufacturing with the highest quality standards.

### ROTARY PALLET STORAGE SYSTEM (PSS-R)

- Optimum entry into automated and highly efficient production



### LINEAR PALLET STORAGE SYSTEM (PSS-L)

- Highly automated, flexible manufacturing line for a wide variety of part machining processes



## PALLET CHANGER SYSTEM

- ⊕ Allows retooling during part machining



## PALLET TOWER STORAGE SYSTEM (PSS-T)

- ⊕ Expands the G-module to a flexible manufacturing cell



## GROB ROBOT CELL (GRC)

- ⊕ Maximum flexibility and customization in manufacturing











## *Moving into a digital future* **INDUSTRY 4.0.**

Transparency and connectivity – our modular GROB-NET<sup>4</sup>Industry web applications let you network and digitalize your production processes across all plants to make your production even more efficient. From planning to engineering to maintenance, GROB-NET<sup>4</sup>Industry combines relevant modules for increasing productivity and offers you an all-round package for modern production in the Industry 4.0 era.

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- ✦ GROB<sup>4</sup>TDX – transfer tool data automatically
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- ✦ GROB<sup>4</sup>COACH – programming, simulation and training



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- ✚ Available 24/7/360
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- ✚ We are right where our customers are



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From Bavaria to the world: Since our founding in 1926 in Munich, we as a global, family-managed company have been on a constant growth trajectory developing and manufacturing systems and machine tools. Our customers include the world's leading automotive manufacturers, their suppliers, and renowned companies from the aerospace, mechanical engineering, and other industries. With our production facilities in Germany, Brazil, the USA, China, Italy and India, as well as 14 worldwide service centers and sales branches, we are represented around the globe, ensuring the highest quality.

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