



# G-SERIES

5-AXIS UNIVERSAL MILL-TURN MACHINING CENTERS

**G350T**  
Generation 2

**G550T**  
Generation 2

**G750T**  
Generation 1

# PURE TECHNOLOGY IN THE SMALLEST SPACE



## Our 5-axis mill-turn machining centers

The G350T, G550T and G750T 5-axis mill-turn machining centers offer all customers in the machining sector practically limitless possibilities for the mill-turn of parts made of the most diverse materials. This universal machine series is set apart by **HIGH PRODUCTIVITY, OPTIMUM AVAILABILITY** and **EXCELLENT MAINTENANCE ACCESS**.

A compact design, maximum mill-turn performance, high visibility and optimized work area access are just some of the outstanding machine features that make GROB a dependable partner for your production facility. Thanks to extensive configuration options, our machining centers can be perfectly matched to your requirements.

## Unique machine concept

### HORIZONTAL SPINDLE POSITION

The horizontal spindle position permits the longest possible Z-travel path and optimum chip fall.

### MAXIMUM STABILITY

The unique arrangement of the three linear axes minimizes the distance between the guides and the machining point (TCP), lending the machine considerable stability.

### "TUNNEL" CONCEPT

The "tunnel" concept provides the basis – even with extremely long tools – for being able to swivel and machine the largest possible component within the work area without collision.

### LARGE SWIVEL RANGE

Three linear and two rotary axes permit 5-sided machining, a 5-axis simultaneous interpolation as well as GROB TRAORI Turning. With a swivel range of 230° in the A'-axis and 360° in the B'-axis, the GROB machines offer the greatest possible positioning flexibility.

## One concept for a broad range of industries

No matter whether aerospace, mechanical engineering, energy technology or die and mold industries – our 5-axis universal mill-turn machining centers cover a convincingly broad range of possible applications and provide the optimum solution for just about any material. Moreover, the universal machining centers are designed for automation solutions and, depending on the customer's requirement, are also available as pure milling machines in sizes G350, G550 and G750.

**Benefit from the process reliability, efficiency and durability of our machine concept.**



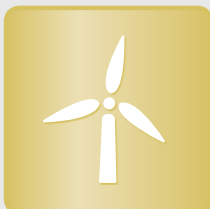
### AEROSPACE

Ideal for complex components where high cutting volumes have to be achieved



### MECHANICAL ENGINEERING

Individual machine configuration for optimized flexibility



### ENERGY TECHNOLOGY

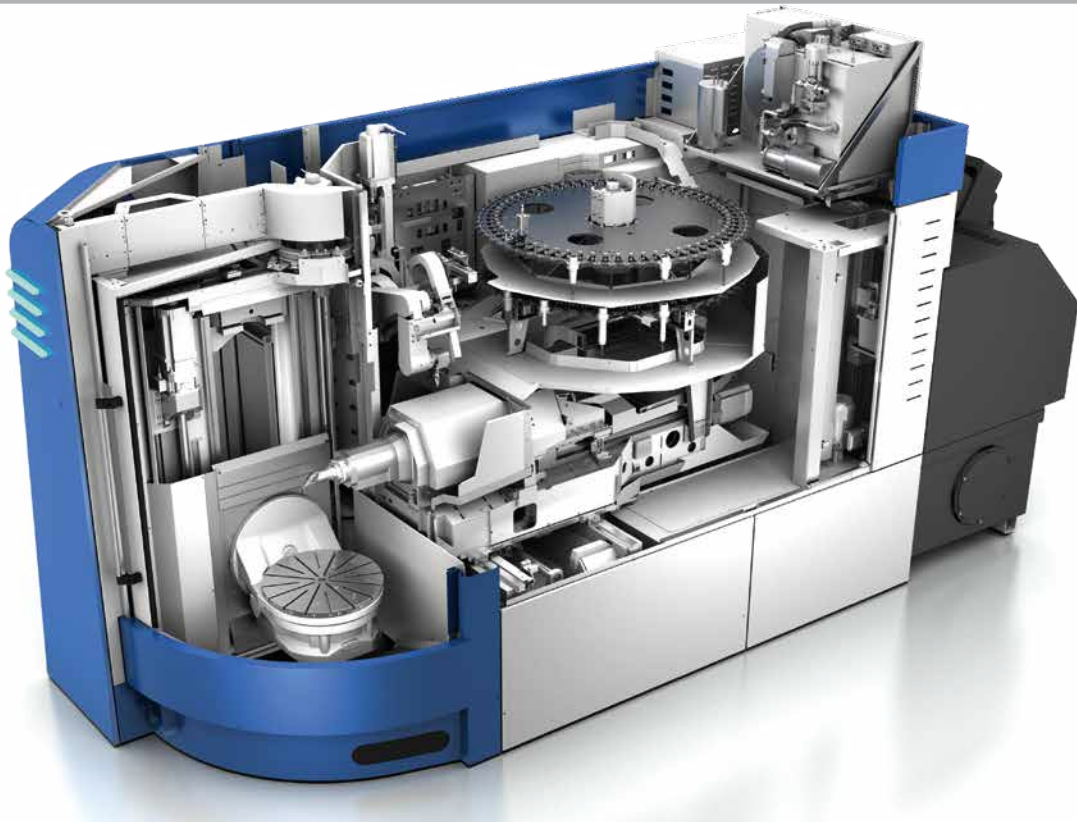
Precise machining results with outstanding machine stability

# MACHINE CONCEPT

## THE BENEFITS TO YOU at a glance

- ⊕ High productivity
- ⊕ Maintenance access
- ⊕ Optimized availability
- ⊕ Compact design

### Machine concept for a G350T | G550T – Generation 2



#### **HORIZONTAL 5-AXIS CONCEPT**

Three linear and two rotary axes permit 5-axis simultaneous machining

#### **MILL-TURN TABLE**

Almost limitless machining options due to a largest possible swivel range

#### **HORIZONTAL MOTORIZED SPINDLE**

For meeting the toughest cutting requirements

#### **MACHINE BED**

Intrinsically-stiff welded design for optimum machine rigidity

#### **ABSOLUTE POSITION ENCODERS**

Including air purge seal in all linear and rotary axes

#### **DISK-TYPE TOOL MAGAZINE**

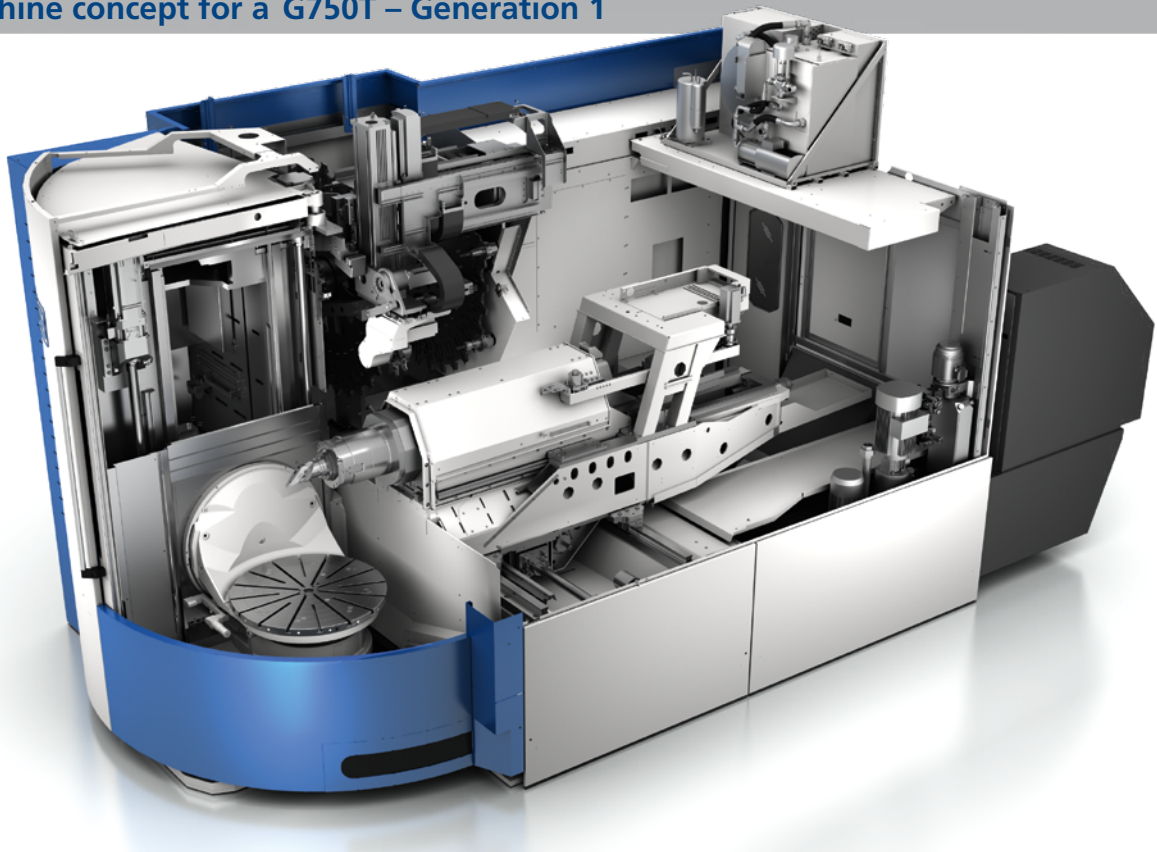
Fast tool change through the intelligent arrangement of magazine to motorized spindle

Illustrations may contain options



- ⊕ High visibility
- ⊕ Optimum accessibility
- ⊕ Flexible applications
- ⊕ Round-the-clock service

### Machine concept for a G750T – Generation 1



#### CHIP DISPOSAL

Uninterrupted part machining with chip disposal by a slat band conveyor

#### FLUID CABINET

Optimized accessibility and maintenance access without machine down-time

#### MAINTENANCE ACCESS

Large maintenance door for optimum access to the machine components

#### INTEGRATED CUTTING FLUID SYSTEM

Including internal cutting fluid supply (23 bar) and paper band filter

#### OVERHEAD MACHINING

Unique tilting rotary table concept allows free fall of chips

#### CONTROL SYSTEMS

Latest machine control systems from SIEMENS (840D sl)

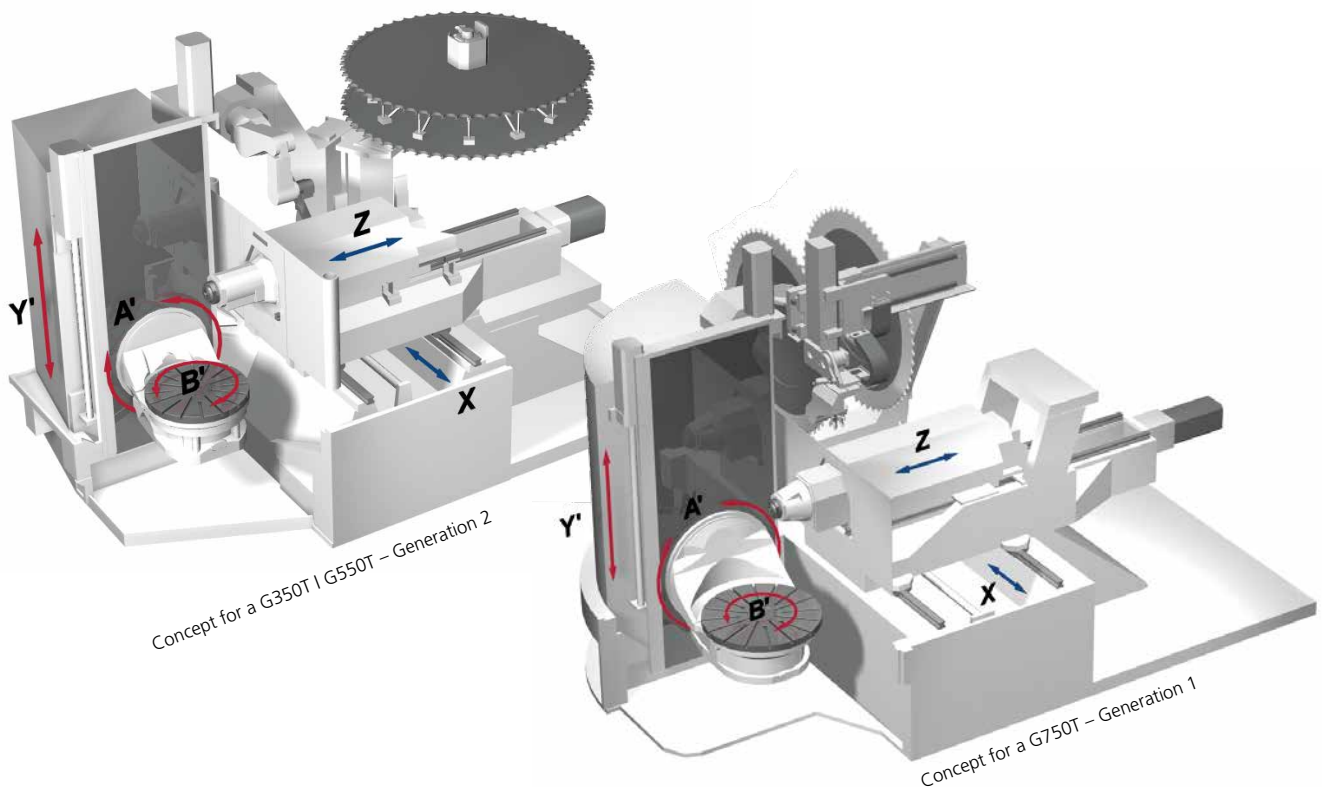
# MACHINE CONCEPT

## Maximum flexibility thanks to machining in every angular position

The machine's unique axis arrangement permits overhead machining, offering you almost limitless possibilities for part machining.

### Axis arrangement and drive concept

Three linear and two rotary axes permit 5-sided machining, as well as 5-axis simultaneous interpolation.



### The drive concept is based on

- two symmetrically-arranged ball screws and a weight compensation function on G550T | G750T in the Y'-axis
- dynamic, wear-free torque motors in the A'- and B'-axis

### THE BENEFITS TO YOU

- ⊕ Optimally designed machining point (TCP) for extreme rigidity
- ⊕ Longest Z-travel path in 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



## Overhead machining



### THE BENEFITS TO YOU

- ⊕ Optimum chip fall, preventing malfunction through chip remnants
- ⊕ No heat influx into the machine from chips left on part and clamping equipment
- ⊕ Simple cleaning of components ahead of the part change
- ⊕ No cutting fluid residues in the part

## 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 used, since the motorized spindle and tool can fully retract into the spindle shaft. In special cases where the part is larger than the maximum part contours shown here, a machining operation is often made possible through re-clamping and a special axis arrangement.



| Max. tool length [mm]                                                                             | G350T        | G550T        |              | G750T          |
|---------------------------------------------------------------------------------------------------|--------------|--------------|--------------|----------------|
| Tool interface                                                                                    | HSK-A/T63    | HSK-A/T63    | HSK-A/T100   | HSK-A/T100     |
| Single disk-type tool magazine<br>▶ Horizontal/vertical disk arrangement                          | 365/-        | 465/-        | 500/-        | -/650* (590)   |
| Double disk-type tool magazine<br>▶ Horizontal disk arrangement<br>(bottom /top /over both disks) | 365/180/550* | 465/280/700* | 500/260/750* | —              |
| ▶ Vertical disk arrangement<br>(advanced /returned)                                               | —            | —            | —            | 650* (590)/500 |

\* With restrictions in the work area

# MACHINE COMPONENTS

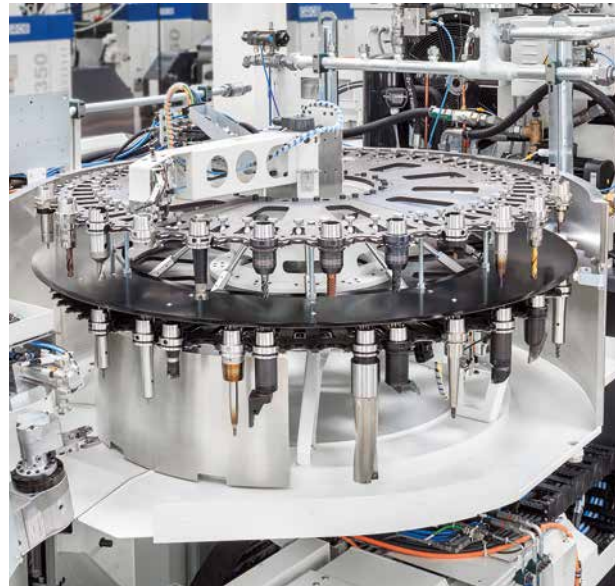
## Quality components and extensive functions included in the basic equipment

Motorized spindle and tool magazine form the heart of all universal machining centers. Designs optimally matched to the machine sizes can be individually combined to suit customer requirements.

**Motorized spindle**



**Tool magazine**



**Work area flushing and lighting**



**Internal cutting fluid supply (23 bar)**





## Centralization of all maintenance-relevant machine components

The central, ergonomic arrangement of the machine components guarantees optimal accessibility to fluid cabinet and electrical cabinet as well as easy access for preventive maintenance and inspection.

**Electrical cabinet**



**Fluid cabinet**



**Chip disposal and integrated cutting fluid system**



**Machine cooling unit**



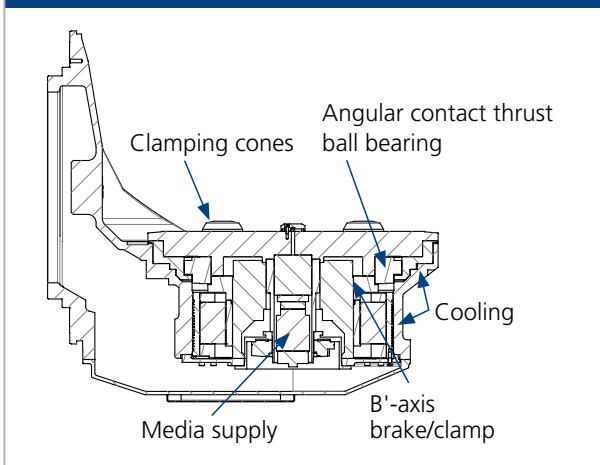
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# MACHINE COMPONENTS

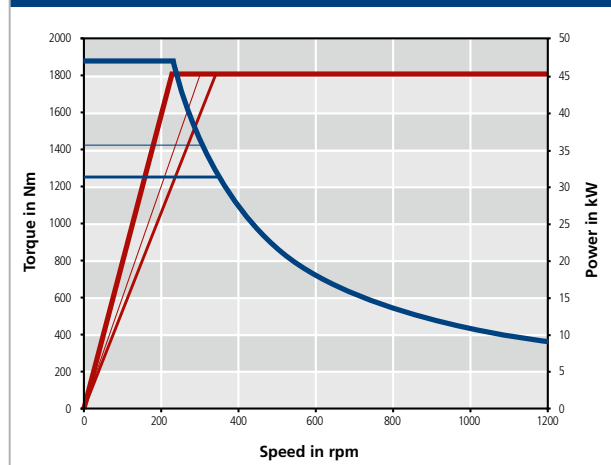
## Versatile machining options with powerful mill-turn tables

To provide you with the best possible support for meeting the requirements of your mill-turn operations, GROB offers tables, optimized specifically for mill-turn operations, with significantly higher maximum speeds than pure universal milling machining centers.

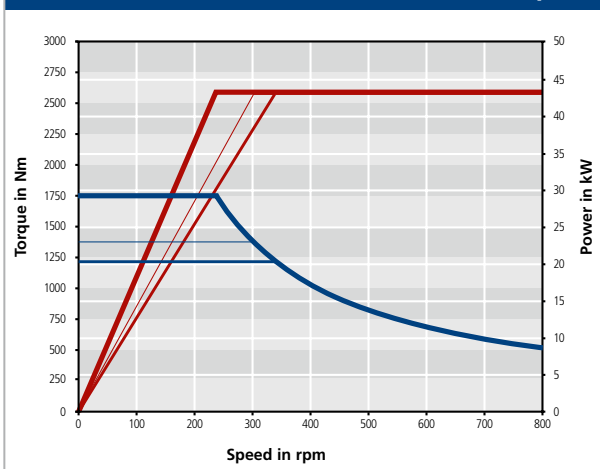
Clamp system for A'-/B'-axis



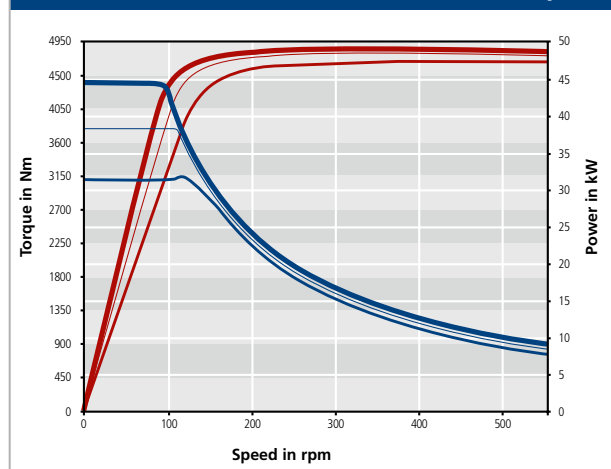
G350T ▶ Mill-turn table 1,420 Nm, 1,200 rpm



G550T ▶ Mill-turn table 1,380 Nm, 800 rpm



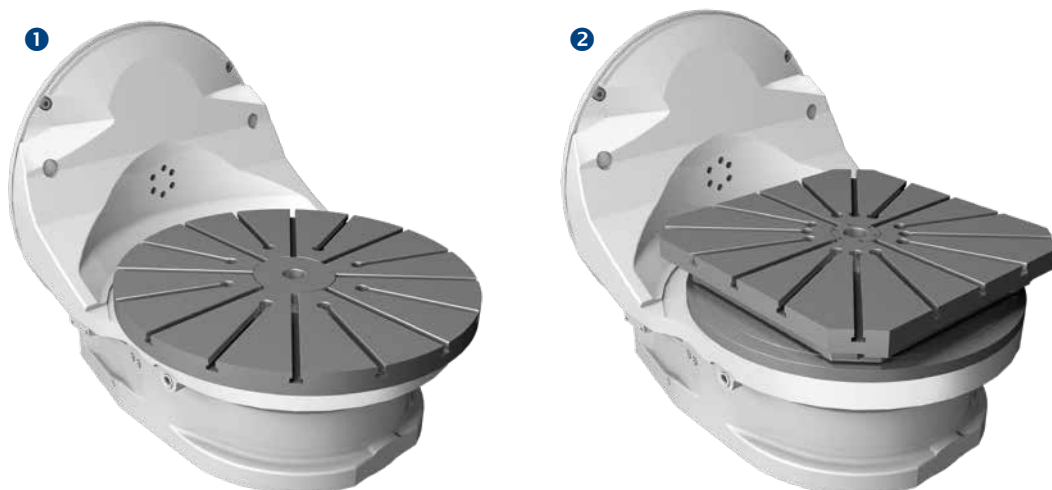
G750T ▶ Mill-turn table 3,740 Nm, 500 rpm



— power: 100 % duty cycle — power: 40 % duty cycle — power (max.) — torque: 100 % duty cycle — torque: 40 % duty cycle — torque (max.)



## Mill-turn table A'-/B'-axis



### General technical data on the mill-turn table A'-/B'-axis

|                                                           | G350T         | G550T         | G750T         |
|-----------------------------------------------------------|---------------|---------------|---------------|
| Swiveling angle A'-axis [°]                               | -185/+45      | -185/+45      | -180/+45      |
| Max. speed A'-axis [rpm]                                  | 35            | 25            | 20            |
| Type of drive A'-/B'-axis                                 | Torque motor  | Torque motor  | Torque motor  |
| Angle of rotation B'-axis [°]                             | n x 360       | n x 360       | n x 360       |
| Max. speed B'-axis [rpm]                                  | 1,200         | 800           | 500           |
| Max. torque B'-axis at 100 % / 40 % duty cycle [Nm]       | 1,250 / 1,420 | 1,200 / 1,380 | 3,110 / 3,740 |
| Max. holding torque B'-axis with additional clamping [Nm] | 1,500         | 2,500         | 6,000         |

#### 1 Mill-turn table with T-slots arranged in a star shape (standard)

|                                                             | G350T       | G550T       | G750T       |
|-------------------------------------------------------------|-------------|-------------|-------------|
| Aligning slot (number / width / quality)                    | 2 x 14 H7   | 4 x 14 H7   | 4 x 18 H7   |
| Clamping slot (number / width / quality)                    | 14 x 14 H12 | 12 x 14 H12 | 12 x 18 H12 |
| Table diameter [mm]                                         | 570         | 770         | 950         |
| Interference diameter [mm]                                  | 600         | 900         | 1,280       |
| Max. permissible loading weight incl. clamping fixture [kg] | 350         | 750         | 1,500       |

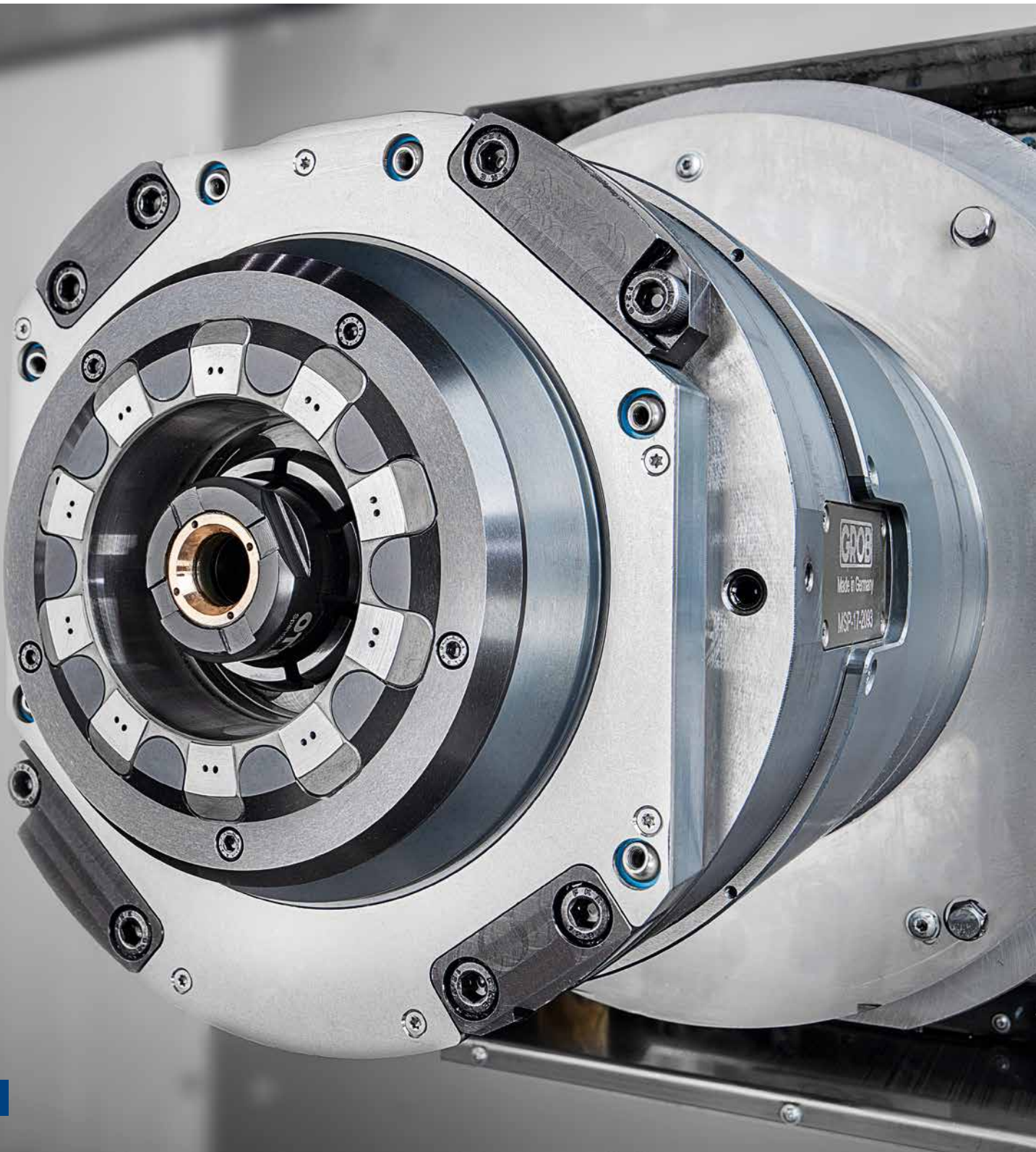
#### 2 Mill-turn table with pallet clamping system (option)

|                       | G350T     | G550T     | G750T     |
|-----------------------|-----------|-----------|-----------|
| Pallet size [mm]      | 400 x 400 | 630 x 630 | 800 x 800 |
| Max. pallet load [kg] | 270       | 600       | 1,000     |

## GROB motorized spindles

To optimize the process design of your mill-turn operations, a GROB mill-turn motorized spindle, developed specifically for this purpose, is available for the machine sizes G350T, G550T and G750T. These have the following optimized quality features:

- Shortest ramp-up times
- Good accessibility and maintenance
- Suitable for all standard cutting fluids
- Symmetrical interference range
- Best mechanical characteristics
- Durability
- Spindle-shaft arrest





## GROB Spindle Diagnostics (GSD)



GROB spindle diagnostics is a system that automatically monitors the condition of the motorized spindle (Condition Monitoring).

### THE BENEFITS TO YOU

- ⊕ Service life of the motorized spindles extended through identification of critical operating states
- ⊕ Process optimization / reduction of tool wear
- ⊕ Machine down-times avoided through scheduled maintenance

## Spindle-shaft arrest

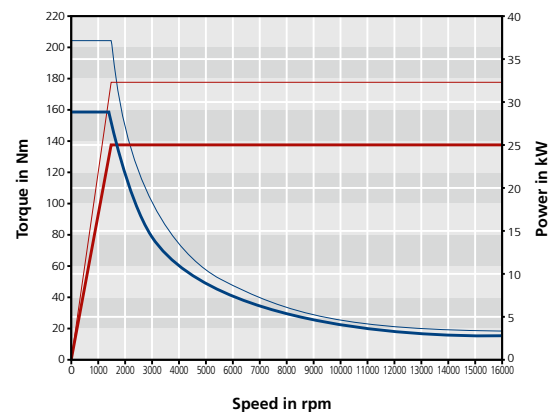
### Clamping disk

For mill-turn operations with HSK-T63, the spindle shaft is clamped by means of a clamping disk. This disk is permanently connected to the spindle shaft and forms the connection to the spindle housing by means of a hydraulic piston. This allows the tool to be positioned anywhere.

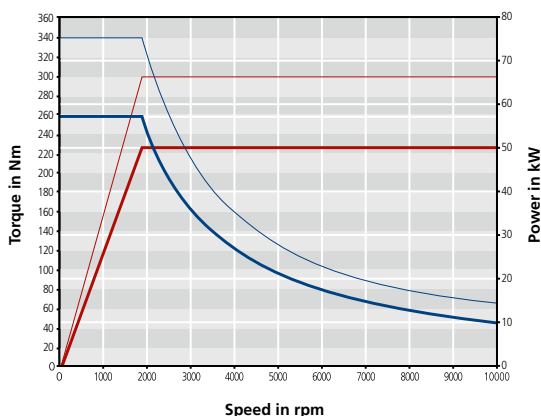
### Hirth coupling

An axially-acting, frontal gearing (Hirth gearing) is used to lock the motorized spindle shaft during mill-turn operations with HSK-T100. This achieves an exact radial positioning accuracy in 2° increments that is essential to precise turning with HSK-T100.

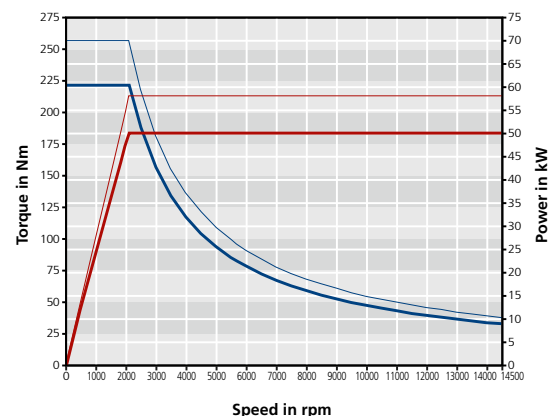
## Motorized spindle 206 Nm, 16,000 rpm



## Motorized spindle 340 Nm, 10,000 rpm



## Motorized spindle 261 Nm, 14,500 rpm



— power S1: 100 % duty cycle    — power S6: 40 % duty cycle    — torque S1: 100 % duty cycle    — torque S6: 40 % duty cycle

## Tool magazine - diverse combinations

GROB tool magazine technology is set apart by fast chip-to-chip times, a smaller space requirement and optimized accessibility.



Example of G350T – Generation 2

### Single disk-type tool magazine

- Tool change via highly dynamic tool changer arm with swiveling double gripper
- Loading/unloading during the machining operation
- Magazine tool disk can be accessed at any time
- An imminent tool change starts as soon as the tool magazine door is closed
- Horizontal magazine disk arrangement on G350T and G550T
- Vertical magazine disk arrangement on G750T



Example of G750T – Generation 1

### Double disk-type tool magazine

- Tool change via highly dynamic tool changer arm with swiveling double gripper
- Loading/unloading during the machining operation
- Tool magazine disks can be accessed at any time
- An imminent tool change starts as soon as the tool magazine door is closed
- Horizontally stacked magazine disks on G350T and G550T (disks coupled)
- Vertically adjacent magazine disks on G750T (disks can be rotated individually)

### DISK-TYPE TOOL MAGAZINE ◀ ▶ MACHINE • AVAILABILITY AT A GLANCE !

|                        | Single disk-type tool magazine |         |          | Double disk-type tool magazine |         |         |         |          |          |          |
|------------------------|--------------------------------|---------|----------|--------------------------------|---------|---------|---------|----------|----------|----------|
| Tool interface*        | HSK-A63                        | HSK-A63 | HSK-A100 | HSK-A63                        | HSK-A63 | HSK-A63 | HSK-A63 | HSK-A100 | HSK-A100 | HSK-A100 |
| Disk arrangement       | horiz.                         | horiz.  | horiz.   | horiz.                         | horiz.  | horiz.  | horiz.  | horiz.   | horiz.   | vert.    |
| Number of tool pockets | 60                             | 70      | 40       | 117                            | 105**   | 137     | 126**   | 77       | 69**     | 60       |
| <b>G350T</b>           | ●                              | —       | —        | ●                              | ●       | —       | —       | —        | —        | —        |
| <b>G550T</b>           | —                              | ●       | ●        | —                              | —       | ●       | ●       | ●        | ●        | —        |
| <b>G750T</b>           | —                              | —       | —        | —                              | —       | —       | —       | —        | —        | ●        |

\* Optional tool interfaces on request

\*\* With tool pockets for oversize tools



### Additional tool magazine TM (option)

The additional tool magazine increases the tool capacity of the basic machine.

- Blockwise setup of up to six HSK-A63 tools on TM200, TM309 and TM374 and up to five HSK-A100 tools on TM180 and TM251
- Additional tool magazine equipped with tools during the machining operation
- If the tool intended for the next machining operation is already in the disk-type tool magazine of the basic machine, the machining time is not impaired
- Tool and magazine management via an industrial control system (Beckhoff-TwinCAT) with screen and keyboard

| NUMBER OF TOOL POCKETS ▶ G350T |                |                        |                                                 |       |       |
|--------------------------------|----------------|------------------------|-------------------------------------------------|-------|-------|
| Basic machine                  |                |                        | Additional tool magazine TM                     |       |       |
| Motorized spindle              | Tool interface | Number of tool pockets | Number of tools of the basic machine and the TM |       |       |
| Single disk-type tool magazine |                |                        | TM200                                           | TM309 | TM374 |
| For all spindle types          | HSK-A/T63      | 60                     | 251                                             | 360   | 425   |
| Double disk-type tool magazine |                |                        | TM200                                           | TM309 | TM374 |
| For all spindle types          | HSK-A/T63      | 117                    | 311                                             | 420   | 485   |
|                                | HSK-A/T63      | 105*                   | 290                                             | 399   | 464   |

| NUMBER OF TOOL POCKETS ▶ G550T |            |      |       |       |       |       |       |
|--------------------------------|------------|------|-------|-------|-------|-------|-------|
| Single disk-type tool magazine |            |      | TM200 | TM309 | TM374 | TM180 | TM251 |
| For all spindle types          | HSK-A/T63  | 70   | 261   | 370   | 435   | —     | —     |
|                                | HSK-A/T100 | 40   | —     | —     | —     | 211   | 282   |
| Double disk-type tool magazine |            |      | TM200 | TM309 | TM374 | TM180 | TM251 |
| For all spindle types          | HSK-A/T63  | 137  | 331   | 440   | 505   | —     | —     |
|                                | HSK-A/T63  | 126* | 308   | 417   | 482   | —     | —     |
|                                | HSK-A/T100 | 77   | —     | —     | —     | 251   | 322   |
|                                | HSK-A/T100 | 69*  | —     | —     | —     | 234   | 305   |

| NUMBER OF TOOL POCKETS ▶ G750T |            |    |       |
|--------------------------------|------------|----|-------|
| Double disk-type tool magazine |            |    | TM145 |
| 10,000 rpm                     | HSK-A/T100 | 60 | 200   |

\* Facility to store oversize tools over both magazine disks due to double assignment

# MACHINE COMPONENTS

## 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 through to the NC simulation – is now digitally mapped on the GROB<sup>4</sup>Pilot control system itself.



### FEATURES

- 3D display of parts and their clampings
- Read out of dimensions or product characteristics (PMI) from the 3D model itself
- Touch keyboard within the display
- HTML5-compliant web browser
- Custom user interfaces
- Activation of remote maintenance via switch

### THE BENEFITS TO YOU

- ⊕ Enhanced user comfort with simplified and intuitive machine operation
- ⊕ CAD/CAM programming on the machine itself
- ⊕ Access to the GROB-NET<sup>4</sup>Industry platform
- ⊕ Expanded applications for increased efficiency
- ⊕ Permits paperless production
- ⊕ Time saving by use of applications parallel to machine operation

| HARDWARE                                                                                                                                                                                                                                                             | SOFTWARE                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• 24" multi-touch display</li> <li>• Illuminated keys with innovative color feedback system</li> <li>• Trackball with three keys for controlling the mouse</li> <li>• 3D SpaceMouse®</li> <li>• Two USB interfaces</li> </ul> | <ul style="list-style-type: none"> <li>• Integrated CAD/CAM system</li> <li>• Simulation viewer</li> <li>• High connectivity of web browser and PDF viewer</li> <li>• Digital operating/programming instructions</li> </ul> |

Example illustration



## Your GROB<sup>4</sup>Pilot Advanced Package (option)

### Multi-functional feed override rotary switch



#### Integrated start/stop function

NC start by pulling and NC stop by pushing the feed override rotary switch.

- ⊕ Allows the operator to concentrate fully on the process



#### Vibration feedback

Short vibration of the feed override rotary switch at 100 %.

- ⊕ Information communicated without the operator having to change the point of focus



#### Rapid travel single block

Single block stop only if a rapid travel movement follows a feed motion.

Critical movement enabled only from the 0 % position of the feed override rotary switch.

- ⊕ Time-saving running-in of non-critical program passages; maximum protection in critical situations via stop



#### Rapid travel reduction

Activation of rapid travel speed reduction to a preset % value at the touch of a button without program reset.

- ⊕ Intuitive application and increased safety during run-in



Feed override rotary switch

Joystick for axis movement

### Joystick for axis movement

Direction of axis and axis speed can be intuitively controlled with just one input device.

- ⊕ Direction of axis keys can no longer be confused

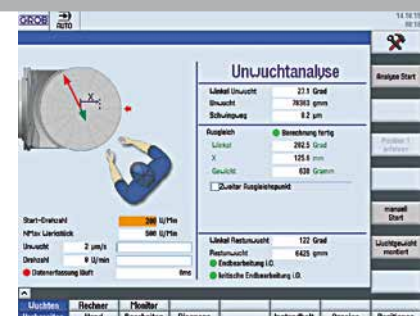


### Imbalance analysis

To analyze the imbalance of asymmetrical tools, GROB provides a balancing cycle for mill-turn operations.

The parameters for the imbalance, for the vibration displacement and for the imbalance angles are recorded.

From these results, the counterweight, position and angle for high-precision mill-turn operations are automatically calculated.



# ACCESSORIES



## High-pressure cutting fluid system

A **23 bar high-pressure cutting fluid pump** with On/Off functionality is integrated in the standard version for generating the cutting fluid high pressure. To meet higher pressure requirements, the following infinitely variable pressure ranges can be selected:

**5–40 bar | 10–80 bar**

Mounted on the cutting fluid tank

## Cooling unit for cutting fluid

External continuous cooler for cooling the cutting fluid

- ▶ Available for all three cutting fluid high-pressure systems
- ▶ The cooling unit is recommended for the 10–80 bar variant



## Decentralized work area mist collecting system

An emulsion mist separator with the following components is available for keeping the work area clean:

- Integrated pre-separator (G550T only)
- Regenerative filtration stage
- Integrated post-filter stage (G550T only)

The adjustable suction power is optimally modified to the particular machine status (cutting, tool/part change).

## Adjustable suction power

**G350T** ▶ 800 m<sup>3</sup>/h; **G550T** ▶ 800 m<sup>3</sup>/h; **G750T** ▶ 2,000 m<sup>3</sup>/h

Mounted in an easily accessible place in the maintenance area (G350T) or at the rear of the machine roof (G550T, G750T)



## Oil skimmer

The oil skimmer is used to remove hydraulic and/or lubricating oil from the cutting fluid surface. This keeps the cutting fluid as clean as possible.

Included components:

- Belt drive
- Wiper
- Collecting vessel with level switch

Mounted to the cutting fluid tank



## Tool cleaning device

- Brushing and air cleaning of the conical and flat surfaces of the tool interface during the machining operation
- Combined, GROB-patented brushing/blow-off device

Mounted to tool magazine



### Tool coding

- Allows data to flow between tool and machine control system
- Shorter tooling times
- Write-read unit for tools with tool coding
- Errors when inputting the tool data avoided

Mounted on the tool insert location



### Laser measurement system for mill-turn tools

- Momentary, mechanical tool measurement of turning tools
- Contactless, optical tool monitoring/measurement of rotating tools (e.g. milling cutters, drills)
- Measurement and monitoring of the following tool parameters:
  - ▶ Tool length, tool diameter, tool breakage, tool wear, tool cutting edge status

Mounted on mill-turn table



### Electromechanical tool breakage detection device

- Tool breakage detection via a tactile tool breakage detection device
- Monitoring during machining
- Tool breakage detection possible from a length of 100 mm

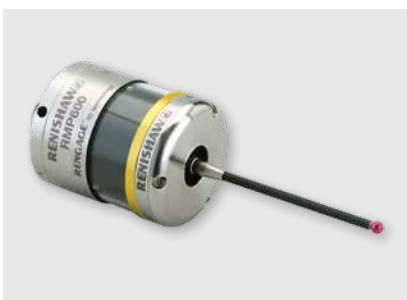
Mounted in the tool magazine at the tool transfer point, between motorized spindle and tool magazine disk



### SIEMENS hand-held controller

Additional option for tool data input by connecting the controller to the tool loading station

- Electronic handwheel
- Keys for selecting the axis directions, feed, rapid travel, emergency stop and for acknowledging axis movements
- Practical "Plug & Play" functionality



### Touch probe

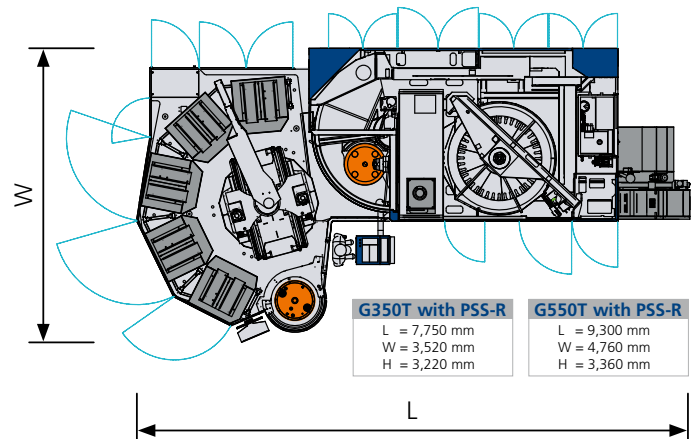
- Broad range of applications:
  - Aligning and measuring parts or clamping fixtures;
  - setting zero and reference points for downstream machining;
  - machine kinematics measurement (optional)
- Touch probe including data transmission with infrared or radio
- Non-machining time for tooling and measuring reduced
- Higher achievable part accuracy

## Customized automation solutions

For decades now, our customers in large-scale production have been relying on GROB automation solutions. The experience garnered is fed straight into our automation solutions, making GROB a strong partner – for solutions with part storage systems through to highly-flexible manufacturing systems.

### GROB rotary pallet storage system (PSS-R)

The GROB rotary pallet storage system expands the G-module to a flexible production cell to offer optimum entry to automated, highly efficient production.



### FEATURES

- Three design versions per machine size
  - G350T (PSS-R5, PSS-R10, PSS-R15)
  - G550T (PSS-R5, PSS-R10, PSS-R13)
- Design versions with up to 15 pallet storage positions at one to three levels
- Fast double change when using two pallets thanks to an innovative pallet changing device
- Visualization and organization of production orders with flexible production control software
- Latest production control software with 19-inch touch screen panel
- Easily accessible setup station arranged next to the machine control panel (can be rotated and locked)
- High-precision setup station for G350T and G550T for positioning your parts (optional)

### THE BENEFITS TO YOU

- ⊕ Complete solution from a single source in a standardized design
- ⊕ Cost-effective production through increased machine utilization
- ⊕ Permits a longer, unmanned production period
- ⊕ Optimized view into the work area and towards the pallet storage positions
- ⊕ Parallel loading and unloading of the pallets from the PSS-R during the machining operation
- ⊕ High storage capacity with small footprint
- ⊕ Pallet storage solution for small initial investment
- ⊕ Simple retrofit on existing machines\*

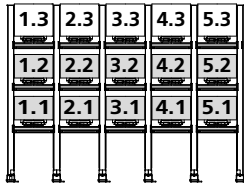
\* If machine is prepared for palletizing



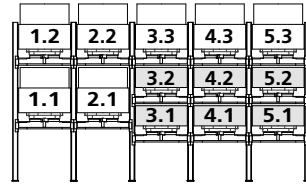
## Pallet storage racking

### Arrangement of the storage positions

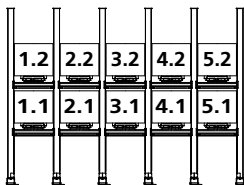
#### G350T ▶ PSS-R15



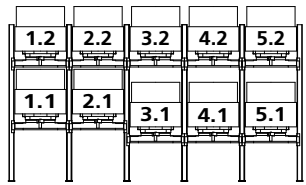
#### G550T ▶ PSS-R13\*



#### G350T ▶ PSS-R10 / PSS-R5



#### G550T ▶ PSS-R10\* / PSS-R5\*



- Storing of pallets containing rough and finished parts, as well as fixtures

## Production control software

The production control software controls and visualizes the flexible production cell. It therefore facilitates automatic, low-staff production and is set apart by the following functionalities:

- Overview of the state of the flexible production cell
- Autonomous part management
- Changing the priority of individual orders
- Changing the machining sequence of parts
- Assignment of the process sheet to one or multiple pallets
- Automatic, repeat machining of a part on a specified pallet through to a defined final condition
- Organization of the pallets and parts, the pallet change and of the requisite process steps.

## PALLET CHANGING DEVICE

- Pallet changing device with two pallet forks arranged opposite
- For the storage and retrieval of pallets from the setup station to and from the pallet storage racking and for loading and unloading the machining center
- Determination of the part weight by the pallet changing device

## SETUP STATION

- Setting up the clamping fixture/pallets with parts
- Storage and retrieval of pallets
- Ergonomic working height and optimum accessibility
- Manual rotation and locking of the setup station table
- Control panel for setup station close to the setup station door

| TECHNICAL DATA                                             | G350T–Generation 2                                                                         |         |         | G550T–Generation 2                                                                         |         |         |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------|---------|--------------------------------------------------------------------------------------------|---------|---------|
| DESIGN VERSIONS PSS-R                                      | PSS-R5                                                                                     | PSS-R10 | PSS-R15 | PSS-R5                                                                                     | PSS-R10 | PSS-R13 |
| <b>Part data</b>                                           |                                                                                            |         |         |                                                                                            |         |         |
| Max. part dimensions [mm]                                  | <input type="checkbox"/> Type 1 ▶ Ø 600x500<br><input type="checkbox"/> Type 2 ▶ Ø 600x400 |         |         | <input type="checkbox"/> Type 1 ▶ Ø 900x725<br><input type="checkbox"/> Type 2 ▶ Ø 900x350 |         |         |
| Max. part weight [kg]                                      |                                                                                            |         |         |                                                                                            |         |         |
| ▶ when one pallet is changed individually                  | 380                                                                                        | 380     | 380     | 700                                                                                        | 700     | 700     |
| ▶ when two pallets are changed at the same time            | 230                                                                                        | 230     | 230     | 250                                                                                        | 250     | 250     |
| <b>Pallet data</b>                                         |                                                                                            |         |         |                                                                                            |         |         |
| Maximum pallet size [mm]                                   | 400x400                                                                                    | 400x400 | 400x400 | 630x630                                                                                    | 630x630 | 630x630 |
| Maximum number of pallets in the system                    | 6                                                                                          | 11      | 16      | 6                                                                                          | 11      | 14      |
| Total number of pallet storage positions                   | 5                                                                                          | 10      | 15      | 5                                                                                          | 10      | 13      |
| Number of storage positions at a part height of 500/365 mm | 5/–                                                                                        | 10/–    | 5/10    | –                                                                                          | –       | –       |
| Number of storage positions at a part height of 785/350 mm | –                                                                                          | –       | –       | 5/–                                                                                        | 10/–    | 7/6     |
| Maximum interference diameter [mm]                         | 600                                                                                        | 600     | 600     | 900                                                                                        | 900     | 900     |
| Pallet change time [s] for 1 or 2 pallets at the same time | Upon request                                                                               |         |         | 34/22                                                                                      | 34/22   | 34/22   |

\* Ø 850 mm from a part height of 430 mm

# AUTOMATION TECHNOLOGY

## Example of a customized solution for part handling

We work with our customers to develop a concept for fully-automated part handling to suit their particular requirements. All components, such as robot arm, robot cell, buffer storage system and measuring machine are matched to the universal machining center required and to the specified output.



### Equipment features of the illustrated design:

- Universal machining center G350
- Robot arm for part handling in an automated robot cell
- GROB<sup>4</sup>Pilot control panel
- Rotary table with driven steady rest
- Cooling unit for cutting fluid

## AUTOMATION ◀▶ MACHINE • AVAILABILITY AT A GLANCE !

|              | GROB rotary pallet storage system (PSS-R)       | GROB linear pallet storage system (PSS-L) | Part handling |
|--------------|-------------------------------------------------|-------------------------------------------|---------------|
| <b>G350T</b> | 5 / 10 / 15 storage locations + 1 setup station | individual                                | individual    |
| <b>G550T</b> | 5 / 10 / 13 storage locations + 1 setup station | individual                                | individual    |
| <b>G750T</b> | individual                                      | individual                                | individual    |



## Customer-specific automation solution

The tougher requirements in the automation sector require an individual solution for optimized flexibility and efficiency that is tailored to the customer's specific needs.

GROB offers solutions from various pallet storage systems to individual part handling through to flexible manufacturing systems with multiple machines and centralized tool supply.

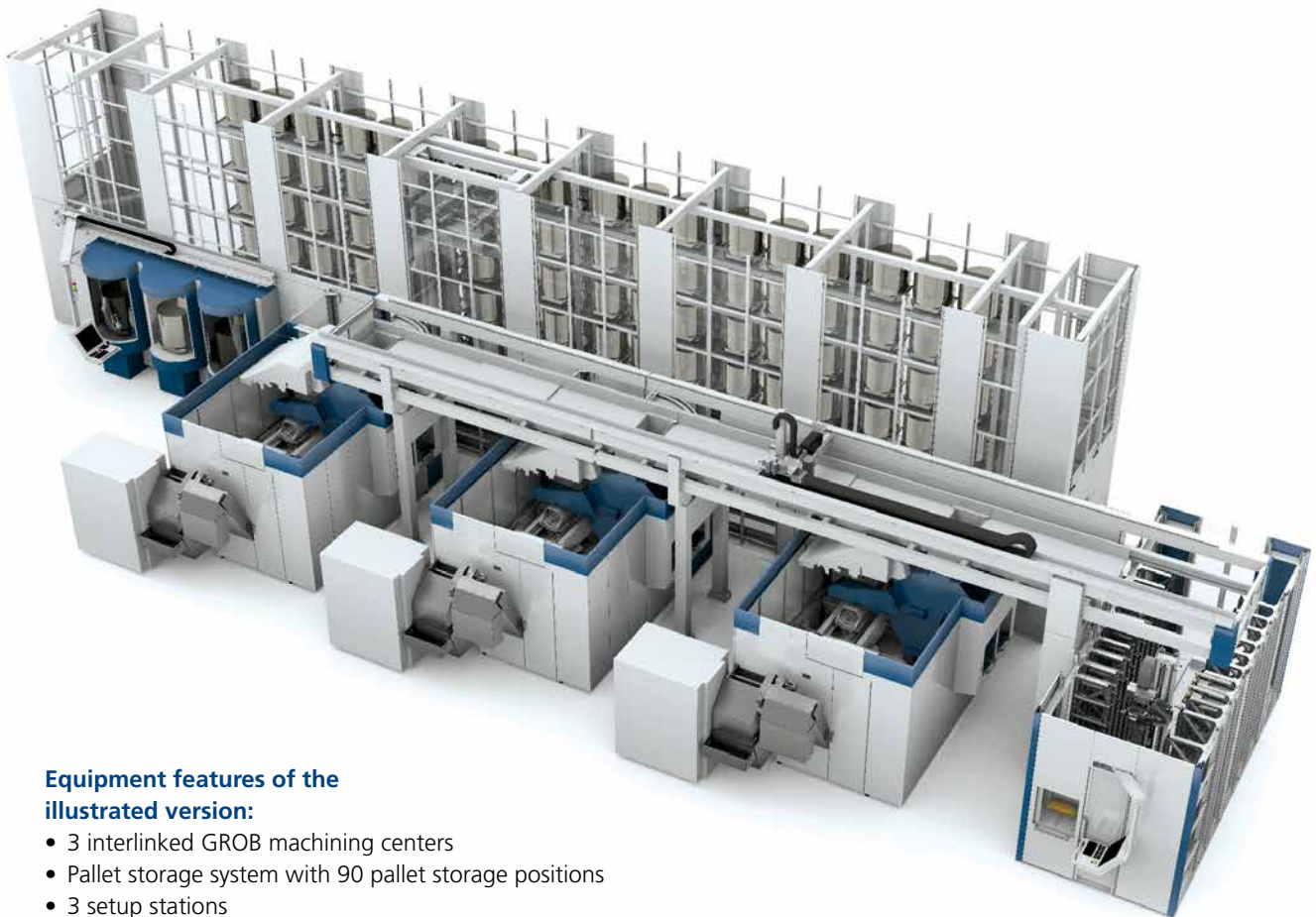
### ► Flexible manufacturing system

In the full version, both the tool flow and the part flow can be automated.

The illustration shows a version of a flexible manufacturing system with a tool buffer storage rack.

The robot can interchange tools in the disk-type tool magazines of individual machines.

The part flow is managed by a pallet changing device for pallet handling, to which three setup stations, one high-rack storage system with 90 pallet storage positions and the machining units are connected.



#### Equipment features of the illustrated version:

- 3 interlinked GROB machining centers
- Pallet storage system with 90 pallet storage positions
- 3 setup stations
- Automatic tool supply with 1,000 tools
- Pallet handling via a pallet changing device
- Space requirement approx. 240 m<sup>2</sup>

## Optimizing machine kinematics

Every machine tool has slight system-related geometric deviations in the rotary axes. These individual, minimal deviations add up to a volumetric geometric deviation within the work area. The following solutions for optimizing machine kinematics are able to be analyzed and minimized.



### GROB swivel axis calibration (GSC)

The GROB swivel axis calibration (GSC) function achieves highly-precise machine calibration and replaces control-specific kinematic cycles, such as CYCLE996.

#### Mode of operation

- Determination of the current kinematics via a 3D touch probe and a high-precision gauge ball
- Display of measured values for analyzing the geometric deviation
- Optimization of swivel accuracy based on the measurement results

#### Special features

- GSC delivers a much higher level of accuracy than standard calibration cycles (e.g. CYCLE996)
- Improved accuracy even without using swivel cycles



## GROB kinematic measurement inspection equipment set

In addition to the kinematic measuring cycles, all measuring instruments are supplied in an inspection equipment set.

### Included components

- Two carbon magnetic bases with high-precision gauge ball for screwing in
- Parallel gauge block
- Magnetic foot with switchable permanent magnets
- Precision lever-type dial indicator, scale division value: 0.002 mm
- High-precision measuring ring and other accessories



## Interpolation turning PLUS

Interpolation turning PLUS in the form of a pure software solution enables any turning operations on a universal machining center, including turning operations that are not coaxial to the B'-axis.

Interpolation turning PLUS simulates a diameter axis (transverse slide) through the simultaneous interpolation of X- and Y'-axis and motorized spindle. The programming and handling correspond to that of a CNC turning machines.

Interpolation turning PLUS can also be combined with a spindle operation.

For example, a chamfer at a reamed hole can be machined by interpolation turning and line-bored using the same tool in the same operation of the cylindrical part. As a result, the speed limitation via interpolation turning applies only for machining the chamfer – when machining the cylinder, the usual speeds are possible.

## THE BENEFITS TO YOU

- ⊕ Fast delivery of prototypes and small series, since standard turning tools can be used and long waiting times for special tooling can often be avoided.
- ⊕ Shortest tool setup times, since almost all special tooling can be replaced by standard turning tools.
- ⊕ Significant cycle time reduction in certain cases, where several step drills can be replaced by one turning tool, thereby saving on tool changes.
- ⊕ Optimized machine availability and productivity, since interpolation turning PLUS as a backup can compensate for missing special tooling.



## Energy efficiency package

For efficient use of energy by reducing the power consumption of the universal machining centers with SIEMENS control system.

### Package content

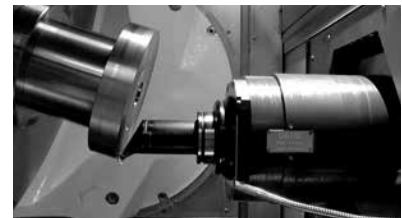
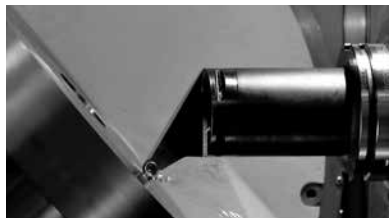
- Shut-down strategies for machine cooling units, chip conveyor and various fans
- Optimized control strategy for motorized spindle and axis drive
- Timed shut-down for the machine

# SOFTWARE OPTIONS

## 5-axis concept with largest possible swivel range

The universal mill-turn machining centers from GROB are optimally designed, with their 5-axis concept and resultant largest possible rotary table swivel range, for GROB TRAORI Turning.

## GROB TRAORI TURNING



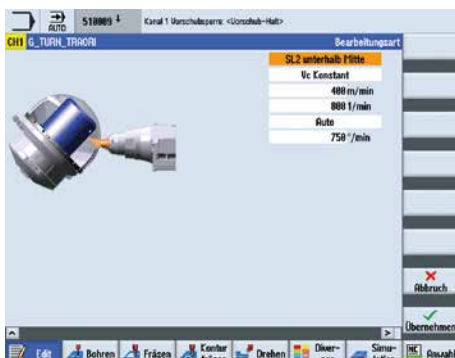
GROB TRAORI Turning leads to a dynamic alignment of the tool cutting edge to the contour of the turned part in consideration of tool length and tool radius. It is achieved through simultaneous interpolation of the GROB universal machining center's linear and rotary axes.

Based on SIEMENS TRAORI function, GROB has developed an easy-to-understand and very user-friendly turning cycle with extended 5-axis functionality containing figures and dialogues.

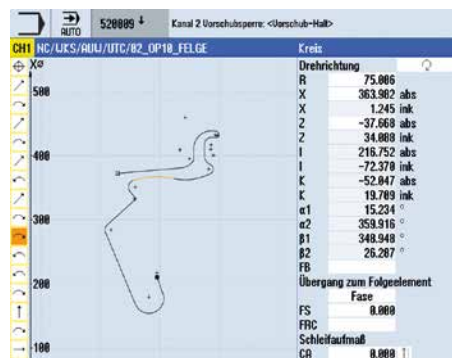
This results in convincing advantages for the customer, for example a significantly longer tool life due to more efficient usage of the tool cutting edge as well as the usage of short tools in case of internal and relief cut turning.

### Programming

- Simple programming via the machine control system
- Contour calculator and A'-axis position
- Automatic cutting edge calculation coupled to machining position (top/bottom)



GROB TRAORI turning cycle



SIEMENS: Cycle for contour turning

## THE BENEFITS TO YOU

- + Standardized, short tools
- + Suitable for all cutting edge types
- + Undercut machining
- + Cost saving
- + Up to three times longer tool service life thanks to fully utilizable tool cutting edge



Gear hobbing machining situation

## Gearing cycles in general

- Axes coupled as on a gear wheel milling machine
- Programming and handling as per a hobbing machine
- Individual correction option (e.g. crowned, tapered, etc.)
- Block entry option at an arbitrary cut (e.g. finish cut)

## Gear hobbing

- For external gearing with hobbing machines
- Ideal for gearing on shafts
- Frontal part access not required

## Power skiving

- For external and internal gearing with hob peeling machines
- Frontal part access required

### OPTION PACKAGE ◀ ▶ MACHINE • AVAILABILITY AT A GLANCE !

|       | GROB<br>swivel axis calibration<br>(GSC) | GROB<br>inspection<br>equipment set | Interpolation<br>turning<br>PLUS | Energy<br>efficiency<br>package | Gear<br>hobbing | Power<br>skiving |
|-------|------------------------------------------|-------------------------------------|----------------------------------|---------------------------------|-----------------|------------------|
| G350T | •                                        | •                                   | •                                | •                               | •               | •                |
| G550T | •                                        | •                                   | •                                | •                               | •               | •                |
| G750T | •                                        | •                                   | •                                | •                               | •               | •                |

# SOFTWARE OPTIONS

## GROB-NET<sup>4</sup>Industry

Your applications for global transparency throughout the production process

### GROB<sup>4</sup>Line



#### The machine in sight via smartphone

- Proactive messages from the machine and notification in case of machine shutdown
- Mobile access to the machines

### GROB<sup>4</sup>Analyze



#### Feedback from the machine for the CIP process

- Visualization of stored machine states
- User-friendly data preparation for the improvement process

### GROB<sup>4</sup>Coach



#### Programming, simulation, training

- Programming of part programs
- Effective, PC-supported training software for CNC novices and experts

### GROB<sup>4</sup>Simulate



#### Complex processes and parts simply simulated

- Avoidance of collisions
- Simulation of the actual NC code and the mean values

### GROB<sup>4</sup>Interface



#### Easy route to machine communication

- Data transfer straight from the machine control system
- Information retrieval without additional hardware having to be installed

### GROB<sup>4</sup>Connect



#### Connection from the real world to the ERP system

- Coupling the machine to the ERP system
- Transmission of all production-relevant data to machine operators via web technology

### GROB<sup>4</sup>Pilot



#### Multi-functional, interactive machine operation

- All production processes amalgamated on one station
- Powerful hardware that is easy to handle

### GROB<sup>4</sup>Automation



#### Intuitive production control software for unmanned operation

- Support of unmanned shifts by simple operation
- Autonomous part management

### GROB<sup>4</sup>Track



#### Machine axes in view at all times

- Machine state monitoring
- Reduction of unscheduled machine downtimes

### GROB<sup>4</sup>Care



#### Service and maintenance portal

- Convenient procurement of spare parts via an online portal without great effort
- Clarification of part availability and display of customer-specific prices

# TYPICAL MACHINING OPERATIONS

## Typical part machining operations

### DISTRIBUTOR BASE



**Machining unit:** G550 | Casting allowance up to 10 mm

|                |                                                   |                   |            |
|----------------|---------------------------------------------------|-------------------|------------|
| Industry       | <b>Food industry</b>                              | Motorized spindle | 14,500 rpm |
| Material       | Duplex stainless steel – X2CrNiMoN22-5-3 (1.4462) | Power             | 58 kW      |
| Machining time | 5.5 hours                                         | Torque            | 261 Nm     |

**Operations:** Complete machining: milling, turning, drilling, honing of food-safe stainless steels  
**Special features:** Extreme machine stability; gun drilling without restriction for the maximum part (20xØ)

### GEAR WHEEL



**Machining unit:** G550T | Dimensions of raw material [mm]: Ø 250 x 50

|                |                                       |                   |            |
|----------------|---------------------------------------|-------------------|------------|
| Industry       | <b>Mechanical engineering</b>         | Motorized spindle | 10,000 rpm |
| Material       | Alloyed heat-treated steel – 42CrMoV5 | Power             | 66 kW      |
| Machining time | 15 minutes                            | Torque            | 340 Nm     |

**Operations:** Machining, turning, hobbing  
**Special feature:** Gearing by hobbing

### ALUMINUM RIMS



**Machining unit:** G550T | Dimensions of raw material [mm]: Ø 500 x 250

|                |                   |                   |            |
|----------------|-------------------|-------------------|------------|
| Industry       | <b>Automotive</b> | Motorized spindle | 10,000 rpm |
| Material       | Aluminum – F7005  | Power             | 66 kW      |
| Machining time | 10 hours          | Torque            | 340 Nm     |

**Operations:** Milling, turning, GROB TRAORI turning  
**Special feature:** Machining of the outer and inner contour in one clamping by GROB TRAORI turning (high concentricity)

### FRANCIS TURBINE WHEEL



**Machining unit:** G750T | Dimensions of raw material [mm]: Ø 800 x 250

|                |                                               |                   |            |
|----------------|-----------------------------------------------|-------------------|------------|
| Industry       | <b>Energy technology</b>                      | Motorized spindle | 10,000 rpm |
| Material       | Chromium-nickel steel – X3CrNiMo13-4 (1.4313) | Power             | 66 kW      |
| Machining time | 90 hours                                      | Torque            | 340 Nm     |

**Operations:** Milling, turning  
**Special features:** Use of long tools despite maximum component size; Optimum chip fall due to horizontal spindle position and overhead machining

# TYPICAL MACHINING OPERATIONS



## Performance examples of mill-turn motorized spindles

| Motorized spindle 16,000 rpm (206 Nm)/HSK-A/T63<br>Machining on a G350T |                   |                  |  |
|-------------------------------------------------------------------------|-------------------|------------------|--|
| Machining type / tool                                                   |                   | Steel – 16MnCrS5 |  |
| Drilling<br>Ø 60 mm                                                     | $v_c = 160$       | $n = 849$        |  |
|                                                                         | $f_u = 0.18$      | $v_f = 153$      |  |
|                                                                         | $a_p/a_e = 50/60$ | $Q = 459$        |  |
| Tapping<br>M36                                                          | $v_c = 13$        | $n = 115$        |  |
|                                                                         | $f_u = 4$         | $v_f = 460$      |  |
| Milling with cutting head<br>Ø 100 mm<br>z = 12                         | $v_c = 330$       | $n = 1,050$      |  |
|                                                                         | $f_z = 0.18$      | $v_f = 2,268$    |  |
|                                                                         | $a_p/a_e = 3/95$  | $Q = 646$        |  |

| Motorized spindle 10,000 rpm (340 Nm)/HSK-A/T100<br>Machining on a G750T |              |                  |  |
|--------------------------------------------------------------------------|--------------|------------------|--|
| Machining type / tool                                                    |              | Steel – 16MnCrS5 |  |
| Drilling with full drill<br>Ø 74 mm                                      | $v_c = 225$  | $n = 968$        |  |
|                                                                          | $f_u = 0.18$ | $v_f = 174$      |  |
|                                                                          | $a_p = 74$   |                  |  |
|                                                                          | $Q = 749$    |                  |  |
| Milling with cutting head<br>Ø 125 mm<br>z = 14                          | $v_c = 200$  | $n = 509$        |  |
|                                                                          | $f_z = 0.25$ | $v_f = 1,783$    |  |
|                                                                          | $a_p = 3$    | $a_e = 75$       |  |
|                                                                          | $Q = 401$    |                  |  |

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]      Metal removal rate:  $Q$  [cm<sup>3</sup> / min]      Number of tool edges:  $z$



## Performance examples of the mill-turn tables



**Mill-turn table G350T**

| Machining type                      | Steel – 16MnCrS5 |           |
|-------------------------------------|------------------|-----------|
| Longitudinal turning on<br>Ø 200 mm | $v_c = 200$      | $n = 318$ |
|                                     | $f_u = 0.5$      |           |
|                                     | $a_p = 4$        |           |
| Facing on<br>Ø 200 mm               | $v_c = 200$      | $n = 318$ |
|                                     | $f_u = 0.5$      |           |
|                                     | $a_p = 4$        |           |



**Mill-turn table G550T**

| Machining type                      | Steel – 16MnCrS5 |           |
|-------------------------------------|------------------|-----------|
| Longitudinal turning on<br>Ø 400 mm | $v_c = 250$      | $n = 200$ |
|                                     | $f_u = 0.5$      |           |
|                                     | $a_p = 6.5$      |           |
| Facing on<br>Ø 400 mm               | $v_c = 250$      | $n = 200$ |
|                                     | $f_u = 0.5$      |           |
|                                     | $a_p = 6.5$      |           |

**Mill-turn table G750T**

| Machining type                      | Steel – 16MnCrS5 |           |
|-------------------------------------|------------------|-----------|
| Longitudinal turning on<br>Ø 850 mm | $v_c = 200$      | $n = 75$  |
|                                     | $f_u = 0.6$      |           |
|                                     | $a_p = 5$        | $Q = 600$ |
| Facing on<br>Ø 850 mm               | $v_c = 200$      | $n = 75$  |
|                                     | $f_u = 0.6$      |           |
|                                     | $a_p = 5$        | $Q = 600$ |

Example illustrations

# MACHINE CHARACTERISTICS

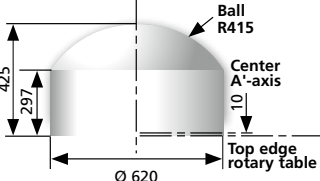
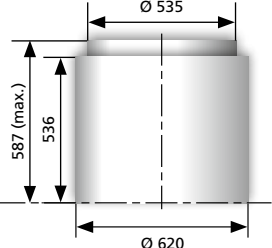
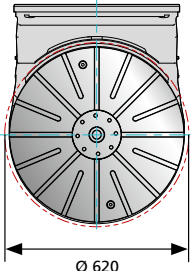
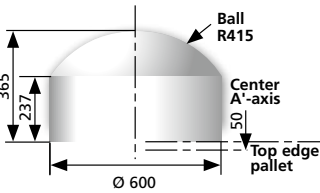
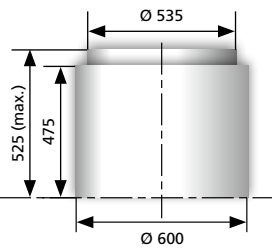
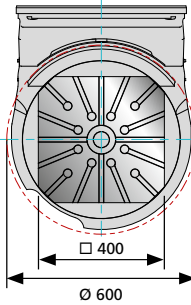
## Use the advantages of our 5-axis mill-turn machining centers

Fewer chucking operations and hence shorter throughput times with higher accuracies.  
See for yourself!

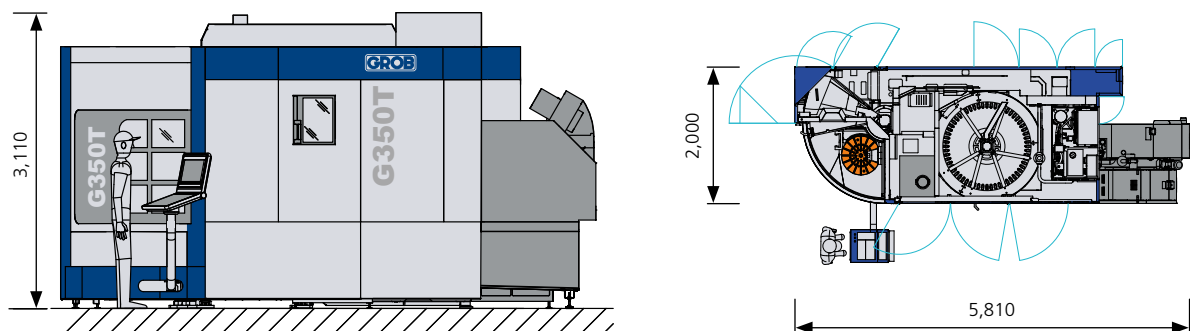




## G350T ▶ Maximum part size

|                                                                           | A'-/B'-axis<br>(max.) [mm]                                                                                                                                              | B'-axis (max.) [mm]<br>(for A'-axis 0°)                                              | Plan view<br>(max.) [mm]                                                              |
|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Basic machine</b>                                                      |     |   |   |
| <b>Basic machine with pallet clamping system (without pallet changer)</b> |   |  |  |

## G350T ▶ Dimensioning ▶ Basic machine



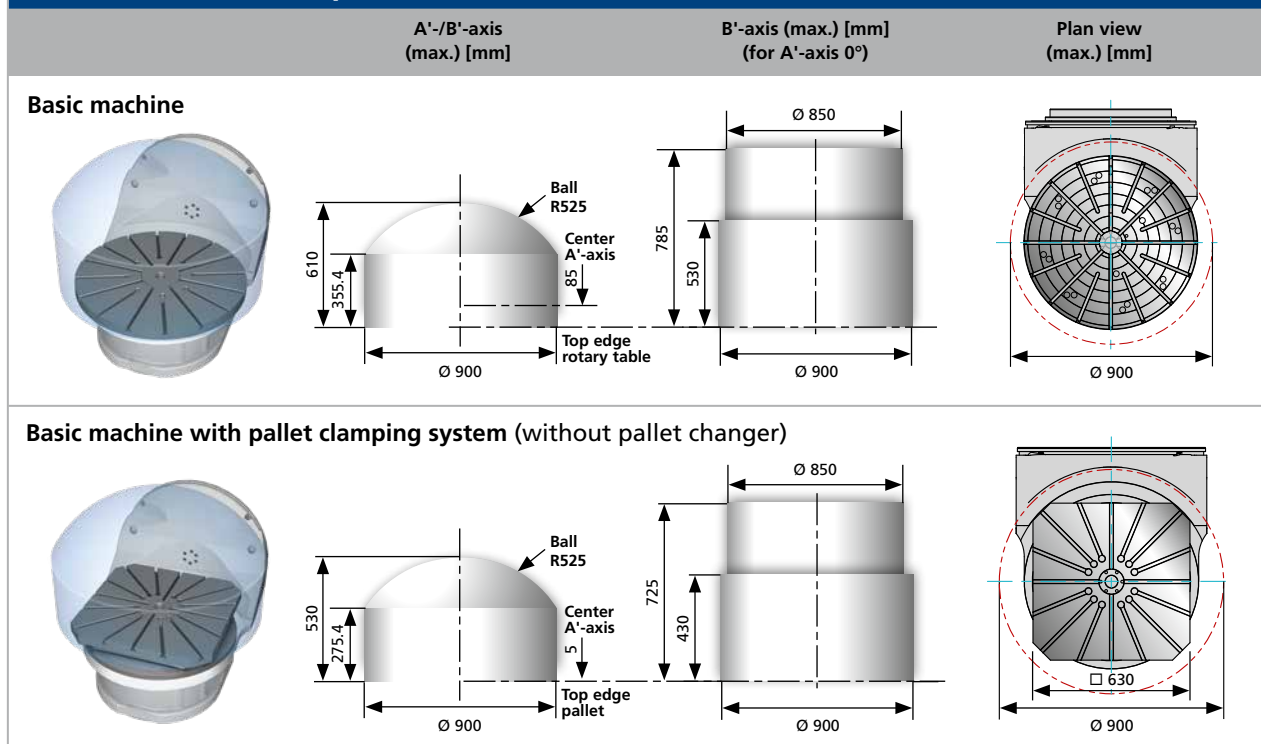
Dimension values [mm], not taking into account preventive maintenance and operating areas

Illustrations may contain options

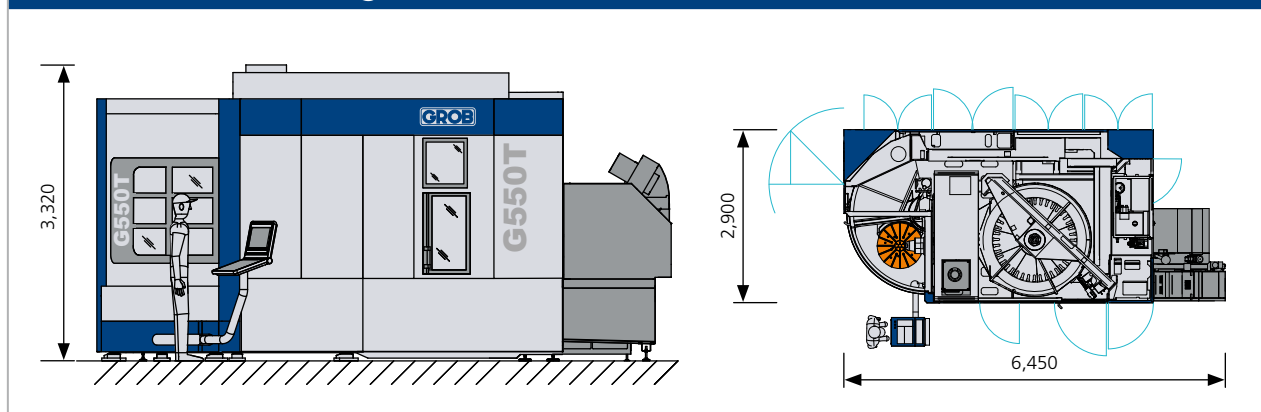
# MACHINE CHARACTERISTICS



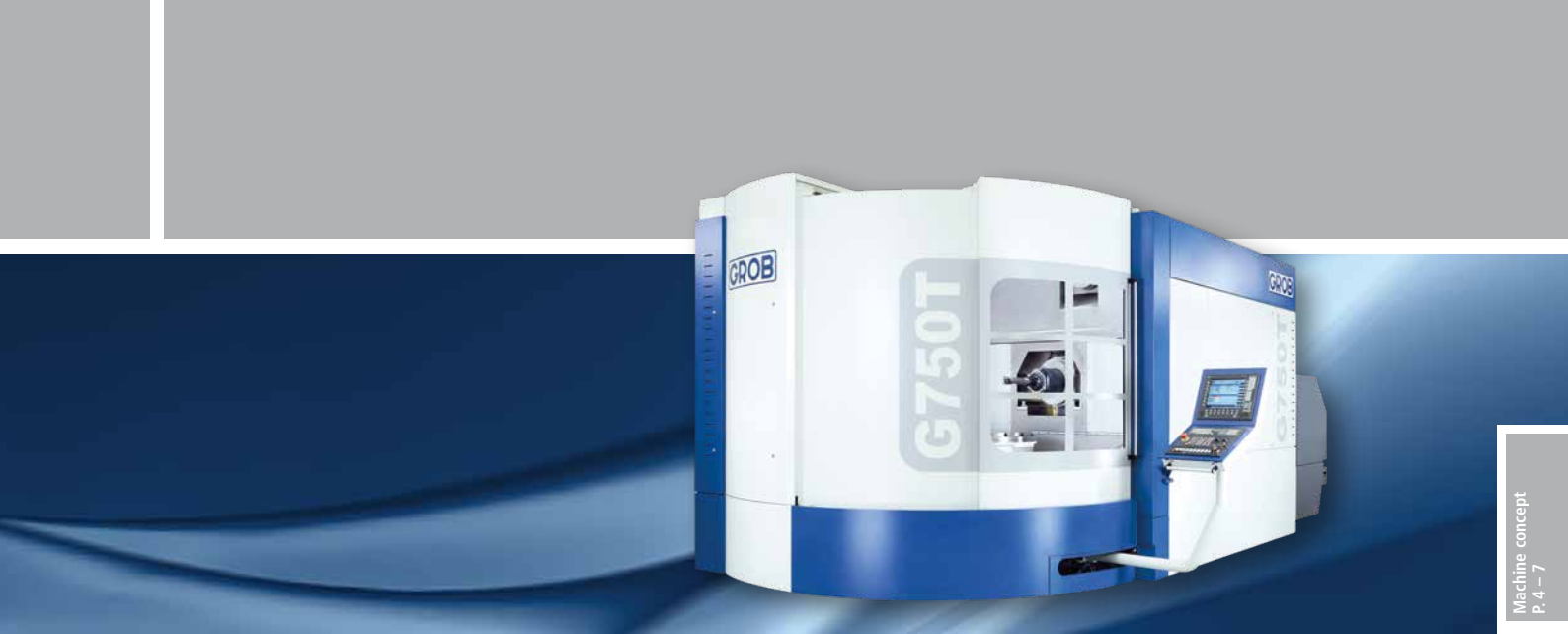
## G550T ▶ Maximum part size



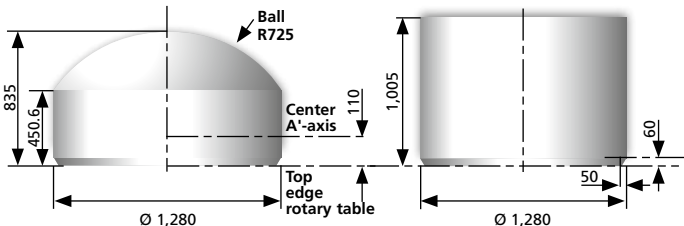
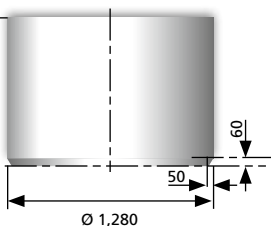
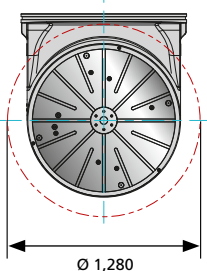
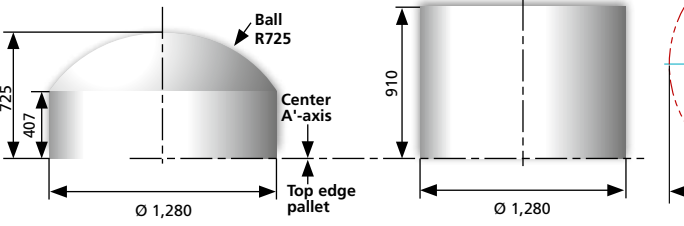
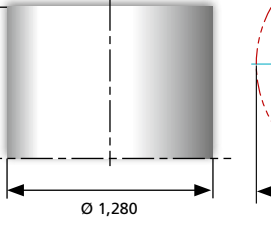
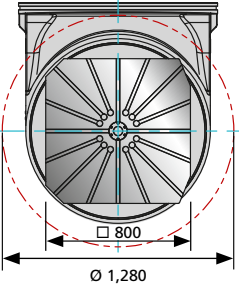
## G550T ▶ Dimensioning ▶ Basic machine



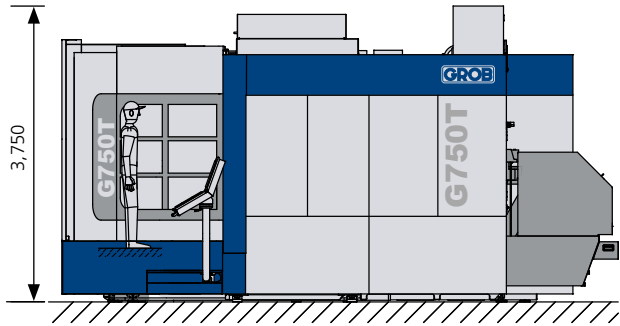
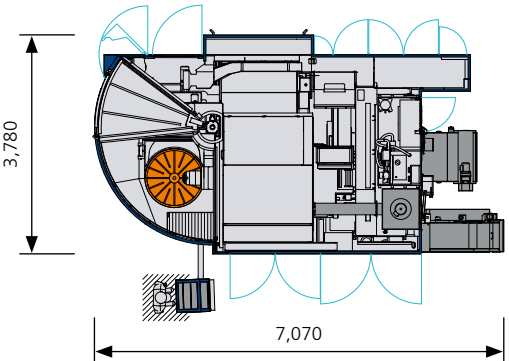
G350T, G550T and G750T also available as pure milling machining centers



## G750T ▶ Maximum part size

|                                                                           | A'-/B'-axis<br>(max.) [mm]                                                                                                                                               | B'-axis (max.) [mm]<br>(for A'-axis 0°)                                              | Plan view<br>(max.) [mm]                                                              |
|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Basic machine</b>                                                      |     |   |   |
| <b>Basic machine with pallet clamping system (without pallet changer)</b> |   |  |  |

## G750T ▶ Dimensioning ▶ Basic machine

|                                                                                     |                                                                                      |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  |  |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|

Dimension values [mm], not taking into account preventive maintenance and operating areas

Illustrations may contain options

Machine concept  
P. 4 – 7

Machine components  
P. 8 – 17

Accessories  
P. 18 – 19

Automation technology  
P. 20 – 23

Software options  
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Machining operations  
P. 29 – 31

Machine characteristics  
P. 32 – 35

Technical data  
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# TECHNICAL DATA

| MACHINE TYPE                                                                |                                                                                                                                                                             | G350T – Generation 2                   |                                |               |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|--------------------------------|---------------|
| SLIDE                                                                       |                                                                                                                                                                             |                                        |                                |               |
| Working travels in X-/Y’-/Z-axis [mm]                                       |                                                                                                                                                                             | 600/855/750                            |                                |               |
| Max. speeds in X-/Y’-/Z-axis [m/min]                                        |                                                                                                                                                                             | 70/45/90                               |                                |               |
| Max. acceleration in X-/Y’-/Z-axis [m/s²]                                   |                                                                                                                                                                             | 5/4/7                                  |                                |               |
| Max. feed force in X-/Y’-/Z-axis [kN]                                       |                                                                                                                                                                             | 8/8/8                                  |                                |               |
| Accuracy (ISO 230-2:2006)                                                   |                                                                                                                                                                             | 0.006                                  |                                |               |
| ► Positioning accuracy in X-/Y’-/Z-axis [mm]                                |                                                                                                                                                                             | 0.006                                  |                                |               |
| ► Repeat precision of positioning in X-/Y’-/Z-axis [mm]                     |                                                                                                                                                                             | <0.0025                                |                                |               |
| MAIN SPINDLE                                                                |                                                                                                                                                                             |                                        |                                |               |
| Drive                                                                       | Tool interface for short hollow taper tools acc. to ISO 12164-3                                                                                                             | HSK-T63                                |                                |               |
|                                                                             | Diameter at front bearing of spindle bearing [mm]                                                                                                                           | 80                                     |                                |               |
|                                                                             | Speed n <sub>max</sub> [rpm]                                                                                                                                                | 16,000                                 |                                |               |
|                                                                             | Max. drive power at 100%/40% duty cycle [kW]                                                                                                                                | 25/32                                  |                                |               |
|                                                                             | Max. spindle torque at 100%/40% duty cycle [Nm]                                                                                                                             | 159/206                                |                                |               |
|                                                                             | Spindle-shaft arrest [Nm]*                                                                                                                                                  | 300                                    |                                |               |
|                                                                             | Chip-to-chip time t <sub>i</sub> according to VDI 2852 [s] relative to speed [min <sup>-1</sup> ]<br>SIEMENS control system and tool changer arm (dynamic package/standard) | 2.7 to n = 7,000/<br>4.0 to n = 10,000 |                                |               |
| DISK-TYPE TOOL MAGAZINE                                                     |                                                                                                                                                                             | Single disk-type tool magazine         | Double disk-type tool magazine |               |
| TOOL INTERFACE                                                              |                                                                                                                                                                             | HSK-A/T63                              | HSK-A/T63                      | HSK-A/T63     |
| Number of tool pockets                                                      |                                                                                                                                                                             | 60                                     | 117                            | 105           |
| Max. tool length [mm]                                                       |                                                                                                                                                                             | 365                                    | 365/180                        | 365/180/550** |
| ► Horizontal disk arrangement (bottom /top /over both disks)                |                                                                                                                                                                             |                                        |                                |               |
| ► Vertical disk arrangement (advanced /returned)                            |                                                                                                                                                                             | —                                      | —                              | —             |
| Max. tool diameter [mm]                                                     |                                                                                                                                                                             | 70                                     | 70                             | 70            |
| ► No diameter restrictions for adjacent pockets                             |                                                                                                                                                                             |                                        |                                |               |
| ► Diameter restrictions for adjacent pockets                                |                                                                                                                                                                             | 170                                    | 170                            | 170           |
| Max. tool weight [kg]                                                       |                                                                                                                                                                             | 8                                      | 8                              | 8             |
| Max. tilt moment around gripper [Nm]                                        |                                                                                                                                                                             | 12                                     | 12                             | 12            |
| MILL-TURN TABLE                                                             |                                                                                                                                                                             |                                        |                                |               |
| Table diameter [mm]                                                         |                                                                                                                                                                             | 570                                    |                                |               |
| Table load [kg] (with/without pallet)                                       |                                                                                                                                                                             | 270/350                                |                                |               |
| Interference diameter [mm]                                                  |                                                                                                                                                                             | 600                                    |                                |               |
| B’-axis speed n <sub>max</sub> [rpm] (with intelligent imbalance detection) |                                                                                                                                                                             | 1,200                                  |                                |               |
| Max. torque B’-axis at 100 %/40 % duty cycle [Nm]                           |                                                                                                                                                                             | 1,250/1,420                            |                                |               |
| Holding torque with additional clamping [Nm]                                |                                                                                                                                                                             | 1,500                                  |                                |               |
| CONNECTION RATINGS                                                          |                                                                                                                                                                             |                                        |                                |               |
| Power requirements at 3 AC 400 V/50 Hz [kVA]                                |                                                                                                                                                                             | at least 42                            |                                |               |
| Compressed air [bar]                                                        |                                                                                                                                                                             | 5                                      |                                |               |
| WEIGHT (approx.)                                                            |                                                                                                                                                                             |                                        |                                |               |
| Total weight [kg]                                                           |                                                                                                                                                                             | 15,300                                 |                                |               |
| EQUIPMENT LEVELS                                                            |                                                                                                                                                                             |                                        |                                |               |
| Pallet size on basic machine with pallet clamping system [mm]               |                                                                                                                                                                             | 400x400                                |                                |               |
| Tool magazine expansion                                                     |                                                                                                                                                                             | TM200; TM309; TM374 (HSK-A/T63)        |                                |               |

\* For turning operation \*\* With restrictions in the work area

|  | G550T – Generation 2                  |                                       |                                |                                       |                   |                        | G750T – Generation 1           |  |  |  |  |  |
|--|---------------------------------------|---------------------------------------|--------------------------------|---------------------------------------|-------------------|------------------------|--------------------------------|--|--|--|--|--|
|  | 800/1,020/970                         |                                       |                                |                                       |                   |                        | 1,000/1,100/1,170              |  |  |  |  |  |
|  | 65/50/80                              |                                       |                                |                                       |                   |                        | 60/50/75                       |  |  |  |  |  |
|  | 6/4.5/6.5                             |                                       |                                |                                       |                   |                        | 4.0/3.3/6.5                    |  |  |  |  |  |
|  | 8/8/12                                |                                       |                                |                                       |                   |                        | 10/10/10                       |  |  |  |  |  |
|  | 0.006                                 |                                       |                                |                                       |                   |                        | 0.006                          |  |  |  |  |  |
|  | <0.0025                               |                                       |                                |                                       |                   |                        | <0.003                         |  |  |  |  |  |
|  |                                       |                                       |                                |                                       |                   |                        |                                |  |  |  |  |  |
|  | HSK-T63                               | HSK-T100                              |                                | HSK-T100                              |                   | HSK-T100               |                                |  |  |  |  |  |
|  | 80                                    | 100                                   |                                | 100                                   |                   | 100                    |                                |  |  |  |  |  |
|  | 16,000                                | 10,000                                |                                | 14,500                                |                   | 10,000                 |                                |  |  |  |  |  |
|  | 25/32                                 | 50/66                                 |                                | 50/58                                 |                   | 50/66                  |                                |  |  |  |  |  |
|  | 159/206                               | 258/340                               |                                | 225/261                               |                   | 258/340                |                                |  |  |  |  |  |
|  | 300                                   | 1,200                                 |                                | 1,200                                 |                   | 1,200                  |                                |  |  |  |  |  |
|  | 2.9 to n = 6,000/<br>4.0 to n = 9,000 | 3.7 to n = 6,000/<br>4.7 to n = 7,500 |                                | 3.7 to n = 6,500/<br>4.7 to n = 8,500 |                   | –/<br>4.2 to n = 6,000 |                                |  |  |  |  |  |
|  | Single disk-type tool magazine        |                                       | Double disk-type tool magazine |                                       |                   |                        | Double disk-type tool magazine |  |  |  |  |  |
|  | HSK-A/T63                             | HSK-A/T100                            | HSK-A/T63                      |                                       | HSK-A/T100        |                        | HSK-A/T100                     |  |  |  |  |  |
|  | 70                                    | 40                                    | 137                            | 123                                   | 77                | 69                     | 60                             |  |  |  |  |  |
|  | 465                                   | 500                                   | 465/<br>280/<br>–              | 465/<br>280/<br>700**                 | 500/<br>260/<br>– | 500/<br>260/<br>750**  | —                              |  |  |  |  |  |
|  | —                                     | —                                     | —                              | —                                     | —                 | —                      | 650** (590)/500                |  |  |  |  |  |
|  | 70                                    | 118                                   | 70                             | 70                                    | 118               | 118                    | 130                            |  |  |  |  |  |
|  | 170                                   | 260                                   | 170                            | 170                                   | 260               | 260                    | 250                            |  |  |  |  |  |
|  | 8                                     | 22                                    | 8                              | 8                                     | 22                | 22                     | 22                             |  |  |  |  |  |
|  | 12                                    | 40                                    | 12                             | 12                                    | 40                | 40                     | 40                             |  |  |  |  |  |
|  |                                       |                                       |                                |                                       |                   |                        |                                |  |  |  |  |  |
|  | 770                                   |                                       |                                |                                       |                   |                        | 950                            |  |  |  |  |  |
|  | 600/750                               |                                       |                                |                                       |                   |                        | 1,000/1,500                    |  |  |  |  |  |
|  | 900                                   |                                       |                                |                                       |                   |                        | 1,280                          |  |  |  |  |  |
|  | 800                                   |                                       |                                |                                       |                   |                        | 500                            |  |  |  |  |  |
|  | 1,200/1,380                           |                                       |                                |                                       |                   |                        | 3,110/3,740                    |  |  |  |  |  |
|  | 2,500                                 |                                       |                                |                                       |                   |                        | 6,000                          |  |  |  |  |  |
|  |                                       |                                       |                                |                                       |                   |                        |                                |  |  |  |  |  |
|  | at least 42                           |                                       |                                |                                       |                   |                        | at least 42                    |  |  |  |  |  |
|  | 5                                     |                                       |                                |                                       |                   |                        | 5                              |  |  |  |  |  |
|  |                                       |                                       |                                |                                       |                   |                        |                                |  |  |  |  |  |
|  | 25,700                                |                                       |                                |                                       |                   |                        | 37,000                         |  |  |  |  |  |
|  |                                       |                                       |                                |                                       |                   |                        |                                |  |  |  |  |  |
|  | 630x630                               |                                       |                                |                                       |                   |                        | 800x800                        |  |  |  |  |  |
|  | TM200; TM309; TM374 (HSK-A/T63)       |                                       |                                | TM180; TM251 (HSK-A/T100)             |                   |                        | TM145 (HSK-A/T100)             |  |  |  |  |  |

G350T, G550T and G750T also available as pure milling machining centers

Subject to technical changes without prior notice

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# AFTER SALES SERVICE

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## GROB product range

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• G-modules</li><li>• Large machining centers</li><li>• Modular special-purpose machines</li><li>• Thermal spraying systems</li><li>• Machining centers for frame structure parts</li><li>• Machine configuration for turbine housing production</li><li>• Motorized spindles</li></ul> | <ul style="list-style-type: none"><li>• 5-axis universal milling machining centers</li><li>• 5-axis universal mill-turn machining centers</li><li>• Large machining centers</li><li>• Pallet storage systems</li><li>• Additional tool magazines</li><li>• Motorized spindles</li></ul> | <ul style="list-style-type: none"><li>• Individual assembly units (fully-automatic, semi-automatic, manual)</li><li>• Customer-specific assembly systems</li></ul> | <ul style="list-style-type: none"><li>• Production systems for electric motors (stator, rotor and overall assembly)</li><li>• Assembly systems for battery cells and fuel cells</li></ul> |
| SOFTWARE AND AUTOMATION SOLUTIONS                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                         |                                                                                                                                                                    |                                                                                                                                                                                           |
| <ul style="list-style-type: none"><li>• GROB-NET<sup>4</sup>Industry (the Industry 4.0 solution)</li><li>• Transport systems (e.g. automation and loading systems)</li><li>• Highly-complex manufacturing lines (turnkey projects)</li></ul>                                                                                  |                                                                                                                                                                                                                                                                                         |                                                                                                                                                                    |                                                                                                                                                                                           |

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