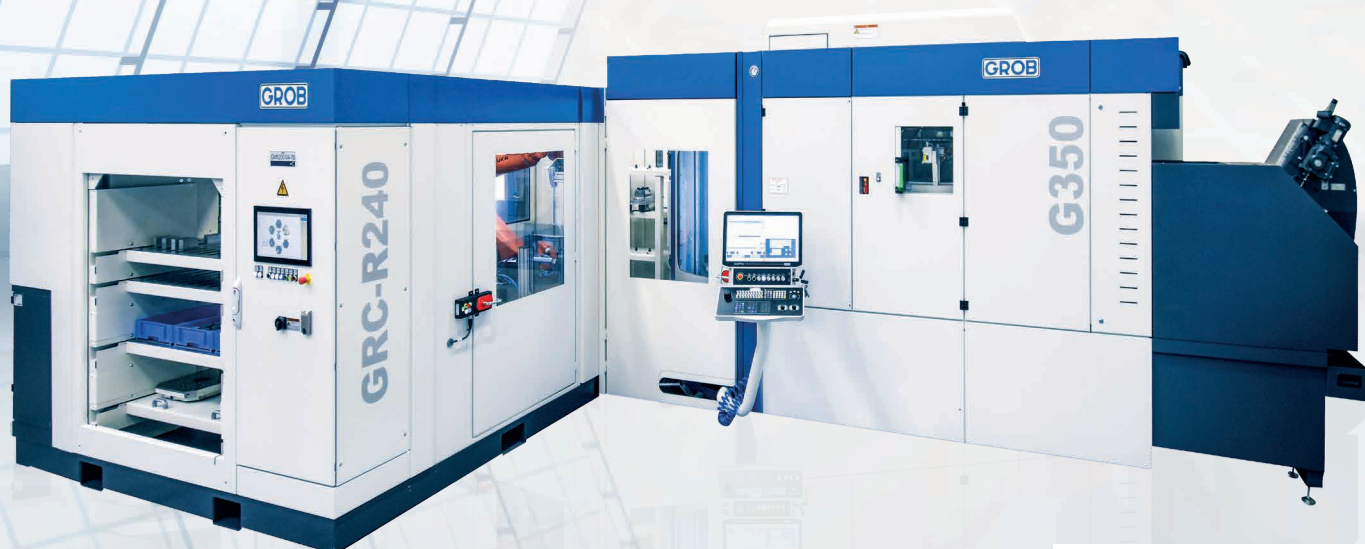




AUTOMATION

FOR MACHINING CENTERS



PSS-R LIGHT

PSS-R

PSS-L

GRC

MANUFACTURING LINES

AUTOMATION CONCEPTS

The ideal automation solution for your machine

Our customers in small, medium, and large-scale production have been relying on GROB automation solutions for decades. The experience garnered is fed straight into our automation solutions, making GROB a strong partner – for solutions with pallet or part storage systems to highly flexible, turnkey manufacturing lines.

GROB automation technology allows you to **FLEXIBLY ADAPT TO CAPACITIES** and guarantees **PALLET AND / OR PART HANDLING PERFECTLY IN TUNE** with your needs.

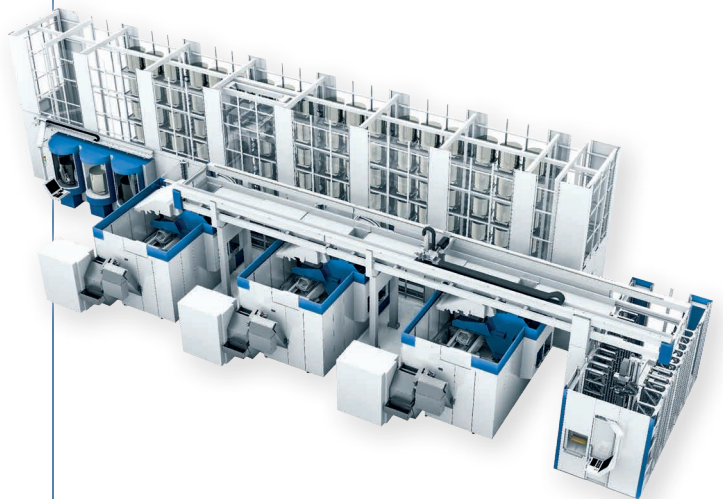
STANDARD AUTOMATION

- ⊕ PSS-R light, PSS-R, PSS-L
- ⊕ Pallet handling
- ⊕ Round or linear configuration



FLEXIBLE MANUFACTURING SYSTEMS

- ⊕ Flexible configuration
- ⊕ Pallet handling
- ⊕ External peripheral device, (e.g. measuring machine, washer, central tool magazine)
- ⊕ Combination of rough part and pallet storage system



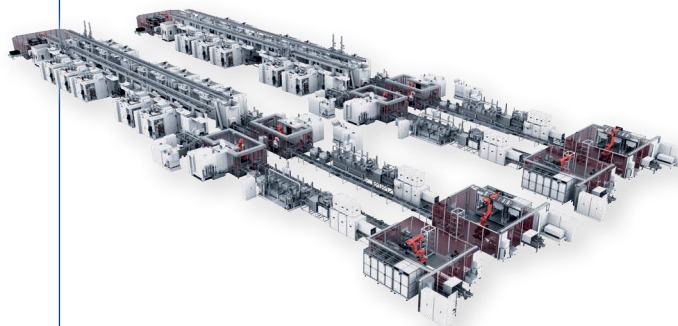
FLEXIBLE ROBOT CELL

- ⊕ GRC-R20 to GRC-R500, GRC-L60 to GRC-L500
- ⊕ Round, linear, or flexible configuration
- ⊕ Part and/or pallet handling
- ⊕ External peripheral device (e.g. deburring, washing, measuring)
- ⊕ Automatic gripper change
- ⊕ Compact drawer feed system



TURNKEY MANUFACTURING LINES

- ⊕ Individual configuration
- ⊕ Complete process chain from a single source
- ⊕ From simultaneous engineering (SE) to turnkey
- ⊕ Top loading or front loading
- ⊕ Loading modules, e.g. swivel changers
- ⊕ Interconnecting automation system with part



PRODUCTION

MASS PRODUCTION

VOLUME

ECONOMIC VIABILITY


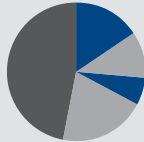


Productivity – Your key to success!

GROB's specifically developed automation solutions help you multiply your company's productivity.

”

Automation – customized for your product range

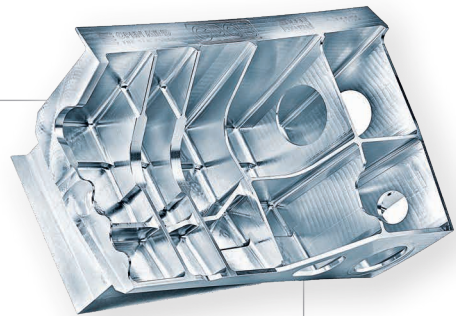
Automation solutions help increase output while reducing unit cost. Our products and competent consultation services help you find the ideal solution for your needs and future-proof your production.

5-AXIS UNIVERSAL MACHINING CENTER ↔ 5-AXIS UNIVERSAL MACHINING CENTER WITH AUTOMATION		
	5-axis universal machining center without automation	5-axis universal machining center with automation
Machine running time [h/day]	15 (2 shifts)	22.5 (3 shifts)
Internal setup time [h/year] with identical output	930	720
Machine running time [h/year]	2,130	3,870
Parts per year	2,840	5,160
Staff availability	 <ul style="list-style-type: none"> external setup time additional activities 	 <ul style="list-style-type: none"> external setup time additional activities unmanned operation
Machine availability	 <ul style="list-style-type: none"> service life internal setup time preventive maintenance 	 <ul style="list-style-type: none"> service life internal setup time preventive maintenance

Calculation basis for estimated machining time: approx. 45 min/part, 240 days/year, 85% utilization

Our promise to you:

- ⊕ Increased spindle life
- ⊕ Retooling during part machining
- ⊕ More efficient staff availability thanks to unmanned production
- ⊕ 3-shift operation with less personnel



AUTOMATION SOLUTIONS

STANDARD AUTOMATION

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

The GROB rotary pallet storage system light expands the G-module to a flexible manufacturing cell and makes it possible to manufacture small and medium lot sizes and even individual orders with individual character and cost-effectiveness. This makes the new PSS-R light an ideal starter solution for automated and highly efficient manufacturing.

INTUITIVE PALLET MANAGEMENT

- + for a longer unmanned production period with a visual organization of production orders

OPTIMAL ACCESS TO THE PALLET STORAGE SYSTEM

- + allows pallet loading and unloading during the machining operation

OPTIMIZED VIEW

- + into the work area and towards the pallet storage positions

COMPACT FOOTPRINT

- + for up to 10 pallet storage positions (pallet 320x320)

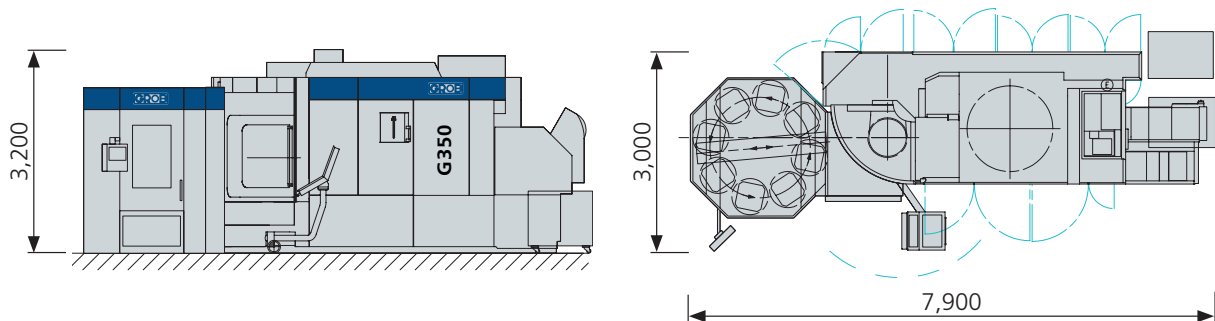


Automation solution specifications and dimensions

TECHNICAL DATA ▶ G150 ◀ G350a / G350

Available machines	G150	G350a / G350
Design variant	PSS-R light	
Pallet size [mm]	320x320	400x400
Max. pallet spaces	10	8
Max. handling [kg]	220	300
Max. interference diameter [mm]	Ø 500	
Max. interference height [mm]	350	

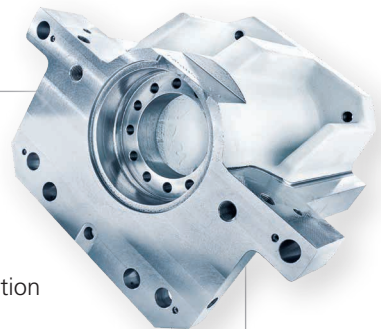
G350 WITH PSS-R LIGHT ▶ DIMENSIONS



Example illustration

Our promise to you:

- ⊕ Low acquisition cost
- ⊕ Cost-effective production thanks to significantly increased machine utilization
- ⊕ Complete solution from a single source with a uniform design
- ⊕ Simple retrofit on existing machines



AUTOMATION SOLUTIONS

STANDARD AUTOMATION

GROB rotary pallet storage system (PSS-R)

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

QUICK PALLET CHANGE WITH DOUBLE-FORK LIFT UNIT

- ⊕ when using two pallets thanks to an innovative pallet changing device

OPTIMAL ACCESS TO THE SETUP STATION

- ⊕ allows pallet loading and unloading during the machining operation with accessibility from above



COMPACT FOOTPRINT

- ⊕ for up to 15 pallet storage positions (pallet 400x400)

PALLET STORAGE RACKING

- ⊕ with drip pans and optional cutting fluid recirculation

ADVANCED PRODUCTION CONTROL SOFTWARE GROB⁴AUTOMATION

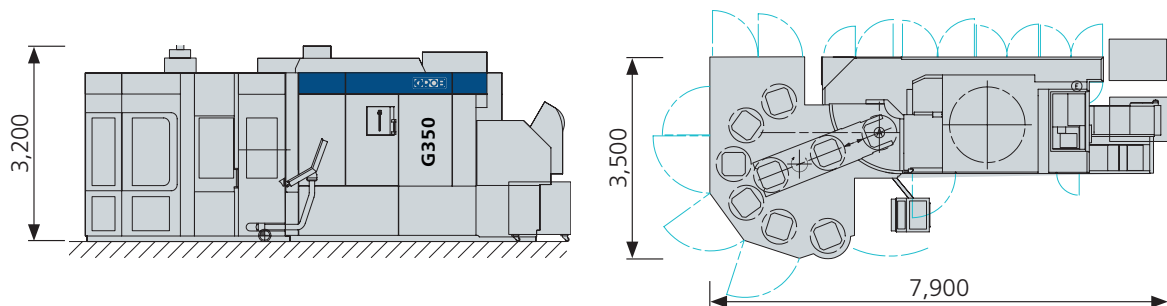
- ⊕ permits a longer unmanned production period with a visual organization of production orders

Automation solution specifications and dimensions

TECHNICAL DATA ▶ PSS-R400 ↔ PSS-R630

Available machines	G350a / G350 / G350T	G550a / G550 / G550T
Design variant	PSS-R400	PSS-R630
Pallet size [mm]	400x400	630x630
Max. pallet spaces (on three levels)	5/10/15	5/10/13
Max. interference diameter [mm]	Ø 600	Ø 900
Max. interference height [mm]	500	785

G350 WITH PSS-R ▶ DIMENSIONS



Example illustration

Our promise to you:

- ⊕ Cost-effective production thanks to increased machine utilization
- ⊕ Capability to produce in unmanned or lightly-manned shifts
- ⊕ Parallel loading and unloading of pallets during the production
- ⊕ Simple retrofit on existing machines
- ⊕ Design versions with pallet storage positions on one to three levels



AUTOMATION SOLUTIONS

STANDARD AUTOMATION

GROB linear pallet storage system (PSS-L)

The linear pallet storage system is a GROB development that complements the product range with an automated, flexible manufacturing system for a wide variety of part machining. It is suitable for stand-alone machines and for interlinking identical machines. Depending on the customer requirement, two or more magazine levels and the number of required setup stations can be freely selected for pallets of this type.

ADVANCED PRODUCTION CONTROL SOFTWARE GROB⁴AUTOMATION

- ⊕ for a longer unmanned production period with a visual organization of production orders

OPTIMAL ACCESS TO THE SETUP STATION

- ⊕ allows pallet loading and unloading during the machining operation with accessibility from above



OPTIMUM ACCESSIBILITY TO THE WORK AREA

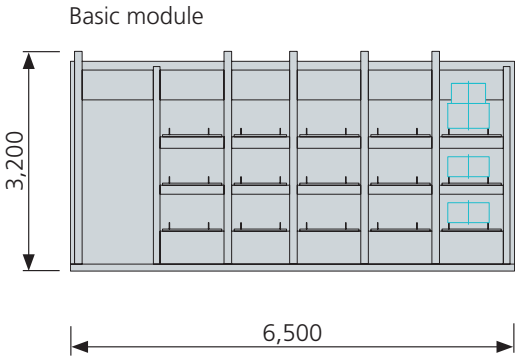
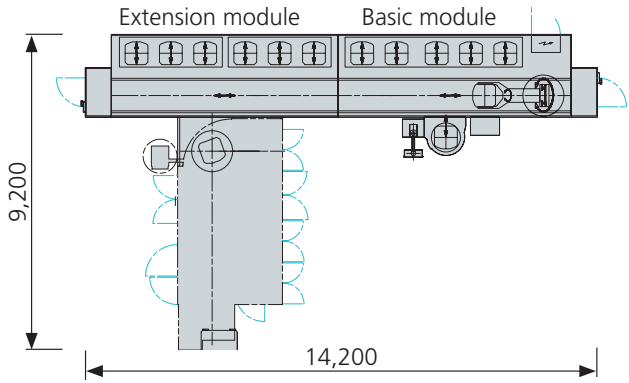
- ⊕ for part checks directly on the machining table

DYNAMIC PALLET CHANGING DEVICE

- ⊕ enables the use of up to 5 machining centers in a system with direct loading for medium to high cycle times

Automation solution specifications and dimensions

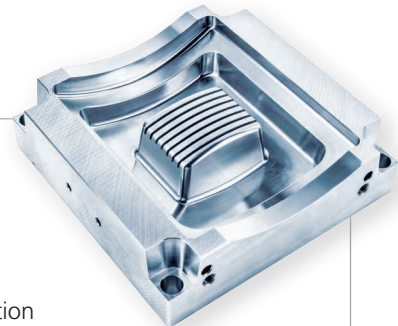
SPECIFICATIONS – BASIC MODULE ▶ PSS-L400 ◀ PSS-L630		
Available machines	G350a / G350 / G350T	G550a / G550 / G550T
Design variant	PSS-L400	PSS-L630
Pallet size [mm]	400x400	630x630
Max. pallet spaces	21	15
Max. interference diameter [mm]	Ø 600	Ø 900
Max. interference height [mm]	500	785

G550 WITH PSS-L630 ▶ DIMENSIONS	
 <p>Basic module</p> <p>3,200</p> <p>6,500</p>	 <p>Extension module</p> <p>Basic module</p> <p>9,200</p> <p>14,200</p>

Example illustration

Our promise to you:

- ✦ Flexible configuration according to your requirements
- ✦ Cost-effective production thanks to significantly increased machine utilization
- ✦ Expandable modular system
- ✦ The basic module can be expanded by up to four expansion modules and additional three setup stations
- ✦ Configurable with and without pallet changer on the machining center



AUTOMATION SOLUTIONS

STANDARD AUTOMATION



Example Simulation – Optimized Automation System!

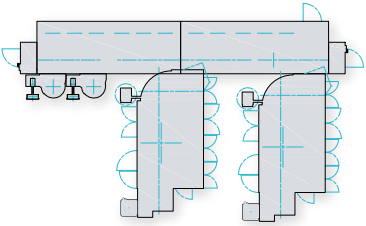
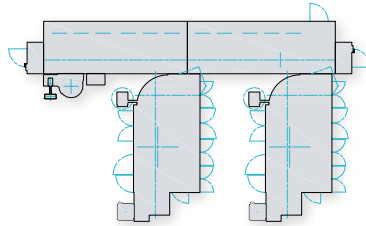
We will develop an automation concept with you that is perfectly customized to your requirements!



Simulation example PSS-L – from first concept study to optimized automation solution

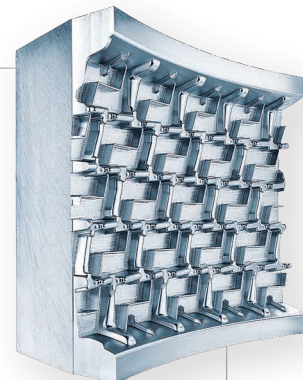
The following parameters are the basis for the optimized automation simulation:

- Number of base modules: 1 (15 pallet positions)
- Number of expansion modules: 1 (18 pallet positions)
- Number of G550 5-axis universal machining centers: 2
- Long parts: 20%, 70 min, setup time: 10 min, parts per lot: 1
- Medium-sized parts: 40%, 40 min, setup time: 10 min, parts per lot: 1
- Short parts: 40%, 30 min, setup time: 10 min, parts per lot: 1

G550 WITH PSS-L ▶ AUTOMATION ACCORDING TO CUSTOMER SPECIFICATIONS ◀ OPTIMIZED AUTOMATION		
	Automation according to concept study	Optimized automation concept
Simulation period [weeks]	4	
Shift model (days/shifts)	5/2	6/2
Pallet storage positions	33	
Number of setup stations	2	1
Max. utilization per setup station [%]	16	37
Max. machine utilization [%]	74	85
Max. output of long parts [pcs]	497	559
Max. output of medium-sized parts [pcs]	496	559
Max. output of short parts [pcs]	463	600
Machine layout		

Our promise to you:

- ⊕ Reduction of investment costs
- ⊕ Higher utilization of the setup station
- ⊕ More efficient staff availability
- ⊕ Higher output by the machine



AUTOMATION SOLUTIONS

FLEXIBLE MANUFACTURING SYSTEM

Flexible manufacturing system

The flexible manufacturing system allows for automating both the tool flow and the part flow. The illustration shows a version of a flexible manufacturing system with a central tool magazine. The portal can interchange tools in the disk-type tool magazines of several 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 three machining centers are connected.

OPTIMAL ACCESS TO THE SETUP STATION

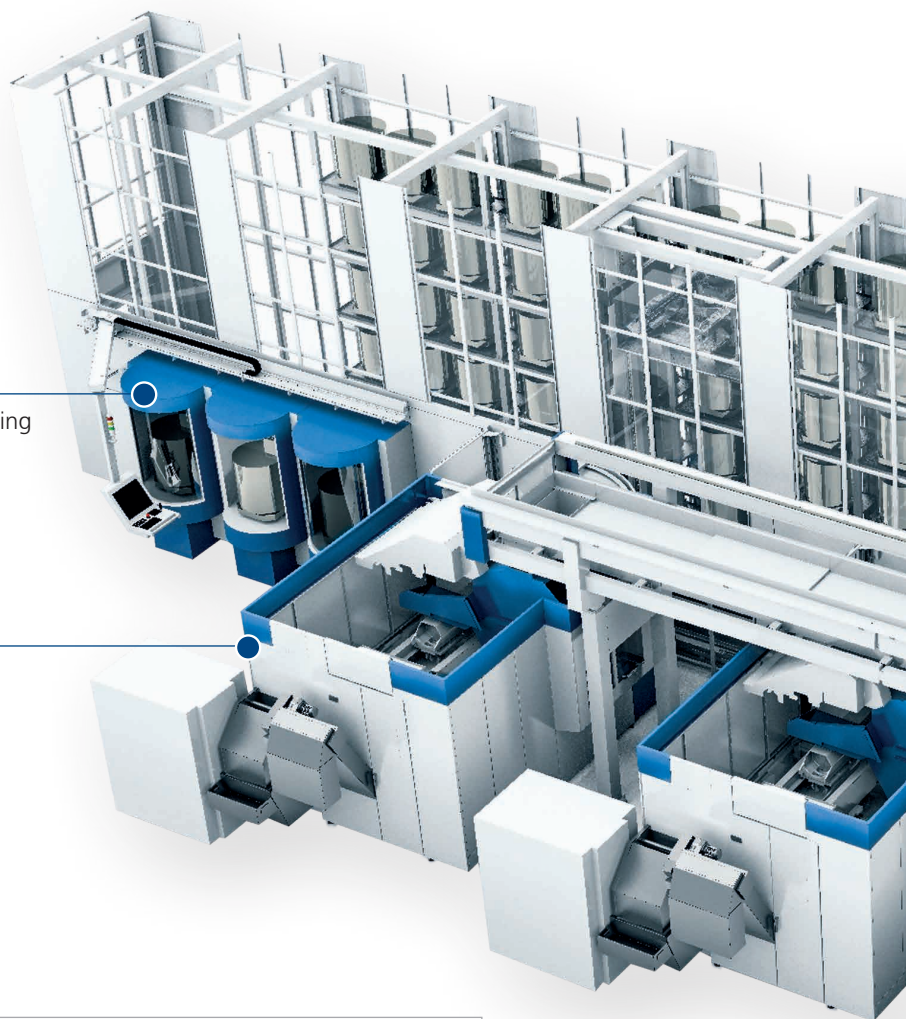
- ⊕ allows pallet loading and unloading during the machining operation with accessibility from above

INTERLINKED MACHINING CENTERS

- ⊕ increase productivity thanks to simultaneous machining of several part types

Our promise to you:

- ⊕ External periphery can be connected
- ⊕ Flexible installation variants and configurable according to your requirements
- ⊕ Expandable modular system
- ⊕ Combination of rough part storage and pallet storage system





PALLET STORAGE SYSTEM

- ⊕ can be used with 90 pallet storage positions and a pallet changing device

AUTOMATIC TOOL SUPPLY

- ⊕ from central tool magazine with tool resources check

CENTRAL TOOL MAGAZINE

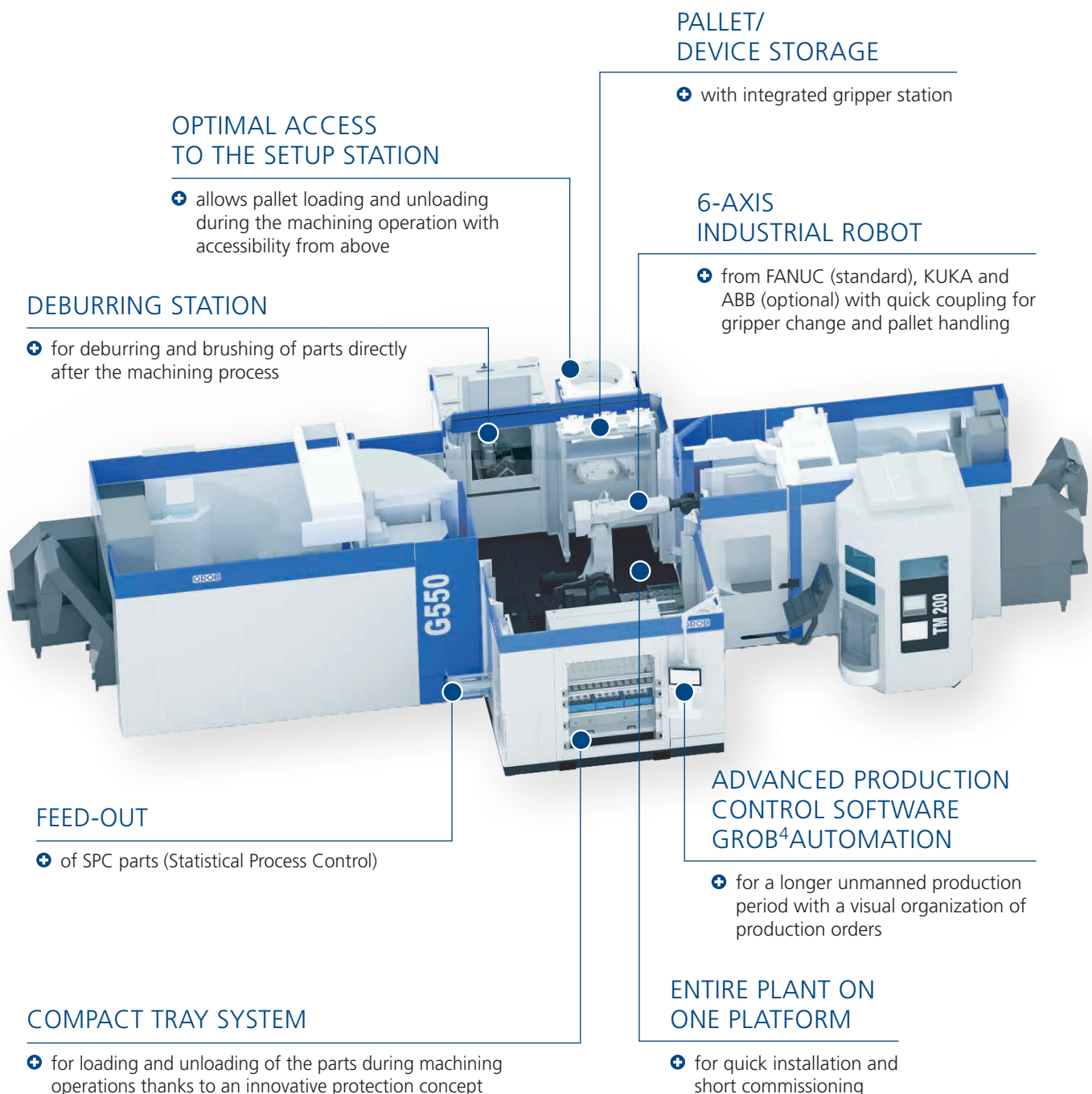
- ⊕ with storage of up to 1,000 tools

AUTOMATION SOLUTIONS

FLEXIBLE ROBOT CELL

GROB robot cell (GRC)

The newly developed GROB robot cell combined with our G-modules offers maximum flexibility and customization for your manufacturing needs.

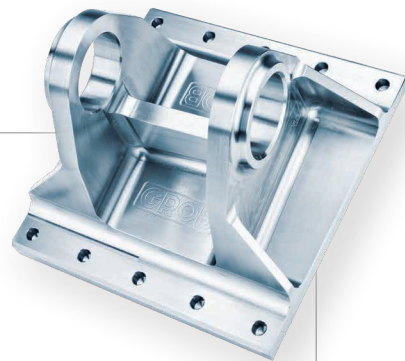


Automation solution specifications and dimensions

DESIGN VERSIONS ▶ SYSTEM MACHINES ◀▶ UNIVERSAL MACHINING CENTERS					
Available machines	System machines G300/G500/G700/G320/G520/G720			Universal machining centers G150/G350/G550/G750	
DIMENSIONS ▶ GRC-R20 ◀▶ GRC-R/L 60 ◀▶ GRC-R/L 150 ◀▶ GRC-R/L 240 ◀▶ GRC-R/L 500					
Design variant	GRC-R20	GRC-R60/ GRC-L60	GRC-R150/ GRC-L150	GRC-R240/ GRC-L240	GRC-R500/ GRC-L500
Max. load [kg]	25	70	210	280	500
Robot range (radius) [mm]	1,800	2,050	3,100	3,100	2,800
Part handling	•	•	•	•	•
Pallet handling	—	•	•	•	•
Device handling	—	—	—	•	•

Our promise to you:

- Complete solution from a single source in a standardized design
- Part and component handling integrated in one system
- Reworking processes and peripheries
- Automatic part loading even for small lot sizes
- Automatic operation of one machine, even if the second machine is retooled



AUTOMATION SOLUTIONS

TURNKEY MANUFACTURING LINES

Complete process chain from a single source

The customer plant illustrated has two highly efficient GROB manufacturing lines for machining gearbox and clutch housings. In this turn-key project, GROB designed and built the machining centers, and also the complete automation system largely by itself. The linear gantry is available as I- or H-loader. It has one or two vertical axes per carriage. With the use of swivel changers, it can be loaded not only from the top, but also from the front.



AUTOMATIC FEEDING OF ROUGH PARTS

- ⊕ via a robot cell

MACHINING CENTERS

- ⊕ 1- and 2-spindle machining centers with 4 or 5 axes

PART CLEANING

- ⊕ with integrated high-pressure deburring machine

Our promise to you:

- ⊕ Reliable, high-volume series production of complex parts
- ⊕ Central handling and process design by GROB directly
- ⊕ Responsibility for all quality-relevant issues
- ⊕ Proof of machine capability and fulfillment of all quality characteristics with standardized pre-acceptance and final acceptance processes

HIGHLY DYNAMIC GROB LINEAR GANTRIES

- ⊕ designed as I- and H-loaders

GROB PART CONVEYORS

- ⊕ connect the individual stations with part-specific transport pallets

LEAK TEST STATION

- ⊕ with robot loading

PART TEMPERING

- ⊕ cooling zone via part conveyors

GROB-NET

4 INDUSTRY

Moving into a digital future with GROB

From planning to engineering to maintenance, GROB-NET⁴Industry combines relevant modules for increasing productivity and offers you the all-round package for modern production in the times of Industry 4.0.



GROB⁴CONNECT

- + Connection from the real world to the ERP system



GROB⁴INTERFACE

- + Easy route to machine communication



GROB⁴PORTAL

- + The secure cloud for industry



GROB⁴LINE

- + The machine in view via smartphone



GROB⁴ANALYZE

- + Feedback from the machine for the CIP process



GROB⁴ANALYZE OFFICE CLIENT

- + Feedback from the machine for the CIP process



GROB⁴COACH

- + Programming, simulation, training



GROB⁴CARE

- + Service and maintenance portal



GROB⁴OPTIMIZATION

- + Motorized spindle process evaluation



GROB⁴TRACK

- + Machine axes in view at all times



GROB⁴AUTOMATION

- + Intuitive production control software for unmanned operation



GROB⁴PILOT

- + Multi-functional machine operation



GROB⁴SIMULATE

- + Flexible data analysis



WANT TO KNOW MORE?

You can find a detailed description of the individual GROB-NET⁴Industry products in our **GROB-NET⁴INDUSTRY BROCHURE** in our GROB Download Center.

Intuitive production control software for unmanned operation

GROB⁴Automation supplies your machining center with parts or pallets through a fully automated process, providing automated, lightly manned production. The production control software controls and visualizes the flexible production cell and is operated via keyboard or touch.

OFFSET DATA

- + provide continuous information about the machine status

TOOL REQUIREMENT PLANNING

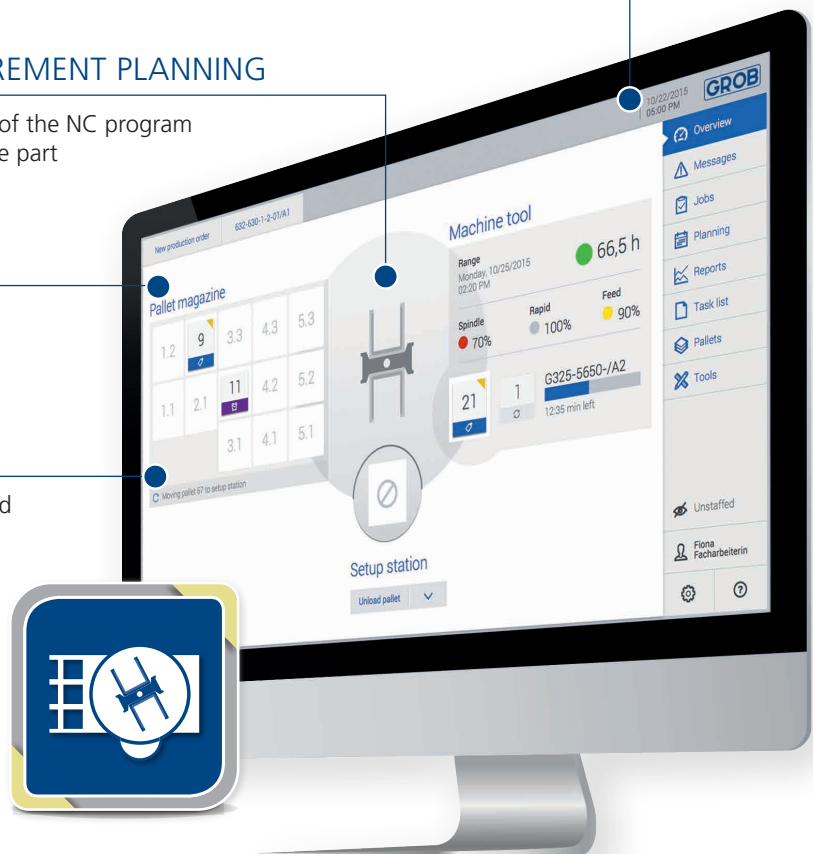
- + via assignment of the NC program to the respective part

PALLETS AND PARTS

- + Simple configuration of pallet storage positions

ESSENTIAL PROCESS STEPS

- + can be adapted in a user-friendly way and allow changing the machining order/priority of parts



Our promise to you:

- + Storage and retrieval of pallets via "drag & drop"
- + Quick acquisition of the machine status
- + Clear presentation of the machine and its parts/tools
- + Loading/unloading of pallets during machining

GROB SERVICE



For all who care about their production!

As a constant and reliable partner, our top priority is maximum productivity of your machine:
WORLDWIDE, A MACHINE LIFE LONG!

PRODUCTION SAFETY

- + Worry-free production and avoiding losses of production
 - Service Level Agreement
 - Express service
 - Spare parts supply
 - Motorized spindle service
 - Preventive maintenance & inspection



QUALITY & OUTPUT

- + Quantity in optimized quality and in the shortest time
 - Condition analysis
 - Cycle time optimization
 - Customer training
 - Mechanical & electrical repairs



ECONOMIC VIABILITY & SUSTAINABILITY

- + Cost reduction due to long and efficient machine running time
 - Overhaul
 - PCU/NCU retrofit
 - Retrofitting options
 - Digitalization GROB-NET⁴Industry



WANT TO KNOW MORE?

A detailed description of the individual GROB service products can be found in our **BROCHURE** on the **GROB AFTER SALES SERVICE** in our GROB download center.



GROB product range

UNIVERSAL MACHINING CENTERS

- ⊕ 5-axis universal milling machining centers, 5-axis universal mill-turn machining centers, additional tool magazines, pallet changer

SYSTEM MACHINES

- ⊕ One- and two-spindle G-modules, large machining centers, modular special-purpose machines, thermal spraying systems, machining centers for frame structure parts

E-MOBILITY

- ⊕ Production systems for electric motors, Assembly systems for battery cells and fuel cells



SOFTWARE

- ⊕ Modular web applications by GROB-NET⁴Industry

AUTOMATION

- ⊕ PSS-R light, PSS-R, PSS-L, flexible manufacturing systems, GRC, turn-key manufacturing lines

ASSEMBLY LINES

- ⊕ Individual assembly units, customer-specific assembly systems, motor assembly and gear assembly

Our promise to you:

- ⊕ All core expertise (sales, project management, engineering, production, assembly, commissioning and customer service) is concentrated under one roof
- ⊕ Permanent contact person throughout the entire project cycle
- ⊕ Our production facility offers you optimized vertical integration, and enables us to dynamically control capacities and respond to bottle neck situations in a flexible manner





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Detroit, Michigan, USA
Querétaro, Mexico

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Pianezza (TO), Italy
Birmingham, Great Britain
Hengelo, Netherlands
Senlis, France
Baar, Switzerland
Poznań, Poland
Győr, Hungary
Moscow, Russia

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