RETROFITTING OPTIONS AUTOMATION

FOR UNIVERSAL MACHINING CENTERS

RETROFITTABLE 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.

GROB automation technology allows you to **FLEXIBLY ADAPT TO CAPACITIES** and guarantees **PALLET, PART AND / OR TOOL HANDLING PERFECTLY IN TUNE WITH YOUR NEEDS.**

STANDARD AUTOMATION

- PSS-R light, PSS-R, PSS-L
- Pallet handling
- Round or linear configuration
- Tool storage systems e. g. TM167

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

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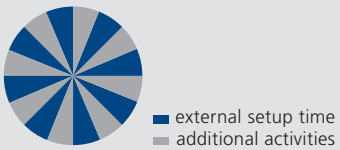
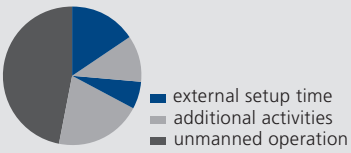
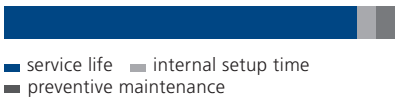
ECONOMIC VIABILITY

Productivity – Your key to success!

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

Automation – customized for your product range

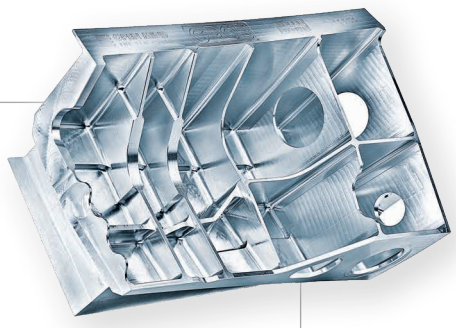
Automation solutions help increase output while reducing unit cost. Our products and competent consultation services help you find the ideal solution for your needs and future-proof your production.

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		
Machine availability		

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



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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

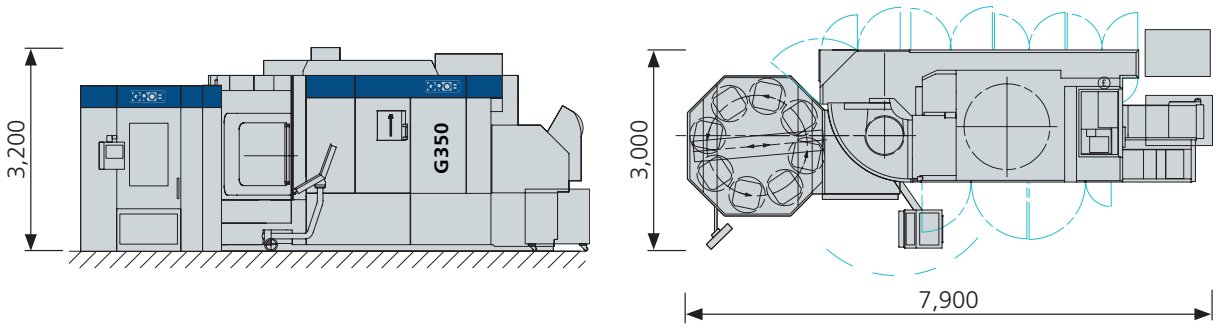
COMPACT FOOTPRINT

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

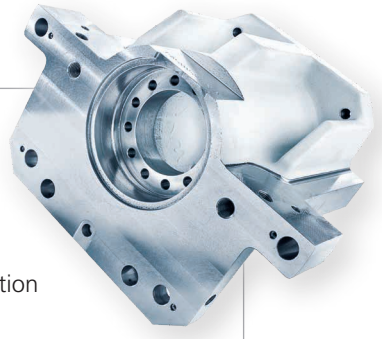
Automation solution specifications and dimensions

TECHNICAL DATA ▸ G150 ◂▸ G350a / G350		
Available machines	**G150**	**G350a / G350**
Design variant	PSS-R light	
Pallet size [mm]	320 x 320	400 x 400
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

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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

PALLET STORAGE RACKING

- with drip pans and optional cutting fluid recirculation

COMPACT FOOTPRINT

- for up to 15 pallet storage positions (pallet 400 x 400)

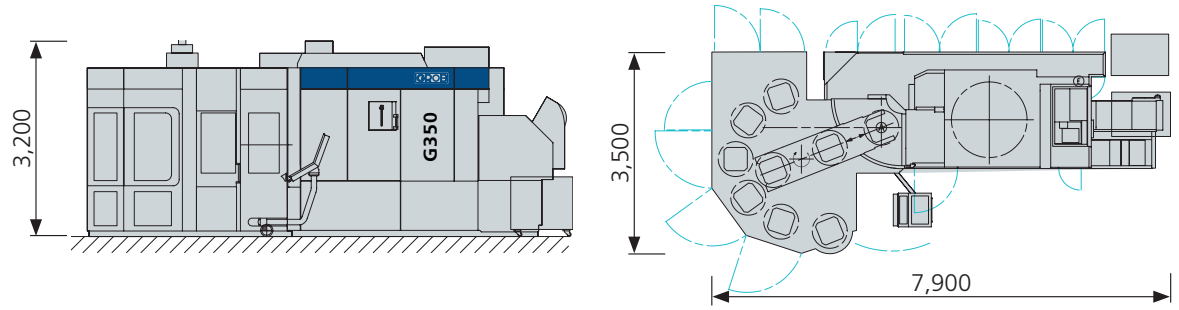
ADVANCED PRODUCTION CONTROL SOFTWARE GROB⁴AUTOMATION

- 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]	400 x 400	630 x 630
Max. pallet spaces (on three levels)	10 / 15 / 20	5 / 10 / 13
Max. interference diameter [mm]	Ø 600	Ø 900
Max. interference height [mm]	500	785

G350 WITH PSS-R ▸ DIMENSIONS



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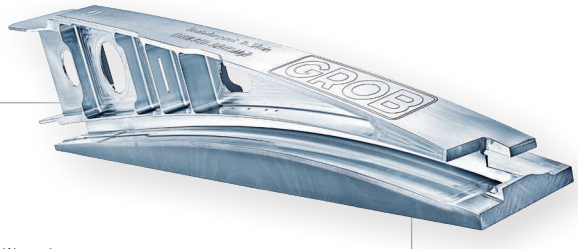

Our promise to you:

- 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

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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 GROB[4]AUTOMATION

- 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

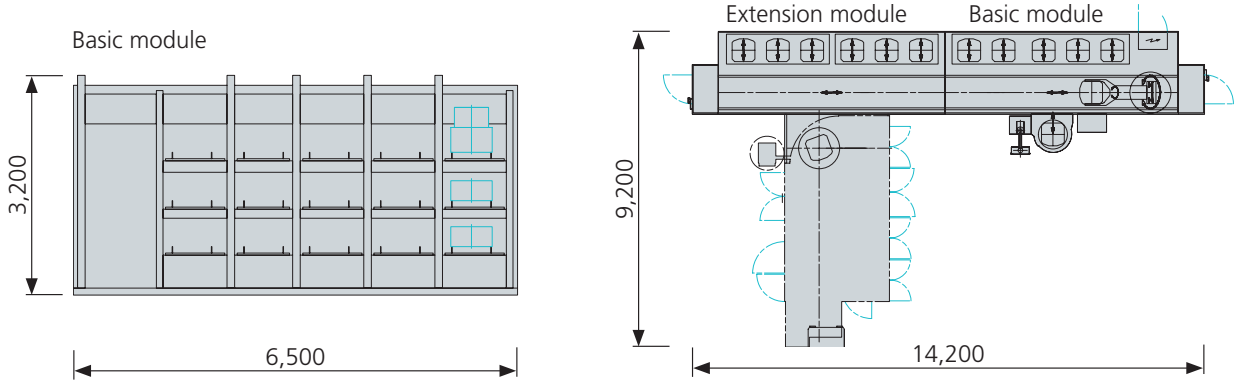
DYNAMIC PALLET CHANGING DEVICE

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

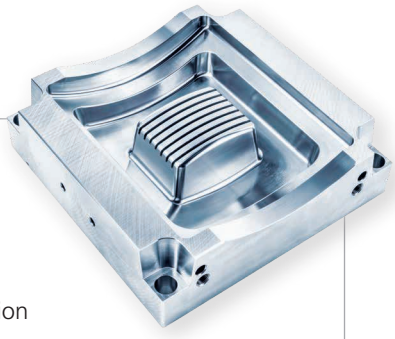
Automation solution specifications and dimensions

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

G550 WITH PSS-L630 ▸ DIMENSIONS



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

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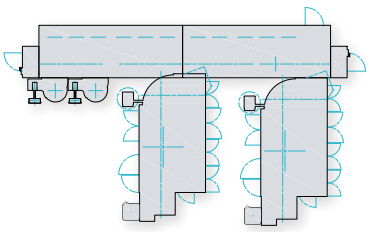
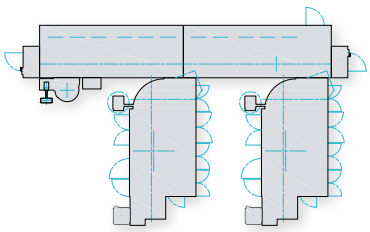
Simulation example PSS-L – from first concept study to optimized automation solution

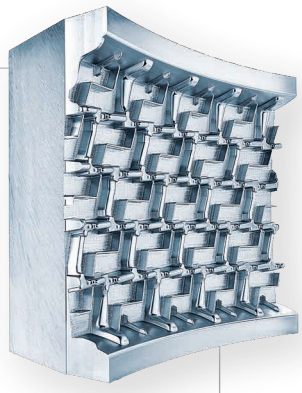
The following parameters are the basis for the optimized automation simulation:

- 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



Additional tool magazine TM (option)

- Increases the basic machine's tool capacity with block-wise setup to up to:
  - 6 HSK-A63 tools on the TM200, TM309, and TM374
  - 5 HSK-A100 tools on the TM180 and TM251
- The additional tool magazine can be 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, machining time is not affected
- Tool and magazine management via an industrial control system (Beckhoff-TwinCAT) with screen and keyboard

NUMBER OF TOOL POCKETS ▸ G350

Basic machine			Additional tool magazine TM		
Motorized spindle	Tool interface	Number of tool pockets*	Total number of tools of the basic machine and the TM		
Single disk-type tool magazine			**TM200**	**TM309**	**TM374**
For all spindle types	HSK-A63	60	251	360	425
Double disk-type tool magazine			**TM200**	**TM309**	**TM374**
For all spindle types	HSK-A63	117	311	420	485
	HSK-A63	105**	293	402	467

NUMBER OF TOOL POCKETS ▸ G550

Single disk-type tool magazine			**TM200**	**TM309**	**TM374**	**TM180**	**TM251**
For all spindle types	HSK-A63	70	261	370	435	—	—
	HSK-A100	40	—	—	—	211	282
Double disk-type tool magazine			**TM200**	**TM309**	**TM374**	**TM180**	**TM251**
For all spindle types	HSK-A63	137	331	440	505	—	—
	HSK-A63	126**	317	426	491	—	—
	HSK-A100	77	—	—	—	251	322
	HSK-A100	69**	—	—	—	243	314

NUMBER OF TOOL POCKETS ▸ G750

			With SIEMENS control system			With HEIDENHAIN or FANUC control system		
Single disk-type tool magazine			**TM167**	**TM218**	**TM145**	**TM167**	**TM218**	**TM145**
12,000/16,000/18,000/ 30,000 rpm	HSK-A63	60	221	272	—	218	269	—
Double disk-type tool magazine			**TM167**	**TM218**	**TM145**	**TM167**	**TM218**	**TM145**
12,000/16,000/18,000/ 30,000 rpm	HSK-A63	120	281	332	—	278	329	—
9,000/10,000 rpm	HSK-A100	60	—	—	200	—	—	196

*Number of tool pockets depends on machine configuration
**Ability to store extra-long tools over both magazine disks due to double assignment

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GROB robot cell (GRC)

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

PALLET/ DEVICE STORAGE

- with integrated gripper station

OPTIMAL ACCESS TO THE SETUP STATION

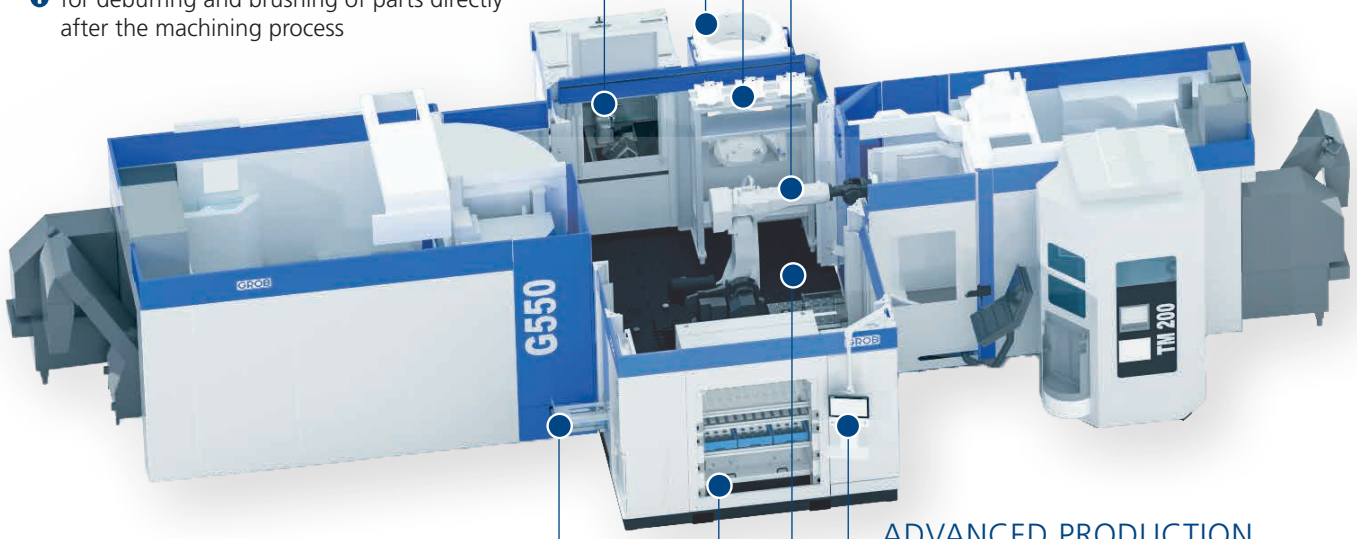
- allows pallet loading and unloading during the machining operation with accessibility from above

6-AXIS INDUSTRIAL ROBOT

- from FANUC (standard), KUKA and ABB (optional) with quick coupling for gripper change and pallet handling

DEBURRING STATION

- for deburring and brushing of parts directly after the machining process



FEED-OUT

- of SPC parts (Statistical Process Control)

ADVANCED PRODUCTION CONTROL SOFTWARE GROB[4]AUTOMATION

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

COMPACT TRAY SYSTEM

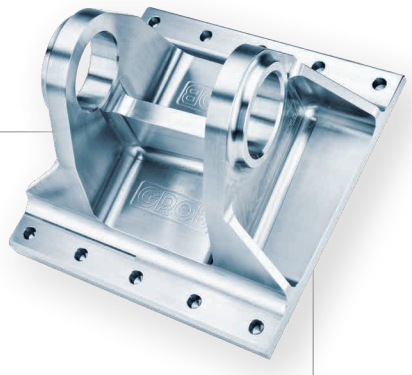
- for loading and unloading of the parts during machining operations thanks to an innovative protection concept

ENTIRE PLANT ON ONE PLATFORM

- for quick installation and short commissioning

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

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GROB-NET 4 INDUSTRY

Moving into a digital future with GROB

With our modularly developed GROB-NET⁴Industry web applications, you can network and digitalize your production processes across plants, making your manufacturing even more efficient.

GROB⁴LINE
- The machine in view via smartphone

GROB⁴ANALYZE
- Feedback from the machine for the CIP process

GROB⁴ANALYZE OFFICE CLIENT
- Flexible data analysis

GROB⁴OEE
- Reduce machine downtime, increase efficiency

GROB⁴CONNECT
- Connection from the real world to the ERP system

GROB⁴INTERFACE
- Easy route to machine communication

GROB⁴PORTAL
- The secure cloud for industry

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

GROB⁴COACH
- Programming, simulation, training

GROB⁴SIMULATE
- Complexe processes and parts simply simulated

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

GROB[4]Automation 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

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GROB-WERKE GmbH & Co. KG
Mindelheim, GERMANY
Tel.: +49 8261 996-0
E-mail: info@de.grobgroup.com

GROB SYSTEMS, Inc.
Detroit, Michigan, USA
Tel.: +1 419 3589015
E-mail: info@us.grobgroup.com

GROB SCHWEIZ AG
Baar, SWITZERLAND
Tel.: +41 76 8191381
E-mail: info@ch.grobgroup.com

GROB MACHINE TOOLS (CHINA) Co., Ltd. Shanghai Branch
Shanghai, P.R. CHINA
Tel.: +86 21 3763-3018
E-mail: shanghai@cn.grobgroup.com

B. GROB DO BRASIL S.A.
São Paulo, BRAZIL
Tel.: +55 11 4367-9100
E-mail: info@grob.com.br

GROB MEXICO S.A. de C.V.
Querétaro, MEXICO
Tel.: +52 442 713-6600
E-mail: info@mx.grobgroup.com

GROB POLSKA Sp. z o.o.
Poznań, POLAND
Tel.: +48 728 646000
E-mail: info@pl.grobgroup.com

GROB JAPAN K.K.
Yokohama, JAPAN
Tel.: +81 45 414-3390
E-mail: info@jp.grobgroup.com

GROB SYSTEMS, Inc.
Bluffton, Ohio, USA
Tel.: +1 419 358-9015
E-mail: info@us.grobgroup.com

GROB MACHINE TOOLS U.K., Ltd.
Birmingham, GREAT BRITAIN
Tel.: +44 121 366-9848
E-mail: info@uk.grobgroup.com

GROB HUNGARIA Kft.
Győr, HUNGARY
Tel.: +36 30436-4471
E-mail: info@hu.grobgroup.com

GROB KOREA Co., Ltd.
Seoul, SOUTH KOREA
Tel.: +82 31 8064-1880
E-mail: info@kr.grobgroup.com

GROB MACHINE TOOLS (CHINA) Co., Ltd.
Dalian, P.R. CHINA
Tel.: +86 411 39266-488
E-mail: dalian@cn.grobgroup.com

GROB BENELUX BV
Hengelo, NETHERLANDS
Tel.: +31 74 3490207
E-mail: info@nl.grobgroup.com

GROB RUSS-MASCH GmbH
Moscow, RUSSIA
Tel.: +7 495 795-0285
E-mail: info@ru.grobgroup.com

GROB VIETNAM Co., Ltd
Haiphong, VIETNAM
Tel.: +84 225 8832-415
E-mail: info@vn.grobgroup.com

GROB ITALY S.r.l.
Pianezza, ITALY
Tel.: +39 011 9348292
E-mail: info@it.grobgroup.com

GROB FRANCE S.A.R.L.
Senlis, FRANCE
Tel.: +33 3650 95025
E-mail: info@fr.grobgroup.com

GROB MACHINE TOOLS (CHINA) Co., Ltd. Beijing Branch
Beijing, P.R. CHINA
Tel.: +86 10 6480-3711
E-mail: beijing@cn.grobgroup.com

GROB MACHINE TOOLS INDIA Pvt., Ltd.
Hyderabad, INDIA
Tel.: +91 40 4202-3336
E-mail: info@in.grobgroup.com

www.grobgroup.com