



TRAINING CONCEPT

GROB UNIVERSAL MACHINING CENTER

TRAINING CONCEPT



GROB customer trainings

As products become more and more complex and the competition gets tougher, the importance of customer training as a key component of the GROB global range of services is constantly growing.

An experienced team of qualified trainers is squaring up to this challenge at GROB.

The GROB service range

Besides individual customer consultation and support, the GROB service range above all includes a wide range of training and development modules.

From system operation, NC programming to preventive maintenance and inspection through to mechanical and electrical maintenance, these modules cover all there is to know about our extensive product range.

We offer various training modules for operators, programmers, installation engineers and maintenance engineers so that you get the best out of your GROB machining center. All training modules are available for SIEMENS 840D sl, HEIDENHAIN iTNC 530 and TNC 640, as well as FANUC 30i-B control systems. Our small group approach means that due consideration can be given to the interests and prior knowledge of all participants.

Depending on availability, individual training modules can be configured to suit particular needs.

All participants who successfully attend the GROB customer training receive a certificate.



The GROB training modules at a glance

STANDARD TRAINING MODULES

| |
|---|
| NC programming |
| Operation |
| Touch probe programming |
| Mill-turn technology |
| GROB rotary pallet storage system (PSS-R) |
| GROB machine calibration |
| Electrical maintenance |
| Mechanical maintenance |

YOUR CONTACT

GROB customer training

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E-mail: training@grob.de

www.grobgroup.com

Detailed information on training enquiries and applications can be found on page 10.

SPECIAL TRAINING MODULES

| |
|---|
| Additional tool magazine |
| Laser tool measurement |
| NC programming (basic training) |
| NC programming (advanced training) for flexible program design (system variables, logging, user variables etc.) |
| Cycle programming |
| Reliable, GROB-specific programming |
| Interpolation turning PLUS |
| U-axis |
| GROB Spindle Diagnostics (GSD) |
| GROB chip-in-spindle detection system (SiS) |
| GROB manufacturer cycles |
| Lateral entry course, Heidenhain iTNC 530 to TNC 640 |

TRAINING MODULES

GROB standard training modules

You will be closely acquainted with GROB machining centers through various modules. No matter whether novice or experienced machine operator – we demonstrate how the machines work to optimal effect.

| NC PROGRAMMING | |
|---------------------------|--|
| Requirements | Basic knowledge of NC programming on the control system used |
| Duration | 2 days |
| Contents | <ul style="list-style-type: none">• Swiveling the machining plane with the control's own swivel cycles• Producing boreholes and surfaces on swiveled-in planes• GROB manufacturer cycles |
| Learning objective | <ul style="list-style-type: none">• Autonomous machine programming in five axes |

| OPERATION | |
|---------------------------|--|
| Requirements | Basic knowledge of the control system used |
| Duration | 3 days |
| Contents | <ul style="list-style-type: none">• Safety• Operation, including. pallet change• Program entry• Tool management system• Loading and unloading tools• Touch probe calibration• Touch probe in manual mode• Standard machine calibration• Daily inspection/preventive maintenance of the universal machining centers |
| Learning objective | <ul style="list-style-type: none">• Autonomous and safe machine operation in manual and automatic mode• Correct handling of tools and associated data• Correct handling of the touch probe• Recognizing the need for machine maintenance |



TOUCH PROBE PROGRAMMING

| | |
|---------------------------|--|
| Requirements | Basic knowledge of NC programming on the control system used |
| Duration | 1 day |
| Contents | <ul style="list-style-type: none"> • Measuring cycles in automatic mode • Positioning parts • Setting part zeros • Correcting tool geometry data |
| Learning objective | <ul style="list-style-type: none"> • Positioning parts in the work area • Checking and correcting parts |

MILL-TURN TECHNOLOGY

| | |
|---------------------------|--|
| Requirements | Participation in the "Operation" module or profound experience with GROB machining centers |
| Duration | 1 day |
| Contents | <ul style="list-style-type: none"> • Safety during turning • Balancing parts • Differentiating and switching between milling and turning mode • Expanded tool management including geometries of turning tools • Function of GROB's turning cycle • Machining of a sample part |
| Learning objective | <ul style="list-style-type: none"> • Safe machining in turning mode • Safe handling of turning tools • Safe handling of swivel cycles in turning mode |

TRAINING MODULES



| GROB ROTARY PALLET STORAGE SYSTEM (PSS-R) | |
|---|--|
| Requirements | Basic knowledge of the machining unit used |
| Duration | 1 day |
| Contents | <ul style="list-style-type: none"> • Safety • Configuration and function of the GROB rotary pallet storage system (PSS-R) • Fundamental principles of the pallet storage system control software • Generation of work plans • Production planning |
| Learning objective | <ul style="list-style-type: none"> • Autonomous and safe operation of the PSS-R • Appropriate equipping and production planning |

| GROB MACHINE CALIBRATION | |
|---------------------------|--|
| Requirements | Participation in the "Operation" module or profound experience with GROB machining centers |
| Duration | 1 day |
| Contents | <ul style="list-style-type: none"> • Backgrounds of machine calibration • Influencing the calibration via variables • Determination of individual measuring positions • Checking the calibration via measuring programs and a log file • Automation possibility |
| Learning objective | <ul style="list-style-type: none"> • Understanding of necessity and individual adjustment of the calibration • Detailed insight into the calibration process and its setting variables • Safe handling of control programs and logs |

| ELECTRICAL MAINTENANCE | |
|---------------------------|---|
| Requirements | <ul style="list-style-type: none"> • Training on electrical or electronic systems • Basic knowledge of the drive and control technology, as well as the control system used |
| Duration | 3 days <ul style="list-style-type: none"> • Course composition: Combination of theory (50 %) and practical exercises (50 %) |
| Contents | <ul style="list-style-type: none"> • Safety training • Functional description of electrical components • Data backup • Data recovery • Hardware replacement • Hardware settings • Diagnostic options • Fault analysis and the correct approach to machine malfunctions |
| Learning objective | <ul style="list-style-type: none"> • Minimizing machine downtimes through preventive maintenance activities • Maintenance of electrical components • Rectifying and localizing electrical faults • Creation and use of data backup as a frame of reference • Confident handling of the documentation |

| MECHANICAL MAINTENANCE | |
|---------------------------|---|
| Requirements | <ul style="list-style-type: none"> • Well-founded training on mechanical systems (metalworking, chipping production) • Fundamental principles of hydraulic, pneumatic and lubrication systems (lubricants, lubrication diagrams) • Experience in maintaining automated machine tools and of diagnosing faults and their causes |
| Duration | 3 days <ul style="list-style-type: none"> • Course composition: Combination of theory (30 %) and practical exercises (70 %) |
| Contents | <ul style="list-style-type: none"> • Introduction to safety technology • Configuration of the machine (assemblies, guides, drives, measuring systems, tool magazine) • Introduction to machine documentation, service and maintenance tasks and special equipment • Motorized spindle (preventive maintenance and inspection) • Machine zeros • Fluid technology |
| Learning objective | <ul style="list-style-type: none"> • Using the technical documentation as a frame of reference • Carrying out inspection and maintenance tasks • Correcting setting reference points • Localizing and rectifying mechanical faults • Implementing the measures required for safe operation and maintenance • Familiarization with the correct procedure for starting a shutdown machine |

GROB special training modules

If you are interested in any of the following special trainings, please contact the Training Department at GROB. These courses are not defined in terms of time. The modules can therefore be combined and taught to meet the customer's particular needs and requirements.

We would be happy to send you detailed information on the content, duration and prices.

ADDITIONAL TOOL MAGAZINE

Contents

- Fundamental principles of the Beckhoff control system
- Inputting tool data
- Magazine configuration
- Loading and unloading tools
- Emergency strategy

LASER TOOL MEASUREMENT

Contents

- Calibration
- Tool measurement
- Wear measurement
- Tool breakage detection
- Cutting edge monitoring

NC PROGRAMMING (BASIC TRAINING)

Contents

- Principles of NC programming
- Straight and circular programming
- Machining cycles
- M- and H-functions
- Milling with radius correction
- Creating program examples on the simulation software

NC PROGRAMMING (ADVANCED TRAINING)

Contents

- Flexible program design
- Reading and writing of system variables
- Creation of log files
- Definition and usage of user variables

CYCLE PROGRAMMING

Contents

- Programming drilling and tapping cycles
- Programming milling cycles
- Contour milling

RELIABLE, GROB-SPECIFIC PROGRAMMING

Contents

- Using GROB manufacturing cycles
- Modifying the reset program
- Checking the tool data
- Automatic program entry after program abort

INTERPOLATION TURNING PLUS

Contents

- Tool management, defining tool data
- Interpolation turning cycles
- Plane switchover
- Programming a component with turning contour

U-AXIS

Contents

- Tool management, defining tool data for a U-axis
- GROB cycles for using the U-axis
- Plane switchover
- Programming a component with turning contour

GROB SPINDLE DIAGNOSTICS (GSD)

Contents

- Function and benefits
- Standard supervision via the HMI
- Using and evaluating the diagnostic software

GROB CHIP-IN-SPINDLE DETECTION SYSTEM (SiS)

Contents

- Function and benefits
- Function test

GROB MANUFACTURER CYCLES

Contents

- Application of all available GROB manufacturer cycles
- Entering the required cycle parameters

LATERAL ENTRY COURSE, HEIDENHAIN iTNC 530 TO TNC 640

Contents

- New cycles (face milling cycle 233 and others)
- New, fast and high-performance removal simulation
- Working with the preset table
- New probing functions
- New TNC functions
- DXF converter
- Control system comparison iTNC 530 ◀ ▶ TNC 640

GENERAL INFORMATION

Individual training opportunities with GROB

If you are not sure which is the best course for you, we will be happy to devise individual training concepts. We work with you to analyze your needs and requirements to develop a tailored course that fulfills your personal aspirations.

Please submit your training enquiry/application to:

E-mail: training@grob.de • Tel.: +49 8261 996-5771

| GENERAL INFORMATION | |
|---|--|
| Application | <p>Please provide the following information when you submit your training enquiry / application:</p> <ul style="list-style-type: none">• Relevant training module• Number of participants, along with their first names and surnames (The maximum number of participants per course is limited to <u>five</u>, applications will therefore be considered in the order in which they are received in writing. If there are fewer than three participants, GROB reserves the right to postpone the course date, even at short notice.)• Your complete contact data (Company name, address with telephone number and e-mail address, as well as a contact for queries.) <p><i>The training application is binding only after our e-mail confirmation!</i></p> |
| Training duration | The duration of the courses varies. One training day usually lasts seven hours, including breaks. |
| Language of the training | German or English. If interpreters are required, they must be provided by the customer. We will of course assist you with your search for an adequate interpreter. |
| Cancelation | A cancelation of the training is free of charge, provided that the written cancelation notice arrives at GROB 14 days before the start of the course at the latest. Cancelations received after this time will attract 10 % of the course fees. If a participant fails to show or leaves the course prematurely, the full fee will be charged. |
| Course cancelation | If the minimum participant number of three persons is not reached, or in case of force majeure, GROB shall be entitled to change the date for the purpose of merging courses or to cancel the course. GROB shall not be liable for any further costs incurred as a result of canceled courses. |
| Course procedure | All courses are held at GROB in professionally-equipped training rooms. |
| Course materials | Training documentation is offered in German or the language of the Technical Documentation delivered. Please do not hesitate to contact us if in need of further languages. The course materials are protected by copyright. They must not be copied nor otherwise reproduced, either in whole or in part, without the trainer's prior consent. |
| Disclaimer | The information on the courses and in the associated materials is always conveyed to the best of our knowledge. GROB does not accept any liability for discrepancies or errors. The written information in particular does not constitute any assurance of quality or the equipment variants of the sold machines. |
| Accommodation during the courses | The participants must arrange their own accommodation. We will of course assist you with your search for overnight accommodation. |
| Security | The training participants are under an obligation to observe and comply with the security regulations applicable on GROB company premises. Specifically, the participants are obliged to wear safety footwear. Please bring safety footwear with you to the training. |
| Costs | We will happily provide you will all costs on request. Generally speaking, the costs are calculated per training day and participant. |
| Meals | On each training day, each participant receives drinks, snacks and one lunch free-of-charge in the GROB company restaurant. |



THE GROB GROUP

Tradition – Know-how spanning generations

As a global, family-owned company, we have been developing manufacturing systems and machine tools for more than 90 years. Our customers include the world's leading automotive manufacturers, their component suppliers and other companies from a broad range of sectors.

We have an international reach through our production plants in Mindelheim (Germany), Bluffton (Ohio, USA), São Paulo (Brazil), Dalian (China) and Turin (Italy), as well as through our worldwide service and sales branches. The GROB Group employs 6,600 people and generates 1.5 billion euro in revenue from all around the world (17/18 fiscal year).

GROB product range

SYSTEM MACHINES

- G-modules
- Large machining centers
- Modular special-purpose machines
- Thermal spraying systems
- Machining centers for frame structure parts
- Machine configuration for turbine housing production
- Motorized spindles

UNIVERSAL MACHINING CENTERS

- 5-axis universal milling machining centers
- 5-axis universal mill-turn machining centers
- Large machining centers
- Pallet storage systems
- Additional tool magazines
- Motorized spindles

ASSEMBLY SYSTEMS

- Individual assembly units (fully-automatic, semi-automatic, manual)
- Customer-specific assembly systems

E-MOBILITY

- Production systems for electric motors (stator, rotor and overall assembly)
- Assembly systems for battery cells and fuel cells

SOFTWARE AND AUTOMATION SOLUTIONS

- GROB-NET⁴Industry (the Industry 4.0 solution)
- Transport systems (e.g. automation and loading systems)
- Highly-complex manufacturing lines (turnkey projects)

GROB core expertise

- ⊕ At GROB, all core expertise is concentrated under one roof:
Sales • Project Management • Design • Production • Assembly • Commissioning • Customer Service
- ⊕ Clear sales structure: You have one dedicated contact person throughout the 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
- ⊕ You can reach our Customer Service 24 hours a day



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