Media

Drive & Control Academy
More knowledge, more benefits: understand and apply hydraulics better.

Unique knowledge at your fingertips: Hydraulics, pneumatics, mechatronics and automation are easy to understand with the Drive & Control Academy training systems from Rexroth. Educational institutions are thereby able to provide practical training based on up-to-date knowledge with original series components. Practically supplemented by online and eLearning tools, and a large media library including manuals, textbooks, exercise books and animations – and with product-related further training courses.

They all embody the unique technological knowledge of Rexroth who, as a world leader in drive and control technologies with 270 production sites, is one of the largest training companies for technical professions. You can learn more here: www.boschrexroth.com/academy

Bosch Rexroth AG
Drive & Control Academy
Bahnhofplatz 2, 97070 Würzburg, Germany
Foreword

Expand your knowledge and strengthen your skills with media from the Drive & Control Academy. It is important to promote an extensive knowledge base, as it is the key to success in all sectors of the technology industry. This catalog contains a comprehensive offer for both the next generation of technical talent and already successful professionals. The large selection of teaching and learning material for the areas of electrical drive and control technology, hydraulics, pneumatics and linear and assembly technology offers cross-technology insights and enables a comparison of the different drive technologies.

The media on offer is suitable both for self-study and as companion material for teaching.

We are committed to the continuous enhancement of our existing media as well as developing new content.

We would be happy to consider your suggestions and ask you to provide feedback.

Bosch Rexroth AG
Drive & Control Academy
Content

General information
The Drive & Control Academy, Trainings systems, Media, Knowledge Portal, Training, Rexroth LearnWorld, Tablet-PC, eDrive&Control Academy, Icons

New Products
Literture: Dictionary – Android App
eLearnings: Basic knowledge of mobile hydraulics, Automotive technology Animations: Hydraulic accumulators, Steering systems, Joystick Software: Simster, CHoose

Literature
Hydraulics, Dictionary, Oil cleanliness booklet, Pneumatics, Mechatronics, Linear motion technology, Sensors, Safety technology

eLearning
Hydraulics, Electric drive technology, Electric control technology, Pneumatics, Linear motion technology, Functional Safety, Energy efficiency, Automation, Automotive technology

Working material
Symbol stencil, Slide rule, Magnetic symbol case

Posters/Cutaway models
Posters: Hydraulics, Pneumatics Cutaway models: Pressure valves, Directional control valves, Non-return valves, Vane pump

Multimedia
Animations: Hydraulics, Pneumatics Web-App Film series

Software
Automation Studio Education™, HYVOS 7.0, Simster, CHoose, Hydrostatic calculations, D&C Scheme Editor, IndraMotion MTX micro Trainer, MTpro light

Free Guest Access

Ordering information/Product overview
The Drive & Control Academy.
Providing access to unique knowledge.

As a leading specialist in drive and control technology, Bosch Rexroth has a unique level of technological expertise. We are keen to pass on this knowledge to apprentices and students and to specialists and employees. At the Drive & Control Academy, we support the tailored training, development and qualification of technical specialists. Hands-on, tailored to the target groups, and using the most modern methods.

Our training fields
- Industrial Hydraulics
- Mobile Hydraulics/Mobile Electronics
- Electric Drives and Controls
- Pneumatics
- Automation/Mechatronics
- Linear Motion and Assembly Technology
- Safety Technology
- Energy Efficiency
- Applications
Knowledge is everything

Employees’ specialist knowledge and expertise create a decisive advantage in the competitive global market. Under the umbrella of the Drive & Control Academy, Rexroth therefore offers a practice-oriented portfolio of knowledge products in the area of drive and control technologies. The Academy sets standards in the didactic preparation of specialized and integrated know-how – for customers, employees as well as education and training institutions.

Everything we offer is based on the same principles:
1. State-of-the-art, practice-oriented equipment
2. Training tailored to specific target groups
3. The latest teaching methods and media

The Drive & Control Academy concept is based on our four pillars of knowledge transfer: Training, Training systems, Media, and Knowledge Portal.

Training
At Rexroth, knowledge is always transferred using state of the art technology and the very latest methods and media. No matter which training method is used – face-to-face training, eLearning, eTraining with online access via the Rexroth LearnWorld, special practical training, blended learning, which perfectly combines the advantages of face-to-face events and eLearning – the principle of customer proximity is paramount.

Training systems
The modular training systems developed by Rexroth specialists provide beginners and more advanced learners alike with tangible technical know-how and problem-solving expertise. Industrial series components, internationally standardized programming languages and open interfaces are used to experience our sound practical knowledge.

Media
Rexroth prides itself on providing training and learning media that always use the very latest technology while maintaining strong practical relevance. Therefore, the latest eLearning and eTraining modules full of animations and simulation-based learning units are included. We also supply printed textbooks and handbooks, eBooks, apps, software and useful work materials.

Knowledge Portal
Knowledge on the Internet - that’s what Rexroth is working on with its Knowledge Portal: In addition to the topics from the existing Rexroth LearnWorld, the portal is evolving to become a multimedia contact point for knowledge pertaining to drive, control and motion technology. The aim is for it to become the core component of our professional and college training in the future. It gives users unique access to high quality information. Community and Wiki functions enable the structured sharing of knowledge and experience for the first time.
Technical know-how and problem-solving expertise in industrial applications is seamlessly integrated into Rexroth’s modular training systems. Consisting of hardware and exercise books, they impart practice-oriented knowledge. They are precisely tailored to the qualification levels of industry and educational institutions.

**Unique learning with standard components**

The training systems allow practical exercises on current standard components from the industrial sector, including the use of standardized programming languages and open interfaces. Just like those used in professional practice. From a handy case to a mobile work station, various training systems are available for hydraulics, pneumatics and automation.

**Hydraulics**

A wide variety of exercises, along with device and fault sets, are available for all kinds of practical hydraulics applications – e.g. for on/off hydraulics, proportional technology, control technology and even mobile applications.

**Pneumatics**

In the field of pneumatics, Bosch Rexroth provides exercises and device sets for standard pneumatics, electro-pneumatics and control engineering. The patented mounting system for the components ensures full flexibility while maintaining a secure hold.

**Automation/Mechatronics**

They help you to understand complex relationships: The automation technology work stations integrate control and drive technologies in a single system. Hydraulic, pneumatic and electric drives as well as linear technology are used. By means of the control technology and sensors, drives are connected to form a complete system.
With a comprehensive range of media in printed and digital form, Rexroth ensures the qualified transfer of knowledge across all channels. The media can be used as work materials for trainers, and for independent eLearning and eTraining to prepare, accompany, and follow-up teaching and training courses.

**Literature**
Documents in eBook format have now become standard. However, textbooks and handbooks, dictionaries as well as teaching and work materials in printed form are and will continue to be part of the Drive & Control Academy portfolio.

**Software**
Software, software-based teaching and learning media as well as apps are key components of competent knowledge transfer at Rexroth – not only in independent eLearning.

**Videos and animations**
Videos and interactive 2D and 3D animations illustrate complex motion sequences and highlight complicated technical relationships.

Try out the free guest access:
www.boschrexroth.com/animation

Orders to:
media@boschrexroth.de

Or through our eShop:
www.boschrexroth.com/eshop
Knowledge Portal

The goal is set: The Drive & Control Academy’s newly developed Knowledge Portal will establish itself step by step as the multimedia benchmark in industrial and academic basic and further training. It is based on the topics and tools from the Rexroth LearnWorld. Via the Internet you have unique access to all aspects of drive, control and motion technology at all times. Practice-oriented knowledge transfer, interactive exchange of experiences, and a convenient service. Everything from a single source.
Rexroth has long established itself in the market as a competent partner for further training for numerous companies and institutions. New training courses and the continuous further development of existing training courses as well as experienced and highly qualified trainers guarantee that the qualification is always kept up to date.

The Drive & Control Academy is certified according to DIN EN ISO 9001:2008.

The combination of conventional and digitalized teaching and learning methods stands for customized realization of employee qualification.

**Methods**

Face-to-face and practical training with personal contact: direct communication and, above all, “grasping” the components reinforce the theoretical content. That is why the majority of Rexroth training courses include practical exercises. With the support of their trainers, the participants set up exercises at practical training systems. The interaction of eLearning and face-to-face courses – whether in preparation for, during, or after the training, or even for individual eLearning – considerably extends the toolbox of methods with numerous advantages.

**Bosch trainer qualification**

Bosch’s modular and certified trainer education guarantees high-quality, sustainable, refresher training for trainers in soft skills and technical topics. Even very experienced trainers develop further in order to keep their fingers on the pulse of the times – and ensure that the knowledge transfer from trainers to the participants works well.
Rexroth LearnWorld

www.boschrexroth.com/learnworld

Training

You will receive the access data for Rexroth LearnWorld in your registration confirmation.

- Videos, animations
- Exercise books, practical training
- Textbooks
- Software/Tools
  - Automation Studio
  - Scheme Editor
  - MTX micro Trainer
  - HYVOS
- Knowledge check per training course
- eTraining Virtual Classroom
- eLearning
- Training documents
- Training Program 2016
  - Information
  - Newsletter
  - more
Tablet PC

Electronic documentation for trainees

The Drive & Control Academy makes use of tablet PCs in numerous face-to-face training courses: All participants receive the documentation for the scheduled training in digital form on a tablet. This device replaces the printed documentation.

The tablet is included in the training fee and belongs to the customer.*

The following documentation packages can be found on your tablet:
- Training documents for the scheduled training
- Bosch and Bosch Rexroth: Information and apps
- Various software and configuration tools

* On request, participants can also receive printed documents instead of a tablet.
In the eDrive & Control Academy (eDCA), Rexroth offers you electronic knowledge transfer. These are often available regardless of time and location, in different languages and 24 hours a day. Use the offer as an alternative learning method to supplement and prepare for classic classroom or practical training, or also as straightforward knowledge transfer variant for autodidactic qualification.

**eLearning**
Independent learning at a computer is an integral part of knowledge transfer.

We offer you qualified and certified eLearning with maximum flexibility.

The eLearning offer from the Drive & Control Academy includes all Drive & Control technologies.

[www.boschrexroth.com/eLearning](http://www.boschrexroth.com/eLearning)

**eTraining**
We all know YouTube, learning videos, webinars, online meetings and news and much more: The digital transfer of knowledge and information is an integral part of qualification.

A trainer provides you with simple and concise information on exciting topics pertaining to technical basic and further training in a Rexroth eTraining session (live or recorded).

[www.boschrexroth.com/eTraining](http://www.boschrexroth.com/eTraining)

**eBooks**
Technical literature: convenient to use, individually adjustable font size, simple chapter selection, didactically prepared graphics, no physical space requirement. eBooks – a clever supplement to autodidactic further training and a useful reference.

[www.boschrexroth.com/learnworld](http://www.boschrexroth.com/learnworld)
Icons

We use the following icons for orientation in this media catalog:

**General information**
- Drive & Control Academy
- New Product
- Information

**Drive & Control Academy media products**
- Media
- Posters/Cutaway models
- Literature
- Multimedia
- eLearning
- Animations
- Working material
- Software
New Products

This chapter gives you a clear summary of all new products.

Literature
Dictionary of fluid technology – Android App 26

eLearning
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Basic principles of motor vehicle electrics 2 – Battery 49
Basic principles of motor vehicle electrics 3 – Starter 50
Basic principles of motor vehicle electrics 4 – Generator 51
Basic principles of motor vehicle electrics 5 – Ignition systems 52
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Multimedia
Animations – Hydraulic accumulators 75
Animations – Hydrostatic steering systems 76
Animations – Electrohydraulic operation of valves – Programmable remote control (joystick) with integrated power electronics 77

Software
Simster – Simulation Platform for Drive Systems 84
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eLearnings for automotive technology from Bosch
Despite the increasing spread of digital media, print products continue to be important. That’s why printed text books and dictionaries will continue to be part of our teaching and learning media portfolio in the future.

Get an insight in our text books as an eBook with our free guest access:

www.boschrexroth.com/literature
Compact knowledge
Hydraulics – Basic principles

Content
▶ General
▶ Basic physical principles
▶ Components
▶ Basic circuits
▶ Systems

Product description
This book offers an overview of basic hydraulic principles and components, such as on/off valves, hydraulic pumps, hydraulic motors, or hydraulic cylinders. These topics are illustrated using graphics and circuit diagrams. The textbook can be used as a reference text, as a supplement to a Bosch Rexroth training course, or for self-study.

192 pages, A5 format
ISBN 978-3-9814879-6-1 (German)
ISBN 978-3-9816219-0-7 (English)

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The hydraulic trainer, volume 1
Hydraulics. Basic principles and components

Content
▶ Graphic symbols according to DIN ISO 1219
▶ Hydraulic fluids
▶ Hydraulic pumps
▶ Hydraulic motors
▶ Hydraulic cylinders
▶ Swivel drives
▶ Hydraulic accumulators and their application
▶ Isolater valves
▶ Directional control valves
▶ Pressure control valves
▶ Flow control valves
▶ Filters and filtration technologies
▶ Accessories
▶ Connection technologies
▶ Hydraulic power units

Product description
The book explains the basic principles and functions of hydraulics, mainly using cross sections of industrial components, thus providing practice-relevant material. This makes this volume an excellent reference text at the workstation or during training or further education.

325 pages, A4 format
ISBN 978-3-9814879-0-9 (German)
ISBN 978-3-9814879-3-0 (English)

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Images, drawings, circuit diagrams, and graphics are available on the “HY1graphics” CD (R961000799) for €59.00.
The hydraulic trainer, volume 2
Proportional and servo valve technology

Content
▶ Proportional valves and system technology
▶ Load compensation using pressure scale
▶ Control electronics for proportional valves
▶ Criteria for designing a control with proportional valves
▶ Getting started with servo valve technology
▶ Servo valves and device technology
▶ From the control to the control loop
▶ Filtration for hydraulic systems with servo and proportional valves
▶ Examples of existing systems with servo and proportional valves

Product description
This book contains a functional description of hydraulic and electronic components for proportional and servo valve technology, with their interaction described using real application examples. A comprehensive chapter is dedicated to the calculation and control of proportional valve technology.

Using clear illustrations of existing systems, this book provides comprehensive and practical information on using proportional valve technology from the control system to the control loop.

286 pages, A4 format
ISBN 978-3-9814879-4-7 (German)
ISBN 978-3-9816219-3-8 (English)

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The hydraulic trainer, volume 3
Planning and design of hydraulic power systems

Content
- Planning hydraulic power systems
- Hydraulic fluids
- Heat balance in hydraulic systems
- Hydraulic accumulators
- Safety regulations and arrangement of hydraulic accumulators
- Steel structure design for hydraulic power units
- Measures for noise reduction
- Calculation and dimensioning of tubing in hydraulic systems
- Interior preservation of hydraulic devices and hydraulic power units
- Corrosion protection on external surfaces using coating substances
- Packaging and transport
- Commissioning and maintenance of hydraulic systems

Product description
This book addresses the interaction of components in hydraulic systems. The authors explain what needs to be observed when planning, configuring, constructing, and implementing hydraulic systems. Numerous selection guides, diagrams, and figures clarify the functional correlations and mutual dependencies; these are useful working aids for daily practice as well as in training and further education. Practical calculated examples and a list of important standards round off each chapter.

376 pages, A4 format
ISBN 978-3-9814879-5-4 (German)
ISBN 978-3-9816219-4-5 (English)

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The hydraulic trainer, volume 4
Logic element technology

Content
▶ Getting started with the two-port slip-in cartridge valve (“logic element”) technology
▶ Directional functions (versions and usage notes)
▶ Pressure and flow control functions
▶ Design of a control with two-port slip-in cartridge valves
▶ Examples of existing controls with two-port slip-in cartridge valves

Product description
In this book, the reader learns what to be aware of when planning, configuring, and implementing hydraulic systems that use two-port slip-in cartridge valve technology. Numerous selection tables, diagrams, and figures illustrate the wide variety of functions in which these valves can be used.

The design of a control with two-port slip-in cartridge valves as well as examples of existing controls are each dedicated to a separate chapter.
Not at least because of these two chapters in particular this reference text is an excellent working aid for the user and those in training and further education when dealing with this technology.

146 pages, A4 format
ISBN 978-3-9816219-5-2 (German)
ISBN 978-3-9816219-6-9 (English)

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The hydraulic trainer, volume 6
Hydrostatic drives with secondary control

Content
- Basic principles of secondary control
- Axial piston machines with secondary control
- Comparison of different variable-speed motor types
- Illustration of basic control principles
- Application examples for secondary-controlled drives
- Efficient cylinder control
- Speed-variable electrical drives
- Information on project design of secondary controlled drives

Product description
The book “Hydrostatic drives with secondary control” conveys basic knowledge to the reader interested in working with this drive concept. Using descriptions of existing applications, it clearly portrays the wide range of applications for secondary control.

196 pages, A4 format
ISBN 978-3-9816219-7-6 (German)
ISBN 978-3-9816219-8-3 (English)

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Content
▶ Introduction to hydraulics
▶ Pumps and hydraulic motors in general
▶ Gear pumps and gear motors
▶ Electrohydraulic pumps
▶ Compact assemblies
▶ Check valves
▶ Pressure valves
▶ Flow control valves
▶ Directional valves
▶ Basic circuits for mobile hydraulics
▶ Mobile directional control valve blocks
▶ Applications
▶ Electrohydraulic hitch control for tractors (EHR)
▶ Hydrostatic fan drives in vehicles
▶ CAN-BUS in mobile hydraulics
▶ Fluids

Product description
This book presents hydraulic components for vehicle hydraulics and explains the basic principles of mobile hydraulic circuit technology. Key topics are the applications for agricultural tractors and forklifts. Additionally, an overview of applications with CAN-BUS is given.

The book provides clear, basic knowledge about the functions of the components used and their combination in systems to readers from the areas of manufacturing, service, and development.

The book is methodically divided into sections about individual components, circuit technology, and applications. It supports both training and self-study in the area of mobile hydraulics.

202 pages, A4 format
ISBN 978-3-9816219-9-0 (German)
ISBN 978-3-9816398-0-3 (English)

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Knowledge in detail
Hydraulics in tractors

Content
▶ General introduction to hydraulics
▶ Hydraulic and electronic components
▶ Hydraulic systems
  – Steering
  – Traction and power take-off drives
  – Braking systems
  – Suspension systems
  – Electrohydraulic hitch control (EHC)
  – Fan drives
  – Controlling attached equipment

Product description
The book “Hydraulic in tractors” gives an overview of the most important hydraulic functions for agricultural tractors. In 13 chapters it describes the tractor components and systems, which are also used in other mobile equipment in application-specific variants.

The reader should have a basic command of hydraulics and know the symbols used in hydraulic circuit technology.

199 pages, A4 format
ISBN 978-3-9814879-8-5 (German)
ISBN 978-3-9814879-9-2 (English)

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Dictionary of fluid technology

Content

- German – English
- English – German

Product description

The dictionary is a convenient reference text for on-site use as a supplement to commercially available dictionaries. It contains technical terms from the areas of hydraulics, pneumatics, electrical engineering, and mechanical engineering.

266 pages, A6 format
ISBN 978-3-9816398-7-2 (German/English)

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iOS App:
The dictionary is available as an app for iPhone in the App Store to the specified conditions and prices (price at the time of catalog publication: 0,99 €).

Android App:
The dictionary is available for free as an app for Android via our free guest access: www.boschrexroth.com/animation

Available Languages in the apps:
German <> English (US), French, Spanish, Italian, Portuguese (BR), Russian, Polish, Czech and English (US) <> Chinese
Rexroth
Oil cleanliness booklet

Content
▶ Need for hydraulic filtration
▶ Types, origins, and examples of contamination
▶ Fitting tolerance for hydraulic components
▶ Damage caused by contaminated hydraulic fluid
▶ Classic analysis of hydraulic fluid
▶ Mobile particle counter MPC 4614
▶ Filtration grade – particle sizes
▶ Recommended cleanliness of hydraulic fluids
▶ Achievable cleanliness in accordance with ISO 4406
▶ Oil cleanliness codes in accordance with ISO 4406
▶ Overview of key filter properties
▶ Fluid and product service

Product description
The hydraulic fluid (usually mineral oil) is the central component of any hydraulic system. If a system fails, the cause is usually excessive contamination of the hydraulic fluid.

This convenient booklet explains the basic principles for controlling and ensuring cleanliness of hydraulic fluids and serves as a reference and comparison text for this important area of hydraulics.

44 pages, A6 format

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Pneumatics. Theory and applications

**Content**
- Introduction to pneumatics
- Functional device description
- Control technology

**Product description**
The book describes and illustrates, in a compact form, the range of pneumatic and electropneumatic components (without proportional and control components), as well as their functions and areas of application.

166 pages, A4 format  
ISBN 978-3-9816398-1-0 (German)  
ISBN 978-3-9816398-2-7 (English)

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Drawings, circuit diagrams, and graphics are available on the “PNgraphics” CD (900701018) for €46.00.
Mechatronics. Theory and applications

Content
- Components of mechatronic systems
- Energy generation and transport
- Pneumatic, hydraulic, and electric drive technology
- Sensor system and control technology
- Programming and documentation
- Safety technology and directives
- Systematic commissioning and error diagnosis

Product description
The book provides the required knowledge for planning, commissioning, and diagnosis of mechatronic systems.

318 pages, A4 format
ISBN 978-3-9816398-3-4 (German)
ISBN 978-3-9816398-4-1 (English)

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Handbook Linear motion technology

Content
- Basic principles
- Profiled rail systems
- Linear bushings and shafts
- Ball screw assemblies
- Linear motion systems

Product description
The “Handbook Linear motion technology” contains basic knowledge as well as hints and advice for linear motion technology and its application. The publication is aimed at design engineers, developers, and professional buyers, as well as students and lecturers at technical colleges or universities.

The first section of the handbook gives readers insights into the fundamental physical principles involved in linear motion technology. Subsequent chapters describe the structural design and technical characteristics of linear bushings and shafts, profiled rail systems, ball screw assemblies, and Bosch Rexroth AG’s ready-to-install linear motion systems. Guide and drive elements are also an essential part of this handbook.

340 pages, A4 format

ISBN 978-3-9816398-5-8 (German)
ISBN 978-3-9816398-6-5 (English)

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Textbook
Sensors in theory and practice

Content
- Introduction
- Inductive sensors
- Capacitive sensors
- Ultrasound sensors
- Optoelectronic sensors
- Magnetic field sensors

Product description
This book imparts the required knowledge concerning fundamental physical principles, functionalities, execution, and areas of application for sensors in automation technology.
The manual is suitable both as support for training and further education programs as well as for self-study.

127 pages, A4 format

ISBN 978-3-9816219-1-4 (German)
ISBN 978-3-9816219-2-1 (English)

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10 steps to performance level
Safety technology handbook

Content
▶ Basic principles of machine safety
▶ 10 steps to performance level
▶ Application examples
▶ Appendix (A tutorial on reliability parameters MTTF\textsubscript{d} and \text{B}_{10} for functional safety)

Product description
The handbook is a practical aid for safe machine design and helps to significantly reduce expenditure when designing safe machine control systems. Practical experience and the most up-to-date knowledge from the active participation of Bosch Rexroth in many standards committees and industry associations have been incorporated into the book. The current standards for functional safety take into consideration the advances in integrated automation technologies and thus demand standardized procedures across technological boundaries.

The handbook explains fundamental principles and standards for machine safety. Readers are introduced to a system that helps them design machines in line with functional safety requirements. The system’s implementation is then explained clearly using different application examples.

264 pages, international format

ISBN 978-3-9814879-1-6 (German)
ISBN 978-3-9814879-2-3 (English)

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eHTG – Basic knowledge of hydraulics

Content

- Hydraulic systems in general (properties)
- Design and function of a hydraulic system
- Basic physical principles and their meaning in hydraulics
- Symbols according to DIN ISO 1219
- Hydraulic fluids
- Hydraulic pumps, motors, and cylinders
- Control technology (check, directional, pressure, and flow control valves)
- Create and read simple circuit diagrams

Scope and duration of learning

- 13 learning modules, 600 training pages, 120 test questions
- Course duration approx. 25 to 32 hours
- Languages: German, English, Italian, French, Chinese, Russian, Hungarian, and others

Prerequisites

- PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
- Deactivated pop-up blocker
- E-mail address for personal login

Product description

From the function and properties of selected components through to the design of hydraulic circuit diagrams – all the basic principles that hydraulics engineers need are offered in the “eHTG – Basic knowledge of hydraulics” eLearning.

License durations

The eLearning is available around the clock within the license duration (12 months after activation).

Licenses for industrial companies

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See the ordering information section for further license models.
eHTGM – Basic knowledge of mobile hydraulics

Content
▶ Hydraulic systems in general (properties)
▶ Design and function of a hydraulic system
▶ Basic physical principles and their meaning in hydraulics
▶ Symbols according to DIN ISO 1219
▶ Hydraulic fluids
▶ Hydraulic pumps, motors, and cylinders
▶ Transmission Units
▶ Loops and controls
▶ Valve technology - Control blocks for mobile hydraulics

Scope and duration of learning
▶ 11 learning modules, 500 training pages, 100 test questions
▶ Course duration approx. 20 to 25 hours
▶ Languages: German, others following

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login

Free guest access:
www.boschrexroth.com/eLearning

License durations
The eLearning is available around the clock within the license duration (12 months after activation).

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See the ordering information section for further license models.
eEATG – Basic knowledge of electric drive technology

Content
▶ Basic introduction to electric drive technology
▶ Operating principles and properties of electric motors
▶ Basics of encoder systems

Scope and duration of learning
▶ 5 learning modules, 175 training pages, 50 test questions
▶ Course duration approx. 10 to 15 hours
▶ Languages: German and English

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login

Free guest access:
www.boschrexroth.com/eLearning

Product description
This eLearning covers the functions and properties of selected drive components. The eLearning is recommended for all those who want to take part in further advanced training courses. The participants become acquainted with the connections of the electrical drive systems and receive an overview of industrial automation technology.

License durations
The eLearning is available around the clock within the license duration (12 months after activation).

Licenses for industrial companies

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See the ordering information section for further license models.
eESTG – Basic knowledge of electric control technology

Content
▶ Basic Introduction to electric control technology
▶ Programmable Logic Controllers (PLC)
▶ Numerical Control Systems (CNC)
▶ Motion Control Systems (MC)
▶ Robot Control Systems (RC)
▶ Application and programming examples
▶ Interfaces

Scope and duration of learning
▶ 6 learning modules, approx. 100 training pages, 34 test questions
▶ Course duration approx. 3 to 4 hours
▶ Languages: German and English

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login

Free guest access:
www.boschrexroth.com/eLearning

Product description
This eLearning provides the basics of electric control technology. Various types of controls will be introduced step by step, differences demonstrated, application areas are explained and the programming discussed. Furthermore, the interfaces between human and control system respectively control system and machine will be presented in the modular eLearning. The eLearning is recommended for those who need a basic understanding of control technology or want attend further advanced training courses.

License durations
The eLearning is available around the clock within the license duration (12 months after activation).

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See the ordering information section for further license models.
ePTG – Basic knowledge of pneumatics

Content
▶ Introduction to pneumatics
▶ Basic physical principles of pneumatics
▶ Compressed air generation, compressor types, procedure for drying compressed air
▶ Maintenance units for conditioning, compressed air networks
▶ Directional, flow control, pressure, and check valves
▶ Pneumatic drives
▶ Graphic symbols and circuit diagrams according to ISO 1219
▶ Basic principles for designing components
▶ Basic pneumatic circuitry

Scope and duration of learning
▶ 9 learning modules, 330 training pages, 56 test questions
▶ Course duration approx. 10 to 15 hours
▶ Languages: German, English, French, and others

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login

Free guest access:
www.boschrexroth.com/eLearning

Product description
From the function and properties of selected components through to the design of pneumatic circuit diagrams – all the basic principles that pneumatic professionals need are offered in the “ePTG – Basic knowledge of pneumatics” eLearning.

License durations
The eLearning is available around the clock within the license duration (12 months after activation).

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See the ordering information section for further license models.
eLTG – Basic knowledge of linear motion technology

**Content**
- Introduction to linear motion technology
- Design, function, and areas of application for profiled rail systems
- Design, function, and areas of application for linear bushings and shafts
- Design, function, and areas of application for screw drives
- Design of linear motion systems
- Overview of all ready-to-install linear motion systems

**Scope and duration of learning**
- 7 learning modules, 400 training pages, 56 test questions
- Course duration approx. 12 to 18 hours
- Languages: German, English, and others

**Prerequisites**
- PC with Internet access, Flash Player 10 or higher ([http://get.adobe.com/flashplayer/](http://get.adobe.com/flashplayer/)), using a web browser with Flash support if necessary
- Deactivated pop-up blocker
- E-mail address for personal login

**Product description**
From the physical principles, products, the applications and basic knowledge of design. The eLearning is recommended for all those who want to take part in further advanced training courses.

**License durations**
The eLearning is available around the clock within the license duration (12 months after activation).

**Licenses for industrial companies**

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See the ordering information section for further license models.

**Free guest access:**
www.boschrexroth.com/eLearning
eFSI – Basics of functional safety

Content
- Basic principles of machine safety
- Machinery Directive, legislation, standards
- 10 steps to performance level

Scope and duration of learning
- 2 learning modules, 80 training pages, 20 test questions
- Course duration approx. 2 to 3 hours
- Languages: German or English (other languages on request)

Prerequisites
- PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
- Deactivated pop-up blocker
- E-mail address for personal login

Free guest access:
www.boschrexroth.com/eLearning

- Flexible time management
- Individual pace of learning
- Unlimited repeatability within the license duration
- Final test + personalized Rexroth certificate (per license)

Product description
In the “eFSI – Basics of functional safety” eLearning we provide you with multimedia learning content on the topics “Basic principles of machine safety” and “10 steps to performance level”, prepared according to the latest didactic findings.

License durations
The eLearning is available around the clock within the license duration (12 months after activation).

Licenses for industrial companies

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See the ordering information section for further license models.
e4EE – Basics of energy efficiency

Content
▶ Energy – a scarce resource
▶ Definition of energy efficiency
▶ General conditions
▶ Energy efficiency in companies
▶ Rexroth 4EE system
▶ Useful information about energy efficiency

Scope and duration of learning
▶ 1 learning module, 43 training pages, 15 test questions
▶ Course duration approx. 1 to 2 hours
▶ Languages: German and English

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login
▶ Interest in the topic of energy efficiency

Product description
Energy is becoming more scarce and expensive all the time. At the same time, demand is on the rise. The focus today is therefore on technologies that help to resolve the problem. Intelligent automation solutions make an essential contribution, provided that people are sensitized to the topic of energy efficiency, work to optimize the way energy is used and select the right technological tools. In this eLearning we convey the basic information you need to know about energy efficiency.

License durations
The eLearning course is available around the clock within the license duration (12 months after activation).

Licenses for industrial companies

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Free guest access:
www.boschrexroth.com/eLearning

Flexible time management
Individual pace of learning
Unlimited repeatability within the license duration
Final test + personalized Rexroth certificate (per license)

See the ordering information section for further license models.
e4EE – Sytronix
Energy-efficient variable-speed pump drives

Content
▶ Basic energy efficiency knowledge
▶ Valve and displacement control
▶ On-demand control
▶ Components of variable-speed pump drives
▶ Parameters for selecting such a drive
▶ Circuit examples
▶ System comparison

Scope and duration of learning
▶ 2 learning modules, 110 training pages, 30 test questions
▶ Course duration approx. 3 to 4 hours
▶ Languages: German and English

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login
▶ Participation in the HTG/eHTG, EATG-1, and HTTPu training courses, or comparable knowledge

Flexible time management
Individual pace of learning
Unlimited repeatability within the license duration
Final test + personalized Rexroth certificate (per license)

Product description
The reliability of high-performance hydraulics, as well as energy efficiency and dynamics of compact electronics, go hand in hand with the Sytronix variable-speed pump drives from Rexroth.
In the “e4EE – Sytronix” eLearning, we provide you with the necessary basic knowledge and technical background.

License durations
The eLearning is available around the clock within the license duration (12 months after activation).

Licenses for industrial companies

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Licenses for educational institutions/schools/colleges

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See the ordering information section for further license models.

Free guest access:
www.boschrexroth.com/eLearning
eSER
sercos – The automation bus

Content
▶ Overview of sercos the automation bus
▶ Applications of sercos in industrial automation
▶ Technical details of sercos
▶ Features of sercos and their benefits

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login

Product description
Today, independent learning at the computer is an integral part of the knowledge transfer. The freedom to choose time and place, unlimited repeatability, individual speed of learning and interactive learning contents make this method an indispensable studying tool. From the basics of sercos to technical details and application examples- Many basics that a user of control systems, electrical and hydraulic actuators, valves and I/O needs.

License durations
The eLearning is available around the clock.

Free guest access:
www.boschrexroth.com/eLearning

- Flexible time management
- Individual pace of learning
- Unlimited repeatability within the license duration
- Final test + personalized Rexroth certificate (per license)
- Free
Bosch eLearning for vocational schools/educational institutions

The slightly different learning experience
Anti-lock braking systems (ABS) in motor vehicles

Content
- Basic principles of physics relating to braking force and slippage
- Function and system design of anti-lock braking system in motor vehicles
- System design and function of hydro units
- Characteristics of sensors
- Change of brake fluid, characteristics
- Testing of the whole system with various test systems, readout of the self-diagnosis
- Knowledge test

Scope and duration of learning
- Course duration approx. 90 minutes
- Languages: German and English

Prerequisites
- PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
- Deactivated pop-up blocker
- E-mail address for personal login

Product description
The participants (apprentices, car mechanics, car electricians, automotive mechatronics) learn basic principles of physics relating to braking force and slippage. Furthermore they get to know various anti-lock braking systems and their control concepts and learn how to test these systems.

License durations
The eLearning is available around the clock within the license duration (12 months after activation).

License
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Flexible time management
- Individual pace of learning
- Unlimited repeatability within the license duration

Free guest access:
www.boschrexroth.com/elearning
Basic principles of gasoline injection

Content
▶ Various types of gasoline injection systems
▶ Functions and system design of gasoline injection systems in motor vehicles
▶ System design and function of the sensors
▶ System design, function and testing of exhaust gas treatment system
▶ Testing of the hydraulic system: Flow rate etc.
▶ Testing of the entire system in motor vehicles using various types of test devices, reading out the self-diagnosis
▶ Knowledge test

Scope and duration of learning
▶ Course duration approx. 90 minutes
▶ Languages: German and English

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login

Product description
The participants (apprentices, car mechanics, car electricians, automotive mechatronics) get to know the various types of gasoline injection systems and their subsystems as well as their functions. Furthermore, they learn how to test them in the entire system.

License durations
The eLearning is available around the clock within the license duration (12 months after activation).

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Flexible time management
Individual pace of learning
Unlimited repeatability within the license duration

Free guest access:
www.boschrexroth.com/elearning
Basic principles of diesel injection

Content
- Various types of Diesel injection systems
- Functions and system design of Diesel injection systems in motor vehicles
- System design and function of distributor injection pumps
- Removal and installation of injection pumps and nozzle-holders with two springs
- Practical tips from the workshop
- EDC system overview, boost pressure control, exhaust gas recirculation (EGR)
- Common rail storage injection system
- Knowledge test

Scope and duration of learning
- Course duration approx. 90 minutes
- Languages: German and English

Prerequisites
- PC with Internet access, Flash Player 10 or higher ([http://get.adobe.com/flashplayer/](http://get.adobe.com/flashplayer/)), using a web browser with Flash support if necessary
- Deactivated pop-up blocker
- E-mail address for personal login

Product description
The participants (apprentices, car mechanics, car electricians, automotive mechatronics) get to know the basic principles of combustion processes and of the Diesel engine. Furthermore, they learn about the system design and working principle of distributor injection pumps and of the common rail injection system.

License durations
The eLearning is available around the clock within the license duration (12 months after activation).

License

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Flexible time management
Individual pace of learning
Unlimited repeatability within the license duration

Free guest access:
www.boschrexroth.com/elearning
Basic principles of motor vehicle electrics 1 – Basic

Content
▶ Basic introduction to Ohm’s law
▶ Electrical resistance, electrical wiring
▶ Measurement of electrical quantities
▶ Series and parallel circuits
▶ Circuit symbols
▶ Basic principles of electronics (diodes, transistors …)
▶ Knowledge test

Scope and duration of learning
▶ Course duration approx. 90 minutes
▶ Languages: German and English

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login

Product description
The participants (apprentices, car mechanics, car electricians, automotive mechatronics) will learn how to deal with measurement technology safely and how to calculate the right cable diameters for car electronics.

License durations
The eLearning is available around the clock within the license duration (12 months after activation).

Licenses

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Flexible time management
Individual pace of learning
Unlimited repeatability within the license duration

Free guest access:
www.boschrexroth.com/elearning
Basic principles of motor vehicle electrics 2 – Battery

Content
- Basic Principles of battery, safety instructions
- Functions and operating principles of the starter battery
- Battery technologies, wet cell battery, AGM battery, gel battery
- Battery load, battery maintenance
- Battery faults, battery testing, battery charging
- Knowledge test

Scope and duration of learning
- Course duration approx. 90 minutes
- Languages: German and English

Prerequisites
- PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
- Deactivated pop-up blocker
- E-mail address for personal login

Free guest access:
www.boschrexroth.com/elearning

Product description
The participants (apprentices, car mechanics, car electricians, automotive mechatronics) learn to handle modern battery technology safely.

License durations
The eLearning is available around the clock within the license duration (12 months after activation).

Licenses

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- Flexible time management
- Individual pace of learning
- Unlimited repeatability within the license duration
Basic principles of motor vehicle electrics 3 – Starter

Content
▶ Various types of starter motors
▶ Functions and operating principles of starter motors
▶ System design and function of the individual starter motors
▶ Function of the freewheel mechanism
▶ Function test of the entire starter system in motor vehicles
▶ Knowledge test

Scope and duration of learning
▶ Course duration approx. 60 minutes
▶ Languages: German and English

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login

Product description
The participants (apprentices, car mechanics, car electricians, automotive mechatronics) get to know the operating principle, the system design and the function of starter motors. Furthermore, they learn how to test them.

License durations
The eLearning is available around the clock within the license duration (12 months after activation).

Licenses

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Flexible time management
Individual pace of learning
Unlimited repeatability within the license duration

Free guest access:
www.boschrexroth.com/elearning
Basic principles of motor vehicle electrics 4 – Generator

Content
- Various types of generators
- System design, functions and operating principles of generators
- Function of the voltage regulation and rectification
- Function test of the entire generator set in motor vehicles
- Knowledge test

Scope and duration of learning
- Course duration approx. 60 minutes
- Languages: German and English

Prerequisites
- PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
- Deactivated pop-up blocker
- E-mail address for personal login

Product description
The participants (apprentices, car mechanics, car electricians, automotive mechatronics) get to know the system design, function and operating principle of generators. Furthermore, the participants get to know the voltage regulation and the possibilities of testing.

License durations
The eLearning is available around the clock within the license duration (12 months after activation).

Licenses

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- Flexible time management
- Individual pace of learning
- Unlimited repeatability within the license duration

Free guest access:
www.boschrexroth.com/elearning
Basic principles of motor vehicle electrics 5 – Ignition systems

Content
▶ Various types of ignition systems
▶ Functions and operating principles of ignition systems
▶ System design, function and testing of encoder systems
▶ Different types of ignition coils
▶ Fully electronic ignition systems
▶ Testing of the individual ignition systems in motor vehicles
▶ Knowledge test

Scope and duration of learning
▶ Course duration approx. 90 minutes
▶ Languages: German and English

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login

Product description
The participants (apprentices, car mechanics, car electricians, automotive mechatronics) get to know the system design and function of electronic ignition systems, different encoder systems, ignition coils and fully electronic ignition systems. Furthermore, the participants learn how to test the respective systems.

License durations
The eLearning is available around the clock within the license duration (12 months after activation).

Licenses

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Free guest access:
www.boschrexroth.com/elearning
Measurement and testing of sensors in motor vehicles

Content
▶ Various types of sensors
▶ Functions and operating principles of sensors
▶ System design, function and testing of sensors
▶ Inductive sensors, hall sensors
▶ Temperature sensors, air mass meters, yaw sensors
▶ Magneto-resistive sensors, piezo sensors ...
▶ Co-operation of the sensors in the entire system
▶ Knowledge test

Scope and duration of learning
▶ Course duration approx. 90 minutes
▶ Languages: German and English

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login

Product description
The participants (apprentices, car mechanics, car electricians, automotive mechatronics) get to know the system design and function of various sensors in motor vehicles and learn how to test them.

License durations
The eLearning is available around the clock within the license duration (12 months after activation).

Licenses

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Flexible time management
Individual pace of learning
Unlimited repeatability within the license duration

Free guest access:
www.boschrexroth.com/elearning
Working material

Working materials from the Drive & Control Academy simplify the realization of hydraulic diagrams and their interpretation.
Symbol stencil

Slide Rule – Hydraulics

Slide Rule – Pneumatics

Symbol stencil

The symbol stencil for fluid technology makes it easier to create graphic symbols and circuit diagrams.

Suitable for pens up to 0.5 mm thickness

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Slide rule – Hydraulics

The hydraulics slide rule is an analog aid for performing basic hydraulics calculations.

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<tr>
<td>R900018485</td>
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Slide rule – Pneumatics

The pneumatics slide rule is an analog aid for performing basic pneumatics calculations.

<table>
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<td>R961000803</td>
<td>de + en</td>
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Magnetic symbol case

Large, magnetic symbols for designing and explaining circuit diagrams for pneumatics, electro-pneumatics and hydraulics come in a plastic case with clearly arranged internal compartments and a list of contents. The magnetic symbols are suitable for use on whiteboards and in conjunction with whiteboard markers. They can be easily placed and moved for quick use at workstations without computers.

Magnetic symbols:
Double-acting cylinder; single-acting cylinder; pneumatic motor; swivel drive; hydraulic motor; shut-off valve; 2/2 directional valve; 3/2 directional valve, closed in normal position; 3/2 directional valve, closed in normal position and flow possible in both directions; 3/2 directional valve through normal position; 4/2 directional valve; 4/3 directional valve closed center; 4/3 directional valve pressurized center; 4/3 directional valve exhausted center; 4/3 directional valve connected in center position; 5/2 directional valve with flow possible in both directions; 5/2 directional valve with flow possible from one direction; 5/3 directional valve closed center; 5/3 directional valve pressurized center; 5/3 directional valve exhausted center; adjustable throttle/non-return valve; adjustable throttle; non-return valve; dual pressure valve (AND function); shuttle valve; quick exhaust valve; pressure relief valve; pressure reducing valve; 2-way flow control valve; 3-way flow control valve; maintenance unit; detailed maintenance unit; hydraulic pump; relay; solenoid; sensor; LED.

<table>
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Posters/Cutaway models

The functional principles of the different technology and knowledge areas are displayed concisely and clearly on the Drive & Control Academy posters.

The design and operating principle of components can be illustrated in detail using cutaway models.
Posters
Hydraulics package 1—General

Content
- Vane pumps (PV7 series)
- Servo directional control valves (Type 4WS.2E)
- Graphic symbols (valves)
- Graphic symbols (pumps, motors, cylinders, and equipment)
- Variable piston pumps (with pressure and flow control)
- Basic principles of physics

Product description
The posters clearly illustrate the design, circuit symbols, and functional elements of hydraulic components, or give an overview of graphic symbols according to DIN ISO 1219.

DIN A1 format (841 x 594 mm)

<table>
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Posters
Hydraulics package 2 – Hydrostatic fan drives, Pump regulating systems

Content

▶ Hydrostatic fan drives 1
(with constant pump and motor, variable displacement pump with thermal pressure relief valve, variable displacement pump with pressure relief valve)
▶ Hydrostatic fan drives 2
(with variable displacement pump with pressure relief valve)
▶ Pump regulating systems 1
(with pressure and flow control, pilot pressure operated, power control, electro-proportional EO control)
▶ Pump regulating systems 2
(with EP control, speed-dependent control)

Product description
The posters clearly illustrate the design and circuit symbols of hydrostatic fan drives and pump regulating systems.

DIN A1 format (841 x 594 mm)

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<td>R961008962</td>
<td>de + en</td>
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Posters
Hydraulics package 3 – Valves

Content
▶ Pressure reducing valve
▶ On/off directional control valve
▶ Servo directional control valve
▶ Pressure relief valve
▶ Non-return valve

Product description
The posters clearly illustrate the design, circuit symbols, and functional elements of hydraulic valves.

DIN A1 format (841 x 594 mm)

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Posters

Pneumatics package 1 – Basic principles

Content
- Directional control valves (LS04AF series)
- Directional control valves (LS04XS series)
- Maintenance units (AS series)
- Pneumatic cylinders (OCT1 series)

Product description
The posters clearly illustrate the design, circuit symbols, and functional elements of pneumatic components.

DIN A1 format (841 x 594 mm)

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R990000375, 2016-01, Bosch Rexroth AG
Cutaway models provide an interesting insight into the inner workings and function of components. All the models originate from industrial products that are used in the field.

The moving elements, as well as the housing, cover, and plugs, all match the original. The different sections of a component are cut away expertly to reveal the parts that are relevant to a particular function. Because mechanical functions continue to work, the moving parts can be actuated, which supports explanation of the components’ functions.

Additional coloration of the channels, holes, and chambers in the cutaway model creates an easily recognizable and effective illustration of the processes in a unit.

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<td>€623.00</td>
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<td>€964.00</td>
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<td>Vane pump</td>
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Multimedia

Videos, interactive 2D and 3D animations and apps illustrate complex motion sequences and clarify difficult technical contexts.

Test our animations with a free guest access:
www.boschrexroth.com/animation
Animations
Hydraulics – Basic principles

Content
▶ Basic circuits
  – Pressure- and force-dependent controls
  – Hydrostatic drives
  – Valve controls
▶ Components
  – Pressure medium, displacement, curves
  – Hydraulic motors
  – Hydraulic pumps
  – Hydraulic valves
  – Hydraulic cylinders
  – Accessories
▶ Basic principles of physics
  – Fluid viscosity

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login
▶ Basic knowledge of hydraulics (recommendation: HTG or eHTG training course)

Product description
The “Hydraulics – Basic principles” animation package comes with more than 50 animations and addresses such topics as basic circuits, components, and basic physical principles.
The animations are language-neutral and any necessary captions are in English.

License durations
The animations are available around the clock within the license duration (12 months after activation).

License durations for industrial companies

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License durations for educational institutions/schools/colleges

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</table>

Free guest access:
www.boschrexroth.com/animation
Animations
Fan control systems

Content
▶ Constant pump and motor
▶ Variable displacement pump with:
  – Thermal pressure relief valve
  – Proportional pressure relief valve with falling characteristic curve
  – Proportional pressure relief valve with falling characteristic curve; cable break
  – Proportional pressure relief valve; reversing drive
  – Interforst fan (film)
  – Shutter
  – Rising characteristic curve

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login
▶ Basic knowledge of hydraulics (recommendation: HTG or eHTG training course)

Product description
The “Fan control systems” animation package contains 7 animations with detailed descriptions and a film. The animations are language-neutral and any necessary captions are in English.

License durations
The animations are available around the clock within the license duration (12 months after activation).

Licenses for industrial companies

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Free guest access:
www.boschrexroth.com/animation
Animations
Throttle control

Content
▶ Principle of throttle control
▶ Load dependency
▶ Speed dependency
▶ Pilot valve
▶ Controlling directional control valves

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login
▶ Basic knowledge of hydraulics (recommendation: HTG or eHTG training course)

Product description
The “Throttle control” animation package contains 5 animations with detailed descriptions.

License durations
The animations are available around the clock within the license duration (12 months after activation).

Licenses for industrial companies

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Free guest access:
www.boschrexroth.com/animation
Animations
Sytronix

Content
▶ Variable-speed drives
  - Open circuit, pump – motor
  - Closed circuit
  - One direction of rotation of the pump, reversing motor via directional control valve
  - One direction of rotation of the pump, cylinder motion reversal via directional control valve
  - Two directions of rotation of the pump (reversal), pressure control
  - Two directions of rotation of the pump (reversal), position control
▶ DFE
  - Motor, open circuit
  - Motor, open-loop circuit with directional valve
  - Cylinder, open-loop circuit with directional valve
  - Pressure and position control

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login
▶ Basic knowledge of hydraulics
  (recommendation: HTG or eHTG and e4EE training courses)

Product description
The “Sytronix” animation package contains 10 animations with detailed descriptions.
The animations are language-neutral and any necessary captions are in English.

License durations
The animations are available around the clock within the license duration (12 months after activation).

Licenses for industrial companies

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Free guest access:
www.boschrexroth.com/animation
Animations
Pump regulating systems

Content
- Pressure difference (Δp)-setting (DFRDEITAP)
- Pressure cut-off (DFRPRTAP)
- Electro-proportional (EP) control
- EP control, Master-Slave
- Electro-proportional control with electrical feedback and position control (EO)
- Speed-dependent control (DA), principle
- DA control, load simulation
- DA control, simulation parallel consumers

Prerequisites
- PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
- Deactivated pop-up blocker
- E-mail address for personal login
- Basic knowledge of hydraulics (recommendation: HTG or eHTG training course)

Product description
The animation package “Pump regulating systems” contains 8 animations. The animations are language-neutral, necessary descriptions are done in English.

License durations
The animations are available around the clock within the license duration (12 months after activation).

Licenses for industrial companies

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Free guest access:
www.boschrexroth.com/animation
Animations
Load-Sensing (LS) & Load pressure-independent flow distribution (LUDV)

Content

- Characteristic curves (programmable, progressive)
- Characteristic curves (programmable, linear)
- Two valves, individual operation
- Two valves, parallel operation
- Two valves, load simulation
- Two valves, load indication (shuttle valve line)
- Two valves, travel drive open circuit with characteristic curve
- Two valves, travel drive open circuit without characteristic curve
- Two valves, anti jamming function
- Functional principle (M7-based)
- Simulation parallel operation (M7-basis)

Prerequisites

- PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
- Deactivated pop-up blocker
- E-mail address for personal login
- Basic knowledge of hydraulics (recommendation: HTG or eHTG training course)

Product description

The animation package “Load-Sensing (LS) & Load pressure-independent flow distribution (LUDV)” contains 11 animations.

The animations are language-neutral, necessary descriptions are done in English.

License durations

The animations are available around the clock within the license duration (12 months after activation).

Licenses for industrial companies

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Free guest access:

www.boschrexroth.com/animation
Animations
2-way proportional valve
(circuits and applications)

Content
▶ 2-way proportional valve, function principle, flow direction P-A
▶ 2-way proportional valve, function principle, flow direction A-P
▶ Proportional directional control valve, (4x 2/2) separate control P-A, A-T, P-B, B-T
▶ Proportional directional control valve, separate control, representation/diagram floating position (manual cylinder actuation)
▶ Proportional directional control valve, separate control, representation/diagram floating position, wheel loader application
▶ Proportional directional control valve, separate control, representation/diagram non-floating position, wheel loader application
▶ Proportional directional control valve, separate control, same retraction and extension speeds

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login
▶ Basic knowledge of hydraulics (recommendation: HTG or eHTG training course)

Product description
The animation package “2-way proportional valve (circuits and applications)” contains 7 animations. The animations are language-neutral, necessary descriptions are done in English.

License durations
The animations are available around the clock within the license duration (12 months after activation).

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Free guest access:
www.boschrexroth.com/animation
Animations
Solenoid current control for proportional valves

Content
▶ Basics principles
▶ Supply voltage simulation
▶ Influence of the length of wiring
▶ Influence of temperature
▶ Basic circuit: Valve with electronics
▶ Principle of pulse width modulation - Influence of power supply
▶ Principle of current regulation - Change in command value/Command value deviation
▶ Influence of frequency on the hysteresis
▶ Influence of frequency on the stability

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login
▶ Basic knowledge of hydraulics (recommendation: HTG or eHTG training course)

Product description
The animation package “Solenoid current control for proportional valves” contains 9 animations. The animations are language-neutral, necessary descriptions are done in English.

License durations
The animations are available around the clock within the license duration (12 months after activation).

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Free guest access:
www.boschrexroth.com/animation
Animations
3-way and 2-way proportional flow control valve (circuits and applications)

Content
- 3-way proportional flow control valve, functional representation
- 3-way proportional flow control valve, functional representation and characteristic
- 2-way proportional flow control valve, functional representation, influence of metering orifice
- 2-way proportional flow control valve, functional representation, influence of metering orifice
- Spreader

Prerequisites
- PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
- Deactivated pop-up blocker
- E-mail address for personal login
- Basic knowledge of hydraulics (recommendation: HTG or eHTG training course)

Product description
The animation package “3-way and 2-way proportional flow control valve (circuits and applications)” contains 5 animations.
The animations are language-neutral, necessary descriptions are done in English.

License durations
The animations are available around the clock within the license duration (12 months after activation).

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Free guest access:
www.boschrexroth.com/animation
Animations
Hydraulic accumulators

Content
- Accumulator pressure test (Check of precharge pressure)
- Bladder accumulator (Functional principle)
- Bladder accumulator, stress and damages
- Piston accumulator
- Piston accumulator with additional gas volume
- Diaphragm accumulator
- Accumulator charging circuit
- State changes of gases (Basic principles of physics)

Prerequisites
- PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
- Deactivated pop-up blocker
- E-mail address for personal login
- Basic knowledge of hydraulics (recommendation: HTG or eHTG training course)

Product description
The “Hydraulic accumulators” animation package contains 8 animations which illustrate the operation of Hydraulic accumulators.
The animations are language-neutral, necessary descriptions are done in English.

License durations
The animations are available around the clock within the license duration (12 months after activation).

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Free guest access:
www.boschrexroth.com/animation

- Flexible time management
- Individual pace of learning
- Unlimited repeatability within the license duration
Animations
Hydrostatic steering systems

Content
▶ Acceptance test set-up to ISO 5010 a and b
▶ Circular test drive to StVZO
▶ Axle (Ackermann) steering, overview and example
▶ Individual wheel steering
▶ Axle (Ackermann) steering, double-rod cylinder, speed-dependent steering wheel amplifier
▶ Axle (Ackermann) steering, double-rod cylinder / electro-hydraulic steering / crab / circle
▶ Steering units:
  – LAGC, OC-R: Design and Function, Servo Operation, Emergency Operation, Exploded View
  – LAGC, CC-LS: Servo Operation
  – LAGU, OC-NR: Servo Operation, Emergency Operation, Exploded View
  – LAGZ, OC-NR: Servo Operation, Emergency Operation, Exploded View
▶ Automation Studio Film 1-4: Function Priority-Valve/Basic circuit Load-Sensing/hydrostatic steering unit with variable displacement pump/Steering with joystick
▶ Roller:
  – crab, top view
  – circle
  – forwards, backwards

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login
▶ Basic knowledge of hydraulics (recommendation: HTG or eHTG or eHTGM training course)

Product description
The “Hydrostatic steering systems” animation package contains 34 animations. The animations match to the project manuals “Mobile Hydraulics - Hydrostatic steering systems”. The animations are language-neutral, necessary descriptions are done in English.

License durations
The animations are available around the clock within the license duration (12 months after activation).

Licenses for industrial companies

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Free guest access:
www.boschrexroth.com/animation
Animations
Electrohydraulic operation of valves – Programmable remote control (joystick) with integrated power electronics

Content
▶ Basics
  – Throttle control, principle
  – Throttle control, pilot control valve (TH)
  – Analog Amplifier Module (characteristics)
  – Analog Amplifier Module (time ramps)
  – Circuit with analog amplifier modules
  – Load-Sensing, characteristics (programmable, progressive)
  – Load sensing, characteristics (programmable, linear)
  – Functional principle 3-way pressure reducing valve
  – Proportional Pressure reducing valve (DRE)
  – Film Programming 4THE5
▶ Pulse width modulation
  – Solenoid valves: Basic principles/Supply voltage simulation/Influence of the length of wiring/Influence of temperature/Valve basic circuit with electronics/
  Principle of pulse width modulation – Influence of power supply/Principle of current regulation – Change in command value/Influence of frequency on the hysteresis/Influence of frequency on the stability
▶ Programmable remote control
  – Joystick 4THE5 with directional control valve (M4_12)
  – Joystick 4THE5

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login
▶ Basic knowledge of hydraulics
  (recommendation: HTG or eHTG or eHTGM training course)

Product description
The animation package “Mobile hydraulics – Electrohydraulic operation of valves – Programmable remote control (joystick) with integrated power electronics”.
The 22 animations match to the project manuals “Mobile hydraulics – Electrohydraulic operation of valves – Programmable remote control (joystick) with integrated power electronics”.
The animations are language-neutral, necessary descriptions are done in English.

License durations
The animations are available around the clock within the license duration (12 months after activation).

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Free guest access:
www.boschrexroth.com/animation
Animations
Pneumatics – Basic principles

Content
▶ Basic physical principles
▶ Compressed air generation
▶ Maintenance units
▶ Pneumatic drives
▶ Directional control valves
▶ Isolator, flow control and pressure control valves
▶ Other pneumatic components
▶ Basic pneumatic circuits

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login
▶ Basic knowledge of pneumatics (recommendation: PTG or ePTG training course)

Product description
The “Pneumatics – Basic principles” animation package contains almost 50 animations and addresses topics such as basic physical principles, directional valves, and basic pneumatic circuits.
The animations are language-neutral and any necessary captions are in English.

License durations
The animations are available around the clock within the license duration (12 months after activation).

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Free guest access:
www.boschrexroth.com/animation
Web-App
Hydraulics – Calculations

Content
Calculation of
▶ Flow (pump)
▶ Displacement volume per rotation (pump)
▶ Speed and torque for hydraulic motors
▶ Speed and force for hydraulic cylinders

Prerequisites
▶ PC with Internet access, Flash Player 10 or higher (http://get.adobe.com/flashplayer/), using a web browser with Flash support if necessary
▶ Deactivated pop-up blocker
▶ E-mail address for personal login

Product description
The “Hydraulics – Calculations” free Web-App explains the physical aspects of hydraulics. The app can determine flow and displacement volume per pump rotation. The calculation is made using a selection of set parameters for drive motor, power and pressure level. The result can then be used to determine key data for hydraulic drives, such as speed and torque for hydraulic motors and force for hydraulic cylinders.

Free guest access:
www.boschrexroth.com/animation
Film series
Technology in motion

Product description
24 sophisticated high quality animations illustrate actual and interesting drive solutions out of various application areas. This film series contains image videos, fair presentations and sales oriented technology information. They are an excellent support tool for both events and presentations as well as a complementary item in training.

Content
1 Corporate Video
2 50 Years Rexroth Hydraulics
3 Trailer Industrial 2006
4 Evolution in Motion
5 Printing Machine
6 Papermill
7 Harvester
8 Sawmill
9 Woodworking
10 Extrusion Press
11 Powder Metal Press
12 Continuous Casting
13 Proportional Valve
14 Servo Valve
15 FIVA Valve
16 HRB Truck
17 HRB Forklifter
18 Drive & Control Academy
19 Food and Packaging
20 Active Heave Compensation
21 Injection Moulding Machine
22 E2C – Easy to combine
23 Wind Energy
24 Solar Energy

Note:
The films are available with a free guest access:
www.boschrexroth.com/animation
or for free on www.youtube.com.

On request the films are also available on CD for €25.00 per piece.

Prerequisites
▶ PC with Internet access
▶ Deactivated pop-up blocker
▶ E-mail address for personal login

– Flexible time management
– Unlimited repeatability
– Free
Software

Software, software-based teaching & learning media, and apps supplement our range of products and are essential components of competent knowledge transfer.

Test our software courses with a free guest access:
www.boschrexroth.com/software
Automation Studio Education™

Content
- Simulation of pneumatics, hydraulics, electrical, and electronics circuits
- Clear illustration and animation of systems and control panels
- Cross-technology simulations illustrate, for example, the interaction between pneumatics, electrics, electronics, PLC, and GRAFCET; control and simulate using SoftPLC or GRAFCET

Prerequisites
- Windows 7 (32-/64-bit), Windows Vista, Windows XP SP2, Windows 2000 SP4, or Windows Server 2003 and Internet Explorer from v5.01
- 800 MB free hard disk space
- 1 GB RAM, 2 GB recommended
- Free USB port for the license dongle

Product description
From designing systems to simulating and animating components, Automation Studio™ offers a wide range of tools to support you in teaching the subjects of hydraulics, pneumatics, electrical engineering and control technology. With Automation Studio™, you can create content-rich and flexible learning material to illustrate basic theoretical principles during the lesson with the help of simulations and animations.

A comprehensive library of components from all subject areas is available to help you accomplish this. The educational version of Automation Studio™ makes it easier to learn quickly when developing, testing and analyzing projects for design, application and maintenance in a virtual and safe environment.

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<td>R901403228</td>
<td>Hydraulics, single license</td>
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<td>R901403229</td>
<td>Fluid technology, single license</td>
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Other license models can be found under the ordering information.

Licenses for educational institutions/schools/colleges

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<td>Fluid technology, single license</td>
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Note:
Attend the corresponding face-to-face training course: DC-AS - Automation Studio™ Fluid Technology Training
HYVOS 7.0
Simulation software for valve-controlled cylinder drives

Content
Simulations in the areas of
- Valves
- Cylinders
- Pressure supply
- Controller
- Command values
- Counterforces
- Functions

Prerequisites
- Operating system: Microsoft Windows 98/NT 4.0 SP4/ME/2000/XP/Vista/Win 7
- CD drive

Product description
Simulate valve-controlled cylinder drives in open- or closed-loop circuits. Hundreds of parameters allow complex structures to be modeled and virtually any motion sequences and loads to be simulated. This software tool helps you minimize effort in testing and significantly reduce development times.

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Notes:
Free test version available.
Use the free guest access for more detailed information: www.boschrexroth.com/software

Attend the corresponding face-to-face training course:
HYV-1 · Simulation with HYVOS 7.0
Simster
Simulation Platform for Drive Systems

Content
▶ Windows-based user interface with intuitive
▶ Operating concept
▶ Rapid familiarization, quick success
▶ Model libraries for all domains (hydraulics, Mechanics, control technology, etc.)
▶ Create and share your own user-defined libraries
▶ High-performance plotter for visualizing the result
▶ Curves
▶ Integrated interfaces for co-simulation (Open-Core, Matlab/Simulink®, TCP/IP, C/C++)
▶ Extensive program help function with some system
▶ Technical explanations

Product description
Simster is a powerful multi-domain simulation platform for modeling and optimizing controlled drive systems in customer machines. The intuitive handling and flat learning curve make it the ideal tool for your drive project. Simster allows both simulation experts as well as beginners to perform a system analysis within the shortest possible time.

Prerequisites
▶ Windows 7 or Windows 8, Microsoft.net 4.5
▶ Framework
▶ 7-day test version, activation following registration possible

Download:
www.boschrexroth.com/simster

– Decrease commissioning times
– Reduce testing efforts
– Low entry barriers
– Free
CChoose
Compact hydraulics configuration tool

Content
▶ Project Parameters (technical details, project destination etc.)
▶ Hydraulic Circuit Configuration (component by component)
▶ 2D Component Placement and Configuration Check
▶ 3D Component Placement and configuration Check
▶ Detailed report with bill of material, drawings, PDF attachments and 3D design
▶ 3D STEP export

Prerequisites
▶ PC with MS Windows XP, Vista, 7 or 8
▶ Microsoft IE 6 or higher
▶ NET Framework V.4.0 or higher
▶ DirectX 9 or higher
▶ 128 MB (256 recommended) video memory

Product description
CChoose is the new Compact Hydraulics configuration tool. It gives you complete freedom by allowing the configuration of customized hydraulic integrated circuits (HIC), compact directional valves (CDV) and compact power modules (CPM).

CChoose contains a vast library of Compact Hydraulics components with full catalog information and configuration error check. During the configuration, you’ll be helped by the software through the configuration steps, with constant check on project parameters and component details.

Download:
www.boschrexroth.com/choose
Hydrostatic calculations with Excel

Content
Linear drives
- Velocity diagram
- Single rod cylinders
- Double rod cylinders
- Cylinders in regenerative circuits
- Natural frequency of the single rod cylinder
- Natural frequency of the double rod cylinder
- Natural frequency of the plunger cylinder

Rotary drives
- Speed diagram
- Travel diagram
- Hydraulic motor, fixed displacement
- Hydraulic motor, variable displacement
- Natural frequency of the hydraulic motor
- Mass moment of inertia

General
- Pump power
- Pipe
- Hydraulic accumulator
- Orifice
- Compressibility

Product description
This software is a collection of individual, unlinked spreadsheets containing calculation formulas.

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- Practice-oriented
- Simple operation
- Component and system design
D&C Scheme Editor

Content
▶ Possible to work with multiple models and worksheets using drag and drop
▶ Select a product in the online catalog and take it over to the D&C Scheme Editor
▶ Symbols can be selected in the library and used in the digital worksheet or directly in the model explorer
▶ Using multiple selection, several components can be added at once
▶ Components can be integrated from the library and connected to form a complete circuit diagram in just a few clicks
▶ Languages: de, en

Prerequisites
▶ Operating system: Microsoft Windows 7/8/XP/Vista

Product description
D&C Scheme Editor is a simple, free circuit diagram software for communicating with the customer. The program makes it possible to work with multiple models and worksheets. The elements can be selected from the symbol library, or directly from the products in the online catalog, and used in the digital worksheet. Pneumatic connections are created in just a few clicks of the mouse, and a parts list with the components used is automatically generated. Selected components can be summarized in an individual user library.

Download:
www.boschrexroth.com/dnc-scheme-editor
IndraMotion MTX micro Trainer

Content
- Turning, milling, drilling, grinding, nibbling
- Different axis controls
- Interpolation and feed functions
- Shifts and compensations
- Tool management
- CNC programming
- PLC programming

Product description
IndraMotion MTX micro is the compact, powerful, and inexpensive CNC solution from Rexroth for standard turning and milling machines. All of the functions required in small CNC machines are available. Up to 6 axes can be controlled in 2 CNC channels with minimal commissioning effort.

Download:
www.boschrexroth.com/mtxtrainer
MTpro light

Content
- Importing CAD and 3D models
  - Changing the perspectives
  - Unlimited number of models
  - Moving all parts in the space
  - Possible to import CAD building plans
- Training systems as 3D models
  - Component carriers
  - DS4 training system for hydraulics
  - DS3 training system for pneumatics
  - Mechatronic station
- Additional parts for WS290
  - Small and large tubing storage
  - Measuring glass 2.5 L
  - Load simulator 15 kg, swiveling
  - Vertical load unit 80 kg

Prerequisites
- Windows XP, Windows Vista, Windows 7 (32-bit/64-bit)
- DVD-ROM drive
- OpenGL-capable graphics card
- Adobe Reader version 6.0 or higher
- For full installation, at least 2.5 GB free hard disk space
- Internet access for automatic updates

Product description
MTpro is software available in two versions for individual classroom planning:
- MTpro light, with no license fees, is limited to the Layout Designer and is available as a free download.
- The full version of MTpro is available on a DVD and offers a wide range of functions. The software is free but after 60 days of use a license fee is payable.

Detailed information
www.boschrexroth.com/mtpro

- Simple and fast operation
- Individual classroom planning in 3D area
- Training models in one-to-one ratio
- Free (MTpro light)
100% free
Test some of our products for free: www.boschrexroth.com/guestlogin

Here you will find free eLearning- and eTraining-Modules from all the Drive & Control technologies, animations and videos for viewing, and an insight in our text books as eBooks.

eLearnings/eTrainings
Animations/Apps/Films

In addition, you will find information about our training courses and systems, as well as other media. The ability to download free software applications completes our offering.

eBooks
Software
On the following pages you will find the available products with a description, material number, and prices (prices are subject to change and exclude VAT).

Please send orders, specifying the desired material number and billing address, to your sales partner or to: media@boschrexroth.de

You can also order quickly and easily online via our eShop: www.boschrexroth.com/eshop

Please also visit our Amazon retailer store:
## Literature

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## Ordering information/Product overview

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### eLearning

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### Slide rule – Hydraulics

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## Posters/Cutaway models

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## Software

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**HYVOS 7.0 – Simulation software for valve-controlled cylinder drives**

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**Simster – Simulation Platform for Drive Systems**

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**Choose – Compact hydraulics configuration tool**

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**Hydrostatic calculations with Excel**

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**D&C Scheme Editor**

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**IndraMotion MTX micro Trainer**

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**MTpro light**

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