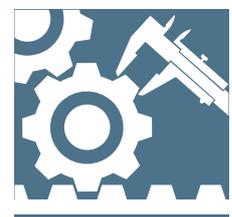


# Training Systems in Fluidics Hydraulics / Pneumatics

Instruction in Hydraulics and Pneumatics,  
Simple and Comprehensible



- Acquire Competence and Skills by Doing Experiments on Your Own
- Training Exercises on Real Industrial Components
- Training Up to Expert Level



# Strong Partners for Production Line Expertise

Industry and commerce need experts for the assembly and maintenance of production lines, trained people that have gained experience on real **industrial components**. The training systems from Lucas-Nülle provide the foundation for trainees to acquire the necessary technical qualifications and skills in the area of hydraulics and pneumatics under **real-life conditions**.

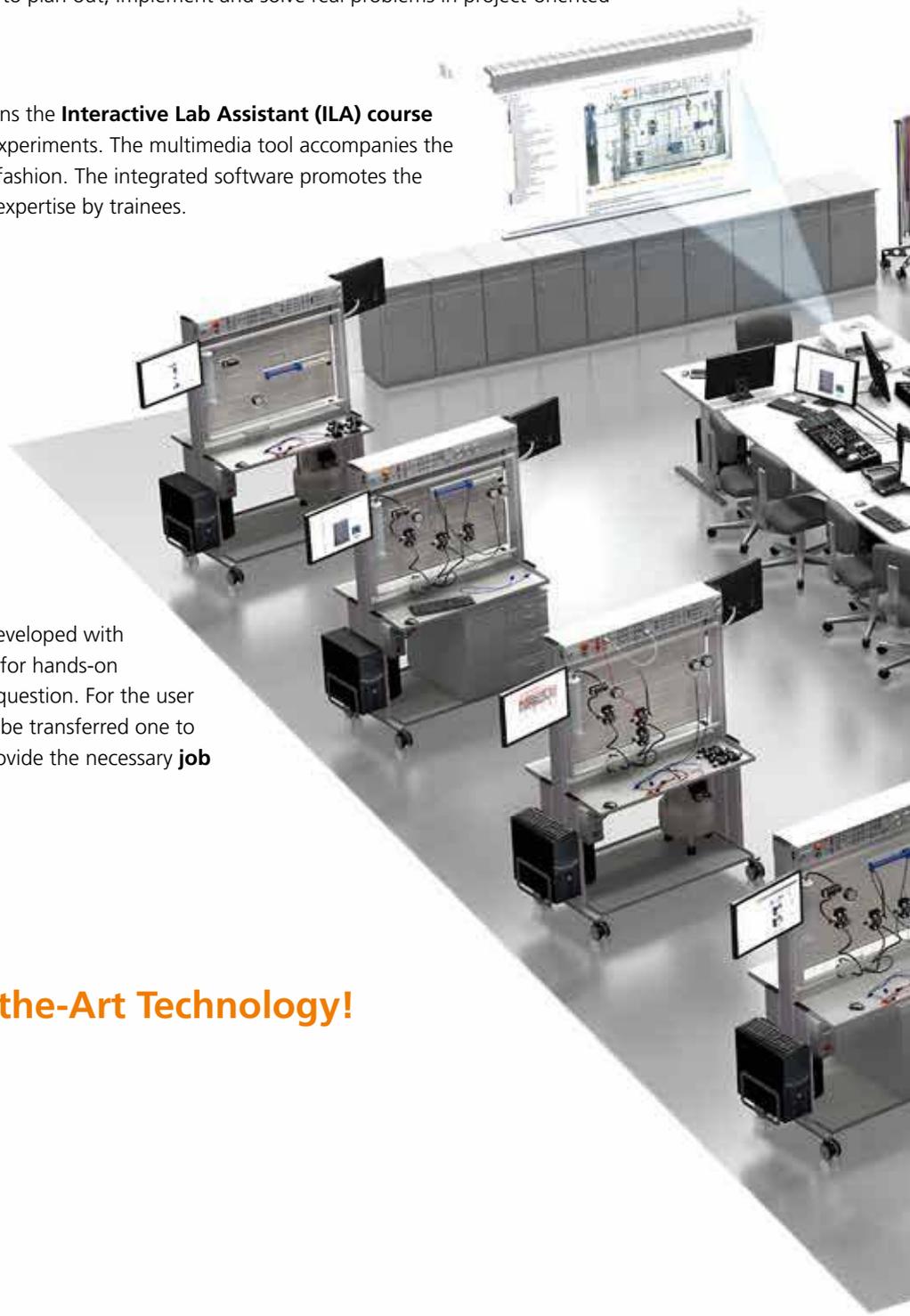
Our training systems are equipped with **genuine components** from **Bosch Rexroth**.

The key to a successful training is being able to plan out, implement and solve real problems in project-oriented exercises afforded by the training systems.

Each training system from Lucas-Nülle contains the **Interactive Lab Assistant (ILA) course** which serves as an instruction guide to the experiments. The multimedia tool accompanies the trainee through the material in step-by-step fashion. The integrated software promotes the systematic acquisition of technical skills and expertise by trainees.

All Lucas-Nülle training systems have been developed with the stipulation that the content be designed for hands-on training geared towards the target group in question. For the user this means that the know-how acquired can be transferred one to one to real-life job requirements and thus provide the necessary **job skills and expertise**.

## Training with State-of-the-Art Technology!

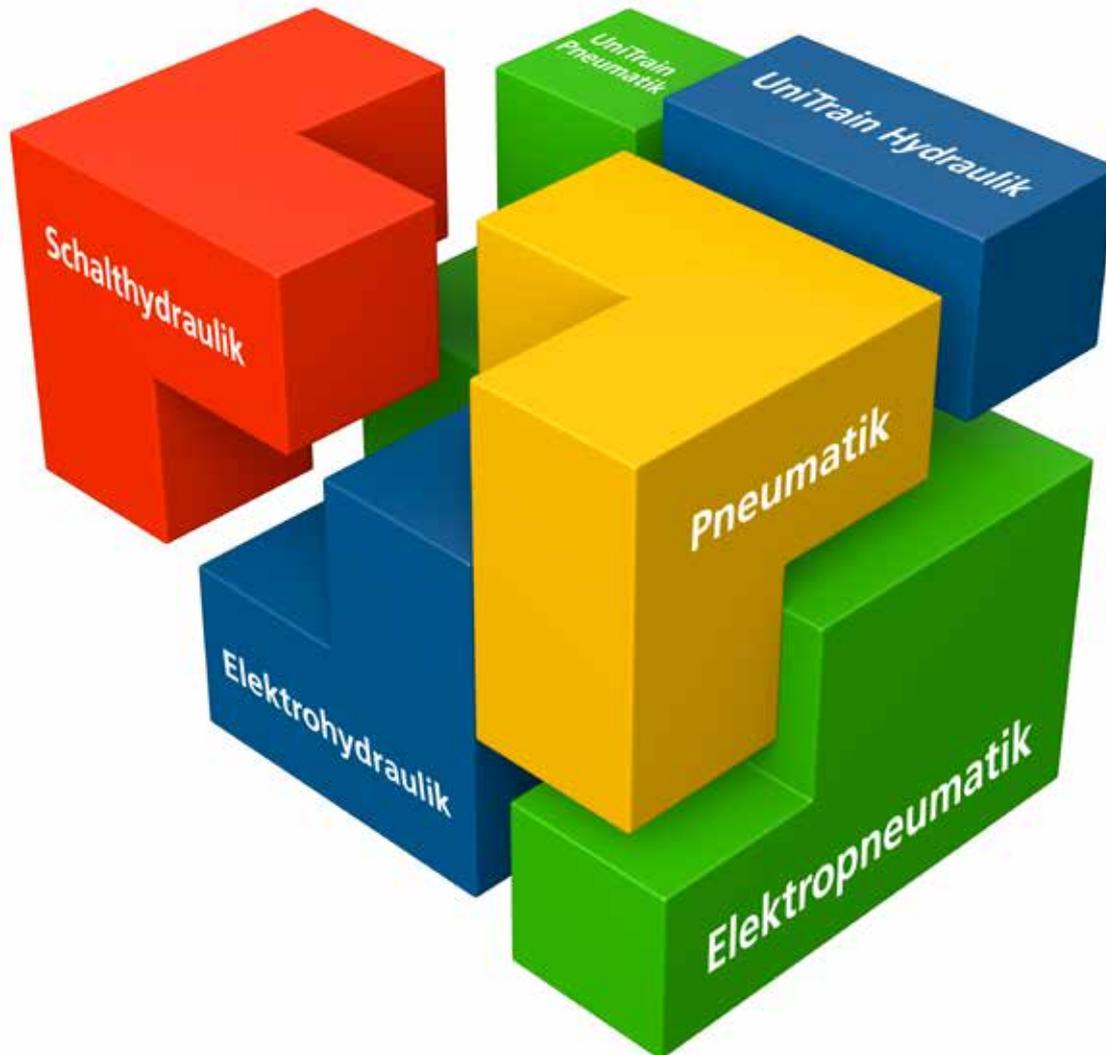




# Taking Modularity to New Heights

For over 40 years Lucas-Nülle has stood for **advanced and innovative learning** and has promoted vocational training and education all over the world with its training systems. Each training system is integrated into Lucas-Nülle's **overall educational concept** and provides the stepping stones on the path to **successful training and education**. Whether you wish to purchase a single training system or equip an entire laboratory:

We are passionately committed to seeing your **individual needs** satisfied.



As **experts** specializing in the mechanics of production lines, these are the people responsible for ensuring that the manufacturing lines of the car industry operate seamlessly and CNC machines reliably perform tool drilling, cutting and machining processes without a hitch. After all, damage to the gears of a lathe can bring about production standstill.

Lucas-Nülle's overall concept is made up of modular units designed to make practitioners skilled and successful.

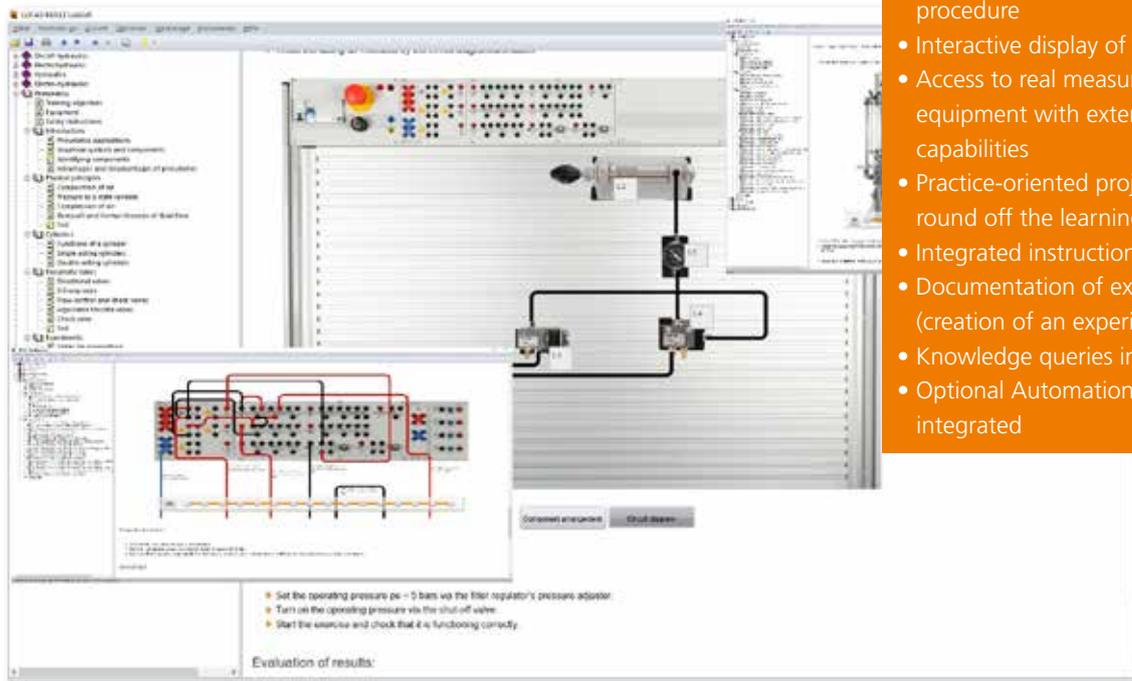
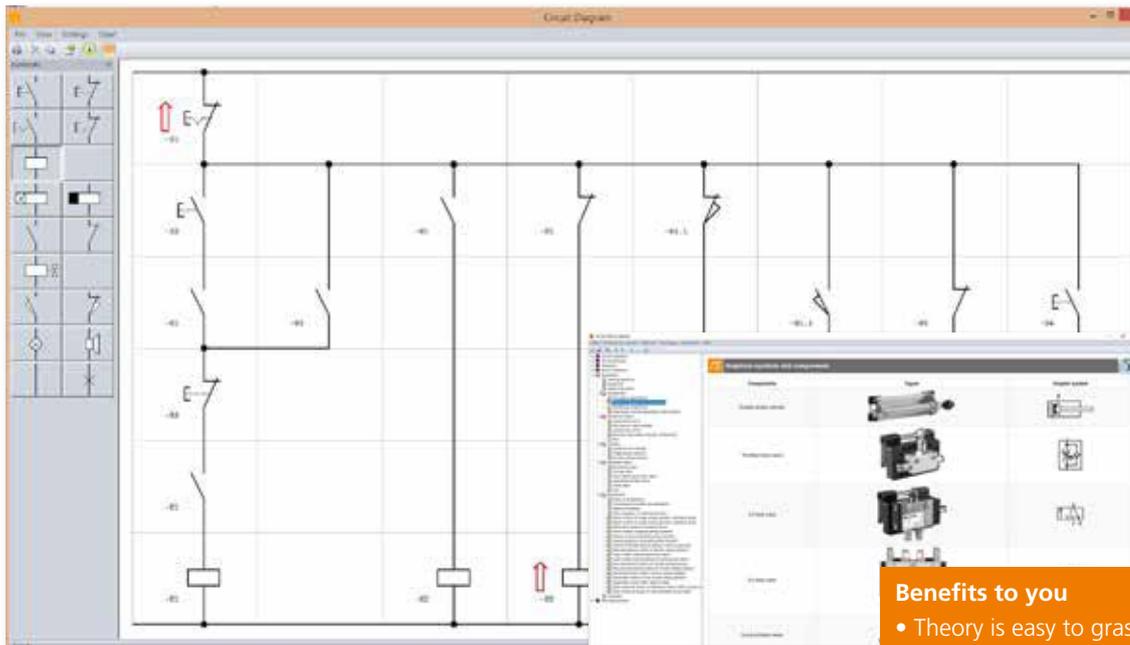
With our **UniTrain Hydraulics** and **Pneumatics Board**, the first steps in process control technology are learned in the classroom using **interactive training content**.

Afterwards, the mobile Hydraulics and Pneumatics experiment stands equipped with **industrial components** are deployed and supported by **animations** and **experiments** to teach the more complex material of fluid engineering.

# Right Where You Need It: The ILA Course

## Computer-based Learning Environment: Interactive Lab Assistant (ILA)

Presenting complex training content vividly: the kind of support you receive when doing experiments from the ILA course. Being more than just an experiment manual, it provides valuable theoretical background information, records measurement values and automatically creates the lab documentation as a printed copy or as a PDF file. Furthermore, you can modify or supplement the training content using the LabSoft Classroom Manager.



ILA course with set-up animation – Interactive circuit editor

### Benefits to you

- Theory is easy to grasp thanks to simple-to-understand animations
- Support provided during experiment procedure
- Interactive display of the experiment setups
- Access to real measurement and testing equipment with extensive evaluation capabilities
- Practice-oriented project-based exercises round off the learning success
- Integrated instruction sheets
- Documentation of experiment results (creation of an experiment report)
- Knowledge queries incl. feedback function
- Optional Automation Studio Software integrated

# This is How Your Training System Could Look!

Select Your Equipment:



- Your choice of single- or double-ended outfitting option
- Your choice with or without energy supply channel
- With interface operating module and USB port

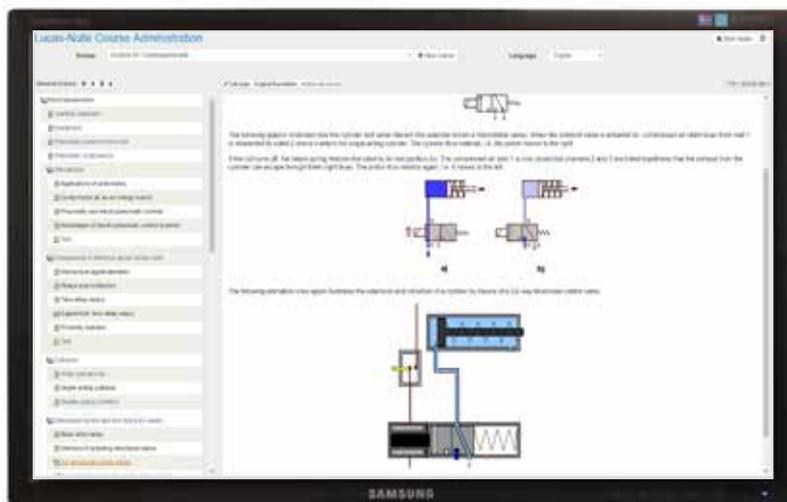
- As pneumatics / electropneumatics training system
- Or hydraulics / electrohydraulics training system
- Or hydraulics / pneumatics training system



# Electropneumatics Training System

## Pneumatics Compact Trainer

The UniTrain Electropneumatics course conveys the know-how needed to control and perform maintenance on a modern, automated production process. Animations and experiments on real systems are used to explore the fundamental properties of industrial components.



UniTrain Electropneumatics course

### Training contents

- Basics of pneumatics
- How single-action and double-action cylinders operate
- Become familiar with different directional control valves
- Explore design and operation of electropneumatic control system
- Hard-wired controls
- Programmable controls
- Recording displacement-step diagrams
- Time-dependent controls

## The Safe Way to Experiment – Using the UniTrain Multimedia Course

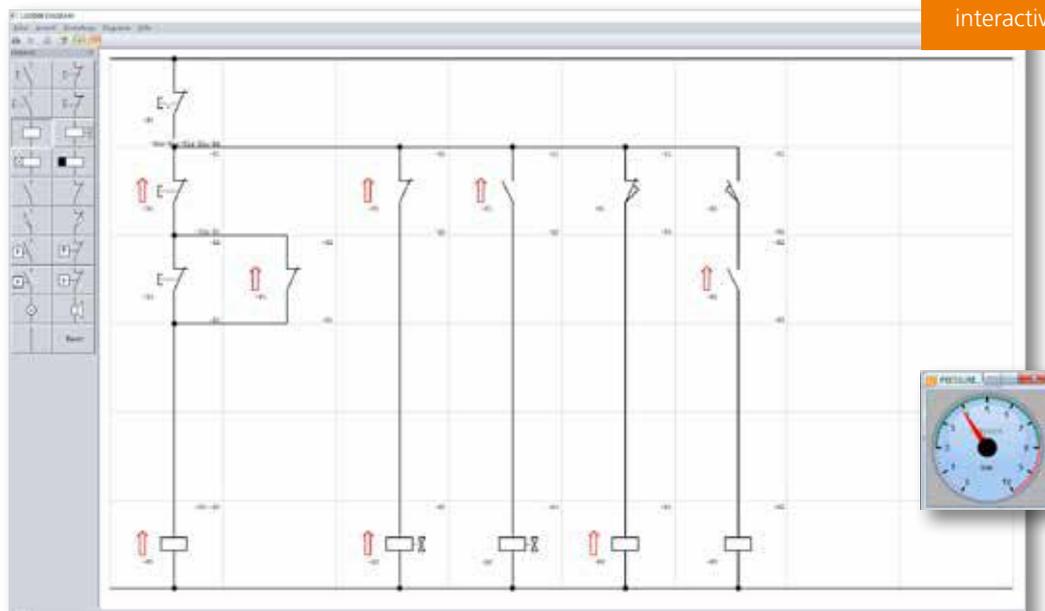
In addition to the Electropneumatics training system, the UniTrain Multimedia course features PC-based evaluation of measurement data and fault simulation.

The screenshot shows the 'Lucas-Nülle Course Administration' interface. The main content area is titled 'Experiment: automatic retraction of a cylinder'. It includes a 3D model of a cylinder and a detailed electrical control circuit diagram. A sidebar on the left lists various experiment topics. An inset window shows a 'Pneum-logic diagram' with a timing diagram of a cylinder's position over time.

ILA Fundamentals of Electropneumatics course

### Benefits to you

- Interactive multimedia course
- Set-up animations
- Deployable in every classroom
- Interactive creation of displacement-time diagrams
- Direct control of the hardware using interactive circuit editor



Interactive circuit diagram

# Pneumatics Training System

## Manually Operated Industrial Pneumatics

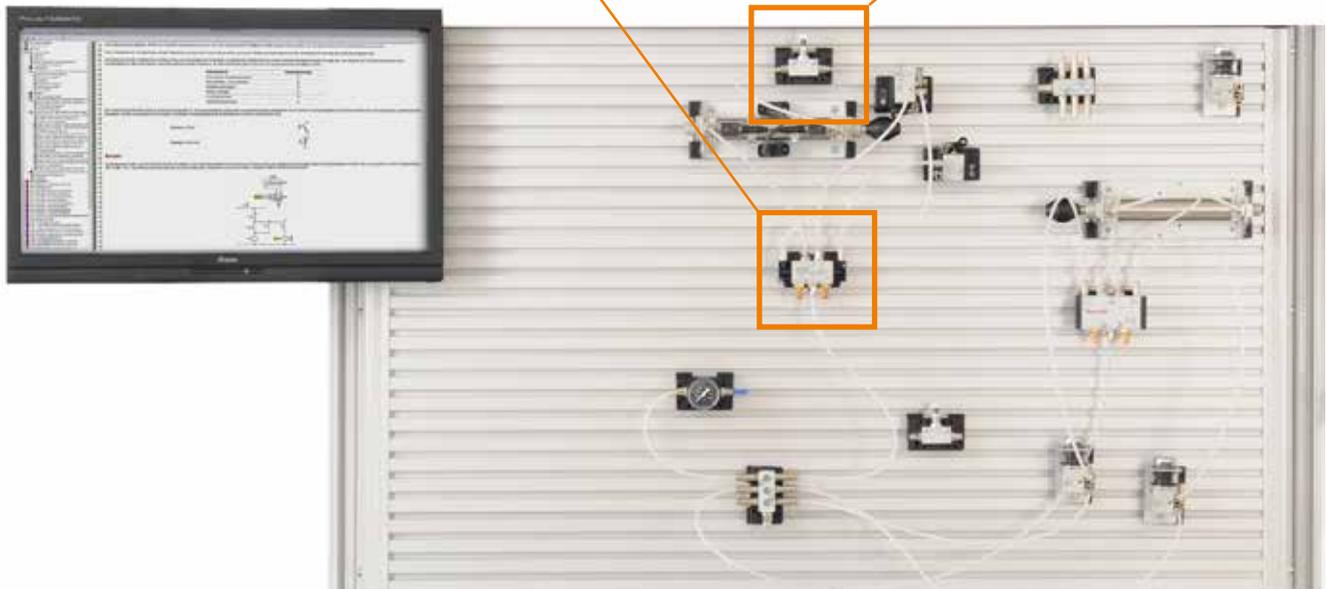
Using authentic industrial components and the patented "snap-in" fastening mechanism the Pneumatics training system is setting trends in the area of vocational and advanced training and education.



Patented "snap-in" feature



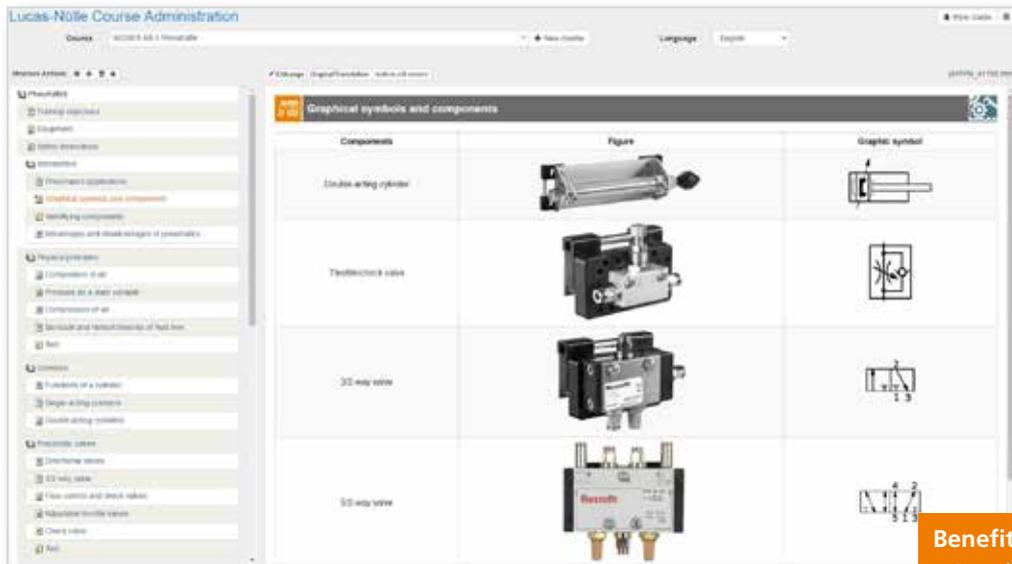
Industrial serially manufactured components



### Training contents

- Direct/indirect control of single- and double-action cylinders
- Displacement-dependent controls
- Control of double-action cylinder using pulse valve
- Logic controls with variable pressure and dual pressure valves
- Pressure-/time-dependent controls
- Cascade or sequential control with pneumatically-operated proximity switches

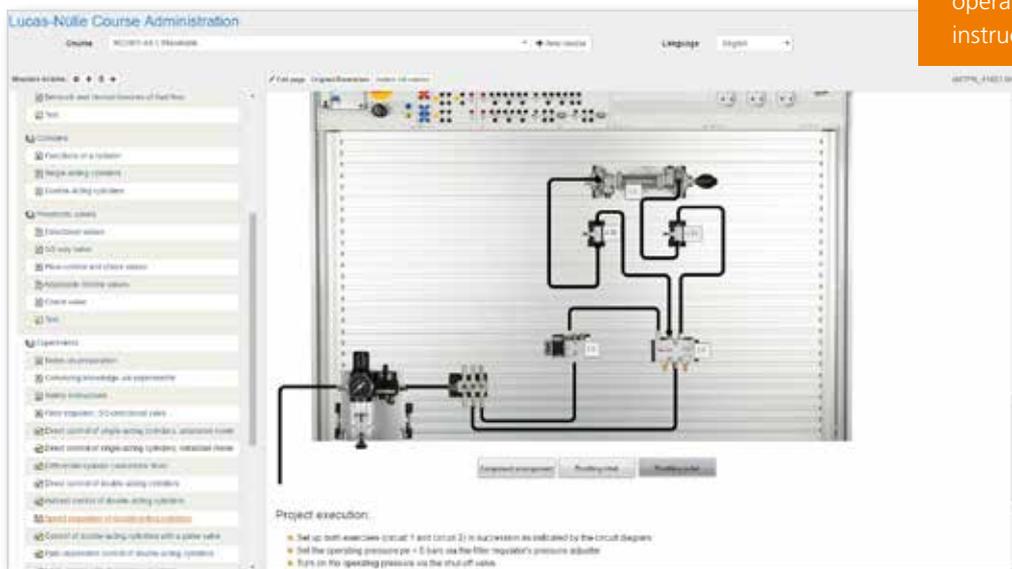
## Test Your Learning Progress Using the ILA Course



Teaching the fundamentals in the Pneumatics course

### Benefits to you

- Step-by-step multimedia-based instructions
- Explore and understand general physical principles using easy-to-understood animations
- PC-based evaluation of measurement data
- Virtual measuring instruments operated directly from the experiment instructions



Step-by-step set-up animations in all courses

# Electropneumatics Training System

## Electrical Expansion Kit for Industrial Pneumatics

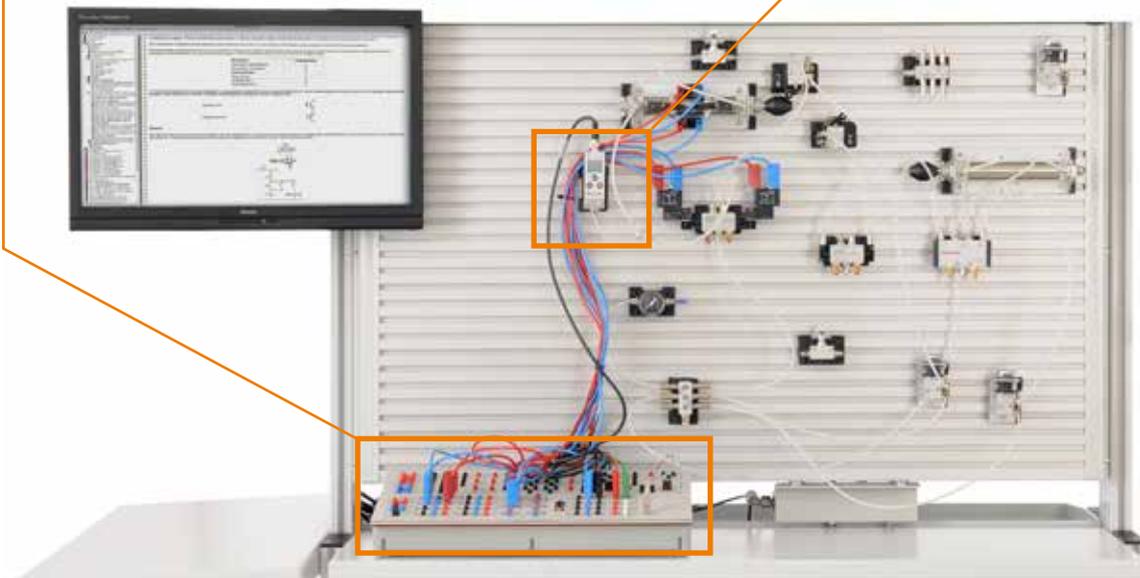
With the electropneumatics component expansion kit it is possible to carry out project exercises in electropneumatics. Using an electrical operating console the electropneumatics components can be operationally connected. Alternatively operational connection can be carried out using the operating module located in the energy channel.



*Interactive interface to the circuit diagram editor*



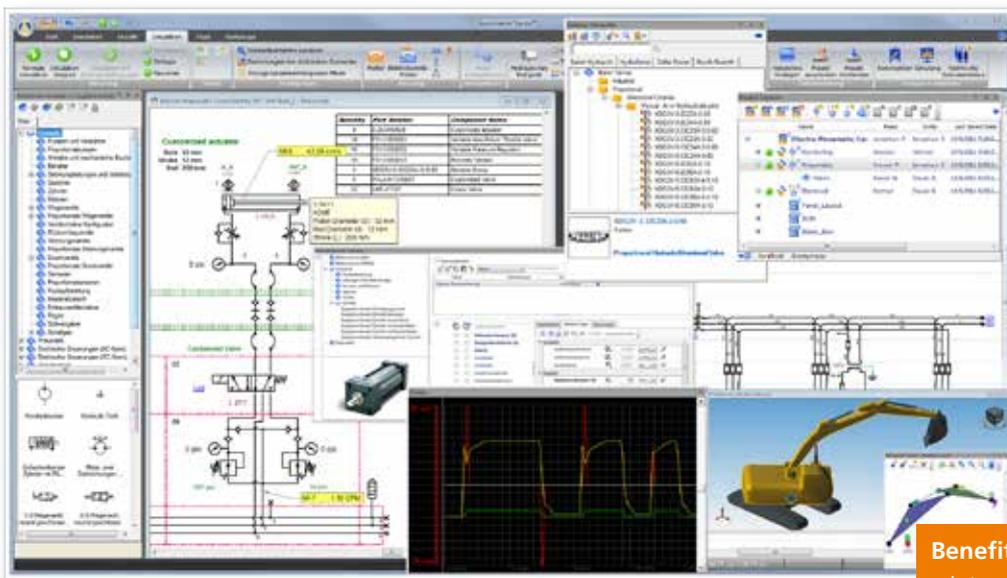
*Original industrial components with patented snap-in mechanism*



### Training contents

- Function and deployment of electropneumatic components
- Setting up relays and self-holding controls
- Time and process-driven sequential controls
- Displacement-dependent controls with sensors and pre-setting counter
- Program control using sequential control

## Direct Hardware Control from the ILA Course

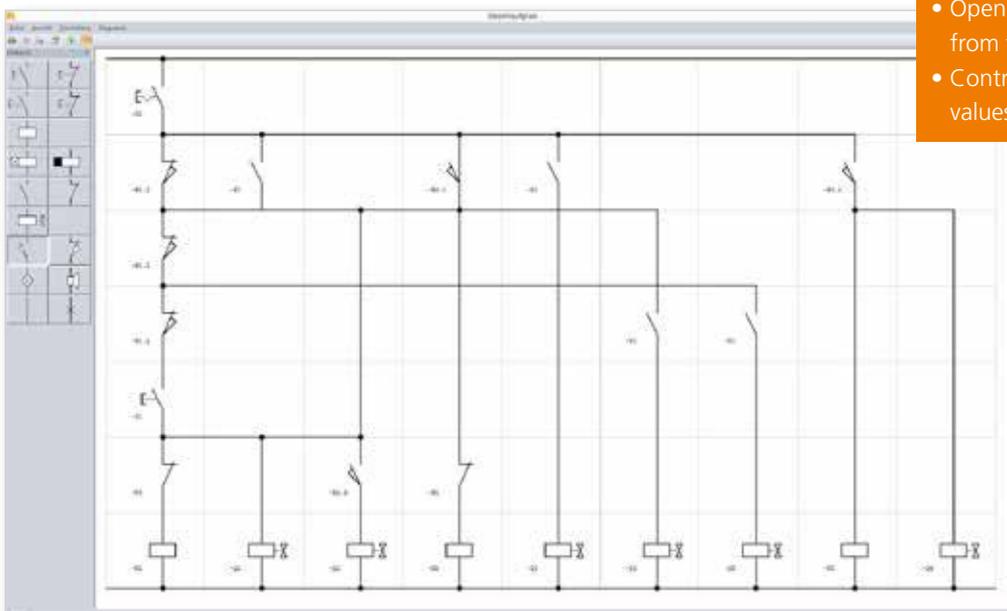


**AUTOMATION STUDIO**

Automation studio, process control of Pneumatics components using the OPC interface

### Benefits for you

- Interactive control of the hardware from the ILA course
- Drafting circuit diagram using the "Automation Studio"
- Opening the interactive circuit diagram editor from the ILA course
- Opening the measuring instruments from the ILA course
- Control and detection of measurement values via USB

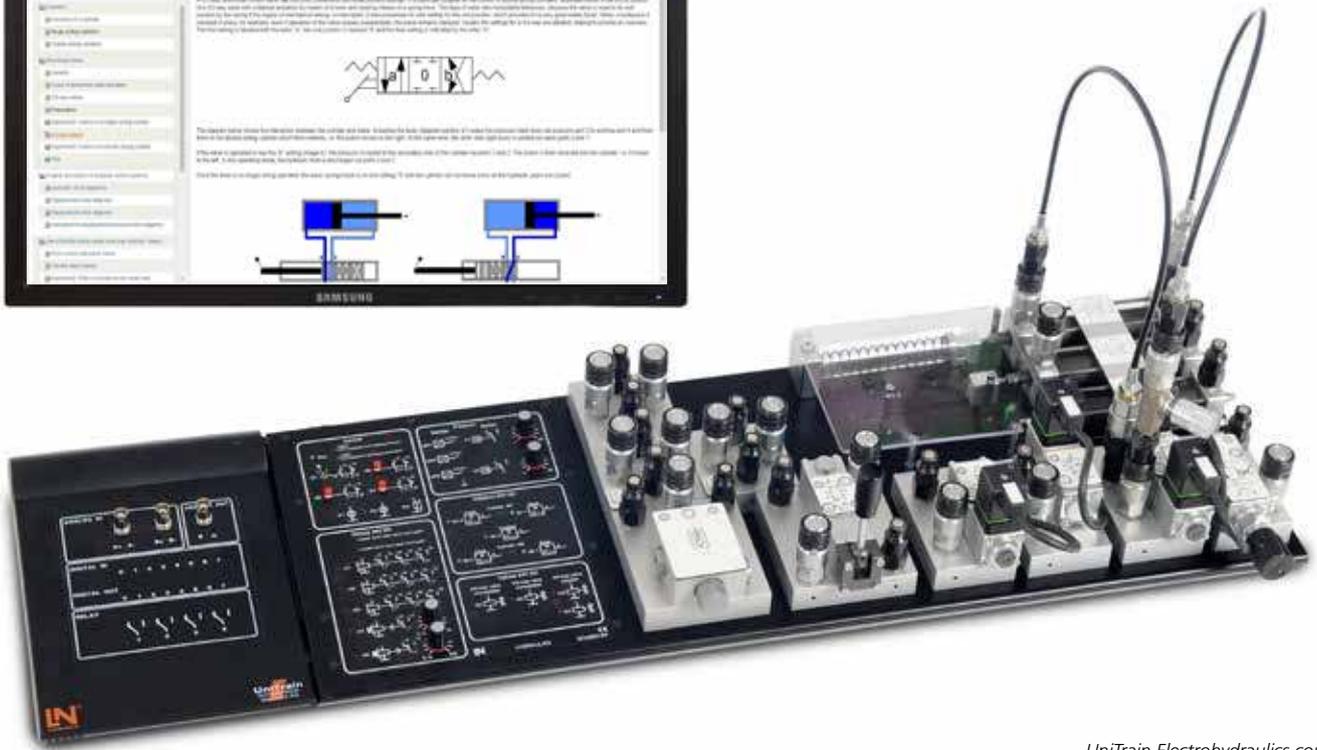
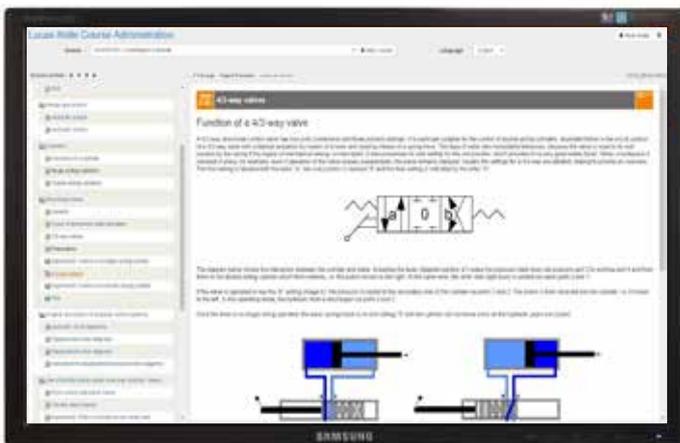


Interactive circuit diagram

# Hydraulics / Electrohydraulics Training Systems

## Hydraulics Compact Trainer

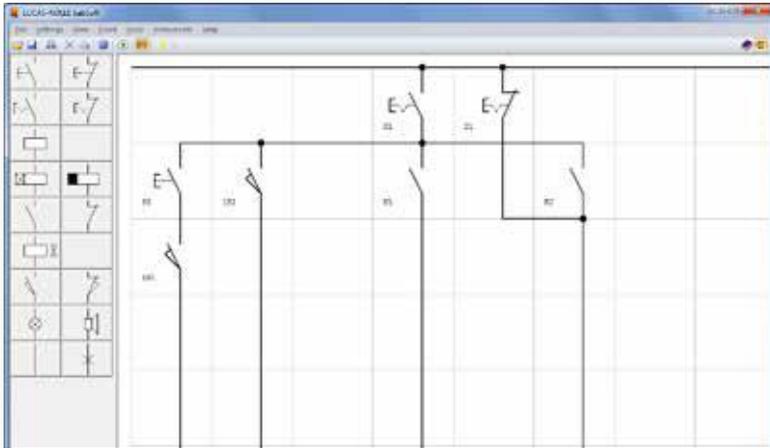
Thanks to the low-leakage connecting hoses, safer and cleaner work is possible in the classroom even at pressure levels up to 40 bar. The accompanying UniTrain course designed for self-study guides students through the entire hydraulics course on fundamentals. Create logic circuitry in the circuit diagram editor integrated right into the software or do the cable connections required in the projects using classic control elements integrated onto the board.



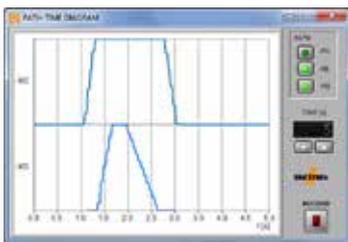
UniTrain Electrohydraulics course

### Training contents

- Fundamentals of hydraulics/electrohydraulics
- Hydraulic and electrical circuit diagrams
- Recording displacement-time diagrams
- Basic circuitry using AND/OR logic circuits
- Displacement-dependent controls



Interactive circuit diagram editor



Displacement-pressure-time diagram for pressure-dependent control



Pressure gauge

### Benefits to you

- Compact, portable hydraulic system with constant pressure pump
- Low-leakage and self-sealing, hydraulic connections
- Interactive multimedia course
- Instrument activation directly from the multimedia course
- Control of hardware using interactive circuit diagram editor

Hose connection animations in the UniTrain course

# Hydraulics Training System

## Manually Operated Industrial Hydraulics

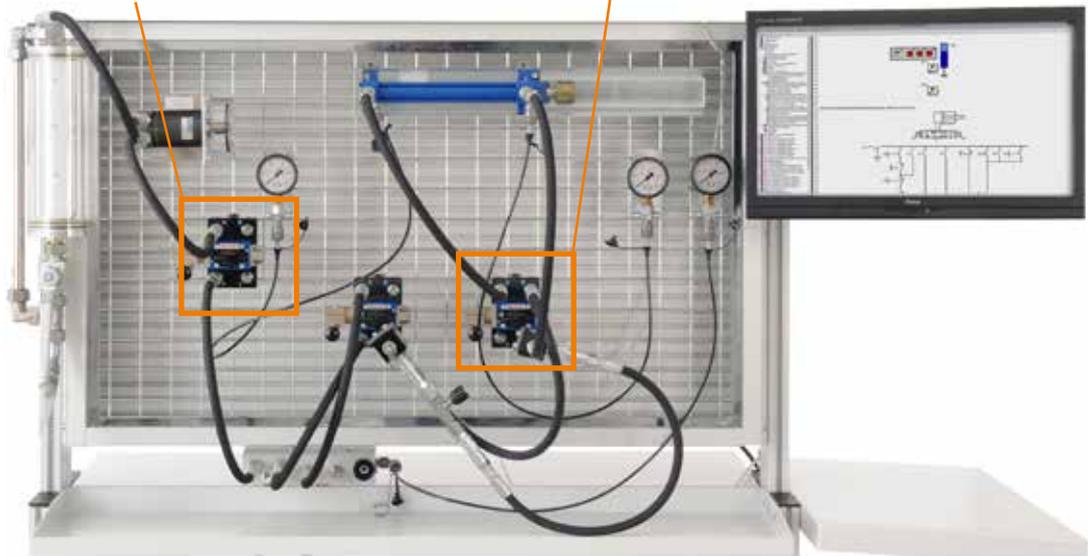
The training objectives have been adapted to the training content found in the vocational training practices of commerce and industry and provide a hands-on approach to the various stages of hydraulic training and education.



Custom-built: 4/3-way valve for vocational training skills and qualifications



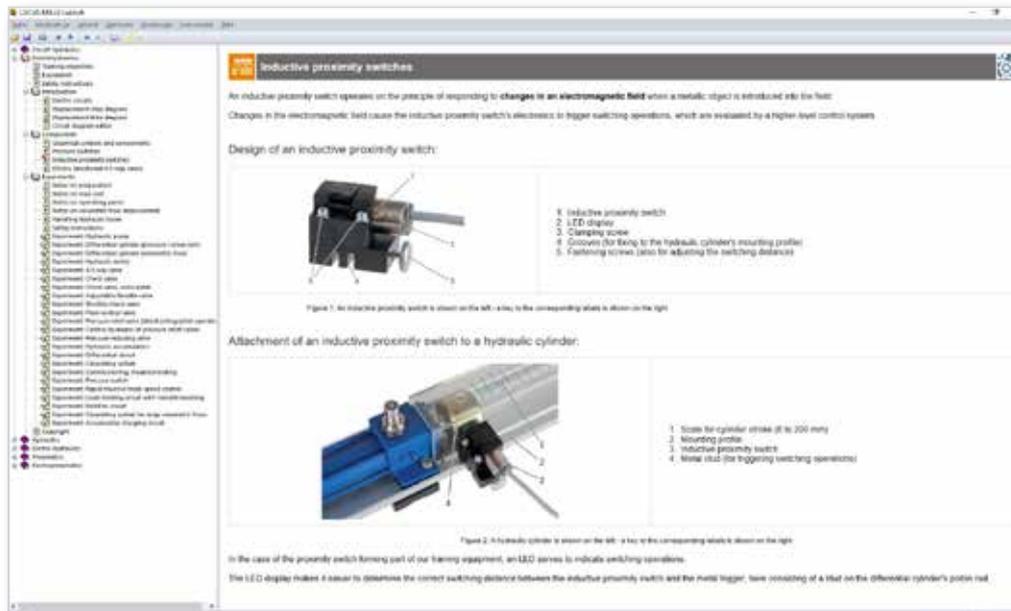
Industrial tools safely and securely mounted



### Training contents

- Exploring the physical principles of hydraulics such as pressure differential, opening cross-section and volumetric flow
- Becoming familiar with and using principle symbols found in hydraulic circuit diagrams
- Understanding how basic hydraulic circuits operate
- Identifying the operating response of hydraulic components
- Determining characteristic values

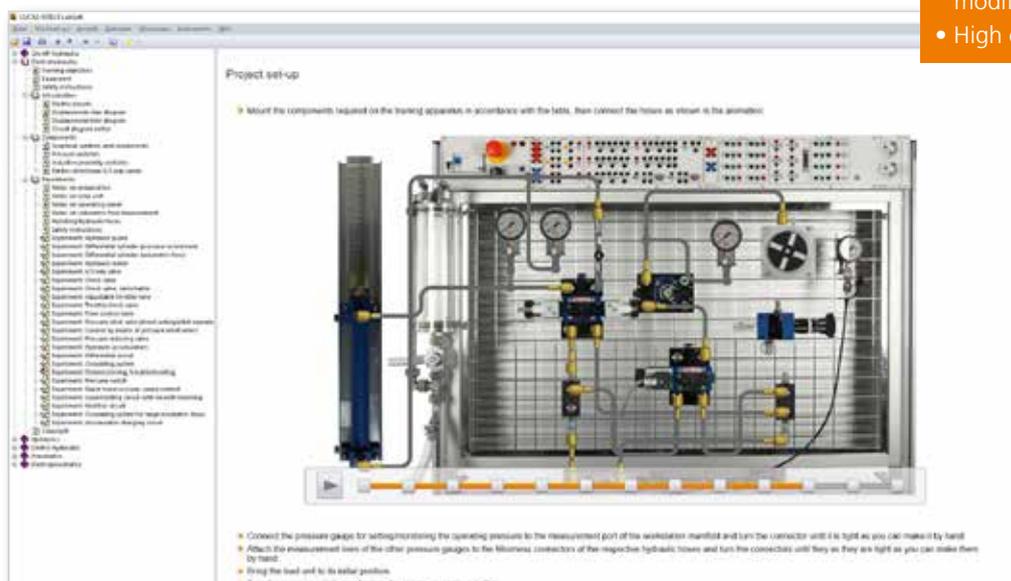
## Complete Project Work Using the ILA Course



Faithful visualization of the hardware

### Benefits to you

- Use of conventional serial-produced components
- Set-up animations provided in the interactive multimedia course
- Accurate monitoring of all the generated forces thanks to interactive measuring instruments
- Component configuration can be modified with some degree of freedom
- High operating pressures permitted



ILA supports interactive set-up animator

# Electrohydraulics Training System

## Electrical Expansion into Industrial Hydraulics

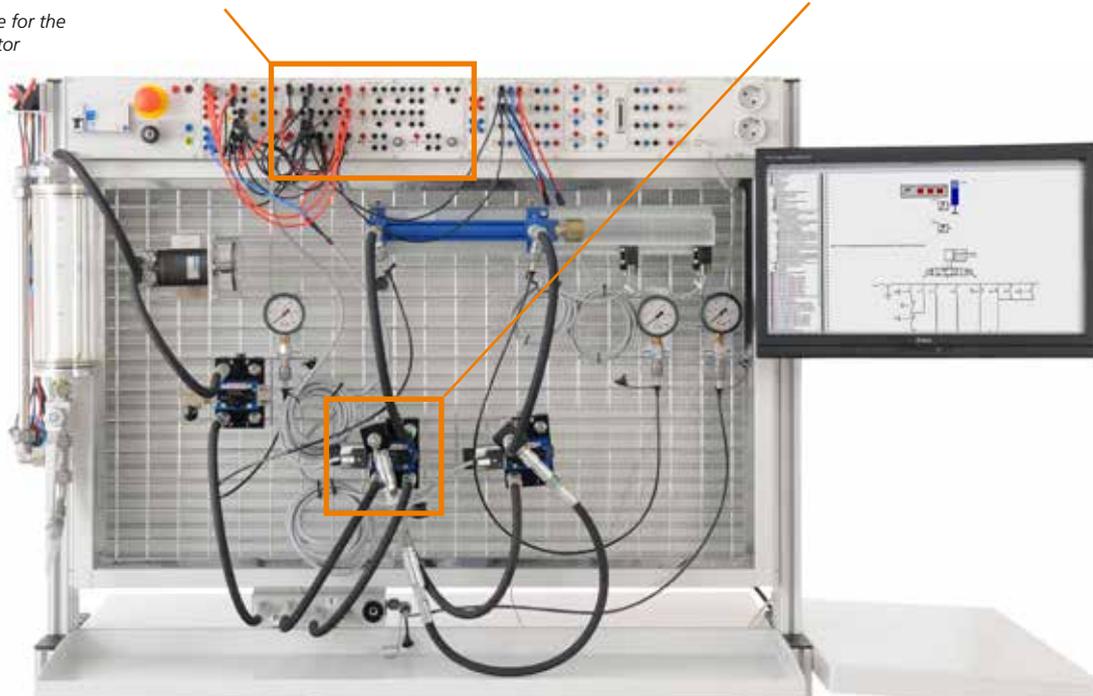
In all practice-oriented project assignments, core and technical qualifications are developed in an integrated fashion through independent planning, execution and monitoring. All this complete with components from Bosch Rexroth.



Interactive interface for the circuit diagram editor



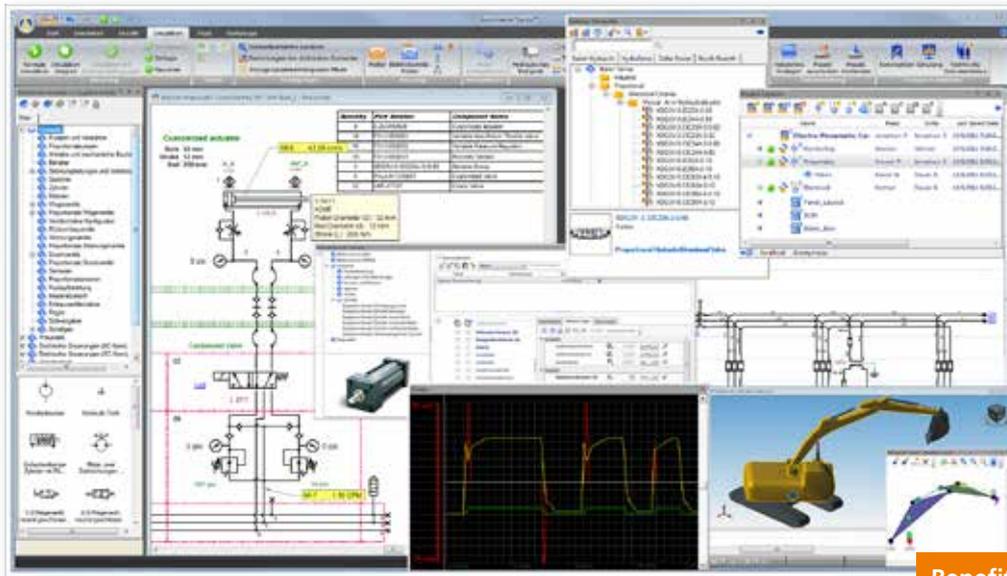
4/3-way industrial-quality slide valve mounted on an equipment board



### Training contents

- Creating pressure-volumetric flow characteristics
- Pressure boosting with differential cylinders
- Open-loop control using directional control valves
- Relationship between opening diameter / pressure differential / volumetric flow rate
- Open-loop control of the hydraulic drive

## Controlling the Hardware Using the ILA Course and the Automation Studio

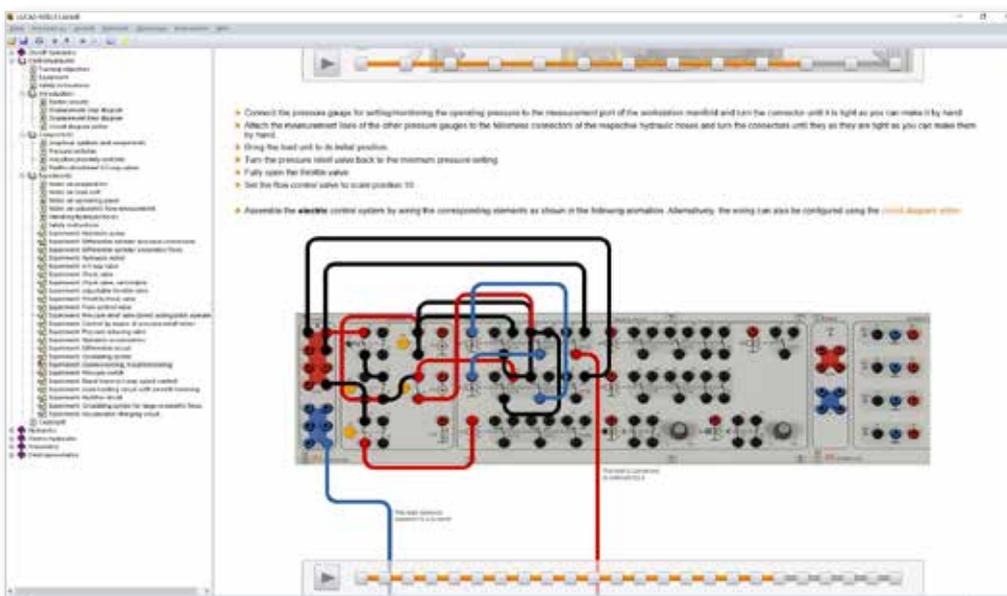


**Automation Studio**

Direct hardware control via the interface

### Benefits to you

- Use of real industrial components
- Work with the Automation Studio simulation software
- Direct evaluation of interactive knowledge tests
- Step-by-step animation as a guide for wiring and hose connection set-up
- Simple operation permitted by starting control from the course



Electrical wiring as set-up animation in the ILA course

**Rexroth**  
Bosch Group

# Lucas-Nülle GmbH

Siemensstraße 2 · D-50170 Kerpen-Sindorf

Telephone: +49 2273 567-0 · Fax: +49 2273 567-69

[www.lucas-nuelle.de](http://www.lucas-nuelle.de) · [vertrieb@lucas-nuelle.de](mailto:vertrieb@lucas-nuelle.de)



*Headquarters in Germany*

