Christiani

We train ahead

Technical Education & Training Systems

TVET

- Metal Technology
- Electrical Engineering
- STEM
- Renewable Energies & HVAC
- Automotive Technology

christiani-international.com

International specialist consultation

Due to its practical orientation, the German education system is viewed globally as a success factor for a solid start to professional life. We support companies, colleges, universities and training centres in providing training and qualifying employees, trainees and students according to German standards abroad too. Have a chat with us!

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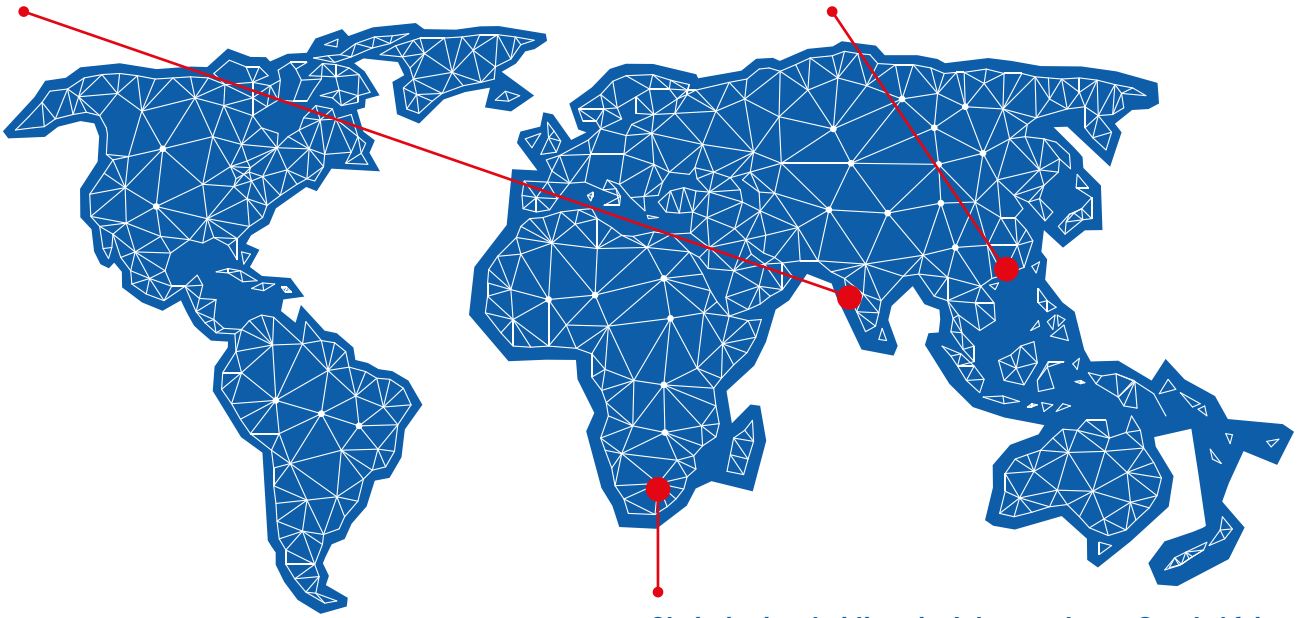
Christiani Sharpline , joint venture in Navi Mumbai, India

Christiani subsidiary in Guangzhou, China



Christiani subsidiary in Johannesburg, South Africa

Member of: didacta Verband der Bildungswirtschaft · Afrika-Verein der deutschen Wirtschaft · DCW Deutsch-Chinesische Wirtschaftsvereinigung e.V. 德中经济联合会

Dear trainers and readers,

In this catalogue, we will guide you through the most important training content in metalworking, electronics, HVAC and automotive technology professions, as well as for school/STEM lessons. We would like to show you how your trainers and teachers can convey training content for training occupations in a didactically meaningful and practice-oriented way. A variety of learning media from our comprehensive product range is available to help you, from specialist books to digital applications to didactic teaching systems. To keep your company's trainers, teachers and specialists always up to date with technical expertise, our Christiani Academy trains your technical personnel in our teaching system – either in one of our Competence Centres or at your premises. You can also visit us in one of our international sites, being present in China, India and South Africa.

For more than 90 years now, Christiani has stood for expertise and quality in technical vocational and further training. Our many years of experience and strong network form the basis for the high quality of our Christiani products. As a result and thanks to our lasting commitment, we have become an important and reliable partner for anyone who values technical training as much as we do.

We will be happy to advise you on the teaching materials and learning concepts that best suit your aims and requirements in technical training.

In Rheine, Landsberg (near Munich) as well as in Berlin, we will be delighted to show you our world of technical training. We would like to invite you to find out about our innovative product solutions in our Competence Centres and discover the latest trends and developments in technical education.

We look forward to meeting you!

Kind regards,

Ferdinand Ganser

Ferdinand Ganser
Head of International Cooperation

Five excellent reasons to choose Christiani

International and future-oriented

We are a forward-looking company that operates on an international scale and is always at the cutting edge with our innovative products.

The right choice for everyone

We offer a comprehensive range of teaching materials, teaching systems and learning concepts for technical training – all from a single source, perfectly coordinated and tailor-made to suit your needs.

Your reliable partner for end-to-end training

We are your reliable partner for every stage of learning, for both learners and teachers, right from encouraging an interest in technology at school, to conveying the necessary technical knowledge in vocational training and at university, through to professional advanced training in technical areas with our Christiani Academy.

Technical expertise, proudly Made in Germany

Companies, educational institutions and training centres across the world rely on our products, solutions and services. Christiani represents technical training modelled on the German educational system, combining theory and practice.

Professional consulting and service quality

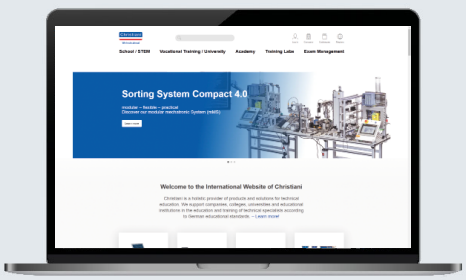
People are always at the heart of what we do. You can count on our reliable employees' specialist and technical expertise. We are happy to advise you by telephone and e-mail, and remain your reliable contact partner after purchase or conclusion of contract.

Follow us on LinkedIn

Christiani's full programme online

Quick to search with all products up to date plus extensive additional information.

Visit us: christiani-international.com



German dual system is setting a benchmark worldwide

Fit for the future with vocational training

The German dual educational system is designed to bring together theoretical knowledge and practical content. Thanks to our teaching systems and learning materials, trainees and students benefit from a demonstrative and practical environment in which they gain the technical expertise required for their occupations. We support trainers in conveying learning content in a targeted and interesting way.

In short: At Christiani, you will have everything you need to teach your trainees and students theoretical and practical knowledge – both online and offline.

Success in professional life through technical and vocational education and training

High-quality technical and vocational education and training (TVET) that is aligned to the needs of the labour market increases the employability of trainees, students, and learners. The availability as well as the skills of these skilled workers play a vital role in both economic growth and prosperity development.

The education and training of trainers and teaching staff is a crucial first step in the development of a quality training system. Only with this qualified training staff is it possible to convey the required knowledge and know-how in a didactically meaningful way during vocational training.

The proven and versatile teaching systems and learning concepts from Christiani are suitable both for the qualification of trainers and teaching staff and for the training of trainees, students and learners. We aim to develop qualified and motivated skilled workers who enjoy using their skills, talents and interests and want to continuously develop their potential.

Our mission: Lifelong learning with success and vision!

OUR SUCCESSFUL TRAINING CONCEPT

Model for complete action

Christiani provides a balanced concept that combines technology, vocational training and modern media in a practical, well-tested package.

- Practical, action-based training
- Promotion of social skills
- Optimum implementation of the curriculum
- Reduction in training costs
- Use of modern training media
- Preparation for working life

Doing

Finding information | **Checking**

Planning | **Evaluating**

Decision-making

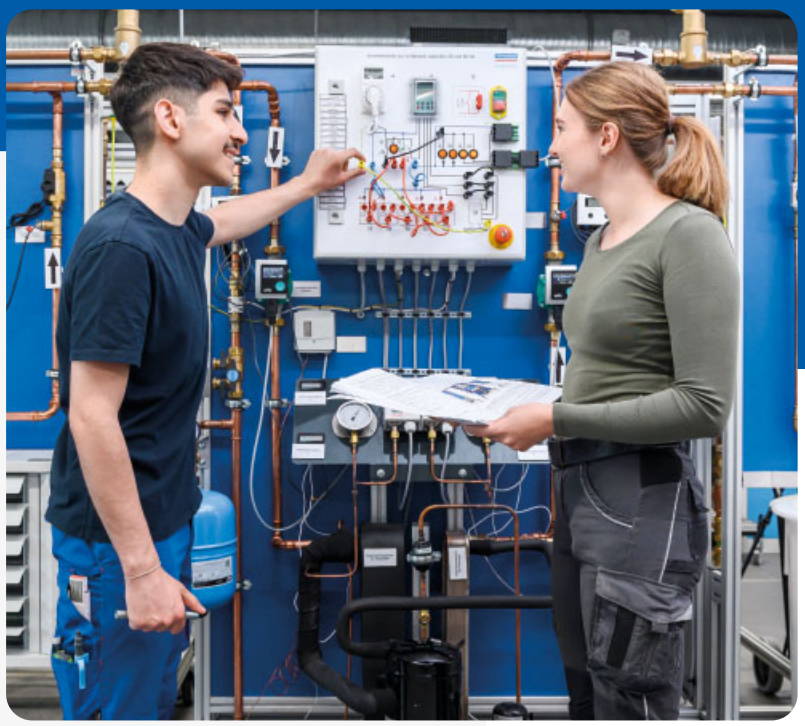
All of our teaching materials and learning media are based on the principle of complete action, bringing together knowledge and real-world scenarios:

- Christiani reference tables
- Christiani specialist books
- Courses for vocational training
- Project work
- Learning cases
- Teaching and workstation systems
- Training boards
- Simulation software
- E-learning courses
- Mechatronic systems

This brochure gives an overview of how you can be successful in conveying the requirements and content for vocational training thanks to the teaching systems and learning concepts that we provide.

Industrial components for your perfect training lab

Christiani's training laboratories are based on fundamental components: Teaching Systems, Furniture, Machines and Didactic Media. By combining these components perfectly, we create individual training labs to meet your needs. And of course, we always keep an eye on the costs.



Multifunctional teaching systems and training stands

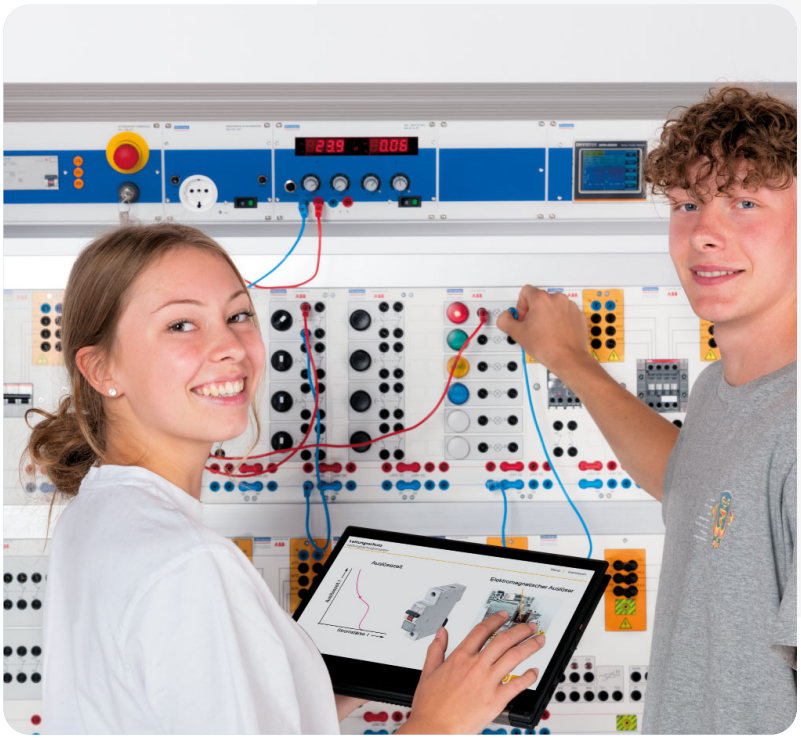
We use original industrial components for device and component Kits. Models, training stands and teaching systems are didactically and technically designed to enable learning under "real conditions". Corresponding technical media ensure the transfer of theoretical knowledge.

Workstation systems for flexible use

In the competition for the best trainees, you can set yourself apart by providing modern training workshops and classrooms. Workbenches, workstation systems, cabinets, shelving and other furniture, equipment and storage systems ensure ergonomic working and perfect interiors.

Professional machines and systems

Professional processing and tool machines as well as training systems ensure state-of-the-art learning and working. It doesn't get more practical than this!



Didactic media – digital or analog

You can choose between different types of media, from reference books and folders to e-learning courses and apps. With C-LEARNING, we offer a learning platform for a wide range of digital media. Applications with augmented or virtual reality offer entirely new possibilities for knowledge transfer and collaboration.

We would be happy to advise you in person
You can find our Regional Managers on page 1.

Successful projects in just a few steps

Complete project management by Christiani

We are meticulous when planning to ensure that everything comes together perfectly when you move into the new rooms. When planning and constructing training labs and training workshops, you can rely on the breadth of our experience, expertise and knowledge.

Consultation, planning and set-up

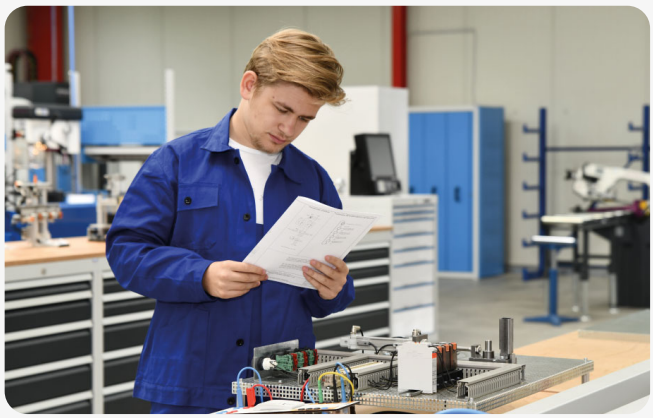
- **Requirement analysis**
- **Budget planning**
- **Training lab planning – Ideas for room design and equipment**
- **Teaching systems, didactic material, tools, room equipment**
- **One contact partner: Project support from the start until handover**
- **Training courses for trainers**

Training systems and complete workplace equipment from a one-stop shop.

Workstation equipment for manual or machine-based processing in several industries.

We would be happy to advise you in person
You can find our Regional Managers on page 1.

Christiani has equipped one of Germany's largest guilds for sanitary, heating and air conditioning technology in Munich.



Rooms full of energy for the electrical engineering training - suitable for all electrical professions

Automotive and high-voltage technology for vocational education and training.

We train your trainers in using the technical systems and show them how to communicate the relevant learning content.

Christiani Competence Centres

Learning concepts and teaching systems – see, touch and try it for yourself

Our Competence Centres are worth a visit for anyone involved in education. We would like to invite you to find out about our innovative product solutions for technical vocational and further training and discover the latest trends and developments in technical education.

Fully equipped showrooms, workshops and laboratories

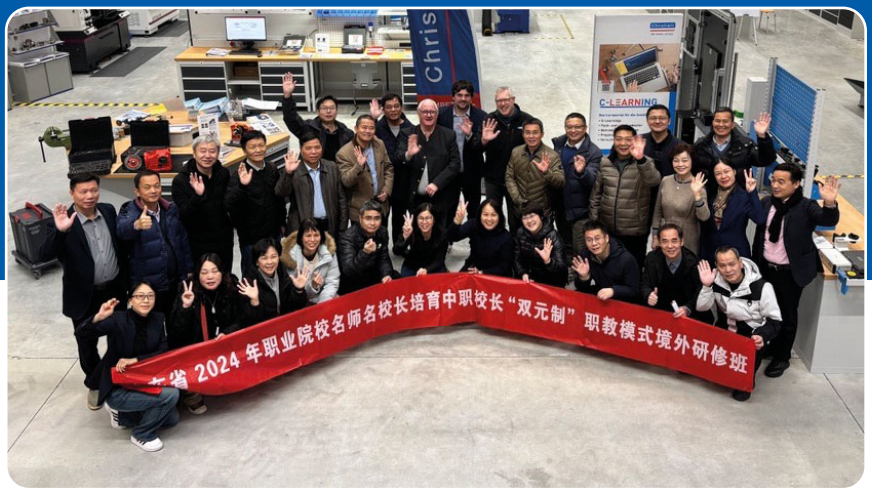
Our technical teaching systems and fully equipped training labs across the world ensure that trainers can teach the required knowledge in ideal conditions. Take a look around, test it out and find out information for yourself.

Your training lab – sophisticated from a teaching perspective and guaranteed to be practical

We keep the bigger picture in mind for training lab solutions. We plan and fully equip your rooms, from tools, media, teaching systems and training stands to teaching materials. The results are impressive!

Tailored solutions need the best advice

Our specialist advisors will be happy to address your every question and request. We support you every step of the way in developing new rooms with valuable practical tips, and show you how you can use teaching aids and didactic materials in a targeted manner in training. Simply let us know what you need and we will be happy to help.



1 Competence Centre in Landsberg/Lech

Celsiusstraße 15
86899 Landsberg am Lech, Germany

2 Competence Centre in Rheine

Schulten Sundern 14
48432 Rheine, Germany

3 Competence Centre in Berlin

Im Ludwig-Erhard-Haus, Fasanenstraße 85
10623 Berlin, Germany

Contact:

International Team
E-Mail: info@christiani-international.com
Phone: +49 7531 5801-110

More information:
christiani-international.com/competence-centres

The Christiani network

Industry and didactics – hand in hand

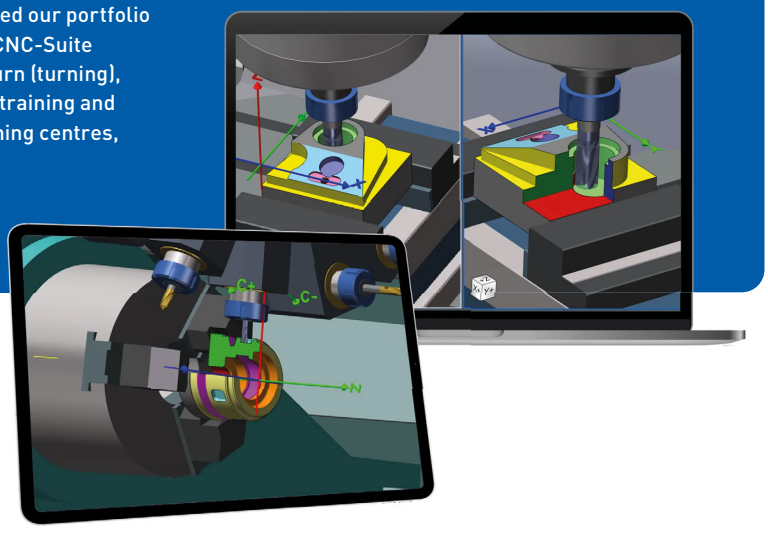
In developing our innovative products, we work directly with well-known international partners from industry and trade. In order to create unique and innovative products we combine our didactic knowledge with the technical expertise of our industrial partners. The joint goal is to bring young people and trainees up to speed in technology matters and thus give them the best possible education.

SIEMENS · KUKA · bedrunka+hirth BETRIEBSEINRICHTUNGEN · SMC · Stürmer Maschinen · AVENTICS · PHOENIX CONTACT · SEW EURODRIVE · Certified Excellence rexroth A Bosch Company · TÜV SÜD ISO 9001 · KARL · UNIVERSAL ROBOTS · wilo · PEPPERL+FUCHS

Expanded product portfolio with Siemens' TopCNC Suite

Together with our Partner SIEMENS, we have further expanded our portfolio of learning materials in the field of CNC technology. The TopCNC-Suite simulation software, consisting of Topmill (milling) and Topturn (turning), offers a practical and didactically well-designed solution for training and further education. Developed for vocational schools and training centres, it teaches CNC skills safely, efficiently and realistically.

More information on page 37



Christiani Academy

Advanced training for technical and specialist trainers

The Christiani Academy is a modern training centre for targeted qualification of technical and specialist trainers. As Germany's oldest distance learning institute, Christiani has a long history of advanced training.

The Christiani Academy's range of advanced training focuses on topics in two areas:

1. Trainer qualification
2. Technical qualification

Advanced training at locations world wide

Our range facilitates advanced training at a variety of locations across the world:

- Courses with supervision (blended learning) – worldwide
- Seminars and workshops – at our customers' company site or in our Competence Centres in Germany (Rheine in Westphalia and Landsberg am Lech near Munich, as well as our company site in Berlin)
- Webinars and online courses – from anywhere in the world
- Specialist literature

Customised solutions

We develop customised solutions for advanced training for staff in companies, educational institutions and other institutions.

- We train technical specialists and trainers.
- We support trainers in their work with targeted qualification measures.
- We enable companies and educational institutions across the world to work according to the German model of dual education, combining theory and practice.
- We can create customised advanced training programmes from existing workshop modules to train multiple participants, or we can develop learning content according to our customers' requirements.

More information at:
christiani-international.com/academy

Christiani Academy

Technical Training

From basic knowledge through to proficient expertise, we train technical staff in metal technology, automation technology and electrical engineering. We will also be happy to develop tailor-made education concepts for your employees.

PLC Technology

With the "PLC Technology" training course, the participant learns the basics of PLC technology and programming with the SIMATIC STEP 7 programming language in a practical manner in six instructional letters. As part of the course PLC programs for various automation tasks are created and tested with a professional simulation program.

Learning content:

- Basic structure and functions of modern automation systems
- Installation steps for configuration and parameterization of software and hardware
- Well-founded insight into the process-oriented working method and operation of a SIMATIC S7-300
- Creation of PLC projects and the systematic design of program sequences and program documentation
- Important programming commands in different programming languages (AWL/KOP/FUP)
- Program structure with functions, data and function blocks
- Standard functions, standard function blocks and individual registers in SIMATIC STEP 7 projects
- Practical exercises on the simulation models are used for commissioning and testing
- Systematic troubleshooting and error correction

Electrician Basics

This module is designed for employees (participants) from the areas of engineering, construction, commissioning and service & maintenance of electrical systems and equipment with electrical engineering training. Electrical specialists are qualified to carry out, supervise and be responsible for electrotechnical work on equipment, electrical systems and in electrical operating facilities. The module also covers laws, standards and guidelines, electrical components and hazards in electrical engineering.

Electrician

(with switching qualification for switching authorization)

The basis of this course is the module "Electrician Basics". On top of this module the following additional contents will be covered. Electricians are trained to carry out switching work in the medium-voltage grid up to 52 kV. They are authorised to connect and disconnect electrical operating sites to the distribution network. Electrical installers are responsible for the management of electrical installations and operating sites as plant and/or work supervisors.

Hydraulics

This course is suitable for anyone who is encountering the subject of "Hydraulics" for the first time. The focus is on safety, basic physics and the structure of a simple hydraulic system. Furthermore, the function and schematic structure of various components are covered extensively in the course to help participants get started with hydraulics. With the help of various measuring methods, the special features and effects of area ratios are demonstrated in practice, among other things.

Pneumatics / Electropneumatics

The course “Pneumatics / Electropneumatics” developed in cooperation with the company SMC, the world's leading expert for pneumatic solutions. Using practical examples, the course imparts comprehensive knowledge about pneumatic components and systems. Step by step, under professional supervision, you will acquire basic physical knowledge, learn to create and simulate pneumatic plans and gain an insight into electropneumatics.

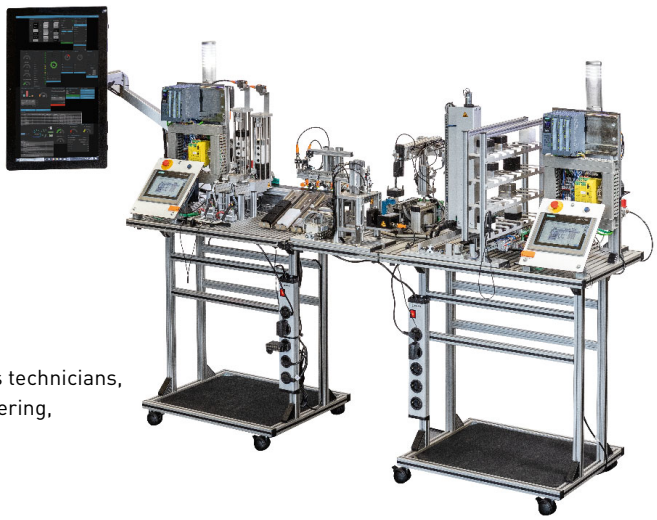
Learning content:

- Possible applications and operating conditions of pneumatics
- Structure of pneumatic systems
- Physical basics
- Properties of the transmission medium compressed air
- Pneumatic drive elements (cylinders, grippers and pneumatic motors)
- Cylinder designs and mounting options
- Functionality and types of directional control valves
- Possible applications of shut-off and flow control valves
- Circuit diagram creation and extensions
- Representation with control tasks
- Function and fields of application of proportional technology
- Basics of vacuum technology
- GRAFCET plan representations
- Basics of electrical engineering and electropneumatics
- Introduction – electrical control of valves
- Basic circuits in electrical control systems
- Sensors in pneumatic systems

Automation Technology / Industry 4.0

The course "Automation Technology / Industry 4.0" deals in detail with the modular Mechatronics System Sorting System 4.0 (mMS SSC 4.0). With the mechatronic system, learning contents of automation technology and mechatronics can be taught from the basics to complex applications of Industry 4.0 in a small space. The following content will be taught in this training course:

- Fundamentals of mechatronics
- Basics of industrial system and processes
- Sensor and actuator technology
- IO-Link technology
- PLC and HMI programming in TIA portal
- Pneumatics and electropneumatics
- Plant, machinery and operator safety
- Network technology - wired and wireless
- IIoT tools like OPC UA, MySQL and MQTT
- Dashboard designing using Node-RED
- Data acquisition, data storage and data analysis



This training course is well suited for plant mechanics, mechatronics technicians, automation technology technicians, technicians for industrial engineering, technicians for industrial mechanics etc.

Course structure:

Day 1

- Introduction to SSC 4.0 and various IoT tools used in SSC 4.0
- Commissioning check of SSC 4.0 Understanding how to make the system ready for operation
- Manual IO Check. Understanding various sensors and actuators installed in SSC 4.0
- Automatic operation – How to issue a command from HMI, dashboard or smart devices

Day 2

- Understanding PLC and HMI programming structure
- Introduction to IO-Link technology and various IO-Link devices used in SSC 4.0
- Introduction to OPC UA and learning how to use OPC UA to get the data from the PLC to the visual dashboard
- Introduction to MQTT and MySQL. How these tools are used in SSC 4.0 for data exchange and logging

Day 3

- Introduction to Node-RED (graphical development tool) and learning how Node-RED brings all IIoT tools together to display information on a visual dashboard
- How SSC 4.0 can send data to the cloud. LIVE demonstration of cloud connections

More information at:
christiani-international.com/academy

The Christiani learning portal

Your access to digital training

Digital media often have crucial advantages for learning: Processes and workflows can be visualised more clearly on the screen than on paper, exercises and tests can be completed and evaluated more easily, and learning becomes networked and interactive.

The well-proven Christiani specialist books, reference tables or vocational courses are also available in a digital version for PC or tablet. With the learning portal, you can conveniently control and use all digital content purchased from Christiani wherever you are.

C-LEARNING

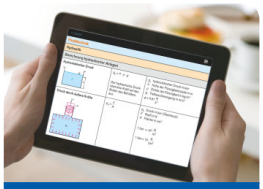


Table and textbooks

Our table and textbooks provide the necessary basic knowledge and deepen examrelevant topics.

E-Learnings

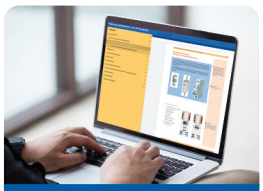
Digital knowledge transfer with our comprehensive E-Learning courses for basic knowledge in metal and electrical engineering.

Training courses

Training courses combine theory and practice in a meaningful and practical way.

Project works

Selected project works are now available in digital form.

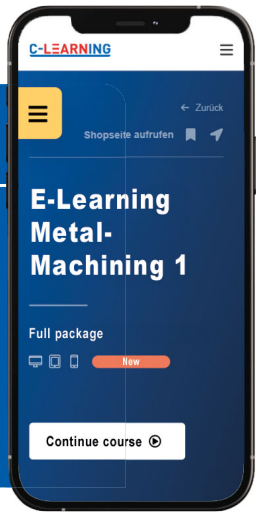


Teaching manuals

Our teaching manuals are also available digitally via C-LEARNING.

ADVANTAGES OF THE LEARNING PORTAL C-LEARNING

- Flexible learning - at any time and anywhere
- All didactic learning content in one portal
- Practical exercises
- Interactive media for the entire training and further education process
- All digital content can be accessed and managed via one address
- Short loading times
- Can be integrated into your learning environment via interfaces



C-LEARNING *plus* International

All content on C-LEARNING is available as an attractive licence model at a fixed price per year.

- **From books and e-learning courses to project work and long-term training courses. You will evenfind test instructions for our hardware productsin this offer.**
- **Use our digital products across all areas,with no hidden costs and no restrictions.**
- **The simple pricing model offers access to all content without time-consuming research and at predictable costs.**

This offer is unique in the educational landscape and combines theory and practice in a completely new way.

BENEFITS

- **Includes everything that trainees and trainers need**
- **Always up to date: new content, editions and versions**
- **Simple management of learners and licences, predictable annual costs**
- **Access from anywhere and at any time via web access**
- **Content available in foreign languages such as English or Spanish**
- **Interface to existing learning management system (API, LTI, OAuth 2.0)**

C-LEARNING *plus* International

Trainee access

All the content of our new learning portal C-LEARNING is available as an attractive licence model at a fixed price per year. The simple pricing model makes it possible to gain access to all digital content without time-consuming research and at predictable costs.

Annual License

- Administrator access is included for two or more trainee accounts
- Trainees can be created and assigned content with the administrator access
- E-learning
- Digital reference and table books
- Company courses (digital)
- Project work (digital)
- Test instructions (digital)

Multi-year licenses on request

C-LEARNING *plus* International

Trainer access

Use our digital products across all areas, without hidden costs and restrictions. This offer is unique in the educational landscape and combines theory and practice in a completely new way.

Annual License

- Access to the solutions of all stored tasks
- Trainees can be created and assigned content
- E-learning
- Digital reference and table books
- Company courses (digital)
- Project work (digital)
- Test instructions (digital)

Multi-year licenses on request

For more information, go to:
christiani-international.com/digital-learning

Metal Technology
Basic Training

As a trainer in the industrial metalworking professions, you can count on our support. A variety of learning media from our comprehensive product range is available to you, from specialist books to digital applications to didactic teaching systems. With every product, you can convey learning content in an easily understandable and visual way – from an individual learning medium to fully equipped training labs and training workshops.

We are your partner for technical vocational and further training.

Here is a practical overview of the most important learning media and teaching systems, covering key topics for training.

- Reference tables and specialist books
- E-learning courses
- Courses for vocational training
- Project work
- Learning cases
- Workstation systems
- Simulation and training software

Our teaching materials and teaching systems are perfect for conveying the following training content:

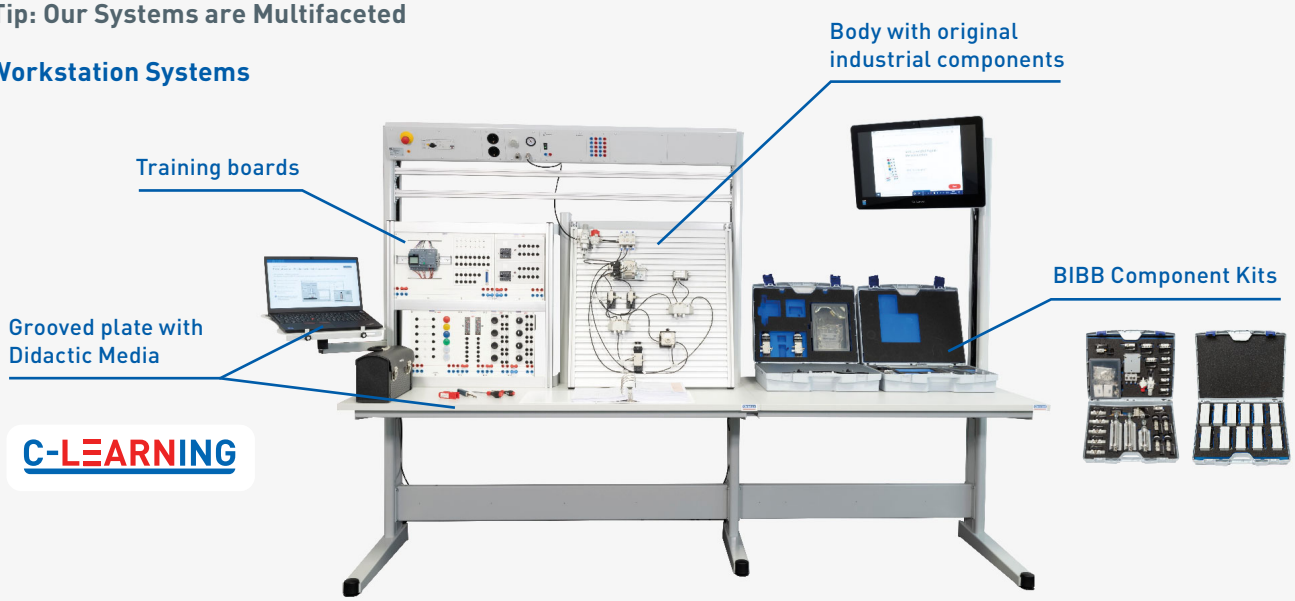
- Material Processing
- CAD / CAM
- Transmission Technology
- Control Technology
- CNC Technology

Metal Technology

- Basic Knowledge
- Material Processing
- Manual Material Processing
- Machine-based Material Processing
- Thermal Material Processing
- Transmission Technology
- Control Technology
- Pneumatics / E-Pneumatics
- Hydraulics
- PLC Technology
- CAD / CAM
- CNC Technology

Tip: Our Systems are Multifaceted

Workstation Systems



Basic principles of metal technology

E-Learning courses as full package

E-Learning Metal – Full Package English

Spanish also available!

Article	Order-No.
Single User License for Schools/Companies	46500

More information at: christiani-international.com/46500

To the demo version and more info in the video

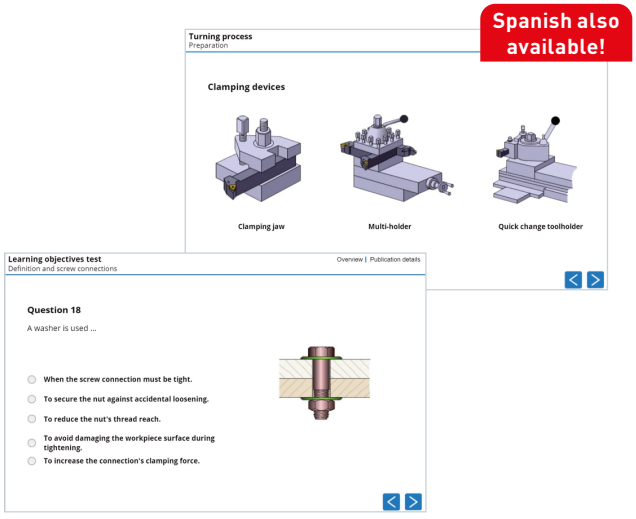
With the Christiani E-Learning courses on metal technology, you teach the learning content that a trainee in testing and production technology needs to know. The trainees control their learning independently and individually. The mix of reading texts, animated graphics, images, videos and spoken texts makes this form of knowledge transfer vivid and lively.

The full package includes:

- E-Learning Metal – Machining 1
- E-Learning Metal – Machining 2
- E-Learning Metal – Machining 3
- E-Learning Metal – Machining 4
- E-Learning Metal – Machining 5
- E-Learning Metal – Machining 6
- E-Learning Metal – Machining 7
- E-Learning Metal – Joining 1
- E-Learning Metal – Joining 2
- E-Learning Metal – Checking 1
- E-Learning Metal – Checking 2
- E-Learning Metal – Work plan
- E-Learning Metal – Parting and forming

More information at:
christiani-international.com/46500000

Spanish also available!



! Further modules on materials technology, pneumatics and specialised calculations are in progress

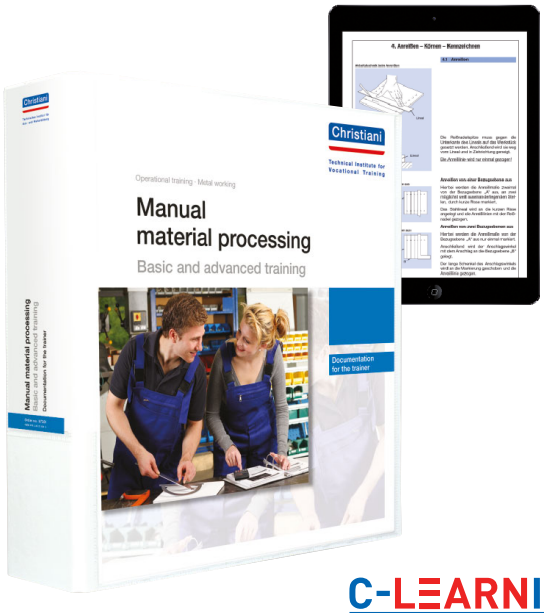
Manual material processing

Christiani courses as the perfect basis for the whole vocational training in metal

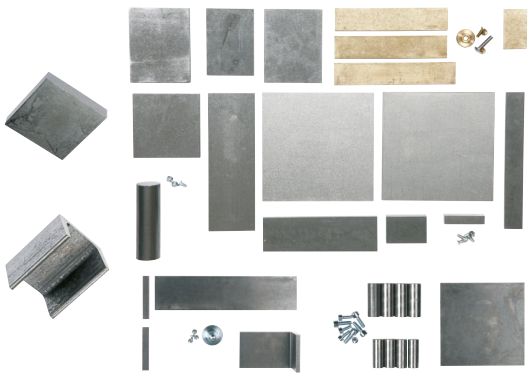
The "Manual Material Processing" training course covers the manual cutting manufacturing process for metalworking professions. Basic skills, such as testing, measuring, filing and sawing, are covered here in detail. Trainees also learn how to handle simple tools correctly.

Content:

- **Trainer manual**
  Accompanying materials with didactic and methodical explanations and concrete instructions that provide full support for the vocational training course
- **Sample solutions**
  Nearly all tasks and exercises can be followed and checked based on detailed sample solutions
- **Exercises for trainees**
  26 practical exercises with information sheets and forms for self-evaluation as well as learning success checks
- **107 slides as a download**
  The slides support understanding of complex connections
- **Textbooks**
  7 textbooks with information on the vocational training such as standards, regulations and legal texts, manuals for use of specialist books and reference tables



C-LEARNING



Spanish and French also available!

Article	Print Order-No.	Digital, Annual License Order-No.
Documents for the Trainer	97351	41229
Documents for the Trainee	97352	41328
Text Book	97421	41393
Material Kit	68000	

More information at: christiani-international.com/97351

Tip: We plan training workshops so that theory and practice always go hand in hand

Hexagonal Workbench

More information at: christiani-international.com/50984

Foam Insert

More information at: christiani-international.com/50540

Toolbox

More information at: christiani-international.com/56207

Machine-based material processing

Training courses and e-learning courses

This training documentation covers the mechanical cutting manufacturing process known as turning. Here, the different skills required for turning, such as centring, drilling, producing threads, taper turning, knurling and deburring, are covered in detail.

C-LEARNING

Machine-based Material Processing - Part: Turning

Spanish and French also available!

Article	Order-No.
Documents for the Trainer	74324
Documents for the Trainer Digital, Annual License	41233
Documents for the Trainee	74325
Documents for the Trainee Digital, Annual License	41332
Text Book	74326
Text Book Digital, Annual License	41360
Material Kit	68014

More information at: christiani-international.com/74324

The milling section of the vocational training course is specially designed for the various milling processes. Thanks to the training documentation, the trainee will become well acquainted with all milling processes and can use the processes with this newly acquired knowledge.

C-LEARNING

Machine-based Material Processing - Part: Milling

Spanish and French also available!

Article	Order-No.
Documents for the Trainer	72996
Documents for the Trainer Digital, Annual License	41231
Documents for the Trainee	97749
Documents for the Trainee Digital, Annual License	41330
Text Book	72998
Text Book Digital, Annual License	41361
Material Kit	68015

More information at: christiani-international.com/72996

Measurement technology

ISO Trainer Metal Technology

It has been proven that learning is most successful when learners can fully investigate both the theory and the practice of the object of their studies. With the ISO Trainer, you can teach the technical facts and practical skills clearly. The case is handy, compact and includes not only the different sample components and workpiece models, but also the supporting materials, manuals and software.

Metal Technology ISO Trainer

The ability to correctly test workpieces is one of the most important skills in industrial vocational training. Trainees and students can use the ISO Trainer to practice measuring and gauging on sample workpieces. The focus is put on the correct selection and use of test equipment and identifying and evaluating the required accuracies according to drawings.

Order-No.
50697

More information at: christiani-international.com/50697

Project Work

From teaching the basics to specialist knowledge

Christiani project work has provided a solid basis for good, qualified training in many companies. Trainees use practical work to learn the various working techniques and manufacturing processes involved in metal technology. Based on project work, trainees learn to handle technical drawings, materials, tools and machines. The project work, designed as small, manageable projects, are particularly suited for an introduction to hands-on training. Each project comprises detailed project documentation with a work contract, guiding questions, full set of drawings and monitoring and evaluation questionnaires, as well as a complete material kit.

What makes Christiani project work special?

- **Support the requirements of complete action**
- **Project folders match the basic requirements in practice**
- **Impart basic knowledge and skills in a quick and hands-on manner**
- **Fulfil requirements in a wide variety of jobs**

Helicopter

Article	Order-No.
Material Kit + Documents for the Trainee	99895
Documents for the Trainer	64089

More information at:
christiani-international.com/99895

Formula 1 Racing Car

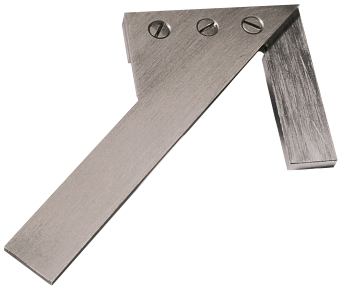
Article	Order-No.
Material Kit + Documents for the Trainee	99897
Documents for the Trainer	64087

More information at:
christiani-international.com/99897

Trike V2

Article	Order-No.
Material Kit + Documents for the Trainee	99898
Documents for the Trainer	67841
Supplement Lighting	99899

More information at:
christiani-international.com/99898

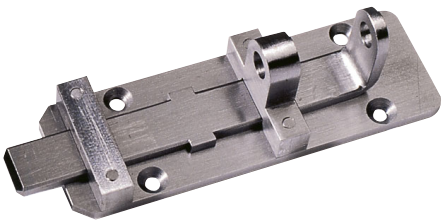


Angle Plate

Spanish also available!

Article	Order-No.
Material Kit + Documents for the Trainee	97818

More information at:
christiani-international.com/97818



Sliding Bolt

Article	Order-No.
Material Kit + Documents for the Trainee	97812

More information at:
christiani-international.com/97812

Drill Cassette

Article	Order-No.
Material Kit + Documents for the Trainee	88801

More information at:
christiani-international.com/88801

! Delivery as a material set consisting of: Semi-finished products and Standard parts

Project Work Press

Interdisciplinary learning on a joint project

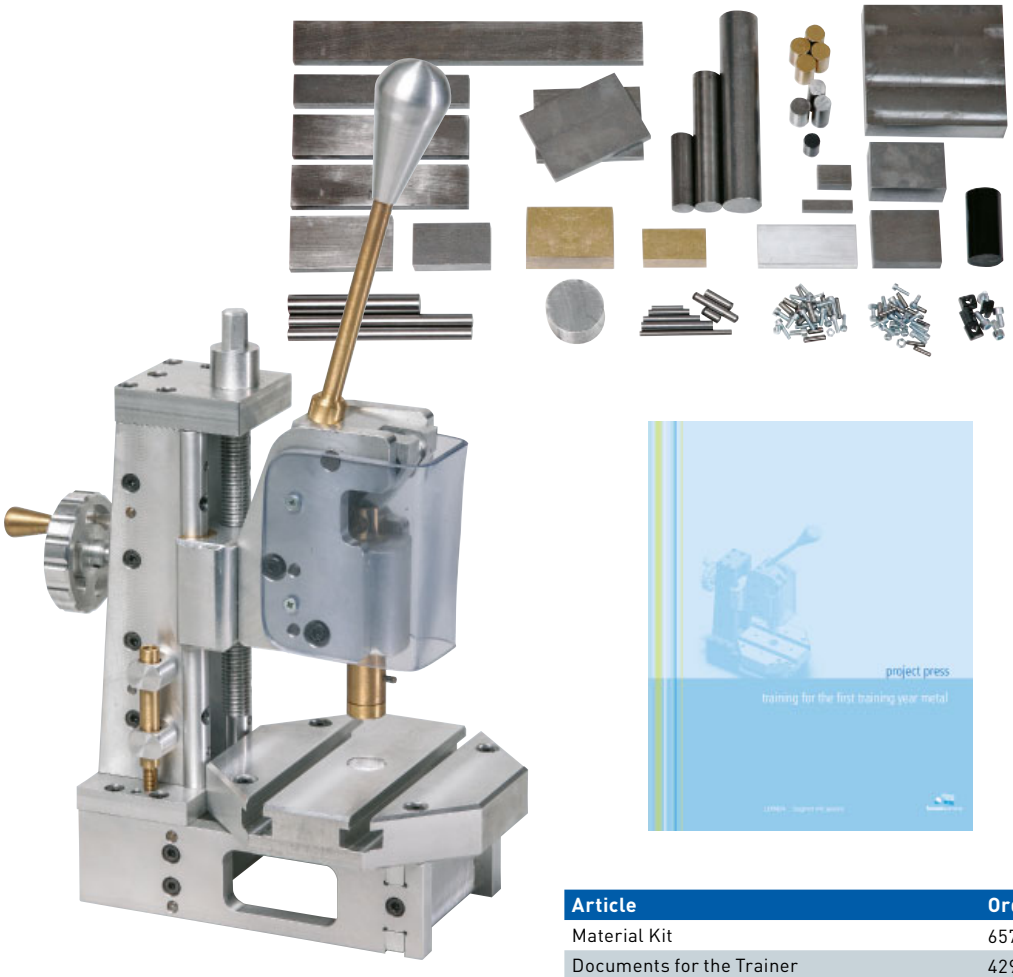
The training project "Press" was developed by trainers and teachers as the result of a coordination process between companies and the vocational school. This joint project represents a compromise between the individual interests of all participating companies and the vocational school. On the basis of this project different training areas of the broad-based core qualifications into one whole. The documents are learning aids for the independent learning of the apprentices in the company or school workshop. Extensive methodological aids explain to you the ways in which you can possibilities of working on this project with the apprentices. The entire project is divided into individual modules, which contain different focal points. This project is much more than a new set of drawings with learning sheets. The new learning field-oriented documents are used for the practical part of vocational training.

Common core qualifications for metalworking occupations:

- Occupational safety and health
- Environmental protection
- Operational and technical communication
- Planning and organizing work, evaluating work results
- Manufacture of components and assemblies
- Manufacturing, assembling and disassembling components and assemblies
- Distinguishing, allocating and handling raw and auxiliary materials
- Maintaining operating equipment
- Customer orientation

Suitable for

- Precision mechanic
- Toolmaker
- Machinist
- Construction mechanic



Article	Order-No.
Material Kit	65741
Documents for the Trainer	42992
Documents for the Trainee	42993

More information at: christiani-international.com/42992

Project Work Robot Arm V²

Teaching the fundamentals of metal processing and electrical engineering

Teach the fundamentals of the metal and electrical industry relevant to the profession, combined with new automation technologies, as part of an exciting and innovative project. The kinematics of the 7-axis robot arm are like those of an industrial robot. By building this robot arm, your trainees will learn all the necessary fundamentals of metal processing and electrical engineering. Our goal is to prepare trainees as well as possible for the mechatronics engineer examination. The linear axis of the robot arm corresponds to the axis model that appears in the final examination part 2. This allows trainees to apply their knowledge in a targeted manner and tailor their skills to the requirements of the examination. The complete package contains all the materials required to build the robot arm.

The media library offers extensive training materials such as drawing sets, assembly drawings, images and videos, as well as the Arduino programme. It also contains checklists and assessment sheets to monitor the progress and understanding of the trainees.

Robotic Arm V2 with web control

Discover innovation in automation: for the first time, our new robotic arm can be controlled directly via a web application– simple, flexible and from anywhere. Maximum control, modern technology, ready for immediate use. Experience the future now!

Article	Order-No.
Project Work Robot Arm V² Complete set of materials with digital media library	105717

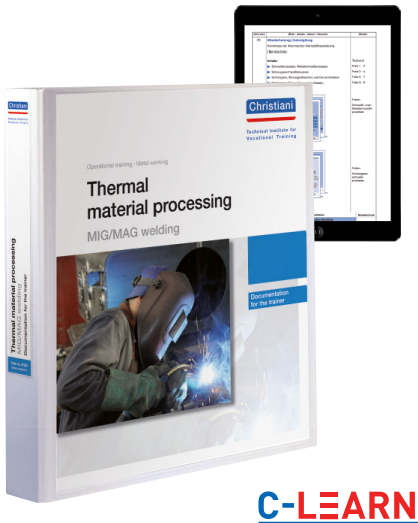
More information at: christiani-international.com/105717

! Delivery as a material set consisting of: Semi-finished products and Standard parts

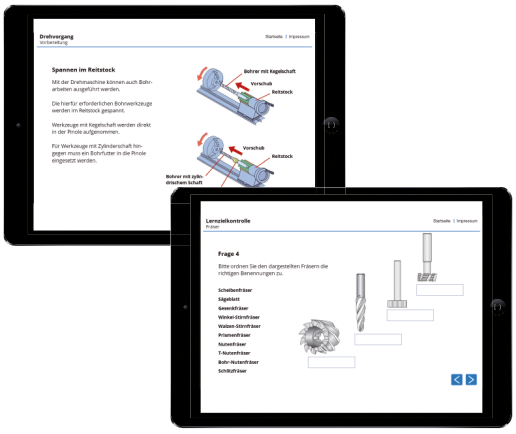
Thermal material processing

Learning welding

Thermal processes play a central role in the field of metallic material processing. They include essential joining and bonding techniques that are used in numerous branches of industry. A sound education in this field is essential to meet the ever-growing demands of modern technology.



C-LEARNING



Vocational course – Thermal material processing

Spanish also available!

Article	Order-No.
Oxyacetylene Welding, Package	33495
Oxyacetylene Welding, Documents for the Trainer	97358
Oxyacetylene Welding, Documents for the Trainee	97359
Oxyacetylene Welding, Text book	97509
Oxyacetylene welding for the Trainer	100116
Oxyacetylene welding for the Trainee and Text book	100112
MIG/MAG Welding, Package	33496
MIG/MAG Welding, Documents for the Trainer	97360
MIG/MAG Welding, Documents for the Trainer Digital, Annual License	41235
MIG/MAG Welding, Documents for the Trainee	97361
MIG/MAG Welding, Documents for the Trainee, Digital, Annual License	41362
MIG/MAG Welding, Text book	97510
MIG/MAG Welding, Text book Digital, Annual License	41363
Manual Arc Welding, Package	33494
Manual Arc Welding, Documents for the Trainer	97356
Manual Arc Welding, Documents for the Trainee	97357
Manual Arc Welding, Text book	97508
Arc welding for the Trainer	41240
Arc welding for the Trainee	41989
Arc welding, Text book	41988

More information at: christiani-international.com/33496

! The package versions each contain 16 sets of documentation for the trainees, 16 textbooks and one set of documentation for the trainer.

See for yourself – on site!

You can thoroughly test out our teaching principles in combination with our teaching system for the practical aspect in our Competence Centres in Rheine and Landsberg (near Munich).

christiani-international.com/competence-centres

Didactic kits for transmission technology

Gears are a fundamental unit in metalworking. The basic task of a gear is to control the ratio between speed and power. Due to the increasing number of technologies used in practice, prospective specialists must acquire in-depth and comprehensive knowledge of mechanical drive technology increasingly quickly. The demo cases from SEW are the ideal learning model for practical training in transmission technology. All tools and aids required for the work are integrated in the didactic kits. The detailed assembly instructions describe the assembly and disassembly process simply and clearly in illustrated work steps.

What are the advantages of the learning cases for you?

- Easily understandable introduction to the machine elements
- Theory is easier to understand thanks to practical review
- Assembly and disassembly can be practised as often as desired, without cost-intensive pressing tools

Practical lab experiments:

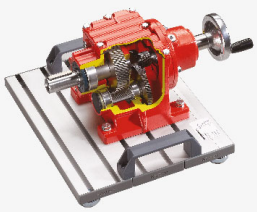
- Determine the gear ratio and torque with a fixed speed
- Interaction of the machine elements in a gear (shaft-hub connector)
- Preventive maintenance based on parts lists or individual components
- Design for Assembly
- Safe use of suitable assembly tools and assembly aids

Applies to all construction kits:

- Can only be assembled and disassembled with standard industry tools
- Components, such as gearwheels, pinion shafts and tapered roller bearings, are corrosion-protected and therefore wear-free
- Integrated in two sturdy plastic cases or in a base cabinet
- The gear module has been developed for training purposes only

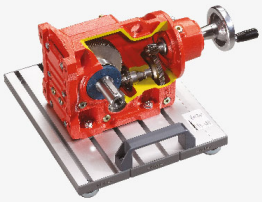
Tip: Sectional models for basic understanding of transmission technology

Spur Gear Unit



More information at:
christiani-international.com/54739

Bevel Gear Unit



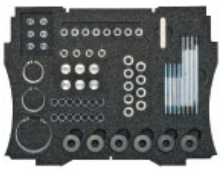
More information at:
christiani-international.com/54740

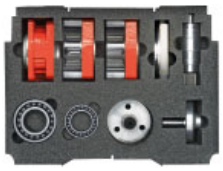
Worm Gearbox

More information at:
christiani-international.com/54741

Didactic kits

SEW products stand for diversity, quality, reliability and innovative strength. Performance features that you will find throughout the entire product portfolio. The didactic kits are ideal learning models for practice-oriented training in transmission technology. The didactic kits can be used to explain the assembly, disassembly and operation of a gearbox in a practical manner.





Article	Order-No.
Servo Planetary Gear Unit didactic kit	32743
Worm Gearbox didactic kit	50772
Spur Gear Unit didactic kit	50770
Bevel Gear Unit didactic kit	50771

More information at: christiani-international.com/32743

Three-phase Asynchronous Motor DRN71M4

Especially for vocational training, we have designed an industrial three-phase asynchronous motor as a didactic kit and developed the corresponding accessory components and spare parts. This teaching aid is intended for use in initial and further training, e.g. at vocational schools, technical schools, colleges, universities or company training centres.

- The motor can be used as a stand-alone didactic kit or mounted on the didactic kits.
- Enables theoretical and practical introduction to electrical engineering
- Assembly and disassembly of the motor can be practised repeatedly - without cost-intensive assembly

Order-No.
101634

More information at: christiani-international.com/101634

For more information, go to:
christiani-international.com/transmission-technology

MAPS Multifunctional Workstation System

Learning with industrial components and didactic teaching material

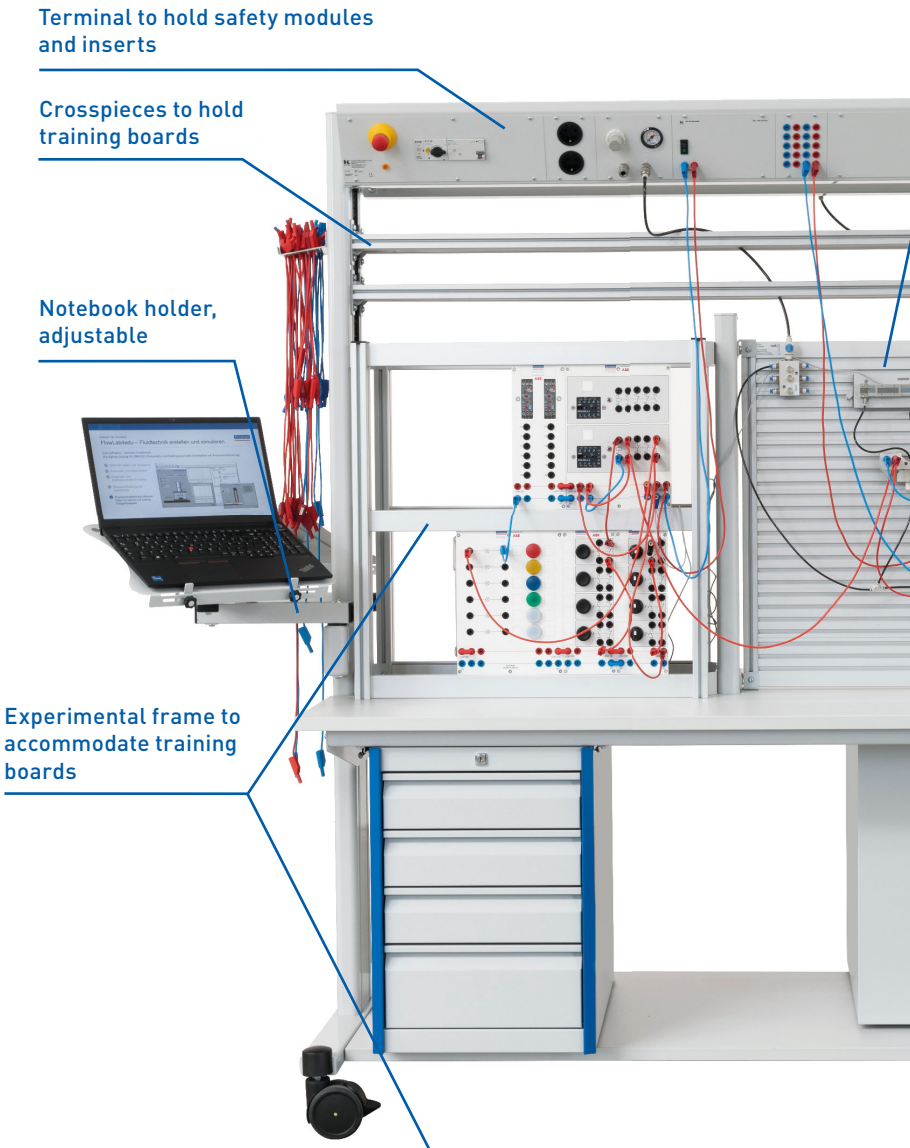
On the MAPS multifunctional workstation system from Christiani, almost all technologies for control technology for industrial-technical vocational training can be taught in a way that is oriented towards practical applications. The basic equipment includes a mobile desk, energy terminal, training board frame and a grooved plate that can be used on both sides and crosspieces. This means different components and parts can be used at the workstation. Thanks to extensive accessories, you can expand the multifunctional training desk system according to your exact needs, whether for pneumatics, electrical engineering or PLC training. Proven industrial components as well as didactic teaching materials are available as accessories.

System with many advantages

- Low entry price and modular design
- Can be used flexibly for a variety of different training occupations
- One-sided or two-sided versions
- Customer-specific adaptations
- Stable design with aluminium system profile
- Quick, easy and safe component assembly

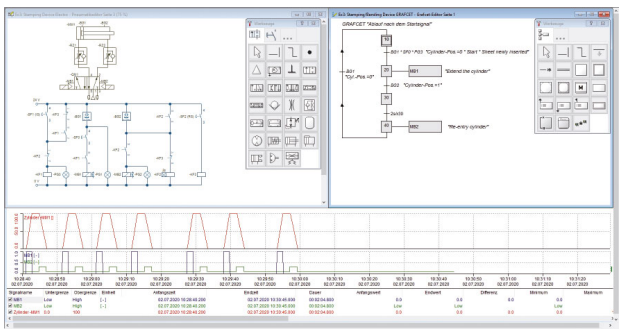
Article	Order-No.
MAPS Basic (single-sided)	43406
MAPS Basic (double-sided)	43407
MAPS Mechatronics (single-sided)	43400
MAPS Mechatronics (double-sided)	43401
MAPS Mechatronics (single-sided)	43960
MAPS Mechatronics (double-sided)	43962
MAPS Professional (single-sided)	43410
MAPS Professional (double-sided)	43411

More information at: christiani-international.com/43406



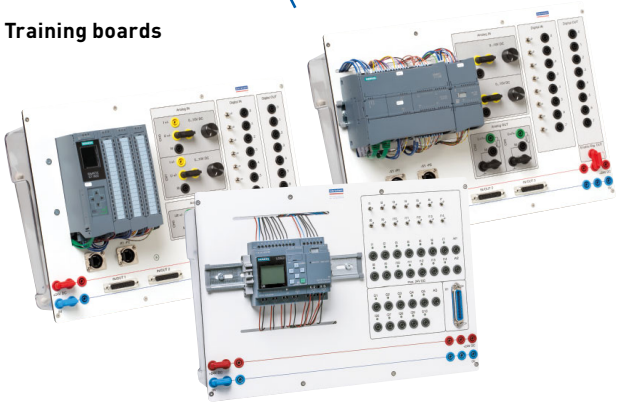
Simulation software

FlowLab4edu



More information on page 24/25.

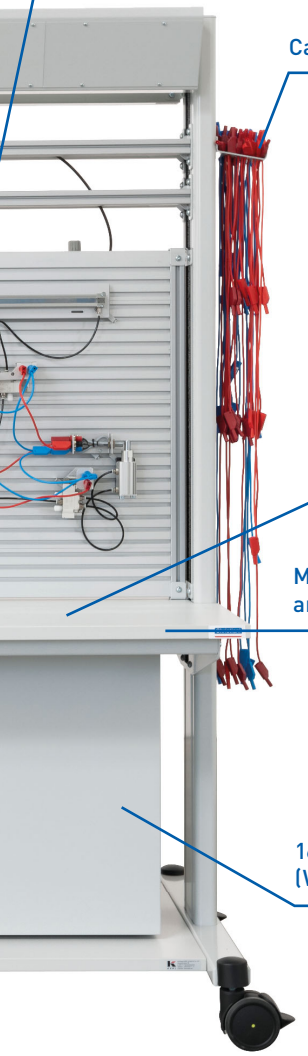
Training boards



More information at:
christiani-international.com/teaching-systems-electrical-engineering

Pneumatic/electropneumatic component sets can be attached to the grooved panel as test set-ups.

Cable holder



Robust base frame made of aluminium column profile and hard laminate desktop

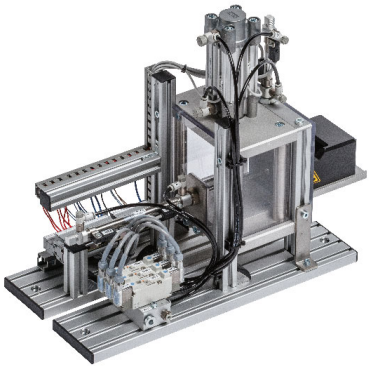
Mechatronic and pneumatic processes are made easy to understand.

1600 x 800 x 1900 mm (W x D x H)

BIBB Basic Pneumatic Kits and Electropneumatic Kits

More information on page 29.

mMS functional units



Connect the training boards to the mMS functional units to present the mechanical and pneumatic processes in an understandable way.

More information at:
christiani-international.com/69513

MAPS Multifunctional Workation System

Learning with industrial components and didactic teaching material

Christiani's multifunctional MAPS training station system allows you to teach virtually all control technology concepts in a practical manner. Choose between our three standard versions or let us advise you! All versions are available as single or double-sided workstations. The standard versions do not meet your requirements? We would be happy to customize your MAPS system according to your specific needs.

MAPS Basic

The basic configuration of the MAPS Basic consists of a work table, a slotted plate and cross profiles. Pneumatic and electro-pneumatic components with quick-mounting systems can be placed on the slotted plate. The MAPS Basic is available in two versions:

Article	Order-No.
MAPS Basic single-sided	43406
MAPS Basic double-sided	43407

More infromation at: christiani-international.com/43406

MAPS Mechatronics

The basic equipment of MAPS Mechatronics consists of awork table, an energy terminal with safety modules and individual plates, an experiment frame and a slotted plate. This allows different components and parts to be used at the training station.

Article	Order-No.
MAPS Mechatronics single-sided	43400
MAPS Mechatronics double-sided	43401

More infromation at: christiani-international.com/43400

MAPS Professional

The basic configuration of the MAPS Professional consists of a work table, a power terminal with safety modules and insert plates, an experiment frame, a slotted plate, cable comb, a notebook holder and a rolling container. This allows different components and parts to be used at the workstation.

Article	Order-No.
MAPS Professional single-sided	43410
MAPS Professional double-sided	43411

More infromation at: christiani-international.com/43410

Control technology in a learning case

BIBB component kits for pneumatics and electropneumatics

The increasing importance of pneumatic and electro-pneumatic systems is also reflected in training for many metalworking professions. The BIBB component kits offer a wide range of options for exercises and pneumatic circuits – perfect for practising circuit designs and for knowledge transfer.

BIBB component kits:

- For pneumatics and electropneumatics
- Snap-in and
- Slide-In technology
- With industrial components from SMC and Aventics

BIBB Basic Pneumatic Kit

Article	Order-No.
SMC Components	101640
Aventics Components	103105

More infromation at: christiani-international.com/101640

BIBB Electropneumatic Extension Kit

Article	Order-No.
SMC Components	101637
Aventics Components	103106

More infromation at: christiani-international.com/101637

Tip: The right teaching materials for the BIBB component kits

Pneumatics - Manual / Pneumatic Control

More infromation at: christiani-international.com

FlowLab4edu

Simulate, create and control fluid technology

Exclusively at Christiani

FlowLab4edu is comprehensive software for creating, simulating and controlling pneumatic and electropneumatic circuits. Using the intuitive editor, any desired pneumatic and electropneumatic control systems can be created.

Real pneumatic components can be connected and operated via the electrical control systems or GRAFCET. Use the process visualisation and create your own process images so that you can observe and operate simulated or real systems.

Main features:

- Graphical design of pneumatic circuits
- Symbols corresponding to the standard DIN ISO 1219-1
- Simulation and testing of designed pneumatic diagrams
- Design and simulation of electropneumatic circuits
- Description of circuit with GRAFCET
- Creation of control systems with GRAFCET
- Data logging and analysis
- Process visualisation
- Detailed documentation and help
- Independent study and work
- Includes introductory tasks and examples

More information

Test the free demo version now at:
christiani-international.com/34701

FlowLab4edu Simulation Software

Article	Order-No.
Single User License for Companies	34700
SIngle User License for Schools	34701

More information at: christiani-international.com/34700000

FlowLab4edu Simulation Software Update and Maintenance Pack

Article	Order-No.
for Companies	41527
for Schools	41529

More information at: christiani-international.com/41527000

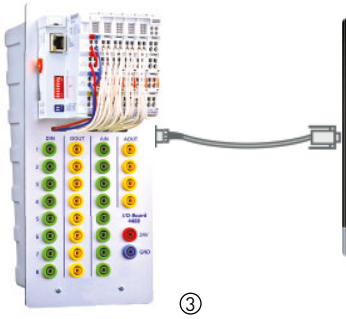
Controlling practice circuits and real systems

Together with the I/O board, electropneumatic practice structures and real systems can be controlled directly via FlowLab4edu. There is an Ethernet connection to the PC. All signals are connected via 4 mm safety laboratory sockets.

1. BIBB electropneumatics component kit
2. Measuring lines
3. I/O board
4. PC with FlowLab4edu screenshot

①

②



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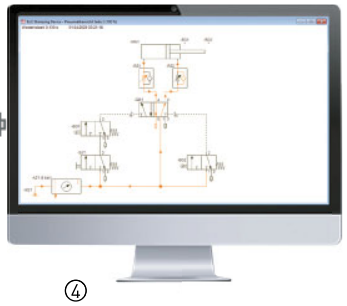

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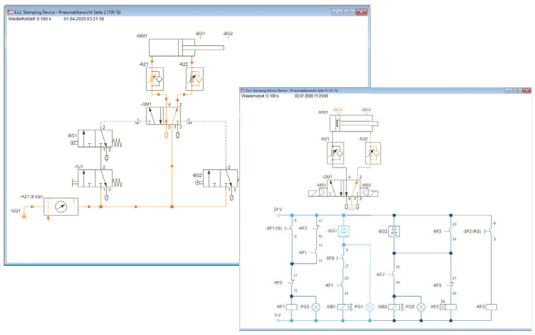
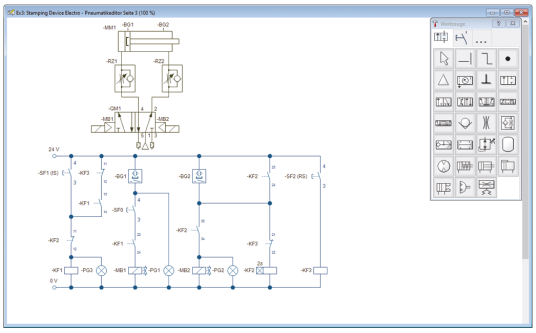


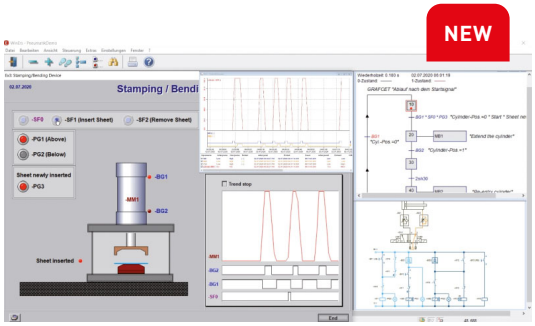
(E-)pneumatics simulation

Testing the behaviour of pneumatic circuits in the simulation or connecting real electropneumatic elements.



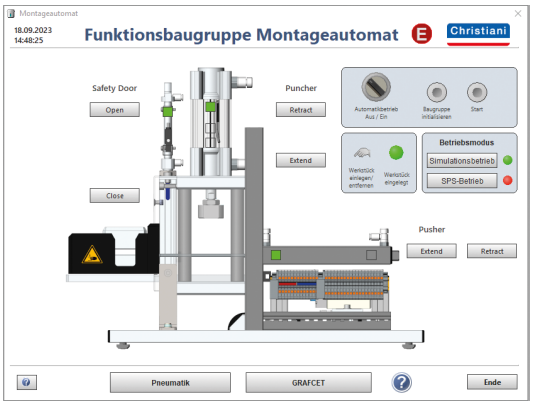
(E-)pneumatics editor

The editor, which is intuitive to operate, has a comprehensive library of pneumatic components and electronic elements. A variety of settings can be configured for individual components.



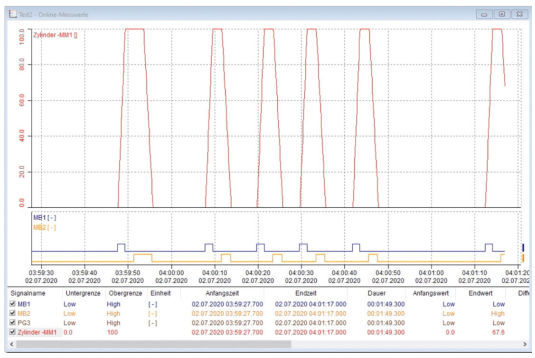
GRAFCET

Process description of the pneumatic circuits developed with GRACET. Control systems for systems and pneumatic circuits. Monitoring and observing control system processes in the GRAFCET view.



Process visualisation

Create your own process images so that you can observe and operate simulated or real systems. Create your own individual process images with the process visualisation.



Data logging and storage

Data recording, storage and analysis of all positions, switching states, pressures, etc., as measured values.

! In addition to existing process images, there is the option to create your own process visualisations. On request, individual process images can be created.

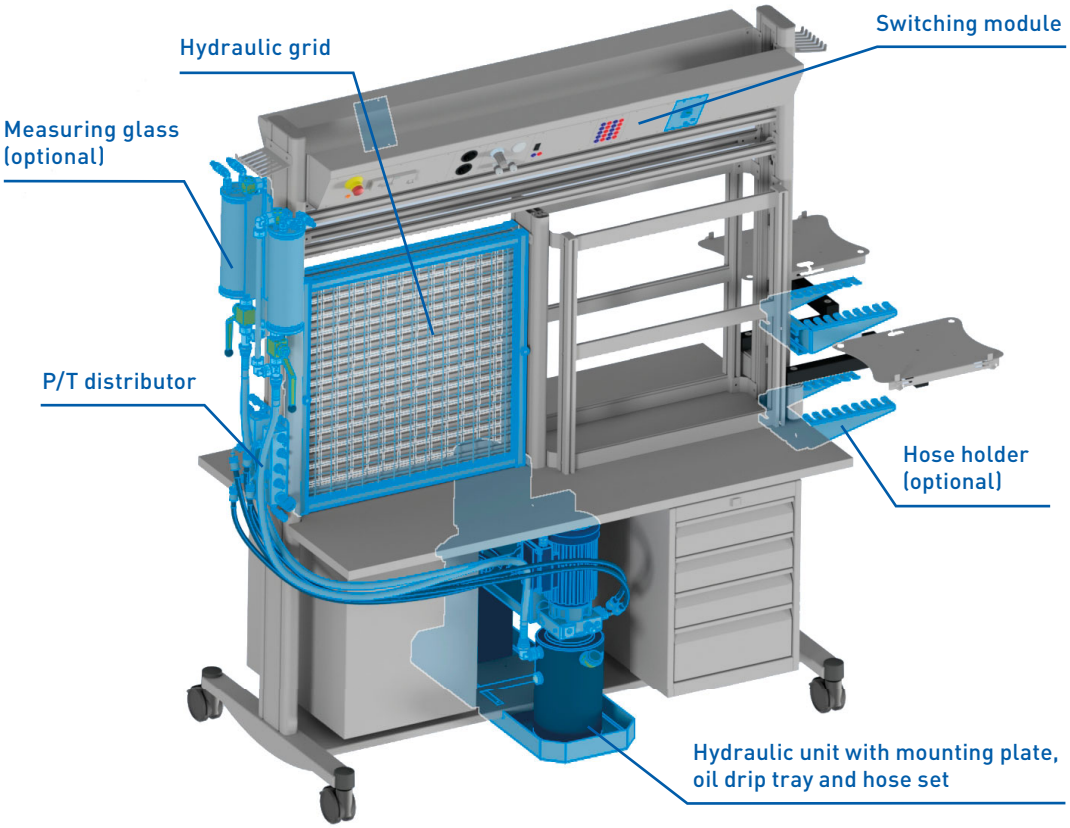
More information at:
christiani-international.com/flowlab4edu

Introduction to hydraulics

MAPS extension hydraulics

With the new extension of hydraulic technology, our MAPS is now even more powerful! The extension not only enables increased flexibility, but can also be easily upgraded to existing workstation systems.

The extension kit is available fully assembled or as a kit for self-assembly. Both versions consist of the following components:

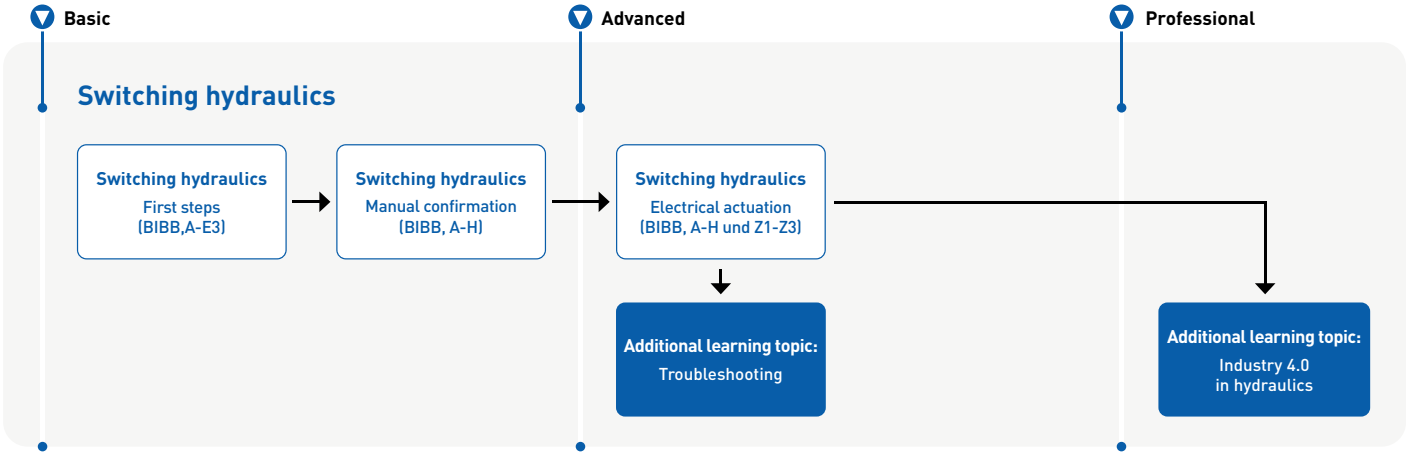


Article	Order-No.
MAPS extension hydraulics - single-sided	105276
MAPS extension hydraulics - double-sided	105277

Mehr Infos unter: christiani.de/105276

Immerse yourself in the world of hydraulics. The following learning topics can be taught using theMAPS Hydraulics workstation system:

- Switching hydraulics – first steps
- Switching hydraulics – manual operation
- Switching hydraulics – electrical operation
- Switching hydraulics – Industry 4.0 in hydraulics



Introduction to hydraulics

Workstations and matching tasks

Constantly increasing requirements even for entry-level employees in metalworking professions have made it necessary to adapt vocational training. This practice module helps to consolidate existing knowledge of hydraulics.

XITE Hydraulix 300 workstation

For training in on/off hydraulics, proportional hydraulics and control hydraulics.

Article	Order-No.
Workstation (single-sided) 230 V / 50 Hz	95977
Workstation (double-sided) 230 V / 50 Hz	95981

More information at: christiani-international.com/95977

XITE Hydraulix 200 workstation

For training in the basics of hydraulics.

Article	Order-No.
Workstation (single-sided) 230 V / 50 Hz	95700
Workstation (double-sided) 230 V / 50 Hz	95701

More information at: christiani-international.com/95700

! On request, the XITE workstations are also available in 400 V/50 Hz and 230 V/60 Hz versions.

XITE Hydraulix 201 device set

- On/Off Hydraulics – Manual Operation (according to BIBB)
- For the XITE Hydraulix 200/300 workstation

Learning the basics of hydraulics on the basis of practical exercises with industrial components specially prepared for the training area.

Order-No.
99802

More information at: christiani-international.com/99802

Tip: The right teaching materials

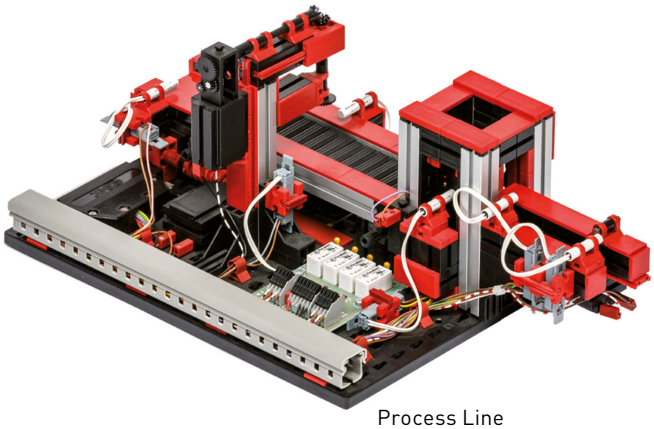
On/Off Hydraulics - Manual Operation (according to BIBB)

More infromation at: christiani-international.com/99814

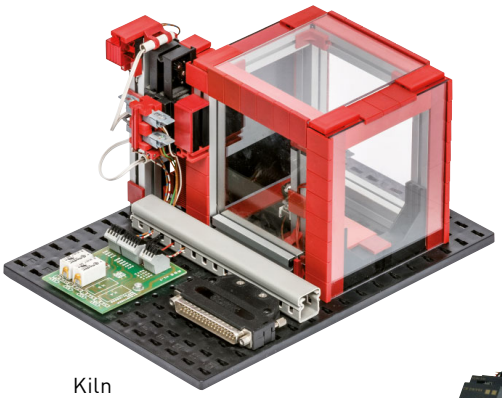
Basic principles of PLC technology

Complete tasks on training boards and models

Being able to ensure or improve the functionality of machines and systems by controlling, regulating and monitoring work movements and their auxiliary functions is an additional requirement that trainees must be able to fulfil.

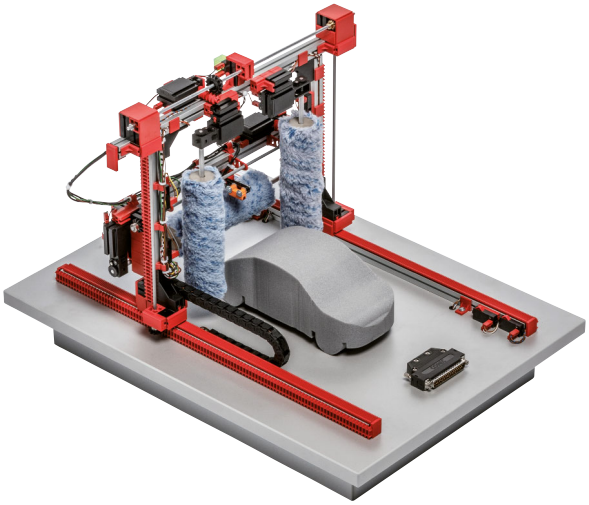


Process Line



Kiln

LOGO! Control

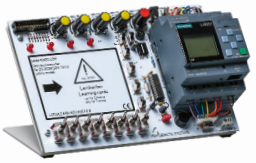


Car Wash Line

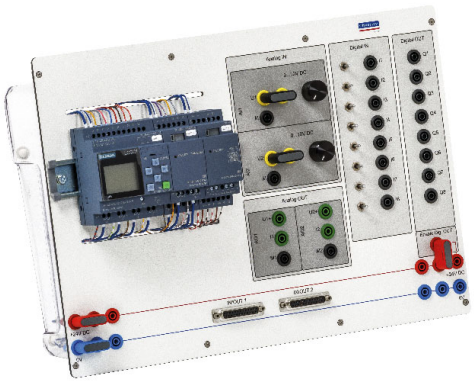
PLC Starter Kits

Our sets contain:

- Industry model
- LOGO!Learn PLC trainer
- Remote control, cable
- Software, Teachware



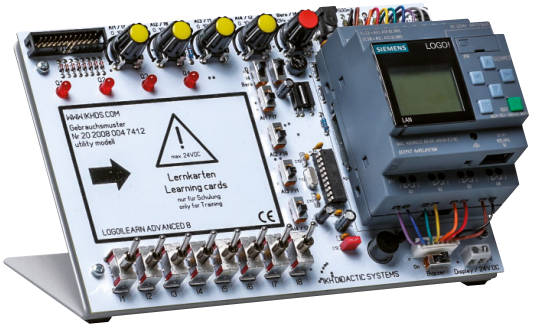
Article	Order-No.
Christiani Industry Model PLC Starter Kit	14827
Christiani Industry Model PLC Starter Kit 2	43544
Christiani Industry Model PLC Starter Kit 3	43545



LOGO! 8 Training Board

Order-No.
102892

More information at: christiani-international.com/102892



LOGO!Learn Advanced

Order-No.
58037

More information at: christiani-international.com/58037

Getting started with CAD/CAM

Cutting with hot wire

The FiloCUT system is a very easy-to-use CNC fusion cutting system for polystyrene foam. For trainees or students, it is the tool that will motivate them to acquire future-oriented skills. With the easy-to-use FiloCUT3 fusion cutting machine and the pedagogically structured, configurable FiloCAM programme, you can gain hands-on and productoriented experience of modern production technology.

Exclusive at Christiani

- The FiloCAM programme provides direct reference to mathematical principles (coordinate system and geometric design with parameters).
- Trainees and students can take their first programming steps with plain text commands, as well as in advanced logo programming (with repetitions and procedures) as well as CNC (G-Code). The programme they create is displayed immediately in the draw area.
- Synchronised parameter-based drawing and programming makes the connections transparent and can lead to "CNC drawing".
- In addition to many other specifications, you can use the programme's configuration options to determine whether your trainees and students are only allowed to perform CNC programming and/or CNC drawing.

More information at: christiani-international.com/19763

For more information on the FiloCUT system and on how to use it, see the video – accessible via this QR code:

Training and simulation software for CNC technology

SINUMERIK ONE – Digital Native CNC

SINUMERIK ONE is the future-oriented CNC system for highly productive machine tools. With the digital twin of SINUMERIKONE for machining, Run MyVirtual Machine, offline programming and verification of NC programs is possible without a physical machine. This allows programming, job planning, and process optimization to be carried out virtually. Machining programs are prepared completely offline on the computer using the digital twin. Digital twins of different machines can be stored on a single PC, allowing all programs to be created at a single workstation.

Article (upgrades on request)	**Order-No.**	Software maintenance per year** **Order-No.**
SINUMERIK ONE Run MyVirtual Machine /Operate Academic * Single User License, incl. Software Maintenance	101612	–
SINUMERIK ONE Run MyVirtual Machine /Open Academic * Single User License, incl. Software Maintenance	101613	–
SINUMERIK ONE Run MyVirtual Machine /3D Academic * Single User License, incl. Software Maintenance	101614	–
Run MyVirtual Machine / Operate Commercial Training (CT) Licence, Single User License	105933	105938
Run MyVirtual Machine / 3D Commercial Training (CT) Licence, Additional Module Single User Licence	105934	105939
Run MyVirtual Machine / Open Commercial Training (CT) Licence, Additional Module Single User Licence	105937	105943

* Note: Licensing restrictions apply. Please download the licensing agreement from www.christiani-international.com for the respective product, sign and stamp it and then submit it together with your order. No sales to private individuals. Not for commercial training.

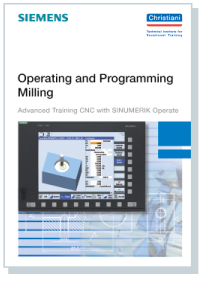
** Sale only with software maintenance for one year, incl. Siemens support.

! To use items 101613 and 101614, you must purchase the Run MyVirtual Machine/Operate Academic license (item 101612). Discounted licenses for educational institutions are available upon request.

Introduction to CNC technology

Basic principles and training software

Operating and programming CNC machines requires specialist knowledge, which is necessary primarily in industrial companies and manufacturing companies. CNC control system improves flexibility for production processes and increases the accuracy of tool machines. The basic principles of CNC technology in technical vocational training can be ideally conveyed using the hands-on training documentation.

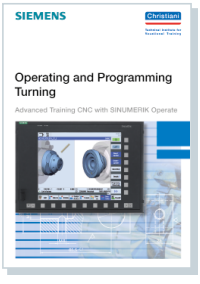


Operating and Programming Milling

Spanish also available!

Order-No.
12870

More information at: christiani-international.com/12870



Operating and Programming Turning

Spanish also available!

Order-No.
12871

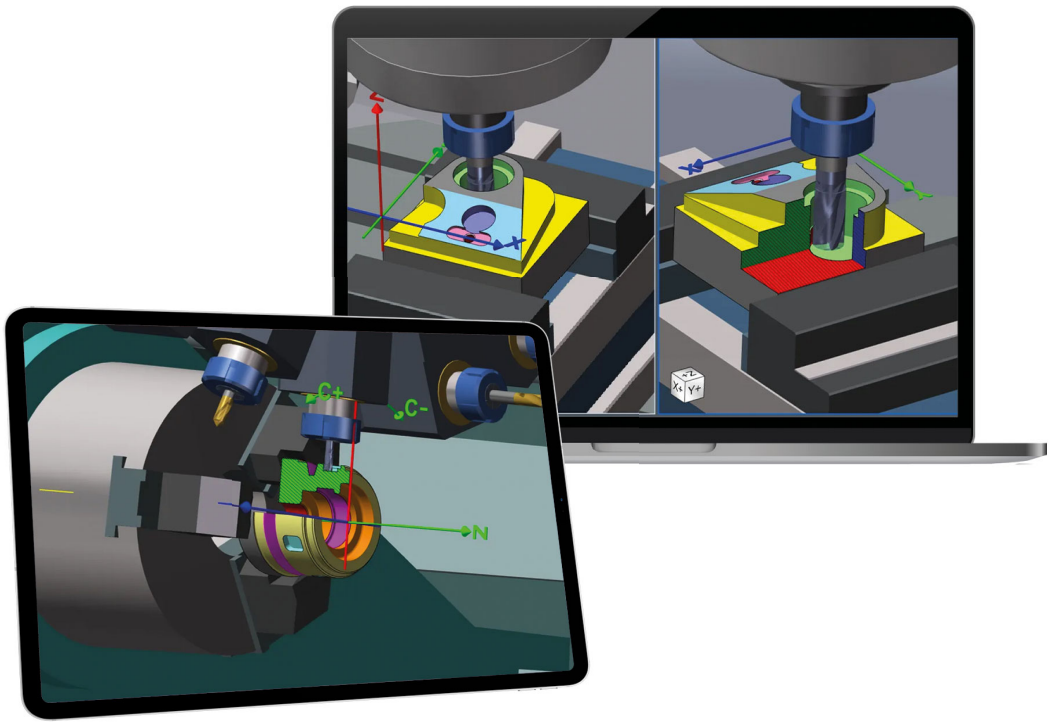
More information at: christiani-international.com/12871

More information at:
christiani-international.com/cnc-technology

CNC simulation software

TopCNC Suite from Siemens

We are delighted to be able to expand our range of solutions in the field of CNC technology together with our strong partner Siemens. The professional CNC simulation software TopCNC Suite, consisting of Topmill (milling) and Topturn (turning), is the perfect solution for practical training and further education in the CNC field. Developed for vocational schools, training centres and industrial companies, it imparts CNC knowledge reliably, efficiently and realistically.



Available licences:

- TopMill&TopTurn /PAL – for working with generic machine models according to the PAL standard
- TopMill&TopTurn /Siemens – for working with replicas of SINUMERIK CNCs and corresponding machine models
- TopMill&TopTurn /3rdPart – for control replicas from other manufacturers

TopCNC Suite

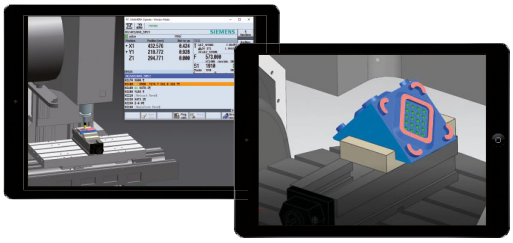
Article	Order-No.
TopMill&TopTurn /PAL Single User Licence	105950
TopMill&TopTurn /PAL 10 Workstations	105951
TopMill&TopTurn /Siemens Additional Module Single User Licence	105952
TopMill&TopTurn /Siemens Additional Module 10 Workstations	105953
TopMill&TopTurn /3rd Party Additional Module Single User Licence	105954
TopMill&TopTurn /3rd Party Additional Module 10 Workstations	105945
TopCAM3D / PAL Additional Module Single User Licence	105956
TopCAM3D / PAL Additional Module 10 Workstations	105957
TopTrain Additional Module Single User Licence	105958
TopTrain Additional Module 10 Workstations	105959
NC Test Additional Module Single User Licence	105960
NC Test Additional Module 10 Workstations	105961

More information at: christiani-international.com/105951

CNC simulation with the Digital Twin

Digital Twin teaching system in modern CNC training

The digital twin is a true-to-life digital replica of the real machine tool used in the workshop. It contains all the geometries of the machine, fixtures, tools and the controls used, including the version and all parameter settings. Digital twins therefore form the fundament for understanding and applying Industry 4.0.



Advantages:

- Better understanding of machine functions
- Simulation of machining processes
- Cost efficiency
- Risk-free experimentation
- Verification and testing of created CNC programmes
- Safe operation through collision avoidance
- Improved communication and collaboration
- Efficient training and education

The use of digital twins significantly expands learning opportunities in training and opens up numerous didactic perspectives:

- Practical experience in CNC programming
- Setting up tools and performing CNC machining on various machine tools (virtually)
- Teaching all necessary theoretical and practical knowledge
- Error and safety simulation: The teaching system can simulate errors and problems in CNC machining. This gives learners the opportunity to recognize, analyse and rectify them. The consideration of safety aspects ensures a safe learning environment
- Visual and haptic: Realistic size and operation of a CNC milling or turning machine

Suitable for:

- Industrial mechanics
- Construction mechanics
- Cutting mechanics

Article	Order-No.
Digital twin CNC teaching system - Mobile version	102390
Digital twin CNC teaching system - Table version	102391

More information at: christiani-international.com/102390

There are two ways to create a digital twin:

1. The functionality of the machine is simulated or replicated using software(CSE driver). This can be implemented for any control system and machine.

2. The real system software is used (VNCK). With this approach, the Sinumerik Operate user interface is fully available.

We would be happy to advise you personally and tailor the digital twin to your individual needs.

The modern teaching system of the digital twin is based on the Siemens SINUMERIK ONE Operate/Run MyVirtual Machine software or, on request, on Siemens NX.

Our service includes the following:

- Creation of a machine model (real existing CNC machine is modelled or replicated in CAD)
- Creation of the simulation or machine kinematics
- Creation of the post-processor
- Commissioning and instruction

In addition to the mobile version, we now also offer a desktop version! Request your individual quote!

More information at: christiani-international.com/102390 and 102391

Electrical Engineering

Principles of electrical engineering

Are you looking for practical solutions to make technical vocational training in electrical engineering efficient and interesting? Do you need digital applications for the training? Do you want to prepare trainees successfully for the examinations?

Then we are your first point of contact.

Here is a practical overview of the most important learning media and teaching systems, covering key topics for training:

- Specialist books
- Training software
- Courses for vocational training
- Project work
- Laboratory tables
- Training boards
- Mechatronic systems

Our teaching materials and teaching systems are perfect for conveying the following training content:

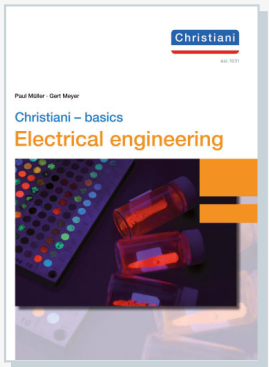
- Basic knowledge
- Control technology
- Machines and drive technology
- Automation technology

Electrical Engineering

- Basic Knowledge
- Control Technology
- Machines and Drive Technology
- Automation Technology
- Industry Models
- modular Mechatronics System (mMS)
- Industry 4.0

Tip: Christiani – Basics of Electrical Engineering

Text Book



More information at: christiani-international.com/41172

Text Book Digital, Annual License

C-LEARNING

More information at: christiani-international.com/41315

Solid Basis for the whole training process

Project work and courses electrical engineering

Electrical engineering topics are taught in an understandable and visual way, ideal for vocational training. Theory and practice are combined with project work for high practical relevance. The switch cabinet training concept helps consolidate basic knowledge, while project work supports independent planning, implementation, and assessment.

Training Concept Switch Cabinet – Basic Module

Spanish also available!

Article	Order-No.
Training Concept Switch Cabinet – Basic Module	65992
Documents for the Trainer	93366
Documents for the Trainee	93367

More information at: christiani-international.com/65992

Courses for practical vocational training with documentation for trainers and trainees

The "Basic principles of electrical engineering" courses teach essential skills, from installing and connecting equipment to checking key data and functions. Trainees also learn system commissioning according to German standards, focusing on background knowledge, measurement preparation, and evaluating results in context.

C-LEARNING

Principles of Electrical Engineering

Part 1: Electrical Engineering

Article	Order-No.
Documents for the Trainer Digital, Annual License	41256
Documents for the Trainee Digital, Annual License	41258
Text Book Digital, Annual License	41351

Material Kits	Order-No.
Mounting Plates	97640
Power Supply - Small Distributors	97641
Main Materials	97642
Consumable Materials	97643

More information at: christiani-international.com/41256

C-LEARNING

Comissioning as per DIN VDE 0100-600*

Article	Order-No.
Documents for the Trainer	41197
Documents for the Trainer Digital, Annual License	41224
Documents for the Trainee	41198
Documents for the Trainee Digital, Annual License	41225
Text Book	41199
Text Book Digital, Annual License	41349

More information at: christiani-international.com/41197

Basics of electrical engineering digital

E-Learnings for the technical basics

C-LEARNING training platform contains e-learning modules on various technical topics, available in different languages. Trainees can deepen and test their knowledge here.

Our e-learning courses enable you to teach all relevant content in electrical engineering training. Your trainees learn all the topics necessary for practical work in an individual and clear manner. The content of the e-learning courses is based on our successful textbooks and is therefore closely aligned with them. The mix of reading texts, animated graphics, images, videos and voice-overs makes this form of knowledge transfer clear and lively.

Benefits

- Flexible learning - access on the road, at work, at school or at home
- No installation required
- Contents also in foreign languages
- Learning content is complemented continuously
- Cost-effective licenses starting from 1 user

C-LEARNING

E-Learning Electrical Engineering – Full Package

Chinese also available!

Article	Order-No.
Full package for companies (one year)	106891
Full package for companies (five years)	106892

More information at: christiani-international.com/106891

The following e-learning modules are included in the full package:

The basic modules

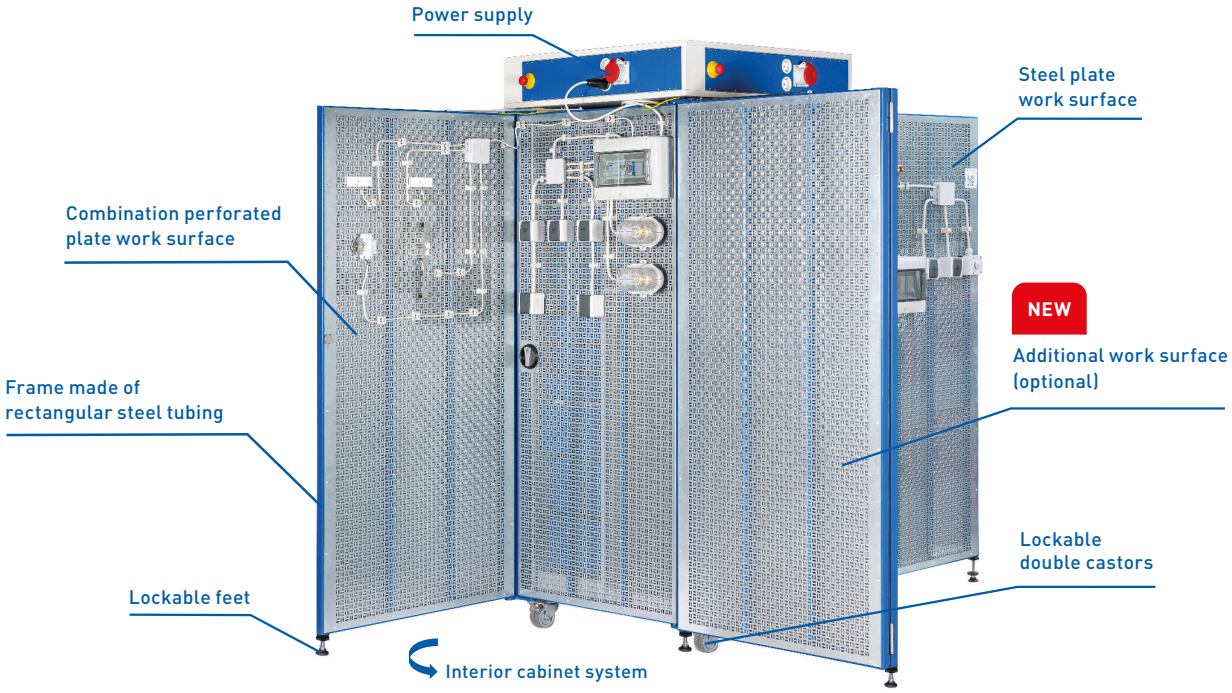
- Basics of electrical engineering
- Electronics 1 - Passive components: resistors
- Electronics 2 - Passive components: capacitor and coil
- Electronics 3 - Active components: basics
- Alternating current technology 1
- Alternating current technology 2 - Three-phase alternating current
- Electrical wiring (processing time: approx. 1/2 hour)
- Electrical protective measures 1
- Electrical installation technology (electrical engineering) 1 - Building installations
- Control technology 1 - Electromechanics (VPS)
- Control technology 2 - Logical basic functions
- Control technology 3 - Sequential controls
- Control technology 4 - PLC technology basics
- Control technology 7 - Machine safety
- Transformers 1- basics
- Electrical drive technology 1 - basics

The modules are constantly being expanded and updated. More on our website: christiani-international.com/cms/digital-learning/c-learning

The Christiani Learning Unit

The mobile and flexible workstation system for vocational and further training

The learning unit is the flexible solution to practical lessons in electrical engineering, metal and HVAC. When folded out, the mobile workstation system provides space for up to eight trainees with a work surface of approx. 20 m² and, when folded in, has a footprint of just 1 m² for space-saving storage. The learning unit is available in standard versions, but can also be customised and equipped according to your wishes!

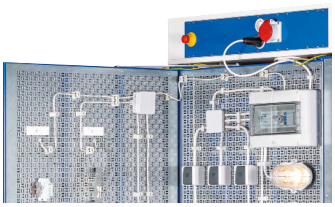


Basic design:
- Welded body on rollers
- Two-sided work surfaces of steel plates and chipboards
- Four folding double work stations

Individual configuration:
- Power supply
- Compressed air connection
- Data sockets (RJ45)
- Internal cabinet systems
- As floor model or on rollers
- Individual height and width
- Additional doors
- Special colours (all RAL colours)

Article	Order-No.
Learning unit with Combination Perforated Plates with Power Supply and Interior Cabinet	19919
Learning unit with Steel Plate with Power Supply and Interior Cabinet	77582

More information at: christiani-international.com/19919



Application example: Electrical engineering

The experiments for the course "Basic principles of electrical engineering and electronics Part 1: Electrical engineering" with the corresponding material kit can be fully constructed and performed on the learning unit. Training boards are straightforward and easy to insert into the experimental frame.

Application example: Metal technology

You can install pneumatic/ e-pneumatic attachments on the assembly plates and easily secure them on the optionally available experimental frame on the learning unit. The device sets enable trainees to prepare very well for examinations and examination situations.

The interior cabinet system

The left side of the cabinet system comprises drawers of different sizes for storing small parts, assembly material, etc., as well as three shelves on the right that you can position where you want. The other side of the cabinet system provides a large, full-length storage area for storing bulkier materials, such as pipes, etc.

Power supply

The power attachment is available in a standard version, but custom configurations and fittings are also possible.

electricLab 4 in 1

Our multi-talented tool for teaching electrical engineering fundamentals

With our electricLab 4 in 1 you can teach the basics of direct current and alternating current technology, electronics and three-phase alternating current. Whether in school, vocational training or company-based training, the electricLab 4 in 1 provides optimal support in everyday training.

What makes the electricLab 4 in 1 so special?

Convey 4 topics with one product

- Direct current technology
- Alternating current technology
- Electronics
- Three-phase alternating current

Suitable experiments available

- 18 experiments on direct current technology
- 18 experiments on alternating current technology
- 22 experiments on electronics
- 6 experiments on three-phase alternating current

Safety

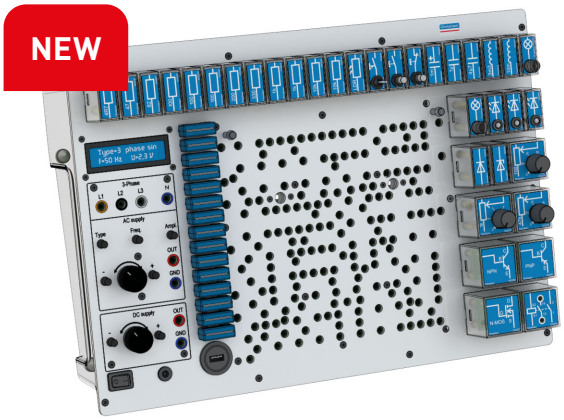
- Operation with safety extra-low voltage
- High touch protection due to insulated plug contacts

Available in different designs

- electricLab 4 in 1 - Training Board
- electricLab 4 in 1 - Mobile

electricLab 4 in 1 - Mobile

NEW

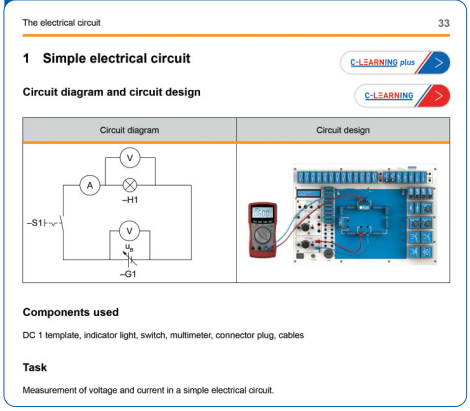


electricLab 4 in 1 - Training Board

Article	Order-No.
electricLab 4 in 1 - Training Board	101242
electricLab 4 in 1 - Mobile	101243

More information at:
christiani-international.com/101242 and 101243

Experiment instructions



C-LEARNING

Free access to selected e-learning courses

C-LEARNING *plus*

Access to all e-learning courses

The temptation guides are provided in digital format.

In conjunction with our C-LEARNING *plus*, you can benefit from additional content on the individual topics.

All information at:
christiani-international.com/c-learning-plus

electricLab 4 in 1

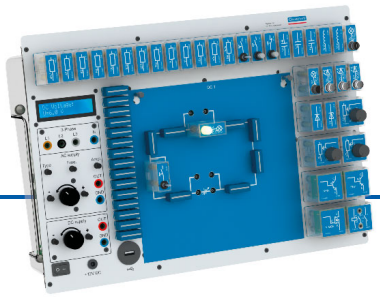
64 pre-defined tasks and custom circuits possible

Direct Current Technology

As an introduction, the simplest basic concepts and circuits are covered: electrical voltage source – switch – load. This is followed by Ohm's law, series and parallel connections of resistors, the unloaded and loaded voltage divider, and the bridge circuit. After examining the temperature dependence of resistors and the behavior of capacitors in direct current circuits, the simplest semiconductor components are introduced. The basic characteristics of diodes and transistors are demonstrated using direct current circuits.

Excercises:

- You receive 18 excercises

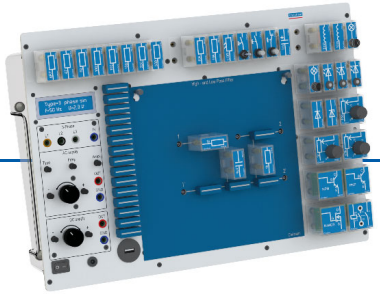


Alternating Current Technology

Alternating current technology is taught based on the basic elements R, C and L. After examining the behaviour in an alternating current circuit, the various series and parallel connections are clearly illustrated using oscillograms and phasor diagrams. Finally, simple filter circuits such as high-pass and low-pass filters are examined.

Excercises:

- You receive 18 excercises



electricLab 4 in 1 in two versions

electricLab 4 in 1 - Training Board

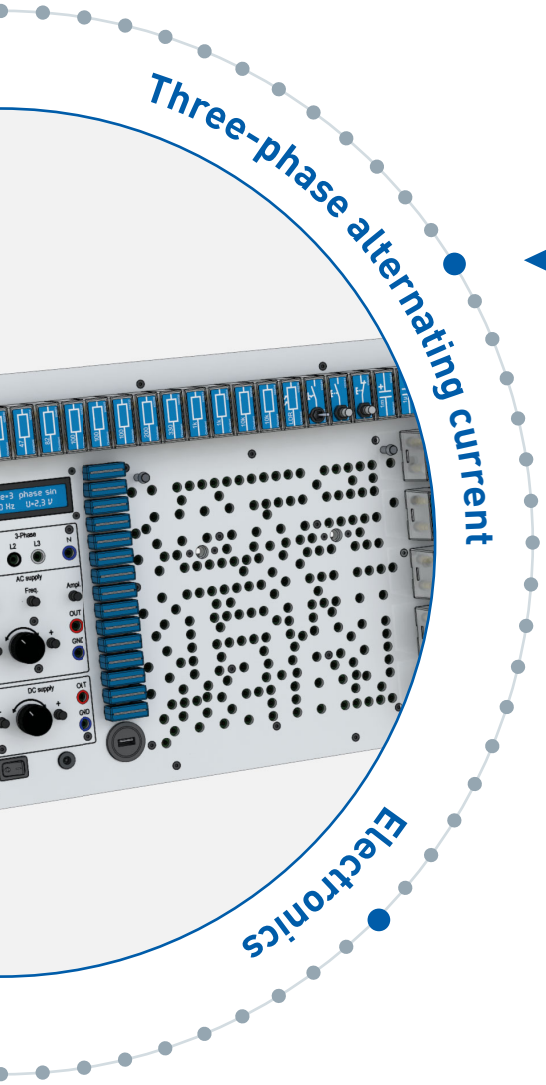
As a training board, the electricLab 4 in 1 can be used in all standard experiment frames and is particularly suitable for laboratory teaching. Alternatively, the electricLab 4 in 1 can be used as a tabletop device. As with all our training boards, the transparent cover provides a view of the interior.

electricLab 4 in 1 - Mobile

As a case, the electricLab 4-in-1 offers enough space to store all the necessary items, from measuring cables to multimeters. Thanks to its battery operation, the electricLab 4 in 1 can be used anywhere.

More information: christiani-international.de/101242 or 101243

(electricLab 4 in 1 - Training Board)

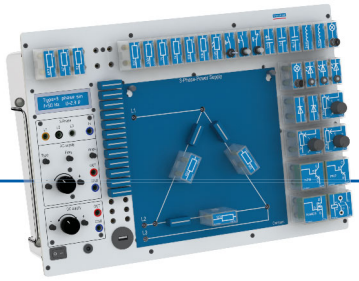


Three-phase alternating current

Three-phase alternating current is taught using delta and star connections. The star connection is set up with symmetrical and asymmetrical loads, and measurements of the currents and voltages are taken in each case.

Excercises:

- You receive 6 excercises

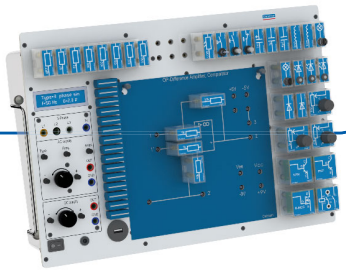


Electronics

In the electronics section, the characteristic curves of electronic components are first recorded and evaluated. This is followed by the simplest basic training, such as rectifier, stabilization, and amplifier circuits. The final part of the teaching material deals with advanced analogue electronics, in particular various operational amplifier circuits.

Excercises:

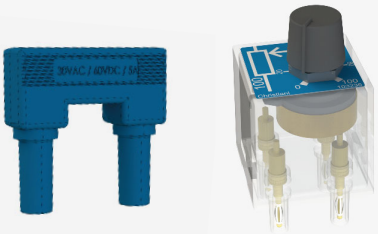
- You receive 22 excercises



(electricLab 4 in 1 - Mobile)

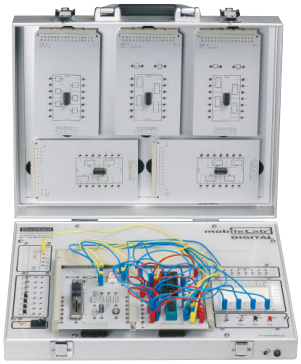
Safety

The electricLab 4 in 1 is operated with low safety voltage. In addition, the 2 mm spring basket plugs of the bridge connectors, laboratory cables and component holders are insulated with insulating sleeves and therefore offer a high level of protection against contact. This makes the electricLab ideal for beginners.



Basics of digital technology

The workstation offers a wide selection of training options, ranging from simple control system tasks through to PID feedback control of various controlled systems and provides optimum support for your lessons on control systems.



mobileLab Digital Case

for digital technology

With the DIGITAL case you can teach the basics of digital technology in descriptive experiments. Starting with the basics of logical connections, the basic elements of digital technology can be understood in an easy to understand way. Based on the basic elements, combinations as well as the function of more complex circuits are then constructed and examined.

Article	Order-No.
mobileLab Digital Case	93710

More information at: christiani-international.com/93710

Control Technology Training Course

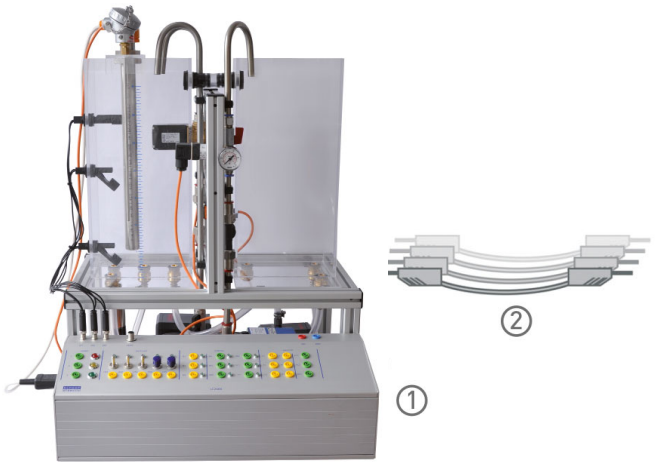
Simulation software for the basic principles of control technology.

Applications:

- Investigation of controller behaviour
- Fill level control
- Temperature control
- Delayed temperature control
- Control of stirred tanks in series
- Investigation of PTN control systems with P, I, PI and PID controllers

Article	Order-No.
LC2030 Training	58689000
Control Engineering Practical Training I	53858000
Control Engineering Practical Training II	53860000

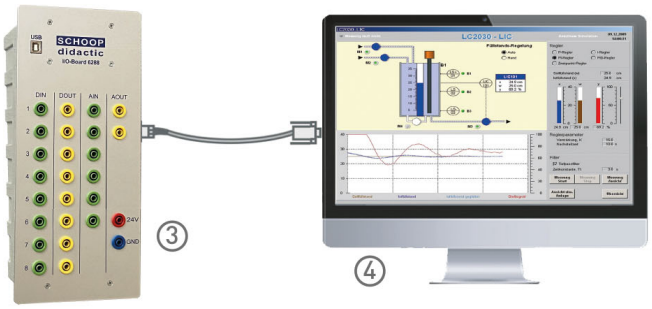
More information at: christiani-international.com/58689000



Practical Training System Control Engineering/Process Automation

Article	Order-No.
Full Equipment	69777

More information at: christiani-international.com/69777



1. Workstation
2. Test lead set
3. I/O interface ADIOS
4. PC with WinErs, GRAFCET Lab or LC2030 process automation training software

More information at:
christiani-international.com/teaching-systems-electrical-engineering

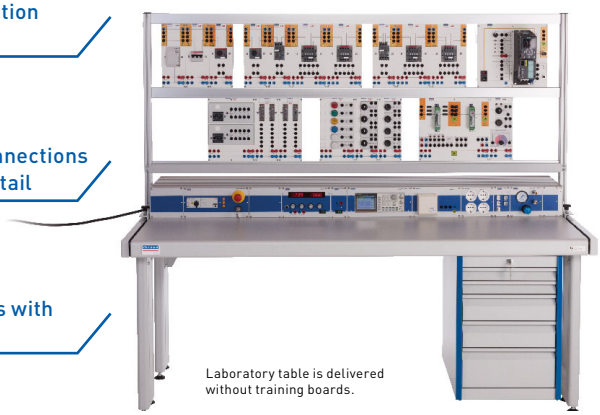
Training in electrical engineering under laboratory conditions

Laboratory tables and workstation systems belong in every training lab for practical vocational and further training. With KARL, we are able to offer premium products that exactly meet the requirements of technical training: These modern workstation systems are characterised by high-quality processing, outstanding functionality and sophisticated ergonomics. They are practical in daily use and versatile in terms of equipment.

A combination of laboratory tables and training boards has proven the best solution for functional and safe use in the electrical engineering laboratory. Using original industrial components, the trainees learn everything they need to know for later application in practice. Training boards for different topics can be suspended in the laboratory tables. In a safe laboratory environment, apprentices and other trainees learn the basics of machine safety, hard-wired programmed control systems, PLC, and many other electrical engineering topics.

High-quality laboratory tables

- High-quality processing, outstanding functionality, sophisticated ergonomics
- The tables meet a variety of requirements in applications and safety provisions
- Wide range of models and options
- Optimisation of processes and workflows, ergonomic working
- Modern, sleek design, can be colour-adapted
- Made in Germany since 1935



Straight laboratory table

Everything a laboratory table needs

The straight laboratory table is designed as a direct route to electrical engineering under laboratory conditions, equipped with an experimental frame for training boards in DIN A4 format, a supply channel and a drawer block.

Order-No.
41540

More information at: christiani-international.com/41540

Quadro-Twin SL laboratory table

Laboratory table for ergonomic working

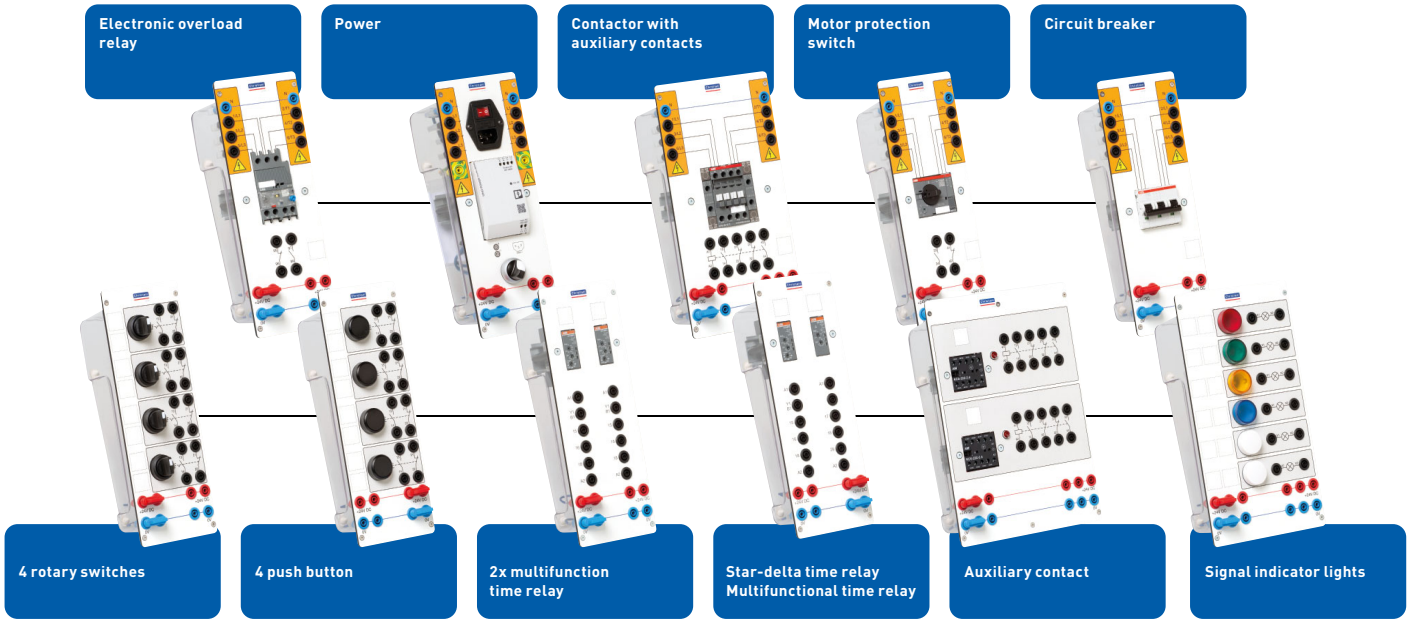
The guide rail means the experimental frame can be easily positioned at the desired distance. This ensures accessibility of all components as well as ergonomic working. In addition, the table is height-adjustable by up to 20 mm. This means unevennesess in the floor can be compensated for and stability of the laboratory table is guaranteed.

Order-No.
41548

More information at: christiani-international.com/41548

Teaching system for hard-wired control

With this modular teaching system, you can teach the basic principles of drive technology and hard-wired control units. Thanks to the highly modular design and selection of components, a wide range of experiments can be carried out.



Article	Order-No.
Training Board Set Electrical Machines Hard-Wired PLC	98199

More information at: christiani-international.com/98199

C-LEARNING

Electric Actuator Technology – Section: Hardwired Control

Experiment Instructions

Article	Order-No.
Electric Actuator Technology – Section: Hardwired Control Experiment Instructions for the Trainer English	19601
Electric Actuator Technology – Section: Hardwired Control Experiment Instructions for the Trainer Spanish	19605
Electric Actuator Technology – Section: Hardwired Control Experiment Instructions for Trainee English	19602
Electric Actuator Technology – Section: Hardwired Control Experiment Instructions for Trainee Spanish	19606

More information at: christiani-international.com/19601

Article	Order-No.
Electric Actuator Technology – Section: Hardwired Control Experiment Instructions for the Trainer DIGITAL English - Annual License	48356
Electric Actuator Technology – Section: Hardwired Control Experiment Instructions for the Trainee DIGITAL English - Annual License	48357
Electric Actuator Technology – Section: Hardwired Control Experiment Instructions for the Trainer DIGITAL English - 5-Year License	48355
Electric Actuator Technology – Section: Hardwired Control Experiment Instructions for the Trainer DIGITAL Spanish - Annual License	48360
Electric Actuator Technology – Section: Hardwired Control Experiment Instructions for the Trainee DIGITAL Spanish - Annual License	48361
Electric Actuator Technology – Section: Hardwired Control Experiment Instructions for the Trainer DIGITAL Spanish - 5-Year License	48359

More information at: christiani-international.com/48355

Star-Delta Starter Connection

- Start motors in star-delta connection to reduce inrush current
- Main Circuit Construction
- Control Circuit Construction
- Manual Switching
- Automatic Switching

The following training panels are required:

- 1× motor protection switch
- 3× contactors with auxiliary contacts
- 1× multifunction time relay
- 1× set of 4 push buttons

Suitable Motor:

- 1× Three-phase asynchronous motor

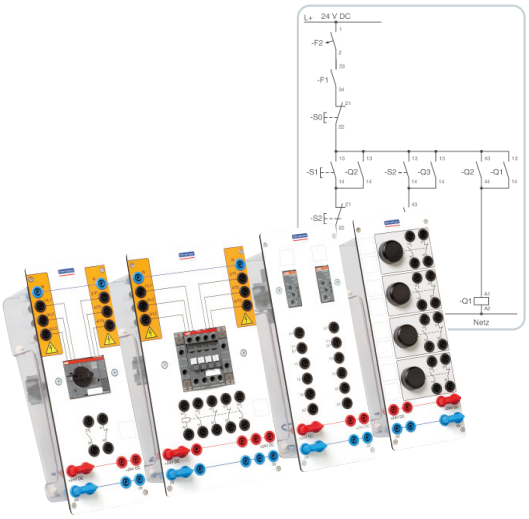
Project: Gate Drive

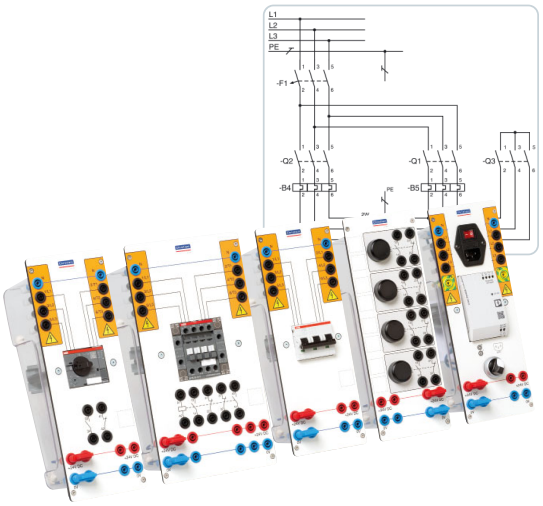
A rolling gate is to be driven by a three-phase motor. Opening and closing of the gate should occur at two different speeds:

- Gate opening: Fast speed
- Gate closing: Slow speed

The following training panels are required:

- 1× power supply
- 2× motor protection switches
- 3× contactors with auxiliary contacts
- 1× circuit breaker
- 2× sets of 4 push buttons / 4 rotary switches





Motor Management

Training Board SINAMICS G120

Whether you are doing exercises for pumping, ventilating, compressing, moving or processing: SINAMICS G120 is the universal drive for the most diverse requirements.

Order-No.
40720

More information at:
christiani-international.com/40720

Three-phase Squirrel Cage Motor with Harting Connector Plug

Motor, suitable for training board frequency inverter SIMATIC G120. Supplied with matching connector plug for quick and easy connection.

Order-No.
48464

More information at:
christiani-international.com/48464

Three-phase Asynchronous Motor

The motor has a power rating of 0.37 kW with a speed of 1400 rpm and a power factor (cos φ) of 0.72. In star connection, the rated voltage is 692 V with a rated current of 0.58 A, whereas in delta connection, the voltage is 400 V with a current of 1 A.

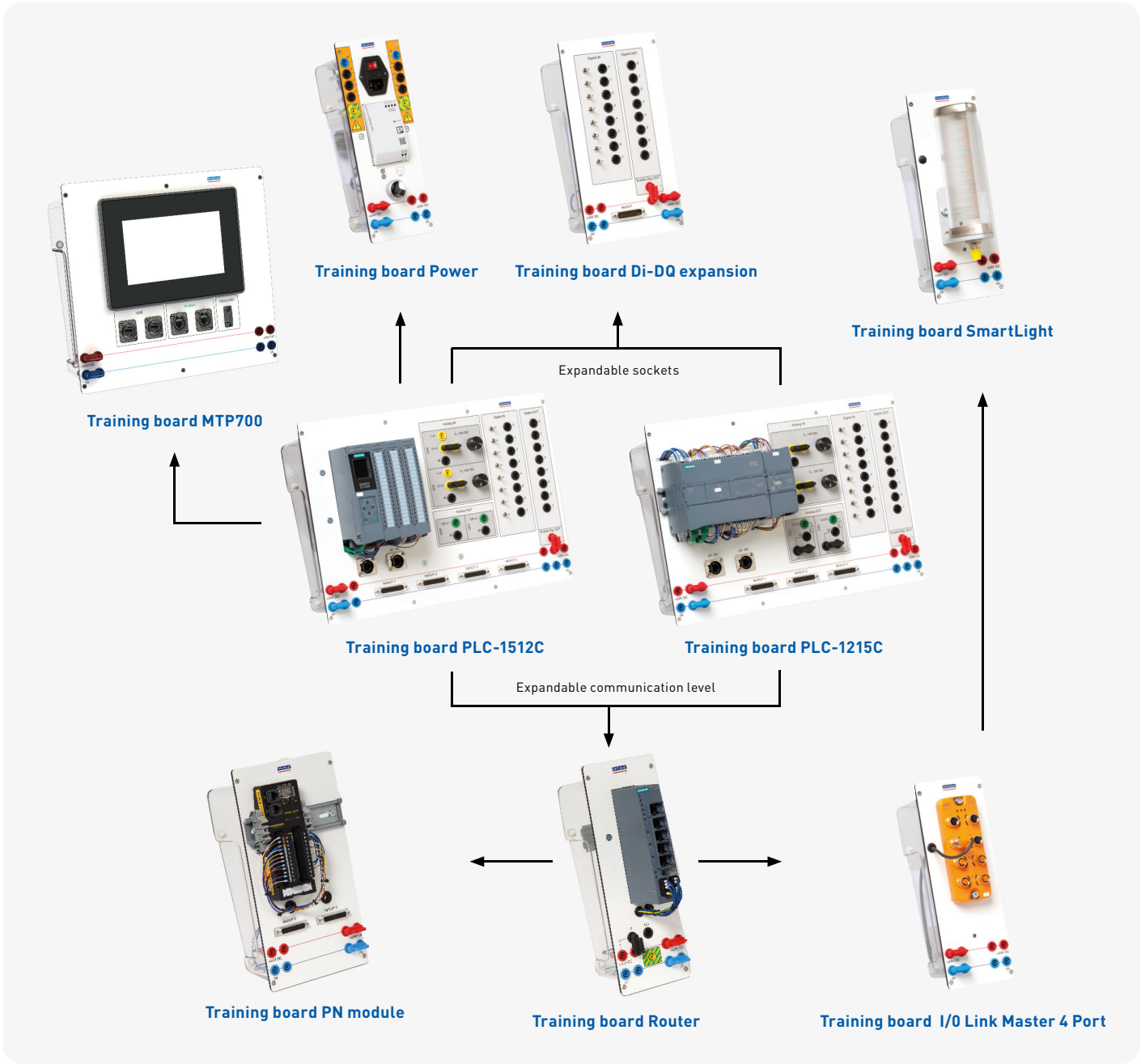
Order-No.
52757

More information at:
christiani-international.com/52757

PLC Training boards

With the new PLC training board series, we have expanded our existing automation concept in an optimal way. Using the same products and components already employed in our mechatronic models, we ensure a high degree of compatibility with our modular mechatronic system. Thanks to the interface sockets, you can quickly connect the hardware or link the training board to a simulated model.

Because of their modular design, the training boards can be easily integrated into everyday training. Want to teach Profinet? No problem - just connect the PLC to the PN module and access the decentralized peripherals. Interested in IO-Link or cybersecurity? With Christiani, you don't have to choose. Modularity and flexibility are part of our concept. Of course, the new training boards can also be combined with our existing ones.



PLC Training board series

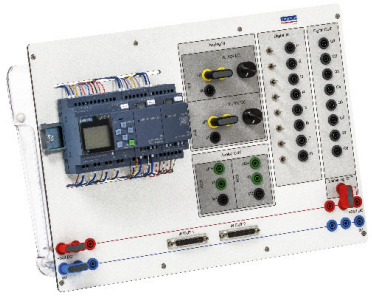
Our training board set consists of all training boards shown above. The set is supplemented by the D-SUB cables that match the control units used D-SUB cables. With this set you and your trainees are are optimally prepared to program our mMS function modules or our industrial models.

Article	Order-No.
PLC Training board Set 1512C	104013
PLC Training board Set 1215C	104014

More information at: christiani-international.com/104013

Train with industrial-grade training equipment

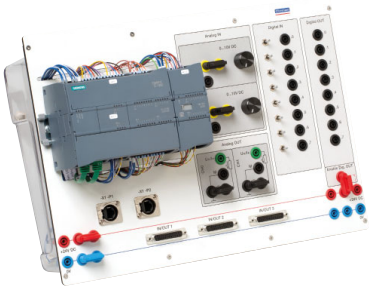
With our PLC training boards, you and your trainees will be optimally prepared to programme our mMS function modules or our industrial models.



Training board Logo! 8

Order-No.
102892

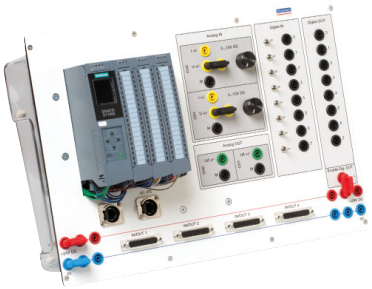
More information at: christiani-international.com/102892



Training board S7-1215C

Order-No.
43379

More information at: christiani-international.com/43379



Training board S7-1512C

Order-No.
43315

More information at: christiani-international.com/43315

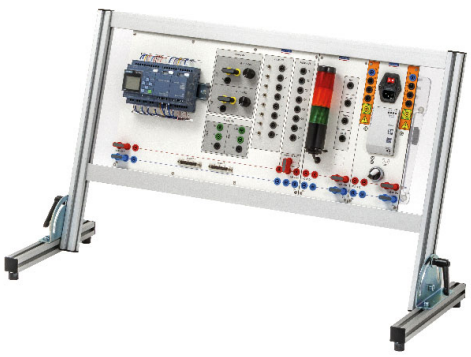
Table frame for A4 training board

You don't have a lab table with a prepared experimental frame on site? Then in future you can also use our table frames. The table frame made of extruded aluminium extruded aluminium profiles has a 1-row experimental frame for hanging A4 training boards. 4 rubber feet guarantee a stable stand. The experiment frame can be quick-release clamps on the sides of the frame can be the desired position. Depending on the version you can use up to 3 training boards next to each other and allow your students to work flexibly and ergonomically.

- 1-row experimental frame
- Clearance: 425 mm or 740 mm
- Suitable for 1 x A3 or A3 and 1.5 A4
- A4 training boards
- Steplessly inclinable
- Rubber feet for secure stand

Article	Order-No.
Table frame for A4 training board Clearance dimension: 425 mm	100995
Table frame for A4 training board Clearance dimension: 740 mm	100996

More information at: christiani-international.com/100995



Christiani Industry Models

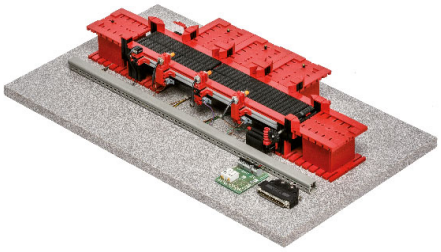
Stand-alone models

The Christiani stand-alone models represent closed processes. You can choose between finished bundles or larger models, such as the process line. Teach commissioning for industrial process simply and based on real-world systems.

Christiani Industry Model Elevator

Order-No.
14807

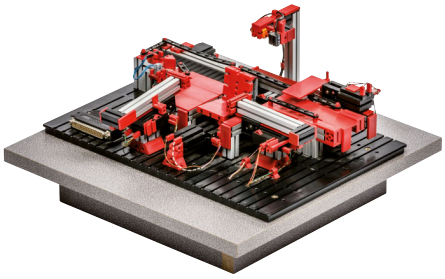
More information at:
christiani-international.com/14807



Christiani Industry Model Assembly Line

Order-No.
14804

More information at:
christiani-international.com/14804



Christiani Industry Model Package Turning System

Order-No.
14831

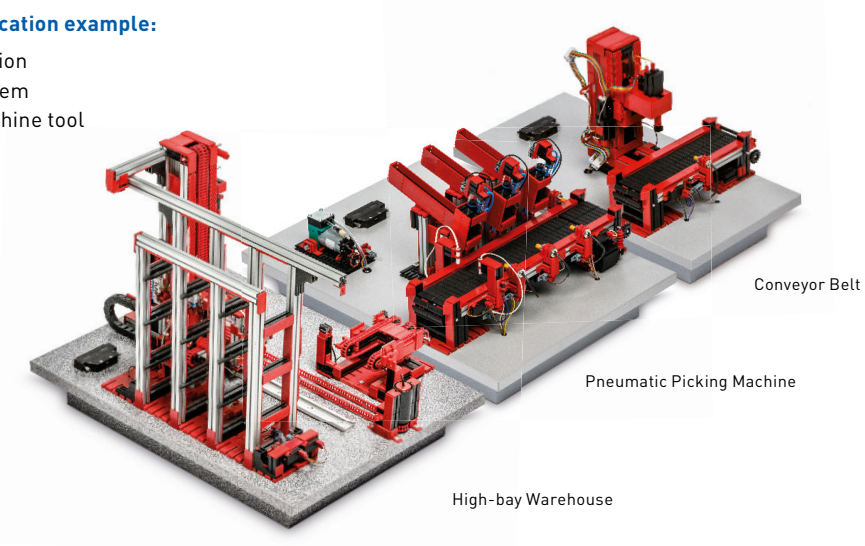
More information at:
christiani-international.com/14831

Combinable models

The "combinable models" product range is a modular model system. These industry models can be combined, from individual stations to complete factory simulation. Conveying, processing, sorting, transferring, storing: Put together your own automated model system using the combinable models. This means that you can reconstruct processes just like they take place in real life.

Combinable model application example:

- ASRS with storage station
- Pneumatic picking system
- Conveyor unit with machine tool



Christiani Industry Model High-bay Warehouse

Order-No.
19156

More information at:
christiani-international.com/19156

Christiani Industry Model Pneumatic Picking Machine

Order-No.
14825

More information at:
christiani-international.com/14825

Christiani Industry Model Conveyor Belt

Order-No.
14823

More information at:
christiani-international.com/14823

Simply switch it on and get going

mMS – a mechatronic system for practical training

Optimally tailored to the requirements of technical education, our modular concept can be used to teach a wide range of different learning content. The mMS function modules and other components of the system can also be easily added and expanded at a later date. Get started with mMS – flexible and modular

- **Robust**
- **Durable**
- **Future-proof**
- **Flexible application**
- **Control-independent**
- **Exclusively with industrial components**

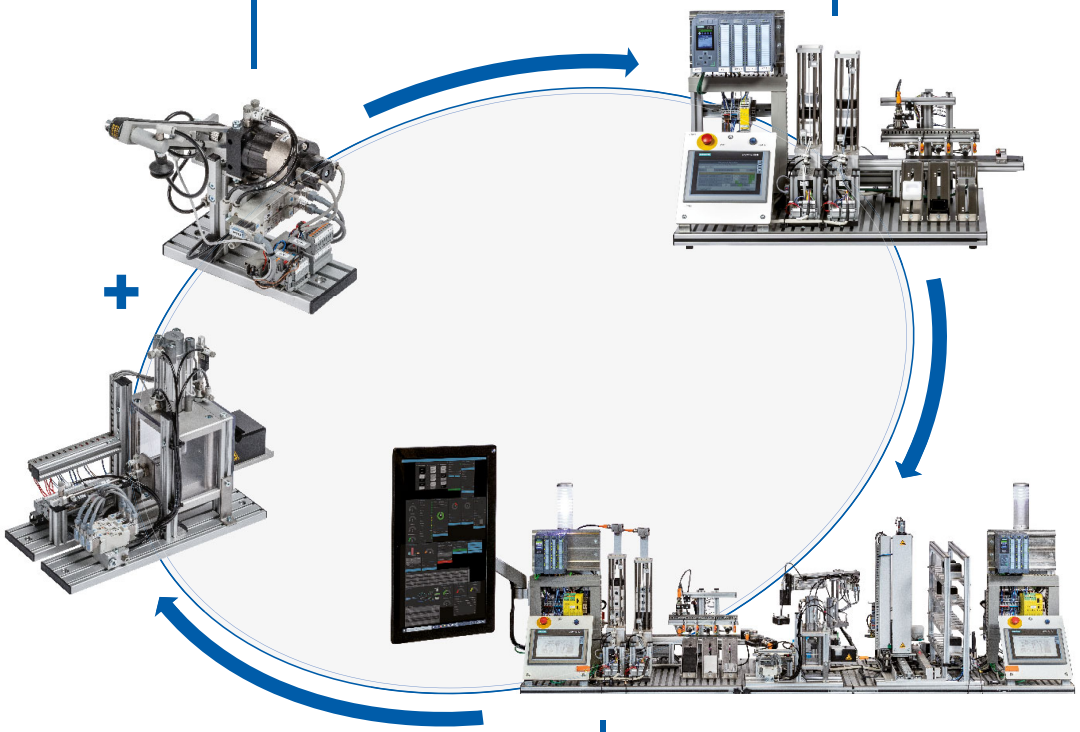
Function models – Stations – Systems

Pneumatics, electrics, mechanics in one system

As a machining kit, assembly kit or fully assembled: Function modules of the modular mechatronic system offer all possibilities for modern vocational and further training. For example, as project work in the field of mechatronics, as a clear function module for PLC programming or within a station or system. For a flexible and modular start!

Modular, flexible station

The mMs function modules can be combined and come together to form a station. Our modular concept therefore gives you the option of either developing and building your own customised station, or using our standard systems.



Sorting System Compact 4.0

The SSC 4.0 is a ready-to-use system, composed of several stations.
In this finished system, cube halves undergo a complete Industry 4.0 process – from machining through to storage as assembled cubes. Thanks to the connection to the SQL database, Node-RED and MES, trainees are introduced to all processes of an Industry 4.0 system. The dashboard makes it easy to monitor and analyse all parameters in a structured manner.

Modular Mechatronic System (mMS)

Function modules, stations and systems from Christiani are based on the specially developed modular mechatronic system (mMS). This in-house development by Christiani is perfectly tailored to the requirements of technical training. The system can be used for all processes, from metal machining to mechatronics to control and programming. Our function modules can be operated as stand-alone modules but they can also be combined with each other. Do you want to develop and build your own training system as a project? The media library included in the scope of delivery contains all the necessary information, instructions, plans and more.

Advantages:

- Robust and durable
- High-quality industrial components
- Easy connection via terminal blocks
- Detailed information available on each function modules, including comprehensive mMS media library
- Extendible, combinable, modular
- Future-proof
- Function modules are free-standing and can be used individually
- Everything on board for pneumatics, mechanics and electronics
- All commercially available control systems (with 24 VDC signals) are suitable

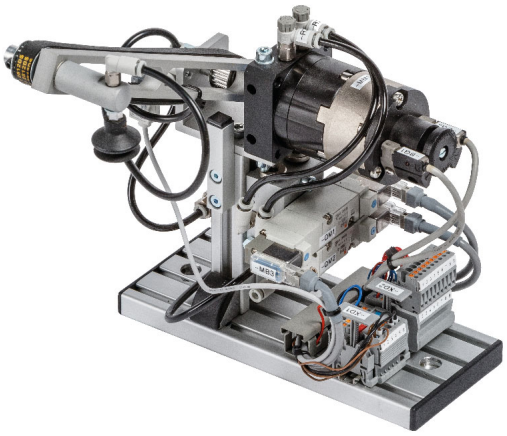
Components can be added to expand an existing system in three simple steps:

1. Mount the components to the existing system with screws.
2. Connect compressed air using a hose connection.
3. Connect electronics using terminal blocks.

Together with the appropriate control system, knowledge in PLC programming can be taught, as well as expertise gained.

The mMS modular mechatronic system is perfectly tailored to the requirements of training:

- Greatest flexibility on the market
- Can be used from day 1 modules long after training
- Develop your own systems together with your trainees and students
- We only use high-quality industrial components
- Comprehensive product and project library for every function modules
- Can be configured however you want for any need



C-LEARNING

NEW: The media libraries for our mMS function modules are now also available on the C-LEARNING learning portal.

All accompanying content for our mMS function modules is now available digitally at any time on our C-LEARNING learning portal.

Included are:

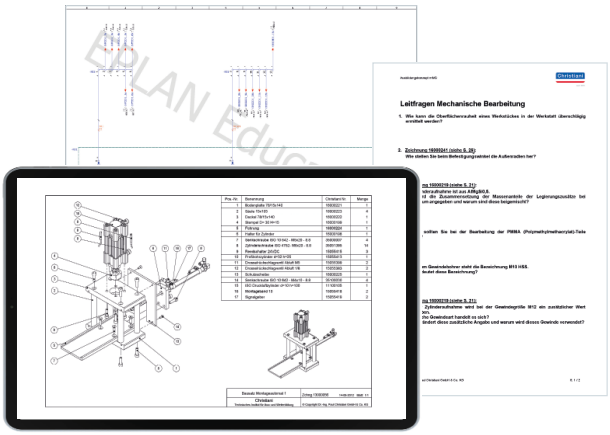
- Technical product data (drawings, parts lists, technology diagrams, etc.)
- Project data accompanying the process from manufacture to commissioning and troubleshooting, including guidelines and solutions
- Download area with additional materials such as (3D PDF,PLC programme (example), EPLAN

Your advantages at a glance:

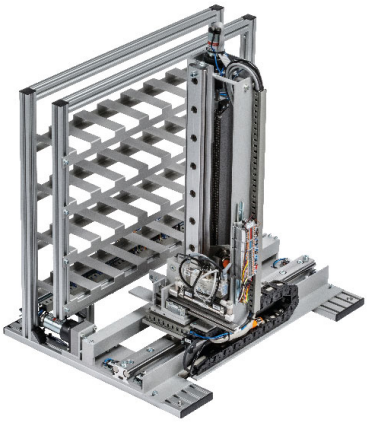
- Clear navigation and quick access
- Individual creation of learning paths
- Direct processing of project data within C-LEARNING
- Simple linking of required product data with project tasks

Are you already using our mMS function modules, but don't yet have access to C-LEARNING?

Our expert advisors will be happy to assist you!



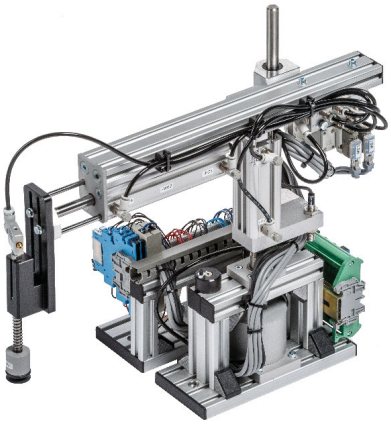
mMS – a mechatronic system for practical training



Function module ASRS

Article	Order-No.
Fully Assembled	69523

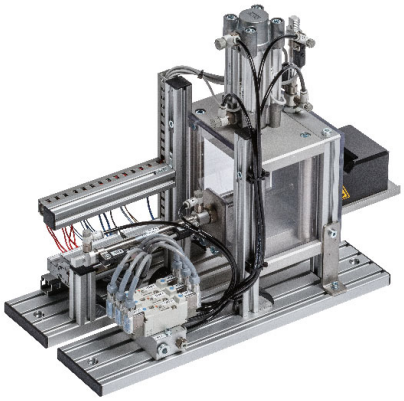
More information at: christiani-international.com/69523



Function module Handling Unit

Article	Order-No.
Fully Assembled	69518

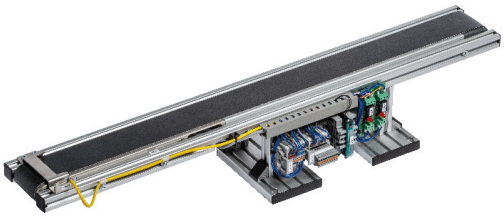
More information at: christiani-international.com/69518



Function module Assembly Unit

Article	Order-No.
Fully Assembled	69514

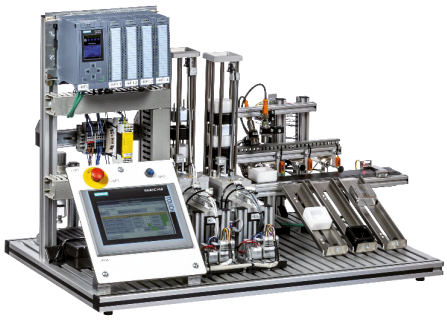
More information at: christiani-international.com/69514



Function module Conveyor Belt

Article	Order-No.
Fully Assembled	40778

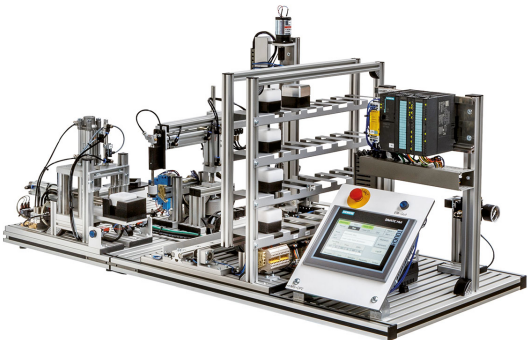
More information at: christiani-international.com/40778



Mechatronic VerSort System for sparting and sorting as a ready-to-use-system

Article	Order-No.
Fully Assembled	39666

More information at: christiani-international.com/39666



Mechatronic BeLag System for processing and storing as a ready-to-use-system

Article	Order-No.
Fully Assembled	39667

More information at: christiani-international.com/39667

Switch on and get stared

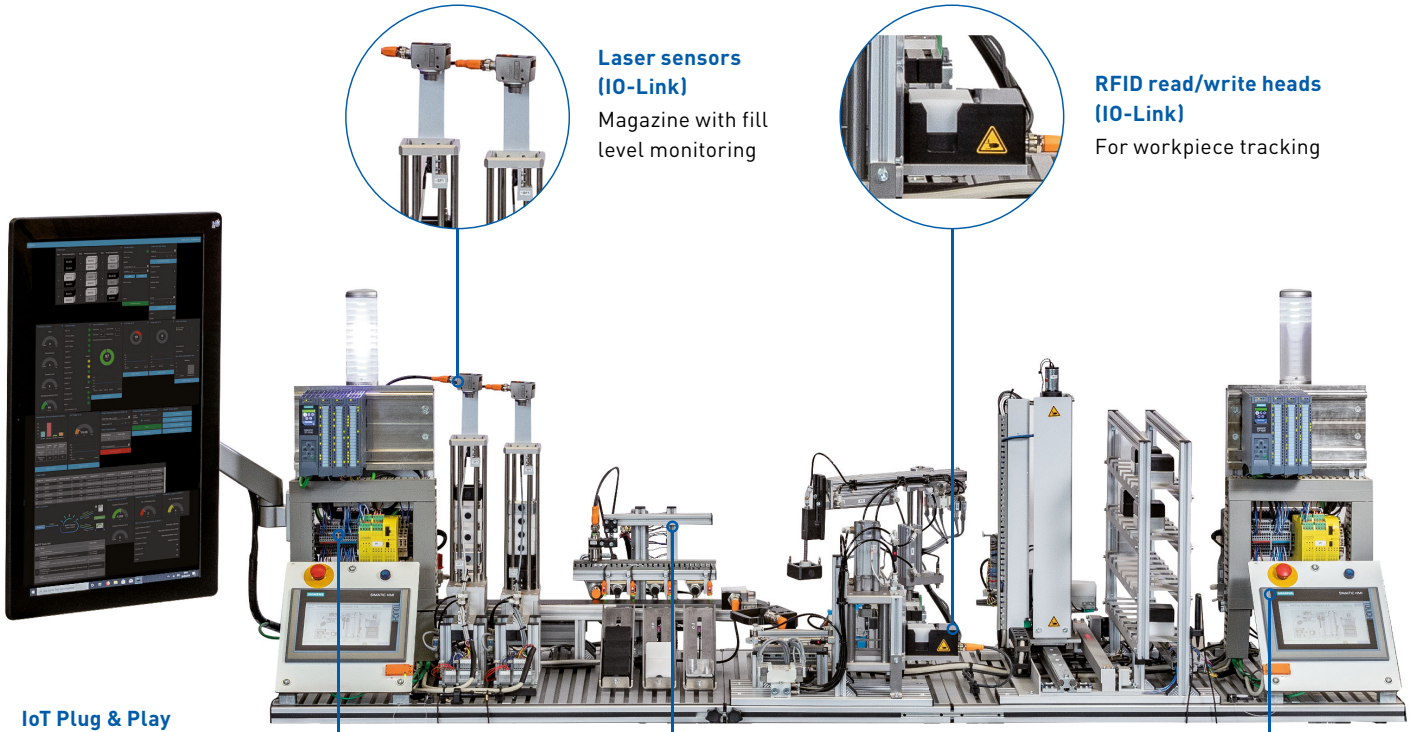
With the Sorting System Compact 4.0

With the Sorting System Compact 4.0 modular mechatronic system, you can teach automation and mechatronics from the basics right up to complex Industry 4.0 topics in a very small space. The specially developed dashboard makes it easy to record and analyse data. Combined with the intuitive operating concept, the system offers the best conditions for successfully passing on expertise.

- 11 function modules incl. storage and dispensing station
- Category 4 safety functions
- OEE functionality as standard
- WiFi antennas included
- Technical remote maintenance
- With original components from well-known manufacturers
- Mini PC with dashboard, Manufacturing Execution System (MES) and system wiki
- Can be divided into two separate stations
- Plug & Play: Ready to use

Take a look at our video for the SSC 4.0!

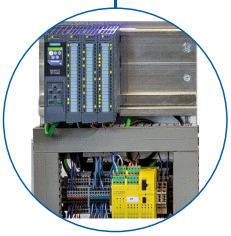
More information at:
christiani-international.com/sorting-system-compact



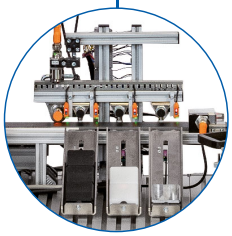
Laser sensors (IO-Link)
Magazine with fill level monitoring

RFID read/write heads (IO-Link)
For workpiece tracking

IoT Plug & Play
Mini-PC with touchscreen pre-configured with dashboard and system Wiki



Open control concept with SIEMENS industry PLC
With additional configurable safety switchgear



Sorting unit with workpiece inspection
Widely used industrial sensors can be found throughout the entire system

HMI with SIEMENS industry touchpanel
Intuitive and graphical operating concept

Article	Order-No.
mMS Sorting System Compact 4.0	32900

More information at: christiani-international.com/32900

New generation robot station

The mMS Station Robotics UR3e is already equipped with an MRK-compatible electric gripper. Since both the robot and the gripper have integrated safety elements, they can be used to implement, teach and train MRK applications in addition to conventional robotics applications. Individual application templates can be attached to a support surface with magnetic fixings. This setup allows a very clear and, in practice, common application to be implemented: robot-assisted welding or gluing.

What tasks can be performed with the mMS Station Robotics UR3e?

- Contouring
- Pick & place
- Stacking
- Palletising
- Model-based robot-assisted welding

Learning objectives:

- Commissioning and setting up robots
- Robot parameters
- Robot designs, especially articulated arm robots
- Kinematics of articulated arm robots
- Manual guidance of robots
- Teaching, testing and adjusting positions
- Safety in robot systems
- Use of external sensors and controls for extreme components by the robot controller
- Path planning
- Collision testing

Scope of delivery:

- Vehicle model
- Controllable point light source

mMS Station Robotics UR3e

Article	Order-No.
mMS Station Robotics UR3e	39980

More information at: christiani-international.com/39980

Automotive Technology

Basic Training and Advanced Training

Are you looking for practical solutions for technical training in automotive engineering? With our didactically prepared training stations, functional models and training vehicles, as well as modern teaching and learning media for imparting basic and specialist knowledge, we offer you everything you need for successful training.

We are your partner for future-oriented technical training and further education!

Here is a practical overview of the most important learning media and learning systems, covering key topics for practical training.

- Specialist books
- E-Learnings
- Training stands
- Teaching systems
- Functional models
- Cutaway models

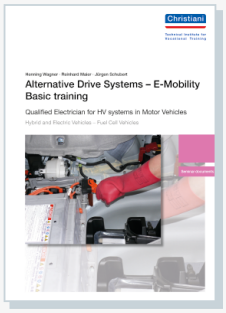
Our training stands and teaching systems are perfect for conveying the following training topics:

- E-Mobility / High Voltage Technology
- Engine Technology
- Drive Technology
- Chassis Technology
- Brake Systems
- Vehicle Electrics / Electronics
- Safety Systems
- Vehicle Diagnostics

Automotive Technology

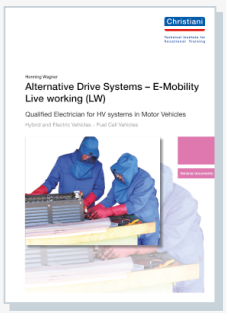
- Basic Knowledge
- High Voltage Technology
- Engine Technology
- Vehicle Electrics
- Brake Systems
- Drive Technology

Tip: Basic principles and specialist knowledge for e-mobility



Alternative Drive Systems – E-Mobiliy
Basic Training

More information at: christiani-international.com/19760



Alternative Drive Systems – E-Mobiliy
Live Working

More information at: christiani-international.com/19770

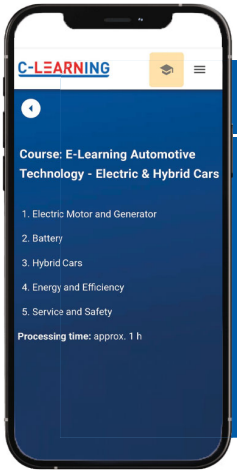
Now train digitally with C-LEARNING

"We train ahead" – that is our motto. We want to pass on our enthusiasm for technology to learners and teachers, trainers and trainees. With our C-LEARNING learning portal, we cover more than just the hot topic of "digitalization in education and training."

Get started with digital knowledge transfer now with our comprehensive e-learning courses in the automotive sector: The following e-learning modules are available in the C-LEARNING *plus* subscription model and as a package.

- Automotive technology – complete package
- Electric and hybrid vehicles
- Passenger car technology
- Vehicle diagnostics
- Accident repair
- Commercial vehicles

Go to the demo version and additional information



ADVANTAGES OF THE C-LEARNING LEARNING PORTAL

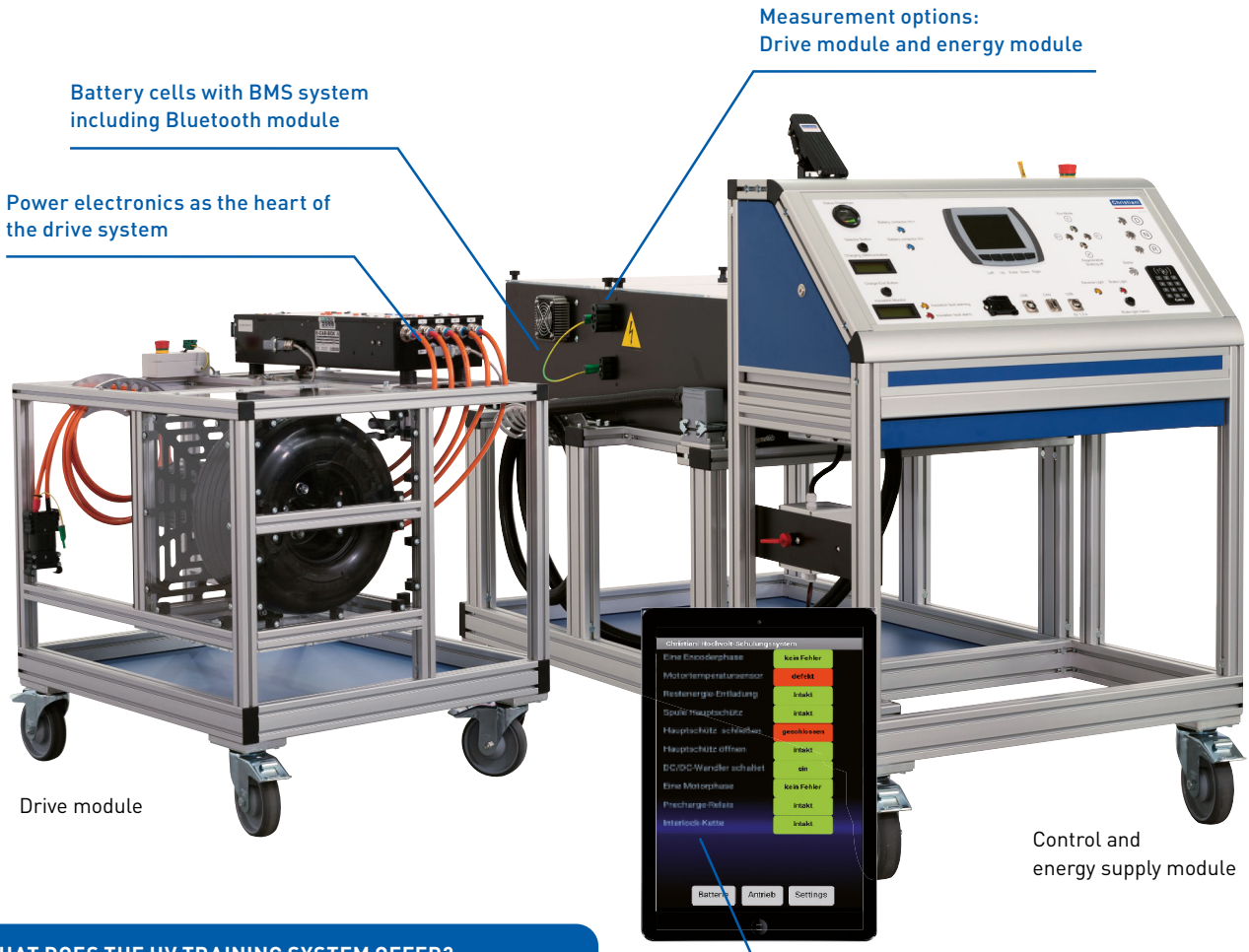
- Fexible learning – anytime, anywhere
- All didactic learning content in one portal
- Practical exercises
- Interactive media for all training and continuing education
- All digital content can be accessed and managed via a single address
- Short loading times
- Can be integrated into your learning environment via interfaces

More information for C-LEARNING at:
christiani-international.com/c-learning

Electrical drives and high-voltage technology in training

HV Trainer – The concept for a safe introduction into e-mobility

E-mobility and high-voltage technology, are the hot topics in automotive technology. The switch from combustion engines to alternative drives requires good training in the field of high-voltage technology and electric drives. With Christiani's training concept, your personnel will be equipped for e-mobility. The combination of realistic training models and didactic documents communicates practical knowledge and theoretical content from one single source. The HV Trainer enables you to provide your trainees with realistic instruction and simulate relevant functions of HV systems in motor vehicles. In addition to working under voltage, all safety-related measurements can be carried out on the HV trainer. These include: insulation resistance measurement, verification of absence of voltage and equipotential bonding measurement.



WHAT DOES THE HV TRAINING SYSTEM OFFER?

- Complete, didactically prepared electric drive train with all required controls
- Manufacturer-neutral components
- Mobile controllable fault circuits possible via app
- High safety in handling and during practical Exercises
- CE-certified

Article	Order-No.
HV-Training System	45861

More information at: christiani-international.com/45861

Good to know:

The HV trainer covers all content required by DGUV Information 209-093 for qualified persons working on HV systems. The DGUV Information 209-093 ('Qualification for work on vehicles with high-voltage systems') regulates how employers in Germany must organise work on vehicles with high-voltage systems safely and what qualifications employees need for this.

Working safely with high-voltage technology

Training Stand HV hazards and accident prevention

Working on high-voltage systems in motor vehicles entails dangers that require special qualifications of all persons who may be exposed to them in their daily work. Particularly important in this context is compliance with the safety regulations in electrical engineering. The training stand "Dangers and Accident Prevention" shows several dangers when working on high-voltage systems, teaches how to recognize danger zones, how to learn safety regulations when working and how to handle protective equipment. The mobile training stand for HV hazards consists of five training modules, which are intended to sensitise trainees and skilled workers to HV technology.

Our five modules (HV1 – HV5) cover realistic and dangerous scenarios:

- HV1 – Hazards when rescuing injured persons
- HV2 – Hazards when cutting through HV cables
- HV3 – Effects of electric current flowing through the body (AC/DC)
- HV4 – Disconnection trainer for high-voltage systems in motor vehicles
- HV5 – Insulation resistance and equipotential bonding measurement exercises

Article	Order-No.
Training Stand High Voltage Hazards and Accident Prevention	13497

More information at: christiani-international.com/13497

Tip: For working safely on high-voltage systems in vehicles

AVL DiTEST HV Safety 2000

More information at: christiani-international.com/95880

CATU High Voltage Package

More information at: christiani-international.com/96891

Multimeter METRAHIT IM E-Drive

More information at: christiani-international.com/33812

CATU High Voltage Set

More information at: christiani-international.com/96892

CATU Portable Rescue Kit

More information at: christiani-international.com/14776

Learning on real vehicles

from precise diagnosis to repair

Training Vehicle Opel Rocks-e

Innovative Training Vehicle based on 48-volt technology

Based on a 48-volt system, our new Opel Rocks-e training vehicle has been specially developed to enable practical and didactically valuable training courses. The didactic concept is based on the requirements of DGUV 209-093 and covers content up to the demanding level 3S. With an operating voltage of less than 60 volts (DC), you can offer your training participants safe training in high-voltage technology. Comprehensive didactic conversion for maximum flexibility and practical relevance. Our didactic conversion package offers a wide range of customisation options to optimally tailor your training vehicle to the needs of training and further education:

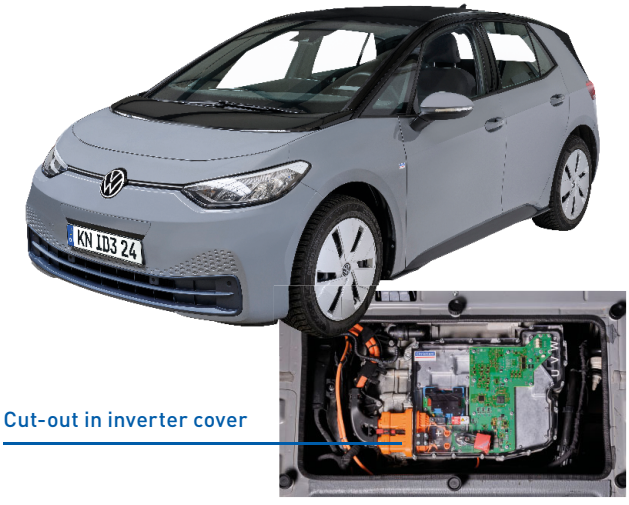
- Customisable fault circuit
- Precise measuring points and body cut-outs for optimum access
- Parallel break-out measuring box for the electronic control unit
- Removable break-out measuring box for the drive battery
- Disconnection, insulation and equipotential bonding trainer

For automotive mechatronics engineers and master automotive technicians in training and further education.

More information at:
christiani-international.com/103158

Article	Order-No.
Training Vehicle Opel Rocks-e	103158

More information at: christiani-international.com/103158



Cut-out in inverter cover

Training Vehicle Volkswagen ID3

Modular expandable base vehicle individually configurable

The VW ID.3 is the perfect basic vehicle for training and further education in the automotive sector. Thanks to its modular design, the vehicle can be adapted for teaching purposes using a modular principle and optimally tailored for training purposes. Whether for basic learning content or complex gear changes, the VW ID.3 covers many training scenarios and thus offers a practical learning experience. For automotive mechatronics engineers and master automotive technicians in training and further education.

Measuring point, 4 mm

Exposed coupling

Measuring and fault switching box

Article	Order-No.
Training Vehicle Volkswagen ID3	104917

More information at: christiani-international.com/104917

Comparison of real training systems for high-voltage technology

Training Vehicle Opel Rocks-e

Innovative and cost-effective training vehicle for safe HV-training.

What does the Opel Rocks-e offer as an HV training system?

- Cost-effective and space-saving training system
- Training in accordance with DGUV regulation 209-093
- Safe training with a voltage range of less than 60 volts
- Original manufacturer components

Workable tasks:

- Measuring and testing systems
- Diagnosing faults in low-voltage systems (lighting)
- Diagnosing faults in high-voltage systems (within the battery under voltage)
- Complying with safety requirements for high-voltage systems and securing the work area
- Recognising data communication between control units

Scope of performance:

- Voltage range < 60 volts (48 volts)
- Safe working environment due to low operating voltage
- Permanently installed break-out measuring box Electric control unit
- Removable break-out box traction battery
- Training in basic electrical principles

More information at: christiani-international.com/103158

HV-Trainer

Realistic and manufacturer-neutral training system for HV technology

What does the HV-Trainer offer as a training system?

- Cost-effective and space-saving training system
- Training in accordance with DGUV regulation 209-093
- Safe training with a voltage range of over 60 volts
- Manufacturer-neutral components

Workable tasks:

- Disconnect systems in accordance with the work instructions, secure against restarting, determine absence of voltage
- Measure and assess insulation resistance
- Check and assess the function of protective and equipotential bonding conductors
- Identify potential hazards
- Diagnose faults in the high-voltage system (inside and outside the traction battery)

Scope of performance:

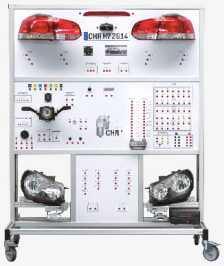
- Voltage range > 60 volts (96 volts)
- Electrical hazard according to definition DGUV 209-093
- Product-neutral
- Charging at the wallbox (type 2)
- Insulation monitoring (safety device)
- Interlock (safety device)
- Potential equalization (safety device)
- Orange-colored cables outside the battery

More information at: christiani-international.com/45861

Tip: Training Stand Central Electric H7 (VW Golf 6)

The training stand has been developed for practical use in corresponding learning fields. In addition to wiring in accordance with the circuit diagram, diagnosis and programming using workshop testers via OBD is also possible. The necessary cable connections between the vehicle electrical system control unit and the installed components must be made by the trainee himself according to the wiring diagram. Laboratory cables with 4 mm safety sockets and different colour coding are used for better identification of the CAN connections between the control units.

More information at: christiani-international.com/77162



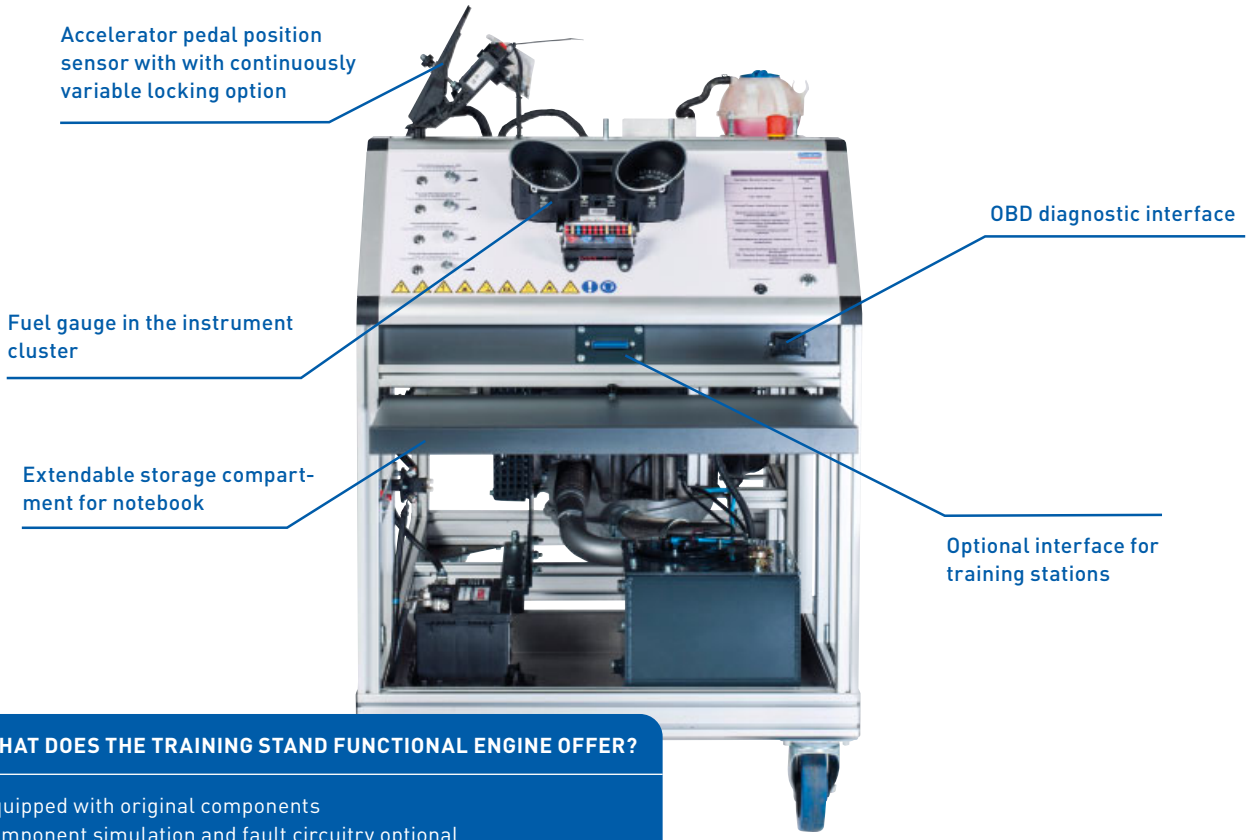
Article	Order-No.
Training Stand Central Electric	77162
Training Stand Central Electrics H7 (VW Golf 6)	77163
Training Stand Central Electrical Unit (VW Golf 6)	77171

Original motors for practical training

Original motors for practical training

The component simulation of Christiani functioning engines make them perfect for displaying various operating statuses and emergency running characteristics. Manipulating individual sensors allows trainees to follow the reaction of the engine management system visually, for example by evaluating measured value blocks or fault code entries. The fitted and lockable fault circuit allows 24 different electrical faults to be connected within the engine. The resulting malfunctions enable training to be very realistic. The functioning engines are mounted on a mobile frame and are composed of original components.

For automotive mechatronics engineers and master automotive technicians in training and further education.



WHAT DOES THE TRAINING STAND FUNCTIONAL ENGINE OFFER?

- Equipped with original components
- Component simulation and fault circuitry optional
- Up to 30 electrical faults can be simulated
- Fully functional and diagnostic-capable
- Complete solution adaptable to individual customer requirements

Training Stands: Diesel Engines

Article	Order-No.
VAG 2.0 TDI EA189	84490
VAG PQ 2.0 TDI EA288 SCR AdBlue	88753
VAG 1.6 TDI EA189	83749
VAG MQB 2.0 TDI EA288 SCR Adblue	13859
VAG 1.2 TDI EA189	92499

Training Stands: Petrol Engines

Article	Order-No.
VAG PQ 2.0 TSI/TFSI EA888	83283
VAG MQB 1.5 TSI EA211 ACT	34296
VAG MQB 2.0 TSI EA888	105930
VAG MQB 1.4 TSI EA211	82745
Opel Multipoint	84240

Further motor types available on request or on our website at:
christiani-international.com

Explaining engine technology clearly and concisely

Training stands with original components

The training stand consists of a networked system of engine management system and brake control unit on the basis of the Golf 6 1.4. The objective of this training stand is to train the IPO principle (Input-Processing-Output) in a targeted manner and to create visible examples of this. The built-in components are colour-coded according to their respective tasks. The system components are connected and labelled according to the original VW circuit diagram. The front is laminated with a printed foil and can be written on with water-soluble pens.

Training Stand VW Sensores/Actuators

Learning objectives:

- Working with maintenance schedules, wiring diagrams, symbols, connections etc.
- Naming electricals and electronic components, functional units and systems
- Selecting and using electrical measuring and testing equipment
- Measuring and evaluating electrical variables and signals

Article	Order-No.
Training Stand VW Sensors/Actuators	81979
Training Stand VW Sensors/Actuators + PDC (Park Distance Control)	93025

More information at: christiani-international.com/81979

Training Stand Drive Dynamics Control

ABS, EDS, ASR, ESP Functional Model

This functional model can be used to illustrate and examine functions and processes, faults and measured values as on the original brake system with vehicle dynamics control. The fully functional ABS/ESP brake system illustrates the various operating and control states. All original parts and required components are clearly arranged on the colour-printed front panel according to the IPO principle.

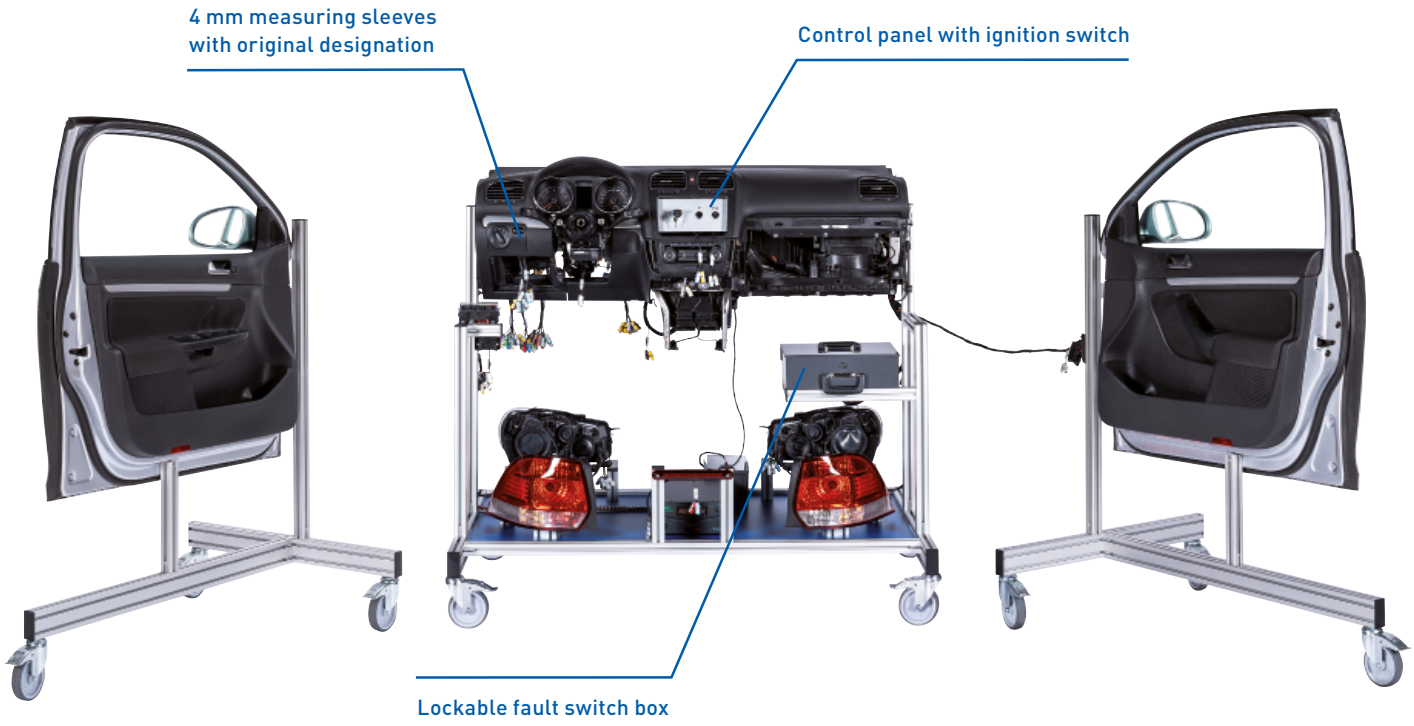
Article	Order-No.
Training Stand Driving Dynamics Control	33430

More information at: christiani-international.com/33430

Vehicle electrics and networked systems

from the basics to advanced topics

Electrical vehicle systems are amongst the most complex automotive technology to be found in vehicles. The use of measuring and test equipment as well as sophisticated diagnostics devices requires specific expertise in vehicle electrics and in the complete data communication system structure. The training stand CAN-LIN Bus is perfect for practical use in the areas, central electrics, air conditioning control, airbar and comfort system. The integrated fault circuit with 20 faults enables troubleshooting in electrical connectors and practice-oriented work with measuring devices and diagnostics systems usually used in workshops. Eight additional faults can also be switched in the CAN data bus in order to facilitate troubleshooting in data communication between the various control devices.



Learning objectives:

- Naming of electrical and electronic components, assemblies and systems
- Testing and repair of electrical and electronic circuits
- Selecting and using electrical measuring and testing equipment
- Measurement and evaluation of electrical quantities and signals

WHAT DOES THE CAN-LIN-BUS FUNCTIONAL MODEL OFFER?

- Equipped with original components
- Up to 20 fault circuits can be simulated
- Fully functional and diagnostic-capable
- OBD interface enables real-world diagnostics

Training Stand Central Electrics

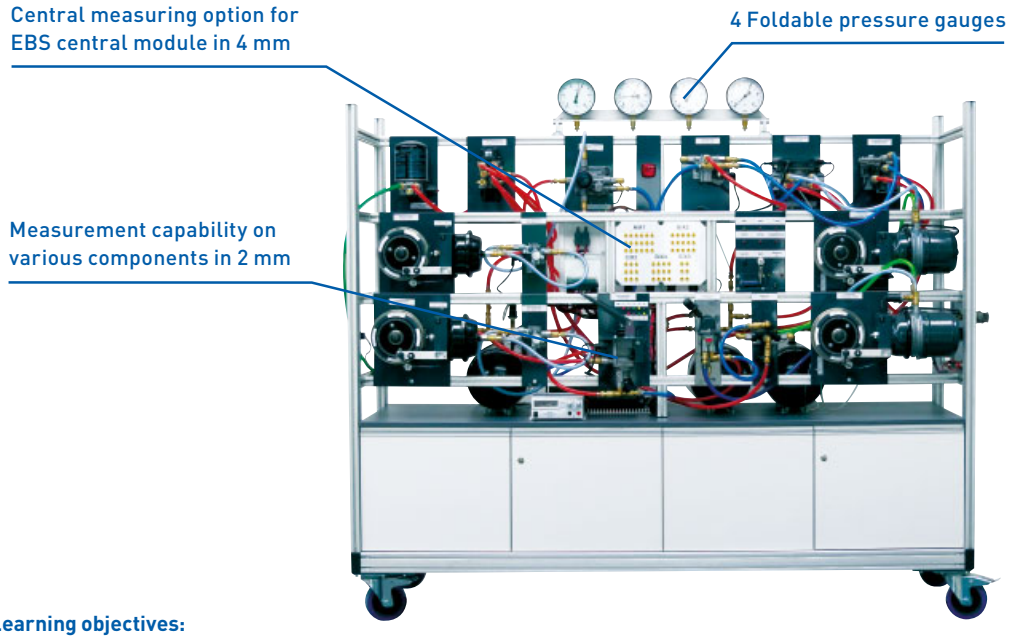
Article	Order-No.
CAN-LIN BUS	82616
Driver and passenger door for Training-Stand CAN-LIN-Bus	105705
Additional equipment bi-xenon bending light	34401
Additional equipment break-out box for driver	34402

More information at:
christiani-international.com/82616

Learn and understand commercial vehicle technology

Training stand compressed-air braking system EBS 1C

The motor vehicle compressed-air braking system consists solely of original components from WABCO. To show the EBS control procedures, the functional model has four electrically driven wheel units for simulation of the front and rear axle. An integrated fault circuit, with 10 practically oriented faults, makes it possible to follow realistic operating situations and practice troubleshooting. The modular system structure allows students to gradually become accustomed to the field of commercial vehicle compressed-air braking systems.



Learning objectives:

- Understanding how it works
- Pressure safety test SP according to STVZO
- Identifying components
- Performing maintenance work
- Analysing and diagnosing faults

Article	Order-No.
WABCO EBS 1C Motor	80870
WABCO EBS 1C Trailer	80871
WABCO EBS 1C Motor Vehicle and Trailer	32855
WABCO TEBS-E Trailer	77192
WABCO EBS 1C / TEBS-E-Motor Vehicle and Trailer	32855

More information at: christiani-international.com/80871

WHAT DOES THE COMPRESSED-AIR BRAKING SYSTEM OFFER?

- Compressed air brake system constructed from original WABCO components
- Demonstration of EBS control processes via four electrically driven wheel units (front/rear axle)
- 10 practical fault simulations for realistic operating situations
- Step-by-step introduction to commercial vehicle technology – compressed air brake systems
- Real ABS functions

Matching this:

WABCO TEBS-D compressed air braking system, trailer training stand

In addition to the tractor unit, we offer trailers in other designs.
These are also fully functional and diagnostic-capable.
Newer version TEBS-E (item no.: 32850) also available!

More information at: christiani-international.com/80871

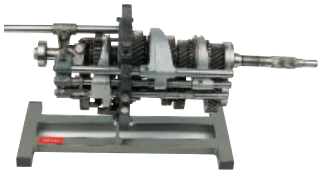
Learning with cutaway models of motor vehicles

Christiani's cutaway models allow you to provide excellent demonstrations of the inner workings of components and engine parts that are not usually visible. The cut edges are highlighted in colour to aid visibility. The moving parts, such as pistons, shafts or valves, are also functional on the cutaway model.

Diesel Industrial Engine

Article	Order-No.
Cutaway Model	89813

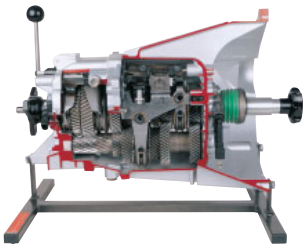
More information at:
christiani-international.com/89813



5-speed Transmission

Article	Order-No.
Assembly Model	73452

More information at:
christiani-international.com/73452



6-speed Transmission (Mercedes-Benz)

Article	Order-No.
Cutaway Model	73446

More information at:
christiani-international.com/73446

Petrol Engine (Mercedes-Benz A-Class)

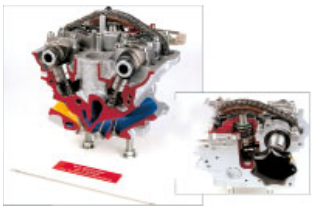
Article	Order-No.
with Injection, Cutaway Model	77128

More information at:
christiani-international.com/77128

Diesel Engine (Mercedes-Benz A-Class)

Article	Order-No.
with Common Rail Technique, Cutaway Model	77127

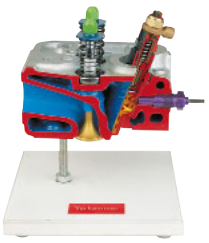
More information at:
christiani-international.com/77127



Cylinder Head with 5 Valves and Camshaft Adjustment (Audi)

Article	Order-No.
Cutaway Model	72503

More information at:
christiani-international.com/72503



Cylinder Head

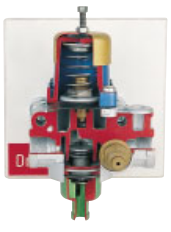
Article	Order-No.
with Prechamber, Cutaway Model	73326

More information at:
christiani-international.com/73326

Starter Motor

Article	Order-No.
Cutaway Model	73548

More information at:
christiani-international.com/73548



Pressure Regulator

Article	Order-No.
Cutaway Model	73541

More information at:
christiani-international.com/73541

Further cutaway models available on request or on our website at:
christiani-international.com

Renewable Energies and HVAC

Basic Training in Renewables and HVAC

Practical, sophisticated teaching systems and solutions, combined with training material that has been prepared for teaching, form the foundation of successful training in renewable energies and HVAC.

Using our products, you can teach your trainees the required course content in an easily understandable and visual way. We provide the right solution, from the basics right through to complex teaching systems.

We are your partner for successful vocational and further training!

Here is a practical overview of the most important learning media and learning systems, covering key topics for practical training.

- Training stands
- Teaching systems
- Experiment manuals (in various languages)
- Experimental systems
- Workstation systems

Our training stands and teaching systems are perfect for conveying the following training topics:

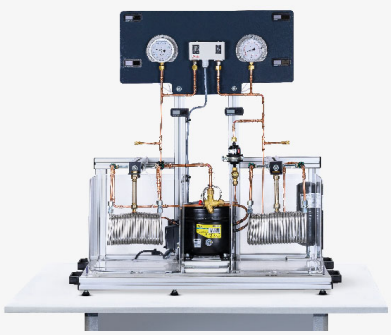
- Photovoltaics
- Solar Thermal Energy
- Heating Technology
- Heating Hydraulics
- HVAC / Sanitation Technology

Renewable Energies and HVAC

- Basic Knowledge Renewable Energies
- Photovoltaics
- Heat Pump / Biomass
- Solar Thermal Heat
- Basic Knowledge HVAC
- Heating Hydraulics / Wilo-Brain

Tip: Teaching systems for heat pump technology – Heating technology for the present and the future

Compact Heat Pump Model



More information at:
christiani-international.com/101962

Mobile Training Stand Heat Pump

More information at:
christiani-international.com/101963

Experimental systems for renewable energies

Converting energy from the sun, wind and hydrogen: The fully equipped theme kits, including extensive teaching materials, enable a wide range of experiments. The easy-to-understand experiment instructions allow students to learn about the technology independently. Just unpack and get started!

Exclusively by Christiani

Wind Trainer junior

Wind Energy - Experimental System

- Measurement of the wind speed of the wind machine as a function of the controller setting
- Output power of the generator as a function of the blade shape (flat, curved)
- Output power of the generator as a function of the number of blades (2, 3, 4)
- Output power of the generator depending on the blade position
- Recording of the U/I characteristic curve of the generator at constant speed

Available in German, English and Spanish

Article	Order-No.
Wind Trainer junior Wind Energy - Experimental System	81802

More information at: christiani-international.com/81802

Solar Trainer junior

Photovoltaics Energy - Experimental System

- Measuring the irradiance of different light sources
- The solar cell as an energy converter / as a diode
- The open-circuit voltage of a solar cell / shading
- The short-circuit current of a solar cell / shading
- The open-circuit voltage and short-circuit current at different irradiance levels

Article	Order-No.
Solar Trainer junior Photovoltaics Energy - Experimental System	81800

More information at: christiani-international.com/81800

H2-Trainer junior

Hydrogen - Experimental System

- Measurement of the volume ratio of the gases produced
- Measurement of the gas volumes produced per unit of time as a function of the current strength
- Determination of the energy and Faraday efficiency of the electrolyzed/fuel cell
- Determination of the U/I characteristic curve of the electrolyzed/fuel cell
- Construction of an island network

Article	Order-No.
H2-Trainer junior Hydrogen - Experimental System	81804

More information at: christiani-international.com/81804

Learn the basics of energy and solar technology

practical and versatile

Thanks to the pedal-powered and solar-powered teaching systems, the basic principles of photovoltaics and energy technology can be introduced in a fun way. Basic principles, such as current, voltage, power and energy are brought to life for learners through application and experience-oriented knowledge transfer. In addition to hardware, appropriate experiment manuals are a major constituent in the overall didactic concept.

Generator Bike

English, Spanish and more languages are available

Article	Order-No.
Basic Configuration	75637
Basic Configuration with USB Interface	93800

More information at: christiani-international.com/75637

Solar Power Case

English, Spanish and more languages are available

Article	Order-No.
Basic Configuration	75636
Extended Basic Configuration	76704

More information at: christiani-international.com/75636

Energy Trainer

Article	Order-No.
Training Case	97437
Cable Winch as an Energy Storage Unit	77493

More information at: christiani-international.com/97437

Solar Work Case

Article	Order-No.
Material Kit Unprocessed	94920
Material Kit Prepared and Ready for Installation	94921
Ready for Use	94922

More information at: christiani-international.com/94920

Innovative learning with the PV-Trainer

All-in-one teaching system for planning photovoltaic systems

Cutting-edge technology – taught in an interesting, modern and practical way.

A complete and mobile photovoltaic installation in the classroom or specialist room. The teaching system can be used to demonstrate almost all practical tasks, plans and configurations that customers encounter or require can be reproduced and flexibly and efficiently integrated into everyday training.

The components of the PV-Trainer allow both the construction of a photovoltaic system with full feed-in and the configuration of a typical self-consumption system. To optimize the self-consumption rate, a home storage unit is also installed, which can be flexibly integrated into the system configuration depending on the respective learning situation.

The system is delivered with country-specific configuration and is connected to an internet portal for data visualization. Alternatively, the system can be connected to the internet via a LAN connection or via its own SIM card using the router built into the communication unit. With the help of the tablet located on the system, both the local values of the inverter and the data and values stored in the portal can be accessed. The system is designed for use in the UK.

Learning objectives:

Operation as a grid-connected system

- Design, calculation and construction of various system concepts
- Construction of systems with different sun and inclination angles
- Dimensioning and construction of a photovoltaic system as a full feed-in system
- Construction of a self-consumption system with surplus feed-in
- Integration of a home storage unit
- Consideration of the efficiency of different system concepts
- Balancing of feed-in and consumption
- Simulation of different orientations and real-time yield analysis
- Measurement and optimization of various PV string concepts
- Design of measurement data acquisition and safety concepts
- Surge protection and safety devices

Operation as a backup power system

- Simulation of grid failure and switchover to backup power operation
- Design of an emergency power system
- Consideration of black start capability
- DC charging from the PV generator

Communication technology

- Data transmission from inverters and storage systems
- Setting up portal applications for monitoring the system
- Optimization of self-consumption with smart home applications

Advantages:

- Practical and flexible – the PV-Trainer enables comprehensive photovoltaic training directly in your training workshop.

Future-proof learning:

- Optimized energy flows, transparent monitoring and the highest safety standards ensure effective learning and realistic training.

Suitable for:

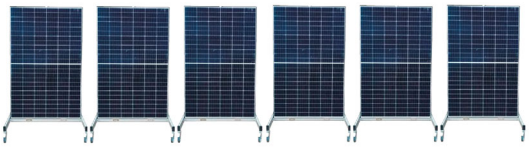
- Vocational schools
- Company and inter-company training centers Training and further education
- Universities
- And other educational institutions for PV

Article	Order-No.
PV-Trainer	104446

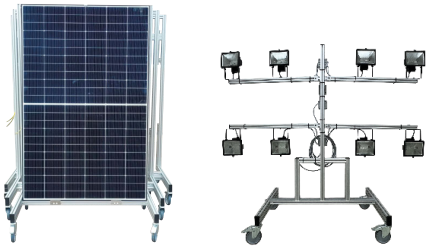
More information at: christiani-international.com/104446

Powerful Solar Power for the PV Trainer

With the new mobile PV-Module-System (Item No.: 104447), the PV-Trainer can be powered in various ways. The mobile PV-Module-System consists of 6 powerful modules and can be connected to the PV Trainer in different ways (serial/parallel). Each module is mounted on a separate mobile frame made of extruded aluminium profile and can be moved and positioned on lockable swivel castors. The mobile PV-Module-System is also ideal for outdoor use. For indoor operation, we offer a combination of 4 mobile PV-Modules with our Sun simulator (Item No.: 105884). Each of the four modules is powered by powerful halogen spotlights. Even with this reduced number of PV-Modules, different string concepts can be tested. We also offer a laboratory power supply unit (Item No.: 105885) for simulating PV Power as an addition. This space-saving alternative to the mobile PV-Modules can be used flexibly as a power source for the PV-Trainer. We recommend operating the PV-Trainer with the PV-Modules, and to use the power supply unit as an optional and flexible enhancement.



Item-No.: 104447, all 6 PV Modules feed into the PV-Trainer (Similar Illustration)



Item-No.: 105884, 4 PV Modules on trolleys and 2 on racks with sun simulation

Article	Order-No.
Mobile PV-Module-System	104447
Mobile PV-Module-System with sun simulation	105884
Solar Power Simulator power supply unit	105885

More information at: christiani-international.com/104447

The Solar Power Laboratory

Learning photovoltaics like the professionals

The solar power laboratory, developed by solar specialists and teachers, can be used to convey learning content about off-grid technology and on-grid technology in a way that is practical and easy to understand. Detailed experiment manuals for trainers and students are the perfect addition to the overall didactic concept. Working with the individual modules, trainees and students gain an insight into the commonly used circuits in photovoltaics. The solar power laboratory modules are state-of-the-art in photovoltaic technology, comply with relevant requirements (VDE 0100 Part 712) and are equipped with standardised and easy to understand symbols.

Learning objectives:

- Basic fundamentals of photovoltaics
- Components and functional principles of PV off-grid systems and on-grid PV systems
- Different circuits and system concepts
- and many more

Experiment manuals:

Besides basic information on climate protection and renewable energy, the experiment manuals provide an introduction to off-grid and on-grid technologies. A key part of the manuals comprises practice tasks, which can be performed at the solar power laboratory. The solutions for these tasks can be found in the trainer's edition.

English, Spanish and more languages are available

Article	Order-No.
Documents for the Teacher	82017
Documents for the Students	82807

More information at: christiani-international.com/82017

Article	Order-No.
Solar Power Laboratory incl. Compontents for Off-grid and On-grid Systems	82371
Compontents for Off-grid Systems	76970
Compontents for On-grid Systems	76971

More information at: christiani-international.com/82371

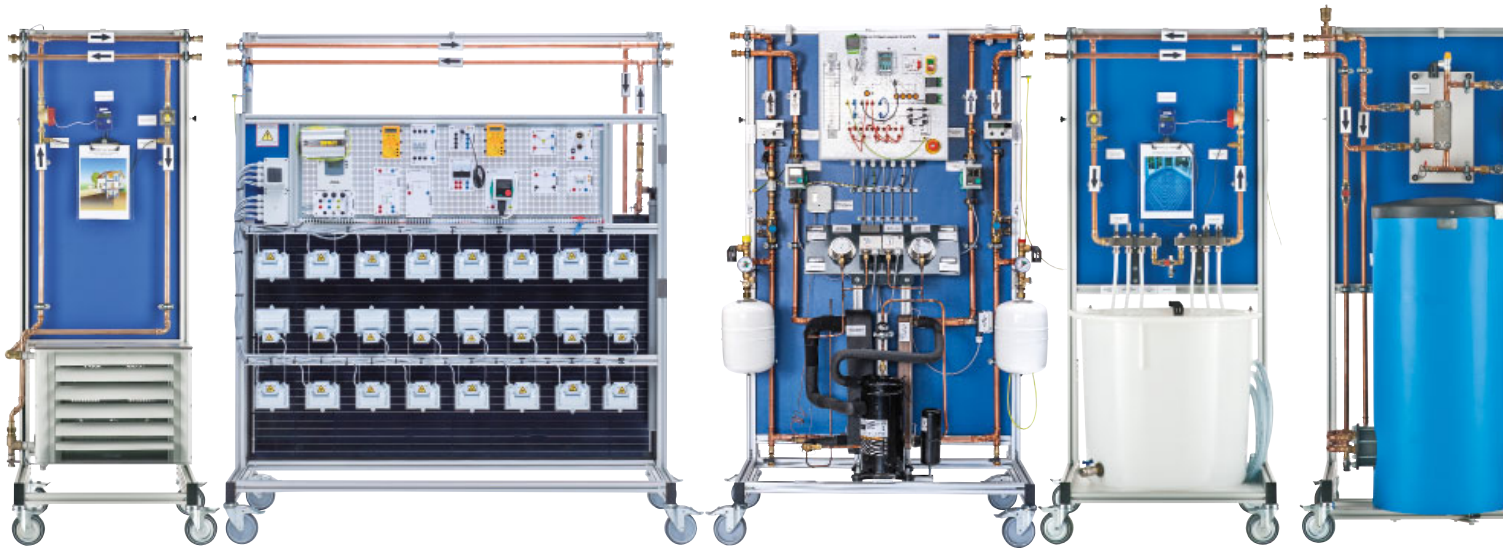
The complete system for heating technology with renewable energies

Hands-on teaching system with solar thermal energy, photovoltaics and pellet heating

This hands-on teaching system with original components enables you to provide teaching about solar thermal technology, heat pumps and biomass and pellet heating systems. The training stands for the modular teaching system can be individually combined depending on the technology to be taught. In addition to providing technical training in basic principles, the teaching system can also be used to impart specialist knowledge of electrical and hydraulic systems. A key part of the teaching system is activity-based and independent work by learners.

Learning objectives:

- Understanding of system conditions of heating systems with renewable energies in general, heat pump heating systems, wood pellet heating systems, solar thermal systems and hybrid collector systems in particular.
- Knowledge of electrical, hydraulic and control operating conditions in various heating system concepts with renewable energies
- Knowledge of the physical processes in various heating technologies
- Skills in planning, installation, commissioning and maintenance of various heating technologies with renewable energies.
- And many more



S2 S6 S5 S1 S4

Article	Order-No.
Teaching System Heating Technology with Renewable Energies Training Stands S1, S2, S3, S4, S5, S6, S7	96431
Teaching System Heat Pump with Solar Thermal Energy and Photovoltaics Training Stands S1, S2, S3, S4, S5, S6	85394
Teaching System Heat Pump with Solar Thermal Energy Training Stands S1, S2, S3, S4, S5	83855
Teaching System Heat Pump Training Stands S1, S2, S3, S4, S5	96429
Teaching System Pellet Heating Training Stands S1/S2, S4, S7	96430
Teaching System Solar Thermal Energy Training Stands S1/S2, S3, S4	96428

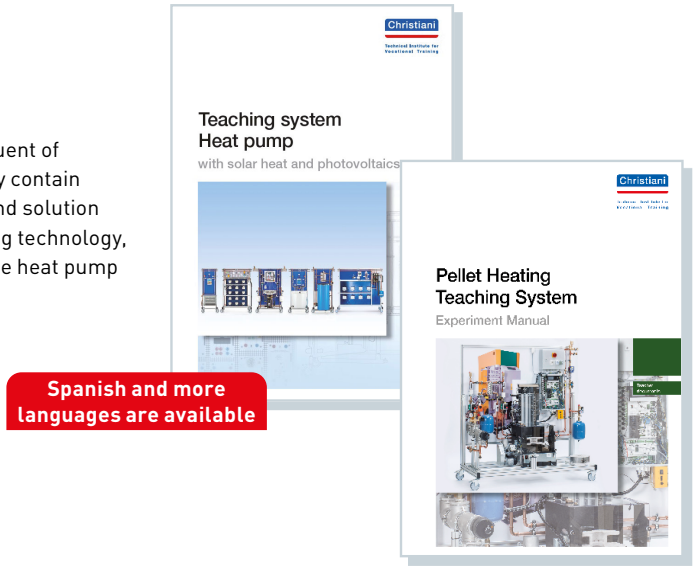
More information at: christiani-international.com/96431

Article	Order-No.
Training Stand Geothermal Heat Source or Underfloor Heating Training Stand S1	82125
Training Stand Fan Coil as Source or Sink Training Stand S2	82126
Training Stand Solar Thermal Energy with Solar Simulation Training Stand S3	82127
Training Stand Coupling Component Hydraulic Switch, Plate Heat Exchanger and Buffer Storage Training Stand S4	82128
Training Stand Heat Pump Training Stand S5	82129
Training Stand Hybrid Collector with PV Components Training Stand S6	85317
Training Stand Pellet Heating Training Stand S7	98380

More information at: christiani-international.com/82125

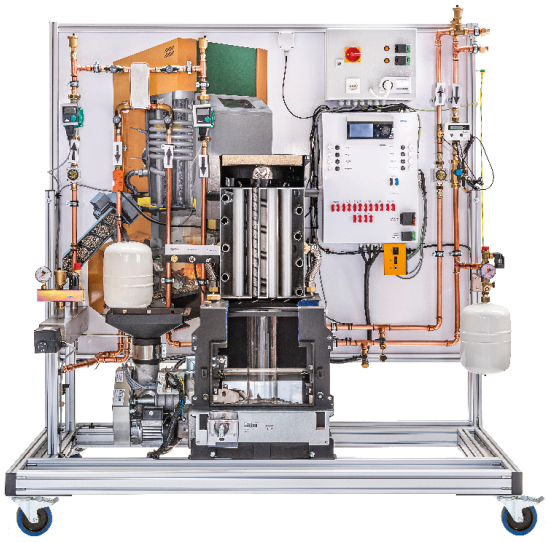
Experiment manuals:

Experiment manuals are a major constituent of Christiani's overall didactic concept. They contain an information section and an exercise and solution section. In the teaching system for heating technology, experiment manuals are included with the heat pump and pellet heating training stands.



Spanish and more languages are available

S3

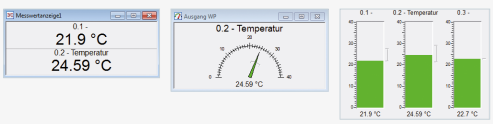


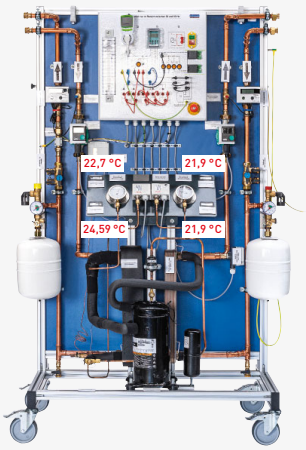
S7

Tip: Digital data logging and display

Digital data logging allows for fast, automated and precise logging and display of measured values (temperature, pressure and much more). In addition to data logging and display, an in-depth understanding and the ability to evaluate the measured values logged are a key component of the didactic concept. With digital data logging, you are well equipped for future didactic and technical developments.

Display of data logged sensors





Article	Order-No.
Digital Data Logging with measuring device	19687
Digital Data Logging Advanced with measuring device	19688
Digital Data Logging Comfort Equipment	19689

More information at: christiani-international.com/19687

Heating technology for the present and the future

New teaching systems for heat pumps of all sizes

The two heat pump teaching systems explain the functional principle of the heat pump in a clear and understandable way. The central stations of the refrigeration circuit – evaporation, compression, condensation and expansion – are shown in a visual and comprehensible way.

Compact Heat Pump Model

Compact model with comprehensive features

- With two spiral heat exchangers as evaporator and condenser, and with compressor and expansion valve
- Pressure gauge for displaying pressure on low- and high-pressure side
- Two vessels (as heat source and heat sink) with temperature recording
- Temperature recording in the refrigeration circuit at:
  - Evaporator inlet and outlet
  - Condenser inlet and outlet
- Pressure switches on the high-pressure and low-pressure sides
- Energy meter
- Filter dryer, collector

Learning objectives – for both teaching systems, the compact model and the training stand model:

- Knowledge of the terminology and operating equipment of heat pump systems
- Understanding of the technical system requirements of heat pump heating systems
- Knowledge of the operating conditions of a heat pump heating system
- Knowledge of the physical processes in the refrigeration circuit of a heat pump
- Competence in measuring and evaluating the processes in heat pump systems

Article	Order-No.
Compact Heat Pump Model	101962

More information at: christiani-international.com/101962

Mobile Training Stand Heat Pump Model

High-quality mobile training stand with frame made of extruded profile with grooves on all sides, on lockable castors (Ø 125 mm)

- With grooves on all sides, on lockable castors (Ø 125 mm)
- With two plate heat exchangers as evaporator and condenser, and with compressor and expansion valve
- Pressure gauge for displaying the pressure on the low-pressure and high-pressure sides
- Two large vessels (as heat source and heat sink) with
- Two large vessels (as heat source and heat sink) with temperature measurement in both vessels
- Temperature measurement in the refrigeration circuit at:
  - Evaporator inlet and outlet
  - Condenser inlet and outlet
- Pressure switches on the high-pressure side and on the low-pressure side
- Energy meter
- Filter dryer, collector
- For Training as a plant mechanic (HVAC)
- Further training in heat pumps and renewable energies

Learning fields:

- Plant mechanic HVAC – Learning areas 9, 12, 14, 15

Article	Order-No.
Mobile Training Stand Heat Pump	101963

More information at: christiani-international.com/101963

Solar heat from flat-plate or tube collectors

for heating and domestic hot water

(Solar Thermal Training Stand: Flat-Plate Collector)

(Solar Thermal Training Stand: Tube Collector)

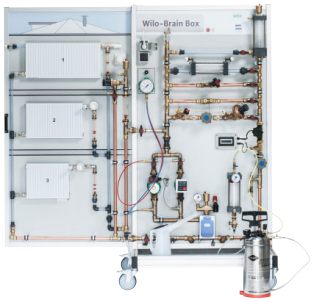
Solar Thermal Training Stand

Mobile training stand with frame made of grooved extruded aluminum profile, on castors (Ø 125 mm), equipped with, among other things

- Flat-plate collector or tube collector from a brand-name manufacturer, with connection hose set
- Brand-name solar station
- Solar expansion vessel approx. 18 l
- Upstream vessel
- Solar hand pump
- Automatic air separator
- Automatic quick air vent
- Branded solar controller with digital display, with 3 sensors and C1/C2 connection cable
- Solar storage tank approx. 26 l with built-in copper pipe coil as heat exchanger
- 3 digital insertion thermometers for measuring the temperature stratification in the storage tank
- Pipe system made of copper pipe 18 x 1.5 mm

Article	Order-No.
Solar Thermal Training Stand: Flat-Plate Collector	100946
Solar Thermal Training Stand: Tube Collector	101947

More information at: christiani-international.com/100946



Wilo-Brain Box classic plus – The heating system on a small scale

Ideal for initial training

The Wilo-Brain Box allows you to see what usually remains hidden behind insulation and plaster. The test stand shows all the essential components of a heating system on a small scale. The heating process is almost completely replicated with partly transparent components. This allows you to demonstrate faults and facilitates professional fault elimination.

Article	Order-No.
Wilo-Brain Box classic plus	58129

More information at: christiani-international.com/95485

Demonstrate connections for heating hydraulics

Training Stand Heating Hydraulics

Use the mobile training stand to teach connections in heating hydraulics in a demonstrative and practical way. Radiator simulations are equipped with thermostat valves and flow meters to measure the radiator output temperature.

Article	Order-No.
Training Stand Heating Hydraulics	97177
Heat Generator	14562

More information at: christiani-international.com/97177

Know-how for tomorrow's plumbing professionals

Training Stand Bathroom Installation

This training level allows learning situations such as the design of a guest bathroom to be addressed. The teaching materials provide step-by-step guidance through professional planning and implementation.

Article	Order-No.
Training Stand Bathroom Installation	95741

More information at: christiani-international.com/95741

Training Stand Drinking Water DIN EN 1717

The training course teaches the basics of installing and maintaining drinking water systems. In the didactic learning situations, practical exercises are used to work through 'customer orders', from analysis to handover.

Article	Order-No.
Training Stand Drinking Water DIN EN 1717	95743

More information at: christiani-international.com/95743

Training Stand Sanitary Control

The sanitary control training stand can be used to teach about different control systems for sanitary systems. The mobile training stand consists of a perforated sheet metal wall in a frame made of extruded profiles with grooves on all sides, on lockable castors, with a washbasin and a urinal control system, each fully functional and mounted on pre-wall elements.

Article	Order-No.
Training Stand Sanitary Control	33645

More information at: christiani-international.com/33645

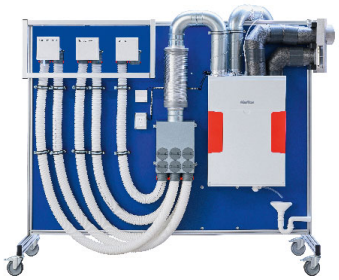
Training Stand for Faucet Testing

The valve testing training stand allows participants to literally 'grasp' the essential characteristics and functions of various valves. The mobile training stand consists of a perforated sheet metal wall in a frame made of extruded profiles with grooves on all sides, mounted on lockable castors, three different mixer taps, each with a spout hose for attaching a penetration thermometer directly to the spout to measure temperatures.

Article	Order-No.
Trainind Stand for Faucet Testing	33646

More information at: christiani-international.com/33646

Teaching systems for modern ventilation and air conditioning technology

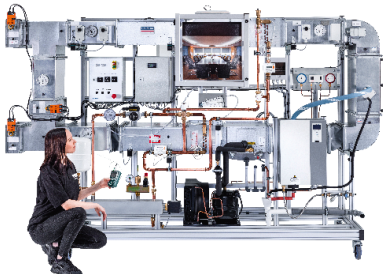


Teaching System Controlled Living Space Ventilation

The training stand with a frame made of grooved extruded aluminum profile can be used flexibly thanks to its castors and is equipped with a fully functional Helios air conditioning unit. The unit has a weather protection grille on the inlet and outlet side, which is connected directly to the ventilation unit via insulated pipe sections. There is a silencer in both the supply air and exhaust air flow.

Article	Order-No.
Teaching System Controlled Living Space Ventilation	43301

More information at: christiani-international.com/43301



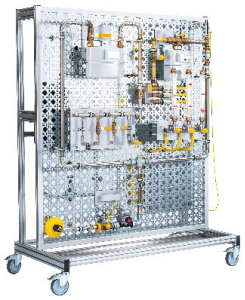
Teaching System Laboratory Air Conditioning

The fully functional training stand is built on a mobile frame made of extruded aluminum profiles with grooves on all sides. Components can be attached to the profile later using T-nuts, without the need for drilling. It depicts a classic duct system with elbows, dampers and reducers.

Article	Order-No.
Teaching System Laboratory Air Conditioning	84621

More information at: christiani-international.com/84621

Teaching heating control in a clear and practical way



Training Stand Gas Technology

Gas installations require precision and safety. The mobile training stand enables practical teaching of the basics of gas technology. Self-contained tasks, right up to complete work orders, can be carried out on real industrial components.

Article	Order-No.
Training Stand Gas Technology	95740

More information at: christiani-international.com/95740

Compact Model Heating Control

The compact model is a universal system to which commercially available controllers, such as those from Honeywell, Landis, Viessmann and others, can be connected. The compact tabletop model consists of a base plate on which six interchangeable plates (standard) and two additional plates (optional) can be mounted.

Article	Order-No.
Compact Model Heating Control	97269

More information at: christiani-international.com/97269

Understanding science and technology

It is our mission to inspire young people with a thirst for knowledge in science and technology. Encourage your students' engagement and interest with practical and demonstrable approaches, which ensure successful learning.

Experiments from the suitcase

Everything you need for exciting physics lessons:
Christiani's demonstration and student experiment kits are safely stored in practical cases. They are available with workbooks and experiment descriptions for the following topics:

- Mechanics (Item No. 44580)
- Optics (Item No. 44578)
- Magnetostatics (Item No. 96965)

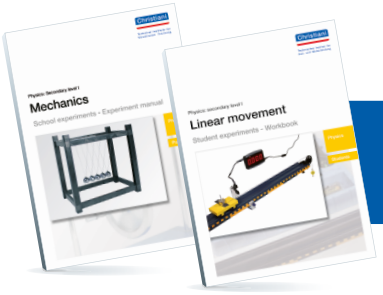
Example: Optics 1 (Item No. 44578)

Sturdy stackable case

High-quality equipment for vivid experiments

Everything included? Complete overview

Device shaped foam insert



Workbooks for all topics available in English and Spanish

Cloud chamber with peltier cooling and LED lighting

You can easily convey an understanding of radioactivity to your students with our compact cloud chamber.

Learning objectives:

- Demonstration of radioactivity
- Identification and description of different particle tracks
- Explanation of the origin of particle tracks
- Understanding of the effect of particle radiation on materials

Spanish also available!

Article	Order-No.
Continuous Cloud Chamber with Peltier Cooling and Bright LED Illumination	100786

More information at: christiani-international.com/100786

Exclusively by Christiani

Experimental systems renewable energies

Wind Trainer junior

Wind Energy - Experimental System

- Measurement of the wind speed of the wind machine as a function of the controller setting
- Output power of the generator as a function of the blade shape (flat, curved)
- Output power of the generator as a function of the number of blades (2, 3, 4)
- Output power of the generator depending on the blade position
- Recording of the U/I characteristic curve of the generator at constant speed

Article	Order-No.
Wind Trainer junior Wind Energy - Experimental System	81802

More information at:
christiani-international.com/81802

Solar Trainer junior

Photovoltaics Energy - Experimental System

- Measuring the irradiance of different light sources
- The solar cell as an energy converter / as a diode
- The open-circuit voltage of a solar cell / shading
- The short-circuit current of a solar cell / shading
- The open-circuit voltage and short-circuit current at different irradiance levels

Article	Order-No.
Solar Trainer junior Photovoltaics Energy - Experimental System	81800

More information at:
christiani-international.com/81800

H2-Trainer junior

Hydrogen - Experimental System

- Measurement of the volume ratio of the gases produced
- Measurement of the gas volumes produced per unit of time as a function of the current strength
- Determination of the energy and Faraday efficiency of the electrolyzed/fuel cell
- Determination of the U/I characteristic curve of the electrolyzed/fuel cell
- Construction of an island network

Article	Order-No.
H2-Trainer junior Hydrogen - Experimental System	81804

More information at:
christiani-international.com/81804

How you benefit from C-LEARNING

C-LEARNING supports you as a trainer

Saving time

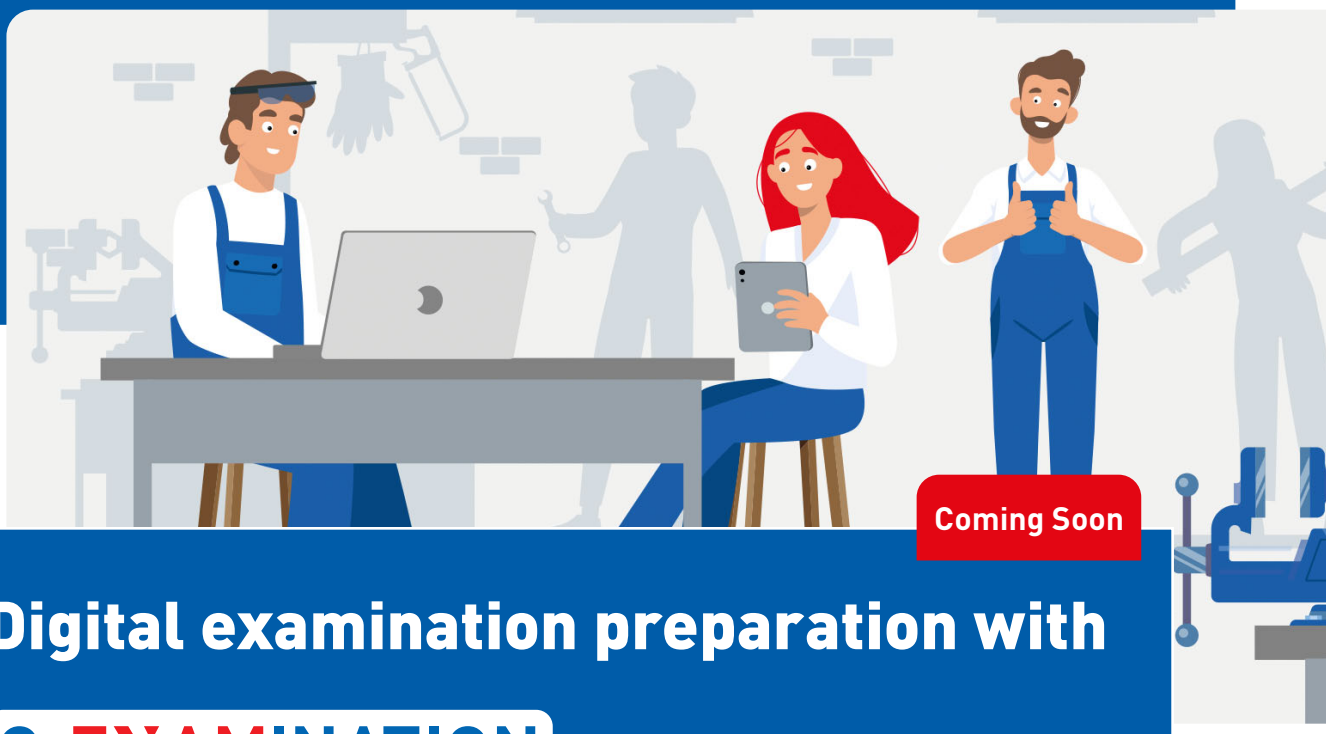
By using C-LEARNING, trainers can save time, as they do not have to monitor every learning activity of the trainees. The time spent on research work is also reduced. By constantly enriching new digital products, trainers no longer have to research what is needed for the trainees.

Qualified trainees

Learning progress can be worked on independently at their own pace, tracked individually and given targeted support.

Reduced costs

Our learning platform helps to reduce training costs while increasing the company's efficiency and productivity. There are no additional or hidden costs when using C-LEARNING *plus* International.



Coming Soon

Digital examination preparation with C-EXAMINATION

With interactive digital exam tasks, trainees can practice independently and at their own pace – perfectly tailored to real exam formats. At the same time, results are always within reach: Completed tests are automatically evaluated, so trainees and trainers can track progress immediately.

For more Information contact our regional managers

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