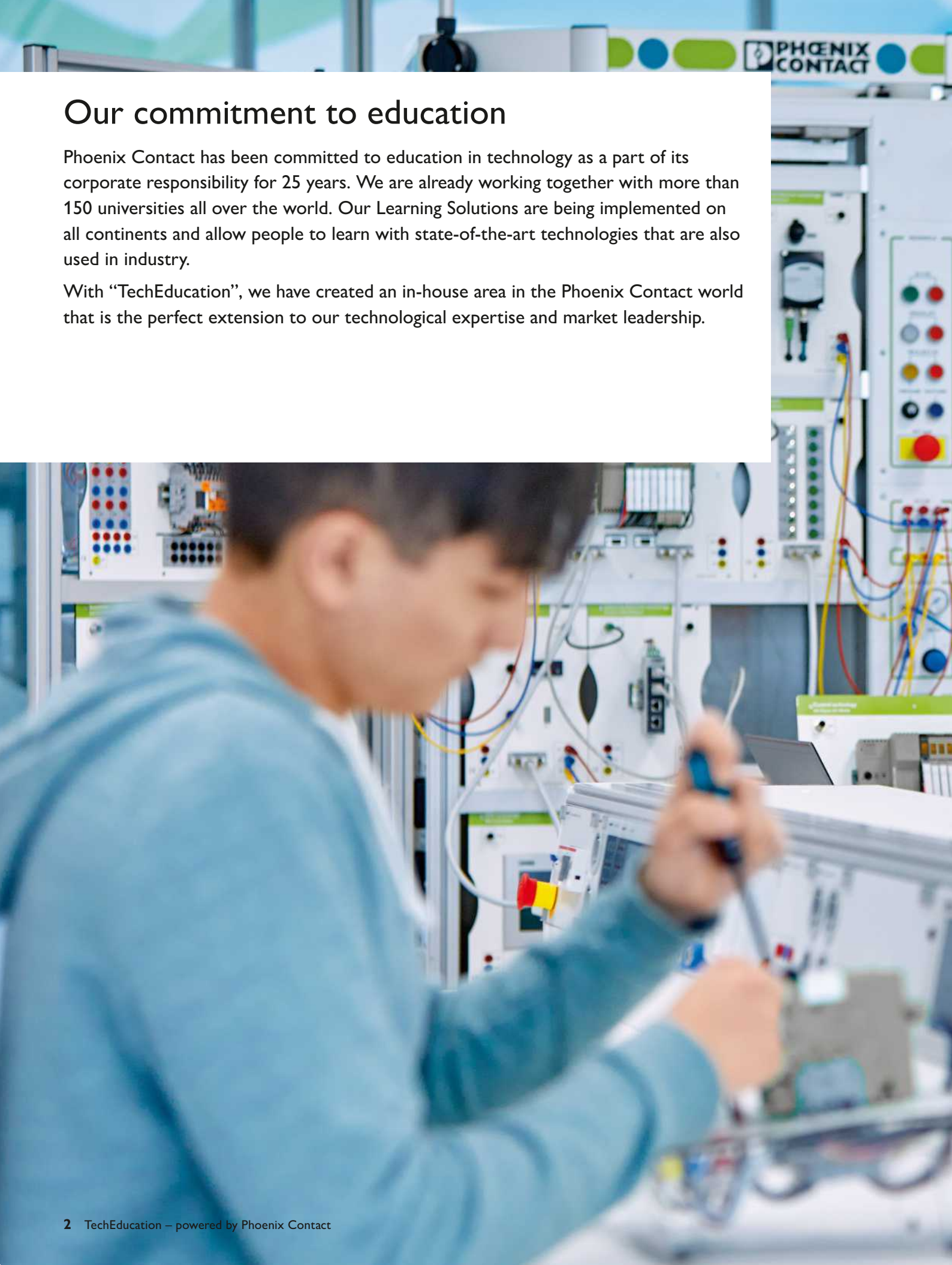
Education solutions from Phoenix Contact

TECH Education
Powered by Phoenix Contact

Our commitment to education

Phoenix Contact has been committed to education in technology as a part of its corporate responsibility for 25 years. We are already working together with more than 150 universities all over the world. Our Learning Solutions are being implemented on all continents and allow people to learn with state-of-the-art technologies that are also used in industry.

With “TechEducation”, we have created an in-house area in the Phoenix Contact world that is the perfect extension to our technological expertise and market leadership.



TechEducation – powered by Phoenix Contact

We are developing a holistic and innovative range of educational products under the new brand "TechEducation – powered by Phoenix Contact".

Our motivation is our passion for technology. We are driven by our conviction that education and knowledge play key roles in solving the greatest challenges that need to be overcome to achieve a sustainable world.

We are placing society at the center of education in technology, and are paving the way towards an "All Electric Society". With our educational approach and the latest technology and industry expertise, we are here to support you at every stage – at college and university, as well as in the apprenticeship, training, and educational departments of companies. Together, we are forming a leading international community for technical educational institutions and business.

Our aspiration:
Empowering Society Through Technology

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The TechEducation product portfolio

Phoenix Contact develops components and innovative solutions in the fields of electrification, automation, and networking. TechEducation draws upon this expertise and experience.

Benefit from qualified industry expertise and the technology of a global market leader. Our product portfolio is comprised of hardware with the associated service, accessories, and teaching tools for technical education.

Your advantages

- ☑ Exceptional basis for targeted education and further education of in-house and external specialists
- ☑ Hands-on learning with state-of-the-art technology and components used in industrial settings
- ☑ Intensive engagement with industry-specific technology functions
- ☑ Secure your competitive edge with trained experts

The Eduline product family

We make technology accessible with Eduline

Eduline stands for the simple, practical, and cross-industry transfer of technology-related learning content in the fields of electrification, automation, and networking. Current industrial requirements will be realized with the latest technology. This creates a comprehensive understanding and enables ideal preparation for professional life, both in the trades and in industry. Eduline training boards can be used in school lessons, in training and further education, as well as during studies and accompany people through the various phases of learning.

Eduline boards are:
- Robust and long-lasting
- High-quality and safe
- Flexible in use
- Modular in design

They feature:
- Transparent casing, enabling a view of the wiring
- Quick and easy commissioning

Eduline can be used in various learning scenarios

Eduline prepares for the real world

Eduline has been conceived specifically for training interns and specialists. Specialists receive targeted further training in industry-specific technologies. This is achieved through the practical application of current industrial technologies.
Eduline facilitates qualification for industry-specific system technologies so that existing and future professionals can quickly take on operative and changing tasks in that industry.
Eduline supports interns and students in making their decisions on possible specializations and provides an insight into the diversity of industry-specific system technologies in the fields of electrical engineering and automation.
In light of the complexity of existing specialization options in training and education, selecting the professional orientation can be greatly simplified by the variety of Eduline boards.

Eduline components are also used in modern production systems

We are introducing Industry 4.0 to education

Eduline PLCnext Technology Board

"Industry 4.0", with the ever-increasing degree of process automation supported by programmable logic controllers, is a central dimension and driver behind the "All Electric Society". This progression allows machines to share information and interact with the help of intelligent sensors and actuators. Data is collected, analyzed, and stored in the cloud for later processing. Networked production control with an ever-increasing degree of automation and digitalization leads to increased design options for machine builders and system operators. The necessity to integrate "Industry 4.0" subjects using practice-oriented training systems into training and further education programs is constantly on the rise.

Our practice-oriented Eduline PLCnext Technology Board is ideal for learning and developing skills in the field of IT automation with a focus on PLC programming. Here, PLCnext Technology from Phoenix Contact also allows programming in the IEC 61131 languages as well as in high-level languages such as C/C++ and C#. Digital and analog sensor and actuator technology are available directly "on-board".

Depending on the application, up to 16 digital inputs can be controlled via toggle switches and up to 16 digital outputs are available as LEDs. A rotary potentiometer can be used to simulate a 0 … 10 V analog input signal and a corresponding analog output signal using a bar graph display. One additional analog input and one additional output signal each can be connected via the existing safety sockets.

The Eduline PLCnext Technology Board can be used as both a module and as a stand-alone trainer.

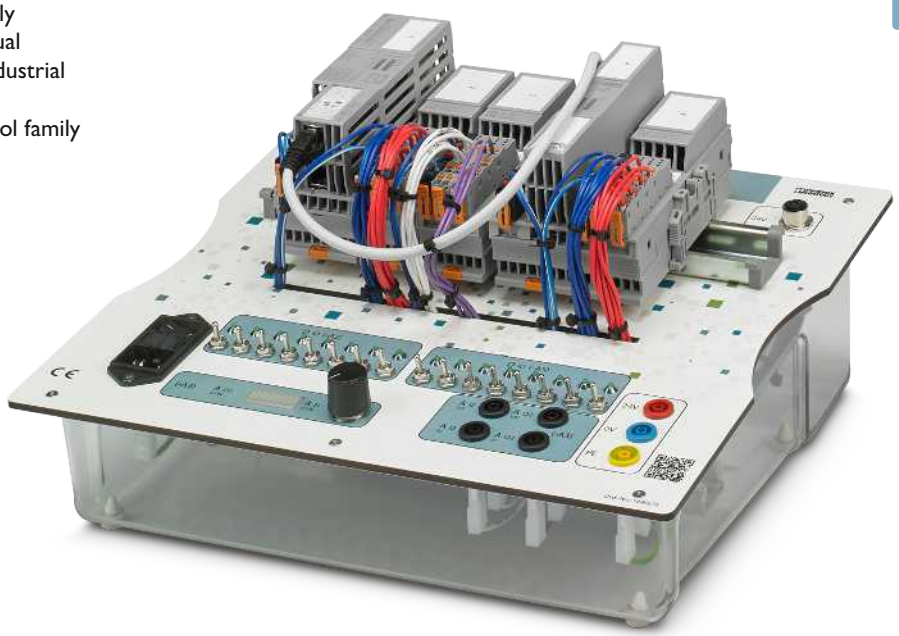
Technical properties

- Wiring: 8 x DIO (toggle switch and LED) and 1 x AIO (rotary potentiometer and bar graph) on the EDU AXC F 2152, plus 1 x AIO via sockets for free selection, 8 x DIO (toggle switch and LED) on the AXC PN BK
- Can be networked via Ethernet; two additional RJ45 jacks are available depending on the application
- Can be programmed with PLCnext Engineer (PLCNEXT ENGINEER software, item number 1046008), available for download at phoenixcontact.com
- 230 V AC power supply via connection for non-heating devices on the board surface, transfer of the 24 V DC module voltage via 4 mm safety sockets and M12 interface possible
- Dimensions: 345 mm x 297 mm x 103 mm (DIN A4 height)
- Weight: 3.9 kg

Eduline PLCnext Technology Board EDU AXC F 2152, item number 1046674

This product includes a power supply system, Ethernet cable, and the actual training board with the following industrial components:

- Controller of the PLCnext Control family
- 3 x I/O modules
- Bus coupler
- Power supply



Design of the Eduline PLCnext Technology Board

Eduline comprises standard-compliant, touch-safe teaching materials. They are constructed in DIN A4 format as a rack or desktop device. A transparent casing enables a view of the wiring within. Uniform front panels and standardized interfaces facilitate the greatest level of modularity in construction. Easy commissioning is ensured with the comprehensive pre-wiring. The arrangement of the individual electronics components is in accordance with the industry standard.

Your advantages

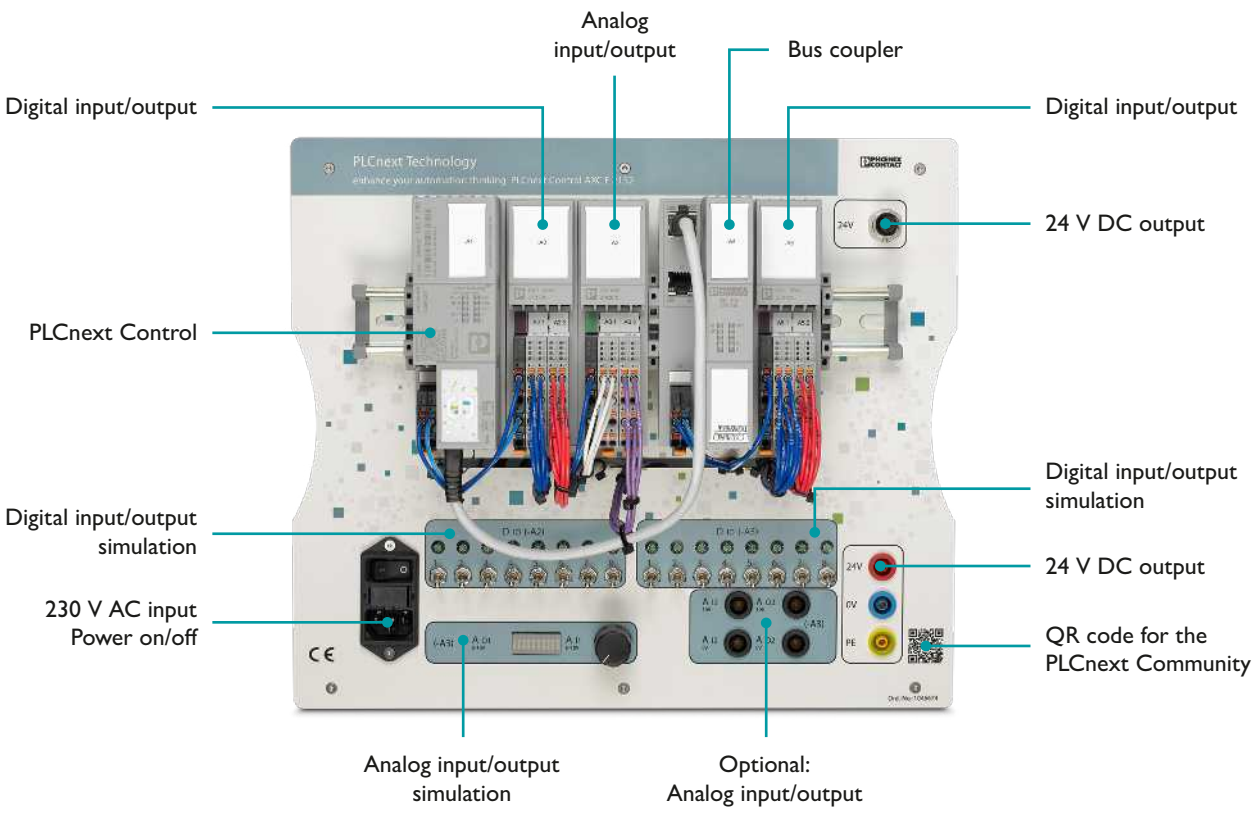
- Easy to use in class and laboratory scenarios
- Ideal for teachers to prepare for lessons at home
- Highly durable during transport and in lessons
- Integration of existing external peripherals
- Facilitates qualification for industry-specific system technologies
- Uniform Eduline design with standardized interfaces for seamless combination with other Eduline boards

Relevant subjects

- Basic principles of Industry 4.0
- Programming and operating automated systems
- Basic principles of PLC programming
- Programming with PLCnext Engineer in IEC 61131 programming languages and programming in C, C++, and C#
- Development of initial application-oriented automation projects

Special features

- PLCnext Engineer PLC programming software free of charge
- Classic and new programming languages
- Open ecosystem with cloud connection
- Free-of-charge Proficloud.iotrial version for up to 20 metrics per year



Accessories for the Eduline PLCnext Technology Board

Train-the-Trainer online and local seminars

Our experienced trainers teach small groups using the board at the Phoenix Contact Training Center, directly on site in Schieder-Schwalenberg, Germany, or digitally. Webinars and online demos are also available.

Relevant subjects
- General introduction to PLCs and the PLCnext Technology ecosystem
- Installing the boards
- PLCnext Technology
- C++, C#, and MATLAB libraries
- Modbus/TCP
- OPC UA
- Web HMI
- Node-RED

We train and support trainers

Preconfiguration

Eduline-specific SD card and additional Industry 4.0 features for preconfiguring the Eduline PLCnext Technology Board and the black PLCnext Technology Starterkit.

The SD card enables a direct introduction to programming in the lesson. If the card is removed, the device returns to the default state.

The SD card contains a preconfiguration for:
- Node-RED, including nodes for OPC UA, REST, and Dashboard
- MQTT (Mosquitto, MQTT Client Library)
- Example project

Educational material

Course units on "Networked systems for automation" – basics of PLC programming and visualization, comprehensive and holistic accompanying educational material, consisting of:
- User manual, hardcopy and digital (PDF)
- Knowledge tasks (theory) and solutions, 15 exercises
- Practical tasks and solutions, 30 exercises
- PowerPoint slideshow, 60 slides, 16:9

Selected theory content:
- History and basic principles of PLC technology and automation
- Structure of a PLC and standards
- Programming languages

Software licenses

Various add-ins are available for PLCnext Engineer.

Single-user and network licenses:
- SFC Editor
- Application Control Interface
- MATLAB Simulink Model Viewer
- Safety programming

We network with intelligence

Eduline PROFINET Board

Complex production processes call for intelligent communication structures. The considerable complexity of the system is made manageable for people with communication between the product and controller.

The Eduline PROFINET Board is a training board capable of receiving a variety of signals from sensor and actuator technology and forwarding them to a PROFINET controller for automation purposes. In detail, the board can be used to make up to 16 DI, 16 DO, four AI, four AO, and eight IO-Link signals available to a controller via a PROFINET bus coupler. Here, the signals are contacted directly at the I/O module terminal point.

Technical properties

- 230 V AC power supply via connection for non-heating devices on the board surface, transfer of the 24 V DC module voltage via 4 mm safety sockets and M12 interface possible
- Dimensions: 188 mm x 297 mm x 103 mm (DIN A4 height)
- Weight: approx. 1.5 kg

Relevant subjects

- Basic introduction to various I/O systems in Industrial Ethernet
- Basic introduction to PROFINET
- Basic introduction to Industrial Ethernet

Special features

The Eduline PROFINET Board can be connected to all Eduline boards that communicate via Ethernet.

Eduline PROFINET Board
EDU PN IO SERVER, item number 1286379

This product includes a power supply system along with the actual training board with the following industrial components:

- Bus coupler
- 6 x I/O modules
- Module carrier
- Power supply

We visualize

Eduline HMI Board

The Eduline HMI Board is a module and operating platform with HMI for displaying pictograms and function diagrams for the visualization and operation of a system simulated via PLCnext Engineer. The board can be used for a variety of functions for technical control and regulation processes.

Technical properties
- 7-inch touch screen
- Dimensions: 345 mm x 297 mm x 90 mm (DIN A4 height)
- Weight: approx. 2 kg

Freedom of use of visualizations in conjunction with PLCnext automation, therefore a direct compatibility recommendation for the Eduline PLCnext Technology Board.

Relevant subjects

- Human-machine interface
- Visualization of control and regulation processes

Special features

The board does not have a power supply unit. The 24 V DC module voltage must be fed in from external or existing interfaces.

Eduline HMI Board
EDU HMI 4070, item number 1284756

This product includes the actual training board with the following industrial components:
- Touch panel

We connect with Switch

Eduline Switch Board

With the Eduline Switch Board, the Eduline training boards from Phoenix Contact can be connected together via Industrial Ethernet. The board can be used for networking laboratory applications via Industrial Ethernet for training purposes.

Technical properties

- 5 x TP-RJ45 connections
- Automatic data transmission detection
- Speed of 10 or 100 Mbps (RJ45)
- Auto-crossing function
- Dimensions: 188 mm x 297 mm x 90 mm (DIN A4 height)
- Weight: approx. 1.5 kg

Relevant subjects

- Connection via Ethernet
- Networked industrial components

Special features

The board does not have a power supply unit. The 24 V DC module voltage must be fed in from external or existing interfaces.

Eduline Switch Board
EDU FL SWITCH SFN 5TX, item number 8101898

This product includes the actual training board with the following industrial components:

- Ethernet switch

We supply power

Eduline Power Supply Board

The Eduline Power Supply Board supplies all Eduline modules with a 24 V DC supply voltage.

Technical properties

- Input: 1-phase, 100 V AC … 240 V AC via inlet connector for non-heating apparatus and switch
- Output: 24 V DC / 4.2 A via M12 cable connection and 4 mm safety sockets
- Dimensions: 188 mm x 297 mm x 90 mm (DIN A4 height)
- Weight: 1.4 kg

Relevant subjects

- Basic principles of industrial power supply

Special features

None

Eduline Power Supply Board
EDU PS 24 V DC 4,2 A, item number 8101606

This product includes a power supply unit and the actual training board with the following industrial components:

- Power supply

Eduline Smart Lab

Possible Eduline board combinations for creating an Eduline Smart Lab

Our Eduline Smart Lab is ideal for a simple introduction to complex subjects in factory automation and Industry 4.0. It is made up of five boards of the Eduline product family. The Eduline Smart Lab provides all automation and information technology components necessary to set up a Smart Factory in the learning laboratory for various industries.

Part I
Control technology part with a PLCnext Control device including power supply. This part is comprised of the Eduline PLCnext Technology Board with integrated I/O modules.

Part II
This part includes an HMI web panel and an Ethernet switch. The HMI panel is used for operating and visualizing an automation system.

Part III
Various communication and periphery modules can be used to extend the PLCnext Control device. In order to be able to connect sensors and actuators to the controller via PROFINET and IO-Link the communication systems, additional I/O modules are needed. Each controller provides access to a trial version of the Proficloud functions with up to 20 metrics.

Demonstrators such as small robots, tank systems, etc., can be connected individually.

The technical brain of an Eduline Smart Lab is the programmable logic controller (PLC) that satisfies the requirements on an Industry 4.0 controller. The PLC enables the creation of control programs using various programming languages (IEC 61131-3, C/C++, C#, and Java). Here, the PLC communicates with a cloud via MQTT and is embedded in the PLCnext Technology ecosystem including app store, developer blogs, knowledge hub, etc. In order to be able to integrate real demonstrators, variable interfaces are available for integrating sensors and actuators. As an option, the Eduline Smart Lab can also include a device unit for operating and visualization (HMI panel). Various periphery units can be integrated into the Eduline Smart Lab that allow the connection of technological models via digital and analog process signals. A wide range of Ethernet-based protocols is available for this.

Relevant subjects

- Open and closed-loop control technology
- Operation and monitoring
- Field-level communication
- Vertical networking
- Cloud computing

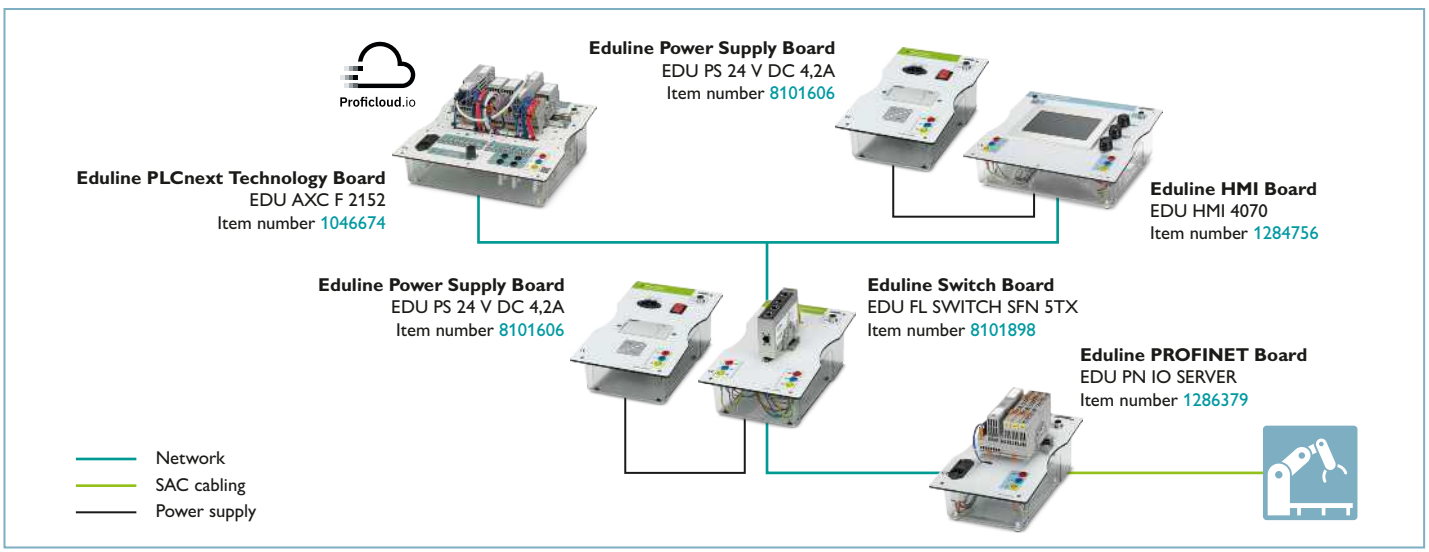
Special features

- The Eduline Smart Lab enables various possible applications of different complexities and for different industries to be realized.
- The Eduline Smart Lab can be combined with proprietary actuator and sensor technology.

Integrated components

The Eduline Smart Lab provides all automation and information technology components:

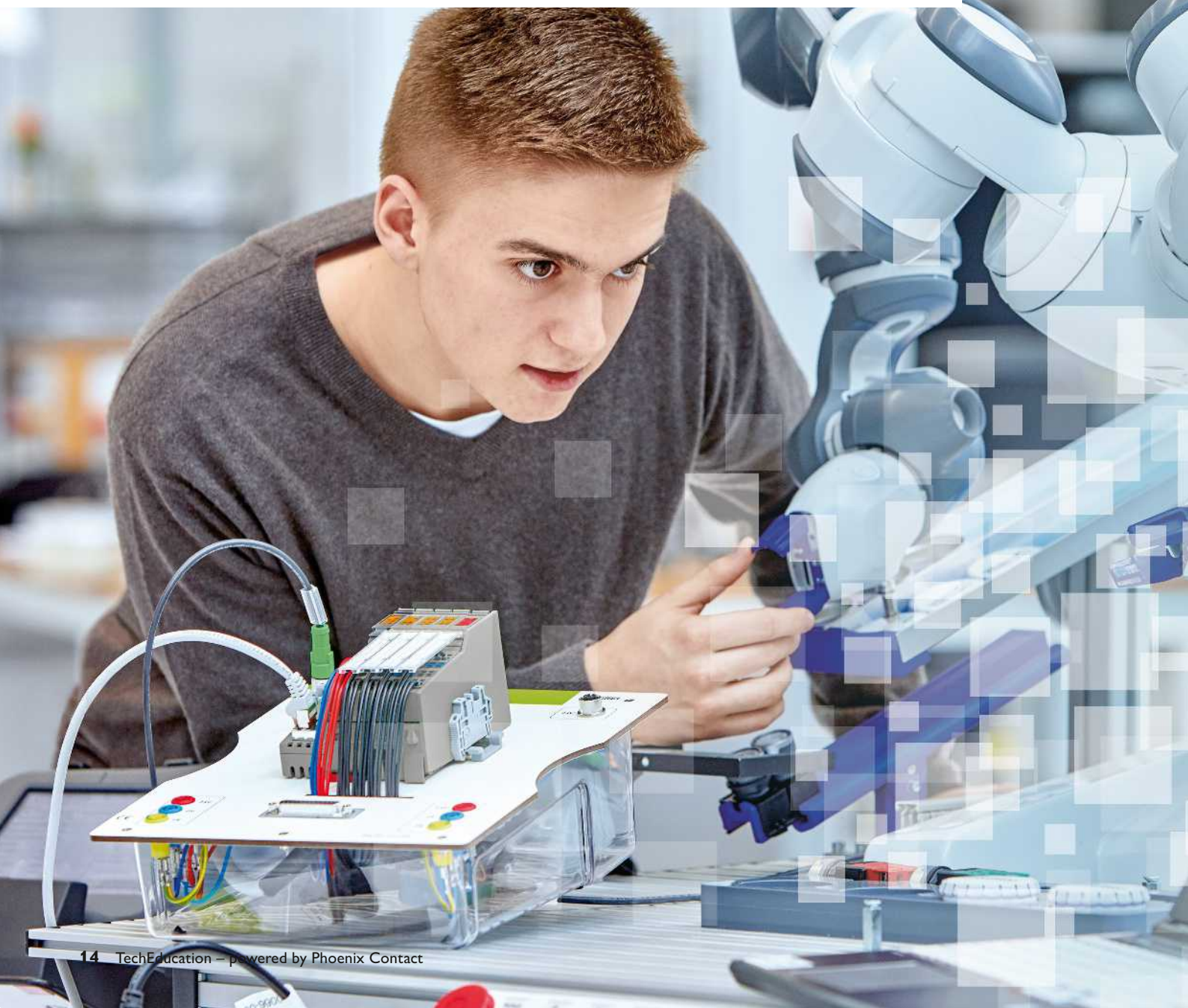
- Eduline PLCnext Technology Board
- Eduline HMI Board
- Eduline Power Supply Board
- Eduline Switch Board
- Eduline PROFINET Board



We develop solutions for the education of tomorrow

With its close relationship with all development areas at Phoenix Contact, TechEducation always has a finger on the technical pulse of the times. We already know today what will shape the industry in the future and we are bringing this expertise into education – we align our product portfolio especially for this.

Join us in taking a look at our subjects and products for the future.



Our product portfolio for the future

“E-mobility” as a subject for the future

Our subjects
- Introduction to the charging infrastructure
- Basic components of charging stations and for their operation: charge controllers, contactors, miniature circuit breakers (MCBs), residual current devices (RCDs), energy meters, communication with the electric vehicle (EV), ventilation
- Charging cycle
- Extended functions of a charging station: RFID user identification, use of RFID readers, writing to and approving RFID cards, charging processes with RFID cards, communication via 3G/4G, integration of EVs into intelligent grids, energy management
- Commissioning and testing a charging station

Our solutions
- Training boards
- Educational charging stations (wired, unwired)
- Accompanying educational material

E-mobility as a subject of the future for the lesson

Holistic knowledge transfer at the control cabinet

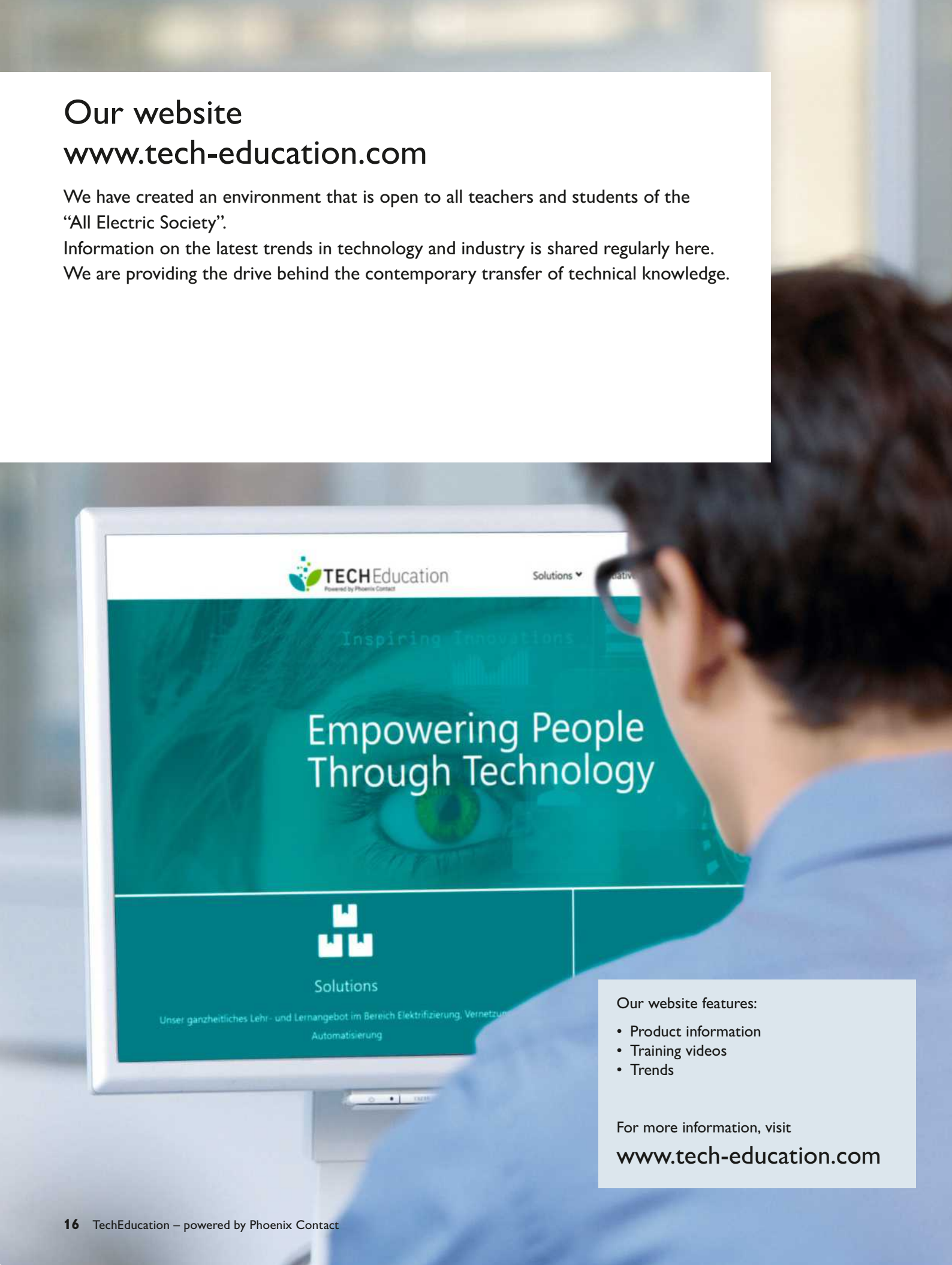
Our subjects
- Basic training for manual and industrial electrical professions
- Analysis of electrical engineering systems and functional test
- Planning and designing electrical installations
- Mechanical processing, mounting, wiring, and commissioning of a switchgear and controlgear assembly

Our solutions
- Control cabinet assembly kit with rolling profile frame
- Direct view of the components through the viewing window in the door
- Modular extension through various extension modules and advanced actuator technology
- Accompanying educational material

The control cabinet as an assembly kit – from the basics through to digitalization

Our website www.tech-education.com

We have created an environment that is open to all teachers and students of the "All Electric Society".
Information on the latest trends in technology and industry is shared regularly here.
We are providing the drive behind the contemporary transfer of technical knowledge.



Our website features:

- Product information
- Training videos
- Trends

For more information, visit

www.tech-education.com

Our commitment to education

EduNet international network of colleges and universities

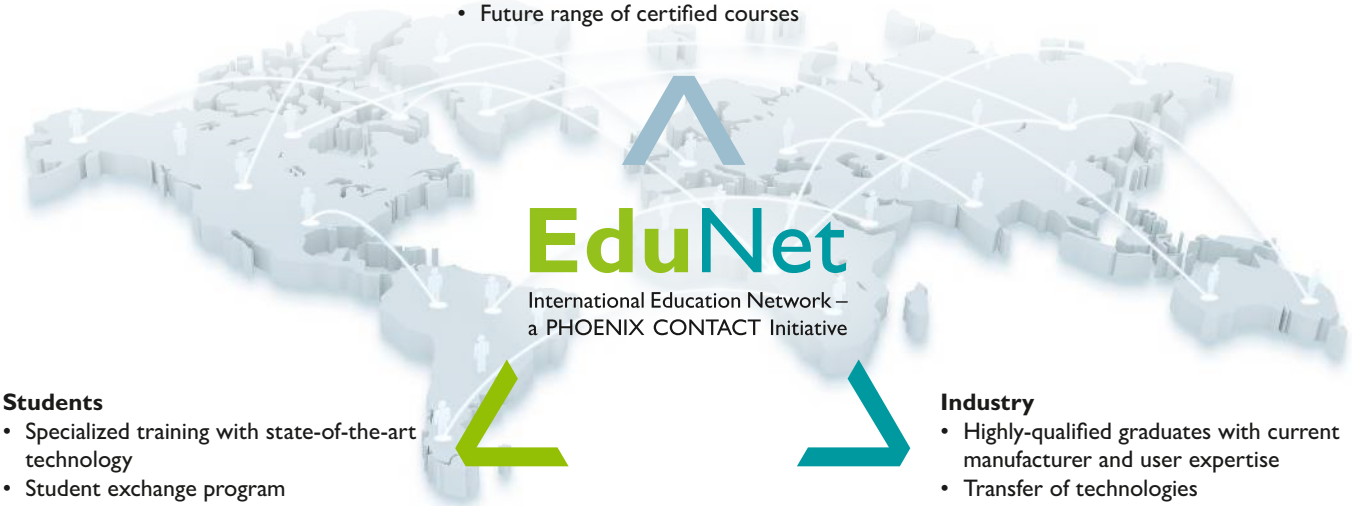
Through the EduNet international higher education network, Phoenix Contact promotes interaction and cooperation between higher educational institutions and industry in the field of automation. With the help of the network, the automation technology expertise of users and manufacturers can be integrated into the teaching program.

Studying in jointly designed EduNet laboratories supports students in their transition to the working world. The goal is to work together to develop educational innovations and content and to test them out in a real-world environment.

With EduNet, we are promoting cooperation with universities

The benefits for the EduNet target groups

College and university
- Practical laboratories with state-of-the-art technology
- Moodle-based learning management system
- International symposia
- Free training sessions for instructors
- International research projects
- Future range of certified courses



EduNet
International Education Network –
a PHOENIX CONTACT Initiative

Students
- Specialized training with state-of-the-art technology
- Student exchange program
- Bachelor and Master theses
- International internships
- Participation in certified courses of study

Industry
- Highly-qualified graduates with current manufacturer and user expertise
- Transfer of technologies
- Highly motivated training staff as partners
- Increased familiarity with technologies

Our services for education and enterprises

We see ourselves as a partner to educational institutions and enterprises and will support you whenever required. The TechEducation team:

- Provides advisory support in (funded) equipment projects
- Provides support in planning customized training or certification programs
- Designs customer-specific products upon request with state-of-the-art Phoenix Contact technology from our portfolio

A total of 150 universities worldwide work with Eduline

References

A total of 150 universities spread across 37 countries are already working with our Eduline training boards today. More than 900 training boards have been installed in EduNet labs throughout the world. A total of 10,000 students are being taught with TechEducation equipment every year.

The following universities also work with the Eduline PLCnext Technology Board:

- The National Technological University, Argentina
- The DUOC UC Professional Institute Foundation, Chile
- Tongji University, China
- Dresden University of Technology, Germany
- Technical University of Munich (TUM), Germany
- Monterrey Institute of Technology and Higher Education, Mexico
- Zuyd University of Applied Sciences, the Netherlands
- University of Applied Sciences Campus Vienna, Austria
- National Aerospace University KhAI, Kharkiv, Ukraine
- Purdue University, USA
- The University of Danang – University of Science and Technology, Vietnam

Eduline is already being used at a large number of universities

Your contacts

The TechEducation team is based in Schieder-Schwalenberg in East Westphalia-Lippe, Germany. Situated directly in the Phoenix Contact Training and Education Center, we are also close to in-company training and further education as well as industrial development and production in Blomberg and Bad Pyrmont.
Our product managers bring the various Phoenix Contact fields of expertise together and are your direct contacts.

Henning Drake
Product Manager

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Open communication with customers and partners worldwide

Phoenix Contact is a global market leader based in Germany. We are known for producing future-oriented products and solutions for the electrification, networking, and automation of all sectors of the economy and infrastructure. With a global network reaching across more than 100 countries with over 20,000 employees, we maintain close relationships with our customers, something we believe is essential for our common success.

Our wide range of innovative products makes it easy for our customers to implement the latest technology in a variety of applications and industries. This especially applies to the target markets of energy, infrastructure, industry, and mobility.

You can find your local partner at

phoenixcontact.com

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INSPIRING INNOVATIONS