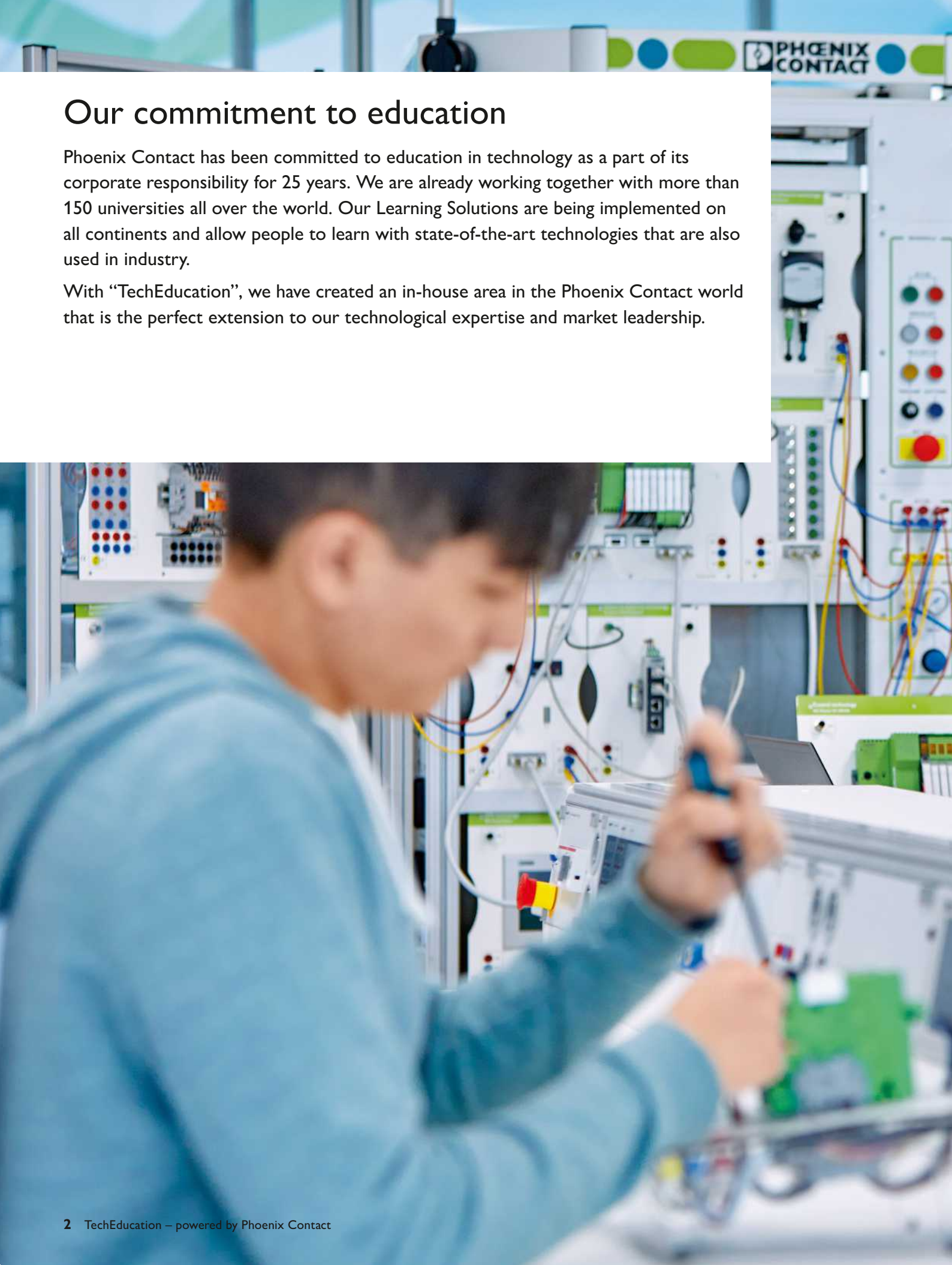
Education solutions from Phoenix Contact

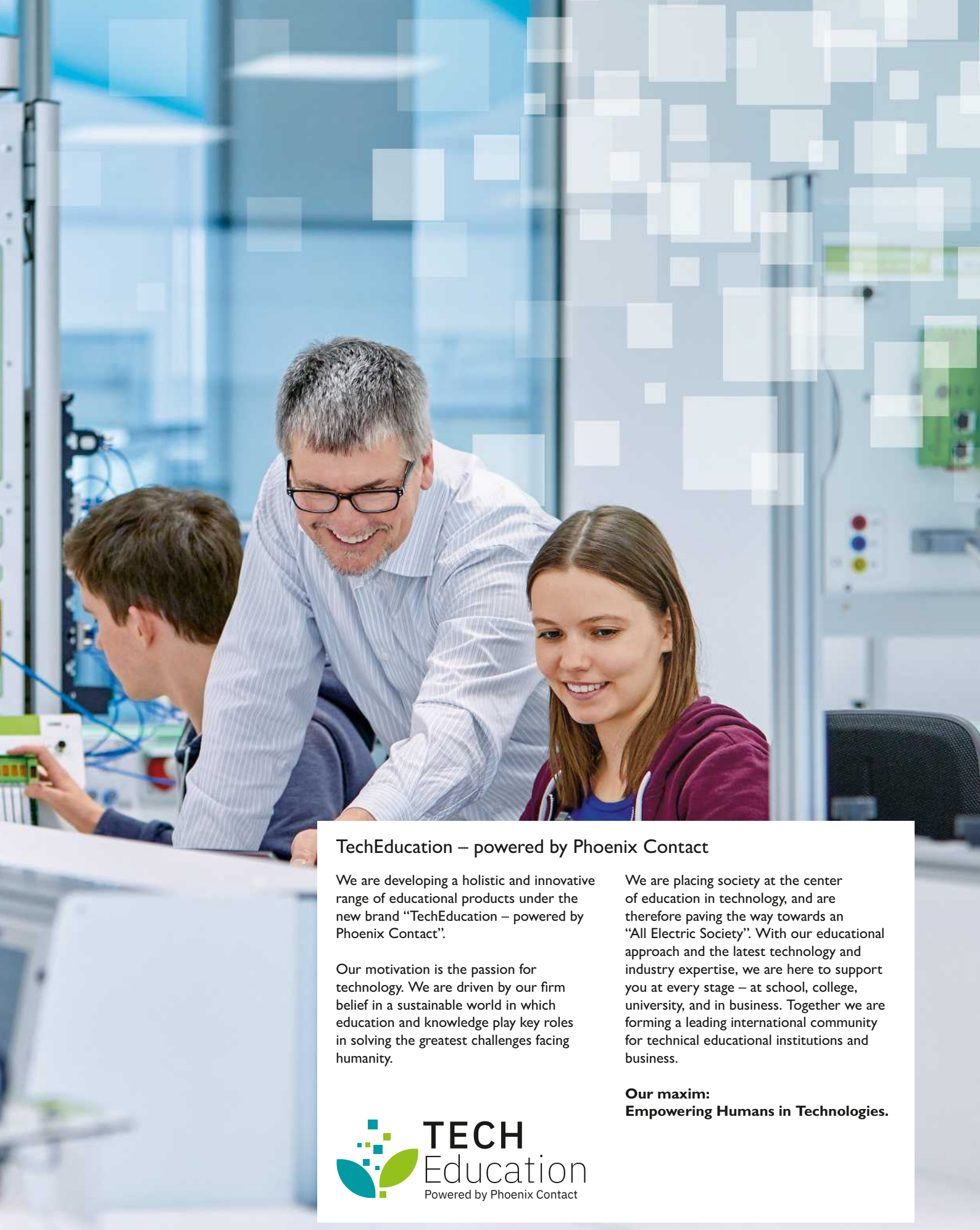
TECH Education
Powered by Phoenix Contact

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 the passion for technology. We are driven by our firm belief in a sustainable world in which education and knowledge play key roles in solving the greatest challenges facing humanity.

We are placing society at the center of education in technology, and are therefore 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 school, college, university, and in business. Together we are forming a leading international community for technical educational institutions and business.

Our maxim:
Empowering Humans in Technologies.

TECH Education
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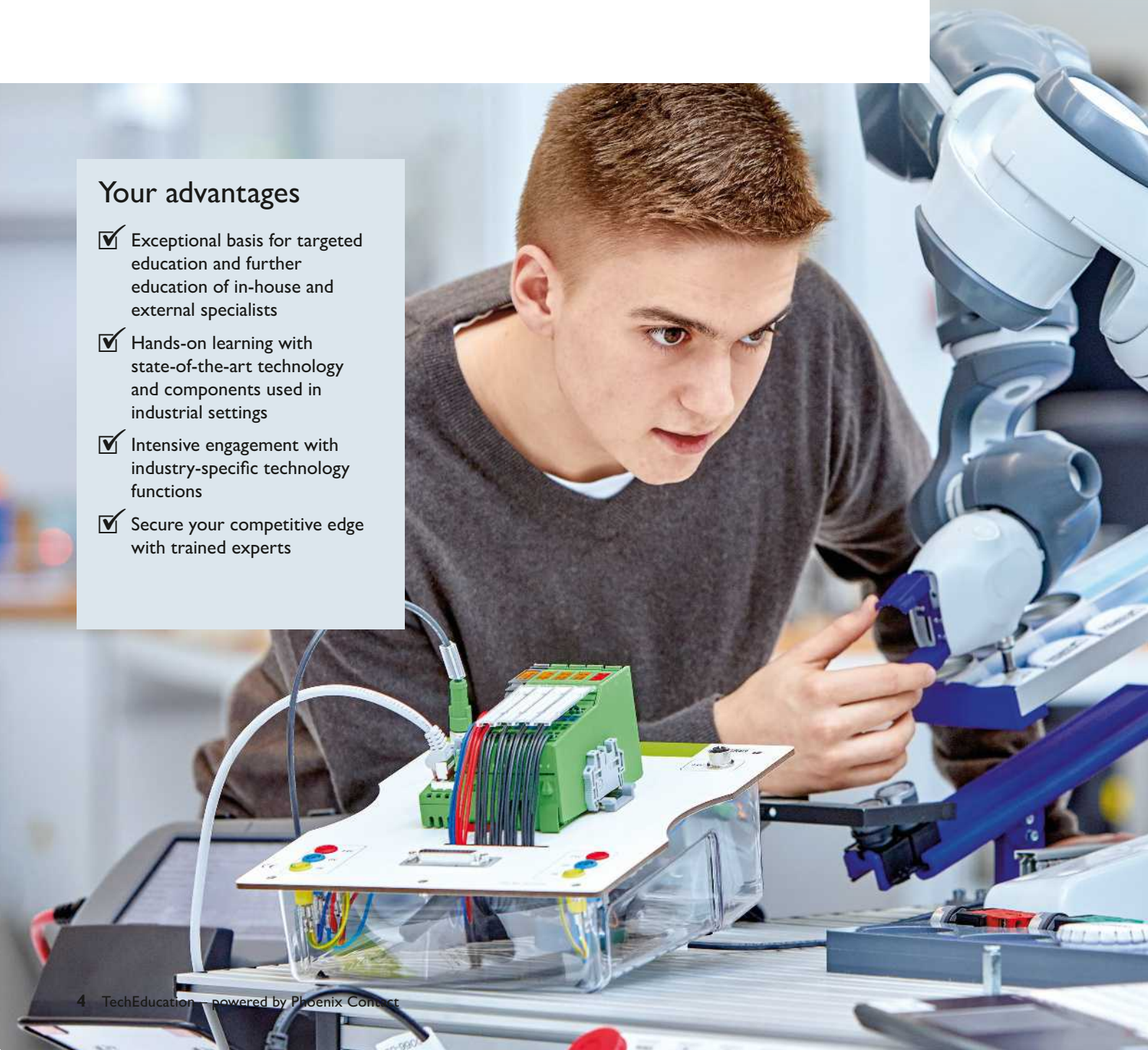
The TechEducation product portfolio

Phoenix Contact develops components and innovative solutions in the fields of electrification, networking, and automation. 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 vocational schools, technical colleges, universities, and training companies.

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 represents the simple, practical, and cross-industry transfer of technology-related learning content in the fields of electrical engineering, automation, and Industry 4.0. 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 learning tools can be used in school lessons, in training, further education, and during studies and accompany people through the various phases of learning.

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

They feature:
- A transparent rear panel, 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 products.

Eduline components are also used in modern production systems

We are introducing Industry 4.0 to education

PLC automation system 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 EDU AXC F 2152 system board is ideal for 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 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. An additional analog input and output signal can be connected via the existing safety sockets.

The EDU AXC F 2152 system board can be used as both a module and as a stand-alone trainer.

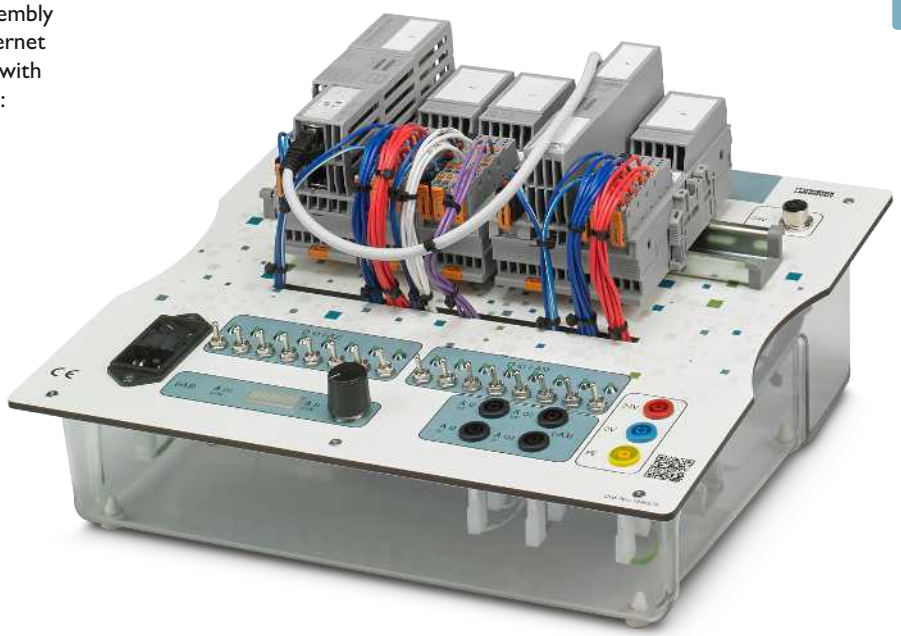
Technical properties

- 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 application
- Can be programmed with PLCnext Engineer (PLCNEXT ENGINEER software, Order No. 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

EDU AXC F 2152
Order No. 1046674

The switchgear and controlgear assembly comprises a power supply unit, Ethernet cable, and the actual training board with the following industrial components:

- PLCnext Technology controller
- 3x I/O modules
- Bus coupler
- Power supply



Layout of the EDU AXC F 2152 system board

Eduline comprises standard-compliant, touch-safe teaching materials. They are constructed in DIN A4 format as a rack or desktop device. A transparent rear casing reveals the wiring contained 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 logical and in accordance with the industry standard.

Your advantages

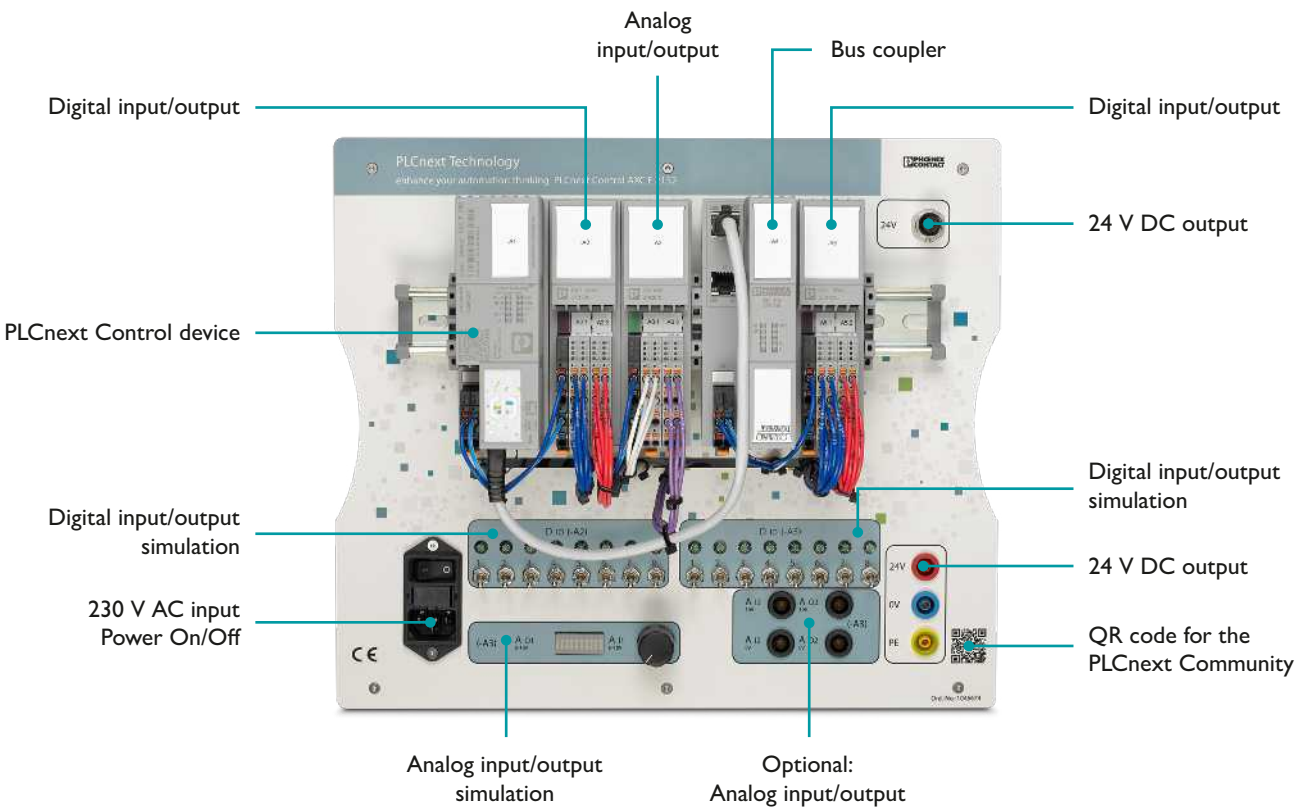
- Easy to use in class and laboratory scenarios
- Ideal for teachers to prepare for lessons at home
- Highly durable during transport and in lessons
- Integration of existing external peripherals
- Facilitates qualification for industry-specific system technologies
- Uniform Eduline design with standardized interfaces for seamless combination with other Eduline training 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 and high-level languages (C, C++, C#)
- Development of 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.io trial version for up to 20 metrics per year



EDU AXC F 2152 accessories

Train-the-Trainer online and local seminars

Our experienced trainers teach small groups using the training 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 training board
- PLCnext Technology
- C++, C#, and Matlab libraries
- Modbus/TCP
- OPC UA
- Web HMI
- Node-RED

We train and support trainers

Preconfiguring

Eduline-specific SD card with 8 GB memory and additional Industry 4.0 features for preconfiguring the EDU AXC F 2152 PLCnext controller. The SD cards facilitate a direct introduction to programming in the lesson. If the card is removed, the device returns to the default state.

One EDU-SD quick-start card contains a pre-configuration 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

Training board with IO server

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 EDU PN IO SERVER training board is a training module 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 EDU PN IO SERVER 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 IO 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 different IO systems in Industrial Ethernet
- Basic introduction to PROFINET
- Basic introduction to Industrial Ethernet

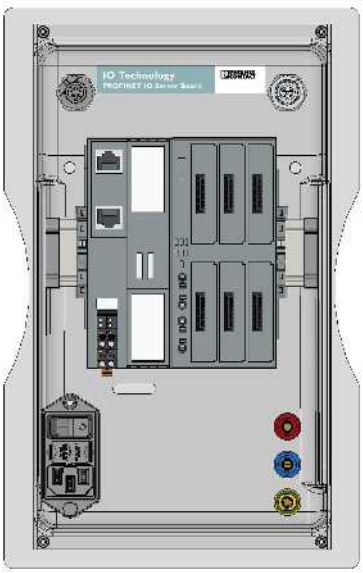
Special features

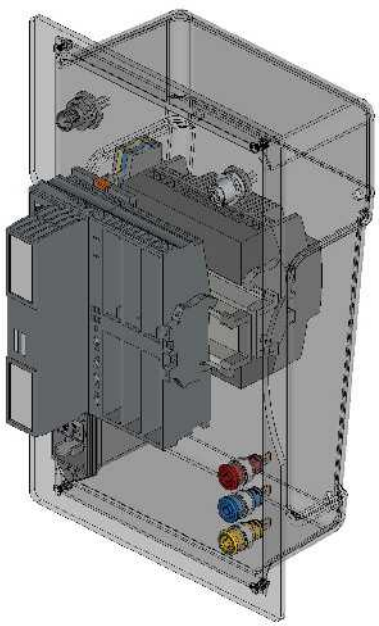
The EDU PN IO SERVER training board can be connected to all Eduline controller boards that communicate via Ethernet.

EDU PN IO Server
Order No. 1286379

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

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





We connect with Ethernet

Training board with IO server

Industrial communication based on Ethernet and the Internet networks remote structures and forms the basis for flexible, self-optimizing production processes. Reliable protection in the event of unauthorized third-party access and electrical faults is a key requirement.

The EDU EIP IO SERVER training board is a training module capable of receiving a variety of signals from sensor and actuator technology and forwarding them to an EtherNet/IP™ 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 an EtherNet/IP™ controller via an EtherNet/IP™ bus coupler. Here, the signals are contacted directly at the IO 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 different IO systems in Industrial Ethernet
- Basic introduction to EtherNet/IP™
- Basic introduction to Industrial Ethernet

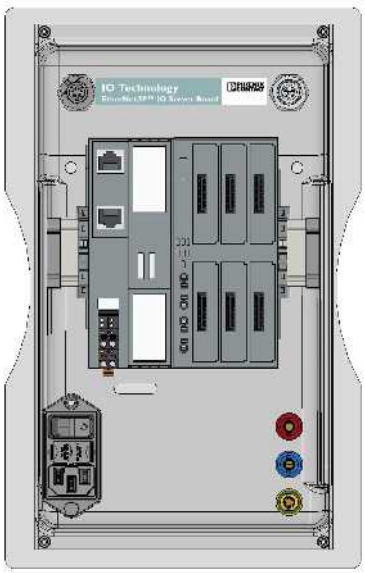
Special features

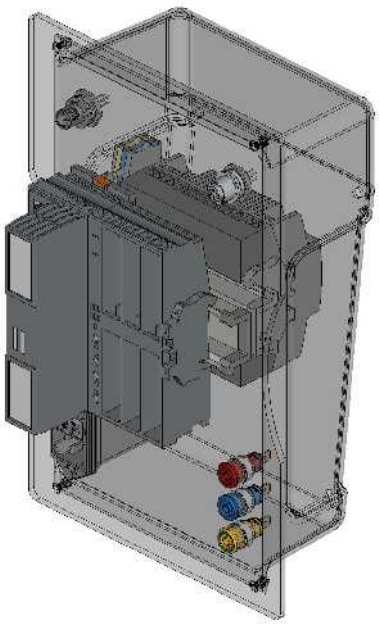
The EDU EIP IO SERVER training board can only be used in combination with an EtherNet/IP™ controller for collecting sensor signals and distributing actuator signals.

EDU EIP IO Server
Order No. 1287426

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

- Bus coupler
- 5x I/O modules
- Module carrier
- Power supply





We visualize

Training board with WebHMI panel

The EDU HMI 4070 training 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 EDU AXC F 2152.

Relevant subjects

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

Special features

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

EDU HMI 4070
Order No. 8101661

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

We connect with Switch

Training board with Ethernet Switch

With the EDU FL SWITCH SFN 5TX 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

- 5x 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
- Networking industrial components

Special features

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

EDU FL SWITCH SFN 5TX
Order No. 8101898

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

- Ethernet Switch

We supply power

Training board with power supply

The power supply training board supplies all Eduline modules with 24 V DC supply voltage.

Technical properties

- Input: 1-phase, 100 V AC … 240 V AC via non-heating device socket 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

EDU PS 24VDC 4,2A
Order No. 8101606

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

- Power supply

Our Smart Lab

Possible Eduline board combinations for creating a Smart Lab

Our Smart Lab is ideal for a simple introduction to complex subjects in factory automation and Industry 4.0. It is made up of modules from the Eduline product family and provides a solid basis for a wide range of learning scenarios. The Smart Lab is comprised of three Eduline components:

Part I
Control technology part with a PLCnext Control device including power supply. This part is comprised of the EDU AXC F 2152 training 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 a Smart Lab is the programmable logic controller (PLC) that satisfies the requirements on an Industry 4.0 controller and that facilitates 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 Smart Lab can also include a device unit for operating and visualization (HMI panel). Various periphery units can be integrated into the Smart Lab that allow the connection of technological models via digital and analog process signals. A wide range of Ethernet-based protocols are available for this.

Relevant subjects

- Basic principles of cyber-physical systems and the Industrial Internet of Things (IIoT)
- Advanced PLC programming
- Feedback control technology or robotics/basic principles of robot control/programming
- Human-machine systems
- Big data analysis for industrial applications

Special features

The Smart Lab can be combined with proprietary actuator and sensor technology.

Integrated components

The Smart Lab is comprised of individual Eduline modules.

From left to right: PLC automation system board, WebHMI panel, power supply, Ethernet Switch, IO server board

Further products available on request

Please contact us if you are interested in the following training boards.

				
	Visualization and operation	**Controller with digital inputs/outputs**	**Controller with digital and analog inputs/outputs**	**System automation**
Type	EDU WP 07T	EDU ILC 131 ETH	EDU ILC 191 ME/AN	EDU PLC CB 01
Order No.	8101661	8101638	8101644	8101466
Description	Training board with HMI for the visualization and operation of Automation Suite and WebVisit.	The ILC trainer 131 ETH is an Eduline training board for the control of a simulated system via digital inputs and outputs.	The ILC trainer 191 ME/AN is an Eduline training board for the control of a simulated system via digital and analog inputs and outputs.	The EDU PLC CB 01 board is an Eduline training board for creating small automation tasks within a simulated system.

				
	Simulation of digital inputs/outputs	**Wiring and plugging circuits**	**Transmission of wireless signals**	**Simulation of a cellular transmission device**
Type	EDU IO SIM DI	EDU RIF WB 01	EDU RAD 2400	EDU RAD 2400 MOB
Order No.	8101660	8101558	8101648	8101652
Description	The EDU IO SIM DI board is an Eduline training board for the simulation of digital inputs and outputs.	The RIFLINE trainer is an Eduline training board for safely wiring and connecting circuits and enables the simulation of relay functions.	The EDU RAD 2400 is used for transmitting digital and analog signals wirelessly (Trusted Wireless 2.0 technology) in a simulated system.	RAD 2400 MOB is a training board for the simulation of a cellular transmission device in combination with the EDU RAD 2400, which is used as a receiving device.

				
Type	**Simulation of analog inputs/outputs**	**Simulation of safety functions**	**Simulation of safe input signals**	**WLAN**
Type	EDU IO SIM AN	EDU PSR TS/S	EDU SAFE HAND SIM	EDU FL WLAN EPA
Order No.	8101659	8101654	8101897	8101899
Description	The analog I/O board is an Eduline training board for the simulation of analog inputs and outputs.	The TRISAFE trainer is an Eduline training board with a configurable safety module, used to simulate safety functions up to SIL 3 or performance level E.	The safe-hand simulation board is an Eduline training board for simulating safe input signals, for example for the TRISAFE trainer from Phoenix Contact.	The EDU FL WLAN EPA Eduline training board connects various Eduline modules via WLAN.

Knowledge Hub
Our online and knowledge platform

We have created a forum that is open to all teachers and students of the "All Electric Society".
Regular information on the latest trends in technology and industry is shared here.
We are providing the drive behind the contemporary transfer of technical knowledge.
Experts share their knowledge in live presentations and training programs, and also publish white papers, specialist articles, and new concepts.

Our Knowledge Hub offers:
- Publications by specialist experts
- Online live events
- Vodcasts

For more information, visit
www.tech-education.de

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, users' and manufacturers' automation technology expertise 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
- Specialist 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
- Increase in familiarity with technologies

Our services for education and enterprise

We see ourselves as being the partner to educational institutions and enterprise and will support you whenever required. The TechEducation team

- Provides advisory support in (funded) equipment projects
- Provides support for the planning of tailored 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 throughout the world 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 EDU AXC F 2152 training board:

- The National Technological University, Argentina
- The DUOC UC private institute of higher education, 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 in 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.

Jenny Schaffrath
Product Manager Digital Education Media

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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 components, systems, and solutions for electrification, networking, and automation. With a global network reaching across more than 100 countries with over 17,100 employees, we maintain close relationships with our customers, something we believe is essential for our common success.

Our wide variety of innovative products makes it easy for our customers to implement the latest technology in a variety of applications and industries. We focus on developing the fields of energy, infrastructure, process, and factory automation.

You can find your local partner at

phoenixcontact.com

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