PLCnext Technology

Linux. IIoT-ready. Revolutionary.

PHŒNIX CONTACT
INSPIRING INNOVATIONS

Open to the future

Today's IoT world contains more connected devices than people, and the demand for data is growing exponentially. This requires engineers to manage a wide variety of programming languages, as digitalization ushers in a new world of automation and control. Phoenix Contact is ready to lead this technological revolution with PLCnext Technology, a state-of-the-art digital ecosystem that will transform the world of automation.
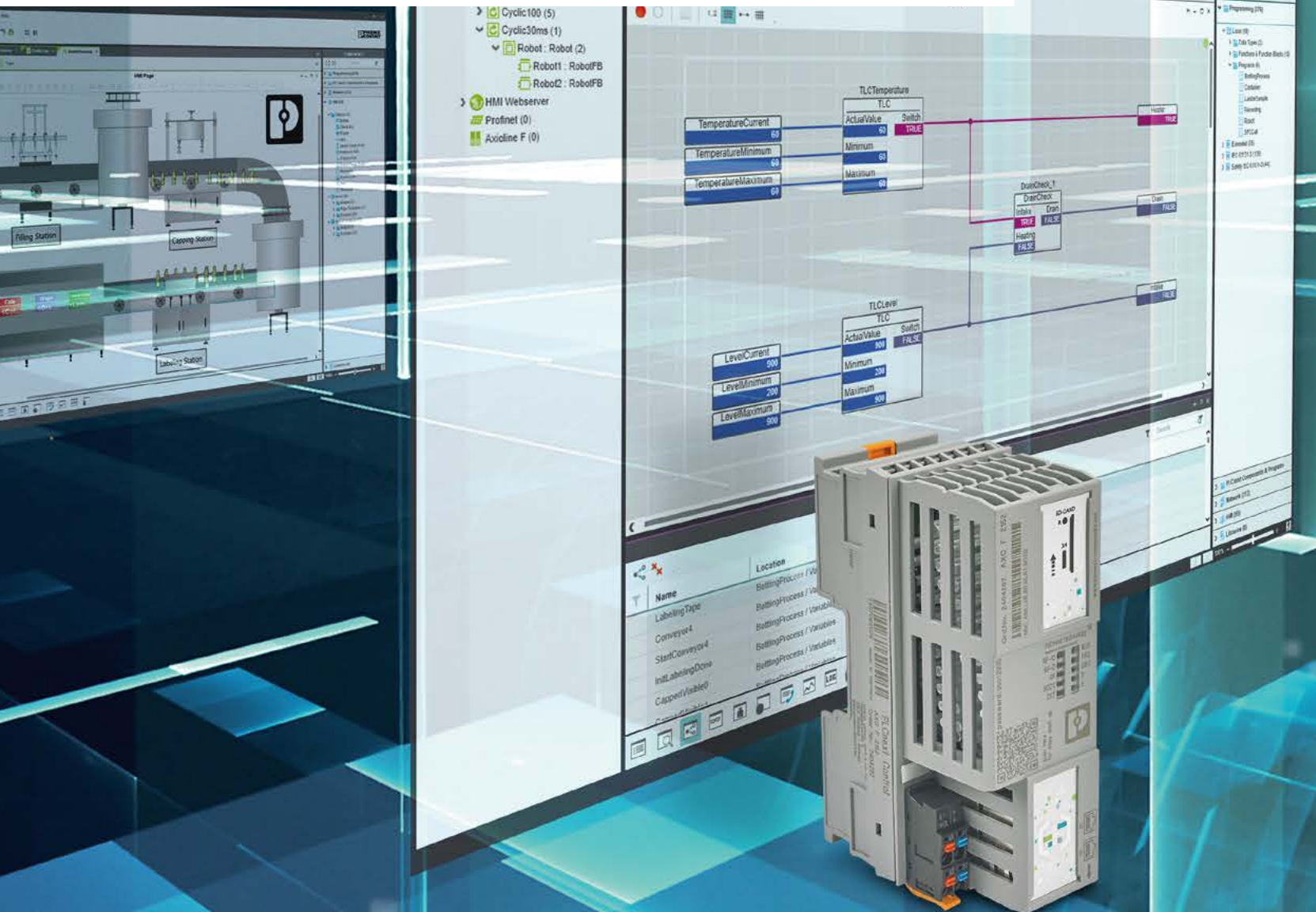
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PLCnext Technology

PLCnext is a new technology that expands the use of a PLC in ways that will change the future of automation. This state-of-the-art digital ecosystem offers an open Linux environment for edge computing with access to more data via IoT systems and more flexibility with open source code. PLCnext presents a revolutionary new development environment offering HTML5 visualization and seamless integration of high-level languages.

Your advantages

- ☑ Linux – PLCnext Technology is completely open, allowing Linux-minded users to directly access the core of the controller for virtually limitless creative freedom.
- ☑ IIoT-ready – PLCnext Technology is IIoT-ready with simple connection to common platforms including AWS, Azure, Google IoT, and more.
- ☑ Revolutionary – PLCnext Technology provides a completely reimagined programming environment for standard PLC operations. Achieve real-time control with advanced computation, and modern visualization using HTML5 and adaptive response.

Learn more at:
www.phoenixcontact.com/Open

PLCnext Technology
Designed by PHOENIX CONTACT

PLCnext Control

PLCnext Control is hardware that leverages the PLCnext Technology, combining the reliability and security of a classic PLC with the openness and flexibility of a Linux-based control platform.

PLCnext Engineer

PLCnext Engineer provides a familiar IEC 61131 development environment with HTML5 visualization, real-time integration with high-level languages, and direct connection to the cloud for a complete IIoT-ready solution.

PLCnext Store

The PLCnext Store is a repository for pre-made libraries, applications, solutions, and PLC runtimes developed specifically for PLCnext Control by in-house Phoenix Contact engineers and PLCnext contributors.

PLCnext Community

The PLCnext Community provides information on all aspects of PLCnext Technology, including FAQs, forums, YouTube tutorials, and a GitHub presence.

PROFICLOUD

PROFICLOUD is a platform for industrial IoT automation and is a prime example of how data can be visualized "in the cloud". PROFICLOUD offers direct integration with PLCnext Control and can be used to collect, visualize, and store machine and process data securely in the cloud.

PLCnext Control

PLCnext Control devices are the first targets available for the open PLCnext Technology ecosystem. They enable the realization of automation projects without the limitations of proprietary systems. PLCnext Control devices enable parallel programming based on established software tools. For example, you can freely combine functions in accordance with IEC 61131-3 with routines from C/C++, C#, or MATLAB® Simulink®, and merge these to create a complete system.
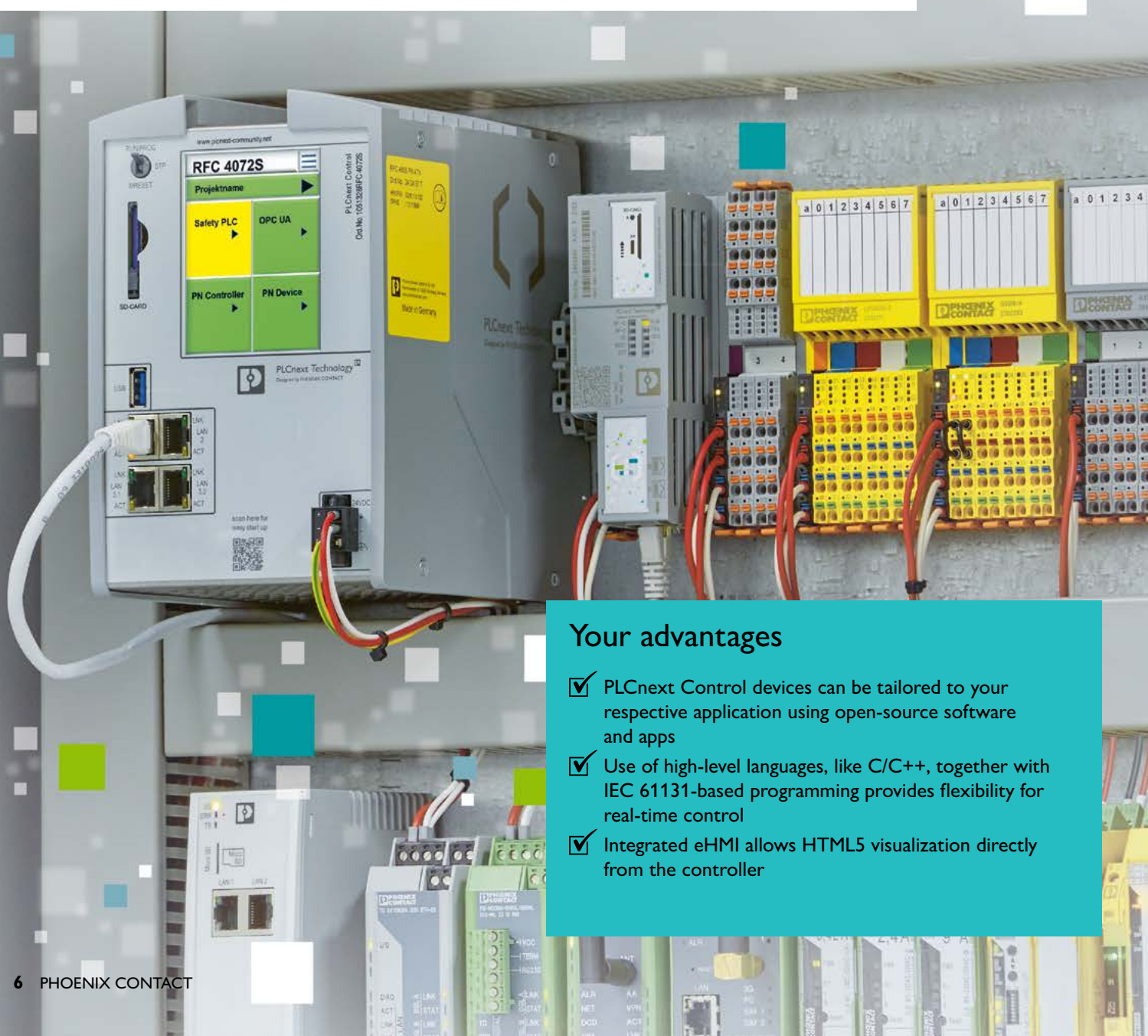
Your advantages

- ☑ PLCnext Control devices can be tailored to your respective application using open-source software and apps
- ☑ Use of high-level languages, like C/C++, together with IEC 61131-based programming provides flexibility for real-time control
- ☑ Integrated eHMI allows HTML5 visualization directly from the controller

Product overview and technical details

High-performance PLC

AXC F 2152
Order No. 2404267

First controller with two processor cores:
ARM Cortex A9 processor, 2 x 800 MHz

- 512 MB RAM
- 2 Ethernet interfaces
- Up to 63 Axioline F I/O modules directly alignable
- Trusted Platform Module (TPM) for security
- PROFINET, OPC UA
- Direct connection to the PROFICLOUD
- Programming with PLCnext Engineer

High-performance safety PLC

RFC 4072 S
Order No. 1051328

PROFINET controller and device

- PROFIsafe profile V2.6.1 support
- Safety CPU: 1 x ARM® Cortex® A9, 800 MHz, 1 x ARM® Cortex™ A8, 600 MHz
- Standard CPU: Intel® Core™ 5-6300U (dual core, 2.4 GHz)
- System networking M2M with OPC UA
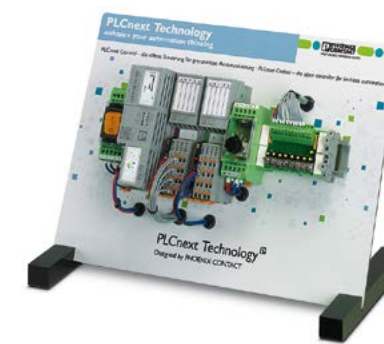- Standard and safety programming with PLCnext Engineer

Program/configuration external memory

SD FLASH 8GB PLCNEXT MEMORY
Order No. 1061701

SD FLASH 2GB PLCNEXT MEMORY
Order No. 1043501

Optional 8GB and 2GB SD expansion cards

- Store application programs and other files in the file system of the PLC
- Compatible with both AXC F 2152 and RFC 4072S controllers

Starter kit

AXC F 2152 STARTERKIT
Ord. No. 1046568

- AXC F 2152
- 2 Axioline F I/O modules for digital and analog signals
- Potentiometer (for analog signals)
- Switch module (for digital signals)
- PROFICLOUD Credit
- Voltage switch and power supply unit
- CAT5 Ethernet cable

Ethernet control extension

AXC F XT ETH 1TX
Order No. 2403115

- Individual expansion option for all PLCnext Control devices of the Axiocontrol series
- Left-alignable module
- Additional gigabit-enabled Ethernet interface: 10/100/1000 Mbps
- Auto negotiation
- Additional independent network interface
- PROFINET support

### Adapter terminal for Inline I/Os

AXC F IL ADAPT
Order No. 1020304

- Right-alignable Inline adapter terminal for AXC F 2152
- Up to 63 Inline local bus devices alignable
- Automatic transmission speed recognition
- Diagnostics and status indication

PLCnext Engineer

With PLCnext Engineer, you can utilize popular programming environments such as Microsoft Visual Studio, Eclipse, and MATLAB Simulink. High-level languages, like C and C++, together with IEC 61131-based programming, provide flexibility for your real-time control. PLCnext Engineer offers modern visualization using HTML5 and adaptive response. For simple machines or dedicated applications, the integrated visualization tools of PLCnext Engineer make it quick and easy to visualize the application on any modern device, including IPCs and HMIs, smartphones, tablets, and laptops.
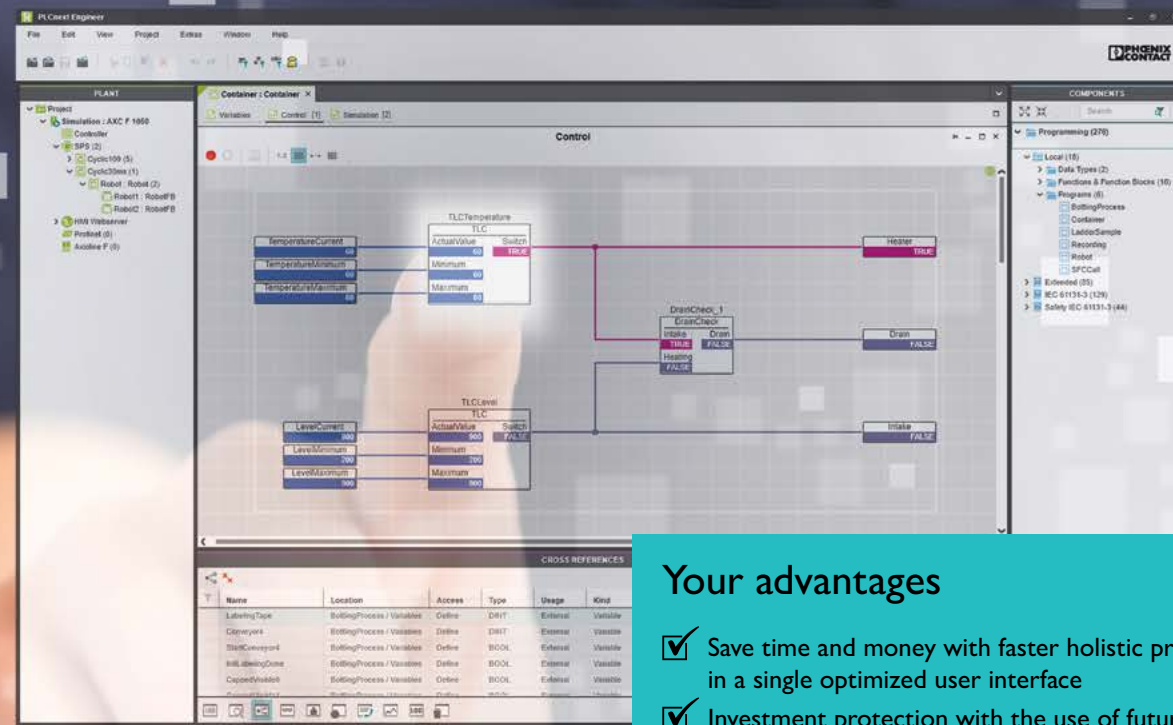
Your advantages

- ☑ Save time and money with faster holistic programming in a single optimized user interface
- ☑ Investment protection with the use of future-oriented technologies and open interfaces
- ☑ Flexible engineering through the integration of individual add-in functions
- ☑ Simplifies the engineering process with reusability and object-oriented programming

## Product overview and technical details
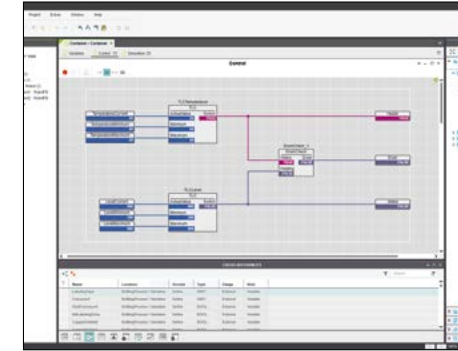
Programming in accordance with IEC 61131-3

The software supports programming in the structured text (ST), ladder diagram (LD), function block diagram (FBD), and sequential function chart (SFC) languages. In the case of graphical programming languages, the user can choose between network-oriented and free graphical programming. Languages can be mixed at will within program organization units.
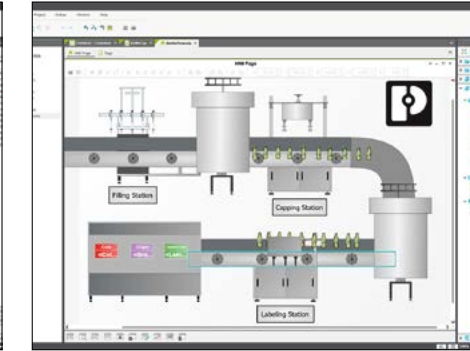
Web-based visualization

PLCnext Engineer has been optimized for the creation of modern visualization solutions. Familiar operating concepts from other editors make it easier to get started. With respect to the technology, the visualization integrated into PLCnext Engineer is based on open standards such as HTML5 and JavaScript. No web-based skills are required, the software offers numerous symbols and templates and can be expanded on a case-by-case basis.
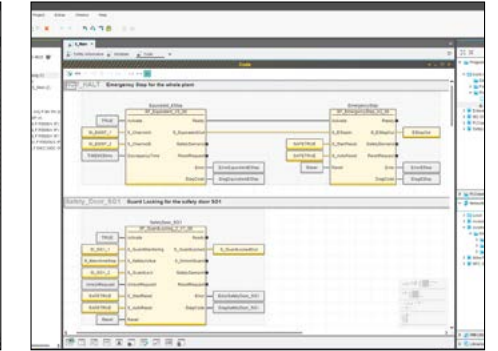
Functional safety

The creation of safe programs in PLCnext Engineer has been developed and certified in accordance with IEC 61508. Thanks to user authentication, the user can employ standard editors in which he can mix function block diagrams and ladder diagrams as a "limited variability language" (LVL). The safe semantic code analysis that runs in the background assists the user in the positioning of safety-related and non-safety-related signals and blocks.

Modular software platform

PLCNEXT ENGINEER   Order No. 1046008

- Programming for the new generation of Phoenix Contact controllers
- IEC 61131-3 programming
- End-to-end engineering: configuration, programming, visualization, and diagnostics
- Free download and licensed add-ins available at phoenixcontact.com

Programming flexibility

PLCnext Engineer is the free engineering platform that includes all basic functions for programming, visualization, diagnostics, and hardware configuration.

Add-in functions, such as safety and visualization solutions, can be easily integrated into the platform. The modular software design supports intuitive user guidance with its simple, structured interface: you only see and pay for the functions that you really need.
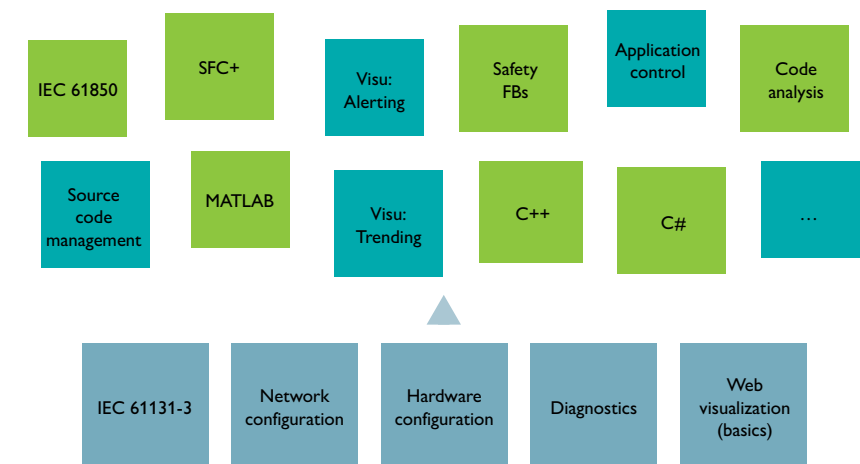
PLCnext Store

The PLCnext Store provides software apps that enable you to expand the functions of PLCnext Control directly and easily. The open nature of the store also allows third-party providers to sell the apps that they have developed. At the PLCnext Store, you will find the broadest range of apps for any application – from software libraries for accelerated programming through to fully programmed apps that can be used without any programming knowledge.

www.plcnextstore.com

Your advantages

- ☑ Accelerated application development with easy access to software apps for the PLCnext Control family
- ☑ Innovative approaches as well as expanded versatility and application options for your automation solution, thanks to the dynamically growing range of apps
- ☑ Creative ideas and new solutions for your application, including special software – even for niche markets

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PLCnext Store and PLCnext Community

PLCnext Store

Store user
Accelerate your application development process by using solution apps. With the PLCnext Store, you can download complete solutions to your PLCnext Control device and, without a broad programming knowledge, create applications quickly. For example, with the PLCnext Store, a PLCnext Control device can be transformed into a solar park PLC easily and without programming. Phoenix Contact already provides numerous software libraries for PLCnext Engineer which are currently available as apps in the PLCnext Store for simple download. These libraries include data logger functions and remote-control protocols. With PLCnext Store, you receive optimum support in the efficient programming of your PLCnext Control device.

Contributor
Do you lack access to hardware distribution or the platform for your software solution?

Become a contributor to the PLCnext Store and benefit from this unique ecosystem. Make your software solutions available to a huge range of potential customers. You will not only make a profit, you will also be increasing your profile and visibility in an industrial environment that is relevant to you.


Visit our store at: www.plcnextstore.com

Become a part of the PLCnext community

Along with a future-oriented system of hardware, software, and cloud solutions, users of the ecosystem also benefit from a growing community involved in all aspects of PLCnext Technology. The exchange of ideas among our users is becoming increasingly important, and having access to specialists and a broad range of apps, code, and sample programs is a huge advantage for programmers.

The PLCnext Community provides information on all aspects of PLCnext Technology. Discover application examples, user manuals, detailed instructions, tutorials, training videos, and FAQs, as well as software and firmware downloads. Use GitHub, our forum, or the technical help on YouTube for additional support.

Become a part of the user community. Discuss your personal experiences with PLCnext Technology with other users. We look forward to your ideas and your feedback.

Join the community – become a part of PLCnext Technology.
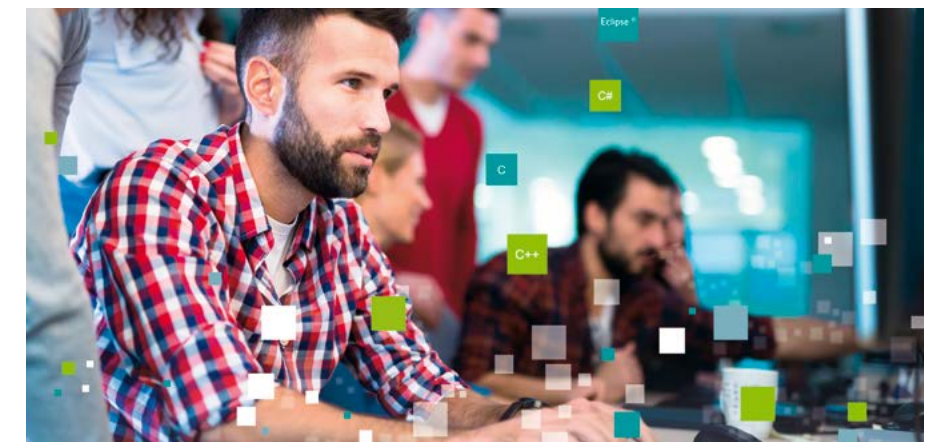
Learn more at: www.plcnext-community.net

PROFICLOUD

PROFICLOUD offers the ability to collect data from traditional control systems and/ or PLCnext Control systems and easily report it to the cloud. PROFICLOUD stands out from similar services by displaying data in an attractive format with minimal effort via customizable dashboards for standard applications. If advanced dashboarding or data services are required, the Phoenix Contact Engineering Services team can create a custom solution on public cloud platforms such as AWS or Microsoft Azure.

Your advantages

- ☑ Maximum availability, because you can access data anytime, anywhere
- ☑ Openness, because you can develop your own cloud services for PROFICLOUD and operate them in the PROFICLOUD
- ☑ Flexible ability to integrate new functions and technologies quickly and easily
- ☑ Scalability with dynamic IT services that can be quickly and individually adjusted to your requirements

## Future-proof automation with PROFICLOUD
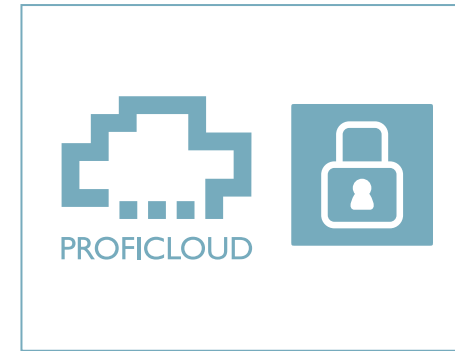
Consistent security

A deeply integrated security concept provides you with maximum security. The Trusted Platform Module (TPM) for secure encryption management protects against unauthorized access to stored data. All data is transmitted with TLS 1.2 (Transport Layer Security) encryption and authentication.

Big data applications

With PROFICLOUD, you can capture your machinery and system data from anywhere in the world and combine large amounts of data from different sources. Using modern data analysis as a foundation, you can make expert decisions, calculate forecasts, and improve your operative process control.
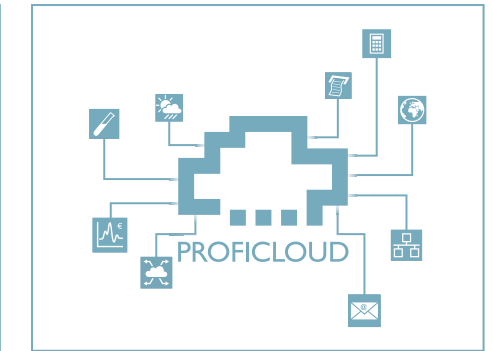
Integration of services

Cloud services can be easily integrated into your automation solution. Extend your applications with services such as energy data management and predictive maintenance.

Advanced cloud-based services

Get the most out of your cloud with help from our Engineering Services team. We will work with you every step of the way to deliver a customized solution to suit your needs. Whether you're integrating directly into the PROFICLOUD or using third-party cloud services like Microsoft Azure or AWS, our Engineering Services team has you covered.
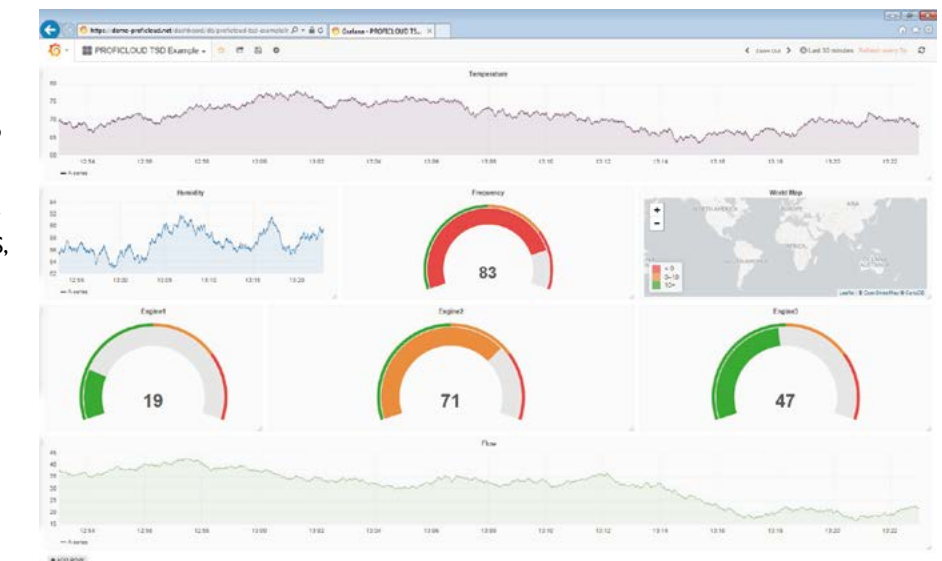
Register today: www.proficloud.net

Axioline F – preferred I/O list

Technical data

Ambient conditions

Relative humidity (operation)	5% … 95% (non-condensing)
Temperature range (operation)	-25°C … +60°C
Extended temperature range for XC modules (operation)	-40°C … +70°C
Vibration	5 g according to IEC 60068-2-6
Shock	30 g according to IEC 60068-2-27
Continuous shock	10 g according to IEC 60068-2-27
Degree of protection	IP20

Electromagnetic compatibility

Noise emission	Class B according to EN 61000-6-3 (residential area)
Noise immunity	According to EN 61000-6-2

Digital input and output modules

Digital I/O modules with 4 to 64 channels and a 35 mm or 54 mm housing width.

Digital input	Designation	Order No.	Overall width
32 channels, 1-conductor, 24 V DC	AXL F DI32/1 2H	2702052	35 mm
64 channels, 1-conductor, 24 V DC	AXL F DI64/1 2F	2701450	54 mm
64 channels, 1-conductor, 24 V DC	AXL F DO64/1 2F	2702053	54 mm
8 inputs, 8 outputs, 3-conductor, 24 V DC	AXL F DI8/3 DO8/3 2H	2702071	35 mm
16 inputs, 16 outputs, 1-conductor, 24 V DC	AXL F DI16/1 DO16/1 2H	2702106	35 mm

Analog input/output modules

Analog I/O modules with 2 to 8 channels, 16-bit, 35 mm or 54 mm housing width.

Analog input	Designation	Order No.	Overall width
4 channels, current	AXL F AI4 I 1H	2688491	35 mm
4 channels, voltage	AXL F AI4 U 1H	2688501	35 mm
Analog output			
4 channels, current/voltage can be configured	AXL F AO4 1H	2688527	35 mm
Analog input/output			
2 inputs, 2 outputs, current/voltage can be configured	AXL F AI2 AO2 1H	2702072	35 mm
Temperature recording			
4 channels, for temperature resistors (RTD)	AXL F RTD4 1H	2688556	35 mm
4 channels, for thermocouples (UTH)	AXL F UTH4 1H	2688598	35 mm

Function modules, feed-in module

Various function and communication modules, 35 mm or 54 mm housing width.

Serial communication	Designation	Order No.	Overall width
Can be configured as RS-485/422 or RS-232	AXL F RS UNI 1H	2688666	35 mm
Position detection			
1 SSI interface, 1 analog output	AXL F SSI1 AO1 1H	2688433	35 mm
2 digital impulse interfaces for an extended temperature range	AXL F IMPULSE2 XC 1H	2702655	35 mm
2 counter inputs, 2 incremental encoder inputs	AXL F CNT2 INC2 1F	2688093	54 mm

Accessories

| Type	Designation	Order No.
Bus base module for housing type H	AXL F BS H	2700992
Bus base module for housing type F	AXL F BS F	2688129
Connector set	AXL CNS 8L-ORBG/D/UI/E1/E2	2700980
Shield connection set	AXL SHIELD SET	2700518
Zack marker strip, unprinted	ZB 20,3 AXL UNPRINTED	0829579
Insert label, roll, white, unmarked	EMT (35X28)R	0801602
Bus base module for Ethernet control extension	AXC BS L 2	1064312

Full list of available Axioline F I/O modules can be found at:
www.phoenixcontact.com/axlf

Ongoing communication with customers and partners worldwide

Phoenix Contact is a global market leader based in Germany. Our group is known for its future-oriented components, systems, and solutions in the fields of electrical engineering, electronics, and automation.

With a global network reaching across more than 100 countries and 16,500 employees, we can stay in close contact with our customers, something we believe is essential to success. The wide variety of our innovative products makes it easy for our customers to find future-oriented solutions for multiple applications and industries. We especially focus on the fields of energy, infrastructure, process, and factory automation.
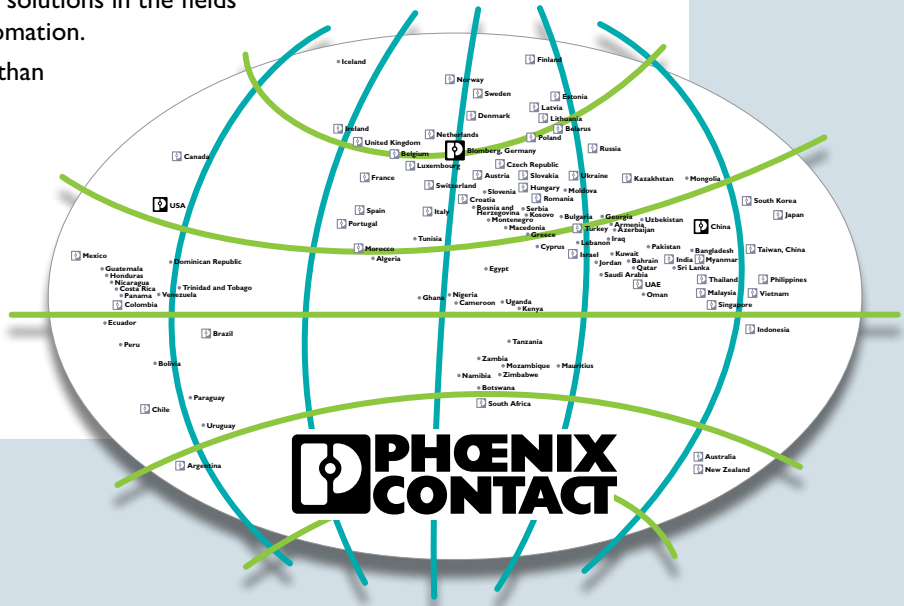
You will find our complete product range at:

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