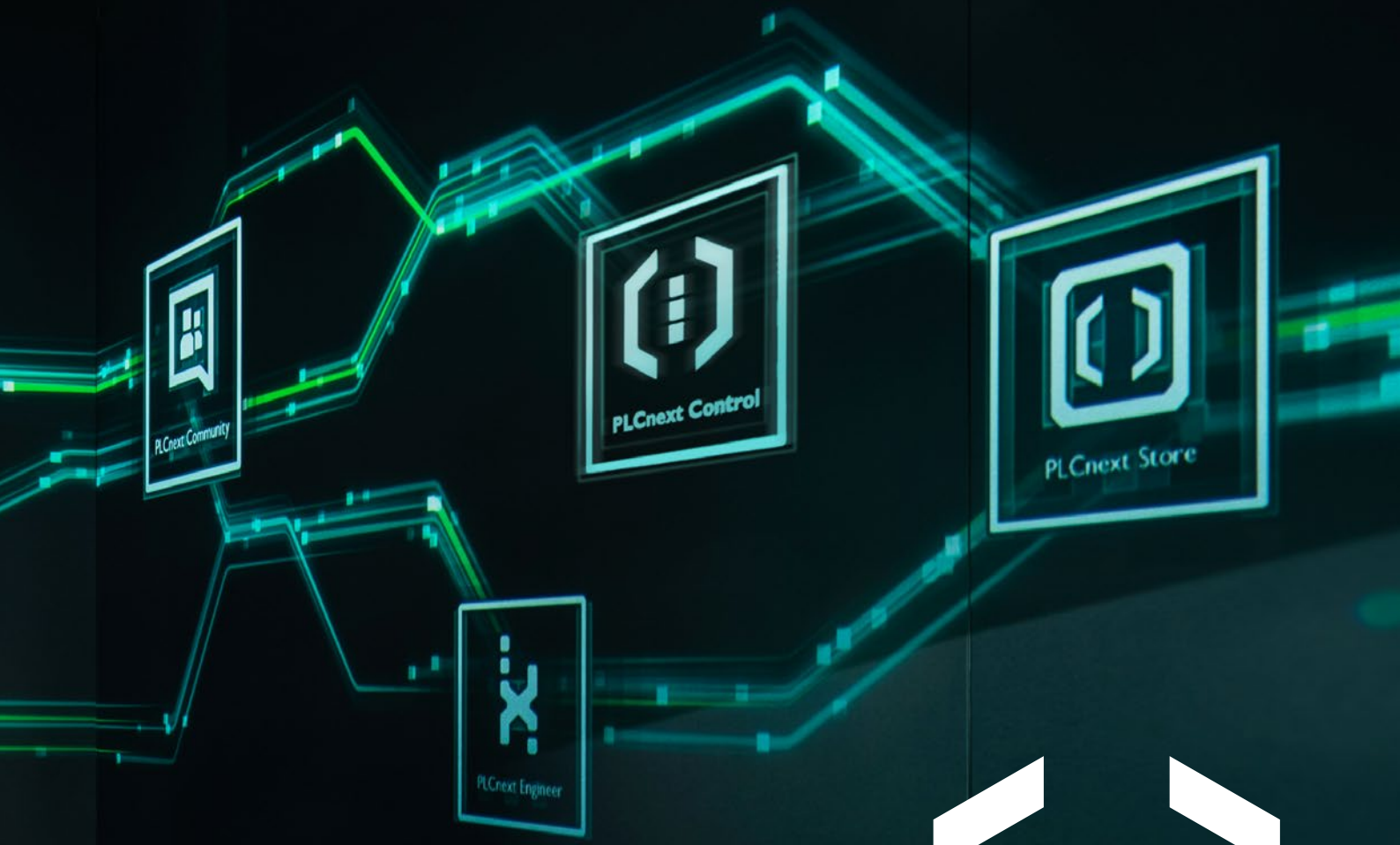
PLCnext Technology
Designed by Phoenix Contact



PLCnext Technology

Ecosystem for limitless automation

Open to the future

Automation is currently experiencing an unprecedented global paradigm shift. The digitalization, networking, and globalization of business and technical systems are generating new market requirements. Classic system structures are developing into globally interlinked production systems. The pace of innovation is increasing rapidly. Technologies are converging, and products and infrastructures are becoming more intelligent. Young engineers and software specialists are shaping new working methodologies, and cloud and edge computing are making forward-thinking industrial business models possible.

For many companies, this means rethinking and changing processes. In particular, many advancements and innovations will arise from communities and the creativity of many people sharing ideas. Flexibility and efficiency are becoming the most pressing requirements for us all. This means we need to reuse what has already been developed and proven, and have complete openness. Openness in thinking and openness of systems.

This is why we have developed PLCnext Technology. PLCnext Technology is an open ecosystem that extends the use of familiar PLCs in ways that will change the future of industrial automation.

plcnext-community.net

Contents

You will find buttons throughout this e-paper that enable further interaction. Watch videos. Find out more detailed information on our products in our web shop.

Link

Product info

Video

Blog/forum

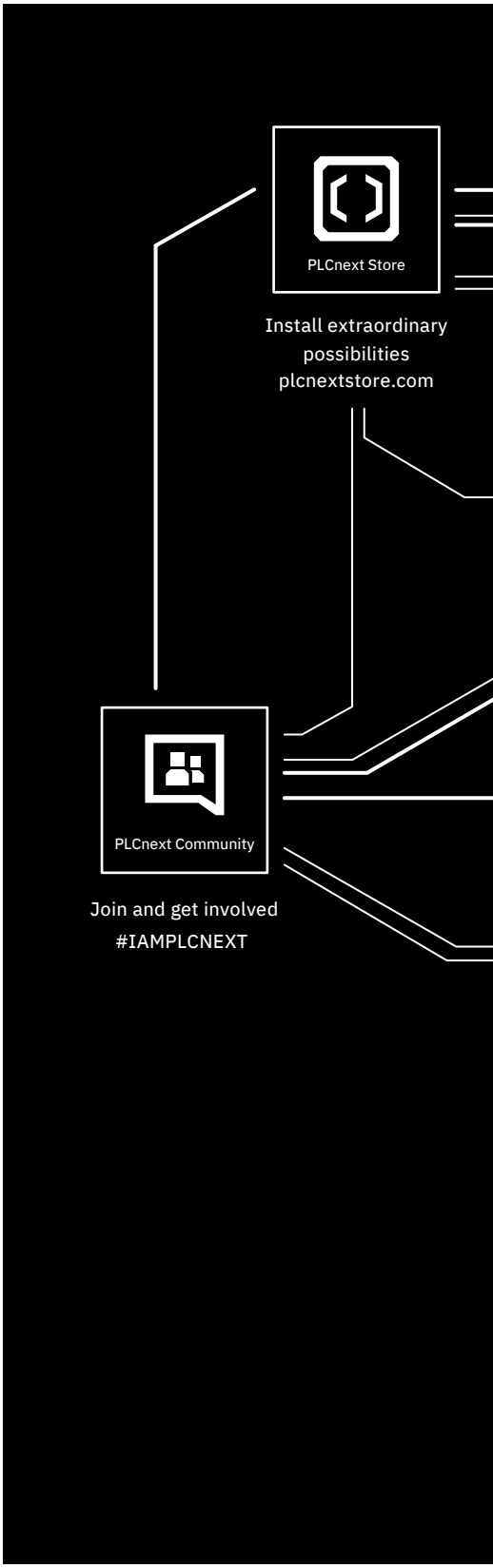
The ecosystem

PLCnext Technology connects the IT and OT worlds

PLCnext Technology is the ecosystem for industrial automation, consisting of open hardware, modular engineering software, a global community, and a digital software marketplace. This combination makes it easy to adapt to changing demands and enables efficient utilization of existing and future software services, swarm intelligence, and technologies.

The precisely tailored design of the open automation system is just as important as flexible, modular expansion. In addition to standard PLC programming in accordance with IEC 61131-3, parallel programming and the combination of programming languages such as C/C++, C#, and Matlab® Simulink® in real time is also possible with PLCnext Control. Accelerate your application development process with the free basic version of PLCnext Engineer. Or use your familiar programming environment – you decide!

With simple cloud integration, the option to use open source software, and the ever-expanding expertise of the PLCnext Community, you will benefit from new forms of collaboration. The resulting solution apps, software modules, runtime systems, and function extensions are available in the PLCnext Store and save an enormous amount of time and money when creating applications. Are you a developer? Then publish an app yourself in the PLCnext Store and gain access to a new, wide target group. This makes PLCnext Technology the ideal ecosystem for your modern automation challenge.



PLCnext Control

PLCnext Engineer

PLCnext Store

PLCnext Community

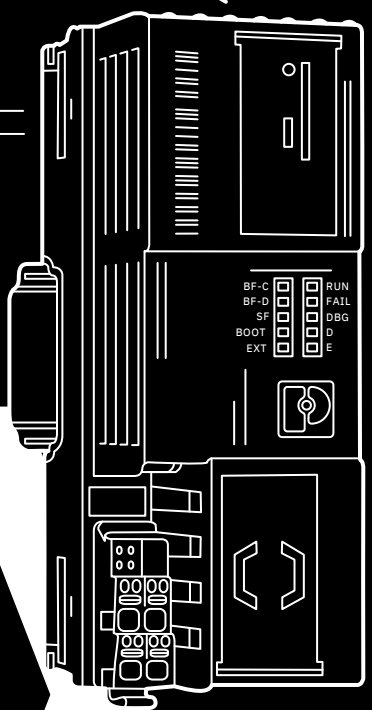
PLCnext Technology

Designed by Phoenix Contact

The open ecosystem for limitless automation

PLCnext Engineer

Speed up your
application development



PLCnext Control

Discover flexible
automation

Make your application
fit for IIoT

Ecosystem advantages

In a rapidly changing world, in which more things are now networked together than there are people, industrial automation is also undergoing a fundamental shift: Classic system structures are developing into cyber-physical systems, and future-proof automation systems must be flexible, open, and networked.

It is time for an ecosystem that provides completely new levels of freedom for automation. It is time to think in new ways. It is time for PLCnext Technology.

Connected coworking

With PLCnext Technology, several developers from different generations can work on one control program, in parallel and yet independently, using different programming languages. This enables you to develop complex applications quickly by combining the advantages of the classic PLC world with the openness and flexibility of PLCnext Technology.

Real-time execution across different programming languages

Combine program sequences in different languages into tasks as desired. The patented task handling of PLCnext Technology lets program routines of different origin run like classical IEC 61131 PLC code. Your high-level language programs become deterministic. The platform ensures consistent data exchange and synchronous execution of the program code.

Flexible integration of open source software and apps

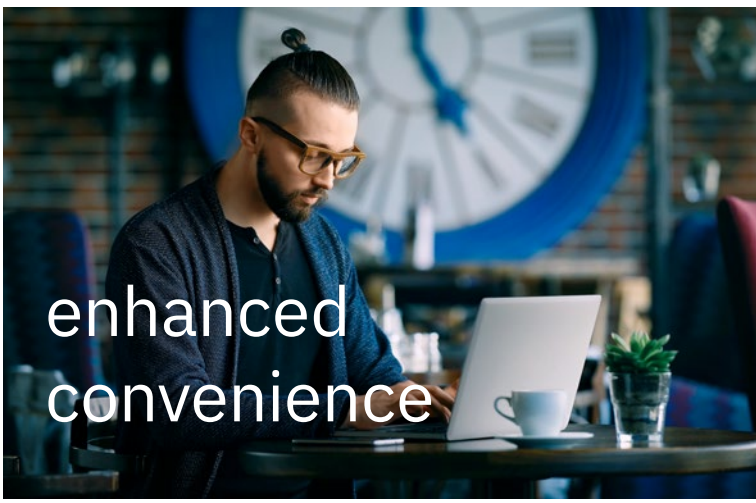
PLCnext Technology enables you to combine independent program parts created in various environments and complete applications in any way you like. Using open source software and apps improves the efficiency of your development processes. The sky is the limit when it comes to future expansions.

Open interfaces and cloud integration

PLCnext Technology enables you to integrate current and future interfaces and protocols for open communication in highly networked automation systems. Implement new IoT-based business models through direct connection to cloud-based services and databases.

Use of your favorite programming tool

The openness of PLCnext Technology enables you to use your favorite programming language, whether IEC 61131 or a high-level language. Develop your individual solution conveniently in a familiar development environment such as PLCnext Engineer, Matlab® Simulink®, CODESYS, Eclipse, or Visual Studio.




PLCnext
Control

Real-time-capable and combinable: IEC 61131-3 and high-level languages

PLCnext Control is the hardware for the PLCnext Technology Ecosystem. It enables the implementation of automation projects without the limitations of proprietary systems. The PLCs based on a Linux kernel are characterized by their real-time capability, both for IEC 61131-3 and for high-level languages such as C/C++, C#, and Matlab® Simulink®. The patented task handling allows any combination of IEC 61131-3 code, high-level languages, and model-based tools in one task. Integrate open source code and apps, or network with PLCnext Control via cloud connections. Your data is perfectly protected because PLCnext Control is secure by design in accordance with IEC 62443 and has been certified by TÜV SÜD.

PLCnext Control offers scalable controllers with IP20 degree of protection. From modular controllers for basic applications and centrally managed high-performance controllers to PC-based edge devices – this product family always offers a suitable solution for your project. The open Linux core also allows you to integrate new technologies such as OPC UA, TSN, and KI. PLCnext Control thus offers a high degree of future-proofing.

Find out more

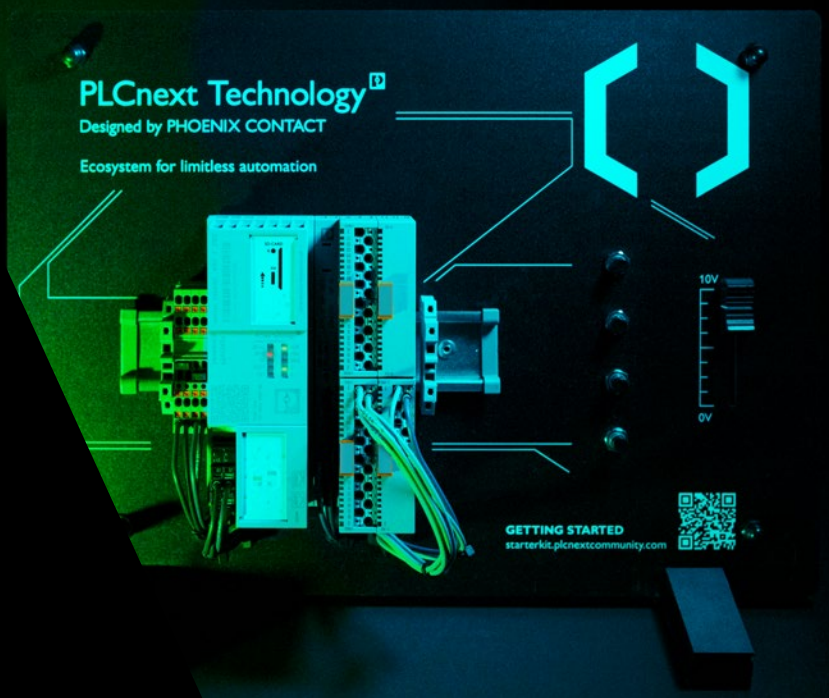
Your advantages

- PLC-typical real-time performance and data consistency, even for high-level languages and model-based code, including an optimized development environment
- Open Linux operating system
- Unlimited adaptability with quick and easy integration of open source software, apps, and future technologies
- Intelligent networking with cloud connection, such as to Proficloud.io, enables you to analyze your global machine and system data
- PLCs with different performance classes and optimized for various fields of application

If you want to implement AI or edge applications, our portfolio also offers specially optimized hardware for this.

Get started with PLCnext Technology now!

Enter the open world of PLCnext Technology and take inspiration from the functionality, operation, and exceptional performance in a small application. The PLCnext Technology Starterkit includes a PLCnext Control AXC F 2152 and a backplane with four Axioline Smart Elements. This station can be extended to suit your needs.



Modular and flexible: PLCnext Control for simple to complex applications

The robust Phoenix Contact Axiocontrol series features several PLCs in various performance classes for PLCnext Technology. These modular controllers give you flexibility for your station structure. The PLCs can be extended with modules for the Axioline and Inline IP20 I/O systems. Furthermore, you can also add further interfaces and control functions to the left of the PLCnext Control. PLCnext Control is secure by design and certified by TÜV SÜD. The security is based on a Trusted Platform Module (TPM), which can also be used to bind your user certificates to the device and protect them.

To the product overview

Extending PLCnext Control functionality

Extend the functions of your PLCnext Control with a safety, Ethernet, or AI module that can be aligned to the left of the controller, for example. This allows you to provide an additional Ethernet interface and to optimize your controller for applications with artificial intelligence and machine learning. The left-alignable PROFIsafe extensions are fully functional safety-oriented PLCs that extend the functional scope of your PLCnext Control for safety applications up to SIL 3. In addition, an INTERBUS and PROFIBUS controller is available that allows you to integrate INTERBUS and PROFIBUS remote bus devices into the station. Connect up to three modules to your PLC with an additional extension module.

To the product overview

”

With the integration of the future-oriented **container runtime Podman**, applications can be encapsulated for greater security and flexibility. With our **gRPC interface**, we offer a high-performance solution for communication between PLCnext Runtime and containerized applications in all common programming languages”.

Dr. Tobias Frank, Phoenix Contact,
Vice President Automation Systems

High modularity in the automation system with I/Os

Do you need I/Os for your automation system? With the extensive portfolio of I/O modules, PLC stations which optimally implement the respective application requirements can be set up in accordance with the modular principle. You can then connect the block-modular I/O modules from the Axioline F product family as well as the Axioline Smart Elements, which can be assembled flexibly in a confined space, to an Axiocontrol series PLCnext Control. You can even combine both I/O systems with up to 63 I/O modules. In addition to digital and analog modules, the I/O portfolio also includes various function modules. Some Axioline F modules are also available in versions for very harsh ambient conditions.

To the product overview

Safe and redundant: PLCnext Control for large networks

High-performance controllers for PLCnext Technology enable you to realize automation applications that place high demands on safety or availability, for example. Our safety controllers up to SIL 3 offer the highest level of protection for applications with the highest safety requirements. They combine high-level safety, due to the use of two independent CPUs, with a high-performance four-core system which can operate very large networks with up to 300 safety-related devices. Furthermore, the safety controller is available as a box PC version.

With redundant automation technology, you can reduce downtimes, work cost-effectively, and also avoid potential dangers, such as in tunnels or at airports. The integrated redundancy function based on fiber optics means that the process is not interrupted if one controller fails or is replaced. The RFC controller is based on PROFINET and establishes system redundancy automatically with AutoSync Technology.

Both RFCs feature a user-friendly user interface with improved handling due to a resistive touch screen. This ensures easier monitoring. With the embedded OPC UA server, the PLCs are already equipped to handle future demands today with the use of a standardized communication protocol.

To the product overview

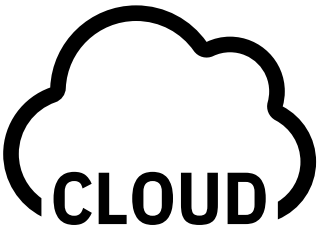
Data-centered and compact: PLCnext Control for edge computing

With PLCnext Control for edge computing, you can process your field data directly where it is created. This reduces latency, takes the strain off central systems, and enables you to respond more quickly to process changes.

In addition to the full-fledged IEC -61131-3 controller, software for analyzing data can be easily and conveniently installed in the underlying Linux Ubuntu Pro Desktop. The open architecture allows the flexible integration of containerized applications or native Linux tools – without special hardware adjustments. The preinstalled Virtual PLCnext Control enables the software-based implementation and scaling of control functions. This creates a future-proof solution that seamlessly connects the IT and OT worlds and also supports sophisticated applications such as AI-based analysis or predictive maintenance.

To the product overview

Any cloud: Intelligent networking through cloud connections



You can connect the PLCnext Control to any cloud, whether Phoenix Contact's own Proficloud.io, Amazon's AWS, Microsoft's Azure, or your own cloud solution on site. Make the most of your data. Take advantage of individual cloud services to optimize your processes. As a result, you increase the quality of your products or system, reduce costs, and do not have to intervene in running applications. Your data is perfectly protected here.

Even though the PLCnext Control range comes with a direct connection to Proficloud.io as standard, you can either download ready-made cloud connectors from the PLCnext Store to your PLCnext Control, eliminating annoying programming work. Another options is to use standard communication protocols such as OPC UA or MQTT for connecting to your chosen cloud solution.

Smart Services from Proficloud.io – added value for your automation data

Smart services provide targeted access to automation data – for greater transparency, efficiency, and better decisions. The IIoT platform from Phoenix Contact is safe, scalable, and easy to integrate.

With PLCnext Technology, Proficloud.io seamlessly connects machines, systems, and data. The modular Smart Services provide practical solutions – from visualization through to data analysis.

Whether maintenance, energy management or remote monitoring: Smart Services help to optimize processes, minimize downtimes, and make informed decisions – without the need for in-depth IT knowledge.

Find out more

You will find an overview of all Proficloud.io smart services on page 64.

Virtual control systems for industrial automation

The new portfolio of virtual PLCnext Control solutions provides a state-of-the-art software solution that replaces classic controller hardware with virtualized instances. These controllers run as OCI containers on powerful computer platforms and therefore enable flexible, scalable, and cost-effective implementation of industrial automation tasks.

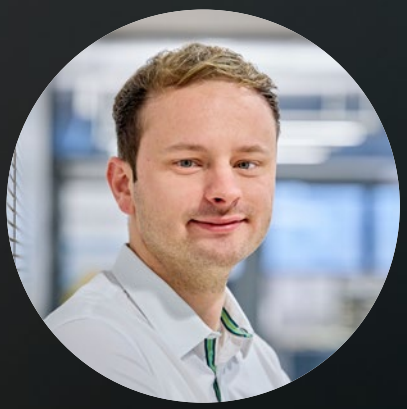
Software-based controllers in a container format

The Virtual PLCnext Control is supplied as containerized software and provides an environment that is equivalent to the familiar PLCnext hardware controller in terms of functionality and operation. Virtual PLCnext Control is not a simulation or stripped-down version, but a complete, IEC 61131-3-compliant control system with real-time capability and deterministic behavior. It supports the same programming environments and high-level languages as the hardware versions, including C++, C#, and Python. The runtime is based on the open, Linux-based architecture of the PLCnext Technology ecosystem and is therefore fully compatible with existing tools and workflows.

Conformity with the latest provisioning practices is particularly relevant for developers and IT specialists. The controller is supplied as an OCI container and can be orchestrated with common DevOps tools. This enables scalable and repeatable deployments across decentral systems – whether at the edge, in the private data center, or in hybrid cloud environments.

The solution supports established communication protocols such as OPC UA and PROFINET. Functions such as integrated firewalls, certificate management, database connection, and fieldbus integration are also included. The container architecture provides optimal support for the use of target hardware – for example, for Wi-Fi connectivity or AI applications.

Virtualization makes it possible to implement control processes independently of dedicated hardware. This opens up new possibilities for IT/OT convergence, security, and resource use.



”Virtual PLCnext Control enables **scalable** automation directly on the **IT infrastructure**”.

Michael Rolf,
Product Manager, Phoenix Contact

Find out more

Read more about the paradigm shift in control technology

Read an interview with Dr. Tobias Frank

Typical application scenarios

1. Edge computing in wind farms

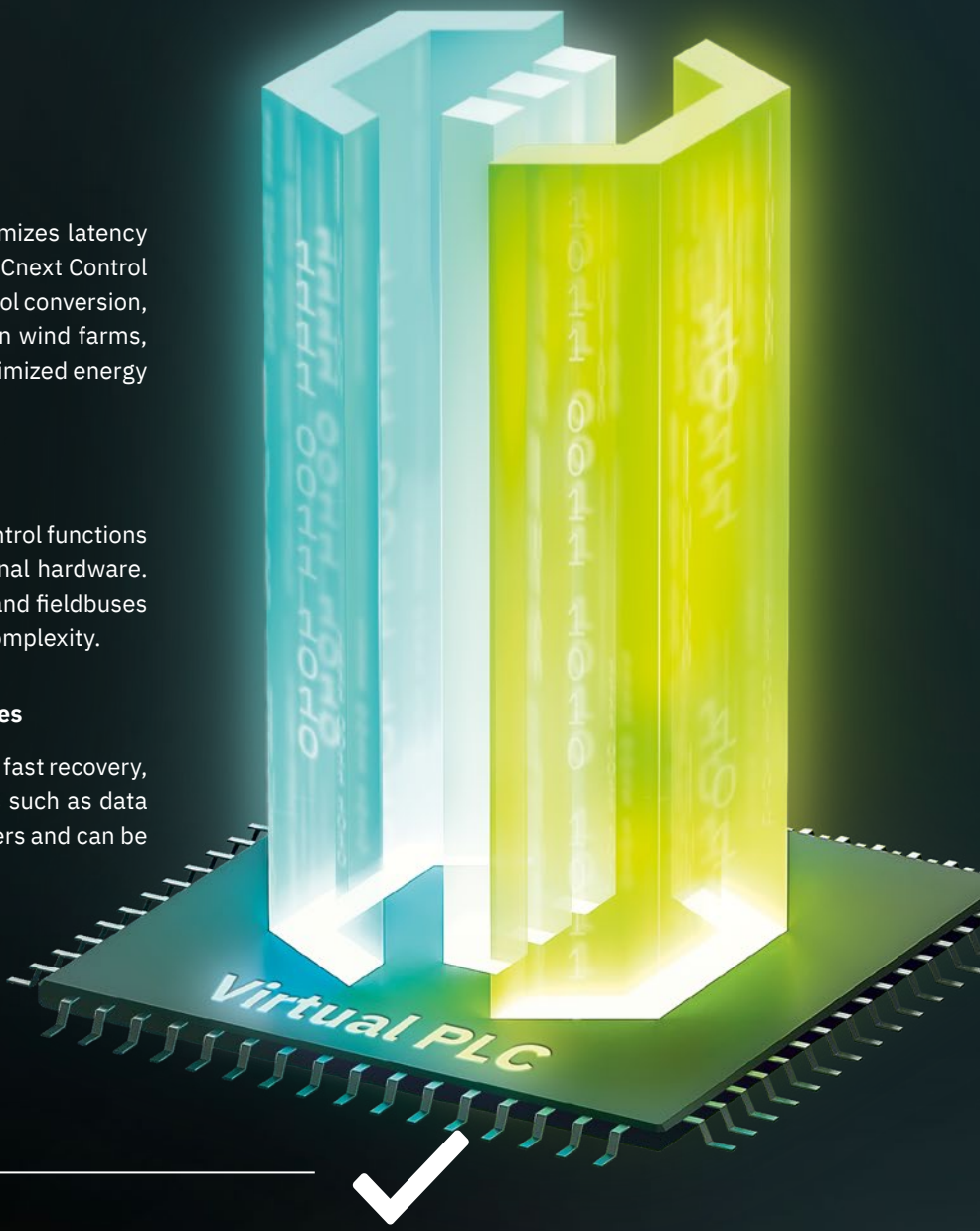
Processing data directly at the source minimizes latency times and increases efficiency. The Virtual PLCnext Control device is ideal for applications such as protocol conversion, local data analysis, and cloud connection. In wind farms, this enables predictive maintenance and optimized energy production.

2. Integration by device manufacturers

OEMs benefit from the ability to integrate control functions directly into their devices – without additional hardware. The support of common industry protocols and fieldbuses simplifies system integration and reduces complexity.

3. Use in data centers and IT infrastructures

Virtual PLCnext Control enables easy scaling, fast recovery, and reduced downtimes in IT environments such as data centers. The controller runs on existing servers and can be adapted flexibly.



Technical advantages at a glance

- **Scalable resource distribution:** CPU cores, RAM, and network interfaces can be adapted dynamically
- **IT/OT security:** The container architecture allows isolated design with integrated security mechanisms from both worlds
- **Platform independence:** Applications can be easily moved between different hardware platforms
- **Efficient maintenance:** Updates and administration tasks are performed via established IT methods
- **Sustainability:** Consolidating multiple controllers in one piece of hardware reduces energy consumption and costs
- **Future-oriented:** The solution is open to new technologies and developments

PLCnext Control for functional safety and industrial security

PLCnext Control sets a milestone as the first PLC on the market that has received both the IEC 62443-4-1 ML 3 Full Process Profile and IEC 62443-4-2 certifications from TÜV SÜD. These significant certifications prove that the entire Secure Development Lifecycle was consistently observed during the development of PLCnext Control. The product certifications underline the high cybersecurity standards during the development phase and provide insight into the implemented technical security requirements. By activating the security profile, users have access to a wide range of security level 2 (SL2) functions. In addition to the AXC F 2152 and AXC F 3152 models, the RFC 4072S and BPC 9102S safety controllers as well as the AXC F T SPLC 1000 safety PLC extension have also been certified.

Our AXC F 2152 and AXC F 3152 controllers have also received IEC 61850 Ed. 2.1 and IEC 62351-3 certification from DNV, which ensure communications security in power grids.

Error states are detected early in safety-related applications due to double calculation. Our safety controllers are tested by TÜV Rheinland and can be used in applications with high safety requirements in accordance with SIL 3 or PL e.

Find out more about IEC 62443

More about IEC 62351-3 and IEC 61850 Ed. 2.1

To the Cybersecurity Info Center

Cyber Security

www.tuv.com
ID 0600000000

Product Safety
Functional
Safety

www.tuv.com
ID 0600000000

Device and update management

The smarter automation components become and the more they communicate with remote (cloud) systems, for example, the more important it is to have up-to-date firmware for the individual components. Updates can be rolled out manually or automatically – and across manufacturers – with OPC UA-based device and update management. This saves time and costs, and minimizes the risk of cyberattacks.

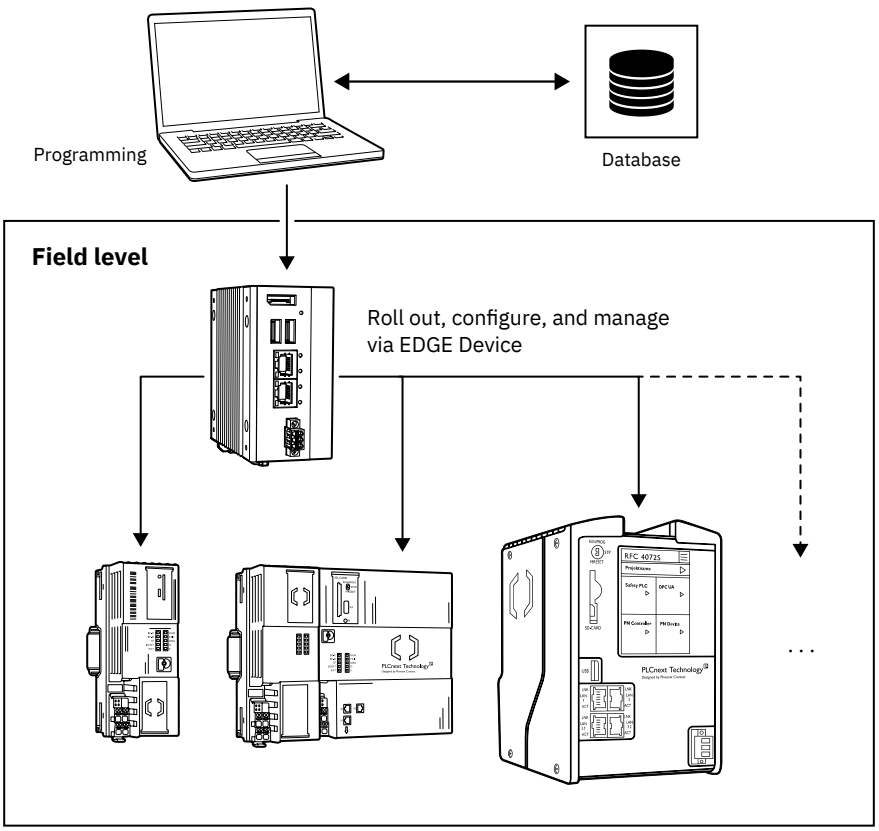
- Security risks due to outdated firmware are ruled out at an early stage
- Firmware from the manufacturer is provided automatically and enables easy automation of updates
- Possibility of distributing PLCnext Engineer projects and updates
- Easy inventory of hardware and firmware data (software/firmware status of all devices at a glance)

Device and update management can also be executed via:

A Windows solution for the PC

A container-based solution in IT

Secure IT/OT center



Unified device and update management

> **Device and update management** is the basis for optimum **cybersecurity** in companies”.

Arno Fast, Phoenix Contact,
Senior Specialist Digital Services

PLCnext Technology architecture

The PLCnext Technology architecture is based on an open Linux system with a real-time patch and combines the features of a classic PLC with those of a smart device. Real-time capability and consistent process data management are the fundamental requirements for control technology. High-level languages become deterministic with PLCnext Technology. The Execution and Synchronization Manager (ESM) and Global Data Space (GDS) components ensure deterministic interaction between programs from different areas. The ESM real-time task scheduler makes it possible to bring programs from different programming languages into a defined sequence. GDS, on the other hand, ensures synchronous and consistent process data exchange between programs, fieldbus systems, and other components.

The open architecture allows programs to be executed directly within the PLCnext Runtime System and non-control programs to be executed directly on the Linux system. Here, the variables and the service components (e.g., OPC UA server, Proficloud.io gateway, web-based management, and HMI web server) can be accessed via a variety of interfaces.

128

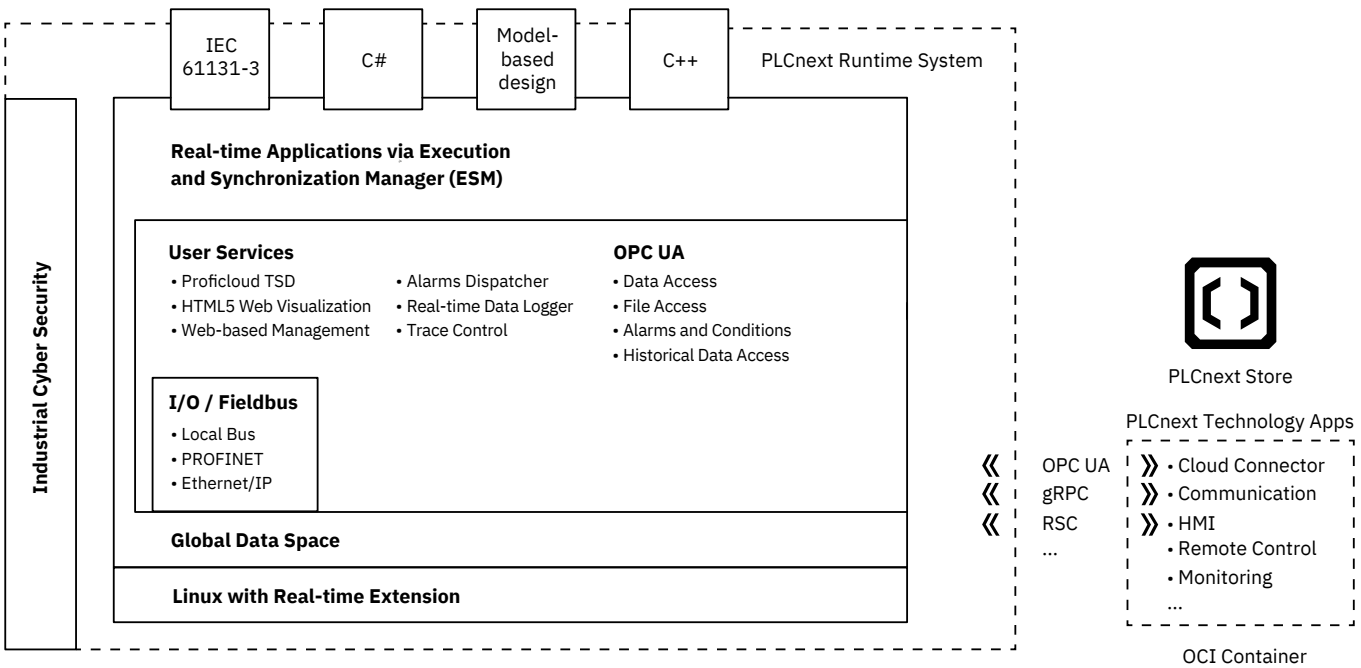
simultaneous real time tasks

8

processor cores

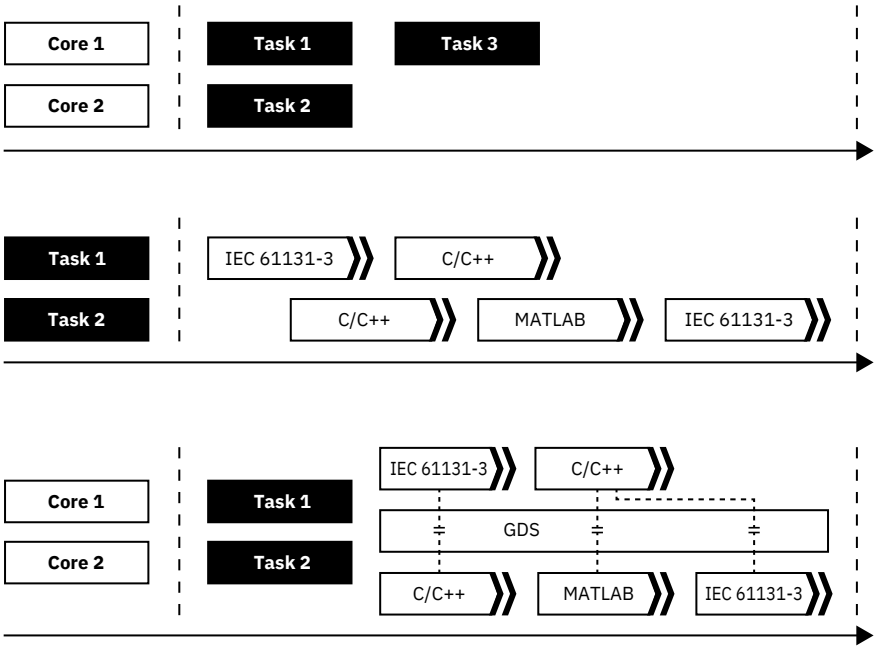
16 GB

memory



PLCnext Technology runtime system

Synchronicity and real time



With multicode support, the processing of tasks can be distributed to multiple processor cores.

Combine different programming languages in any way in one task.

Task-synchronous data exchange between programs of different domains is assured by the GDS (Global Data Space).

Task handling in the Execution and Synchronization Manager ESM

It is possible to add new functions via an app, from the cloud, or via a function block programmed by the user, as well as use software from the PLCnext Store and Open Source Communities. With multicore support, the processing of tasks can be distributed to multiple processor cores. This makes it possible to optimize the utilization of the controller power.

In addition to executing programs in a single programming language, PLCnext Technology offers the option of defining tasks whose individual components come from different programming languages. ESM task management allows any combination of IEC 61131-3 code, high-level languages, and model-based tools in one task. The user not only defines the number of PLC tasks, but can also specify the exact timing as well as the priority. Data exchange between programs created in Matlab® Simulink®, C++, C#, or IEC 61131-3 is task-consistent, even if the program flow is interrupted by a higher-level task. Synchronicity and consistent data access from all programs are thus ensured at all times.

500 µs

fastest cycle time

1 µs/device

local bus speed

Supported communication protocols

Two options are already available as fieldbus protocols: PROFINET and EIP (Adapter Class). Further fieldbus protocols, e.g., INTERBUS, PROFIBUS, or CAN, can be realized with appropriate hardware components. The following established communication protocols are also available: HTTP, HTTPS, SFTP, SNTP, IPsec, syslog, and OPC UA. In addition, due to the open architecture of PLCnext Control, you can easily add missing protocols. The special feature of PLCnext Control is that further function blocks can be loaded later via the PLCnext Store, which is accessible to every user. Via the PLCnext Store, you can download ready-made solutions and controller extensions or add them yourself. Examples include MQTT, CODESYS, Modbus/TCP, and libraries for ready-made industrial solutions. Furthermore, additional runtimes can be emulated via IEC 61131 or even integrated into the firmware. This can also be realized with third-party software. The open architecture of PLCnext Technology makes it possible.

Up to

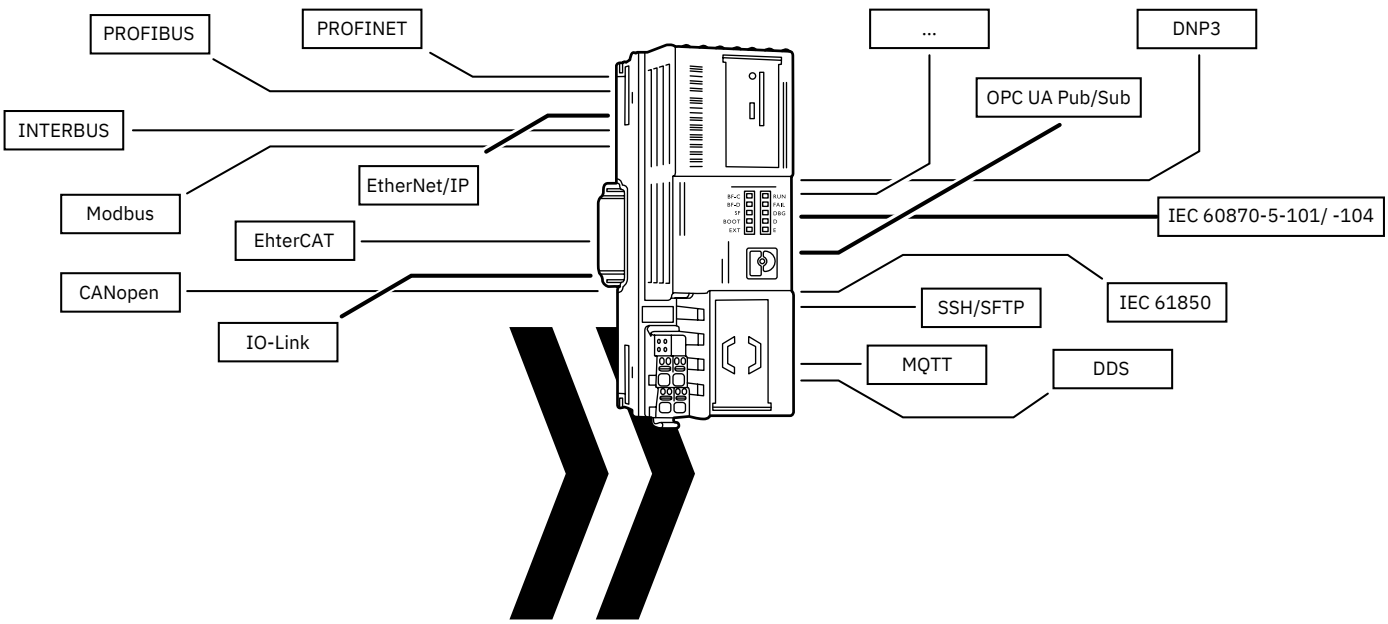
256

PROFINET devices

Up to

300

PROFIsafe devices



Supported communication protocols for PLCnext Control


PLCnext
Engineer

Application development with your favorite tools

PLCnext Engineer is the engineering tool for your PLCnext project. By combining all essential functions for the engineering process in one software program, the flexible engineering tool is more than an all-in-one tool for classic programming. One software program for all engineering tasks – configuration, programming in accordance with IEC 61131-3, safety programming and configuration, visualization, and diagnostics.

With PLCnext Engineer, you can configure your PROFINET networks easily, integrate high-level language programs or Matlab® Simulink® models, and commission and manage these on a PLCnext Control. In addition, you can conveniently integrate IO-Link and IO-Link Safety devices, or configure existing INTERBUS or Modbus/TCP networks.

All editors have been developed in accordance with modern usability and user experience specifications, which can also be found in other software tools from Phoenix Contact. Regardless of whether you are planning Phoenix Contact components with clipx ENGINEER, configuring network components with FL Network Manager, or programming controllers with PLCnext Engineer, you can always work in a homogeneous software landscape.

Find out more

To the product

Video: Speed up your application development with PLCnext Engineer

Your advantages

- One software program for all engineering tasks
- Time and cost savings through programming in one interface
- Flexible engineering with the integration of individual function add-ins and software applications (apps)
- Future-proof: PLCnext Engineer will continue to be extended by further communication systems based on existing usability concepts and thus adapted to current trends in automation

Commission your PLCnext Control more quickly! Holistic programming within one interface offers enormous time and cost savings.

Convenient configuration with free choice of programming language and tools

PLCnext Engineer allows intuitive programming in accordance with IEC 61131-3 and supports the following languages: structured text, ladder diagram, function block diagram, and flow chart (sequential function chart).

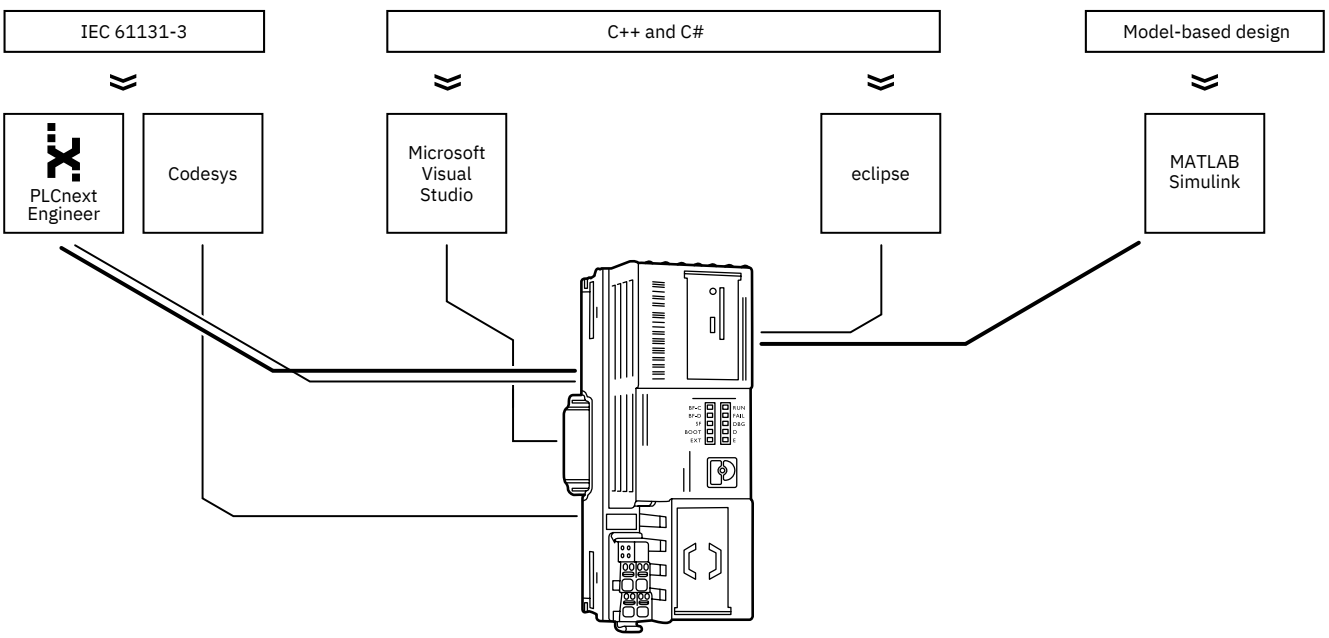
Benefit from convenient handling when combining high-level language programs and standard automation.

For graphical programming languages, you can choose between network-oriented and free graphical programming and mix the different languages within program organization units.

All variables and interfaces can be linked via the data lists, for example, in order to directly connect physical inputs and outputs to high-level language code and to exchange data. As a result, the commissioning and maintenance of highly complex systems without any IEC 61131-3 code is also greatly simplified with PLCnext Engineer.

Get started with the quick-start guide for PLCnext Engineer

Tutorials: Learn about the important features and functions of the user interface



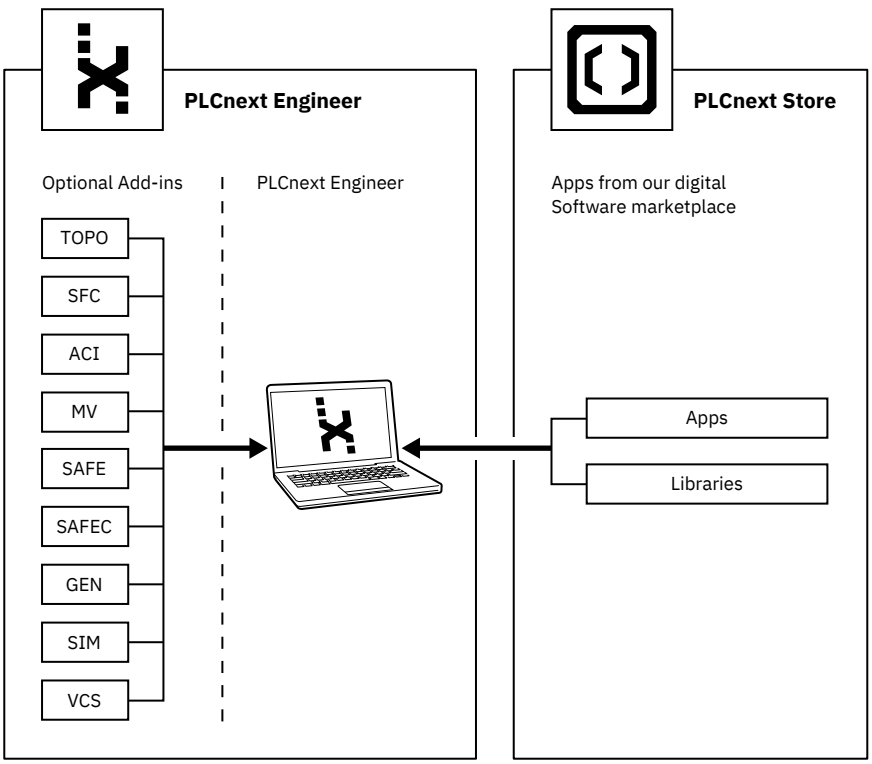
Convenient configuration with free choice of programming languages and tools

Flexible extensions for full individuality with add-ins and software applications

Tailor the free basic version of PLCnext Engineer easily and intuitively to your project needs. To do so, simply add further functions and interfaces to the free basic version via the configurator on our website. PLCnext Engineer's modular architecture means that there are no limits to what you can do.

Optional function add-ins allow you to extend the range of functions to suit your individual needs. You can easily integrate safety solutions, a Matlab® Simulink® viewer, or a visualization generator into the engineering platform.

In addition to extending the range of functions via add-ins, you have the option of speeding up your application development by using ready-made software applications (apps) and libraries from the PLCnext Store.



Benefit from full flexibility with add-ins and software applications

Optional function extensions:

TOPO (ETH TOP VIEW) makes it possible to read in, display, and diagnose the connected Ethernet topology.

SFC (Sequential Function Chart Editor) for programming the IEC 61131-3-compliant sequential function chart with integrated error analysis.

ACI (Application Control Interface) provides an interface for the remote control of the PLCnext Engineer software from external high-level language applications.

MV (Viewer for Simulink®) for displaying Matlab® Simulink® models that are processed on a PLCnext Technology controller.

SAFE (Functional Safety Editor), certified by TÜV Rheinland, for programming safety-related user applications and for configuring and commissioning PROFIsafe devices on safety-related controllers with PLCnext Technology.

SAFEC (SAFE-CFUNC) for creating high-level language-based function libraries and securing them via certificates for secure programming.

GEN (HMI Generator) for generating a complete visualization based on a user project, without any manual effort.

SIM (Simulation) makes it possible to test applications for AXC F 2152 and AXC F 3152 devices without a real controller being connected.

VCS (Version Control System) enables the direct connection of PLCnext Engineer to version management systems such as GIT and Subversion.

Simulation

The new simulation makes it possible to test applications for AXC F 2152 and AXC F 3152 devices without a real controller being connected. It is now even easier and more convenient to test and optimize your PLCnext Engineer applications, even without control hardware. The PLCnext Engineer simulation offers a wide range of options for simulating the functions, components, and models of your project.

Find out more

The simulation function allows you to run your PLCnext Engineer project without a connected PLCnext Control, including:

- IEC 61131-3 code
- Matlab® Simulink® models
- High-level language components

With the simulation, you can:

- Influence the execution of the program code by forcing process data input variables and debugging output signals
- Simulate and test the eHMI part of your PLCnext Engineer project with the full range of functions
- Use the web-based management function of your simulated hardware target to test the behavior of your project with regard to different user authentications
- Configure, prepare, and test the OPC UA server connection with an OPC UA client on your local computer

Discover our highlights

Safety programming

Safety programming was developed in accordance with IEC 61508 and is certified by TÜV Rheinland. Network-oriented editors make it possible to combine function block diagram and ladder diagram. A safe semantic code analysis system runs constantly in the background during code entry. It supports users in positioning safety-related or standard signals and blocks.

Web-based visualization

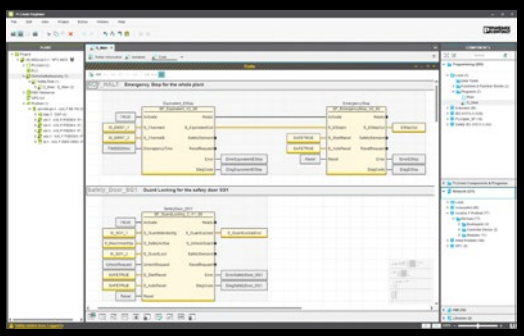
PLCnext Engineer has been optimized for the creation of modern visualization solutions. Already familiar operating concepts from other editors make it easier to get started. With respect to the technology, the visualization integrated in PLCnext Engineer is based on open standards such as HTML5 and JavaScript. Web design knowledge is not required. The software features numerous symbols and templates and can be extended as desired.

Viewer for Matlab® Simulink®

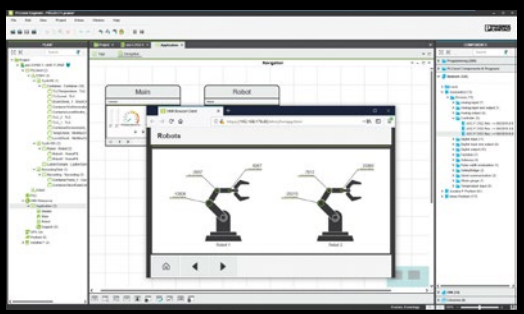
The PLCnext Target for Simulink® toolchain enables model-based design with Matlab®. Prototypes can be developed quickly and cost-effectively because simultaneous simulation and verification is possible. The resulting models can also be displayed with online values in PLCnext Engineer using the Viewer for Simulink® add-in.

Diagnostics of the overall system

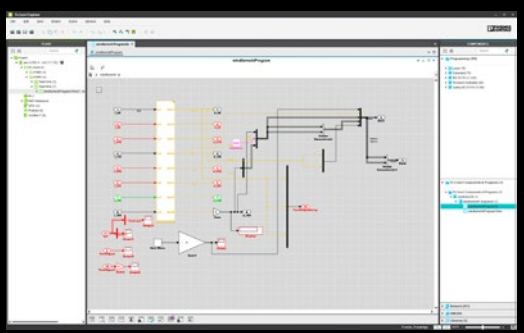
Users can determine the overall status of their application from the central controller cockpit. You can determine whether sufficient resources are available or whether the limits have already been exceeded. PROFINET topology plans are checked on line and errors or differences in the diagnostic archive of the controller cockpit are displayed.



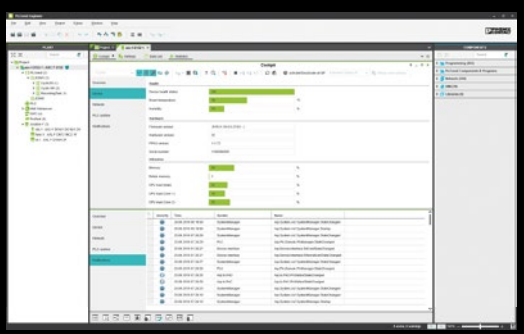
Safety programming



Web-based visualization



Viewer for Matlab® Simulink®

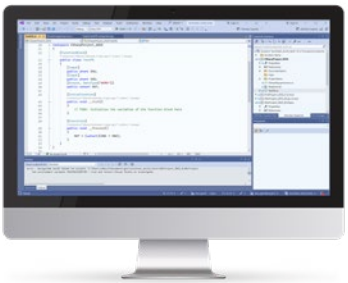


Diagnostics of the overall system

CODESYS

CODESYS is a widely used, powerful development environment which enables control projects to be implemented flexibly and intuitively in IEC 61131-3. With its open architecture, extensive libraries, and integrated visualization tools, CODESYS is also a good addition to the world of PLCnext Technology.

Combine your familiar CODESYS development environment with the advantages and openness of PLCnext Technology. Enhance your CODESYS application with the flexibility and performance of C++ in real time. Connect any application to the CODESYS real-time world with the seamless integration of the Global Data Space (GDS) of your PLCnext Control with CODESYS.



Eclipse® and Visual Studio with PLCnext Technology Toolchain

The PLCnext Technology Toolchain is the ideal solution for anyone who wants to rethink industrial automation. It gives developers the freedom to use modern high-level languages such as C++ and C# - for both real-time and non-real-time applications.

With powerful tools such as the PLCnext CLI, an add-in for Eclipse®, and a Visual Studio® extension, the toolchain integrates seamlessly into established development environments and ensures a smooth workflow. Whether with Windows or Linux, the PLCnext Technology Toolchain offers maximum flexibility and openness for individual automation solutions. This turns classic PLC programming into a future-oriented engineering experience – open, networked, and limitless.

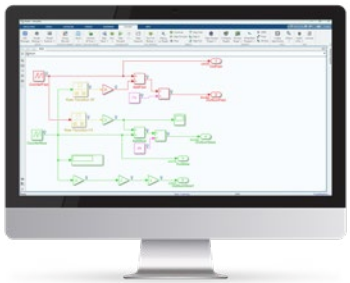
Unlimited programming possibilities

Download the toolchain directly

Installing the PLCnext Technology toolchain

The PLCnext CLI (PLCnext Command Line Interface) provides the complete toolchain for C++ programming for PLCnext Technology as well as a template system for creating projects. You can use these templates as a basis for developing your applications.

Detailed instructions for installation, getting started, and your own project are available on GitHub



Matlab Simulink

Matlab Simulink is a software environment from The MathWorks Inc. that is used for the graphical modeling, simulation, development, and implementation of dynamic systems and control algorithms.

In conjunction with PLCnext Technology, Simulink enables engineers to create sophisticated automation logic without the need for traditional PLC programming. With PLCnext Target for Simulink, models can be translated directly into IEC 61131-3-compliant function blocks or PLCnext Engineer programs and executed on PLCnext Control. This seamless integration bridges the gap between model-based development and industrial automation. It optimizes development, reduces errors, and shortens the time to market.

Link: Download software add-on for the integration and execution of Matlab Simulink models on Remote Field and Axioline controllers

Take inspiration from this example of use with Matlab Simulink

Podman – OCI Container in PLCnext Technology

With Podman on PLCnext Control, Phoenix Contact is taking industrial automation to a new level – flexible, containerized, and future-proof. As a lightweight, docker-compatible container engine, Podman enables the easy deployment and management of applications directly on the controller – without any additional overhead or root daemons. Since firmware version 2023.0, Podman has been an integral part of the PLCnext Technology operating system and opens up completely new freedoms for developers. Whether Node-RED, OPC UA communication or individual microservices – containerized applications can be started, managed, and operated automatically with just a few commands.

This integration makes PLCnext Control the ideal platform for modern, modular automation solutions – open for open source tools, secure with rootless containers, and ready for the requirements of Industry 4.0. Choosing Podman in PLCnext Technology means choosing maximum flexibility, simple scalability, and a future-oriented architecture.

You will find detailed instructions for installing and commissioning the Podman engine here


{
sell=
code.
solutions
}
Buy
automation
solutions
PLCnext
Store

Accelerated application development

As a result of advancing digitalization, complex software functions are taking up more and more space within automation projects. This requires increasingly specialized software skills in application development. Not all programmers have the necessary expertise for this. Phoenix Contact has established the PLCnext Store digital software marketplace precisely for this purpose.

The PLCnext Store offers software applications (apps) with which you can immediately and easily extend the functions of PLCnext Control. This can significantly increase the efficiency of your development processes. The apps on offer range from software libraries for accelerated programming to fully programmed apps that can be used without programming knowledge.

The openness of the store also allows third-party developers to use the platform to commercialize the apps they develop. With the dynamically growing range on offer, the variety and application possibilities are constantly increasing. Be inspired! The PLCnext Store provides innovative solutions and creative ideas, even for highly specialized requirements.

Find out more

Video: Install extraordinary possibilities

Video: Industrial automation – completely different with the PLCnext Store

Your advantages

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

Be inspired!
The PLCnext Store provides innovative solutions and creative ideas, even for highly specialized requirements.

PLCnext Store for users

Increased efficiency for your development project

In times of shortening innovation cycles, it is important to use resources economically. Eliminate time-consuming programming steps and reduce the time required in the engineering process by using apps from the PLCnext Store. You will find innovative solutions here, even for highly specialized requirements.

Register for the PLCnext Store

”We need to make better use of existing **potential**, for **faster developments** and more **innovative strength**. The PLCnext Store was designed to use the **collective intelligence** of the entire industry”.

Ulrich Leidecker, Phoenix Contact,
COO and President Business Area Industry Management & Automation

Speed up your application development

The PLCnext Store follows the idea of using existing industry expertise. It offers niversal, customizable software solutions for a wide range of projects. Depending on the use case, you can use software libraries for accelerated programming or fully programmed apps. Load the apps directly onto your PLCnext Control or integrate them into your engineering environment – through a simple plug-and-work mechanism.

Stay fit for the future

With their knowledge and innovative solutions, many software experts contribute to a diverse range of offers in the PLCnext Store. The number of apps available is constantly increasing. Make use of this potential. Keep pace with changing requirements and technology trends.

>220

software applications for simple functional extension of PLCnext Control

>33

app developers providing expertise from different areas

0

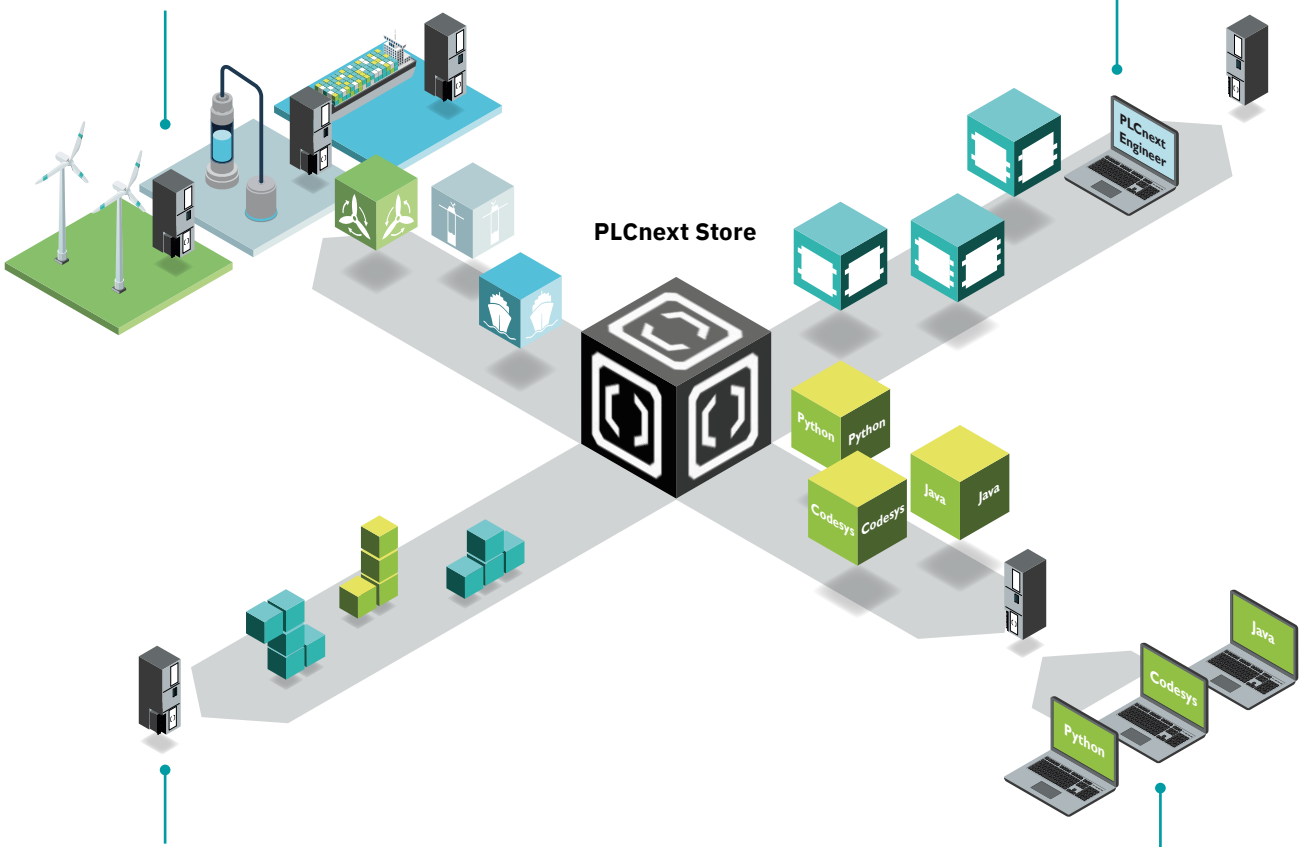
limitations in the implementation of automation projects

Large variety of functions

Artificial intelligence, cloud connector, communication, database, Human Machine Interface, I/O module functions, redundancy, remote control, remote monitoring, safety, security

Transform your PLCnext Control into a fully functional application-specific controller without additional programming knowledge

Accelerate your engineering processes through the integration of turnkey software libraries



Install function extensions for your PLCnext Control, such as cloud integration and MQTT servers

Extend your programming options with additional runtime environments

PLCnext Store for app developers

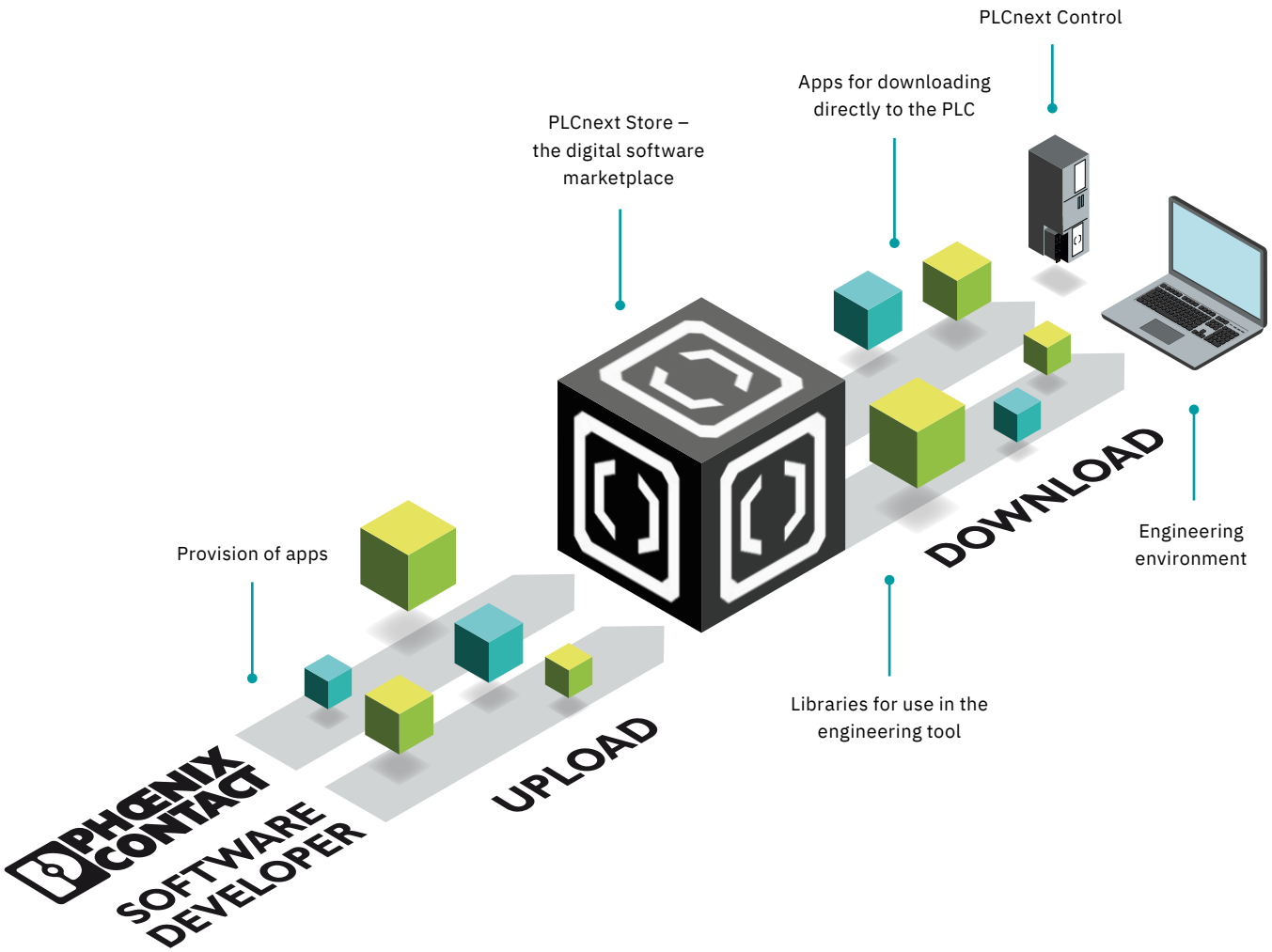
Experience new business perspectives

Have you already developed software solutions or would you like to create an app for automation with a PLC from the PLCnext Control range?

PLCnext Store is the digital marketplace and central platform for connecting software professionals with PLCnext Technology users. It is the marketplace where the best software ideas are turned into great automation projects.

We will help you to market your software profitably in the PLCnext Store.

Get started as a PLCnext Store developer



Reach new customer groups

As a digital marketplace, the PLCnext Store is the central point that connects you with users of PLCnext Technology. Benefit from access to a new, broad customer base and use the PLCnext Store to sell your software modules and solutions.

Increase your brand awareness: Publish your app in more than 50 countries around the world and reach new customers in an industrial environment that is relevant to you.

Easy processes – success in just a few steps

Along with the easy access to a broad and industry-specific target group, you will also be benefiting from a new, digital business model. The PLCnext Store opens up new opportunities for you to quickly extend and scale your reach. Commercialize your software for PLCnext Technology without having to worry about distribution, licensing, or commercial issues. You set the price for your developments yourself – we take care of the licensing process and sales management for you.

It has never been easier to be part of PLCnext Technology. Publishing your app in the PLCnext Store gives you access to a wide range of tools and resources. Receive support for every phase of development – we will accompany you on your way from the idea to the code.

> We were able to deploy an app to connect to the AnyViz cloud in just **a few weeks**. This would not have been possible without the **open** and well-documented PLCnext Technology Ecosystem".

Thomas Hepp, Mirasoft, co-founder

Start with the development

You will find helpful tools for turning your idea into code here:

- Register now!
  Create a developer account easily and directly
- Go to the PLCnext Store Info Center, which contains detailed documentation on various subjects related to PLCnext Technology
- Go to the software development kit – a toolchain consisting of an SDK and a cross-compiler

PLCnext Community

Benefit from crowd knowledge

The PLCnext Community consists of people who are involved with PLCnext Technology. As digitalization and globalization advance, new types of collaboration are becoming both possible and necessary. Because of shortened cycles in development and high competition, your company faces new challenges that are very difficult to overcome alone. We are therefore promoting more effective collaboration and crowd knowledge. With PLCnext Technology, several developers from different disciplines can work together on one project or use open source software, for example, from GitHub. This leads to fast application developments, especially for complex applications. With the help of the community, the code is less vulnerable to error and faster bug fixes are available. This means you can increase your innovative strength and save resources.

Stay in touch with us through our PLCnext Community website and social media channels. Be the first to know about firmware updates and product news. Exchange ideas with other users at any time, share your experience, or ask a question in the forum. Learn more about new industry trends and already-realized applications. Would you like to dive deeper into the world of the PLCnext Technology Ecosystem? There is a wide range of tutorials, e-learning programs, and webinars awaiting you, or you can participate in one of our events and experience PLCnext Technology live.

Join and get involved
Whether you're looking for testimonials, apps, expert advice, 24/7 support, events and webinars, launch news, or industry trends, you will find everything in one place.

Find out more about the PLCnext Community.

Your advantages

- New and more efficient forms of collaboration
- Shorter innovation cycles with a higher degree of innovation
- Faster application development, even for complex applications
- Lower error rates and faster bug-fixing
- Exchange ideas with other users, share experiences, and ask questions at any time

Become a part of the PLCnext Community!
#iamplcnext
#plcnext

Why the sum is more than its parts

When it comes to cooperation in the PLCnext Technology Ecosystem, one plus one does not equal two. Because the more partners there are, the more valuable it becomes for each of the participants. When specialists work together and contribute their expertise and experience, both sides can grow. Collaboration makes it possible to solve problems and achieve goals that seem unattainable alone. But collaboration in an open ecosystem is more than just a handshake captured in a photo. Instead, it is a matter of attitude and mindset.

Find the right partner for you

What else is required beyond trust? Read more here

”

Without trust, we do not really work together; we merely coordinate or, at best, cooperate. It is **trust** that turns a group of people into a **team**”.

Stephen Covey, The Speed of Trust

Join and get involved

There is always someone talking about PLCnext Technology – and we hope you will be one of them. Whether you are looking for peer experiences, applications, advice from experts, informal chats, live event feeds, launch news, or industry trends, you will find them here. Become a part of the PLCnext Community and join in the good work. Meet new like-minded people, share experiences, discuss new ideas, ask questions, and talk to our experts. Simply use the hashtags #plcnext, #iamplcnext, or the tag @plcnext.

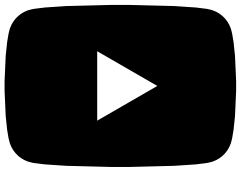
~6,500
registered users

>8,500
questions asked and answered in the forum

@plcnext #plcnext #iamplcnext

>31,000
followers on social media

Videos and tutorials on YouTube



Find PLCnext Technology on YouTube and watch new videos – whether live recordings, customer experiences, application examples, or reports from trade fairs and events. Subscribe to the Phoenix Contact YouTube channel and watch new clips regularly to make sure you don't miss any new application examples or live reports.

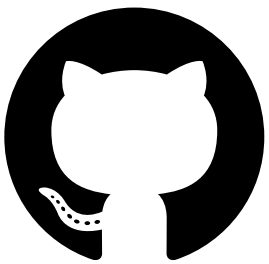
Tutorials for technical support

You can also use our tutorials to learn more about PLCnext Technology. The tutorials cover a wide range of knowledge, depending on your level of experience, from basic and introductory tutorials to the finer points of high-level language programming, data logging, OPC UA, and debugging.

Experience PLCnext Technology on YouTube

Technical support and tutorials

Use and share open source code

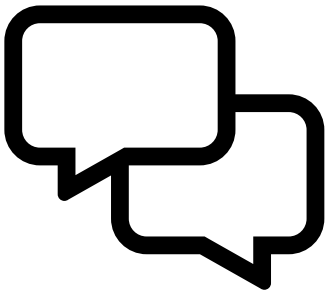


Find open source code for PLCnext Technology on GitHub and start your own project. Use sample code for C++, C#, MQTT, or Node-RED, for example. You can also download our PLCnext Technology toolchain to support high-level language programming here.

Go directly to GitHub

Directly to the toolchain

Ask a question in the forum



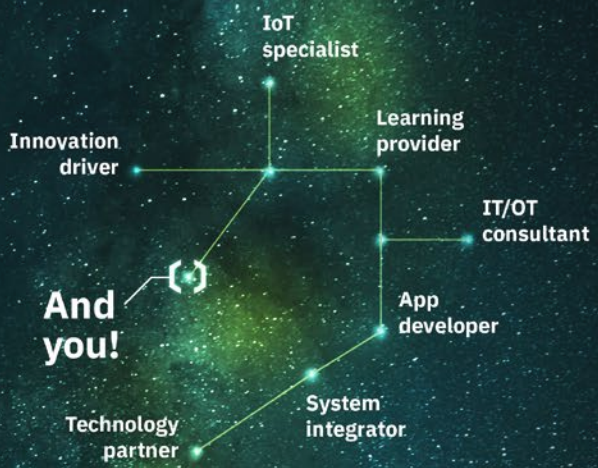
Do you have a question? Then take a look at our FAQs or ask directly in the forum. Other users or our PLCnext Technology experts will respond to your question as soon as possible. Find the right webinar for you, watch tutorials, and get the information you need from our detailed documentation in the Help Center.

Go directly to the forum

Information, support, and useful resources

Collaboration for innovation – become a partner now

To keep up in our rapidly changing industrial world, we need to bring together the knowledge and expertise of the leading minds of our automation world. Our strong partner network, with experts from all areas of the industry, has innovative power and future viability.



Would you like to be a part of the ecosystem and become a partner?
If so, just contact us.

”I had the opportunity to dive into discussions about the future of open automation – and it reminded me why **I love being part of this community**”.

Christoph Garbe, HD Vision
CEO

”The goal must be to work together with various **experts** to develop a solution for the customer. That’s the only way to a **fast solution** and **innovation**.”

Jörn Steinbeck, oee.ai,
Co-Founder

Strategic partnership – shaping innovation together

In an increasingly networked and dynamic automation world, real partnerships are the key to sustainable progress. PLCnext Technology is consistently following this path with strong partners such as Festo and Yaskawa. What sets these collaborations apart is not just a common goal, but also a deep mutual trust, technological openness, and the will to set new standards together.

Faster, more flexible, better together

The strategic partnerships with Festo and Yaskawa pursue a clear objective: to develop future-proof, open automation solutions based on PLCnext Technology. Everyone involved benefits from shorter market launch times and reduced integration costs, right through to an extended exchange of expertise.

Openness meets innovation

Festo is integrating PLCnext Technology into its new generation of intelligent edge controllers and using the open architecture for customized customer solutions. Yaskawa, on the other hand, is contributing its expertise in drive technology and is working with Phoenix Contact to develop new control concepts for motion control applications and the integration of drive technology. Both partners have full access to the source code of PLCnext Technology – a strong sign of trust and equality. As a result, they both provide apps for their devices in the PLCnext Store.

This collaboration goes beyond technical interfaces. It is based on a common understanding of open standards and agile development as well as the desire to offer customers real added value.

An ecosystem for tomorrow

The partnerships with Festo and Yaskawa are an integral part of the ecosystem. They strengthen the community, promote innovation, and create a platform to which new partners can connect. The openness of the technology and the collaboration on an equal footing make these cooperations a model for Industry 4.0.

Find out in this interview how Festo is using PLCnext Technology to implement future-proof automation solutions

Read the interview about Yaskawa's partnership with PLCnext Technology and find out more about its innovative synergies

PLCnext Core

PLCnext Core is the central operating system of PLCnext Technology. Originally developed for our own controllers, the core is now also used by technology partners such as Festo and Yaskawa to extend and customize their device platforms.

As a licensable runtime system, PLCnext Core separates hardware from software, thus enabling flexible, scalable, and secure control solutions on embedded systems. The open architecture allows the integration of common programming languages and development tools, while functions such as Secure Boot and encrypted communication support the implementation of security-compliant devices in accordance with the Cyber Resilience Act and IEC 62443. Real-time capability and connectivity via OPC UA and MQTT are directly anchored in the system.

”

On the one hand, the integration of existing systems offers a significant advantage in terms of **investment security** and costs. Furthermore, **optimized and tailor-made solutions** are possible, which secure our own **expertise** and therefore **provide the customer with competitive advantages**”.

Tobias Unger,
General Manager of the European Technology Center at Yaskawa Europe GmbH

”

With an open architecture, you can have both: software from different providers and **seamless connectivity** at the same time. This opens up **new possibilities for** customers, as they have a much **wider range of solutions** to choose from”.

Helmut Deichert,
Head of Product Line Controls at Festo

A vision for a future worth living

A global society with renewable and affordable energy and a neutral carbon balance – this is the All Electric Society. It is more than just a technological goal – it is a vision for a future that is worth living. A future in which energy from renewable sources is used, distributed, and stored intelligently. In this networked world, sectors merge, systems communicate with each other, and sustainability becomes the basis for economic action.

PLCnext Technology as the digital foundation

PLCnext Technology is the operating system of an All Electric Society. The open ecosystem enables seamless integration of renewable energies, intelligent automation of complex processes, and secure networking of decentral systems. PLCnext Technology creates the conditions for solutions that actively shape the transition to the All Electric Society.

Use cases as companions of the transformation

The use cases presented on the following pages show how PLCnext Technology is already being recognized as a pioneer for the All Electric Society. They illustrate how technological openness results in concrete solutions and how ideas can become real contributions to the energy transition. Innovation and responsibility are intertwined and pave the way for an electrical, networked, and livable future.

Find out more about the All Electric Society

There is much to discover.
Join us in thinking about
the future of automation
today.

With innovative automation technology to intelligent sector coupling

100%
wind power

900 kg
system capacity per day for hydrogen generation

<300 ms
switch-over time – continuous operation guaranteed

Comprehensive automation and intelligent control for hydrogen production

The production of green hydrogen is part of the regional hydrogen ecosystem, HY.City.Bremerhaven. GP Joule is implementing the project as general contractor: from electrolysis, through compression and mobile storage, right through to its own hydrogen service station with fuel cell buses for public transport. The energy comes from an existing wind turbine generator that supplies the electrolyzer.

High availability of the control technology is crucial for unmanned operation. At the heart of it all is PLCnext Technology with redundancy at multiple levels: controllers, a battery-supported power supply, and a ring network. This means that the system is still functional even if individual components fail.

Secure cloud communication for the hydrogen trailers is provided via TC routers and TC mGuard. PLCnext Technology contains IEC 62443-certified components and enables time-efficient fueling via the coordinated control of level detection, valves, and GPS monitoring. An integrated system ensures that the supplied hydrogen quantities are billed in accordance with legal requirements.

PLCnext Control takes over the central control at the electrolyzer site and records all the operating data. These are transmitted wirelessly to a central evaluation unit via the TC mGuard router and an antenna.

For the trailer controller, products with explosion protection are used in combination with Axioline F, I/O modules, and signal isolators – for safe and precise signal acquisition in all zones.

Robust hardware and intelligent software connect the entire hydrogen value chain – from electrolysis, through mobile storage, right through to fueling. This creates a digitalized overall system that enables sector coupling and paves the way for the All Electric Society.

Find out more

Video: Intelligent sector coupling for HY.City. Bremerhaven, Germany

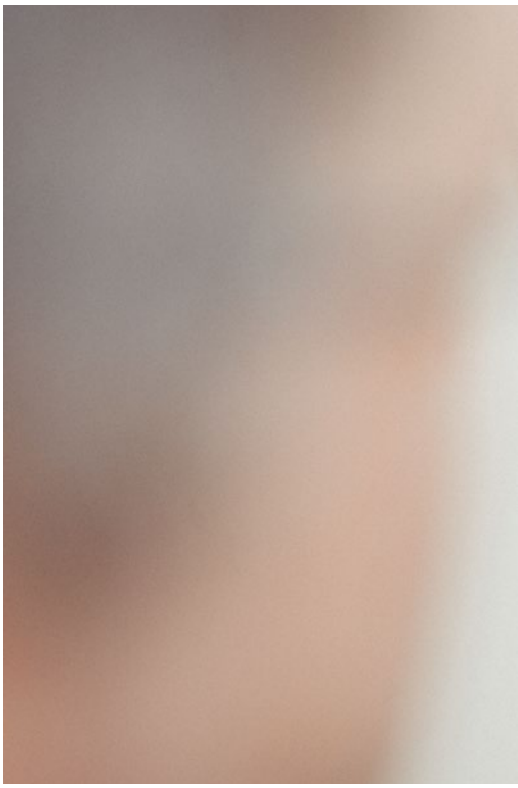
Advantages for HY.City.Bremerhaven

Reliable and safe automation of hydrogen systems
High system availability is ensured by redundant controller hardware, which is coordinated by the intelligent ASR (Applicative System Redundancy) software solution – supplemented by uninterruptible power supplies and network technology. Even short-term failures are safely bridged. This is a decisive factor when handling hydrogen in mobile applications.

Scalable and modular system architecture
From electrolysis through to mobile fueling, the platform enables the flexible automation of all process steps. This means that systems can be extended easily and adapted to future energy requirements.

Real-time data transparency
Secure connectivity to the cloud allows remote monitoring, compliant billing of the hydrogen supplied, and complete process transparency – for efficient operational processes and compliance with legal requirements.

Fast integration with open standards
The support of high-level languages and OPC UA simplifies integration into existing infrastructures and accelerates development cycles.

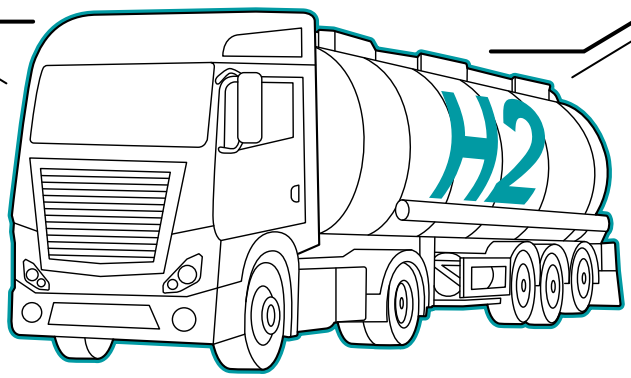


”We can **record fill volumes**, **control valves,** and **track the current location of the trailer via GPS**. The functions are supplemented by a system integrated into the PLCnext Control for the **calibration-law compliant billing** of the supplied hydrogen”.

Marian Hieke,
Head of Engineering at GP Joule

A strong ecosystem on the road to success

PLCnext Control
PLCnext Control ensures high system availability with redundant controllers, smart ASR software, robust power supply technology, and robust network technology – essential for the safe handling of hydrogen in mobile applications. At the electrolysis site, a central controller takes over the remote monitoring of hydrogen production and fueling.



PLCnext Engineer
PLCnext Engineer was used for the configuration. The PLCnext Control is programmed in IEC 61131.

PLCnext Store
The modules required for the ASR redundancy software are available as an app in the PLCnext Store. This allows the intelligent redundancy solution to be integrated into existing automation systems quickly and easily.

With open automation into an electrified future

Carbon-neutral production

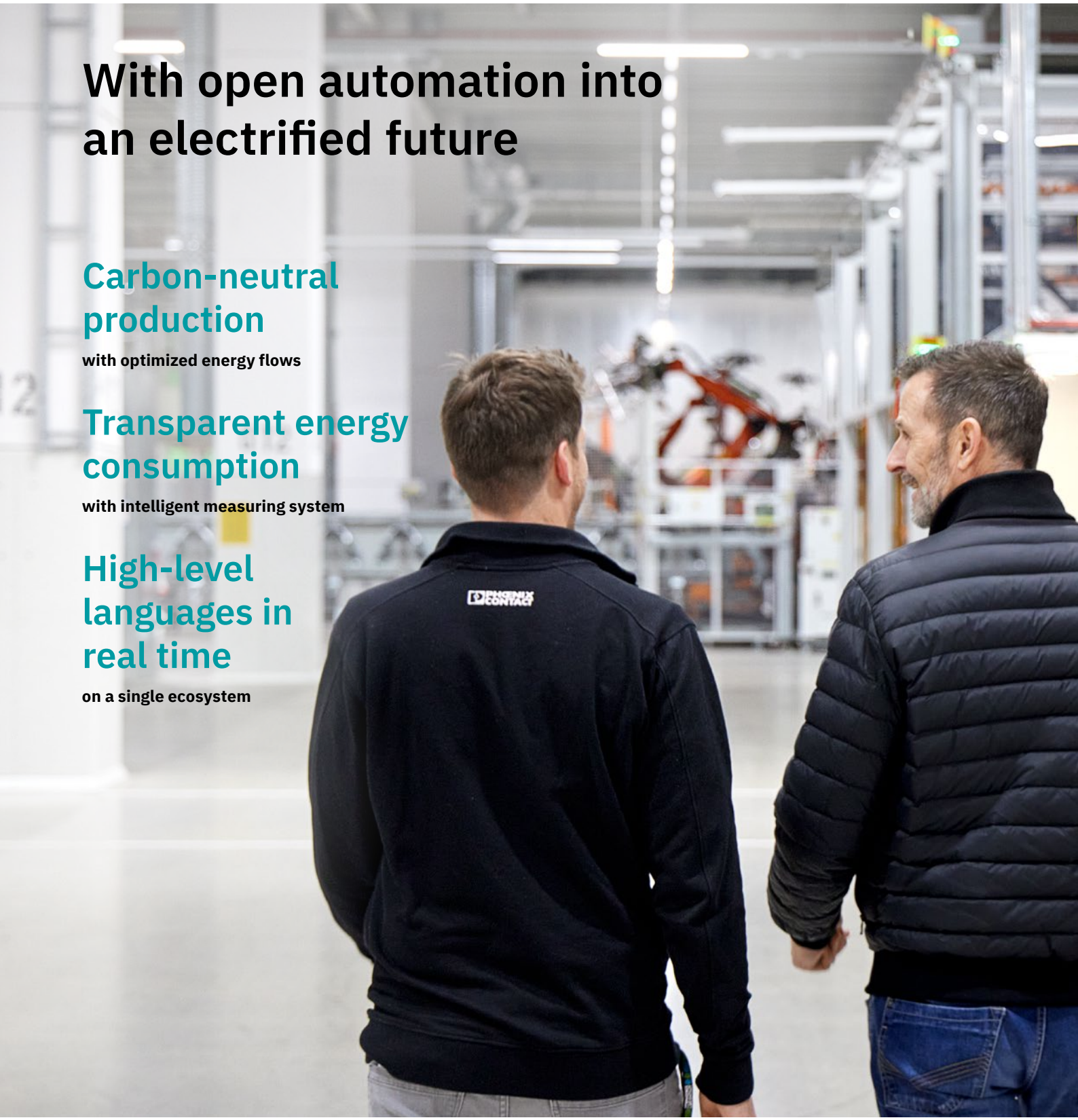
with optimized energy flows

Transparent energy consumption

with intelligent measuring system

High-level languages in real time

on a single ecosystem



On the path to a sustainable future

Audi relies on PLCnext Technology at its Ingolstadt location in Germany for the body shop of the all-electric Audi Q6 e-tron series. In addition to numerous functions for IIoT applications, the open ecosystem also features integrated cybersecurity in accordance with the international IEC 62443-4-2 standard.

Phoenix Contact is supporting the transition to greater sustainability on the way to a sustainable future: The company provides key technologies for electrification, networking, and automation – including PLCnext Technology, for example. The open ecosystem has a large number of interfaces, from the sensor through to the cloud. This enables it to contribute to the continuous flow of information in carbon-neutral production.

In addition to the standard programming of PLC systems in accordance with IEC 61131-3, PLCnext Technology also enables the parallel use of high-level languages such as C/C++, C#, and Matlab Simulink. Both languages run in combination in real time on the PLCnext Control. This means that production can benefit from the expertise of both IT and OT specialists. The ecosystem is therefore also contributing to the transition toward the automation of the Audi production facilities.

In the body shop in particular, it is important to improve emission values through influencing factors such as quality, availability, and adaptability. Every time there is no load or a car body is rejected from the manufacturing process, not only are costs incurred. The production-related GHG balance is increased. To prevent this from happening, Audi uses numerous measures to monitor consumption. These include shutdowns during idle times and the use of communication-capable energy meters, such as the EEM-MA 370 multifunctional measuring device from Phoenix Contact.

To increase optimization even further at this point, transparency about the energy flows and information that indicates a malfunction as soon as it occurs is needed. Even the smallest deviations from quality, which are indicated at an early stage, can make a decisive contribution here. Identifying additional potential for improvement in the process flow results not only in shorter cycle times, but also in the optimization of the energy balance of each individual car.

Find out more

Advantages for Audi

Reduced carbon emissions
Audi achieves climate targets through optimized energy flows and transparent production data. PLCnext Technology supports carbon-neutral manufacturing.

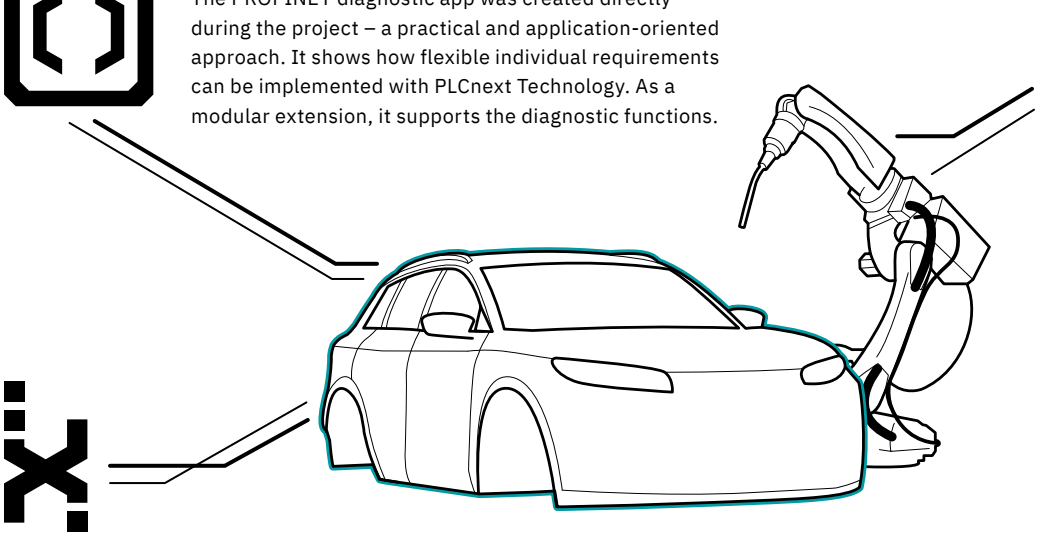
Integrated cybersecurity
Certified safety standards protect sensitive production data. This ensures compliance and operational safety.

Scalable automation architecture
The system grows with production requirements. The modular design supports future extensions and integration.

Improved energy transparency
Intelligent measuring systems and data analyses reveal energy consumption patterns. This helps to reduce waste and optimize consumption.

A strong ecosystem on the road to success

PLCnext Store
The PROFINET diagnostic app was created directly during the project – a practical and application-oriented approach. It shows how flexible individual requirements can be implemented with PLCnext Technology. As a modular extension, it supports the diagnostic functions.



PLCnext Control
As the central element of the production system, PLCnext Control collects, processes, and generates system data directly on site – “Safe and Secure”. The intelligent architecture ensures outstanding performance and meets the most stringent industrial requirements.

PLCnext Engineer
The well-planned user interface of PLCnext Engineer enables the structured and time-efficient commissioning of complex production systems. In combination with the automatically generated visualization, this has accelerated the engineering process at Audi.

”We faced a **wide range of challenges** in the project– from increasing the **efficiency** to **sustainable process design**. The **open ecosystem** gave us the necessary flexibility to develop a **customized solution** for each individual task. PLCnext Technology was a central component on our way to **carbon-neutral production**”.

Jan Diestelkamp, Phoenix Contact
Senior Project Manager Smart Production and Automotive

674
charging points

100%
peak load avoidance

15
PLCnext Control AXC F 2152

600 kW
managed charging power

Scalable charging infrastructure for electric vehicles at Brussels Airport, Belgium

Intelligent charging infrastructure for sustainable mobility solutions

In line with the vision of an All Electric Society – a world in which energy comes from renewable sources and is used intelligently and efficiently – Phoenix Contact and Interparking have jointly implemented a comprehensive charging infrastructure network for electric vehicles at Brussels Airport. A total of 674 charging points have been installed, which are controlled and coordinated via 15 PLCnext Control AXC F 2152 controllers.

In order to meet the increasing demand for charging capacities, an intelligent load management system has been developed that is specifically tailored to the requirements of Brussels Airport. The challenge lies in efficiently managing the operation of all charging points without exceeding grid capacity or triggering costly peak loads.

With an energy management system based on PLCnext Technology, the available energy is distributed dynamically and in accordance with demand – exactly where and when it is needed. This ensures stable operation and optimal use of the available resources.

This project is an impressive demonstration of how PLCnext Technology is supporting the transformation to the All Electric Society – through the intelligent combination of electrification, automation, and digitalization for a sustainable future.

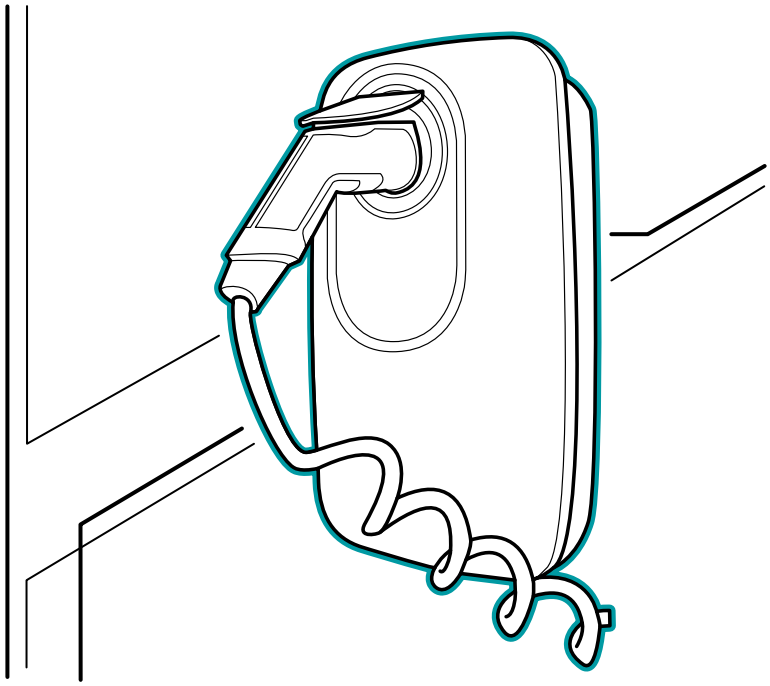
Find out more

”The ability to control **energy flows in real time** across hundreds of charging points is exactly what we needed. **PLCnext Control** gave us the **flexibility** and **power** to enable this safely and reliably”.

Michaes Goethals, Phoenix Contact Belgium
Project Manager Industry Management and Automation

A strong ecosystem on the road to success

PLCnext Engineer
Using PLCnext Engineer enabled software to be developed that was tailored to the needs of the customer.



PLCnext Control
In combination with the performance of the PLCnext Control AXC F 2152, a robust energy management system (EMS) was able to be implemented for the customer. The high computing power and real-time capability of the controller enabled the precise acquisition and control of all relevant energy flows.

PLCnext Store
The use of ready-made libraries available in the PLCnext Store saved a lot of time. This made it possible to reduce development costs and focus on system integration.

Advantages for the solar park

No network extension required
With the intelligent load management system, Interparking was able to avoid costly extensions to the existing power grid. The available energy can be used more efficiently and overloads are reliably prevented.

Scalable charging infrastructure
The solution already supports 674 charging points and can be extended flexibly. PLCnext Technology ensures modularity and future-proofing.

Energy optimization in real time
The power distribution system is continuously being adapted to the actual demand. This ensures that the charging power remains stable and reliable even at peak times.

Reduced operating costs
Avoiding peak loads and having to extend the grid significantly reduces energy-related costs. In addition, the system reduces maintenance effort through intelligent monitoring.

Architecture ready for the AES
The infrastructure enables the integration of renewable energies and follows the principles of the All Electric Society. It is designed for long-term sustainability.

AI-based forecasting capability
The system is ready for future extensions such as predictive analyses. This will enable proactive load management and even more intelligent use of resources.

360
PV half-cell panels

37
inverters

4
transformer stations

1
power control unit (feed-in controller)

Increasing efficiency for a sustainable future

Climate-friendly and robust automation system for the solar park of the Dessora industrial park

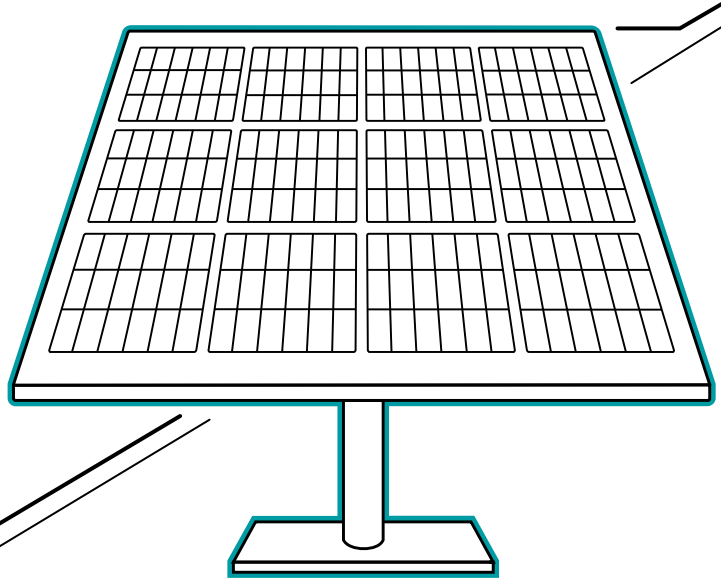
ASG Engineering developed an intelligent comprehensive solution for reactive power control in photovoltaic systems at night based on PLCnext Technology for the solar park at the Dessora industrial park. The new Q@Night control function prevents capacitive and inductive power dissipation from the solar parks, meaning that the grid operator of the 10 MW solar system does not have to buy reactive power. The financial outlay for such purchases would add up to a mid-range five-digit amount over the course of a year.

The Q@Night control function programmed by the company and integrated into the power control unit now ensures that the inverters in the photovoltaic park do not shut down during the night, as is normally the case, but continue to provide reactive power. The inductive and capacitive losses are balanced.

Find out more

A strong ecosystem on the road to success

PLCnext Engineer
The Q@Night function is programmed in Matlab® Simulink® with PLCnext Engineer.



PLCnext Store
This feed-in control is available as an app in the PLCnext Store. There are six different licenses depending on the system output.

PLCnext Control
The hardware and software of the feed-in controller can be adapted individually and project-specifically at any time, as can the Q@Night control function.

Distributed power generation contributes significantly to reliable power supply in the All Electric Society.

Advantages for the solar park

Intelligent comprehensive solution
PLCnext Technology hardware, software, and license.

Suitability for industrial applications
The robustness and industrial suitability of PLCnext Technology is essential in the application of the large 10 MW solar park in particular.

Failsafe performance and adaptability
The reliable and failsafe hardware and software for extending the feed-in controller can be customized individually and specifically for each project.

Efficient extendibility
With the potential for developing on the PLCnext control with Matlab® Simulink®, the Q@Night control function was implemented quickly. This saves both costs and energy.

Safety
System operators need a certified feed-in controller. This feed-in controller, certified in accordance with the German Directive VDE-AR-N 4110/4120, ensures that distributed power generation plants that are connected to medium- and high-voltage grids feed in electricity in accordance with the grid requirements. The feed-in controller received the component certificate in 2019.

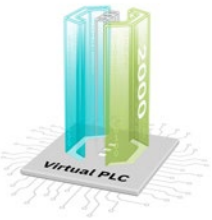
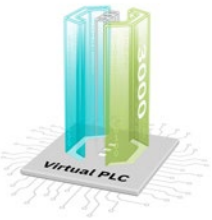
Sustainability
The Q@Night function prevents power dissipation and saves electricity.

Controllers

Type	AXC F 1252	AXC F 2152	AXC F 3152	Starter kit
				
Item no.	1646469	2404267	1069208	1188165
Processor/clock frequency	i.MX93 (Arm Cortex A55 2 x 1.7 GHz)	Arm Cortex A9, 2x 800 MHz	Intel Atom E3930, 2x 1.3 GHz	Would you like to test the operation, handling, and performance of PLCnext Technology in a small application first? The starter kit includes: • PLCnext Control AXC F 2152 • Axioline Smart Elements: digital input, digital output, analog voltage input 0 V ... 10 V • 24 V power supply unit and space for extensions
Main memory (RAM)	1 GB	0.5 GB	2 GB	
PROFINET devices	16	64	128	
Number of tasks (cycle)	8 (4 ms)	32 (1 ms)	32 (500 µs)	
Security	IEC 62443-4-1 and IEC 62443-4-2 Full ML3, IEC 61850 Ed. 2.1, and IEC 62351-3	IEC 62443-4-1 and IEC 62443-4-2 Full ML3, IEC 61850 Ed. 2.1, and IEC 62351-3	IEC 62443-4-1 and IEC 62443-4-2 Full ML3, IEC 61850 Ed. 2.1, and IEC 62351-3	
Interfaces	Axioline, PROFINET	Axioline, PROFINET, PLCnext Control extensions	Axioline, PROFINET, PLCnext Control extensions	
Certifications	UL, CE	UL, CE, Maritime, IECEx, ATEX, PROFINET	UL HazLoc, CE, Maritime, PROFINET	
Other	Integrated bus socket			

Type	RFC 4072S	RFC 4072R	BPC 9102S	VL3 UPC 2440 EDGE
				
Item no.	1051328	1136419	1246285	1760157
Processor/clock frequency	Intel Core i5-6300U, 2x 2.4 GHz	Intel Core 5-6300U, 2x 2.4 GHz	Intel Core i7-107000TE, 8x 2 GHz	Intel Atom x6413E, 4x 1.5 GHz
Main memory (RAM)	8 GB	8 GB	16 GB	16 GB LPDDR4
PROFINET devices	256	256	256	16
Number of tasks (cycle)	32 (500 µs)	1 (10 ms recomm.)	128 (500 µs)	4 (1 ms)
Security	IEC 62443-4-1 and IEC 62443-4-2 Full ML3	–	IEC 62443-4-1 and IEC 62443-4-2 Full ML3	Password-protected logins, TPM 2.
Interfaces	PROFINET/PROFIsafe	PROFINET, Sync Link	PROFINET/PROFIsafe	2x USB 3.1 / Display port 1.4 / 2x Ethernet 1000 Mbps / 2x Serial CO
Certifications	UL, CE, PROFINET/PROFIsafe	CE	UL, CE, PROFINET/PROFIsafe	UL, CE
Other	300 PROFIsafe devices	Redundancy operation	300 PROFIsafe devices	Virtual PLCnext Control, Ubuntu Pro Desktop

Controllers

Type	Virtual PLCnext Control 1000	Virtual PLCnext Control 2000	Virtual PLCnext Control 3000
			
ESM	1	2	4
Tasks / ESM	4	8	16
Number of ARs	16	64	128
Cycle time	1 ms	1 ms	1 ms
Program memory	4 MB	8 MB	12 MB
Data storage system	6 MB	12 MB	32 MB
Modbus/TCP server	8	16	32
PROFINET controller / device	●	●	●
High-level language programming (C# / C++ / Matlab / ...)	●	●	●
App manager	●	●	●
Alerting and retaining	●	●	●

PLC extensions

Type	AXC F XT ML1000	AXC F XT SPLC 1000	AXC F XT SPLC 3000	AXC F XT ETH 1TX
				
Item no.	1259849	1159811	1160157	2403115
Description	Artificial intelligence	Safety 1000	Safety 3000	Ethernet
Extension...	...with a machine learning module	...with a safety-related controller	...with a safety-related controller	...with an additional Ethernet interface
Type	**AXC F XT PB**	**AXC F XT EXP**	**AXC F XT IB**	**AXC F XT KIT**
				
Item no.	1091657	1139999	2403018	1383116
Description	PROFIBUS	Expansion	INTERBUS	Extension kit
Extension...	...for connecting a PROFIBUS network	...for connecting up to three further PLCnext Control extensions	...for connecting an INTERBUS remote bus	...with a universal miniPCIe interface

For further product information, please click on the respective item number.

Smart Services at Proficloud.io

Device Management Service

Device Management Service
Powered by Proficloud.io

The standard for all smart devices from Phoenix Contact

- Overview of all devices and their state of health
- Digital nameplate and device logs
- Extension with DMS Basic Add-on: group formation, hall plans, and visual placement
- Automation of remotely executable firmware and application updates as well as email notifications in the event of status changes

Further information on the Device Management Service

User Management Service

User Management Service
Powered by Proficloud.io

Invite users to Proficloud.io organizations and assign individual permissions

- Inviting people to Proficloud.io organizations
- Predefined roles such as admin, editor, and viewer
- Create new organizations quickly and easily
- Manage multiple locations with one login

Further information on the User Management Service

Time Series Data Service

Time Series Data Service
Powered by Proficloud.io

All process data available centrally – anytime, anywhere

- Alarms in the service or via email in the event of impending problems
- Higher product quality with targeted data use
- TSD Dashboard Library: immediately usable device dashboards
- Visualization for battery energy storage systems, as well as wind and solar applications
- Power reliability: cloud-based alarm generation with information on remaining service life and supply

Further information on the Time Series Data Service

Impulse Analytics Service

Impulse Analytics Service
Powered by Proficloud.io

The world's first intelligent assistance system for surge protection in the field of mains protection

- Improved workflows with remote monitoring
- From reactive to proactive maintenance
- Detailed information on overcurrent events (State-of-Health reports) and remaining service life of the surge protection device (SPD)
- Greater availability and improved process stability

Further information on the Impulse Analytics Service

Energy Management Service

Energy Management Service
Powered by Proficloud.io

Smart energy management anytime, from anywhere.

- Visualization and analysis of energy data
- Early warning in the event of imminent limit violations
- Display and reporting of the energy performance indicators (EnPIs)
- Integration of external data possible
- Data export for further processing

Further information on the Energy Management Service

Find out more

Getting started

FAQs

Go to the service store

Axioline Smart Elements (AXL SE)

Description	Type	Item no.
Digital input module, digital inputs: 8, (floating) 48 V DC, connection technology: 2-conductor	AXL SE DI8/2 48	1438680
Digital input module, 16 channels, 1-conductor	AXL SE DI16/1	1088127
Digital input module (NPN), 16 channels, 1-conductor	AXL SE DI16/1 NPN	1105559
Relay module, two relay outputs, changeover contact, 220 V DC, 230 V AC	AXL SE DOR2 W 230	1105562
Digital output module, four channels, 2 A, 2-conductor	AXL SE DO4/2 2A EF	1181790
Digital output module, 16 channels, 1-conductor	AXL SE DO16/1	1088129
Digital output module (NPN), 16 channels, 1-conductor	AXL SE DO16/1 NPN	1105560
Safe digital input module (PROFIsafe), eight channels (one-channel assignment), four channels (two-channel assignment)	AXL SE PSDI8/3	1079241
Safe digital input module (FSoE), eight channels (one-channel assignment), four channels (two-channel assignment)	AXL SE FSDI8/3	1090203
Safe digital input module (SafetyBridge Technology), eight channels (one-channel assignment), four channels (two-channel assignment)	AXL SE SSDI8/3	1190012
Safe digital output module (PROFIsafe), four channels (one-channel assignment), two channels (two-channel assignment)	AXL SE PSDO 4/2 2A	1079231
Safe digital output module (FSoE), four channels (one-channel assignment), two channels (two-channel assignment)	AXL SE FSDO4/2 2A	1090205
Safe digital output module (SafetyBridge Technology), four channels (one-channel assignment), two channels (two-channel assignment)	AXL SE SSDO4/2 2A	1190017
Analog input module, four channels, 0 mA ... 20 mA, single ended	AXL SE AI4 I 0-20	1296378
Analog input module, four channels, 4 mA ... 20 mA, single ended	AXL SE AI4 I 4-20	1088062
Analog input module, four channels, 0 V ... 10 V, single ended	AXL SE AI4 U 0-10	1088104
Analog input module, four channels, -10 V ... 10 V, single ended	AXL SE AI U -10-10	1487836
Analog output module, four channels, 0 mA ... 20 mA, single ended	AXL SE AO4 I 0-20	1296372
Analog output module, four channels, 4 mA ... 20 mA, single ended	AXL SE AO4 I 4-20	1088123
Analog output module, four channels, 0 V ... 10 V, single ended	AXL SE AO4 U 0-10	1088126
Analog output module, four channels, -10 V ... 10 V, single ended	AXL SE AO U -10-10	1487835
Temperature measurement module, four channels for connecting resistance temperature detectors (Pt 100)	AXL SE RTD4 PT100	1088106
Temperature measurement module, four channels for connecting resistance temperature detectors (Pt 1000)	AXL SE RTD4 PT1000	1182190
Temperature measurement module, four channels for connecting thermocouples or linear voltage	AXL SE UTH4 EF	1182068

Axioline Smart Elements (AXL SE)

Description	Type	Item no.
Communication module, IO-Link master, four IO-Link ports Class A	AXL SE IOL4	1088132
Communication module, RS-485 serial interface	AXL SE RS485	1088128
Communication module, RS-485 serial interface, extended functionality	AXL SE RS485 EF	1507978
Communication module, RS-232 serial interface	AXL SE RS232	1181787
Communication module, RS-232 serial interface, extended functionality	AXL SE RS232 EF	1507979
Function module, counter input for 24 V sensors	AXL SE CNT1	1088131
Function module, symmetrical incremental encoder	AXL SE INC1 SYM	1088130
Function module, asymmetrical incremental encoder	AXL SE INC1 ASYM	1182185
Potential distribution module, 24 V DC	AXL SE PD16 24V	1337223
Potential distribution module, GND	AXL SE PD16 GND	1337224
Potential distribution module, 24 V DC, GND	AXL SE PD8/8 24V/GND	1337225
Module for covering unused backplane slots, active	AXL SE SC-A	1088134
Module for covering unused backplane slots, passive	AXL SE SC	1167159
Flat slot cover	AXL SE SC-F	1745227
Backplane, for accommodating four Axioline Smart Elements	AXL F BP SE4	1088135
Backplane, for accommodating six Axioline Smart Elements	AXL F BP SE6	1088136

Updating your Inline station

We have to adapt ever more quickly to new technologies, including those that are considered futuristic even by today's standards. But why dispose of an entire control station when you can adapt it easily to future technologies?

- Connectors for 63 Inline I/Os
- 24 PCP devices can be used
- 4096 bit input/output data
- Current consumption 20 mA
- Approvals: UL, CUL-DNV/GL, LR, BV, ABS, Rina

To the product

AXC F IL ADAPT
Item no. 1020304

Axioline F: Standard I/O modules

Description	Type	Item no.
Digital input module, eight channels, 2-conductor, 24 V DC	AXL F DI8/2 24DC 1F	2702783
Digital input module, eight channels, 2-conductor, 48 V, 60 V	AXL F DI8/2 48/60DC 1F	2702654
Digital input module, eight channels, 2-conductor, 110 V DC	AXL F DI8/2 110/220DC 1F	2700684
Digital input module, 16 channels, 1-conductor, 24 V DC	AXL F DI16/1 1H	2688310
Digital input module, 16 channels, 1-conductor, 24 V DC, with fast inputs	AXL F DI16/1 HS 1H	2701722
Digital input module, 16 channels, 4-conductor, 24 V DC	AXL F DI16/4 2F	2688022
Digital input module, 32 channels, 1-conductor, 24 V DC, 35 mm overall width	AXL F DI32/1 2H	2702052
Digital input module, 32 channels, 1-conductor, 24 V DC, 54 mm overall width	AXL F DI32/1 1F	2688035
Digital input module, 64 channels, 1-conductor, 24 V DC	AXL F DI64/1 2F	2701450
Safe digital input module (PROFIsafe), eight channels (one-channel assignment), four channels (two-channel assignment)	AXL F PSDI8/4 1F	2701559
Safe digital input module (SafetyBridge Technology), eight channels (one-channel assignment), four channels (two-channel assignment)	AXL F SSDI8/4 1F	2702263
Digital output module, four channels, 3-conductor, 24 V DC	AXL F DO4/3 AC 1F	2702068
Digital output module, four channels, 2-conductor, 24 V DC	AXL F DOR4/2 AC/220DC 1F	2700608
Digital output module, eight channels, 2-conductor, 24 V DC	AXL F DO8/2 2A 1H	2688381
Digital output module, 16 channels, 1-conductor, 24 V DC	AXL F DO16/1 1H	2688349
Digital output module, 16 channels, 1-conductor, 24 V DC, with FLK connection	AXL F DO16 FLK 1H	2701813
Digital output module, 16 channels, 2-conductor, 24 V DC	AXL F DO16/2 2H	1027904
Digital output module, 16 channels, 3-conductor, 24 V DC	AXL F DO16/3 2F	2688048
Digital output module, 32 channels, 1-conductor, 24 V DC, 35 mm overall width	AXL F DO32/1 2H	1004925
Digital output module, 32 channels, 1-conductor, 24 V DC, 54 mm overall width	AXL F DO32/1 1F	2688051
Digital output module, 64 channels, 1-conductor, 24 V DC	AXL F DO64/1 2F	2702053
Safe digital output module (PROFIsafe), eight channels (one-channel assignment), four channels (two-channel assignment)	AXL F PSDO8/3 1F	2701560
Safe relay output module (PROFIsafe), four safe relay outputs	AXL F PSDOR4/2 1F	2702858
Safe digital output module (SafetyBridge Technology), eight channels (one-channel assignment), four channels (two-channel assignment)	AXL F SSDO8/3 1F	2702264
Safe digital output module (SafetyBridge Technology), eight channels (one-channel assignment), four channels (two-channel assignment), with integrated safety logic	AXL F LPSDO8/3 1F	2702171
Safe relay output module (SafetyBridge Technology), four safe relay outputs	AXL F SSDOR4/2 1F	2702859

Axioline F: Standard I/O modules

Description	Type	Item no.
Digital input/output module, eight channels each, 1-conductor, 24 V DC	AXL F DI8/1 DO8/1 1H	2701916
Digital input/output module, eight channels each, 3-conductor, 24 V DC	AXL F DI8/3 DO8/3 2H	2702071
Digital input/output module, 16 channels each, 3-conductor, 24 V DC	AXL F DI16/1 DO16/1 2H	2702106
Digital I/O module, 16 channels (input), 1-conductor, eight channels (output), 2-conductor, 24 V DC	AXL F DI16/1 DO8/22A 2H	2702291
Analog input module, four channels, current, configurable current ranges	AXL F AI4 I 1H	2688491
Analog input module, four channels, voltage, configurable voltage ranges	AXL F AI4 U 1H	2688501
Analog input module, eight channels, current/voltage, configurable current and voltage ranges	AXL F AI8 1F	2688064
Safe analog input module (PROFIsafe), eight channels (one-channel assignment), four channels (two-channel assignment)	AXL F PSAI8 I 1F	1061424
Analog input/output module, two channels each, current/voltage, configurable current and voltage ranges	AXL F AI2 AO2 1H	2702072
Analog output module, four channels, current/voltage, configurable current and voltage ranges	AXL F AO4 1H	2688527
Analog output module, eight channels, current/voltage, configurable current and voltage ranges	AXL F AO8 1F	2688080
Temperature measurement module, four channels for connecting resistance temperature detectors (RTDs)	AXL F RTD4 1H	2688556
Temperature measurement module, eight channels for connecting resistance temperature detectors (RTDs)	AXL F RTD8 1F	2688077
Temperature measurement module, eight channels for connecting resistance temperature detectors (RTDs), with high dynamic range	AXL F RTD8 S 1F	2702120
Safe temperature measurement module (PROFIsafe), eight channels (single-channel assignment), four channels (two-channel assignment) for connecting resistance temperature detectors (RTDs), exclusively for connection to Phoenix Contact or Siemens controllers	AXL F PSRTD8 1F	1374265
Temperature measurement module, four channels for connecting thermocouples	AXL F UTH4 1H	2688598
Temperature measurement module, eight channels for connecting thermocouples	AXL F UTH8 1F	2688417
Function module, counter inputs: 2, digital inputs: 6, 24 V DC, digital outputs: 4, 24 V DC	AXL F CNT2 1H	1028066
Function module, two counter inputs for 24 V signals, two incremental encoder inputs, eight digital inputs	AXL F CNT2 INC2 1F	2688093
Communication module, serial interface, can be parameterized	AXL F RS UNI 1H	2688666
Communication module, IO-Link master, eight channels	AXL F IOL8 2H	1027843
DALI master, two channels, integrated DALI power supply unit	AXL F MA DALI2 1H	2702864
M-Bus master, for connecting M-Bus meters in accordance with EN 13757-2	AXL F MA MBUS 1H	1104545

Axioline F: Standard I/O modules

Description	Type	Item no.
Function module, one SSI interface for absolute encoder, one analog output	AXL F SSI1 AO1 1H	2688433
Function module, pulse width modulation	AXL F PWM2 1H	1007352
Strain gauge capture module	AXL F SGI2 1H	2702911
Power measurement module, voltage and current measurements	AXL F PM EF 1F	2702671
Power module for the communications power UBus	AXL F PWR 1H	2688297

Axioline F: I/O modules for extreme environments

Description	Type	Item no.
Digital input module, 16 channels, 4-conductor, extended temperature range	AXL F DI16/4 XC 2F	2701224
Digital input module, 16 channels, NAMUR, extended temperature range	AXL F DI16 NAM XC 1F	1052427
Digital input module, 16 channels, NAMUR, intrinsically safe, extended temperature range	AXL F EX IS DI16 NAM XC 1F	1052423
Digital input module, 32 channels, 1-conductor, extended temperature range	AXL F DI32/1 XC 1F	2701226
Digital output module, four channels, 24 V DC, 48 mA, intrinsically safe, extended temperature range	AXL F EX IS DO4 SD 24-48 XC 1F	1086901
Digital output module, four channels, 21 V DC, 60 mA, intrinsically safe, extended temperature range	AXL F EX IS DO4 SD 21-60 XC 1F	1086902
Digital output module, eight channels, 2-conductor, extended temperature range	AXL F DO8/2 2A XC 1H	1035427
Digital output module, 16 channels, 3-conductor, extended temperature range	AXL F DO16/3 XC 2F	2701228
Digital output module, 32 channels, 1-conductor, extended temperature range	AXL F DO32/1 XC 1F	2701230
Digital input/output module, eight channels each, 1-conductor, 24 V DC, extended temperature range	AXL F DI8/1 DO8/1 XC 1H	2702017
Analog input module, four channels, current, configurable current ranges, extended temperature range	AXL F AI4 I XC 1H	2702007
Analog input module, four channels, voltage, configurable voltage ranges, extended temperature range	AXL F AI4 U XC 1H	2702008
Analog input module, eight channels, current/voltage, configurable current and voltage ranges, extended temperature range	AXL F AI8 XC 1F	2701232
Analog input module, eight channels, HART, extended temperature range	AXL F AI8 HART XC 1F	1052434
Analog input module, passive analog inputs: 8 (HART), 0 mA ... 20 mA, 4 mA ... 20 mA, connection technology: 2-conductor, HART functionality, extended temperature range	AXL F AI8 P HART XC 1F	1215394

Axioline F: I/O modules for extreme environments

Description	Type	Item no.
Analog input module, eight channels, HART, intrinsically safe, extended temperature range	AXL F EX IS AI8 HART XC 1F	1052432
Analog input module, passive, eight channels, HART, intrinsically safe, extended temperature range	AXL F EX IS AI8 P HART XC 1F	1215393
Analog output module, four channels, current/voltage, configurable current and voltage ranges, extended temperature range	AXL F AO4 XC 1H	2702153
Analog output module, four channels, HART, extended temperature range	AXL F AO4 HART XC 1F	1087080
Analog output module, four channels, HART, intrinsically safe, extended temperature range	AXL F EX IS AO4 HART XC 1F	1087081
Analog output module, eight channels, current/voltage, configurable current and voltage ranges, extended temperature range	AXL F AO8 XC 1F	2701237
Analog input/output module, two channels each, current/voltage, configurable current and voltage ranges, extended temperature range	AXL F AI2 AO2 XC 1H	1035429
Temperature measurement module, four channels for connecting resistance temperature detectors (RTDs), extended temperature range	AXL F RTD4 XC 1H	1035430
Temperature measurement module, eight channels for connecting resistance temperature detectors (RTDs), extended temperature range	AXL F RTD8 XC 1F	2701235
Temperature measurement module, eight channels for connecting resistance temperature detectors (RTDs), intrinsic safety, extended temperature range	AXL F EX IS RTD8 XC 1F	1397158
Temperature measurement module, eight channels for connecting thermocouples, extended temperature range	AXL F UTH8 XC 1F	2702464
Function module, two counter inputs for 24 V signals, two incremental encoder inputs, eight digital inputs, extended temperature range	AXL F CNT2 INC2 XC 1F	2701239
Communication module for serial data transmission, one interface can be parameterized as RS-485/RS-422 or RS-232, extended temperature range	AXL F RS UNI XC 1H	2702006
Function module, two digital pulse interfaces for evaluating magnetostrictive position transducers with start/stop interface, for extended temperature range	AXL F IMPULSE2 XC 1H	2702655
Power module for the communications power UBus, extended temperature range	AXL F PWR XC 1H	1776593

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