Products for the intelligent production of tomorrow

Phoenix Contact – your partner for Industrie 4.0
The intelligent production of tomorrow

The world is changing. It is becoming more digital, intelligent, and flexible. Industrie 4.0 presents solutions for optimizing complex production processes with new technologies. To overcome the challenges of the future, Phoenix Contact is implementing Industrie 4.0 in its own production lines. Producing batch sizes of 1 at the same cost of mass production, for example, has become a reality. Find out how you can benefit from the digitalization of the industry, with the aid of examples and future-proof products.

Find out more with the web code

For detailed information, use the web codes provided in this brochure. Simply enter # and the four-digit number in the search field on our website.

Web code: #1234 (example)

Or use the direct link: phoenixcontact.net/webcode/#1234
Digitalization and communication as the basis for Industrie 4.0

Phoenix Contact is converting the sometimes abstract advantages of Industrie 4.0 into practical areas of action. Instead of doing everything that is technically possible, only aspects that are sure to benefit the process in question are put into practice. The focus is firmly on quality, performance, and cost-effectiveness.

- Consistently digitally described
- Communicative and secure
- Autonomous and adaptive
- Easy to install
- Easy to operate
- Resource-efficient
Consistently digital descriptions

Digitalization is the basis for Industrie 4.0. Products and processes are first of all created virtually and are fully transparent. Throughout the entire lifecycle of a product, all process phases are supported by a consistent digital description within the value-added network, such as the engineering, installation or production phases. All operating states are known at all times; their visualization simplifies planning, analysis, and operation.
Benefit from digital data today

Digitalization improves processes in tool engineering

**Challenge**
Complex injection molding tools are used to manufacture sophisticated plastic parts, which need to be ready in ever shorter time frames due to the increasingly customized nature of the end products.

**Implementation**
Data is consistently used to optimize processes. To do so, the digital data is uniquely assigned to the physical product. The result is an element of Industrie 4.0, the cyber-physical system. By connecting these higher-level systems, information, such as costs or material type, is made available on a project-specific basis.

**Result**
To carry out fully automatic production in the future, and thereby save time and costs, tools and processes are described fully digitally.

Digital boards provide the information needed for upcoming decisions. Augmented reality, i.e., computer-assisted augmentation of reality, also helps to determine the coordinates for the positioning of ejectors for injection molding tools.

Augmented reality supports the manufacture of injection molding tools

Heavy-duty connectors
Use the configurator to combine modular contact inserts to create an individual solution.

**Web code:** #0002

QUINT POWER power supplies
Optimally adapt power supply units to the application in question through individual parameterization.

**Web code:** #1513

Connection technology for device manufacturers
Use intuitive solution configurators and CAD data for design-in.

**Web code:** #0425

Marking system
Consistent data flow from project planning right through to the finished marking label.

**Web code:** #0289

Universal electronics housings
Combinable electronics housings for individual embedded systems design solutions.

**Web code:** #0514

Standardized product data
All data can be found on the product itself, e.g., ETIM/eCl@ss/UNSPSC data or the data sheets.

**Web code:** #0001
Communicative and secure

Intelligent mechatronic systems communicate across locations and companies using network infrastructures. In doing so, only standardized and open interfaces are used. This communication method, based on Ethernet and Internet, networks distributed structures and forms the basis for flexible, self-optimizing production processes. Reliable protection in the event of unauthorized third-party access and electrical faults is a key requirement.
Products for secure communication

Secure communication during the production of I/O modules

**Challenge**
With an ever growing number of variants and smaller batch sizes, Axioline I/O modules must be economical to produce.

**Implementation**
As soon as the material is on the workpiece carrier, a connection to the higher-level system is established via an RFID tag. The circulation system, which can be extended as desired, enables the flexible networking of all conceivable production resources to form a single manufacturing system. The work stations, assembly machines, and test cells required for the manufacturing process can be easily connected.

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

Information is available when and where it is needed

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**Professional cloud solution**
PROFICLOUD for industry: from cloud devices and matching platforms to cloud services.

**Industrial communication technology**
Communication via copper, FO, and wireless for robust and secure networks.

**Cyber security**
Protection against unauthorized access by people or malware.

**WLAN for machine building**
Stable wireless reception with an access point and antenna in a single device.

**Ethernet extender system**
Easy connection of large IP networks.

**Functional safety**
Reliable protection with safety relays, complex controllers, and services.
Autonomous and adaptable

Adaptive behavior strengthens production to handle any kind of disturbance and provides flexibility for maximum efficiency. There is no central controller; instead there is intelligent collaboration. Distributed controllers adapt independently to processes, equipment, and devices. Complex processes and unexpected events are easier to manage and optimize. Thus producing batch sizes of 1 at the same low cost of mass production has become a reality.
Open automation solutions
Secure your future and adapt production processes to new tasks and structures with ease.

PLCnext Technology
The open controller platform enables several developers to work in parallel and speeds up development processes.

PC Worx Engineer
This adaptive engineering platform for programming according to IEC 61131-3 increases efficiency thanks to new functions.

Intelligent automation
Implement reliable and economical automation with controllers in all performance classes.

Individual signal conditioners
Order individually as a batch size of 1, combine as desired, and transmit field signals into industrial networks.

Software
Efficient automation with software from configuration to system operation.

Economic production of a batch size of 1

Challenge
The MINI Analog signal conditioners are customized in the web configurator, which results in around 1000 different device versions.

Implementation
The freely parameterizable process cells produce individual signal conditioners according to customer requirements. The system works very efficiently based on the consistent material flow in the process chain and due to very short changeover times. The freely parameterizable process cells are automatically docked and undocked. The system integrates these stations autonomously; there is no need for time-consuming installation. Employees connect the modules with power, compressed air, and to the IT network with ease. Production can also be adapted through variant-specific graphical configuration of the process flow.

Result
Small batch sizes can already be manufactured at the same cost as mass production. The intelligent and autonomous production system is economical over the long term.

Minimum set-up times for high flexibility
Easy to install

The increasing complexity and networking in the industry calls for safe electrical connections as well as clear and durable marking of all components. Quick and error-free wiring saves time during the installation process for energy and data. Push-in connection technology, for example, helps you to achieve this, by making it significantly quicker to wire distributed devices and control cabinets.
Cutting-edge connection technology

An innovative example: Push-in connection technology

**Challenge**
Adaptable production concepts must optimize set-up efforts in modular systems.

**Implementation**
In the case of new installations or changes to a system, innovative connection technologies and plug-in installation systems reduce your costs and assembly times through quick and error-free wiring. To this end, Push-in connection technology has been developed for direct conductor connection: solid conductors or conductors with ferrules can be directly contacted without any tools. The special spring profile enables manual or automatic insertion of conductors with ferrules of 0.34 mm² or more. The spring is opened by means of the actuation lever – easily and without direct contact with live parts.

**Result**
The time-saving conductor connection makes wiring quick and easy. Low insertion forces make wiring significantly easier.

Terminal blocks
The CLIPLINE complete system gives you the freedom of choice of connection technology.

Device circuit breakers
Detailed remote diagnostics and comprehensive process monitoring thanks to IO-Link technology.

PCB connectors
High flexibility thanks to variants adapted for individual solutions.

PTFIX distribution blocks
Flexible and cost-effective load and control current distribution.

Connectors
Connectors for assembly for signals, data, and power.

Tools
Hand tools and automatic devices for professional electrical installations.
Easy to use and resource-efficient

Operation and decision-making is made easier despite increasing complexity thanks to the learning capability of the system. Assistance systems indicate the courses of action that the user requires at that moment.

All the necessary data for an intelligent management system is provided, so energy and material usage can be adapted individually and precisely. Building and manufacturing infrastructure is planned in a forward-looking manner, and is easy to optimize during operation.
Digitalization of building technology

**Challenge**
We are currently witnessing a huge change, moving from classic automation towards digitalization of building technology.

**Implementation**
The IoT-based Ecosystem Emalytics combines building services management with energy management and business intelligence services in a single solution. Smart devices, along with devices, sensors, and actuators from conventional building technology, are directly integrated into the IoT management level based on standardized protocols and interfaces. Regardless of its source, all data is available as an information object in order to optimize building technology processes.

**Result**
For building and energy management, this results in consistent solutions for efficient operation through to integration of production systems. This means energy efficiency rises while operating costs fall.

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Control building infrastructure
IoT-based automation with the multi-protocol-capable controller with Niagara framework.

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Operation and monitoring
Implement various operating concepts directly on site in the control center with HMI.

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Industrial PCs
Box and panel PCs with intuitive visualization for intelligent assistance systems.

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Flexible remote access
Software controls distributed system parts and the communication between networked PCs.

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Energy and power measurement
Measure energy flows, monitor and log energy supplies.

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3D print from Protiq
Additive manufacturing from the generation of the 3D data through to the finished prototype, model or component.

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Passionate about your industry

Each industry places particular demands on automation. We focus on these challenges with technical expertise and passion, and we develop tailor-made and future-proof turn-key solutions together with you. With excellent products and innovative systems, we provide support with digitalization and provide the flexibility needed to optimize your processes.

Shape the world of tomorrow

Products, systems, and solutions from Phoenix Contact offer the features that you require in order to implement forward-looking concepts successfully.
Individual and future-proof industry solutions

Energy

The modern power industry provides an integrated system structure for all automation tasks. Scalable and individual solutions will soon enable simpler distributed structures through the networking of wind and solar energy systems as well as conventional energy generation. Self-learning algorithms and cloud-based data services provide complete transparency and maximum yields. Systems that are consistently digitally described are optimized through sublimation of the behavior, taking all environmental factors for each site into account. Thanks to the IEC 61850 standard, communication and the engineering process are standardized worldwide. This means that users are not dependent on a single manufacturer, and the variety of interfaces is decreasing significantly.

Comprehensive automation and monitoring of renewable and conventional energies for an optimum yield and reliable networks

Infrastructure

In the infrastructure of the future, data and signals are reliably made available in the network – at all times and from any location. The systems respond autonomously to changing conditions. The infrastructure is therefore robust in the face of disturbances and operates securely and efficiently. Mobile and on-site access to all systems and plants via web technology with integrated protection against unauthorized access is important. Consistent digitalization and networking from the control level to the field level with object-oriented data interfaces also enables quicker replacement of devices. In the future, after a device is changed or installed for the first time, the necessary parameters will be set automatically.

Automation, communication, and remote control technology for infrastructure
Process industry

In the modern process industry, the modularization of systems is playing an increasingly important role. Measured values are acquired remotely and processed digitally. Precise data and signals ensure high availability and process quality. The system operates securely and efficiently. With NAMUR recommendation NE 148, the association of users has specified what Industrie 4.0 means for the process industry. For example, engineering, implementation, and maintenance will become considerably more efficient, as modular automation combines functions, thereby significantly reducing complexity. Production will be established and tested as a process chain. Each module is described fully digitally. Thus, after pre-fabricated modules have been installed, the higher-level process controller simply needs to be configured.

Future-proof and certified solutions for the fields of oil and gas, chemicals and pharmaceuticals, as well as marine and offshore

Factory automation

The factory automation of the future ensures maximum productivity and energy efficiency with flexible batch sizes. Intelligent, modular systems are networked. They communicate directly and securely with one another in a non-hierarchical fashion. The system adapts its operating state to the actual requirements. The advantages of the industrial production of tomorrow are already within reach today. Small batch sizes at the low costs of mass production are a reality. Start-up scenarios for new products can be mapped better in the production facilities. What’s more, manufacturers can respond to increases in sales volumes at short notice. To do so, similar processes are simply duplicated, for example. Manufacturers can invest in equipment in a timely manner and according to the actual sales figures.

Open automation solutions for factory automation from modular integration of system parts through to system reliability
Our experience leads to your success

Together with customers and partners, we are actively shaping solutions to convert the digitalization of our world into the intelligent production of tomorrow. Here, our experience in machine building, process expertise in manufacturing, and our products for intelligent automation are just three of the many reasons why Phoenix Contact is the best partner.

“I have worked at Phoenix Contact for over 30 years and played a role in shaping automation technology here right from the start. I find Industrie 4.0 incredibly fascinating. We can all see how our world is changing due to digitalization. Based on this, we can assume that our industrial environment will also start to change significantly faster in the future. In this world, all parts of industry will be connected: people, machines, and products will communicate with each other. New opportunities will be created.”

Roland Bent, CTO Phoenix Contact Group
The intelligent production of tomorrow

Your partner in Industrie 4.0

Experience in machine building
Our in-house machine building department possesses expert knowledge of processes and automation. We are familiar with the challenges of machine building, as we plan and construct our own manufacturing systems and optimize intelligent production with the latest technologies.

Process expertise in production
We experience intelligent production in our own manufacturing systems with extensive manufacturing capability and in close collaboration with our customers on a daily basis. We manufacture in nine countries around the world, using state-of-the-art processes – from screws to industrial PCs. That’s why we are taking advantage of the opportunities that Industrie 4.0 offers.

Products for intelligent automation
Our components, systems, and solutions are offering competitive advantages already and will also fulfill the practical requirements of tomorrow. We are actively shaping Industrie 4.0, through research into the areas of communication technology and IT, web technology, security and safety, installation, and engineering.

We shape the intelligent production of tomorrow

To be successful in the future, too, standards and guidelines must be open. The interaction of future systems has already been described through models. Solutions are created based on the “Reference Architecture Model Industrie 4.0” (RAMI 4.0). At the heart of this is the Industrie 4.0 component, which can be understood as a networked product, machine or entire factory. The physical object is assigned an administration shell, i.e., a virtual image. This contains the functionalities of the object as well as the data that is collected there over the entire lifecycle. The practical implementation of Industrie 4.0 starts with the openAAS (open Asset Administration Shell) project. This is an open development and test environment for companies in the electrical industry and their customers in machine building. At present, the content of the administration shell has been clearly defined, and a reference solution has thereby been created, which enables communication from the sensor through to the Internet.

Industrie 4.0 platform
The main idea behind Industrie 4.0 is to shape the impending digital structural change in the industry in a coordinated manner. Expertise with regard to Industrie 4.0 is pooled; for example the “Labs Network Industrie 4.0” initiative helps companies to find suitable test centers for their Industrie 4.0 solutions before they make big investments.

It’s OWL – Intelligent Technical Systems Ostwestfalen Lippe
In the technology network, joint projects are developed by companies from the machine building, electric, and electronic industries as well as the automotive supplier industry and regional research institutes.

Smart Engineering and Production 4.0
The basis for tomorrow’s intelligent production is the use of a consistent digital description. Eplan, Rittal, and Phoenix Contact are working on a consistent, automated process from the digital product through engineering to production.

Web code: #1086
In dialog with customers and partners worldwide

Phoenix Contact is a globally present, Germany-based market leader. Our group is synonym for future-oriented components, systems, and solutions in the fields of electrical engineering, electronics, and automation. A global network across more than 100 countries, and 15,000 employees ensure a close proximity to our customers, which we believe is particularly important.

The wide variety of our innovative products makes it easy for our customers to find future-oriented solutions for different applications and industries. We especially focus on the fields of energy, infrastructure, process and factory automation.

You will find our complete product range at:
phoenixcontact.com