



Transportation infrastructure

Solutions for road traffic and waterways

In dialog with customers and partners worldwide

Phoenix Contact is a global market leader in the field of electrical engineering, electronics, and automation. Founded in 1923, the family-owned company now employs around 14,500 people worldwide. A sales network with over 50 sales subsidiaries and more than 30 additional global sales partners guarantees customer proximity directly on site, anywhere in the world.

Our range of services consists of products associated with various electrotechnical applications. This includes numerous connection technologies for device manufacturers and machine building, components for modern control cabinets, and tailor-made solutions for many applications and industries, such as the automotive industry, wind energy, solar energy, the process industry or applications in the field of water management, power transmission/distribution, and transportation infrastructure.



Company independence is an integral part of our corporate policy. Phoenix Contact therefore relies on in-house competence and expertise in a range of contexts: the design and development departments constantly come up with innovative product ideas, developing special solutions to meet customer requirements. Numerous patents emphasize the fact that many of Phoenix Contact's products have been developed in-house.

"A good transportation infrastructure is an important prerequisite for positive economic development. The availability and safety of roads and waterways is ensured by state-of-the-art, carefully coordinated automation solutions. Phoenix Contact has been an expert provider of solutions and products in the transportation infrastructure area for many years. Join us as we design a cost-effective and future-ready evolution of transportation routes worldwide."

Joachim Pucker, Global Industry Manager

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Overview: Solutions for transportation infrastructure



Road traffic

The infrastructure for road traffic is the basis for mobility. As part of urbanization, topics such as control engineering for tunnels and energy saving street lighting are becoming more important all the time. For lighting, remote control technology and the control level, Phoenix Contact offers products and solutions focused on function, simplicity, flexibility and energy efficiency.

For further information, see page 6 onwards



Waterways

Safe and reliable use of waterways must be guaranteed at all times. Globally available ocean freight routes require aspects such as reliable signaling under rough ambient conditions, safe and reliable control in accordance with the Machinery Directive and energy-efficient systems. Solutions and services from Phoenix Contact enable your operations to comply with these standards.

For further information, see page 14 onwards



Solutions for road traffic

Intelligent infrastructure in road traffic is increasing in importance all the time. Large-scale increases in transportation capacity in ever more complex structures call for smart automation solutions. These are focused on urban mobility and safety of the traffic participants.

Phoenix Contact supports highly advanced projects involving transportation technology equipment, tunnel construction and additional transportation systems with reliable engineering. Make use of our comprehensive solutions for transportation infrastructure – including everything from the central element of control technology, with connection of the sensors and actuators, surge protection, to a comprehensive safety concept.





Overview: Road traffic



Street lighting

Solutions for the efficient and energy-saving management of street lighting systems

Tunnels

Solutions for easy installation and startup of tunnels



Movable bridges

Solutions for safety-optimized control of movable bridges

Solutions for road traffic

Street lighting

The existing infrastructure for street lighting has to face new technical and economic challenges. These are focused on increasing the safety and attractiveness of streets and plazas. Urban planners use energy-saving and low-maintenance solutions to accomplish these goals.

Innovative light management systems from Phoenix Contact provide demand-oriented control of the lighting from the control room via standardized remote control technology. Flexible switching scenarios enable efficient switching.

Your advantages:

- Significant minimization of maintenance and energy costs through diagnostics and monitoring of all stations in the control system
- Transmission of all relevant data via mobile communication to the control center for analysis and archiving
- Automatic control of lighting based on calendar entries in case of a communication failure



Decentralized control and acquisition

Control street lighting systems efficiently and, above all, in an energy-saving way. Our automation system equips you for communication via standardized remote control technology. Switch on the lighting only where it is needed, only as much as needed and depending on the specific twilight conditions.

Protect

Surge voltages significantly reduce the savings potential of energy-saving LED street lighting. With turnkey solutions for surge voltage protection and device protection, you can keep these costs as low as possible. The BLOCKTRAB surge protective devices provide reliable protection for your electrical equipment. The installation directly in the lamp or in the cable junction box is easy.

Exchanging data continuously

To monitor remote systems, analyze measured values and archive data, all stations have to be networked to the control room. The ODP server enables remote transmission of data, protected from unauthorized access. Continuous exchange of data is possible – wired or via mobile communication – between street lighting distributors and SCADA systems.

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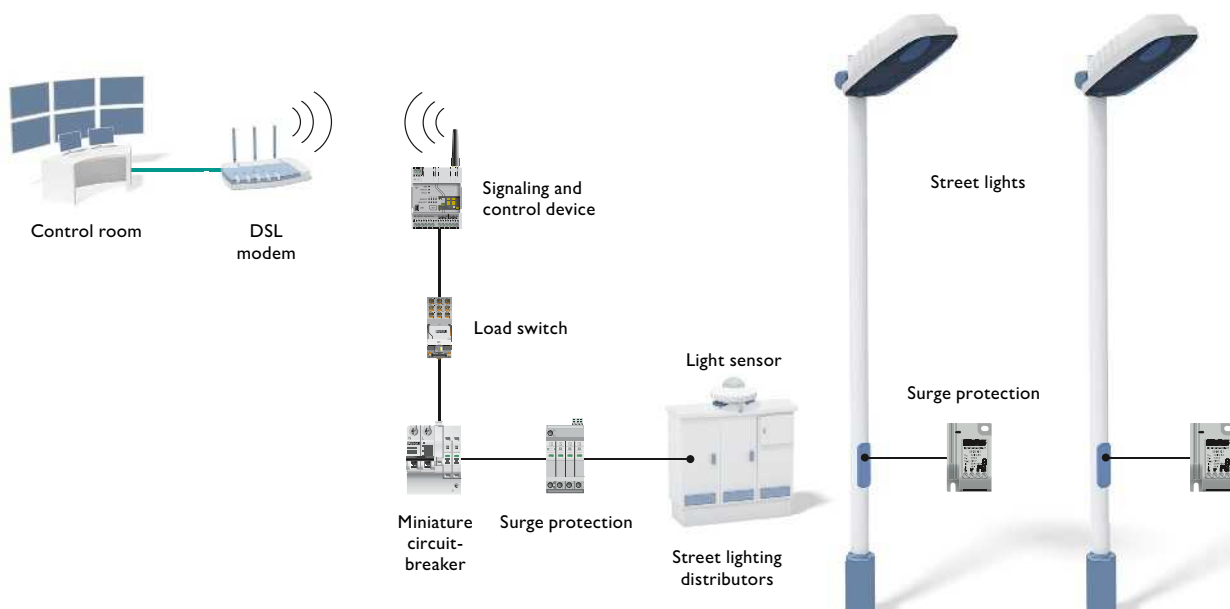
[#1098](#)

Efficient activation of street lighting using M2M communication

The compact TC Mobile I/O X300 signaling and control device takes over activation of the light strips in the street lighting distributor. Communication takes place via an ODP/OPC server via mobile

communication. The individual activation of the power contactors in the street lighting distribution board allow for nighttime setting, semi-nighttime setting and for a separate activation of crosswalks for pedestrians. The

signaling device transmits and logs decentralized switch-on and switch-off times. In case of a communication failure, static time-driven switch-on of the street lighting is ensured.



Solutions for road traffic

Tunnels

Safety and availability are decisive factors in tunnel infrastructure – along with economical operation. Various categories of facility management and safety systems, such as lighting, ventilation, emergency call and energy supply facilities have to communicate smoothly with each other. Continuous operation of the systems in the tunnel is a must.

Phoenix Contact products provide you with a high-quality electrotechnical infrastructure from a single source. We have state-of-the-art, future-oriented technology and products.

Your advantages:

- Flexible reaction to different traffic and daylight situations
- Easy installation and commissioning, thanks to Plug and Play
- Efficient maintenance procedures, thanks to enhanced diagnostic status and operating lifetimes
- Compensation of losses due to aging and dirt thanks to Constant Light Output



Flexible cabling

The reliable function of lighting and the emergency control system in tunnels is essential. Maintenance work must be carried out quickly and easily. The easy-to-use, versatile and robust QPD installation system with tried-and-tested QUICKON fast connection technology allows you to distribute power over long distances effortlessly. The simple connection principle, in conjunction with the optional pre-assembly, ensures time-efficient installation.

Efficient illumination

Intelligent activation electronics are a fast and easy way to implement LED-based lighting solutions in the tunnel. Data about ambient conditions of the tunnels is gathered to attain an ideal illumination level for the complete tunnel. They only generate as much light as is required at that particular time. This cuts energy costs and increases the service life of the LED lights. Integrated surge protection increases the availability of the lighting system.

Intelligent control

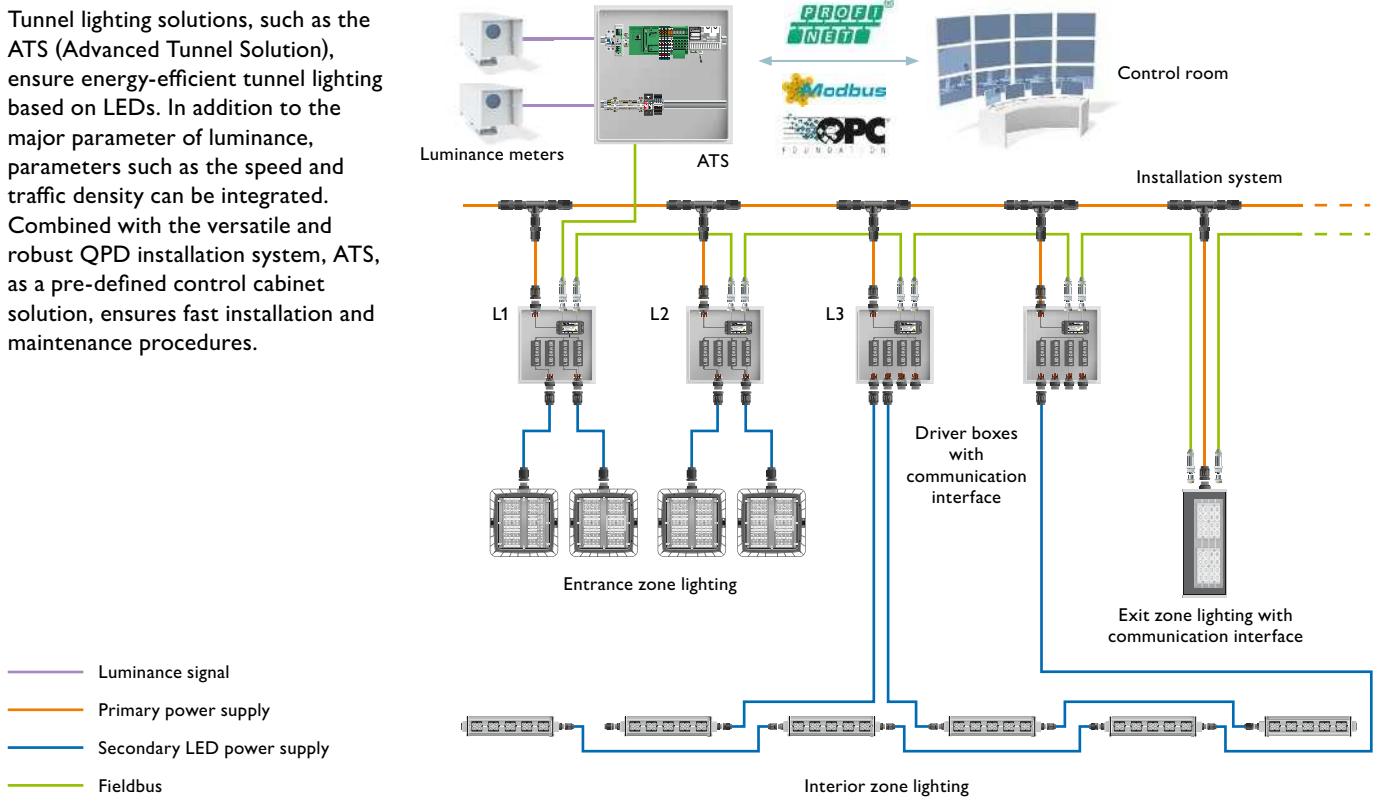
Adaptive, intelligent control systems that meet the demands of transportation infrastructure are a must in tunnel equipment. CIE88-compliant lighting systems with adaptation to the traffic flow form a powerful, scalable solution. A seamless connection to the tunnel management system is implemented via the predefined communication objects.

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Demand-oriented and energy-efficient tunnel lighting control

Tunnel lighting solutions, such as the ATS (Advanced Tunnel Solution), ensure energy-efficient tunnel lighting based on LEDs. In addition to the major parameter of luminance, parameters such as the speed and traffic density can be integrated. Combined with the versatile and robust QPD installation system, ATS, as a pre-defined control cabinet solution, ensures fast installation and maintenance procedures.



Solutions for road traffic

Movable bridges

Movable bridges are used primarily to route road or rail traffic over rivers and canals. Due to the potential hazard for the traffic participants, special requirements for monitoring, operation and functional safety apply. The motion of the support structure has to be controlled from the control room using the sensors and actuators.

Solutions from Phoenix Contact give you safe and reliable operation of the bridge, including the protection functions.

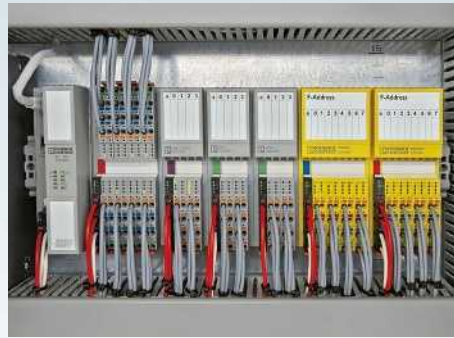
Your advantages:

- Support in planning your system from our safety specialists
- Professional consultation for requirements in accordance with the Machinery Directive
- Remote access with standardized communication protocols
- Redundancy for high system availability



Safe bridge motion

Excessively fast bridge motions can damage the mechanical system of the bridge. Downtime and speed monitors monitor the speed at which the bridge is raised and lowered. This prevents damage to the bridge and complies with the requirements of the Machinery Directive.



Robust automation

The automation technology of the future is fast, robust, and easy. With Axiocentral and Axioline, Phoenix Contact offers an automation system of powerful and optimally coordinated controllers and I/Os. Designed for rough conditions, the system withstands even the strong vibrations or shocks generated by moving bridges.



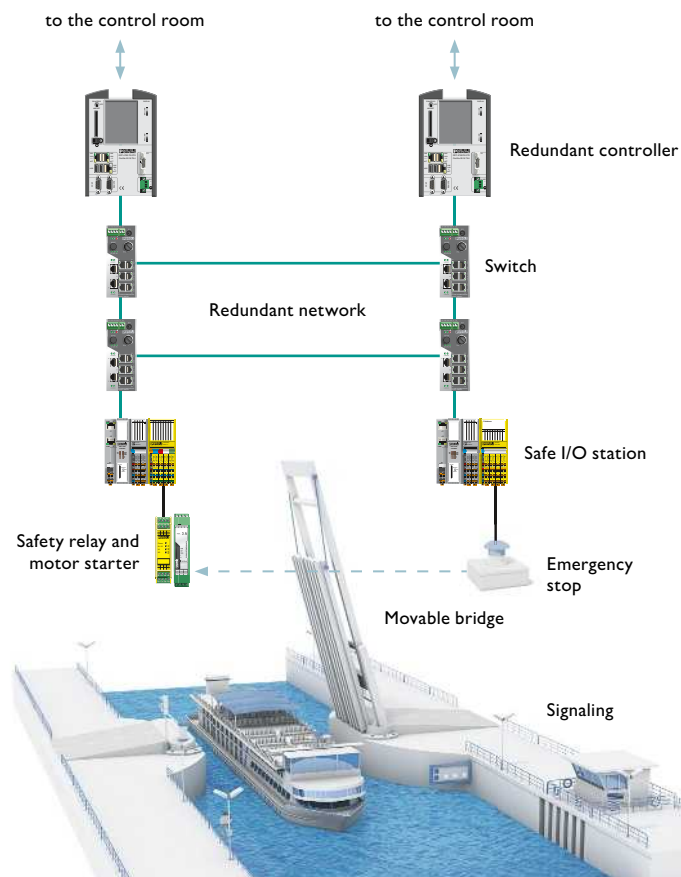
Redundant control

When raising or lowering transportation infrastructure such as bridges, failsafe automation systems are a must. The solution is to use redundant automation concepts based on the RFC 460R high-performance controller. This means that you can ensure that the automation always functions smoothly. If one controller fails, the other takes over immediately, ensuring uninterrupted operation.

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Redundancy means safety

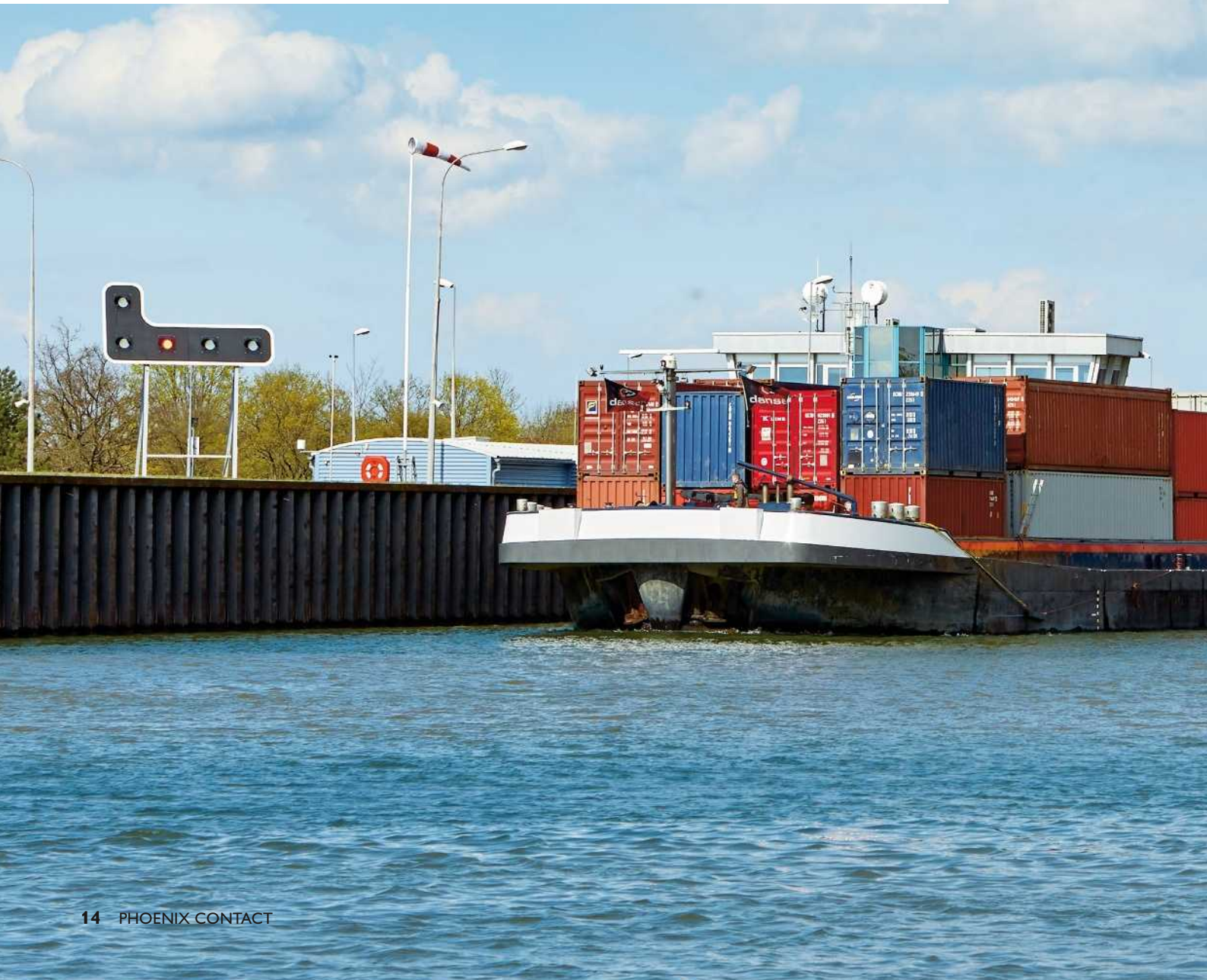
A well-structured, powerful automation system with redundant control and network technology and a compatible field level ensure maximum availability of the movable bridge. With industrial switches and control technology from Phoenix Contact you can easily implement the stringent requirements of your production network with forward planning. As well as the appropriate products, our safety specialists also offer you support in planning your system optimally.



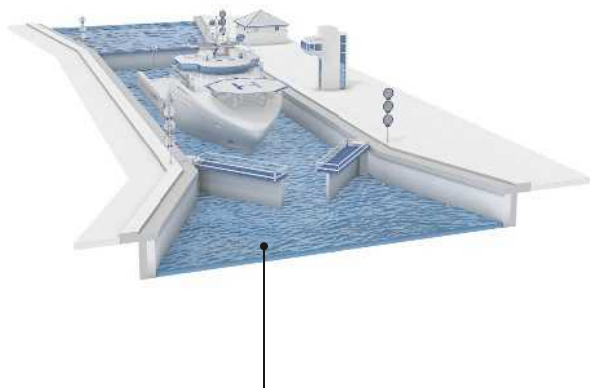
Solutions for waterways

Bridges, locks and passing places ensure that passenger and freight traffic on waterways is smooth and free of time delays. Signals that are visible from afar control traffic and ensure that maritime traffic can react to obstacles such as bridges or cross traffic at an early stage. Optimal automation of the systems is required to allow traffic through.

Solutions from Phoenix Contact support safe lock operation according to the Machinery Directive. Intelligent automation systems offer additional safety and cost-effectiveness for state-of-the-art waterway management.

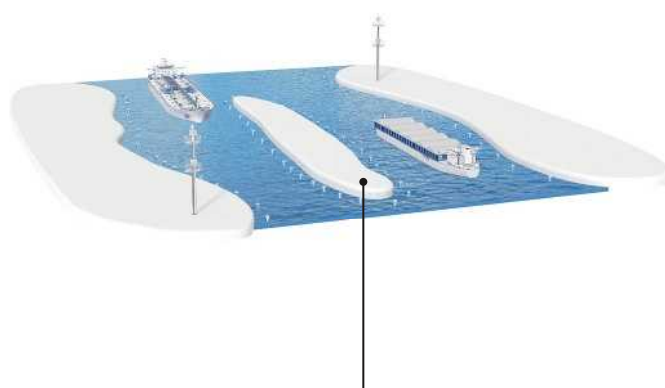


Overview: Waterways



Locks

Solutions for safe lock operation
according to the Machinery Directive



Passing places

Solutions for optimized shipping
management

Locks

Locks are indispensable when it comes to overcoming level differences on waterways. In the event of the failure of a lock system on a busy waterway, losses to the industry run into the millions. Along with the failsafe operation of locks, increasingly stringent safety requirements call for reliable signaling at the lock system that can be diagnosed. Signal lights and automation technology from Phoenix Contact ensure safe round-the-clock operation and therefore reduce running costs.

Your advantages:

- Reliable startup and easy maintenance, thanks to pre-installed software functions
- Long device service life thanks to rugged design and innovative technology
- Fast diagnostics and long-term data security by connecting to the network with standard protocols





Reliable signaling

For locks, the availability of the signaling systems is the top priority. The LED signal lights take this requirement into consideration, thanks to consistently implemented diagnostic properties and a communication connection that is suitable for industrial use. The particularly robust salt-water-resistant housing and the heavy-duty connection technology are designed for use in challenging environments.

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Lock automation

All units of the lock complex, such as gates and chambers, are controlled from the control station. With the wide range of control and I/O systems, you can automate safety-related functions according to the required SIL category or performance level. Combined with redundantly designed PROFINET communication, the intelligent emergency stop system ensures safe control of the lock subsystems.

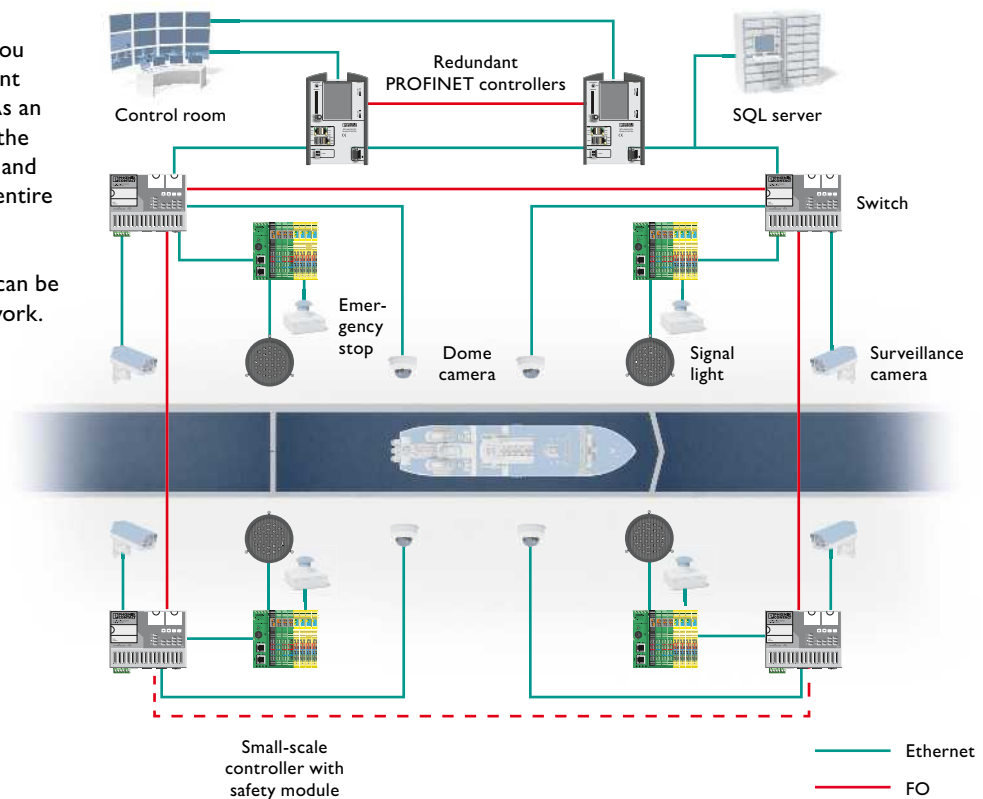


Controlling water levels

Modular control technology from Phoenix Contact can be used to control water inflow and outflow for the lock chamber according to requirements and to reliably record the level. Pumps, valves, and slide gates are controlled and monitored via preprogrammed function blocks. Integration in existing systems can be carried out easily.

Automated lock signaling

With LED signal lights and control technology from Phoenix Contact, you can design reliable and energy-efficient signaling systems for maritime use. As an integral part of the overall solution, the signal lights make status information and alarm messages available across the entire network. They support common industrial communication interfaces. Thanks to the bus connection, they can be seamlessly integrated into your network.





Solutions for waterways

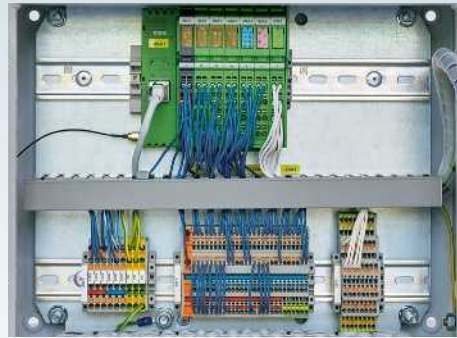
Passing places

Ships in navigation canals cannot always pass each other safely. High-availability signal facilities ensure smooth and uninterrupted operation at the lock.

Solutions from Phoenix Contact monitor system statuses and provide reliable switching of the signals. Using high-efficiency LED signal lights, designed for rough ambient conditions in the maritime environment, guarantees that maritime traffic runs smoothly.

Your advantages:

- Secure and reliable remote control solutions for integration into the control system
- Fast installation via preassembled installation system
- Easy commissioning with prefabricated functions and example projects



Signaling

For use at light signaling facilities, Phoenix Contact offers highly available LED signal lights. Modular control systems communicate directly all the way to the luminaire. The lights can be accessed via a PROFINET network, e.g. to control the light intensity or to define the behavior in the event of connection abort. The users can access a wide range of diagnostic and status information in the traffic control center.

Remote control technology for decentralized signal systems

Regardless of whether it is mobile communication, cable, wireless technology or DSL – Phoenix Contact provides you with modular remote solutions for your systems. Freely combining various transmission paths ensures the best possible adjustment to the system structure. Using preprogrammed function block libraries, you can transmit your data securely from decentralized stations to the control room via standardized protocols.

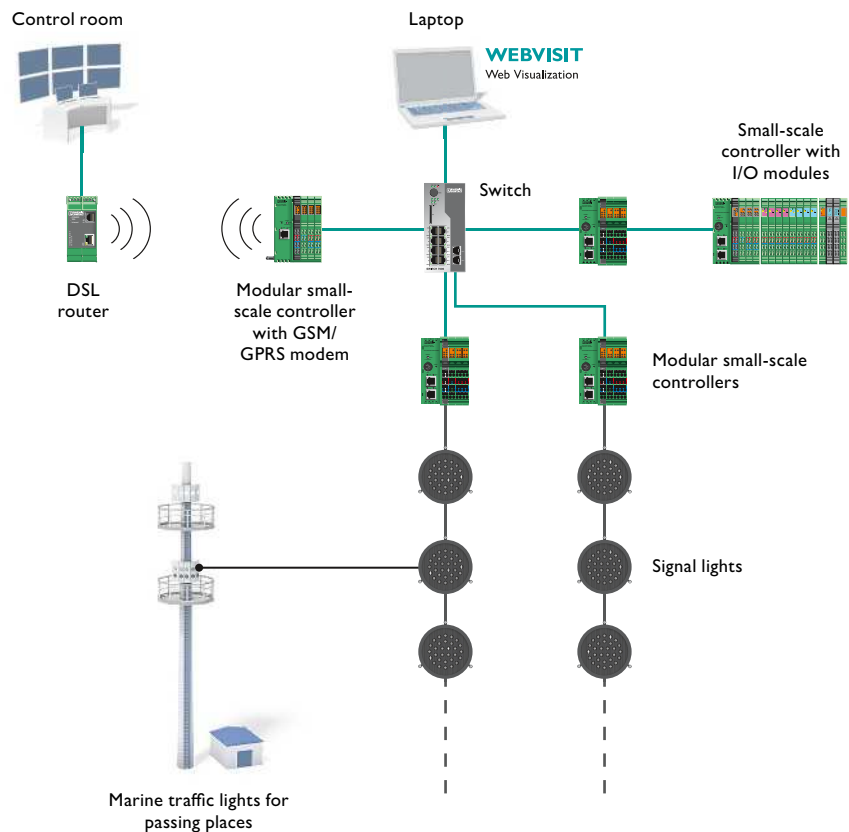
Web-based maintenance

Web servers integrated into the controllers enable you to access your application data from mobile terminal devices. Benefit from HTML-based, system-specific visualization interfaces for maintenance and commissioning. The production and availability of the marine traffic light system for passing places is therefore more transparent because maintenance can be performed according to need.

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Remote control solutions for shipping routes

Waterways involve long distances. The GSM-based control enables data exchange based on standardized protocols. Its integrated mobile network modem makes the controller ideal for remote control and remote maintenance.



Solutions for control rooms

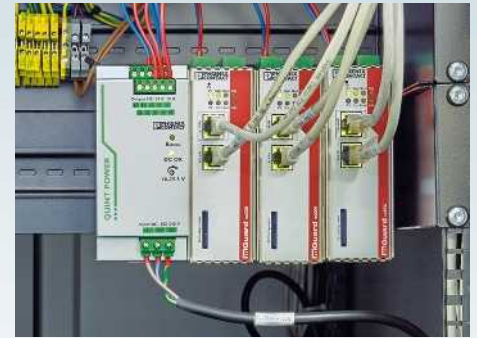
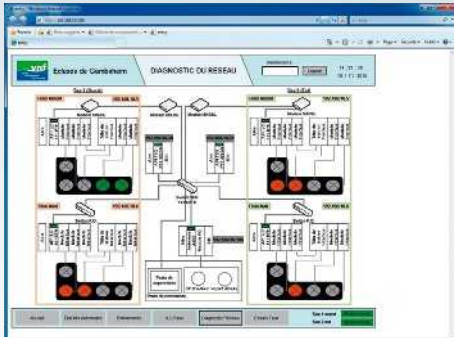
The central control room is where all data of an intelligent traffic system flows together. This enables operators to maintain an overview of the system status at all times, including everything from camera monitoring to activating cross-traffic signals to networking high-availability tunnel systems.

We support you in these tasks with products and solutions from Phoenix Contact. This includes, in addition to redundant control technology, components for a high-performance gigabit network and software fully customized to the system.



Your advantages:

- Customizable scalability with regard to operation and monitoring
- Wide variety of functions: including everything from trend display to alarms, reporting, logging all the way to archiving of the data
- Secure system monitoring from the cloud



Visualizing and alarm

Access your system from any location and at any time and diagnose its condition. With customized visualization solutions, you always have your system in view via remote access. For example, you can use the Visu+ mobile app with a tablet or smartphone to access information about locks, bridges or passing places. This provides efficient operating and monitoring solutions for your technicians.

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Reliable storage of operational data

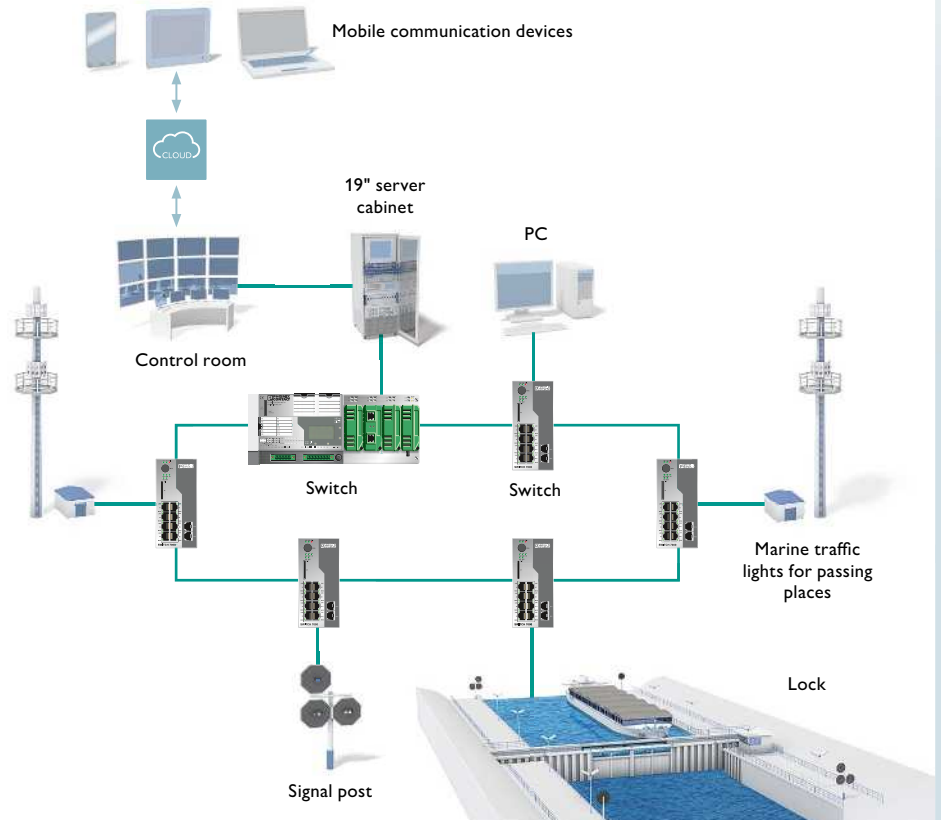
Status and diagnostic information provide the basis for the high availability of signaling devices. They provide a detailed database for smart maintenance as well as for evidence preservation and traceability of the operating behavior. You can easily create reports at any time, thanks to the reliable data management software from Phoenix Contact, which is used for detection, long-term storage and evaluation of operational data.

Secure networks

Phoenix Contact offers reliable and above all secure solutions for data transmission from and to the control room. Depending on the technical and geographical requirements of your traffic system, we offer you the right products: from wireless systems to 3G modems with security router and VPN technology up to SHDSL modems if the infrastructure makes cables and conduits available.

Visualization with cloud and SCADA technology

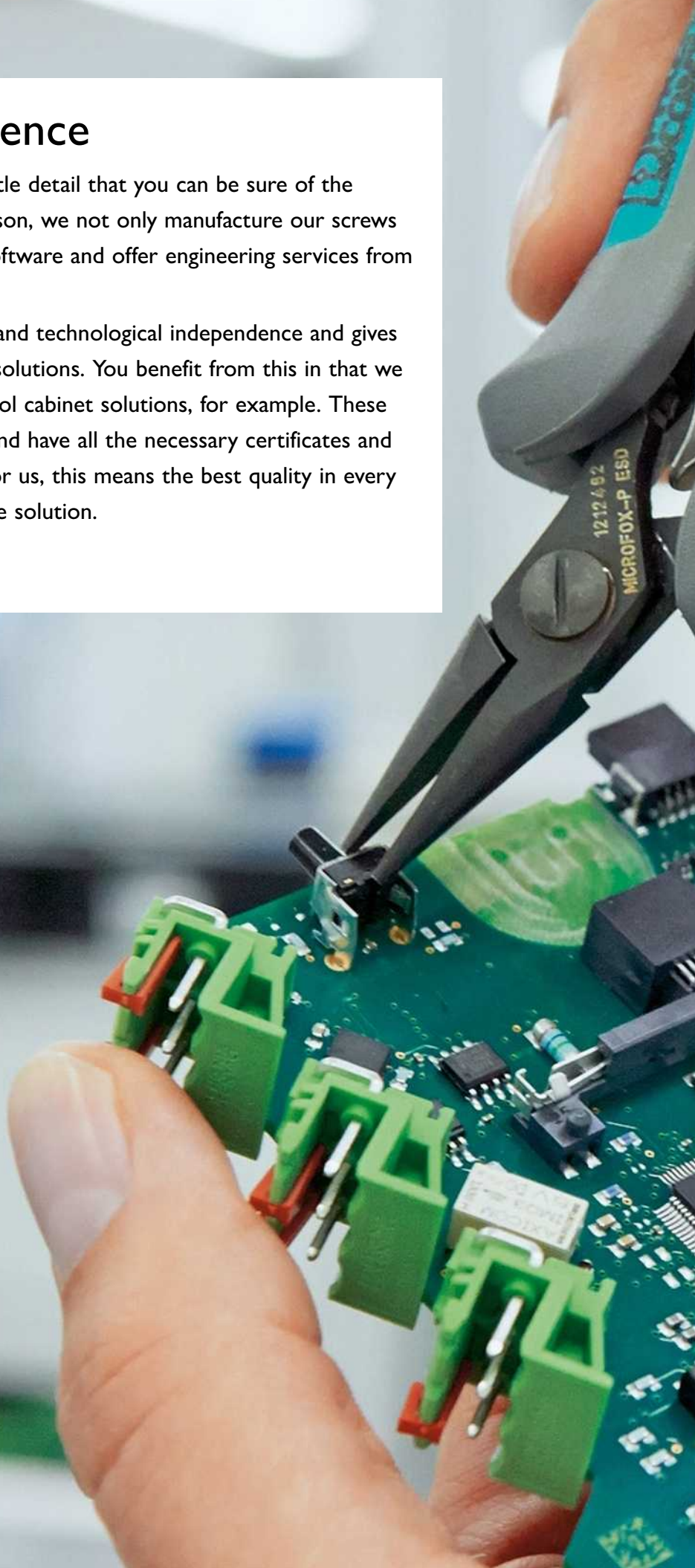
Design flexible operating and monitoring concepts. Using the visualization software combined with cloud technology, you can access your system at any time and from any location. Extend your system visualization to mobile communication devices such as smartphones and tablets with visualization technology from Phoenix Contact.

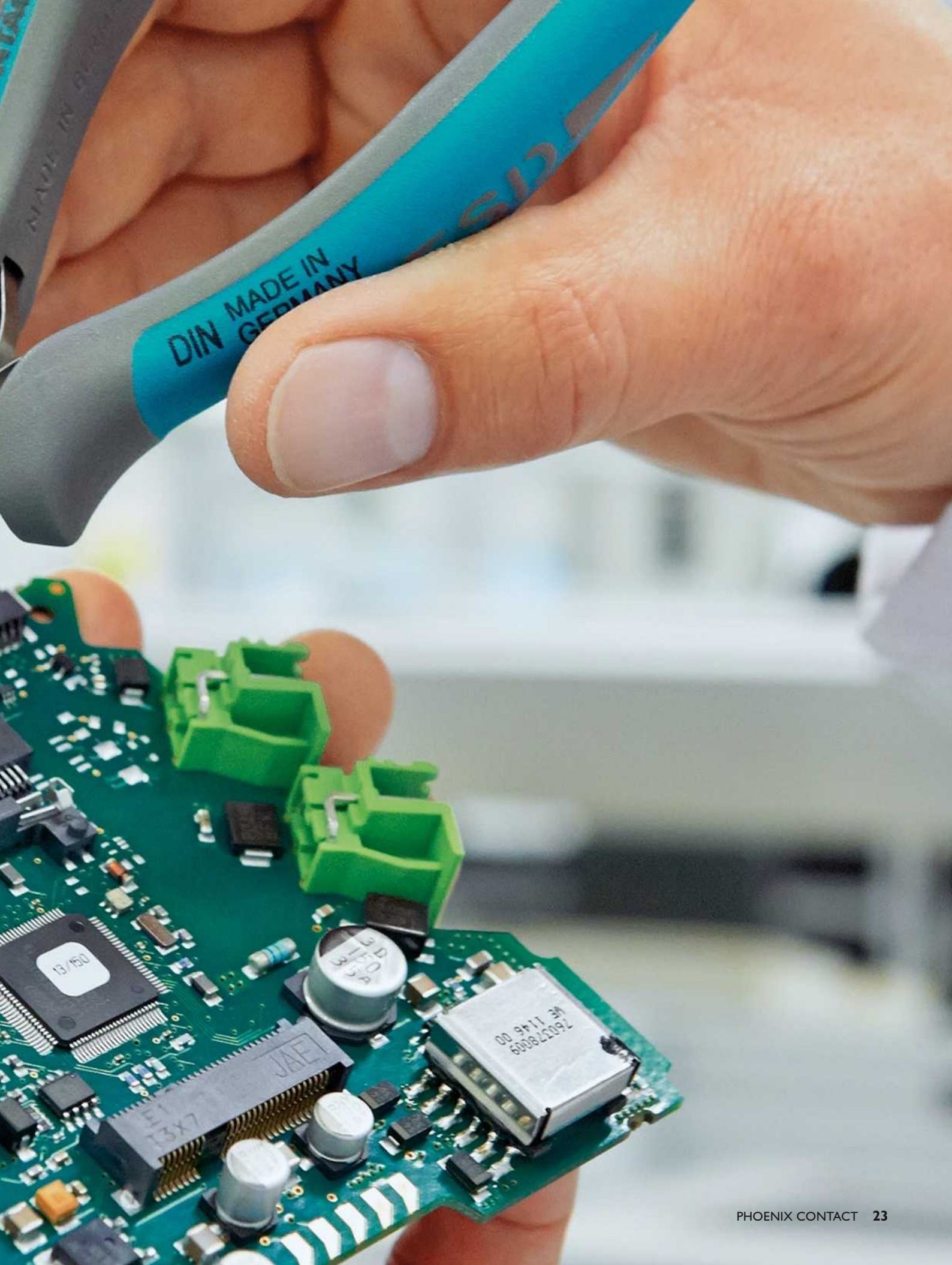


Quality is no coincidence

It is only when you keep sight of every little detail that you can be sure of the quality of the entire product. For this reason, we not only manufacture our screws ourselves, but also develop tailor-made software and offer engineering services from industry professionals.

This allows us to secure our commercial and technological independence and gives us the freedom to develop new industry solutions. You benefit from this in that we are able to offer you pre-assembled control cabinet solutions, for example. These are specifically tailored to your industry and have all the necessary certificates and approvals. "Made by Phoenix Contact". For us, this means the best quality in every product, in every discussion, for the entire solution.



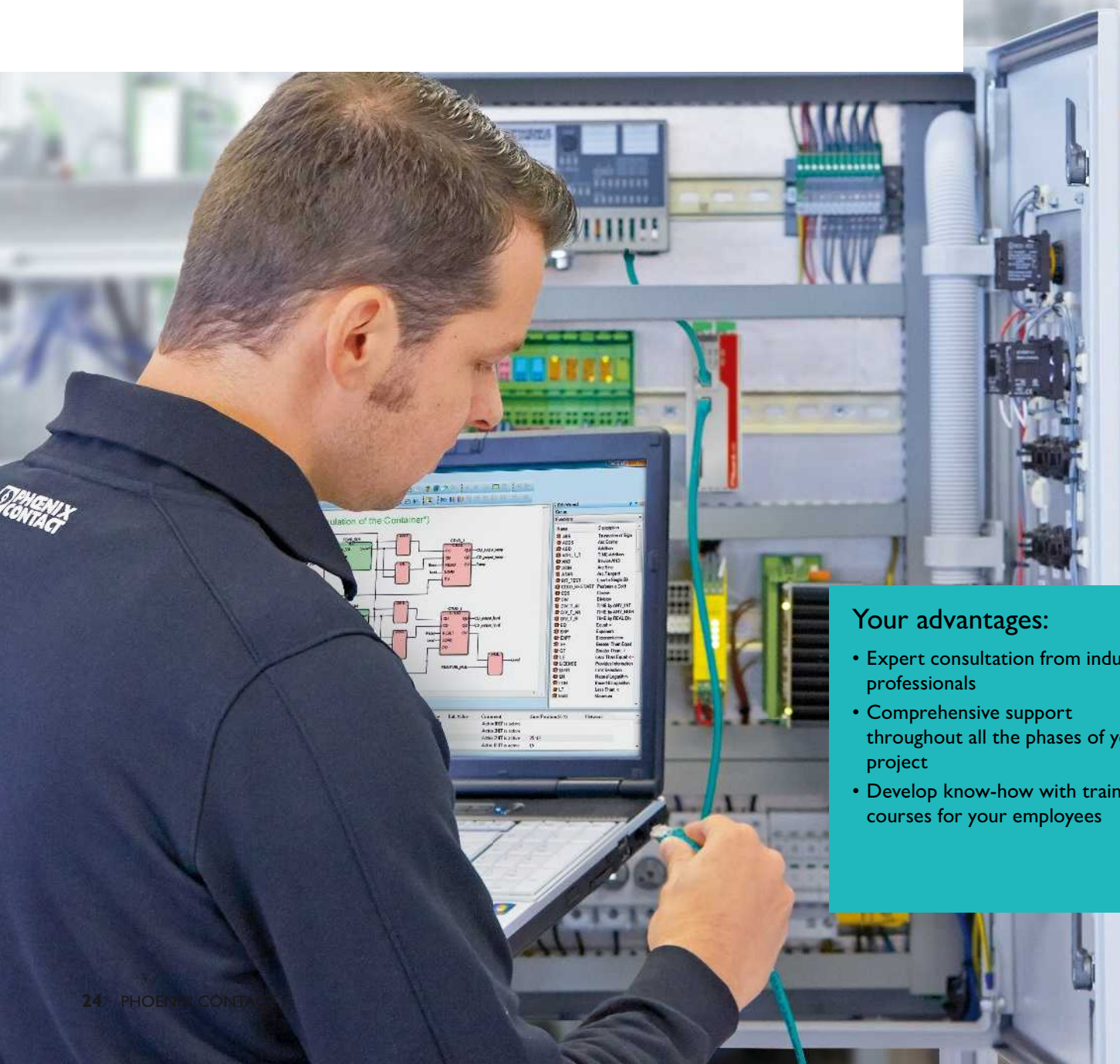


Quality is no coincidence

Engineering and control cabinet solutions

We set the highest standards for your industry solution: everything is tested and certified from a prewired and preprogrammed control cabinet solution to engineering services. Our industry experts advise you during every phase of your project cycle and, if required, take over the engineering of your system.

All Phoenix Contact components undergo intensive testing in the independent and accredited Phoenix Testlab. Control cabinet solutions are designed and engineered according to the required standards and directives. You can therefore be sure that our finished solution products meet the highest requirements.



Your advantages:

- Expert consultation from industry professionals
- Comprehensive support throughout all the phases of your project
- Develop know-how with training courses for your employees



Engineering

Based on the typical phases of a traffic infrastructure project, we provide support by working with you at each stage. Simply give us an outline of the application you would like to implement and we will provide you with a technical concept that includes suitable hardware and software:

- Configuration
- Programming
- Visualization
- Coaching

Control cabinet solutions

Working together with our customers, we develop control cabinet solutions which, depending on the requirements, are ready to use or already prewired so that you can carry out final installation.

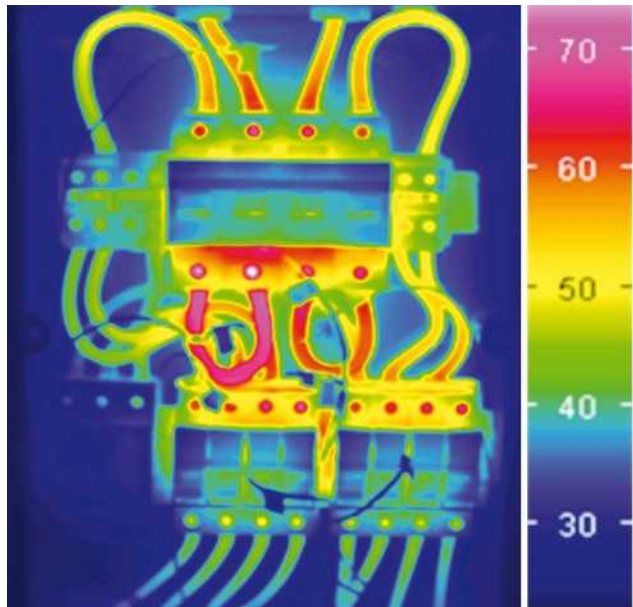
With a network of partners made up of proven control cabinet manufacturers, we can create industry solutions that satisfy the most stringent requirements.

This means that high quality is ensured at every step of the development process. A process-oriented, integrated management system based on international standards DIN EN ISO 9001 and 14001 ensures that legislation and standards such as EC directives 2002/96/EC (WEEE) and 2002/95/EC (RoHS) as well as customer specifications are taken into consideration during product manufacturing.

Quality from planning to production

During preliminary development clarification, all divisions work closely with customers. Following preliminary clarification and the design phase, the prototype undergoes specific tests. The knowledge gained is integrated into product optimization.

As part of the project process, we provide support for the development of solutions: from initial planning and configuration, the layout and design to assessing and verifying the specified standards as well as providing documentation and EPLAN-based circuit diagrams. Production planning and control then follows and, where appropriate, series production.



Quality is no coincidence

Services for functional safety

In addition to components for functional safety, we support you with individual services for safe operation of technical transportation infrastructure systems. Whatever the product, our industry experts help you plan and implement the safety lifecycle according to EN 62061 or EN 13849.

When it comes to the planning and design of machines in transportation technology systems, we support you through the implementation of the European Machinery Directive 2006/42/EC with analytical and engineering services as well as seminars.



Your advantages:

- Comprehensive support from industry professionals
- Flexible help during all project phases
- Time savings, thanks to outsourcing
- Building competence through employee qualification



Analysis

We check the status of your systems and machines and provide tailored recommendations on the following aspects:

- Machine inspection of the current safety status
- Operation of old machines
- Changes to or linking of existing and/or new machines
- Interface analysis of the machine and transportation technology equipment
- Intersection analysis on further guidelines, such as ATEX, EMC, low voltage

Engineering

In the case of requirements according to the Machinery Directive, we implement all required steps throughout the safety lifecycle process:

- Safety planning
- Risk analysis
- Specifying and implementing the required safety functions
- SIL/PL certification
- All verification and validation activities

Seminars

We provide you with the required expertise, both in theory and in practice, on the following topics:

- Machinery Directive: contents, requirements, implementation
- Risk assessment
- Compliance procedures
- Definition of safety functions
- Determining the safety characteristics of components
- Determining the required PL
- PL certification with SISTEMA

Integration of machines in transportation technology systems

Often there are overlaps between the requirements from transportation technology and the safety of machinery: in transportation technology systems, for example, machines such as gates, signaling systems, video monitoring or pump controllers are used.

Scope of the Machinery Directive

An interlinked chain of diverse systems leads to an overall system to be evaluated according to the Machinery Directive. The machines and systems are frequently subject to the changes made by the owner/operator. In such cases, an operator becomes the manufacturer and is responsible for the conformity assessment.

We support you in complying with the specific requirements for the safety of machinery and safeguarding interfaces to the safety areas.



Quality is no coincidence

Service and support

Implement your projects even more quickly and efficiently. Whether you are operating, planning, producing or maintaining systems – Phoenix Contact's services provide professional support that is tailored to your requirements in all phases. This also includes the excellent service we offer by phone and online as well as industrial professionals on site. Numerous seminars at Phoenix Contact headquarters or on site at your company are available for training your employees. As part of our after sales service, we provide expert advice regarding any aspect of your products and solutions.



Hotline:

- Expert consultation from industry professionals
- Comprehensive support throughout all the phases of your project
- Develop know-how with training courses for your employees



Service

Based on the typical project development for tunnel construction or lock modernization, we provide support by working with you at every stage. We can offer you the necessary technological expertise, combined with vast experience in the transportation infrastructure industry. Together with you, we will arrange the necessary services and help you choose the right hardware and software.

Training and workshops

Thanks to intensive contact with our customers and years of on-site experience, we have developed a qualification concept whereby we can specify employee qualifications tailored to your individual requirements: we offer you the appropriate service based on the project phase, target group, and prior knowledge.

After sales

Our service teams excel thanks to their focused expertise, years of practical experience, and high degree of flexibility.

Our service network is on hand to assist you during installation, startup, and operation even in the most remote regions of the world, for example, via our free system hotline with 24-hour product support. In the event of an emergency, we can provide you with replacement parts outside of office hours.

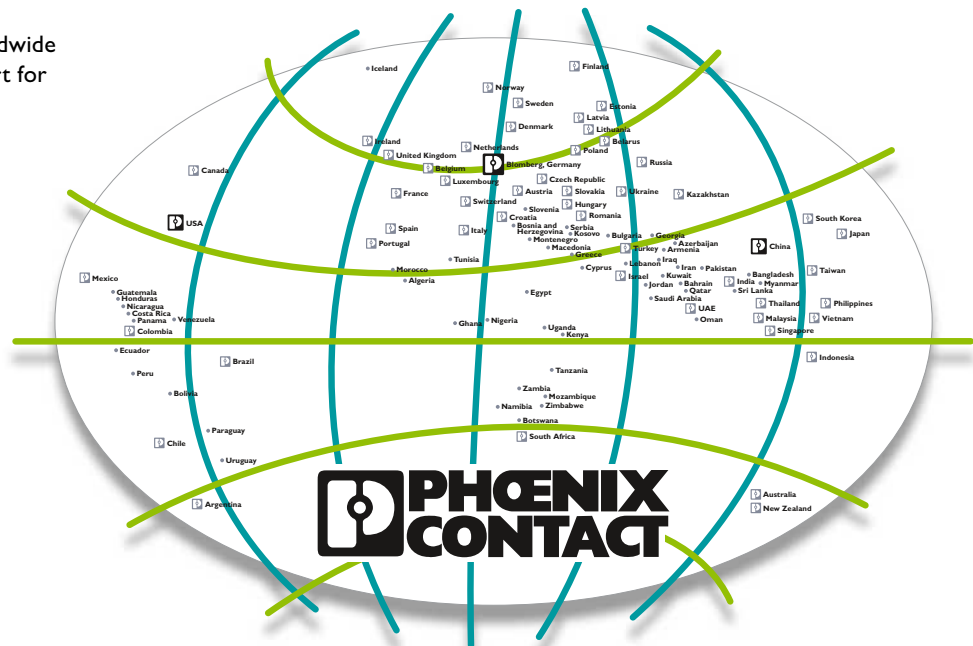
Phone: + 49 5281 9-462888

Local expertise

Phoenix Contact supports you worldwide with professional service and support for all aspects of products, services, and solutions.

Depending on the requirements, we ensure fast replacement of products or support you in the case of problems by hooking into your system.

Our experts are familiar with the regional conditions and specific challenges of your industry. We are happy to provide support all over the world with our close network of automation experts. Contact us for more information.



Quality is no coincidence

Inspiring industry solutions, thanks to excellent products

Phoenix Contact offers innovative transportation infrastructure solutions, including everything from automation technology equipment for tunnels to safe and reliable signaling on waterways. These solutions are based on a wide range of connection and automation technology. Intelligently combined, these products become systems for a variety of functions such as control, remote monitoring or measured value acquisition. Inspiring industry solutions are created as a result of industry expertise, many years of experience, and consideration of special requirements.



Excellent products

Innovative systems

Excellent products



Automation system

Thanks to flexible I/O modules and modular system design, programmable logic controllers (PLCs) can be ideally tailored to your application.



Installation system

Connect cables in a fast, straightforward manner without special tools. Our installation system provides you with versatile options for power distribution in transportation infrastructure facilities.



Safety

Wide range of safety functions, high numbers of I/Os, and large networks – play it safe even in demanding automation systems.



Lighting and signaling

Use robust LED signal lights that are specifically tailored to the requirements of maritime applications.



Power supplies

We provide uninterruptible power supplies with IQ technology and redundancy modules for maximum availability of your processes in the field of transportation infrastructure.



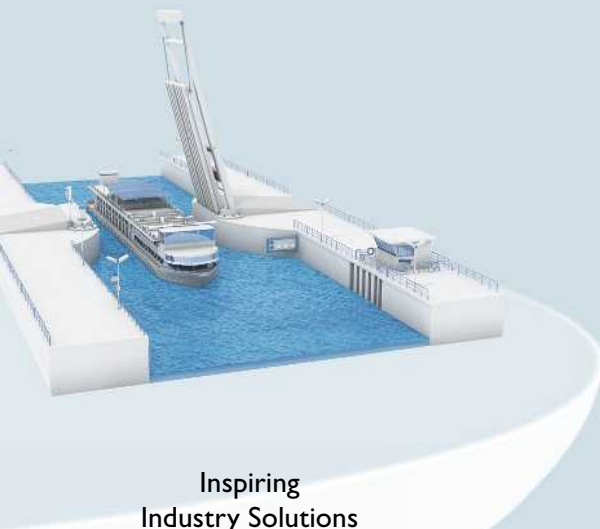
Surge protection

Increase your system availability with intelligent surge protection for all applications, from the power supply to measurement, control, and communication technology.



Industry-specific libraries

Function block libraries for implementing your application by simply switching and linking partial applications.



Control technology

We provide specific products from web-based visualization, to operational data storage, right through to 19" products for server cabinets, for the entire control room.

Passionate about your industry

Each industry places particular demands on system automation. In our dedicated industry teams, we focus on these challenges with technical know-how and passion, and together with our customers we develop tailor-made turnkey solutions. Excellent products are at the heart of our

solutions. Cleverly combined to create innovative systems and supplemented by industry-specific features, they ultimately become industry solutions of proven Phoenix Contact quality.



Excellent products



Innovative systems



Inspiring Industry Solutions

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