

# Marine and Offshore

Solutions for ships and offshore systems



# In dialog with customers and partners worldwide

Phoenix Contact is a global market leader তি in the field of electrical engineering, onduras Nicaragua Costa Ric electronics, and automation. Founded in Brazi 1923, the family-owned company now employs around 14,500 people worldwide. E. 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.

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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. "Whether modern tankers or container ships, elegant cruise ships, magnificent luxury yachts or offshore supply vessels – demand is growing for new, specialized, and highly complex vessels. Safety, reliability, and efficiency are crucial for modern marine and offshore applications. More stringent safety requirements, including in the Ex area, also apply for offshore oil and gas production. With our extensive portfolio of solutions and many years of experience, Phoenix Contact is your expert industry partner for marine and offshore applications."

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#### Thomas Perschke, Global Industry Manager

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## Overview: solutions for marine and offshore



#### Ships

On board a ship, many systems are required for the safe operation of the vessel. These include, for example, the ship's engines, power generation, rudder systems, and fire detection. If any of these systems fail, there is a danger to the crew and the ship. Phoenix Contact offers failsafe control and monitoring solutions for reliable operation.



#### Offshore

In the case of offshore systems, the focus is on both the systematic failsafe performance and material robustness of the technology. Here, Phoenix Contact is the right contact partner for redundantly designed network and control solutions for monitoring and alarms.

For further information, see page 6 onwards

For further information, see page 16 onwards

# Solutions for ships

Whether cargo ships, cruise liners, special purpose vessels, yachts or ferries – Phoenix Contact supplies tailor-made solutions based on a comprehensive range of products.

From bunker monitoring, waste incineration, and water treatment to power measurement at the drive shaft, our systems ensure smooth control and data transmission in all areas of application. Whether wired or wireless: we offer high-performance and reliable solutions even for harsh conditions, which are tested and verified in accordance with all the relevant marine approvals.



## Overview: ships

#### Cargo hold

Failsafe solutions from the hydraulics and lighting to tank and ballast water management.

#### Bridges

Special tailor-made operation and monitoring solutions approved for marine use.

#### Engine room

Robust redundancy concepts from power supplies to control technology for the extended temperature range.

#### Locks

Reliable signaling and automation technology for the safe operation of locks.

## Solutions for ships

# Bridges

Due to their exposed environment, ships place very exacting requirements on the reliability of automation systems. Likewise, clear visualization and operator guidance are indispensable for the safe operation of a vessel, even in rough seas and varying light conditions.

Phoenix Contact offers tailor-made solutions for the ship's bridge – from the reliable control solution thanks to failsafe redundancy to maritime operation and monitoring devices.



## Your advantages:

- Tested quality certified according to GL, LR, BV, DNV, ABS, and EN 60945
- Inexpensive solutions for modernization and system extension
- Maritime HMIs and industrial PCs with compass safe distance in accordance with ISO R 694 and DIN EN 60945 Section 11.2

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# Operator panels for maritime applications

For use on the bridge, you need HMI devices that satisfy the high requirements on board vessels. Along with the integrated alarm horn, the scope of functions also includes dimming the industrial, resistive touch displays. External signaling devices can be controlled via the floating output.



# Redundant multi-client visualization

With our operation and monitoring solutions, you can ensure that the right information is available at the right place. To this end, the clients access a redundantly designed server. You determine the access rights on a central industrial PC and specify which subsets each client should have. This is based on hardware and software that is specifically tailored to shipbuilding.



#### Solutions for wiping systems

The captain must have a clear view at all times in order to ensure safety on board. Thanks to the reliable automation of wiping systems, you can ensure the safe operation of a vessel even in rough seas.

#### Easily configurable, networked visualization

Implement a networked multi-client visualization with access to maritime touch panels based on a redundant OPC server. You can keep an eye on alarm and monitoring functions at all times thanks to access to a consistent database at various locations on the vessel. The redundantly designed system ensures high-availability data communication on board. Lighting and air conditioning can also be conveniently controlled via the HMI.



## Solutions for ships

# Engine room

Reliable control of the engine rooms is essential for smooth operation of the vessel. With redundant systems based on PROFINET, Phoenix Contact ensures the safe and high-availability operation of motors and drives. The PC Worx software supports easy programming according to IEC 61131 and reliably forwards the acquired values from the controller to the control room.

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## Your advantages:

- Easy connection, thanks to numerous non-proprietary communication protocols
- I/O points can be extended without any cabling effort
- Distributed concepts for reduced cabling effort, thanks to nearby I/O points at the sensor

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# Machine controller with SAE J1939

For smooth operation in the engine room, you need a reliable control solution. This can be implemented using our comprehensive solutions for the automation of motors and drives. Thanks to open interfaces, you can still be flexible when it comes to the connection of your machinery. With the J1939 CAN-based communication protocol, you have an overview of the complex processes in your engine room at all times.



## GPS communication in accordance with NMEA 2000

Thanks to GPS communication in accordance with NMEA 2000, the navigation data of the ECDIS (Electronic Chart Display and Information System) can be easily integrated in your automation system, without requiring additional gateways.

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#### NMEA 0183 data acquisition

The voyage data recorder (VDR) gathers important data from the sensors on board vessels. This data is essential for evaluating maritime accidents and disasters, which means that only robust and approved components may be used. Phoenix Contact offers the ideal solution for data acquisition in accordance with NMEA 0183.

#### Connection of voyage data recorders in accordance with NMEA 0183

NMEA 0183 is a defined standard for communication between navigation equipment on vessels. Important voyage data recorders (also referred to as VDRs or black boxes) have a NMEA 0183 input which is not compatible with most standard sensors.

Using special function blocks from Phoenix Contact, the signals from the sensors are acquired via control technology, scaled, and then forwarded to the black box using the NMEA 0183 protocol.

Startup is simply by means of web parameterization and does not involve much programming effort. Communication can be established costeffectively between voyage data recorders and the sensors as the number of Inline input terminals can be optimally adapted to the application.



## Solutions for ships

# Cargo hold

In the cargo hold, reliable and failsafe control of basic functions, such as work lighting, must be ensured in order to avoid hazards and ensure smooth operation. A reliable tank and ballast water system is also indispensable to ensure the stability of the vessel on every voyage. Phoenix Contact offers solutions approved for marine use for controlling lighting systems, the hydraulics, as well as for tank and ballast water management.

## Your advantages:

• Cost-effective and high-availability connection of distributed I/O modules to the control system

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- Open interface and flexible turnkey solutions
- Distributed monitoring in the control system possible at all times, thanks to integrated web server



#### **Energy-efficient lighting solutions**

Phoenix Contact offers inexpensive and energy-efficient solutions for hold lighting. Easy integration into the overall network is possible thanks to control by means of the integrated web server. Distributed stations on vessels can therefore be reliably controlled and monitored at all times.



# High-availability automation for the hydraulics

Automated hydraulics are required for the fast loading and unloading of freight. This avoids long periods in port. In order to ensure the safety of personnel on board, it must also be possible to open and close loading ramps reliably at all times. Phoenix Contact offers redundant control systems for this.



# Tank and ballast water management

Reliable monitoring of the level of storage and cargo tanks is indispensable. Phoenix Contact offers a stand-alone system to prevent the overfilling of tanks. Two control units form a redundant system: a pre-alarm at 95% signals that the fill rate has been reduced. The main alarm at 98% indicates that filling has been stopped.

# Modular and open interface control systems for every application using the hydraulics as an example

Whether Modbus/RTU, Modbus/TCP, CANopen®, NMEA or 4 ... 20 mA: Phoenix Contact offers modular and open interface solutions for your application. For stern ramps, hatch and ramp covers, doors, and movable car decks, use solutions from Phoenix Contact to ensure high-availability communication between the distributed systems and the control room. This means that all systems can be operated without having to switch to manual operation in the event of an emergency.



## Solutions for ships

# 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.

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## Your advantages:

- Reliable startup and easy maintenance, thanks to pre-installed software functions
- Durable devices, thanks to a robust design and innovative technologies
- 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 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.



#### **Controlling lock subsystems**

All units of the lock complex, such as gates and chambers, are controlled from the steering position. With the wide range of control and I/O systems, you can monitor and control 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 sliding 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 offshore

Marine-typical certification is indispensable on ships in the offshore industry such as FPSOs (Floating Production Storage and Offloading Units) or platform suppliers. Absolute failsafe reliability is also important since expensive ships must always be in operation in order to not interrupt oil and gas production.

Life-support systems on ships, so-called essential services such as drives or fire protection, are designed redundantly in order to ensure round-the-clock safe operation. Phoenix Contact provides proven and reliable solutions for virtually all automation tasks in the offshore industry.



## Overview: offshore

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#### **FPSOs** and platform suppliers

Automation solutions for essential services: from the sprinkler system to alarms and monitoring.





Drilling platform

Failsafe solutions with Ex i components for automation tasks on the drilling platform.

## Solutions for offshore

# Drilling platform

Drilling platforms combine maritime requirements with technological requirements for the Ex area. Automation systems must be able to process signals from the Ex area and be certified according to GL, DNV, or ABS. This makes demands on the systematic design of a solution as well as the robustness of the components used.

With many years of experience in the offshore industry and a wide range of maritime and Ex i technology, Phoenix Contact is an expert contact partner for high-performance solutions on drilling platforms.





#### **Power generation**

Monitor the energy requirement on the platform and connect additional diesel generators as required. With a modular control and I/O system and CAN connection, you can implement a power management solution where energy supply on the platform is always in line with requirements. The modular design of the system allows the solution to be extended at any time.



#### Surge protection

The high towers of a drilling platform, including the derrick, are at risk from lightning strikes. The complex technology for driving the drilling pipe must be protected against damage from surge voltages at all times. Phoenix Contact offers highperformance solutions for surge protection based on POWERTRAB and FLASHTRAB arrester devices.



#### Fire extinguishing systems

With a redundantly designed automation solution consisting of a control and monitoring system, you can always keep an eye on the function of the fire extinguishing system. Using flow monitors, you are able to precisely check that all lines are supplied with water. This enables a fast response in the event of an emergency.

#### Redundant system design for essential services

Failsafe reliability is ensured by two controllers, on which applicative software redundancy is installed. The pump unit controls the water supply. Connection to the platform network for system-wide alarms is possible at any time via numerous interfaces.



## Solutions for offshore

# FPSOs and platform suppliers

Efficient automation can be a decisive competitive advantage for cost-intensive oil production with FPSOs. The trend here is towards performing remote maintenance on onboard systems and reducing the number of technical personnel while increasing the size of vessels. Maritime certificates and protocols such as SAE J1939, NMEA 2000, NMEA 0183, GL, or ABS are likewise important. The hardware must be able to withstand the harsh conditions and include specific functions such as one hundred percent dimmable displays. Here, Phoenix Contact is your experienced partner for reliable automation solutions above and below deck.

## Your advantages:

- High-performance and failsafe heave compensation, thanks to redundant control solutions
- Increased safety on board with seamless integration of gas detectors
- Flexible solutions for all aspects of operation and monitoring, thanks to IPCs, HMIs, and visualization solutions for shipbuilding



#### Solutions for heave compensation

With an automation solution based on applicative system redundancy, you can make sure that the heave compensation always ensures the correct position of the ship. This is necessary, for example, when dynamic positioning is no longer sufficient in very high seas.

Secure communication in the network is ensured by mGuard security routers and VPN technology.



#### **Gas detection**

Particularly in the oil and gas industry, various gases pose a risk to people and machines. Using a solution from Phoenix Contact allows you to seamlessly integrate gas detectors into your communication system. This ensures immediate alarms and countermeasures in the event of an emergency, thanks to the redundant design. This solution can also be implemented with SIL as required.



#### **Redundant power supplies**

If the energy supply to system parts or even individual components is briefly interrupted, this can lead to costly production failures due to long shutdown and startup times for processes.

Phoenix Contact offers consistently redundant auxiliary voltage supplies from the mains to every load.

#### **Redundant alarms and monitoring**

Systems such as the ship's engines, power generation, rudder systems, or fire detection are part of the essential services on board. If they fail, there is a danger to the crew and the ship. In order to be notified promptly regarding critical situations, redundant alarms and monitoring based on robust control and network technology are installed.

In addition to the essential services, the

system also reports on general conditions such as the level of the ballast water or fuel tanks and drinking water supplies.



# 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.



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## 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 marine and offshore 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 therefore 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.









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## Quality is no coincidence

# IT security for marine and offshore networks

Protect your ships and offshore platforms against unauthorized access by people or malware. Industrial Ethernet from Phoenix Contact can be easily integrated into your automation infrastructure – because we use decades of experience in automation and industrial Ethernet networks to make Ethernet easy. We know and understand the expectations and demands placed on automation and network technology in your marine and offshore system. Our products, solutions, and expert consultation service bring this to life.





#### Consultation

On request we can offer professional support, from consultation, network analysis, and concept creation to configuration support and startup. We not only provide support over the phone or by e-mail, but also directly on site, if you so desire. Contact us for more information.



#### Engineering

Plan and structure marine and offshore systems and networks. Together with you, we will plan how you can correctly use Managed Switches in your applications and determine which functions will help you design your network in a high-performance, secure and failsafe manner. This allows us to create the right network infrastructure for PROFINET, EtherNet/IP™, and other Ethernet applications.



#### Seminars

In our seminars you will learn about the specifications for secure networks. We will provide an overview of the normative requirements and give you the know-how needed for their practical implementation. In the next step, we will present the appropriate devices and explain how to integrate and configure them. Finally, for central management, we will explain how to implement remote access.

#### Scalable network infrastructure with a high degree of data security

The network infrastructure components from Phoenix Contact allow you to safely and reliably network your marine and offshore system. Redundant FO cables ensure permanent communication between the individual network devices. It is also possible to perform maintenance on vessels or drilling platforms remotely via public networks while preventing unwelcome third-party network access.



## Quality is no coincidence

# Service and support

Implement your projects in the marine and offshore industry 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 of ships or drilling platforms, we provide support by working with you at every stage. We can offer you the necessary technological expertise, combined with vast experience in the marine and offshore 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 and certified solutions for ships and offshore platforms, from control technology to visualization on maritime HMIs. These solutions are based on a wide range of connection and automation technology. When combined in an intelligent way, 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**



#### Controllers

Modular small-scale controllers for remote monitoring of distributed stations to high-performance controllers for redundant applications in the marine and offshore industry.



#### Maritime HMIs and industrial PCs

With the HMI devices and industrial PCs, you can keep an eye on your ship at all times and intervene in processes if required.



#### Measurement and control technology

When it comes to signal acquisition, we offer compact 6 mm signal conditioners, signal conditioners with functional safety, and signal isolators for intrinsically safe circuits in the Ex area.



#### I/O systems

Wherever signals need to be acquired and output, our I/O systems are the ideal solution: whether modular or with a block design, for the control cabinet or in the field, for the Ex area or for functional safety.



#### Power supplies

For maximum availability of your processes in marine and offshore applications, we offer uninterruptible power supplies with IQ technology and redundancy modules.



#### Surge protection

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



#### Software

Software is the key to more efficient automation. Phoenix Contact offers software from configuration to system operation.



#### Industry-specific libraries

Function block libraries for marine and offshore applications enable the easy connection of standard field devices and programming of process automation.



**Industry Solutions** 

#### 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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