



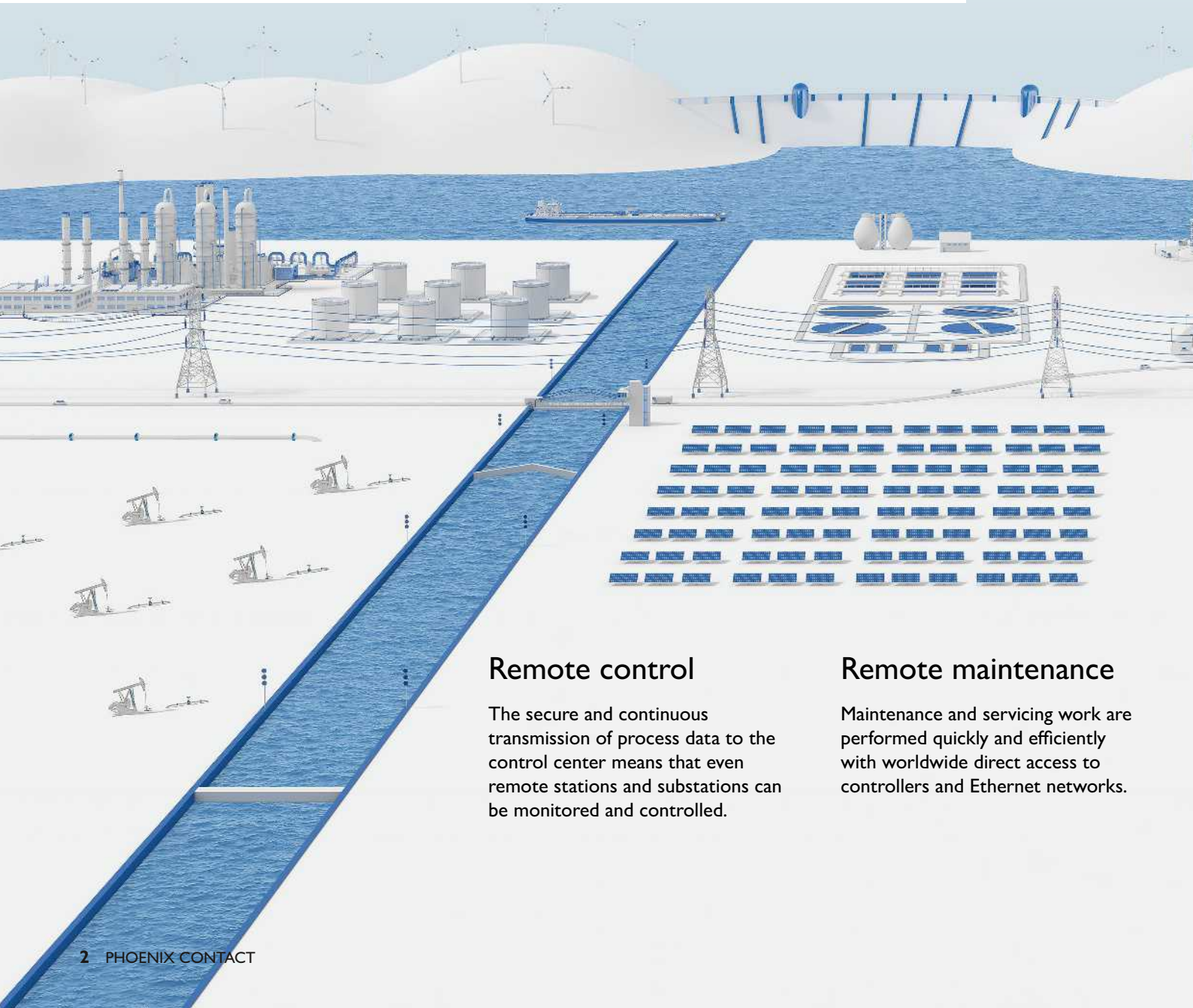
Industrial remote communication

Worldwide remote access to machines and systems

Industrial remote communication

Securely connecting distributed stations with the control room is made possible with the versatile possibilities of remote communication. Remote communication enables access as well as continuous process data monitoring from the central station.

Remote maintenance involves temporary access to a system or machine. In contrast to remote maintenance, remote control requires a permanent connection to a remote station in the vast majority of cases. Various alert systems ensure the timely notification of a wide range of operating states and enable the reliable availability of your system.



Remote control

The secure and continuous transmission of process data to the control center means that even remote stations and substations can be monitored and controlled.

Remote maintenance

Maintenance and servicing work are performed quickly and efficiently with worldwide direct access to controllers and Ethernet networks.

Find out more with the web code

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

i Web code: #1234 (example)

Or use the direct link:
phoenixcontact.net/webcode/#1234

Contents

Remote control

Remote control technology for every application	4
Solutions for remote control technology	6
Remote control technology application examples	8
Remote control via in-house cabling	10
Remote control with wireless systems	14
Remote control via the cellular network	18
High-accuracy time synchronization for remote control applications	21
Smart services with PROFICLOUD	22

Remote maintenance

Remote maintenance via the Internet and cloud	24
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Alerts

Alerts via the cellular network	28
---------------------------------	----

Networking

Networking with fiber optics	30
Networking with WLAN and Bluetooth	34

Solutions for industrial video surveillance

Service and support	38
---------------------	----

Alerts

Errors are quickly eliminated and production downtimes minimized with proactive and precise early warning messages via SMS or e-mail.

Networking

WLAN, Bluetooth, and fiber optics technologies enable the easy and interference-free connection of various system parts, remote stations, and substations.

Remote control technology for every application

Remote control, alerts, and networking – we will provide you with tailored solutions for your challenge, whatever the application. Our portfolio includes versatile possibilities for combining cable-based and wireless transmission media, as well as transmission protocols.

This brochure presents an overview of the possibilities and advantages offered by our portfolio.



Modular controllers and remote control stations

Cable-based communication technology

Network security

Wireless communication technology

Transmission media and communication protocols

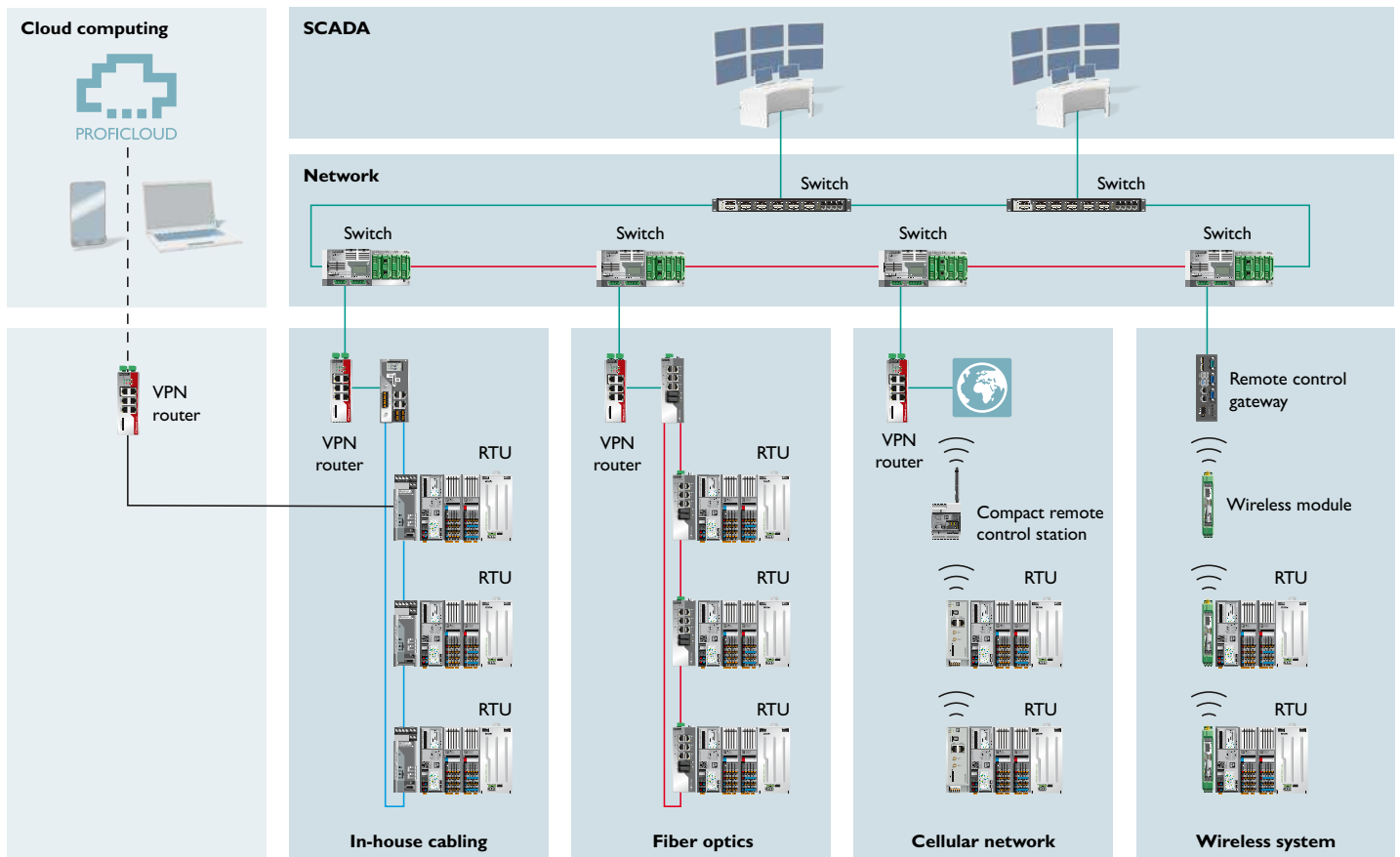
Transmission protocols	Cable-based systems	Cellular network systems	Public telephone network	Wireless systems
Remote control protocols				
IEC 60870-5-101	•	•	•	•
IEC 60870-5-104	•	•	•	•
IEEE 1815 – DNP3	•	•	•	•
Fieldbus protocols				
Modbus/RTU	•	•	•	•
Modbus/TCP	•	•	•	•
PROFIBUS	•	–	–	•
PROFINET	•	–	–	•

Remote control technology from the control system through to the field level

Modern control systems have a wide range of remote control technology interfaces, such as IEC 60870-5-104 and DNP3, for example. Phoenix Contact provides you with the communication infrastructure for

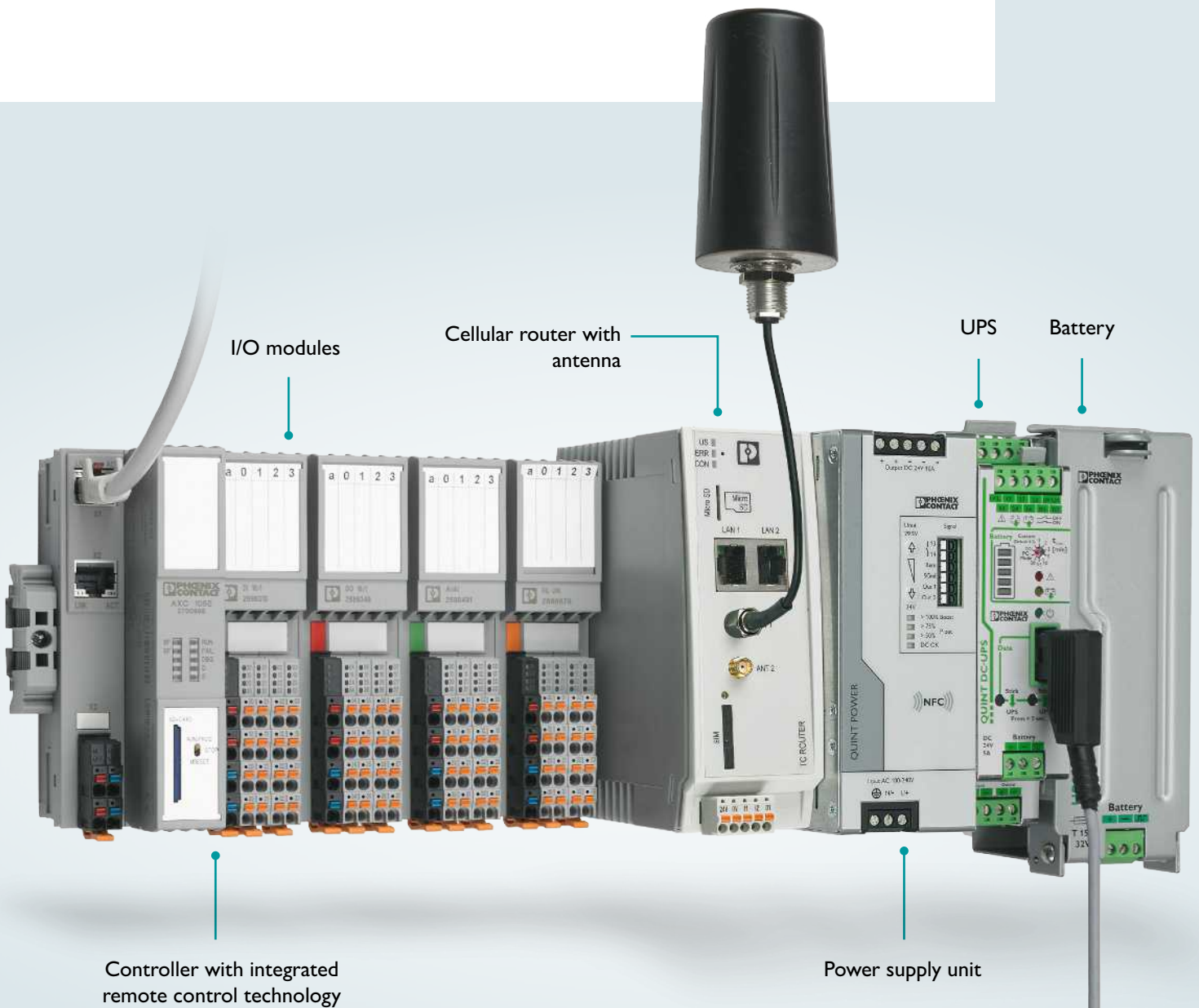
efficiently coupling these protocols with your automation system. Modular remote control stations enable data transmission tailored to your application, e.g. in the supply of energy, water, gas, and district heating. Moreover,

data can be transmitted directly from the controller to the Proficloud.



Solutions for remote control technology

Phoenix Contact provides modular remote control stations and application-specific systems for existing and new systems. The solutions take into consideration both industry-specific framework conditions and customer-specific requirements in order to ensure ideal adaptation to the system structure. The application software ensures reliable operation and secure transmission to the control room. Data can be prepared and presented flexibly with the visualization system.



Individual remote control stations



Remote control and automation system

smartRTU AXS SG Order No. [1110435](#)

Monitor and control various applications in power grids.

- Predefined functions and easy configuration enable operational management even without programming knowledge
- Communication via standardized protocols such as IEC 60870-5-101/104 taking all of the latest information security regulations into consideration



Function block libraries

RESY+ Order No. [2400295](#)

Transmission of process data via Industrial Wireless, cellular network, landline network, and Ethernet.

- Simple: transmit remote signals wirelessly
- Cost-effective: up to 20 km network connections via existing remote control cables
- Secure: thanks to the use of standardized protocols



Feed-in control

PGS controllers
Switchgear and controlgear assembly Order No. [1160749](#)
PGS controller Order No. [1114234](#)

- Acquisition of grid connection parameters:
- Reliable system operation and straightforward grid connection through compliance with all technical and grid operator-specific connection requirements
 - Certification in accordance with VDE-AR-N-4110/20



Well automation

WellControl Order No. [2403104](#)

Control and regulation of groundwater wells.

- Configuration instead of programming
- Connection to the control center via the remote control protocol IEC 60870-5-104
- Straightforward connection of branch-specific field devices
- Reliable supply with an intelligent surge protection and power supply concept



Pump automation

PumpControl Order No. [2403365](#)

Operation and monitoring of single, dual, and multiple pump stations.

- Standardized interfaces for integrating application-specific measuring technology
- Fast configuration and easy diagnostics via the integrated touch panel
- Integrated remote control interface for transmitting data to the higher-level control system and for sending SMS messages



Pipeline leakage monitoring

Monitoring the operating parameters along the length of a pipeline.

- Secure data transmission via the Internet
- Generation of precise time stamps for the measurement data
- Measurement station time synchronization
- Integration of various measuring signals based on 4 ... 20 mA signals, including from the Ex area

Remote control technology application examples

Power transmission and distribution

Application

Monitoring parameters is a fundamental requirement for the efficient expansion and reliable operation of power grids. The increasing use of decentral generation systems and the rapidly increasing number of new electricity consumers, such as in the field of electromobility, are creating new challenges. One such challenge is posed by the resulting fluctuations in the amount of electricity generated, coupled with consumption increasing as a result of applications such as heat pumps and electromobility. The electrical power distribution network must therefore be optimized to ensure reliable and future-proof operation.

Solution

The smartRTU platform was developed specifically for monitoring and controlling distribution networks. The software enables complex applications to be configured in a clear web interface. It also allows technicians to configure parameters comprehensively without any previous

programming knowledge. Higher-level remote control nodes or control systems manage the reporting of operating states and measurement variables as well as all remote control operations in compliance with the latest information security regulations. The data is transmitted along several communication routes with the help of standardized remote control protocols such as IEC 60870-5-101/104 in the reporting and control direction. Alongside monitoring solutions, the smartRTU platform executes a wide range of (remote) control commands, from simple single-point information through to complex double commands with interlocks. For example, load switches and circuit breakers are controlled remotely via simple parameter configurations.

Summary

The smartRTU platform from Phoenix Contact is an easy-to-configure remote control and automation solution. The acquisition of operating data and remote control of the power grid enable



Use of the remote control and automation system in a power grid

operational optimization and investment planning.

i Web code: #2359

Solar power

Application

Decentral photovoltaic systems also need to play their part in high grid stability. The responsible grid operators specify the ranges to be maintained for network frequency and voltage, and for reactive power in their grid connection conditions for photovoltaic systems. Furthermore, the grid operator must also be able to reduce an oversupply of energy whenever necessary. These system regulations are transmitted by the grid operator to the corresponding PV feed-in controllers via remote control technology.

Solution

Our feed-in controllers certified in accordance with VDE-AR-N 4110/20 acquire the parameters at the grid connection. The manipulated variables are calculated based on the grid operator's specifications and transferred to the inverters. Using this closed-loop control circuit, the PV power station performs the grid-support functions for connecting medium or high voltage.



Use of a feed-in management controller in a PV power station

The Resy+ function block library from Phoenix Contact extends the controller in PV systems with remote control technology protocols. The diverse demands of the grid operator are implemented in connection with the modular control technology.

Summary

The feed-in controllers from Phoenix Contact meet the requirements of the test and certification guidelines in

accordance with FGW TR3 and TR8. The Resy+ function block library enables reliable communication and data transmission.

i Web code: #2011

Water and wastewater treatment

Application

Wastewater pumping stations play an important role in reliable wastewater disposal. Municipal wastewater companies have decentral wastewater pumping stations spread throughout their entire distribution network. These must, when necessary, transport the wastewater to higher-level sewage systems and function correctly around the clock. Current operating data is transmitted to the higher-level control system.

Solution

The turnkey PumpControl control cabinet solution takes over the control and regulation of decentral wastewater pumping stations. Along with switching pumps selectively and recording measurement values, the controller transmits important messages to the higher-level control system via a common remote control protocol (IEC 60870-5-104, DNP3, OPC UA) and to the operating personnel via SMS.

Summary

Wastewater pumping stations are controlled and regulated on demand using the PumpControl solution. This saves costs and optimizes the use of resources. The integrated remote control interface enables efficient integration into the higher-level control system.

 **Web code:** #2524



Use of the PumpControl solution in a wastewater pumping station

Process industry

Application

A processing plant often includes hundreds of valves, some of which are still operated manually. The subsequent monitoring of these valves through the retrofitting of position switches improves monitoring capabilities and the safety of the production operation.

Solution

Small control cabinets with an I/O system are positioned at the center of a valve group. Two sensors are installed on each valve, which are then connected to the cabinet via cable. The control cabinet in the field is connected wirelessly to the control center via the Radioline system from Phoenix Contact. Complex proprietary coding ensures secure transmission. An intelligent mesh network increases the system's immunity to interference.

Summary

With its a modular design and capability of incorporating a high number of devices, this system can reliably monitor small to very large plants.

 **Web code:** #2035



Measurement station sensors on a pipeline

Remote control via in-house cabling

Network remote communication devices easily and efficiently via any 2-wire cable system. Use existing telephone lines or master cables, for example, to create a particularly economical network for Ethernet, PROFIBUS, or RS-232/RS-422/RS-485 communication.

Install Ethernet or PROFIBUS cables in combination with the extenders to extend the transmission range beyond the corresponding standard and up to a distance of 20 km per extender segment.

Your advantages

- ✓ Ethernet, PROFIBUS, RS-232, RS-422, and RS-485 communication via any 2-wire cable system up to 20 km
- ✓ Cost savings with the use of existing copper conductors
- ✓ Time savings with quick and easy commissioning, in part via Plug and Play
- ✓ Excellent failsafe performance, with path redundancy: point-to-point 4-wire, or in part via ring redundancy

PROFIBUS/serial extender



RS-232
RS-422
RS-485



PROFIBUS extender

PSI-MODEM-SHDSL/PB

Order No. [2313656](#)

- Point-to-point/line topology
- 2 SHDSL ports
- 1 PROFIBUS port
- 2- or 4-wire operation data rates up to 15.3 Mbps
- Typical PROFIBUS data rate of 1.5 Mbps at approx. 1.5 km
- 4-wire redundancy operation possible

Serial extender

PSI-MODEM-SHDSL/SERIAL

Order No. [2313669](#)

- Point-to-point/line topology
- 2 SHDSL ports
- RS-232, RS-422, or RS-485 can be selected
- 2- or 4-wire operation data rates up to 15.3 Mbps
- RS-232 up to 230.4 kbps (automatic DTE/DCE switchover)
- RS-422/RS-485 up to 2000 kbps
- 4-wire redundancy operation possible

Application description

Network remote serial fieldbus devices easily, efficiently, and cost effectively via existing cables. Special PROFIBUS or RS-232/RS-422/RS-485 cables are not required for ranges up to 20 km.



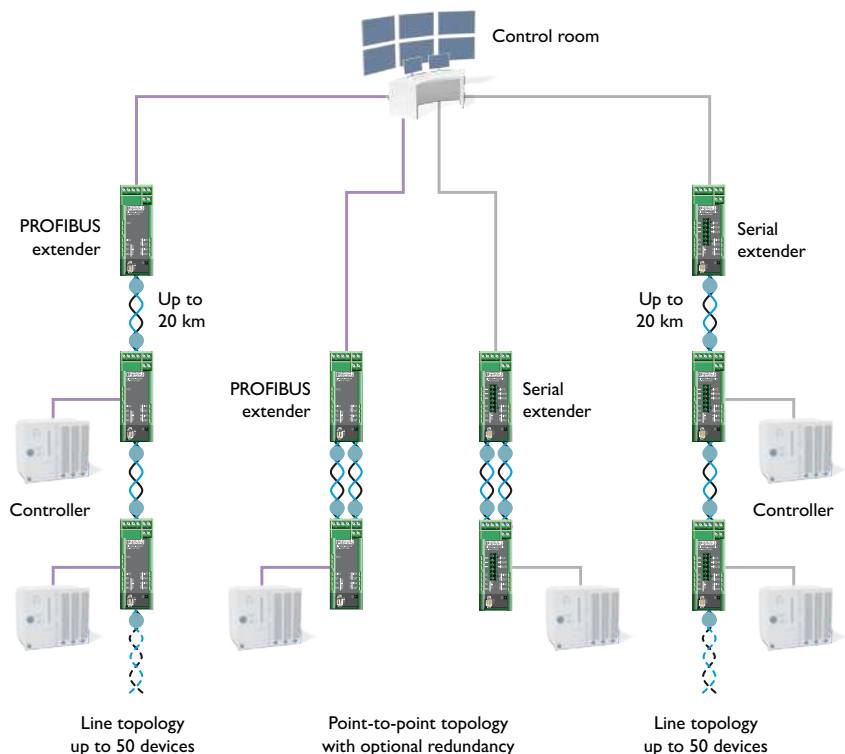
Serial fieldbus communication via any 2-wire cable system up to 20 km

PROFIBUS extender

- PROFIBUS transmission with up to 1.5 Mbps over distances of approx. 1.5 km without using special cables
- 1 PROFIBUS port

Serial extender

- RS-232, RS-422, or RS-485 can be selected
- RS-232 up to 230.4 kbps (automatic DTE/DCE switchover)
- RS-422/RS-485 up to 2000 kbps
- Termination resistor, can be enabled/disabled (RS-485 W2)



Intelligent Ethernet extenders



Managed Ethernet extender

TC EXTENDER 6004 ETH-2S

Order No. [2702255](#)

- Remote diagnostics via IP: web-based or SNMP
- Point-to-point, line, and ring topologies
- 2 SHDSL ports
- 2-wire operation up to 15.3 Mbps
- 4-wire operation up to 30 Mbps
- 4 Ethernet ports
- Local diagnostics via display



Managed Ethernet extender

TC EXTENDER 4001 ETH-1S

Order No. [2702253](#)

- Remote diagnostics via IP: web-based or SNMP
- Point-to-point topologies
- 1 SHDSL port
- 2-wire operation up to 15.3 Mbps
- 1 Ethernet port
- Local diagnostics via LED



Unmanaged Ethernet extender

TC EXTENDER 2001 ETH-2S

Order No. [2702409](#)

- Point-to-point, line, and ring topologies
- 2 SHDSL ports
- 2-wire operation up to 15.3 Mbps
- 4-wire operation up to 30 Mbps
- 1 Ethernet port
- Local diagnostics via LED

i Web code: [#2202](#)

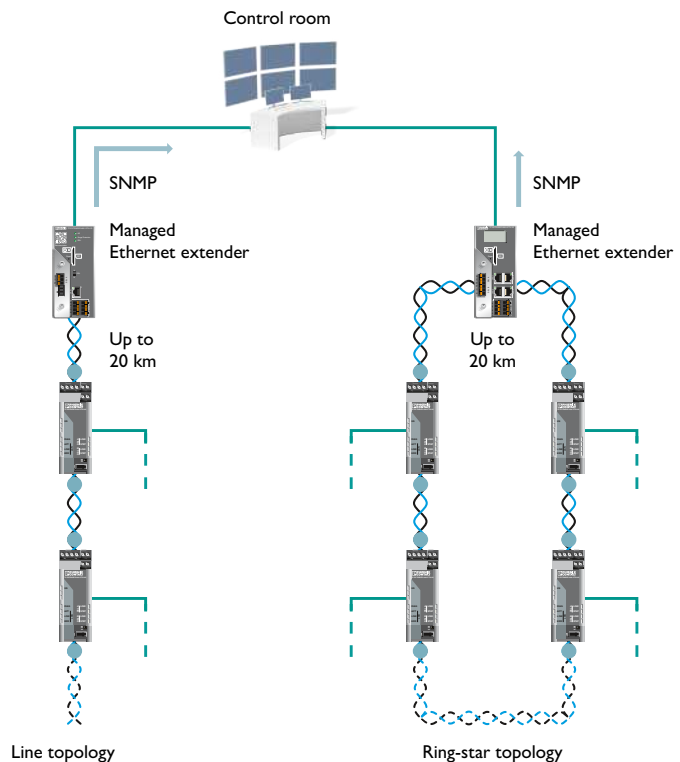
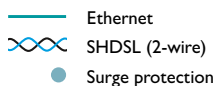
Easy connection and monitoring of extended IP networks

Acting as an extender system, the devices not only connect simple point-to-point Ethernet applications, but also extended IP networks.

All extender paths and devices can be easily monitored remotely using just a single managed device.

Managed Ethernet extender

- Alerts issued for all system results via SNMP
- Remote diagnostics via IP: web-based or SNMP
- Replaceable SHDSL surge protection (state monitoring via SNMP)



IP communication via any 2-wire cable system up to 20 km

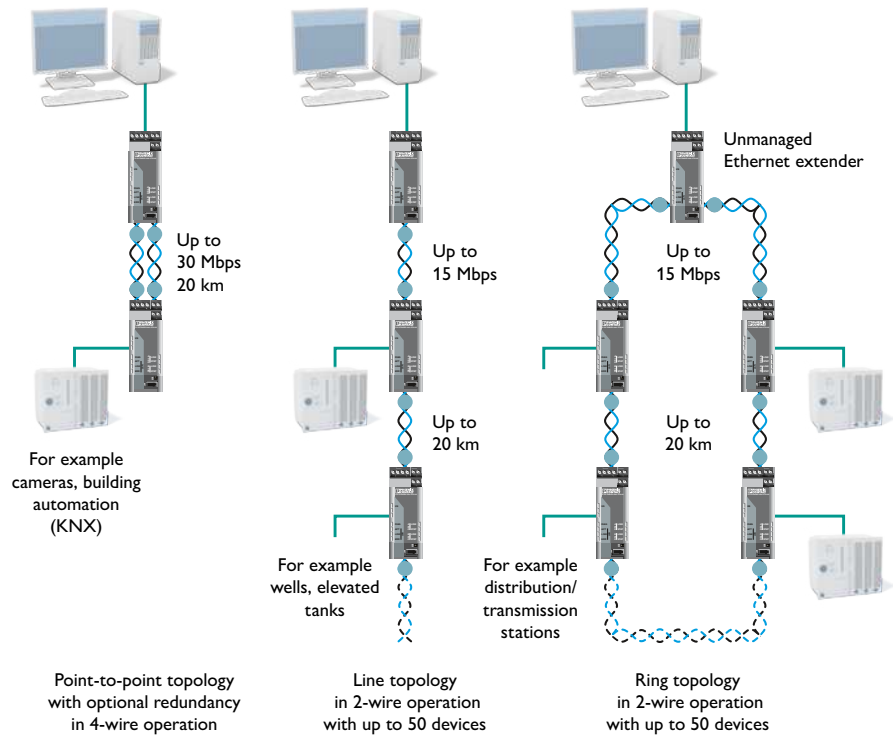
Existing 2-wire cables can be used for networking. The system can be extended during operation without causing any adverse impacts.

Basic features of fast commissioning via Plug and Play:

- No configuration required
- Time and money can be saved with the automatic topology and data rate detection
- Flexible use in point-to-point, line, and ring topologies

Unmanaged Ethernet extender

- No separate IP address (no IP address or network configuration)
- Transparent transmission of all standard Ethernet protocols: EtherNet/IP, Modbus/TCP, PROFINET, PROFINETsafe, EtherCAT, KNX, and BACnet/IP



Virtually separating critical IP networks and making them secure with VLAN

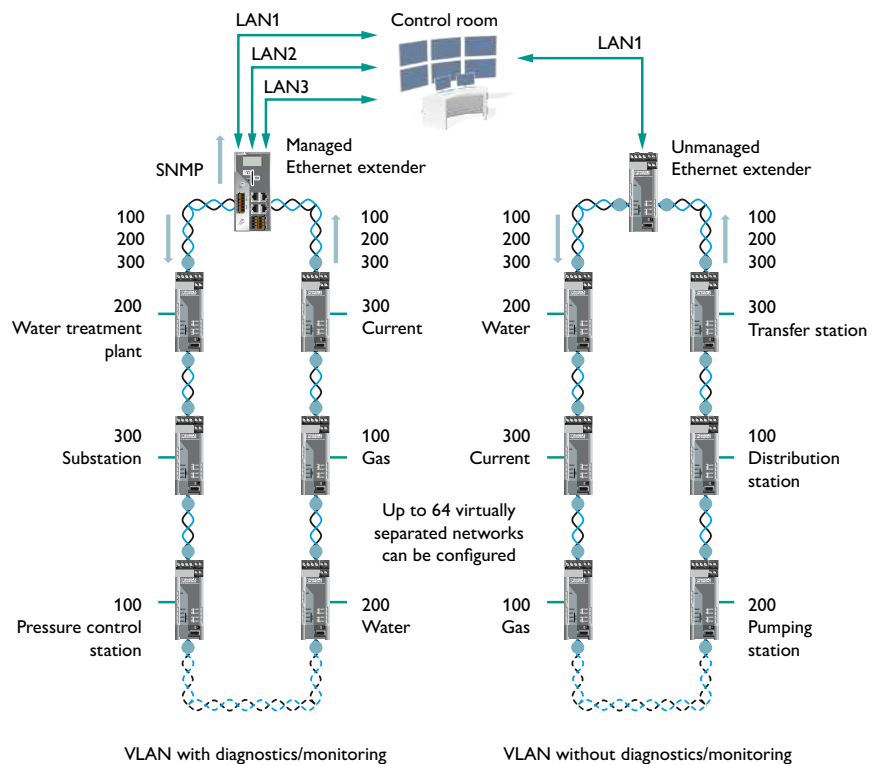
With firmware version v5.xx and later, VLAN (Virtual Local-Area-Network) can be used to virtually isolate critical IP networks and make them even more secure.

VLAN (virtually/logically separate IP networks):

By setting up virtual networks in the Ethernet extender system, access to Ethernet end devices can be limited easily and individually, increasing the security throughout the entire IP network. In this case, communication is only possible within a VLAN.

Commissioning without expert knowledge:

- VLAN configuration via software wizard



Remote control with wireless systems

With wireless systems, you can easily record measuring data and system information from distant or poorly accessible areas and transfer it to central points.

Remote control technology is a reliable and inexpensive alternative to new cable paths, particularly if new system components are to be installed or defective communication cables replaced. The wireless modules have various interfaces, and can thus act as a gateway between local sensors and process station actuators and the control center.

Your advantages

- ✓ Quick and easy commissioning without programming
- ✓ Easy point-to-point or network connections (star, mesh)
- ✓ Can be extended with up to 32 I/O modules per station via DIN rail connector (hot-swap capability)
- ✓ Adjustable wireless interface data rates
- ✓ 128-bit data encryption (AES)

It's easy with Radioline



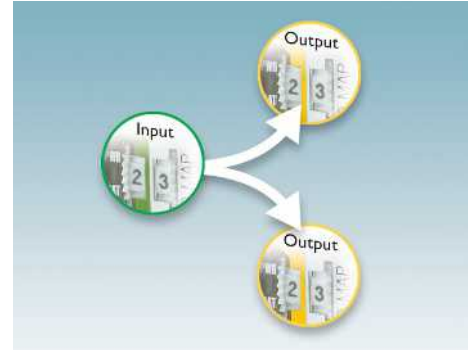
Easy installation

Create a modular wireless station in the control cabinet and extend or replace it easily during operation.



Unique addresses for front modules

Set a unique address on the front module by simply turning the thumbwheel.



Distribute inputs and outputs

The thumbwheel on the I/O module is used to assign the inputs and outputs by creating pairs, thereby easily distributing the I/O signals in the system.

The Radioline system – easy signal distribution with I/O mapping

Radioline is the Phoenix Contact transmission system for extended systems and networks with up to 250 stations. Special features include extremely easy assignment of inputs and outputs by simply turning the thumbwheel – without any programming.

Radioline features:

- Quick and easy commissioning without programming
- Easy point-to-point or network connections (line, star, mesh)
- Modular station structure with up to 32 I/O modules per station via DIN rail connectors
- Transmission of I/O signals and serial data
- Trusted Wireless technology
- Can be combined with RS-485 stations



The I/O extension modules feature:

- Easy I/O mapping via the thumbwheel without the need for programming
- Easy module replacement, even during operation (hot-swap capability)
- Channel-to-channel electrical isolation
- Extended temperature range: -40°C to +70°C

Product overview



Radioline wireless modules

Europe 868 MHz Order No. [2904909](#)
 America, Canada 900 MHz Order No. [2901540](#)
 Australia 900 MHz Order No. [2702878](#)
 Worldwide 2400 MHz Order No. [2901541](#)
 Japan 2400 MHz Order No. [2702863](#)

- Range up to 32 km (depending on frequency band)
- Suitable for large distances with obstacles (868/900 MHz)
- Transmission time typically from 100 ms up to a few seconds (depending on frequency band, range, and network size)

Radioline extension modules

4 digital inputs Order No. [2901535](#)
 4 digital inputs (NAMUR) Order No. [2316275](#)
 8 digital inputs Order No. [2901539](#)
 4 digital outputs Order No. [2901536](#)
 8 digital outputs Order No. [2902811](#)
 2 digital inputs, 2 digital outputs Order No. [2901533](#)
 1 analog input, 1 analog output Order No. [2901537](#)
 4 analog inputs (0/4...20 mA) Order No. [2901537](#)
 4 analog inputs (0...5/10 V) Order No. [2702290](#)
 PT100 temperature model Order No. [2904035](#)
 4 analog outputs Order No. [2901538](#)

Radioline outdoor box

For worldwide use
 RAD-RUGGED-BOX-CONF Order No. [1091638](#)

- Wireless module (selectable): 868 MHz, 900 MHz, or 2400 MHz
- Can be extended with up to three selectable I/O extension modules

For use in America
 RAD-900-DAIO6 Order No. [2702877](#)

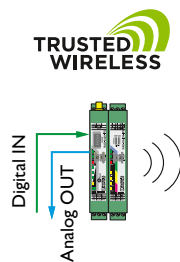
- Integrated 900 MHz wireless module
- 6 integrated I/O channels (2 x DI/DO, 1 x AI/AO)
- Connection to RAD-900-IFS wireless modules possible

One device – a wide range of applications

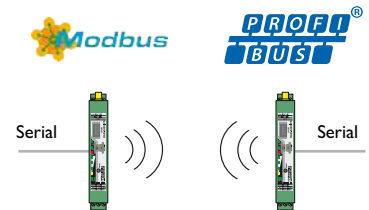
Radioline can transmit both I/O signals and serial data, and can therefore be used in a variety of applications – the Trusted Wireless technology ensures reliable transmission even in harsh industrial environments, regardless of the protocol type. The Radioline function blocks for PC Worx enable easy I/O integration into the control level.

PC Worx function blocks

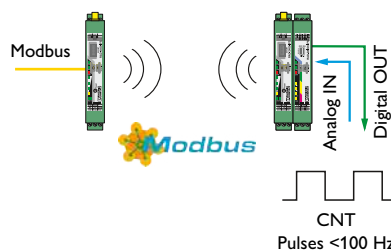
- Free Radioline library
- Central monitoring of wireless stations in the control system



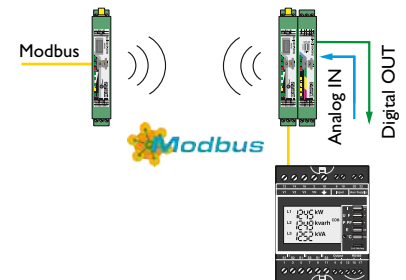
I/O data mode



Serial data mode



PLC / Modbus/RTU mode



PLC / Modbus/RTU dual mode



Wireless set with antennas

ILB BT ADIO MUX-OMNI

Order No. [2884208](#)

- Two permanently paired modules
- Ranges of up to 200 m outdoors
- 16 digital and 2 analog inputs and outputs
- No configuration or settings necessary
- Bluetooth 4.0 technology
- Transmission time typically 10 ms

Wireless set without antennas

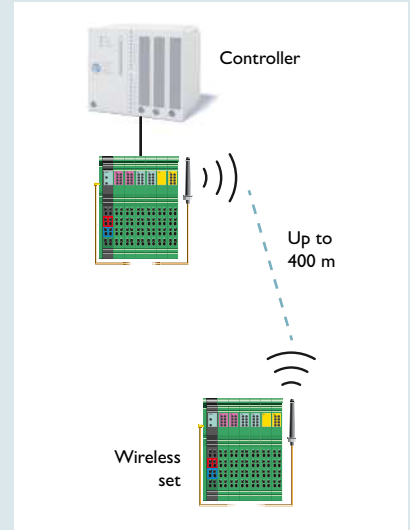
ILB BT ADIO MUX

Order No. [2702875](#)

- Two permanently paired modules
- Ranges of up to 400 m outdoors with directional antennas
- 16 digital and 2 analog inputs and outputs
- No configuration or settings necessary
- Bluetooth 4.0 technology
- Transmission time typically 10 ms

The wireless signal cable

The Wireless MUX transmits 16 digital and two analog signals robustly and quickly, without the need for configuration.



Application example

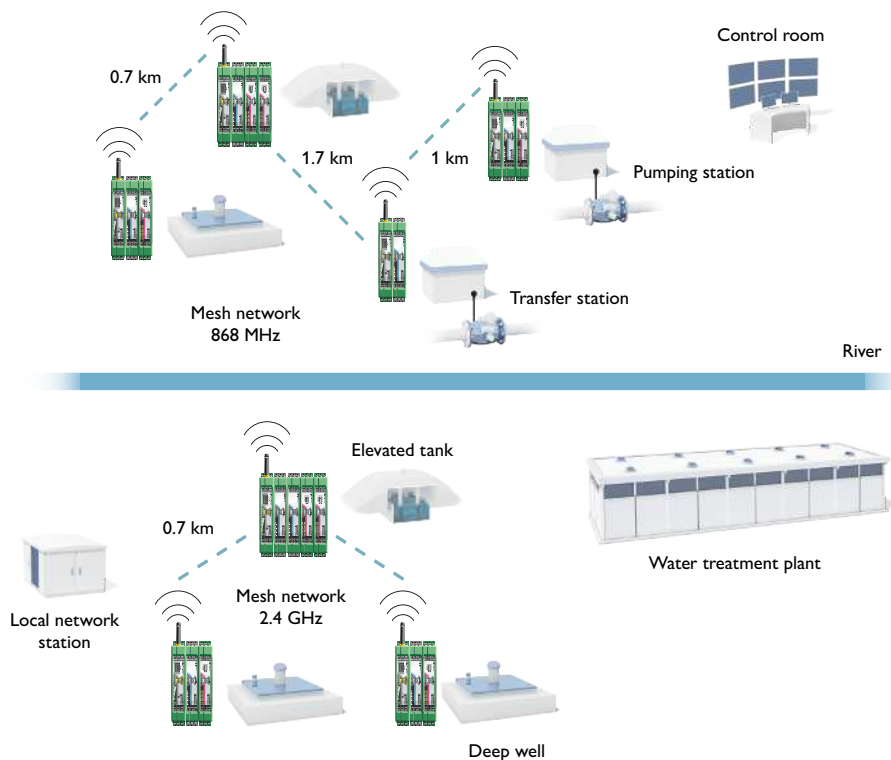
Within the peripheral, highly branched system structures, measured values and other operating information must be transmitted securely, fill levels monitored, and pump performance and flow rates logged continuously.

Application

- In the event of damaged grounding cables and extensive repair work
- Networking of external buildings with the control system (no line of sight)
- Recording standby messages, pump delivery volume, flow, fill level

Advantages

- Easy commissioning
- Private wireless network – provider-independent
- Time and cost savings compared to laying cable



Remote control via the cellular network

For the continuous acquisition of your process data, Phoenix Contact offers cellular devices which support all carrier technologies, from SMS texts through to data communication via GPRS/EDGE (2G), UMTS/HSPA (3G), and LTE (4G). With the globally available cellular network, the devices become a reliable communicator, even in areas with a weak infrastructure.

The smallest remote stations and entire system parks, such as remote pumping stations, can be connected to the control center using methods spanning from SMS over remote control protocols at low-data rates to broadband VPN connection, depending on the communication requirements.

Your advantages

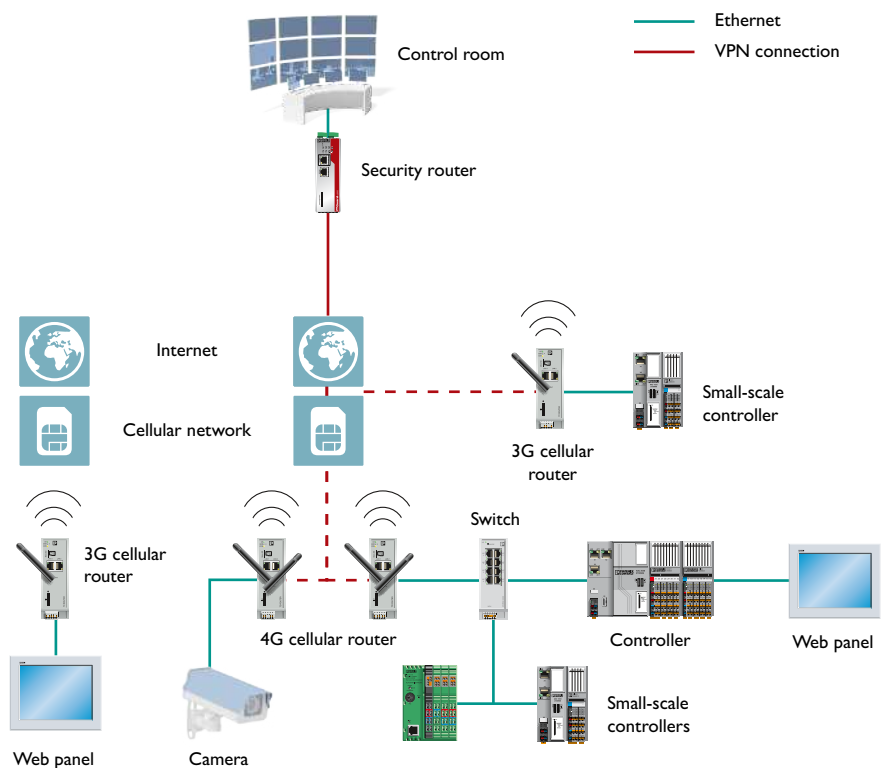
- ✓ Can be used from any location, thanks to worldwide cellular network coverage
- ✓ Scalable – from SMS messages, through streamlined IP remote control protocols, all the way to LTE broadband connection
- ✓ Total network security with private APN, firewall, and VPN
- ✓ Cellular router with extended temperature range for all infrastructure applications
- ✓ Compact cellular network module for connecting the smallest system parts economically

Broadband communication

Industrial cellular routers	LTE, 4G		UMTS/HSPA, 3G		LTE, 4G (USA)	
Type	TC ROUTER 3002T-4G	TC ROUTER 2002T-4G	TC ROUTER 3002T-3G	TC ROUTER 2002T-3G	TC ROUTER 3002T-4G VZN	TC ROUTER 3002T-4G ATT
Order No.	2702528	2702530	2702529	2702531	2702532	2702533
Version	European version: firewall and VPN for secure communication	European version: firewall for secure Internet connection	European version: firewall and VPN for secure communication	European version: firewall for secure Internet connection	Version for Verizon Wireless cellular networks with firewall and VPN	Version for AT&T cellular networks with firewall and VPN
VPN function	3 VPN connections via IPsec or OpenVPN	–	3 VPN connections via IPsec or OpenVPN	–	3 VPN connections via IPsec or OpenVPN	
Technology fallback	2G fallback (GPRS/EDGE) and 3G fallback (UMTS/HSPA)		2G fallback (GPRS/EDGE)		–	3G fallback (UMTS/HSPA)
Temperature range	-40°C ... +70°C					
Signal contacts	2DI / 1DO					

Broadband connection for distributed systems

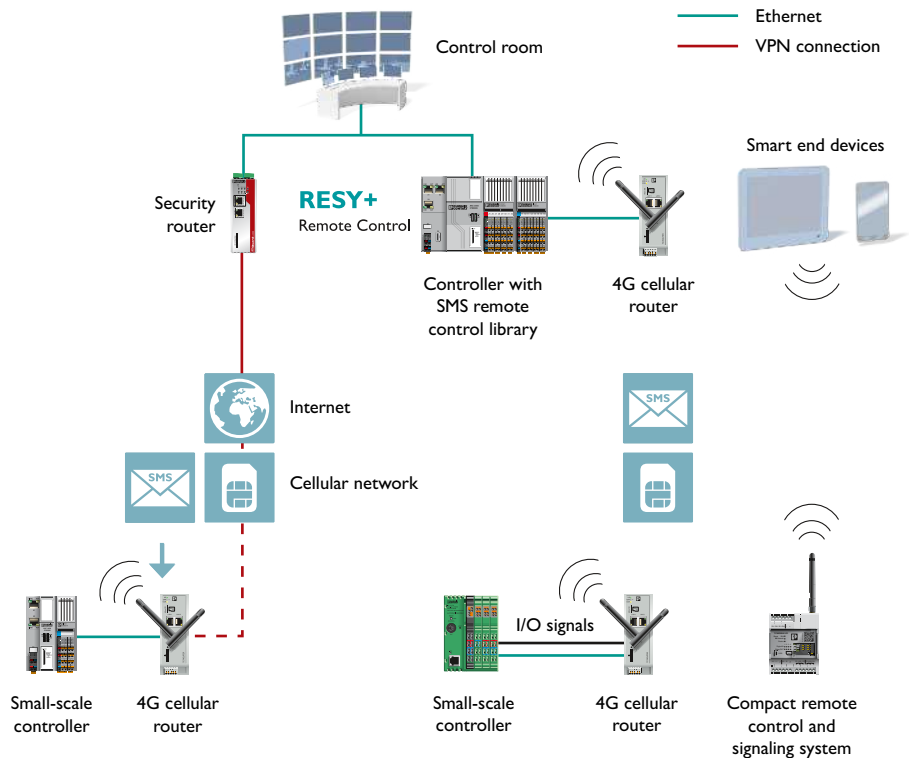
Cellular technology provides a secure communication solution for applications with a large data throughput. In an LTE network, monitoring images and server functions are made available to the control center from around the globe. The routers with VPN functionality enable closed communication on the Internet. The data traffic is transmitted directly to the control room via VPN. Thus, for example, it is possible to connect wind turbine generators via camera applications, or to connect to the network of a sewage treatment plant. The routers without VPN functionality represent an alternative for applications that only need a simple Internet connection. They are also suitable for applications in which VPN is already installed in the downstream end device.



Network structures in remote control applications

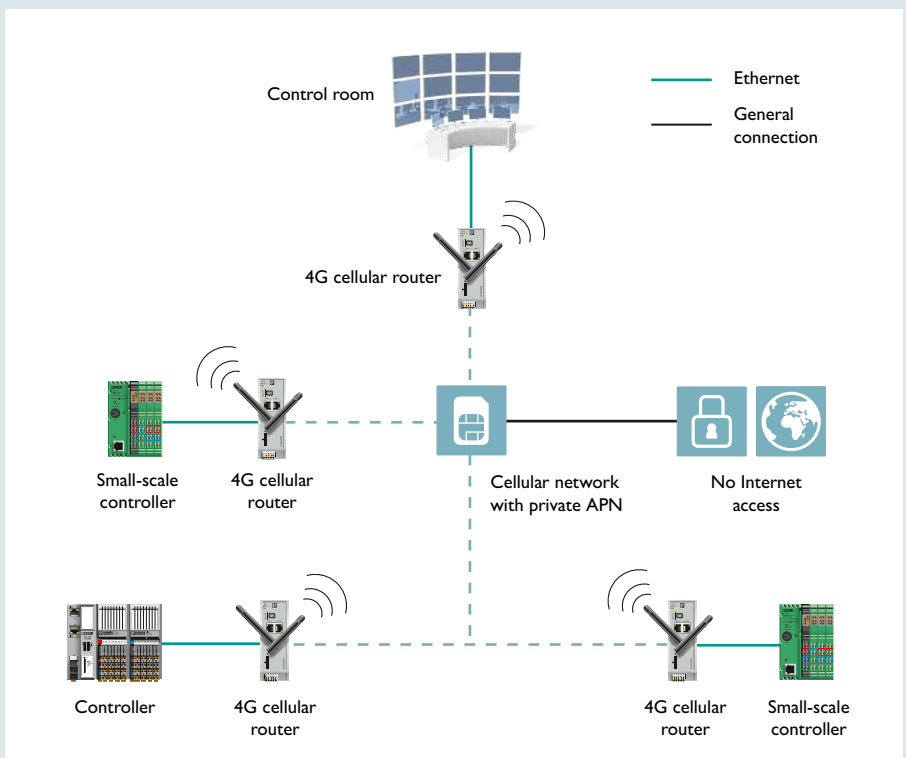
Event-controlled communication

A broadband connection is over-dimensioned for some decentral tasks. SMS technology is ideally suited for a low number of switching operations or a large number of different actuators. A remote process is controlled via SMS commands with a pre-paid card without being bound to a contract. Using the SMS version of the TC MOBILE I/O X200 remote control system, access controls can be implemented with an ordinary cellphone by activating the door lock release system or reactivating systems in the event of an error. The I/Os of a controller are connected via SMS or the VPN tunnel initialized on demand through the existing software interface of the cellular router. This combines both advantages of continuous and event-controlled remote control.



Private network via cell

Special security directives apply to critical applications, e.g. the distribution of water, gas, oil, and electricity. In such applications, communication via public networks is often completely prohibited. Many providers offer SIM cards that use a private APN (Access Point Name). With this procedure, a private network can also be established that goes beyond the cellular interface. A decentral LAN (Local Area Network) is created. Unlike the public cellular network, fixed IP addresses are used, allowing direct communication between the substations. When using this approach, an attempted Internet attack on critical applications is impossible.



High-accuracy time synchronization for remote control applications

The time server provides the Ethernet network with time information via NTP protocol. The time is received even without an Internet connection, either via GPS, GALILEO or GLONASS. Moreover, the precise position can be determined via the NMEA standard protocol. The IP68 housing with integrated antenna enables installation outdoors.



Network time server

FL TIMESERVER NTP Order No. [1107132](#)

Your advantages

- ✓ NTP time server for Ethernet networks
- ✓ GNSS (Global Navigation Satellite System) receiver for GPS, GALILEO, and GLONASS
- ✓ Location information can be obtained via NMEA, SNMP, or web-based management
- ✓ Diagnostic LEDs for power supply and satellite reception

- Power over Ethernet supply via the network cable
- Alternative 10 to 30 V DC supply
- IP68 housing
- Integrated antenna
- Temperature range: -40°C ... +70°C
- Outdoor installation including panel feed-through (40 mm diameter)

Time server application example

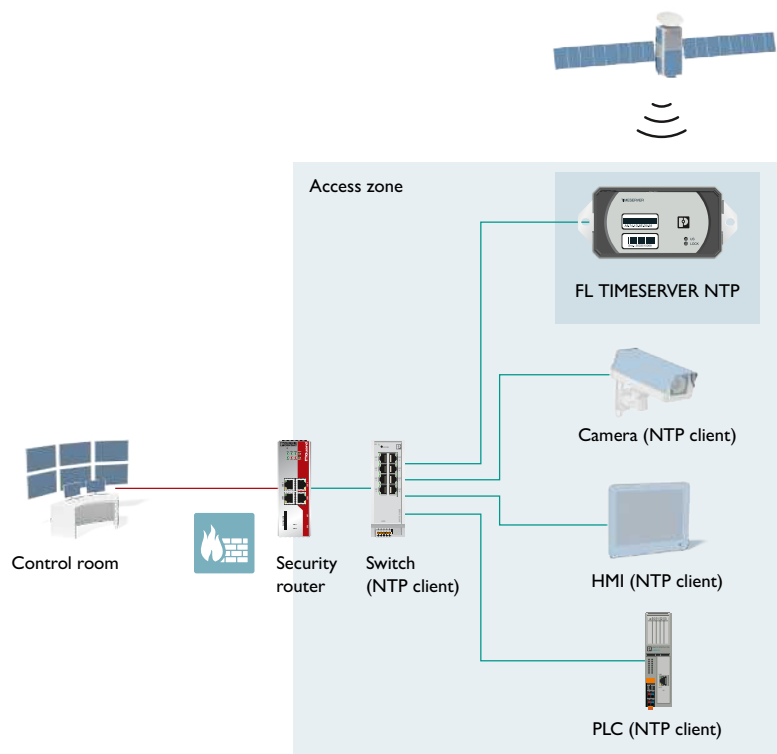
In Ethernet networks, it is very important that all devices have an accurate, synchronized system time. With this, the times of all decentral activities within the network are documented with a high degree of accuracy.

Examples include:

- Log files in network devices
- Camera images (image/time assignment)
- The IEC 60870-5-104, DNP3.... remote control protocols use time stamps

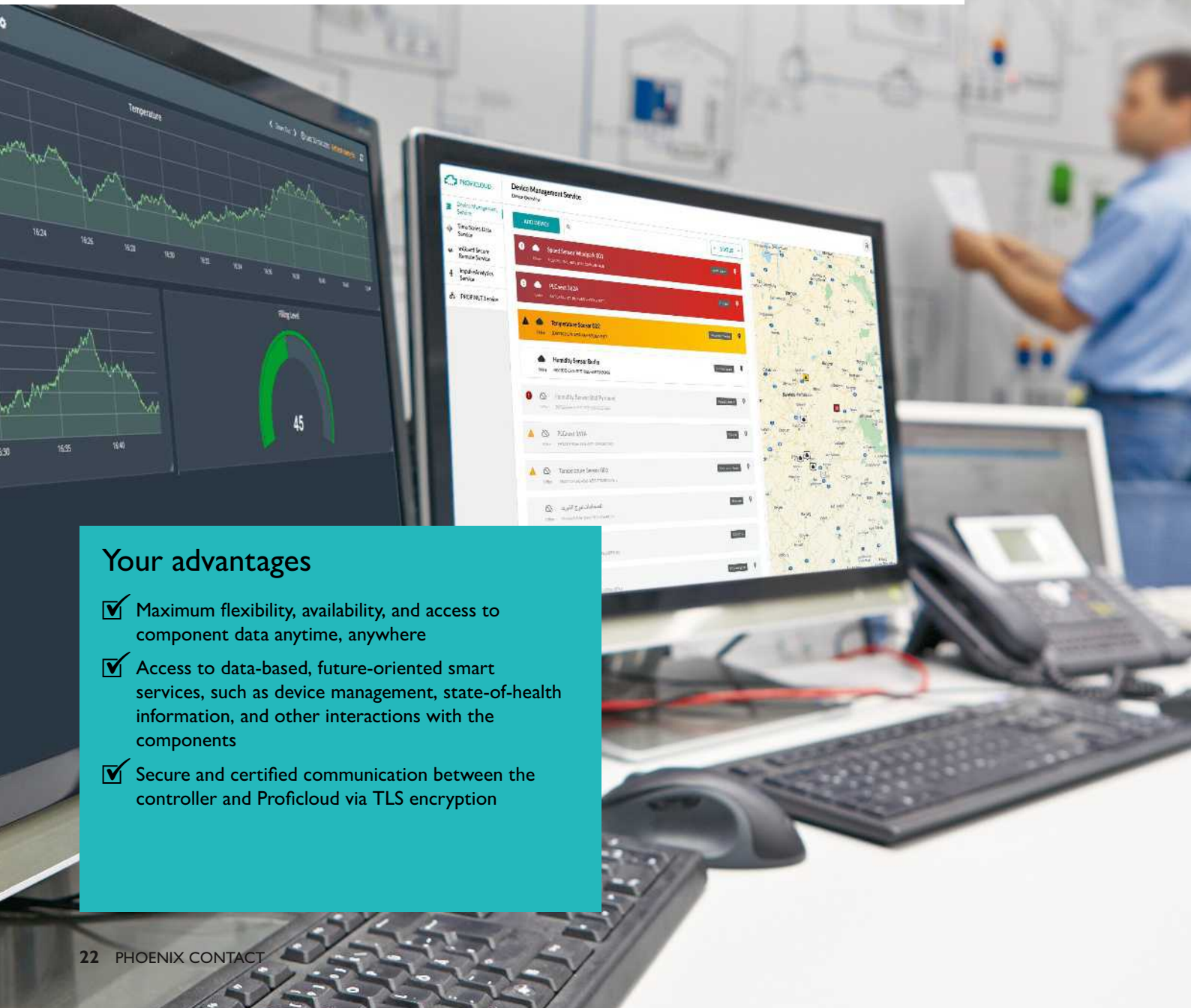
A sequence of events can only be tracked if all of the devices display the same, exact time.

Furthermore, the time server provides precise geo-localization information for determining the location. This is necessary, for example, for determining the location of mobile machinery, containers, and vehicles via GPS positioning.



Smart services with PROFICLOUD

As an open, scalable IoT platform, Proficloud provides you with intelligent communication, networked components, control technology, smart services, and comprehensive data analysis – all with the highest level of security. Take advantage of the unlimited possibilities of a cloud-based solution for the continuous transmission of process data. With Proficloud, you can network your distributed devices in the field easily and securely via the Internet. This lets you benefit from global status monitoring and controlling of your data.



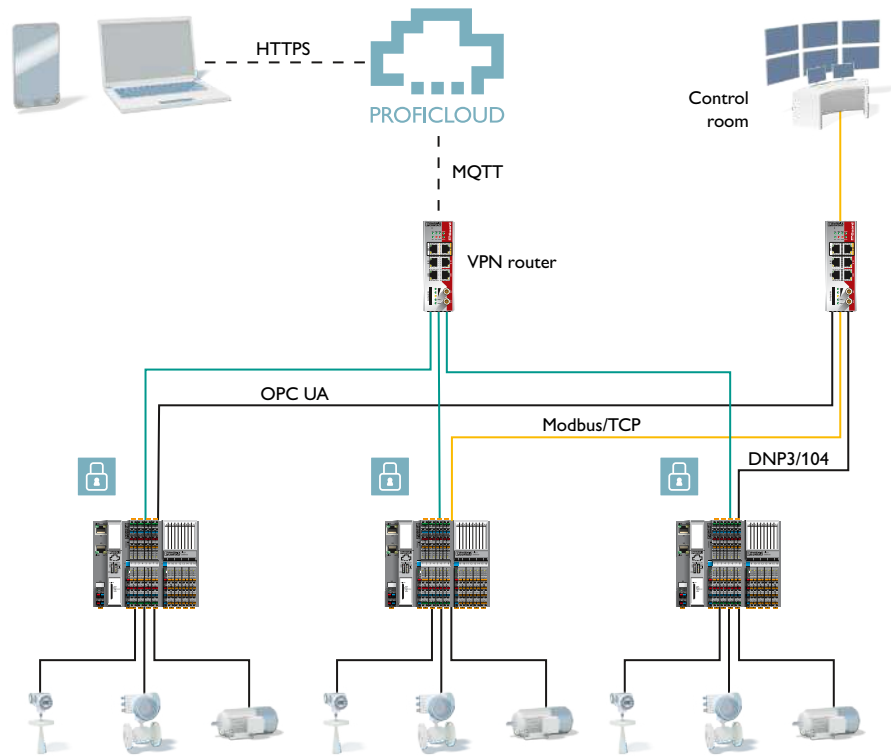
Your advantages

- ✓ Maximum flexibility, availability, and access to component data anytime, anywhere
- ✓ Access to data-based, future-oriented smart services, such as device management, state-of-health information, and other interactions with the components
- ✓ Secure and certified communication between the controller and Proficloud via TLS encryption

Cloud solutions for industry

Future-oriented smart services

Smart, IoT-capable components and controllers from Phoenix Contact enable data to be sent directly to the Proficloud. The availability of component data is guaranteed, and users can access it at anytime, anywhere. The Proficloud enables access to data-based, future-oriented smart services, such as device management, state-of-health information, and other interactions with the components. Moreover, smart services enable the increased transparency of measurement and component data through advanced analysis methods, such as machine learning in the future. TLS encryption guarantees secure and certified communication between the controller, the components, and Proficloud.



Data analysis, using the example of water and wastewater treatment

Current operating data such as the fill level, flow rate or power consumption of distributed infrastructures is analyzed in Proficloud and made comparable with other significant parameters. Thus, for example, a wastewater pumping station can be operated efficiently on demand. Status and operational messages are sent to the control room via an Internet connection. Further information such as weather data can be received via the Proficloud from higher-level equipment to aid optimum operation. In addition, for example, pump operating data on lifecycle or energy management can be combined so that this information can be used efficiently for predictive maintenance.

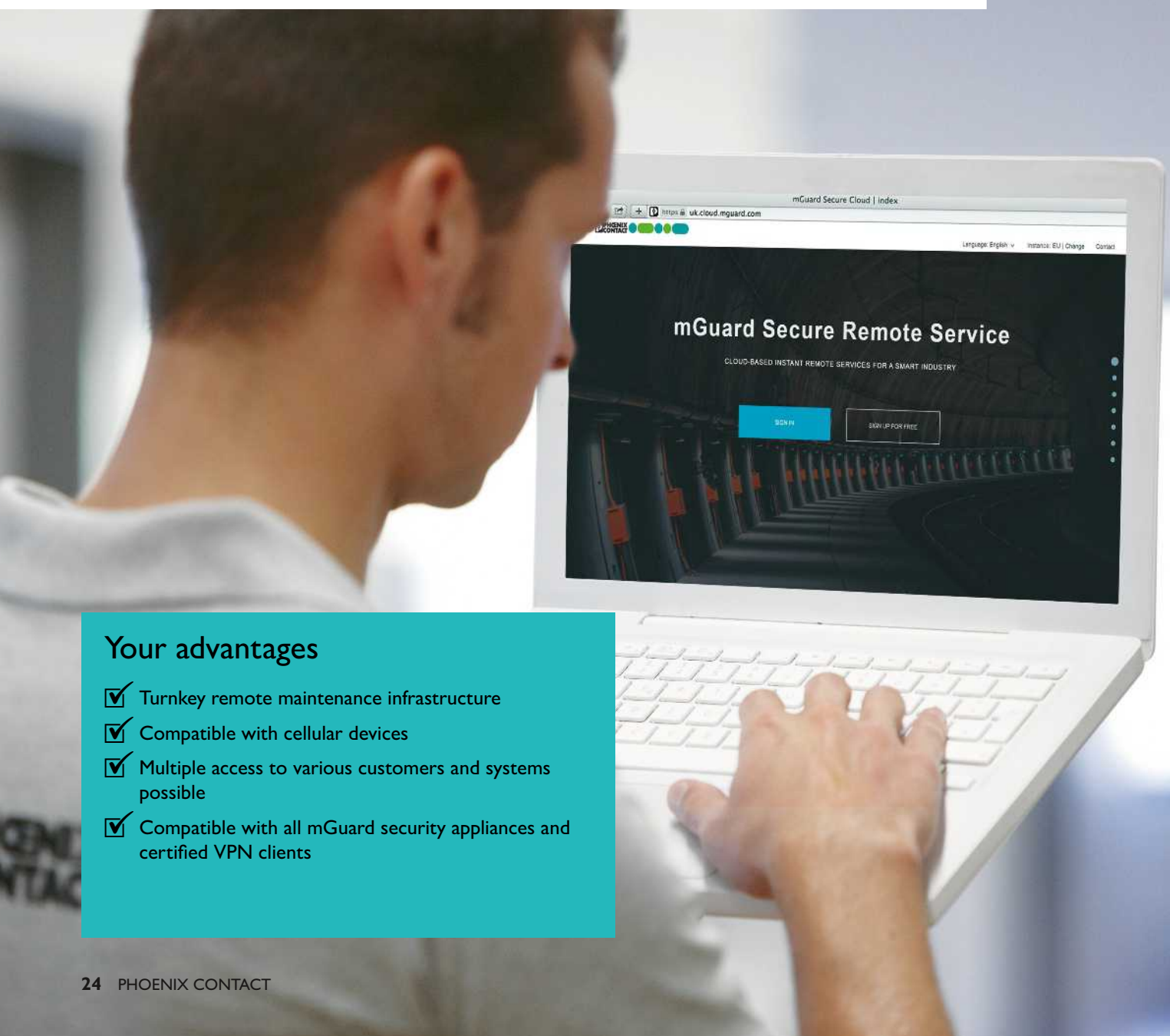


Remote control technology for distributed wastewater pumping stations

Remote maintenance via the Internet and cloud

With Internet and cloud technologies, you have the capability to establish connections to your machines and systems anywhere and at any time. To safeguard your network connections against interference and manipulation, Phoenix Contact offers products featuring state-of-the-art security mechanisms such as VPN, IPsec encryption, and integrated firewalls.

The mGuard Secure Remote Service securely connects service personnel and remote maintenance targets via the Internet. It provides operators, machine builders, and system manufacturers with a turnkey remote maintenance solution in the cloud.



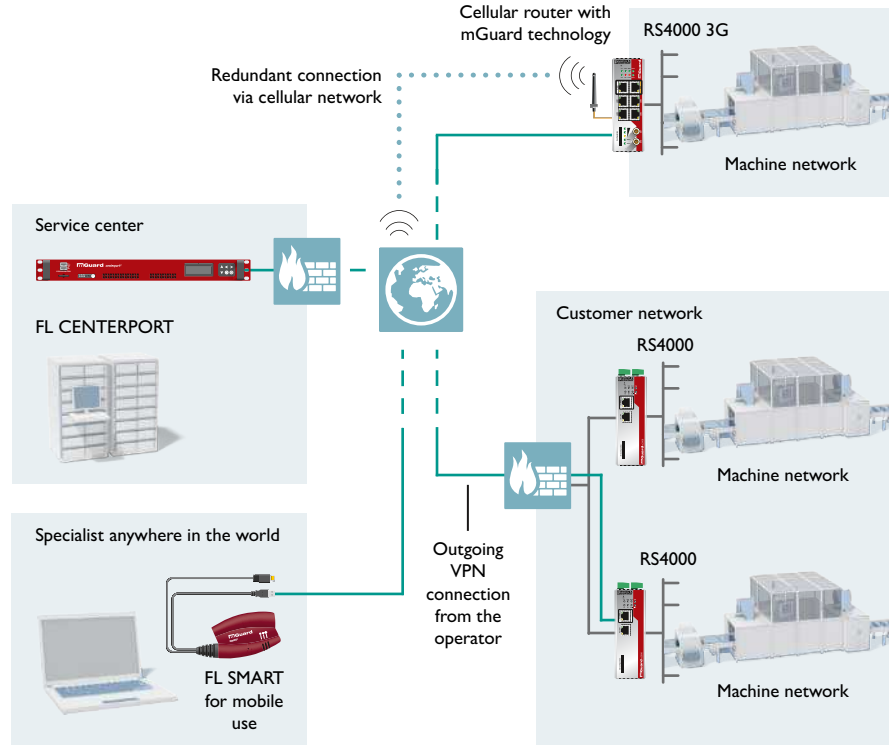
Your advantages

- ✓ Turnkey remote maintenance infrastructure
- ✓ Compatible with cellular devices
- ✓ Multiple access to various customers and systems possible
- ✓ Compatible with all mGuard security appliances and certified VPN clients

Overview of remote maintenance systems

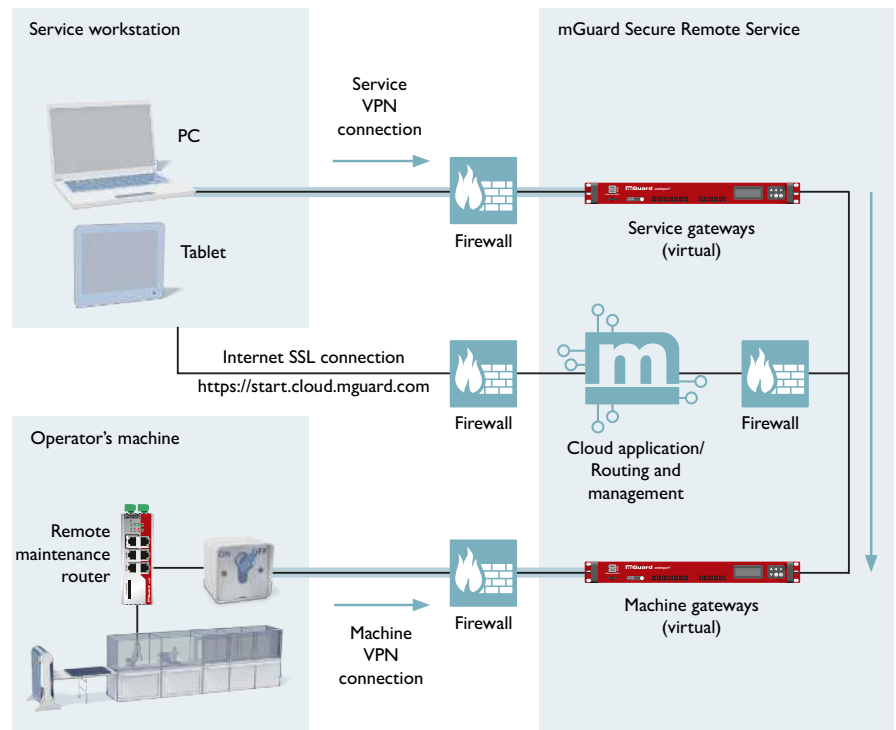
Secure industrial remote maintenance

mGuard products provide you with a tailored security solution for your automatic remote control solution. These robust security appliances suitable for industrial applications include firewall, routing, and VPN functions for protecting against cyber attacks and inadvertent malfunctions. Furthermore, they enable secure remote maintenance via public networks. Phoenix Contact provides various hardware and software products, depending on the application – including DIN rail devices, portable hardware, and 19" devices, from service routers with integrated cellular interface through to central management software and software VPN clients.



Functional components of the mGuard Secure Remote Service

The mGuard Secure Remote Service uses IPsec VPNs and ensures the confidentiality, authenticity, and integrity of the data transmitted between devices. It is operated in high-availability computer centers in Germany and throughout the world in accordance with the most stringent data protection standards. Particularly for small and medium-sized companies, the mGuard Secure Remote Service provides a reliable remote maintenance infrastructure via the Internet as a needs-based and cost-effective service.



Scalable remote maintenance solutions



Industrial VPN gateways

TC CLOUD CLIENT ...	
...1002-TX/TX	Order No. 2702885
...1002-4G	Order No. 2702886
...1002-4G ATT	Order No. 2702888
...1002-4G VZW	Order No. 2702887

- High security with a VPN tunnel to the mGuard Secure Remote Service
- Pluggable configuration memory
- Worldwide use
- Connection for key switch
- Cloud-based device configuration

Secure VPN router

FL MGuard ...	
...RS2000 TX/TX VPN	Order No. 2700642
...RS2005 TX VPN	Order No. 2701875
...RS2000 4G VPN	Order No. 2903588
...RS2000 4G ATT VPN	Order No. 1010464
...RS2000 4G VZW VPN	Order No. 1010462

- Integrated firewall for protection of the machine network
- VPN tunnel to the mGuard Secure Remote Service
- Central device management

Secure VPN router with extended range of functions

FL MGuard ...	
...RS4000 TX/TX VPN	Order No. 2200515
...RS4004 TX/DTX VPN	Order No. 2701877
...RS4000 4G VPN	Order No. 2903586
...RS4000 4G ATT VPN	Order No. 1010463
...RS4000 4G VZW VPN	Order No. 1010461

- Extended firewall for complex security requirements
- VPN tunnel to the mGuard Secure Remote Service
- Central device management

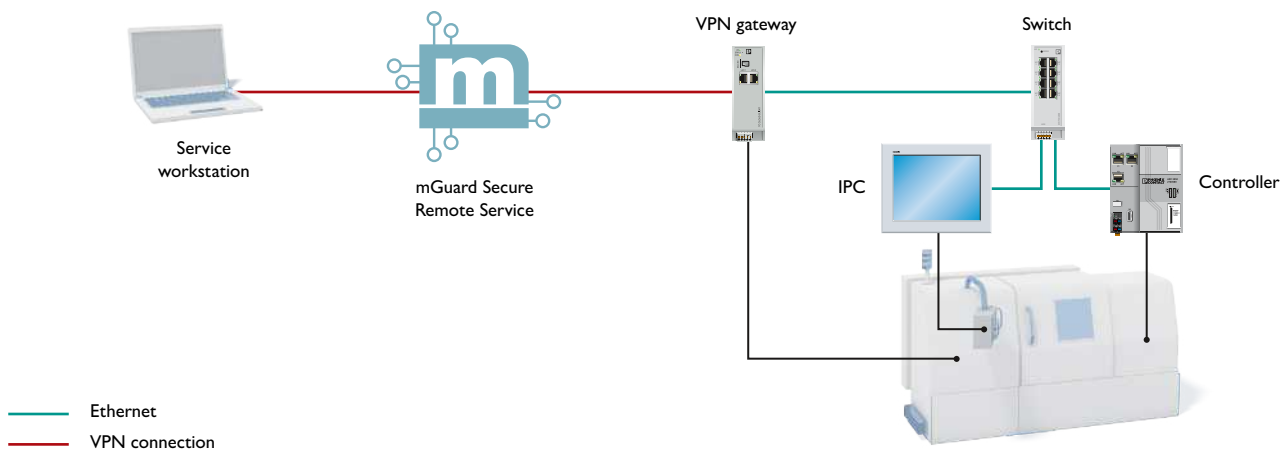
Compact, independent machines

Remote error correction, remote PLC program updating and additional remote support are desired for many machines. The mGuard Secure Remote Service is a fast and secure solution for this remote access.

Easy connection to the mGuard Secure Remote Service

TC Cloud clients are ideally suited for the remote maintenance of individual, compact machines with small IP networks. They connect the machine to the mGuard Secure Remote Service securely via VPN. The cellular network version is ideally suited

for stand-alone machines without a network connection. With the LAN version, remote maintenance access can be easily retrofitted in existing networks. The TC Cloud clients can be integrated easily into an existing machine network.



Integration into the production network

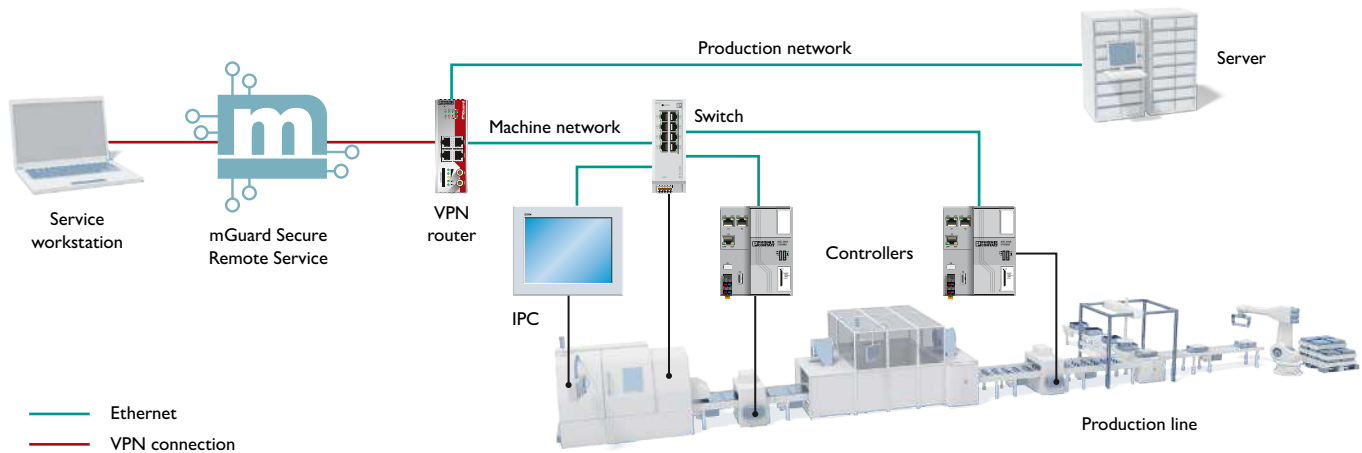
Protection against unauthorized access by people or malware is becoming increasingly more important for networked machines.

Protection of the network

The FL MGUARD RS2000 mGuard products from Phoenix Contact secure your machine network with a powerful, flexible, and easy-to-operate firewall.

This enables the regulation of access to the machine in the production network, e.g. in ERP systems, and the secure connection of the machine to the mGuard Secure Remote Service via VPN. The remote maintenance connection is configured automatically in the cloud and imported into the FL MGUARD. A key switch is ideal for starting the connection – the operator

thus retains complete control of the VPN connection on site.



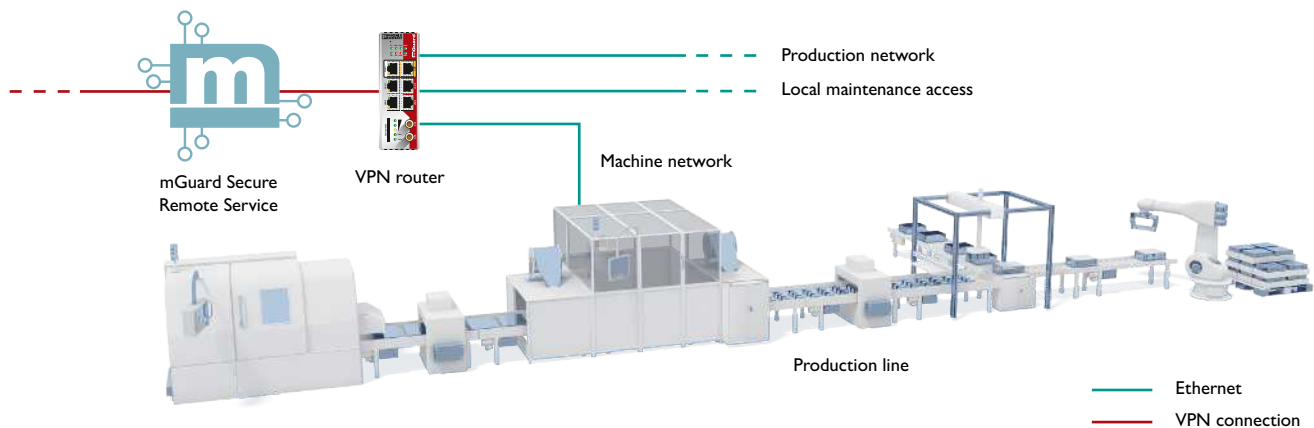
High network availability

When there is a high number of networked machines and systems, the availability of the machine network is of paramount importance. Detailed monitoring of the data traffic and complex security concepts are therefore necessary.

Monitoring the data traffic

The FL MGUARD monitors communication between the production and machine networks. The MGUARD RS4004 is also equipped with a DMZ (Demilitarized Zone) port. This enables, with the help of additional firewall rules, secure

local maintenance access to the machine. A firewall monitors the incoming and outgoing data traffic at each port. Thus, the machine cannot be accessed in the production network during maintenance work.



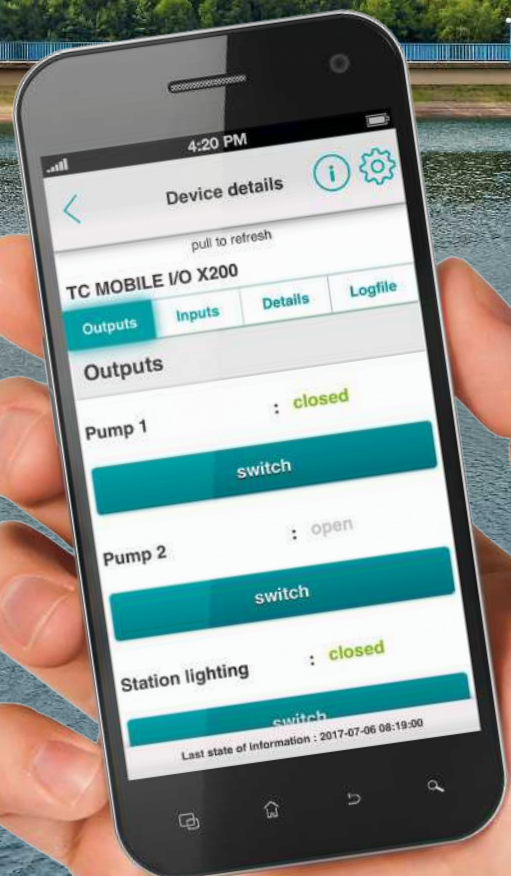
Alerts via the cellular network

Monitor analog and digital values easily and securely via the cellular network. The compact TC MOBILE I/O X200 remote control system keeps you up to date on the status or error state of your system, even in the field. The cellular router and the controller with integrated ILC 151 GSM/GPRS modem combine this capability in addition to their main task.

All solutions can be used to send text messages via SMS or e-mail, and to set one or more peer switching outputs, e.g. for activating the machine. Thus, you can prevent damage and downtimes, and avoid costly on-site servicing.

Your advantages

- ✓ Reduced machine and system downtimes, thanks to automatic alerts via SMS and e-mail
- ✓ Decreased communication costs, thanks to event-driven alerts
- ✓ A conventional cellphone can serve as a peer
- ✓ Cellular networks are available worldwide
- ✓ Integration into existing control systems



Scalable alert solutions



PLC with integrated GSM/GPRS modem

ILC 151 GSM/GPRS Order No. [2700977](#)

- 1 INTERBUS interface and 1 Ethernet interface
- 512 kB program memory and 512 kB mass storage
- 48 kB non-volatile mass storage
- 16 direct inputs and 4 direct outputs
- Integrated web/FTP server
- OPC functionality
- Modbus/TCP integrated

Compact remote control and signaling system

TC MOBILE I/O X200 2G (GSM/GPRS) Order No. [2903805](#)

TC MOBILE I/O X200-4G 4G (LTE Cat1) with 2G fallback (GSM/GPRS) Order No. [1038567](#)

- 2 analog and 4 digital inputs as well as 4 relay outputs
- Voltage range: 10 ... 60 V DC
- SMS notification in the event of voltage failure
- Query the device status and switch outputs via SMS or app

Compact remote control and signaling system

TC MOBILE I/O X200 AC 2G (GSM/GPRS) Order No. [2903806](#)

TC MOBILE I/O X200-4G AC 4G (LTE Cat1) with 2G fallback (GSM/GPRS) Order No. [1038568](#)

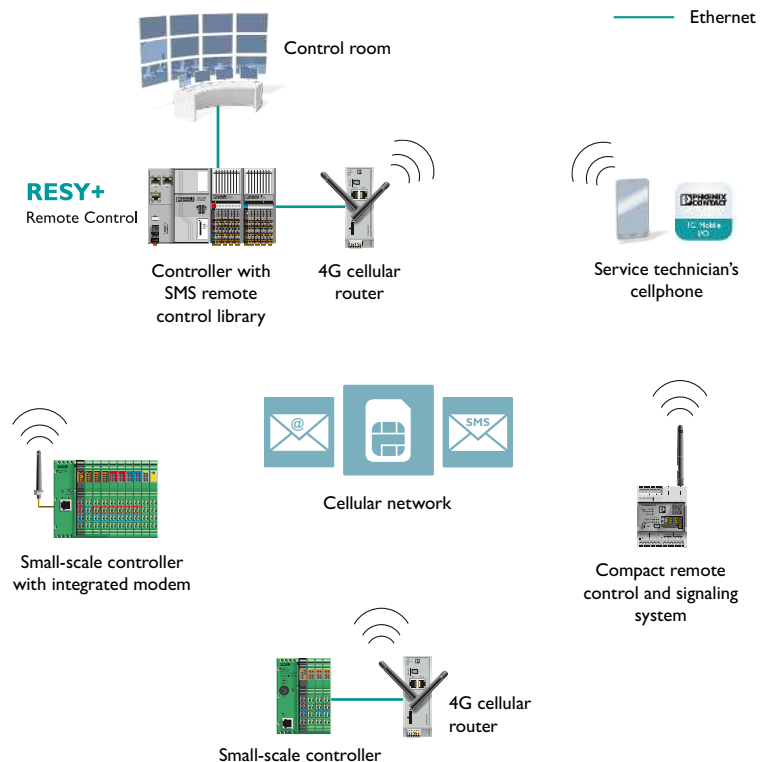
- 4 digital inputs and 4 relay outputs
- Voltage range: 93 ... 250 V AC
- SMS notification in the event of voltage failure
- Query the device status and switch outputs via SMS or app

One network via SMS

It is often the case that an SMS alarm message should not only be sent to a cellphone, but also to the alert management of a control system. This is possible using a controller and a cellular router from Phoenix Contact. Using the Resy+ function block, SMS messages can be received and also forwarded to a control system using an OPC interface, for instance.

TC Mobile I/O app

This app allows you to switch your outputs conveniently and easily check the status of your device at any time. The TC Mobile I/O app makes it even easier to use the TC Mobile I/O X200, and saves you having to write an SMS text. Alerts, however, are still sent as usual via SMS and e-mail. This ensures the best accessibility in the field.



Networking with fiber optics

Our FO converters support conventional communication protocols used in remote control technology, such as PROFIBUS, Modbus/RTU, Ethernet, and the RS-232 and RS-485 interfaces. The main advantages compared to conventional copper-based data transmission are the electromagnetic immunity, the high-quality electrical isolation of the optical path, and the achievable distances of up to 45 km. Benefit from these advantages in your sophisticated remote control application.

Your advantages

- ✓ Automatic monitoring and display of the optical signal quality
- ✓ Warning of failure via floating switch contact
- ✓ Operating state displayed via diagnostics LED
- ✓ Robust devices with extended temperature range
- ✓ Device-specific approvals: ATEX, UL HazLoc, operation at altitudes of up to 5000 m

Serial FO converters



PSI-MOS FO converters for PROFIBUS

- 1 FSMA port Order No. [2708290](#)
- 2 FSMA ports Order No. [2708287](#)
- Polymer/HCS up to 400 m

- 1 ST port Order No. [2708274](#)
- 2 ST ports Order No. [2708261](#)
- Multimode up to 3.3 km

- 1 SC port Order No. [2708559](#)
- 2 SC ports Order No. [2708892](#)
- Single mode up to 45 km

PSI-MOS FO converters for serial interfaces

- 1 FSMA port Order No. [2708313](#)
- 2 FSMA ports Order No. [2708300](#)
- Polymer/HCS up to 800 m

- RS-485, 1 ST port Order No. [2708339](#)
- RS-485, 2 ST ports Order No. [2708326](#)
- Multimode up to 4.2 km

- RS-485, 1 SC port Order No. [2708562](#)
- Single mode up to 45 km

PSI-MOS FO converters for serial interfaces

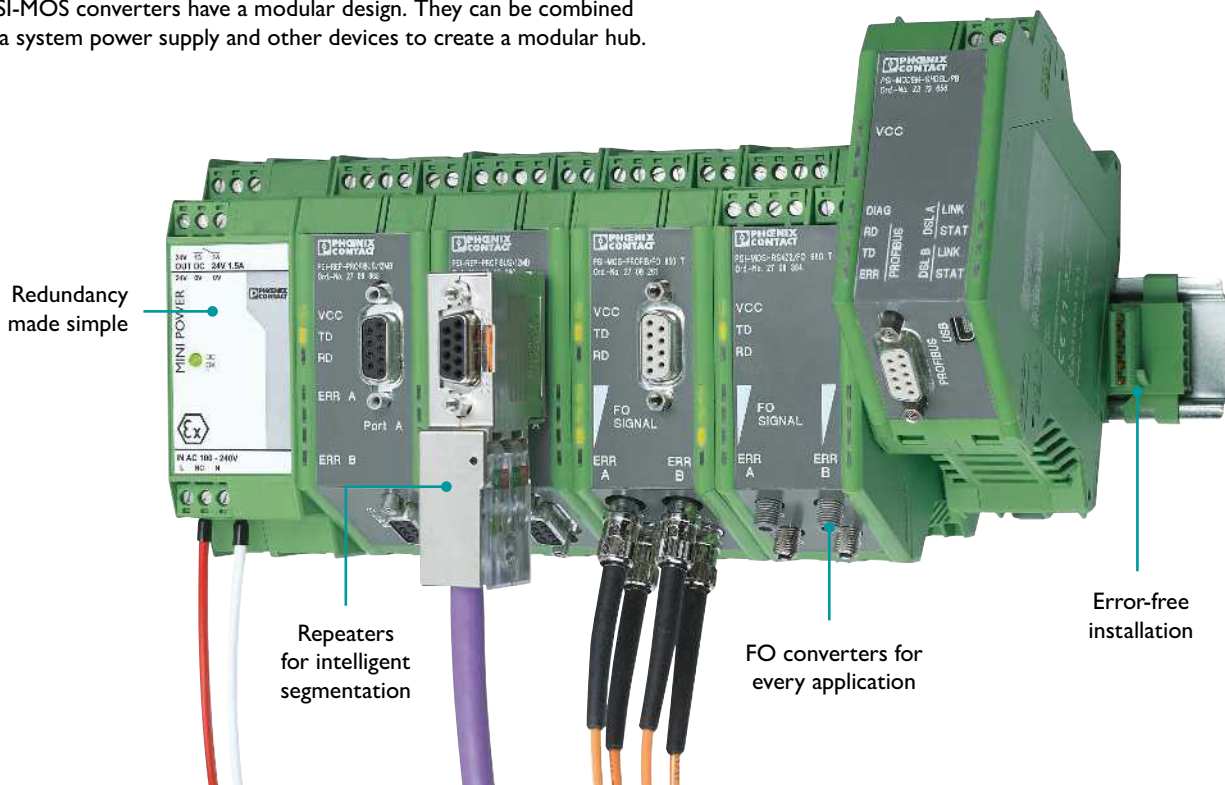
- 1 FSMA port Order No. [2708368](#)
- 2 FSMA ports Order No. [2708410](#)
- Polymer/HCS up to 800 m

- RS-232, 1 ST port Order No. [2708371](#)
- RS-232, 2 ST ports Order No. [2708423](#)
- Multimode up to 4.8 km




- RS-232, 1 SC port Order No. [2708588](#)
- Single mode up to 45 km

Modular PSI-MOS hub

All PSI-MOS converters have a modular design. They can be combined with a system power supply and other devices to create a modular hub.

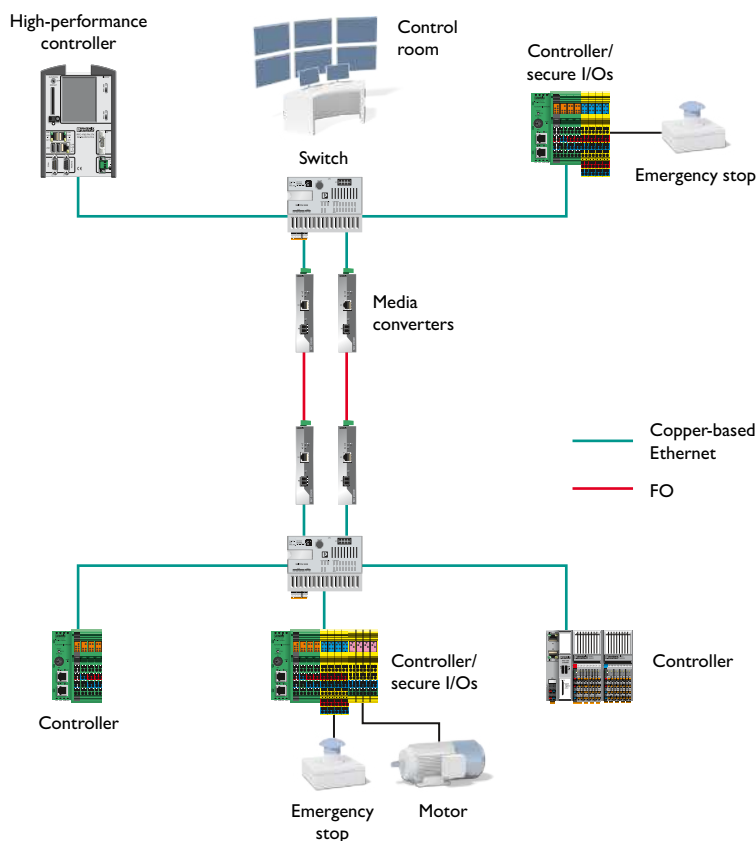





Ethernet media converters

							
Media converters for ...	Standard requirements		IEC 61850-3 / IEEE1613n		Special approvals		
Type	FL MC 1000 SC	FL MC 1000 ST	FL MC 2000E LC	FL MC 2000E SM40 LC	FL MC EF 1300 MM SC	FL MC EF 1300 MM ST	FL MC EF 1300 SM SC
Order No.	2891320	2891321	2891056	2891156	2902853	2902854	2902856
Supply voltage	12 V DC ... 48 V DC		12 V DC ... 57 V DC (redundant)		18 V DC ... 30 V DC		
Temperature range	0°C ... +60°C		-40°C ... +75°C		-40°C ... +65°C		
Light wavelength	1310 nm						
Transmission	Multimode fiberglass		Multimode fiberglass	Single mode fiberglass	Multimode fiberglass		Single mode fiberglass
Connection method	SC duplex	B-FOC (ST®)	LC duplex		SC duplex	B-FOC (ST®)	SC duplex
Range	Up to 9.6 km		Up to 9.6 km	Up to 40 km	Up to 10 km		Up to 36 km
Special features	Auto-negotiation and MDI (x)		4 kV insulation voltage, high EMC protection		Approvals: ATEX, UL, and DNV Backplane bus for redundant or alternative power supply		

Fast diagnostics in the event of a malfunction

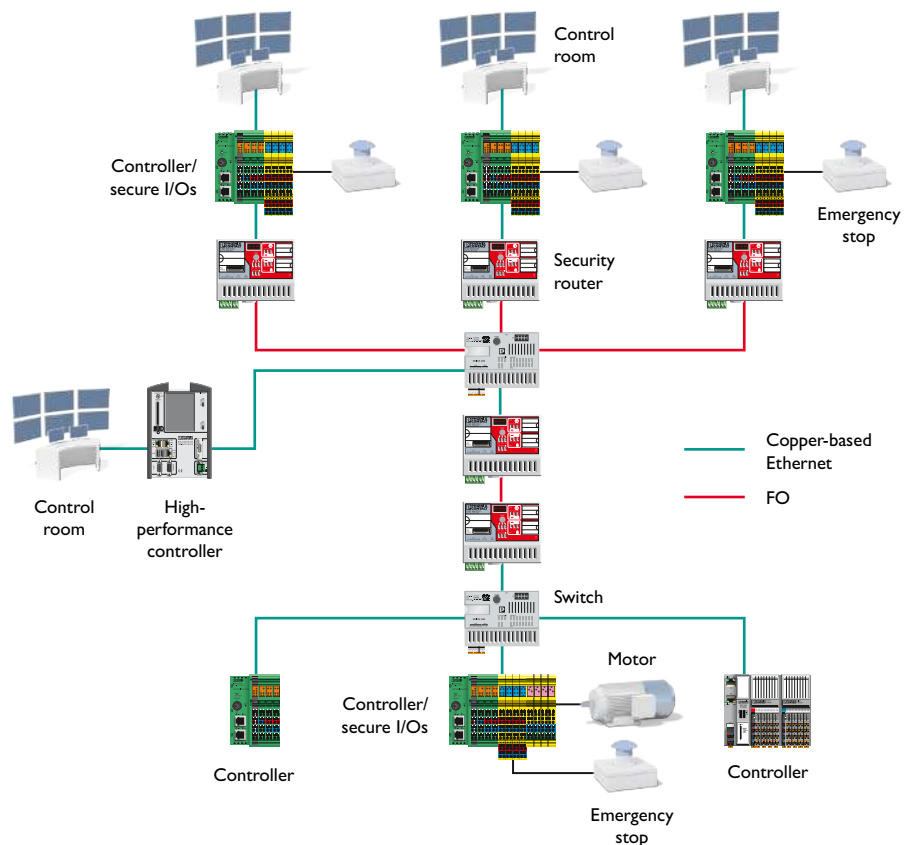
In addition to numerous diagnostics LEDs, the media converter also features the link management function (link fault pass through). This ensures permanent connection monitoring. Both sides of the network connection can therefore detect a lost link immediately. The entire connection over the optical path is therefore just as transparent as it would be with purely copper-based communication. In the event of a network interruption, the transmission path is switched off. Redundancy mechanisms can be used directly. In addition, when the FEF (far end fault) function signals a lost link to the media converters, this also enables the faulty segment to be localized.



							
Real-time protocols				Single-fiber transmission			PROFINET
FL MC 2000T SC	FL MC 2000T ST	FL MC 2000T SM20 SC	FL MC 2000T SM40 SC	FL MC EF WDMSET SC	FL MC EF WDMA SC	FL MC EF WDMB SC	FL MC EF 660 SCRJ
2891315	2891316	2891317	2891318	2902660	2902658	2902659	2702944
12 V DC ... 48 V DC (redundant)				18 V DC ... 30 V DC			18.5 V DC ... 30.5 V DC
-40°C ... +75°C				-40°C ... +65°C			-
1310 nm				1310/1550 nm			660 nm
Multimode fiberglass		Single-mode fiberglass		Full duplex data transmission across one fiber Multimode and single mode fiberglass			Polymer fiber PCF
SC duplex	B-FOC (ST®)	SC duplex	SC duplex	SC simplex			SC-RJ
Up to 9.6 km		Up to 20 km	Up to 40 km	Up to 38 km			Up to 100 m
Store-and-forward and pass through mode can be selected with a short latency time of 835 ns using a DIP switch. These can therefore be used for real-time Ethernet protocols.				Converters A and B	Converter A	Converter B	Single-port media converter

Communication via fiber optics to remote systems

One advantage of optical data transmission is the increase in the maximum range. With copper-based Ethernet communication, it is only possible to achieve distances of up to 100 meters between two devices. This distance is sufficient for small systems, but is much too short for communication to remote systems. With fiber optic cables and industrial media converters or switches, on the other hand, distances of several kilometers can be achieved without difficulty for a point-to-point connection.



Networking with WLAN and Bluetooth

When it comes to the automation of your factory, benefit from the possibilities offered by wireless network communication and reliable industrial components from Phoenix Contact. Wireless Ethernet enables you to implement consistent network solutions in widespread systems and integrate cellular devices along safe, high-performance, and easy-to-maintain lines.

Your advantages

- ✓ Seamless and cost-effective integration into existing networks with flexible installation and configuration concepts
- ✓ High levels of reliability and availability with optimum properties for industrial applications
- ✓ Versatile use from voice-over-IP through to safety – with Ethernet as the common communication standard

STOREBITER® OLS

GEBHARDT

As Controls-TUBUS
TR 47-49

GEBHARDT
STOREBITER®
Gasse Shuttle
S 02 04

Wireless modules for WLAN and Bluetooth



WLAN access point

FL WLAN 5110 Order No. [1043193](#)
 FL WLAN 5111 (US) Order No. [1043201](#)

- WLAN access point/client, repeater
- 2 x RJ45, 10/100 Mbps
- IEEE 802.11 b/g/a/n (2.4/5 GHz)
- MIMO with 2 x RSMA antenna connection
- Cluster management
- Security: 802.11i, WPA2, WPA-PSK, 802.1x, WEP, TKIP, AES

WLAN access point

FL WLAN 1100 Order No. [2702534](#)
 FL WLAN 1101 (US) Order No. [2702538](#)
 FL WLAN 2100 Order No. [2702535](#)
 FL WLAN 2101 (US) Order No. [2702540](#)

- WLAN access point/client, repeater
- 1x RJ45, 10/100 Mbps
- IEEE 802.11 a/b/g/n (2.4/5 GHz)
- MIMO with 2 integrated antennas
- IP54 for WLAN 1100, IP66/67/IP68 for WLAN 2100
- Security: 802.11i, WPA2, WPA-PSK, TKIP, AES, MAC filter

WLAN and Bluetooth adapter

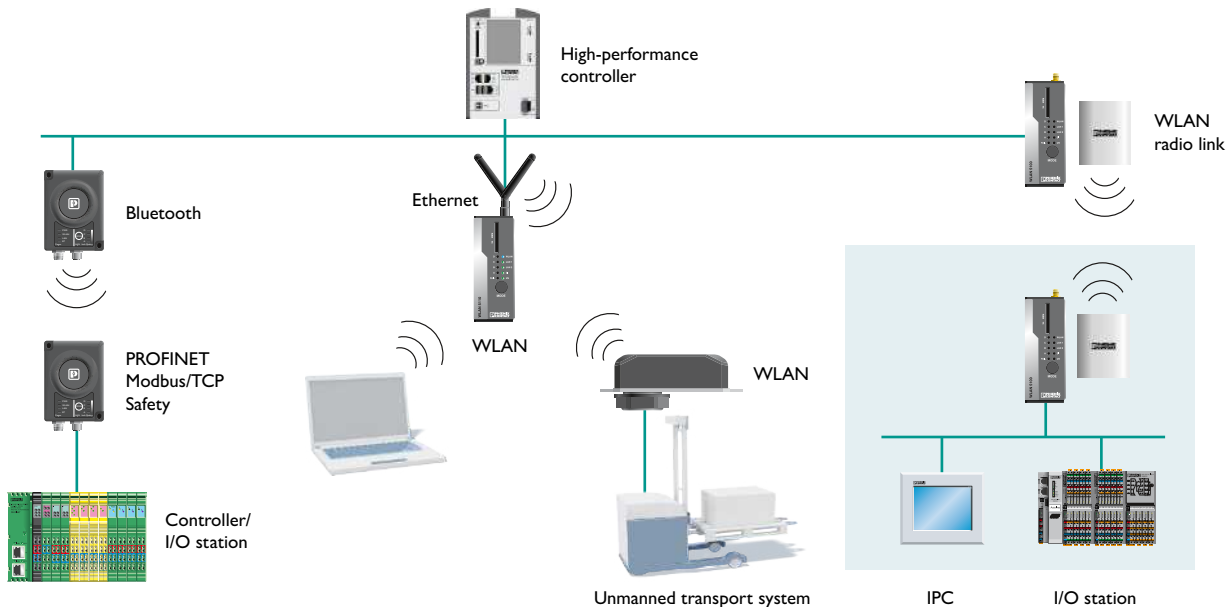
FL BT EPA 2 Order No. [1005869](#)
 FL EPA 2 Order No. [1005955](#)
 FL EPA 2 RSMA Order No. [1005957](#)

- Ethernet wireless module with Bluetooth and WLAN access point/client (FL BT EPA 2, Bluetooth only)
- Bluetooth 2.1+EDR/4.0
- EPA 2 and BT EPA: internal antenna
- EPA RSMA: external antenna connection

- Wireless network communication capabilities

Wireless Ethernet from Phoenix Contact can be used to implement consistent network solutions:

- Integration of moving devices
- Functionally safe communication
- Fast communication connections, including with remote devices



Solutions for industrial video surveillance

Phoenix Contact provides you with reliable video surveillance infrastructure for connecting cameras to video servers, ensuring that no footage is lost – whether you operate just a few cameras in a small industrial plant or hundreds of cameras for the security of a larger facility. Video surveillance systems are only as secure as the network that connects all of the components. Our range includes integrated solutions such as the Smart Camera Box and individual control cabinet components that can be easily adapted to your specific video surveillance system.



Further information on the Smart Camera Box: simply enter the web code in the search field on our website.

i Web code: #2458

Your advantages

- ✓ High network availability with industrial-grade products that operate reliably even in harsh environments
- ✓ Save time and costs: we securely connect your camera to your video server and provide all the necessary components for your video surveillance solution, all from a single source
- ✓ Implement future-proof networks easily with intelligent products and comprehensive services

Product overview

All-in-one device with the Smart Camera Box

The Smart Camera Box connects IP surveillance cameras to the video server. It combines the functions of conventional connection boxes assembled with standard DIN rail devices in a single compact device.

This means that time is no longer needed for planning and wiring a connection box. The integrated mounting adapter for wall and mast mounting makes installation much easier and quicker. Numerous management

and monitoring functions ensure reliable operation of the video system.



Description	Smart camera box					
Uplink ports	2 x FO	2 x FO	2 x copper Ethernet	2 x copper Ethernet	1 x 2-wire Ethernet	1 x 2-wire Ethernet
Camera connections	4 x PoE	2 x PoE	4 x PoE	2 x PoE	4 x PoE	2 x PoE
Type	SCX 4POE 2LX	SCX 2POE 2LX	SCX 4POE 2T	SCX 2POE 2T	SCX 4POE 1C	SCX 2POE 1C
Order No.	1102626	1108543	1108542	1108544	1108541*	1108539*

* Available from Spring 2021.

Modular solution with individual components

Phoenix Contact provides a broad range of industrial connection and communication technology products that can be combined to create an application-oriented solution to connect your cameras and video server.



19" components for your video control room

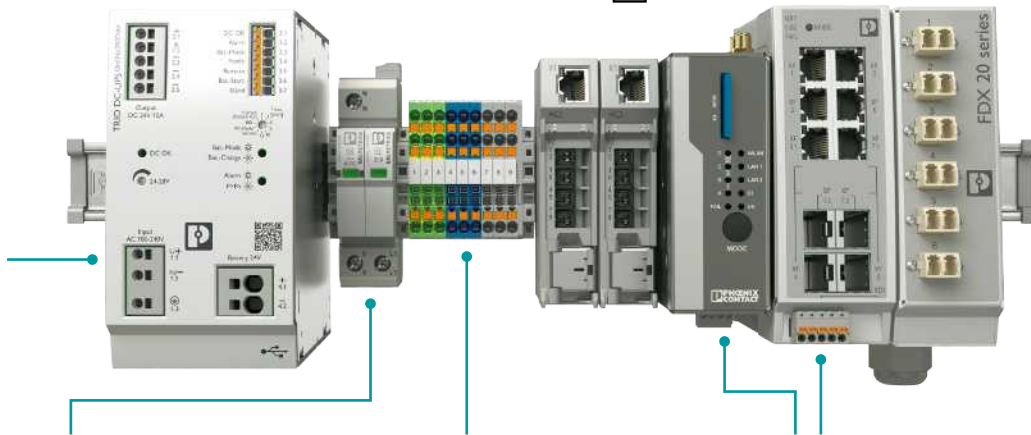
i Web code: #2303

Connectors
i Web code: #0515

Cables and lines
i Web code: #1411

Power supplies and UPS

i Web code: #0150



Surge protection

i Web code: #0291

Terminal blocks

i Web code: #0567

Industrial Ethernet

i Web code: #0956

Service and support

Regardless of the task at hand, the technological solution you are searching for to meet your objective or the products you would like to use, our specialists are always on hand no matter where you are. With our flexible service concept, we provide support for any queries you may have regarding automation technology – from applications and systems to cybersecurity and safety. Our experts have extensive knowledge of the relevant industries and technology. This, combined with Phoenix Contact's wide range of products, means we always have the right solution for you.

Your advantages

- ✓ Short response times, thanks to a global network of service experts
- ✓ Time and resource savings with comprehensive consulting for your entire system
- ✓ Access to expert knowledge, thanks to comprehensive consulting and training services
- ✓ Free system hotline with 24-hour product support

We are there for you



Consulting

We will be happy to advise you regarding the planning and optimization of your machine or system.

Application and system

Ideally tailored to your application, we consolidate control, visualization, PROFINET, and other protocols.

ICS security and Industrial Ethernet

Whether failsafe networks, concepts for secure remote maintenance, or high-performance wireless networks, we will find the right solution for you.



Training and workshops

Thanks to our comprehensive training packages and the expertise of our trainers, you are always kept right up to date.

Application and system

We have the right training package for you to answer any questions you may have about our control and visualization technology.

ICS security and Industrial Ethernet

Through instruction and practical training, we bring you and your employees up to speed on failsafe networks and the latest standards and directives.



Engineering

Benefit from our experience and our network of project engineers and system partners in all phases of your project.

Application and system

We will support you throughout the implementation of your application or sub-application with Phoenix Contact.

ICS security and Industrial Ethernet

We will provide support during the configuration and commissioning of your network and show you where optimizations can be made.



Support

Our service network is on hand worldwide to assist you during installation, startup, and operation.

ICS security and Industrial Ethernet

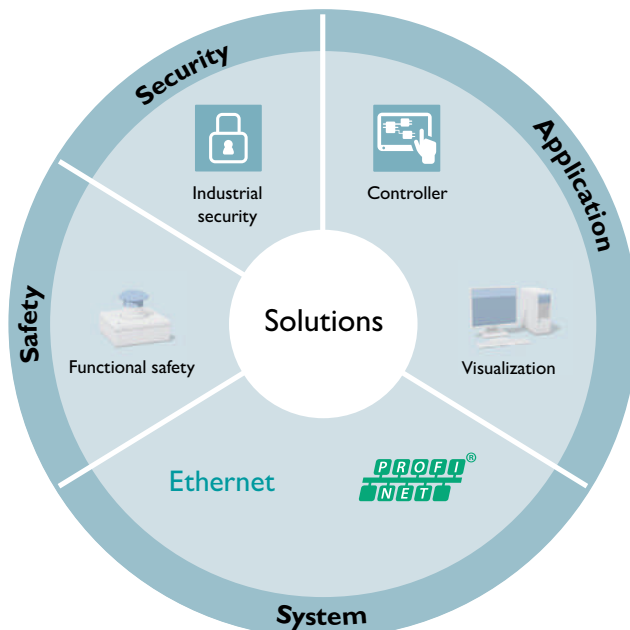
If your network is not living up to your expectations, we will eliminate any faults. We will analyze your network, assist with configuration modifications, and make recommendations regarding interaction with other components.

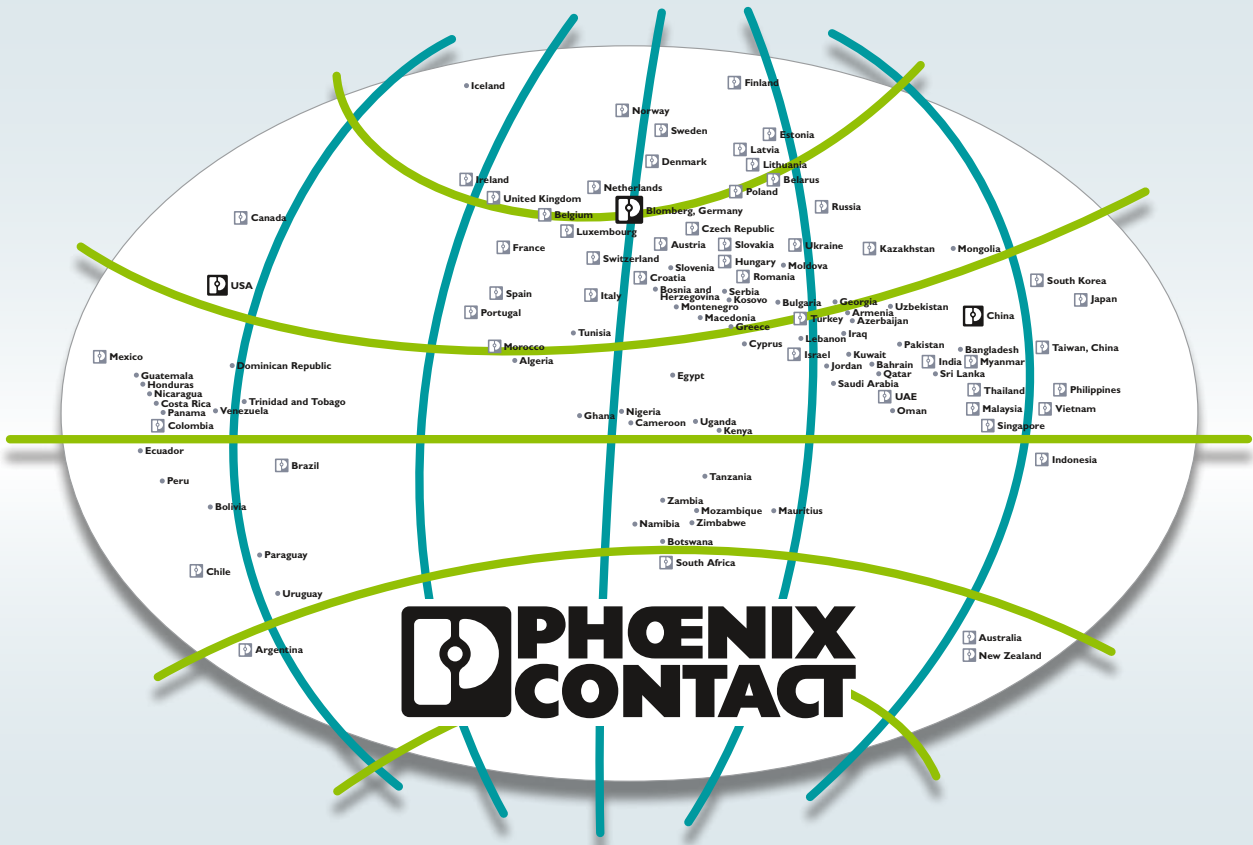
Contact us for more information

Whether by phone, via remote access or on site – Phoenix Contact is there for you.

24-hour hotline: **+ 49 (0) 52 81 9 46 28 88**

E-mail: **automation-service@phoenixcontact.com**





Open communication with customers and partners worldwide

Phoenix Contact is a global market leader based in Germany. We are known for producing future-oriented components, systems, and solutions in the fields of electrical engineering, electronics, and automation. With a global network reaching across more than 100 countries with over 17,600 employees, we maintain close relationships with our customers, something we believe is essential for our common success.

Our wide variety of innovative products makes it easy for our customers to implement the latest technology in a variety of applications and industries. We focus on developing the fields of energy, infrastructure, process, and factory automation.

You can find your local partner at
phoenixcontact.com