Industrial remote communication

Worldwide remote access to machines and systems

PHOENIX CONTACT

Industrial remote communication

Machines and systems are often distributed over wide areas. Securely connecting distributed stations to 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. Phoenix Contact provides a broad portfolio of products for wireless and wired remote access for this purpose.

Remote maintenance

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

› More information starting on page 4

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.

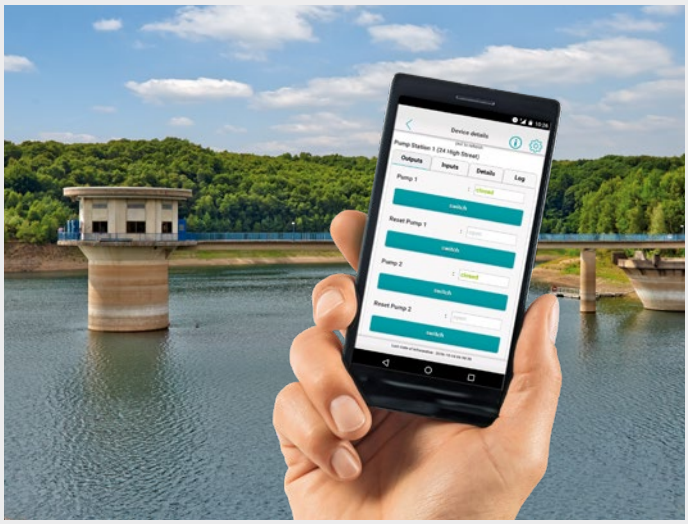
› More information starting on page 10

5G

Remote access via 5G

5G, the new cellular standard, significantly extends the possibilities of industrial communication. In addition to high data rates, higher numbers of devices and low latencies are possible with high reliability. Communication over long distances is often required in classic remote maintenance and remote control applications. This is where the public cellular network comes in, because it is available worldwide and provides Internet access even in remote locations.

With Industrial 5G, private networks that satisfy all of the prerequisites for flexible, sustainable network connections in mobile or highly flexible applications can also be established, for example. The advantages of a private network are that companies can track, analyze, and configure data traffic flexibly to suit their requirements. We will be happy to advise you on the new possibilities with 5G.



Remote control and remote monitoring

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

› More information starting on page 18

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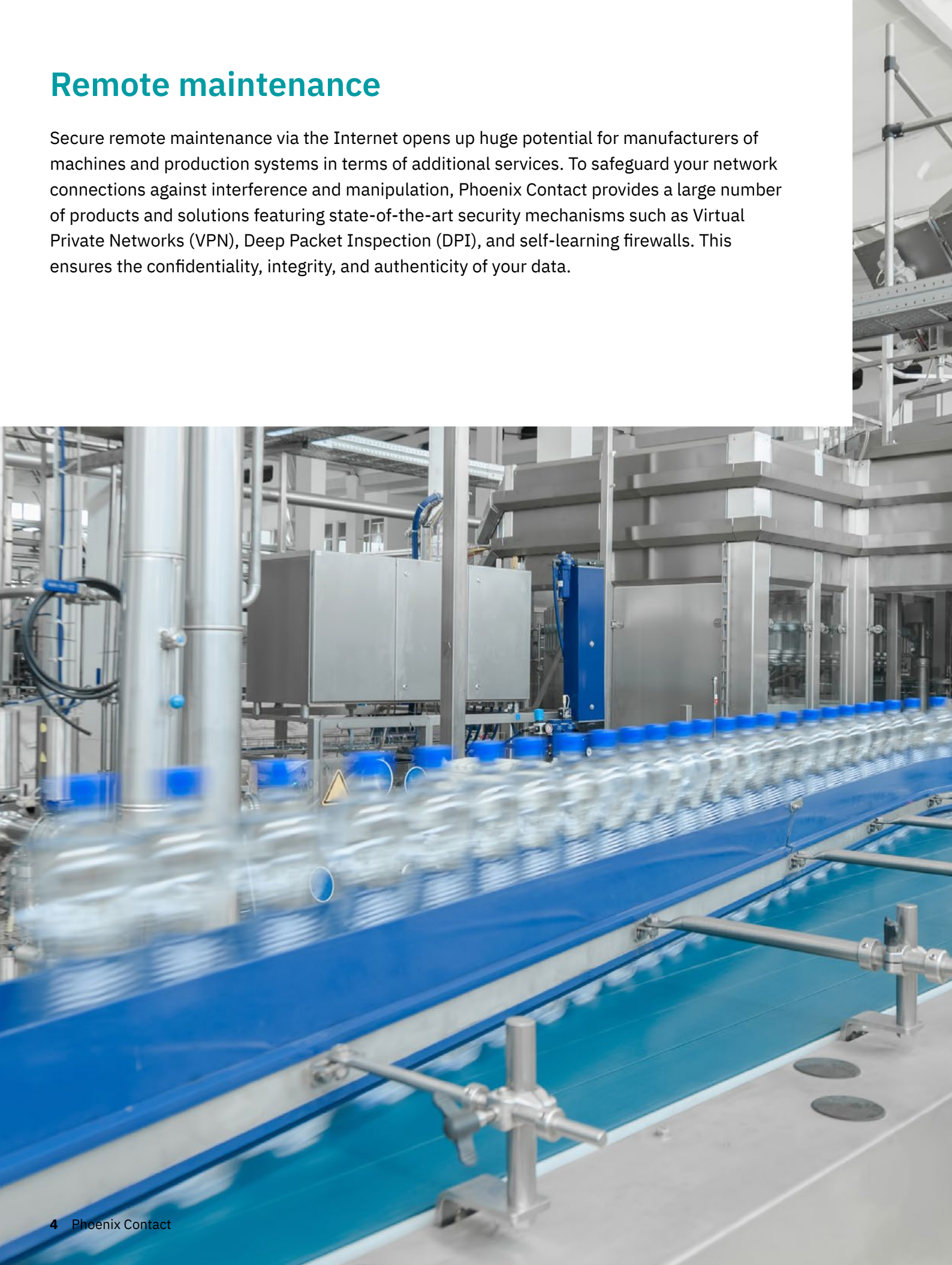
Find out more about the subject of remote communication:

phoenixcontact.com/remotecommunication

Remote maintenance

Secure remote maintenance via the Internet opens up huge potential for manufacturers of machines and production systems in terms of additional services. To safeguard your network connections against interference and manipulation, Phoenix Contact provides a large number of products and solutions featuring state-of-the-art security mechanisms such as Virtual Private Networks (VPN), Deep Packet Inspection (DPI), and self-learning firewalls. This ensures the confidentiality, integrity, and authenticity of your data.



Structure of the remote maintenance concept

Internet access

Depending on the wishes and possibilities on site, a remote maintenance connection is established via a wired Internet connection or with the help of a WLAN or cellular router. While the wired solution is simple and inexpensive to realize, a wireless solution features a high-level of flexibility, even in places where there is no Internet connection.

Data transmission

Either a self-hosted VPN server or turnkey solutions such as the mGuard Secure Cloud are used for data transmission. Both versions feature different advantages (see table).

VPN server	mGuard Secure Cloud
Description	
A secure, transparent communication channel is established between two devices over the Internet.	A secure, transparent communication channel is established over the Internet between the service personnel/field device and the mGuard Secure Cloud.
Internet connection	
Business Internet access required (fixed IP address).	Any Internet access can be used.
Advantages	
• Freely definable routing, firewall, and VPN functionalities • Complete self-control of VPN tunnels	• Turnkey VPN solution • Easy commissioning with configuration assistants • Customized routing, firewall, and VPN functionalities for cloud operation
Additional features	
• In-house encryption certificates necessary • Firewall rules switched on an event basis (conditional firewall)	• Support for cellular devices such as iPad and iPhone • Logbook – all access is logged • Free basic account
IT expertise	
●●●○○	●○○○○

Ensuring data security

To make your remote connection secure, keep the following points in mind:

- Secure data transmission via VPN tunnel
- All access is traceable
- Connection only on demand (no permanent connection)
- Remote maintenance initiation via key switch, I/Os, API, SMS, or call
- No access to the superordinate network
- Use of state-of-the-art encryption standards (IPsec, OpenVPN)

Remote maintenance via the cloud

The mGuard Secure Cloud is your secure remote access ecosystem. It is perfect for companies of all sizes that neither have the time nor the knowledge to set up and operate a reliable remote access solution.

The mGuard Secure Cloud makes it super easy to connect Phoenix Contact devices to the cloud infrastructure securely and enables remote access to machines and systems at the touch of a button.

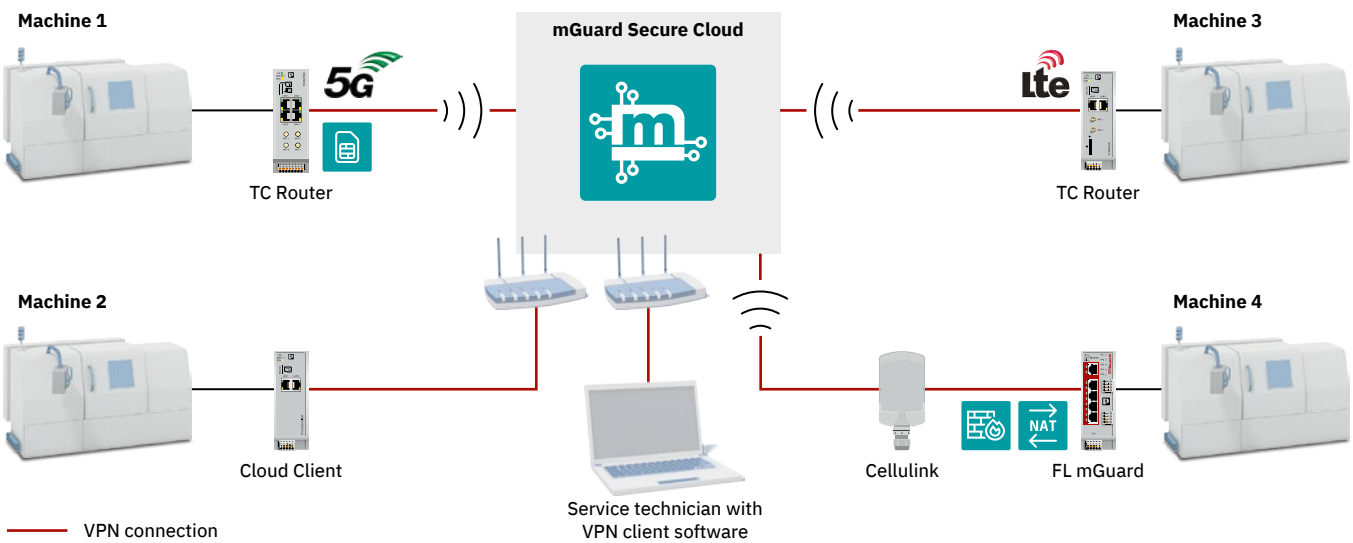
The mGuard Secure Cloud supports dynamic application adaptations with fine-grained cloud service subscriptions.

The mGuard Secure Cloud is based on an advanced architecture that adapts intelligently to the relevant availability, latency, and speed requirements to deliver the best user experience.

Functional components of the mGuard Secure Cloud

Service personnel can use a free OpenVPN software client on the service computer or tablet and connect the workstation to the mGuard Secure Cloud.

The machines are also equipped with industrial-grade remote maintenance routers or PLCnext Control and can establish your VPN connection to the Secure Cloud as necessary. VPN connections can be established locally via hardware (key switch) or via software controlled by the system operator.



Simple – secure – reliable

Phoenix Contact's mGuard Secure Cloud infrastructure supports secure Layer 2 and Layer 3 communication and globally meshes itself with complete redundancy to ensure increased availability.

The comprehensive use of cloud services enables intelligent control of users, connections, machines, and systems.

This means that you do not need to invest in your own hardware, and you save on local administration costs. The hosted cloud is always up to the latest standard and always available. Thus, you benefit from regular updates and patch management, low latency times, and a high-availability data center that is operated around the clock – a particularly convenient service offer, especially for small and medium-sized companies.

Your advantages

- Turnkey remote maintenance infrastructure
- Secure and scalable
- Risk-free testing with free basic service
- Time and cost savings through remote services instead of expensive on-site service actions
- Easy commissioning with configuration assistants and intuitive-to-operate web interface
- Secure and reliable VPN connections, even to China

Register for free now and test the mGuard Secure Cloud:

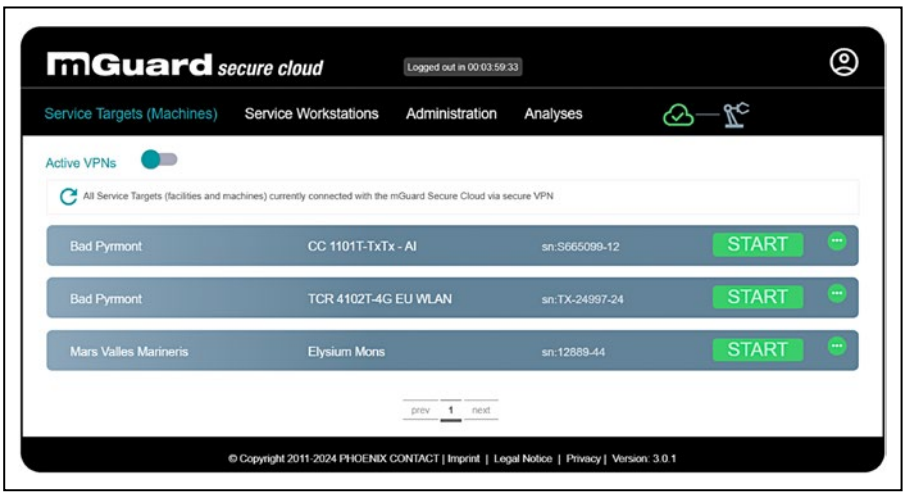
secure.phoenixcontact.cloud

mGuard Secure Cloud web interface

The mGuard Secure Cloud web interface clearly displays the availability of the service target and controls the service personnel access to assigned locations and machines.

New remote maintenance connections can be added conveniently via the assistant. You therefore have a good overview of all connected machines and systems.

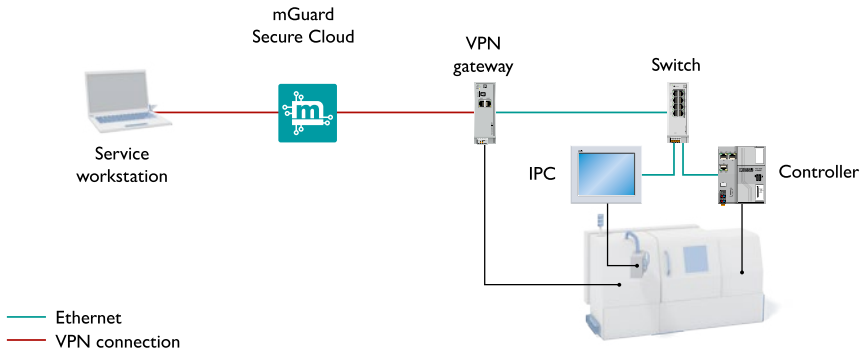
Furthermore, all administration tasks can also be performed via the web interface. This includes the convenient management of users, permissions, service subscriptions, and analyses.



Remote maintenance via the cloud

Compact, independent machines

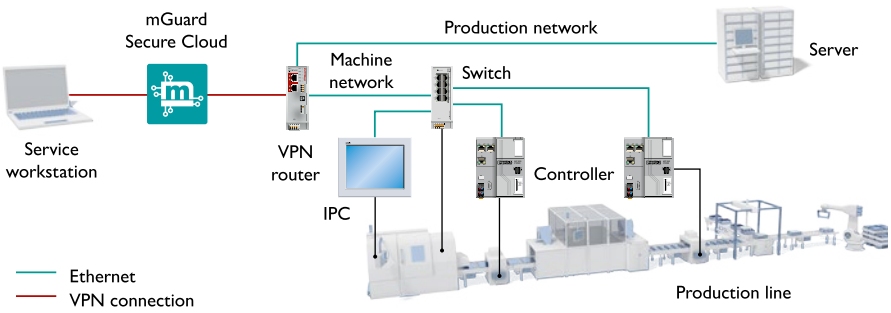
The cloud clients from Phoenix Contact are ideally suited for the remote maintenance of individual, compact machines with a small IP network. They connect the machine to the mGuard Secure Cloud securely via VPN. The cellular network version is ideally suited for stand-alone machines without a network connection.



Integration into the production network

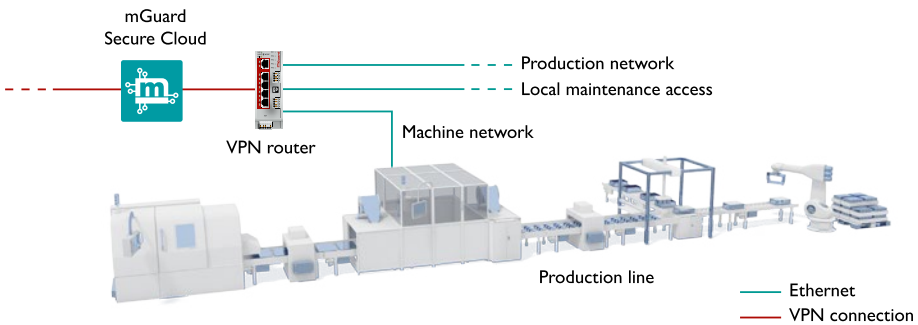
Protection against unauthorized access by people or malware is becoming increasingly more important for networked machines.

The FL mGuard 2102 secures 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 Cloud via VPN.



High network availability

When there is a high number of networked machines and systems, the availability of the machine network is of paramount importance.
Here, the FL mGuard secures the communication between the production and machine networks. 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.



Remote maintenance via in-house VPN infrastructure

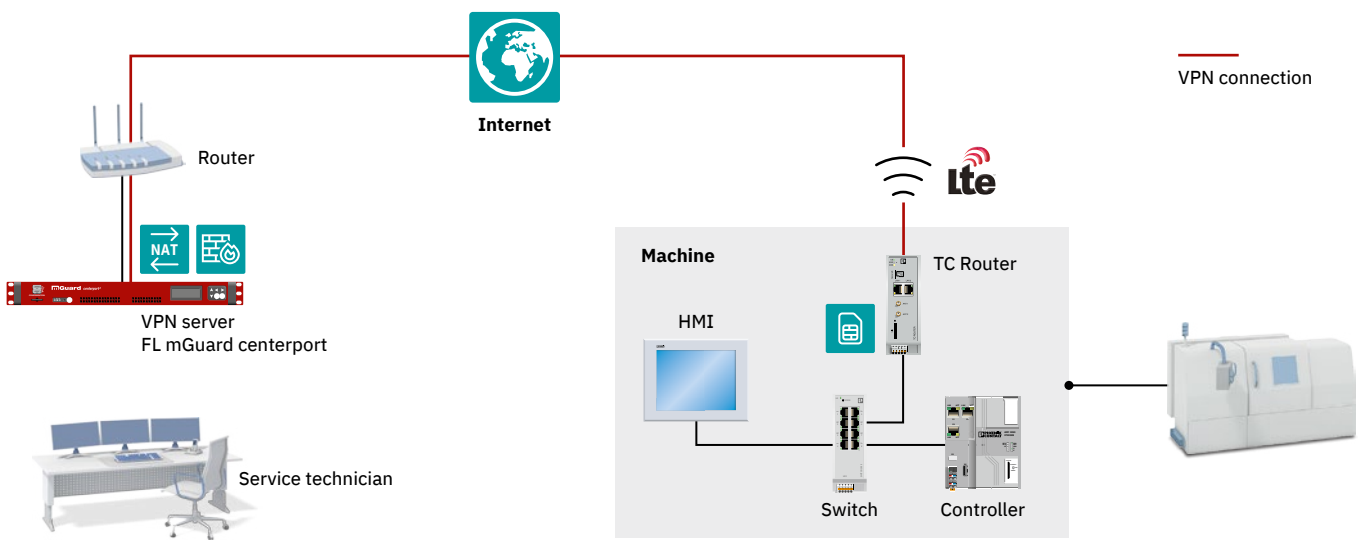
Would you like to freely define access rights and retain control over VPN connections yourself? Then operating your own on-premises VPN infrastructure is a good idea.

With your own VPN infrastructure, everything is yours – including your data, hardware, and software platforms. You decide on the configuration, upgrades, and system changes. Also, you do not always have to rely on Internet connectivity and external factors to access your machines and systems.

IT-savvy employees who take care of the on-premises infrastructure are indispensable. They have to take setup, operation, maintenance, back-up, and support into their own hands.

Typical structure of an in-house VPN infrastructure

All FL mGuard devices from Phoenix Contact can be connected to and operated on such a VPN infrastructure. The FL mGuard centerport in a 19″ design is recommended as the central VPN component. This guarantees perfect compatibility and high security standards.



Remote control

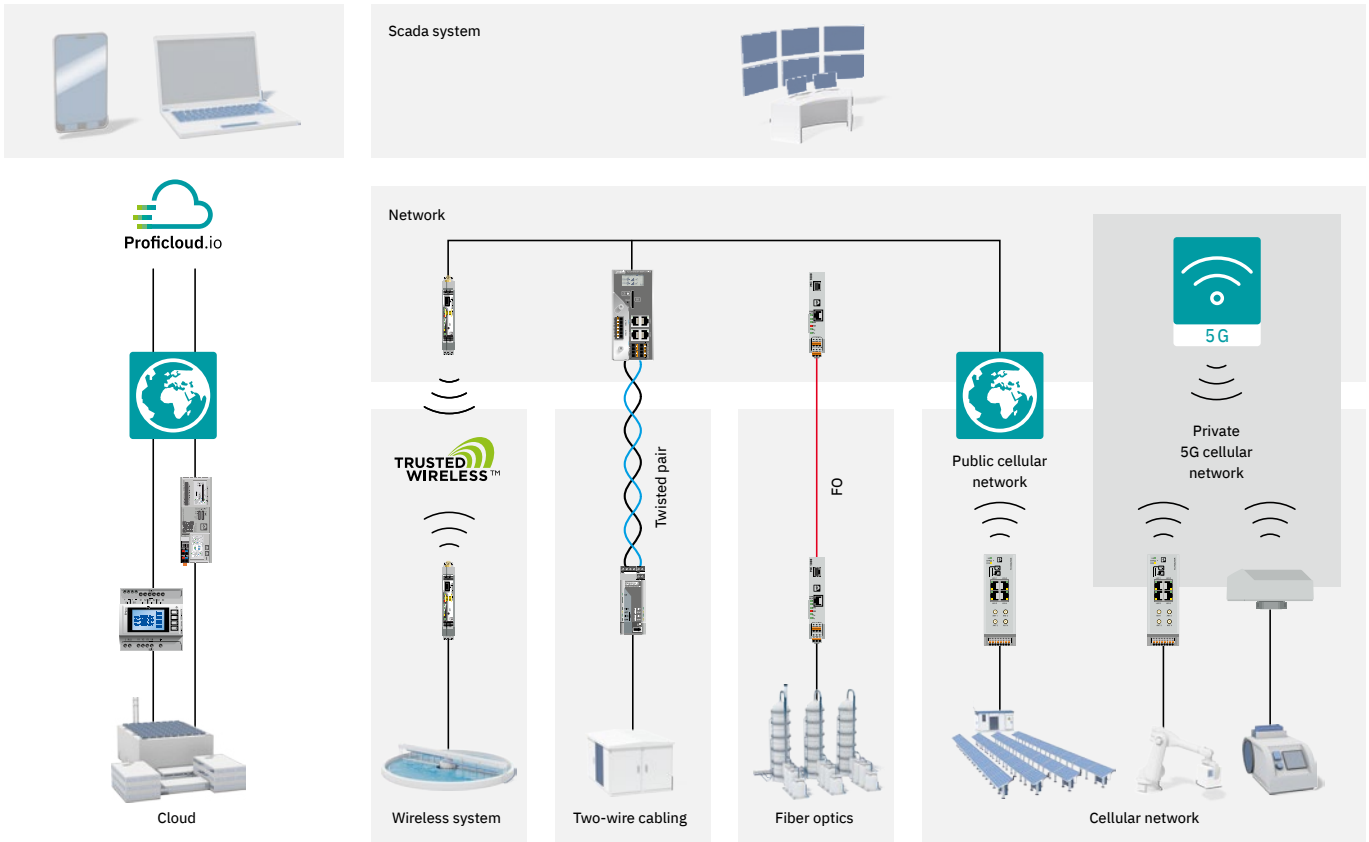
Transfer your process data securely and continuously to the control center via company-owned lines or wirelessly (cellular communication). Phoenix Contact also provides modular remote control stations and application-specific systems for existing and new systems.

Our products ensure seamless integration and enable remote control from the control system through to the field level.

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

Remote control via various media

Which transmission medium is the right one for your application? If you want to cover long distances, fiber optics (FO) is recommended. If installing cables is expensive or impossible, wireless solutions are an option. If no communication cables are available, existing cellular networks provide a good alternative. Phoenix Contact provides suitable components for every transmission medium: from media converters for converting to FO and (cellular) wireless modules through to the appropriate connectors, cables, and antennas.



Properties of the transmission media

Proficloud.io	Wireless system	2-wire cable	Fiber optics	Cellular communication
Range				
Worldwide	Up to 32 km	Up to 20 km	Up to 80 km	Worldwide
Data throughput				
Depending on Internet access	Up to 250 kbps	Up to 1000 Mbps	1000 Mbps	150 Mbps (LTE) 1000 Mbps (5G)
Latency				
●●●○○	●●●●●	●●○○○	●○○○○	●●●○○

Remote control via the cellular network

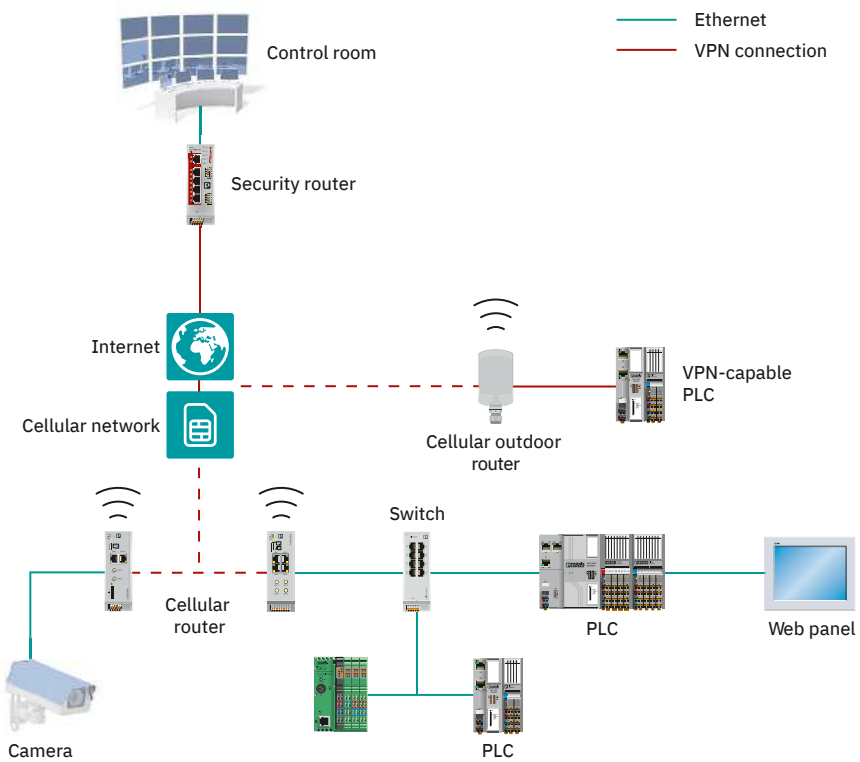
For the continuous acquisition of your process data, Phoenix Contact provides cellular network devices that support all technology standards (5G, 4G, 3G, and 2G). With the globally available cellular network, the devices can communicate reliably, even in areas with a weak infrastructure.

The small remote stations and entire system parks, such as remote pumping stations, can be connected to the control center using methods ranging from text messaging, through remote control protocols at low data rates, all the way to broadband VPN connection, depending on the communication requirements.

Broadband connection for decentral systems

Cellular technology provides a secure communication solution for applications with a large data throughput. In 5G/4G networks, monitoring images and server functions are made available to the control center from around the world.

The routers with VPN functionality enable closed communication over 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.

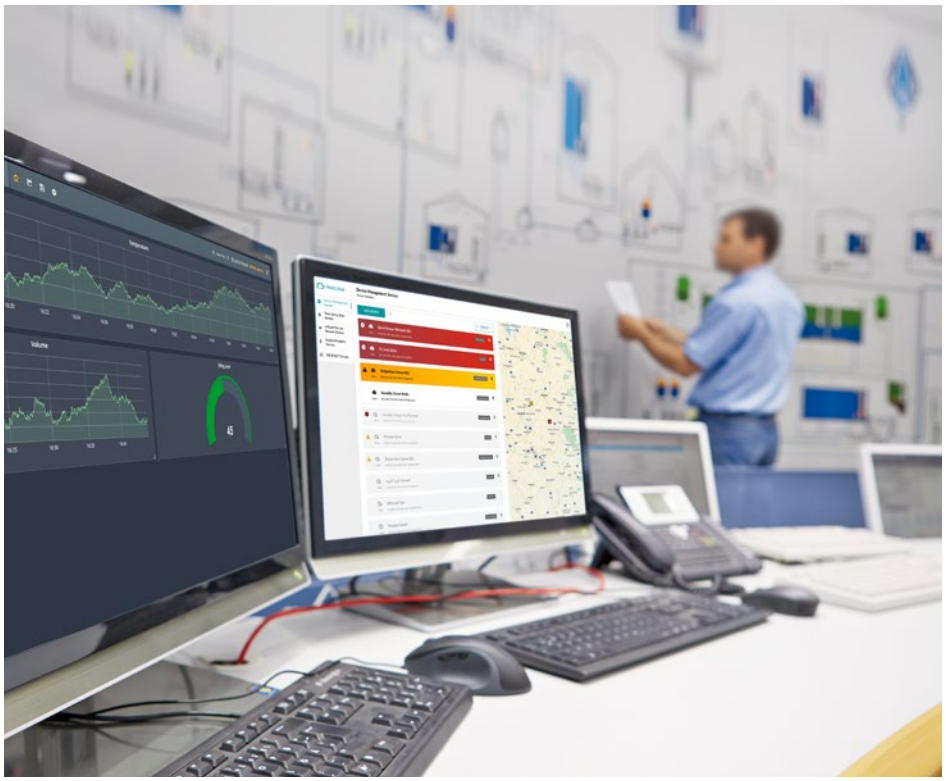


Remote control via the cloud

Proficloud.io is a plug-and-play IIoT platform that, with its smart services, enables devices to be connected to a cloud infrastructure easily and without extensive IT resources. With the various smart services, companies can monitor and analyze their data, for example, to optimize processes, improve quality, and reduce costs.

The platform features maximum simplicity and transparency and supports companies in fully exploiting the advantages of digitalization:

- Access to component data at any time and from anywhere
- Access to data-based, future-oriented Smart Services such as the Time Series Data Service and the Energy Management Service
- Secure and certified communication between the controller and Proficloud.io via TLS encryption

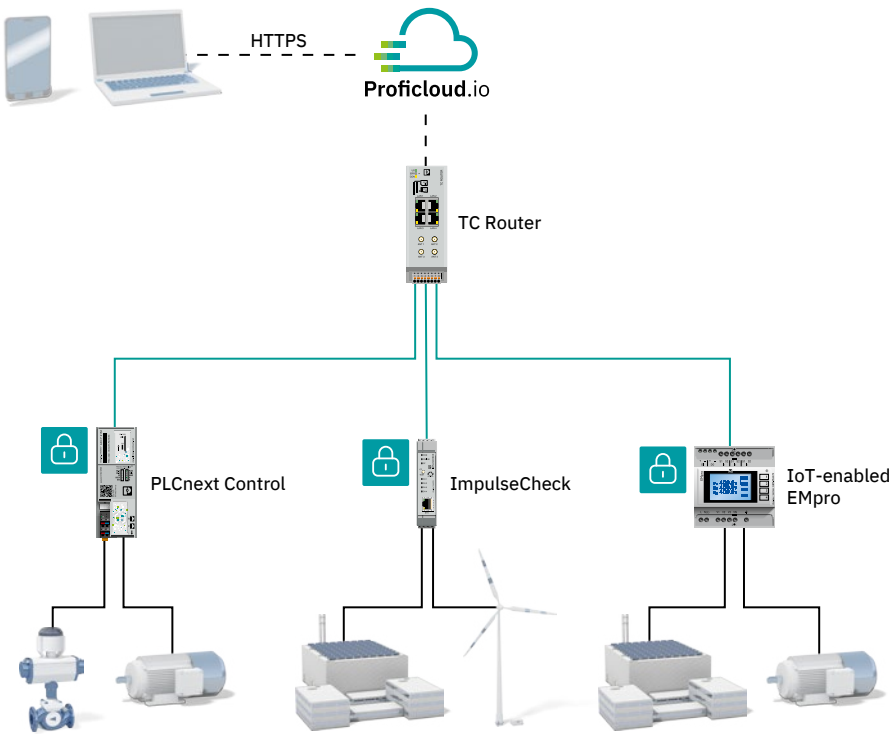


Future-oriented Smart Services

Smart, IIoT-capable components and controllers from Phoenix Contact allow data to be sent directly to Proficloud.io. The availability of component data is guaranteed, and users can access it at any time, anywhere.

Proficloud.io allows access to data-based, future-oriented Smart Services, with functions such as device management, state-of-health, and other interactions with the components. Smart Services also enable increased transparency of measurement and component data through advanced analytics, such as future machine learning.

TLS encryption guarantees secure and certified communication between the controller, the components, and Proficloud.io.



Remote control via in-house cabling

With extenders, you can connect Ethernet networks economically over large distances.

In Gigabit applications, you can even achieve ranges of up to 20 km. Use existing cables for sophisticated network installations and minimize investment costs. Find the ideal extender for your application.

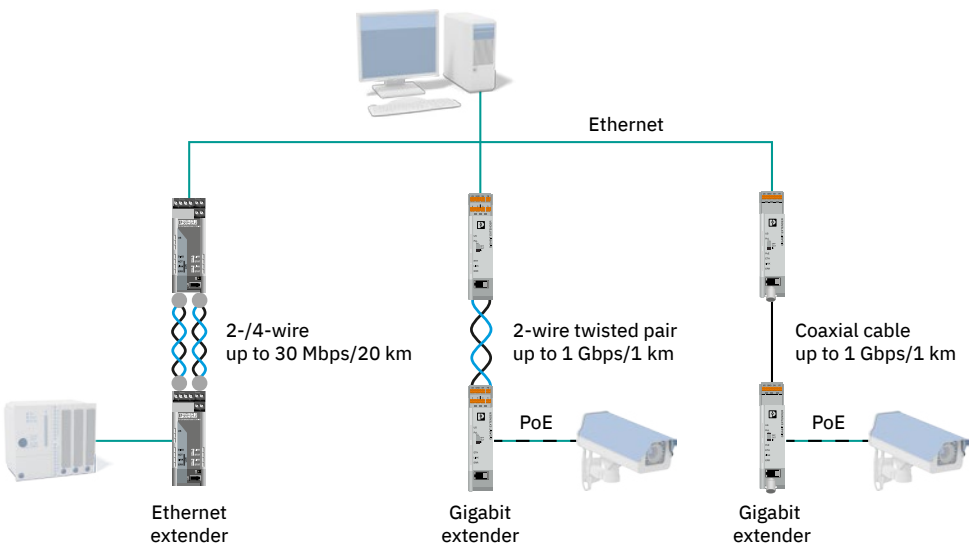
Ethernet communication up to 20 km using any 2-wire cables

Ethernet extenders

With Ethernet extenders, you can connect Ethernet networks over distances up to 20 km via simple 2-wire cables. This allows data rates of up to 30 Mbps to be made a reality.

Gigabit extenders

Gigabit extenders enable broadband Ethernet applications up to 1 Gbps over distances up to 1 km. You can use both existing 2-wire cables and coaxial cables.



Remote control via fiber optics

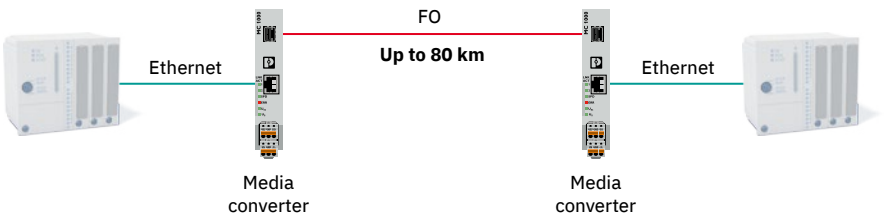
FO media converters for Ethernet and fieldbus allow you to convert your copper interfaces to interference-free fiber optics without the need for complex surge protection, shielding, and equipotential bonding measures.

Another advantage of optical data transmission is the increase in the maximum range to up to 80 km in a point-to-point connection.

Communication to remote systems via fiber optics

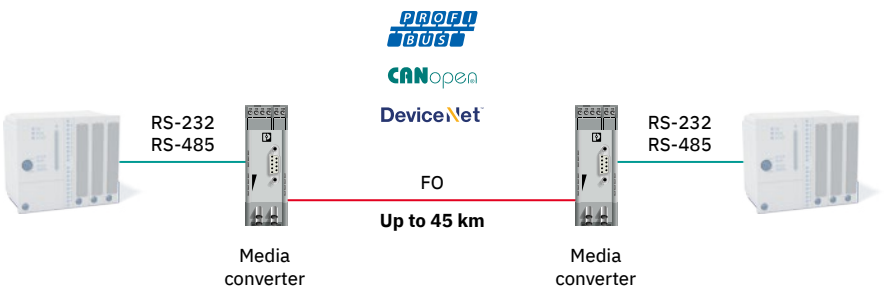
Ethernet media converters

For high-level immunity to interference and long transmission ranges in industrial Ethernet applications, media converters transparently convert Ethernet data to fiber optics. Depending on the device and cable, they bridge distances of up to 80 km at data rates of up to 1 Gbps.



Media converters for fieldbuses

Media converters of the PSI-MOS product families convert copper-bound PROFIBUS interfaces to fiber optics. A transparent protocol is used to convert all data rates up to 12 Mbps.



Remote control via wireless systems

With wireless systems, you simply 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 thus act as a gateway between local sensors and actuators of the process station and the control center.

Application example

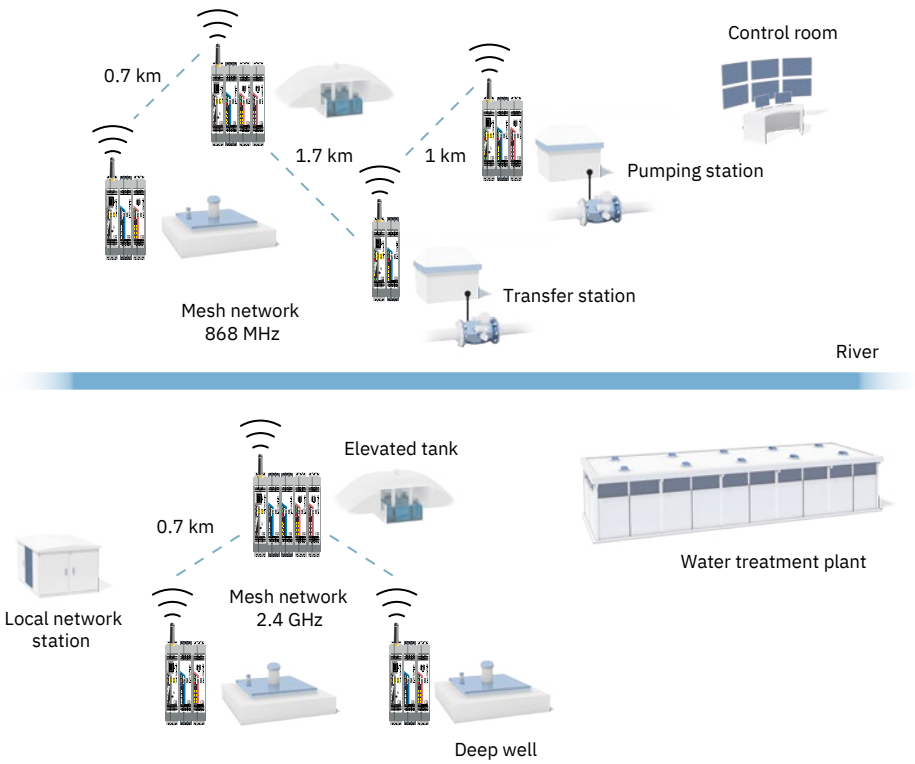
Within the peripheral, highly branched system structures, measured values and other operating information must be transmitted securely, fill levels must be monitored, and pump performance and flow rates must be logged continuously.

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 cables



Remote control solutions in application

Power transmission and distribution

Application

Monitoring parameters is important for the expansion and reliable operation of power grids. The increasing use of decentral generation systems and the rapidly increasing number of new electricity consumers are leading to new challenges, such as fluctuating generation volumes and the increasing simultaneous consumption due to heat pumps and e-mobility.

The solution

The smartRTU platform from Phoenix Contact is an easy-to-configure remote control and automation solution specially developed for monitoring and controlling distribution grids. The software enables complex applications to be configured in a clear web interface. The acquisition of operating data and remote control of the power grid enable operational optimization and investment planning.

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

Solar power

Application

Decentral power generation systems must contribute to grid stability. The feed-in controller ensures that the setpoints and control procedures of the grid operator are maintained at the grid connection point. Remote control technology transmits control specifications to the feed-in controller. The technical connection conditions of the grid operators determine the equipment of the systems that are subject to European and country-specific specifications.

The solution

Our feed-in controller, the Power Control Unit (PCU), is certified for three countries. The controller is a flexible solution based on PLCnext Technology. The PCU calculates the manipulated variables for the generating units based on the grid operator specifications and the permanently implemented control functions. The Resy10x function block library from Phoenix Contact supports grid operator communication.

Grid connection with the feed-in controller in a PV power station

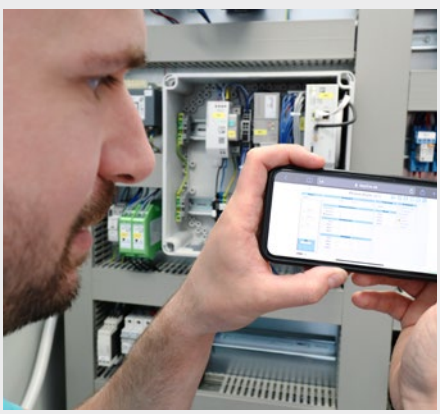
Water and wastewater treatment

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 grid. These must, when necessary, transport the wastewater to the higher-level sewage systems and function correctly around the clock. Current operating data is transmitted to the higher-level control system.

The solution

The turnkey Pump Control control cabinet solution with integrated remote control interface 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.

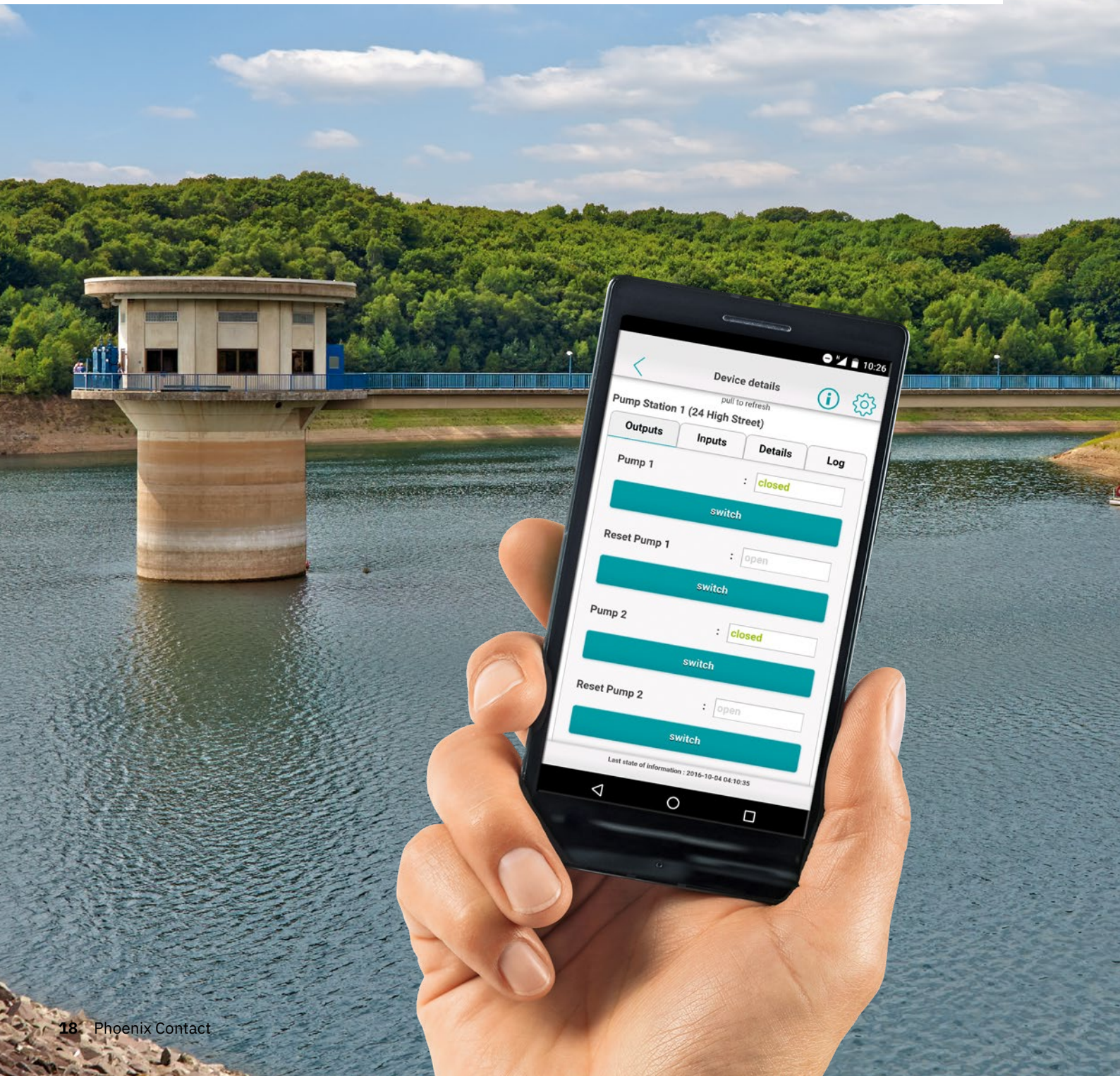


Use of the Pump Control solution in a wastewater pumping station

For additional use cases, please refer to phoenixcontact.com/applications

Remote control and remote monitoring

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. You can send text messages via SMS or email and set switching outputs, e.g., for disconnecting the machine. Thus, you can prevent damage and downtimes and avoid costly on-site servicing.



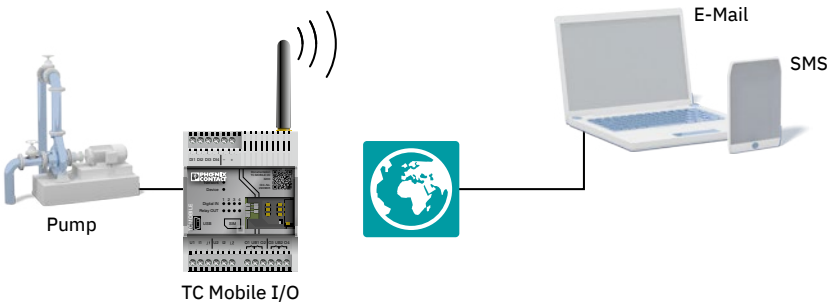
Remote control and monitoring via the cellular network

One network via SMS

In the case of autonomous remote stations, the few switching operations that are required and the system inspections are often still carried out by service personnel on site. Errors quickly lead to downtimes and high costs.

With automatic alerts, immediate remote error detection is possible – without requiring a complex and costly broadband connection. Monitor analog and digital values easily and securely via the cellular network with the compact TC MOBILE I/O X200 signaling system. This ensures that you are always kept up to date on the status and errors in your system.

You can send text messages via SMS or email, and set switching outputs, e.g., for disconnecting the machine. You can prevent damage and downtimes, and avoid costly on-site servicing.



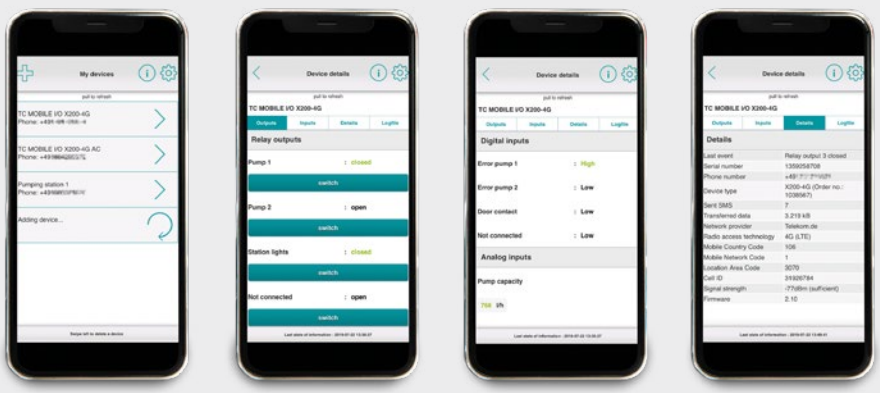
Your advantages

- Reduced machine and system downtimes with automatic alerts via SMS and email
- Decreased communication costs, thanks to event-driven alerts
- A conventional mobile phone can serve as a peer
- Cellular networks are available worldwide
- Free switching by phone call

Free app for the TC MOBILE I/O X200 signaling system

The TC MOBILE I/O X200 also communicates with you via smartphone app (iOS and Android). The app allows you to switch your outputs conveniently and easily check the status of the device at any time.

The TC Mobile I/O app makes it even easier to use the device and saves you having to write a text message. You will receive the alarm as usual via SMS and email. This ensures high-level accessibility in the field.



Cloud-enabled products

For remote communication with worldwide industrial systems, Phoenix Contact provides a broad portfolio for wired and wireless remote access. The range is supplemented by our cloud solutions for remote maintenance and the digitalization and analysis of process data.

Outdoor cellular routers

Cellulink is a new product family of industrial outdoor cellular routers for connecting network-capable devices to the cellular network. The devices certified in accordance with IEC 62443-4-2 have integrated antennas and can be used worldwide.

Security routers

With the mGuard security routers, certified in accordance with IEC 62443-4-2, you can protect your machines and production cells from unauthorized access. A wide range of security functions as well as central management software help to easily increase the security level of your production facilities.

Universal cellular routers

The TC ROUTER cellular routers enable robust data connections over 4G or 5G networks. This allows you to establish a mobile broadband connection even in demanding environments where a wired Internet connection is not available.

Cloud services

mGuard Secure Cloud

The complete turnkey VPN solution for easy remote maintenance.

› More information starting on page 22

Proficloud.io

Unlimited possibilities of a cloud-based solution for the digitalization and analysis of process data.

› More information starting on page 23

PLCnext Technology

Designed by Phoenix Contact

Proficloud.io

Simple remote maintenance routers

Cloud clients connect machines securely to the mGuard Secure Cloud using cables via the operator network. They are the inexpensive entry into scalable remote maintenance of machines, without the need for specific expertise in networking and VPN technology.

Any Cloud: Open controllers

PLCnext Control, the controllers of the open PLCnext Technology ecosystem, can be connected to any cloud. Whether it's Phoenix Contact's Proficloud.io, Amazon's AWS, Microsoft's Azure, or your own cloud solution on site. Take advantage of individual cloud services to optimize your processes.

Cloud-enabled products

mGuard Secure Cloud v3

mGuard Secure Cloud		
	mGuard Secure Cloud v2	**mGuard Secure Cloud V3**
Global availability	No (EMEA, AMER)	Yes (EMEA, AMER, APAC)
Unique decentral infrastructure	No (separate instances)	Yes
Layer 2 support	No	Yes
Any large machine networks	No	Yes
Public and private IP addresses	No (private only)	Yes
Identity provider support	No	Yes (via OpenID)
Software VPN clients	IPsec (Win, iOS/iPadOS, macOS, Linux)	OpenVPN (Win, iOS/iPadOS, macOS, Linux, Android)
Free software VPN clients	No	Yes
Business model	BASIC (limited) and PREMIUM editions	Flexible service subscriptions (monthly, yearly)
Data transfer analyses	No	Yes
Service analyses	Yes	Yes
Remote access control via supervisor	No	Yes
Guaranteed VPN availability to China	Yes (mGuard)	Yes (mGuard, TC Router, Cloud Client)
Two-factor authentication (2FA)	Yes (TOTP, email)	Yes (TOTP, email)
Number of users	Unlimited	Unlimited
Number of machines and systems	Unlimited	Unlimited
Number of service workstations	Unlimited	Unlimited
Free concurrent service connections	1	2 (can be extended freely)
Transfer volume per service connection	4 GB/month	4 GB/month

Proficloud.io and Smart Services

Smart Services at a glance	
Smart Service	
Smart Services Powered by Proficloud.io Perfectly integrated cloud services for the smart route to industrial automation	• Reduction of manual and redundant work steps with cross-location remote monitoring • Data visualization and analysis: Making decisions based on data • Increase in system availability with early error detection and automated warnings • Full transparency of the status of the systems – at any time, from anywhere
All Smart Services in detail	
Device Management Service	
Device Management Service Powered by Proficloud.io The standard for all smart devices from Phoenix Contact	• Overview of all devices • State of health of devices • Firmware update from the cloud • Digital nameplate and device logs
DMS Basic Add-on	
DMS Basic Add-on Add-on for the Device Management Service The Basic Add-on for the device management service: extended innovative hardware management	• Grouping devices and adding separate floor plans • Direct notifications via email when the device status is changed • Easy implementation of remote application updates • Automatic and remote activation of firmware updates
Time Series Data Service	
Time Series Data Service Powered by Proficloud.io All process data available centrally – at any time, anywhere	• Access to process data from any location • Downtimes and workloads can be planned • Increased product quality through data • Warnings in the Smart Service or via email indicate impending problems • Expert knowledge accessible to every employee
Impulse Analytics Service	
Impulse Analytics Service Powered by Proficloud.io The world's first intelligent assistance system for surge protection in the field of mains protection	• Improved workflows with remote monitoring • From reactive to proactive maintenance • Detailed information on overcurrent events (State of Health reports) and remaining service life of the surge protective device (SPD) • Greater availability and improved process stability
Energy Management Service	
Energy Management Service Powered by Proficloud.io Energy Monitoring, Management, Analytics: Smart energy management any time, anywhere	• Visualization and analysis of energy data and uncovering potential savings • Draw conclusions about processes and energy consumption • External data sources can be integrated for additional data transparency • Export of data for further processing in other systems possible • Warning about limits that will be violated imminently • Visualization of the key indicator "Energy Performance Indicators (EnPI)" displayed with the reporting feature

Further information, connection of hardware, and booking options at Proficloud.io

Cloud-enabled products

Routers

	Internet access (WAN)	VPN tunnel	Ports	Special features	Type	Item no.
Outdoor cellular routers						
IEC 62443 device certification, Network Address Translation (NAT) or Exposed Host, outdoor housing: IK10, IP66/IP69K, temperature range: -40 … +70°C, Device and Update Management, dual SIM, GNSS: positioning and time synchronization						
	4G LTE CAT1	-	1x RJ45, PoE in	European version, Panel/mast mounting	CELLULINK 2401-4G EU M25	1503433
	4G LTE CAT1	-	1x RJ45, PoE in	European version, control cabinet mounting, 10 … 30 V DC	CELLULINK 2401-4G EU M40	1503487
	4G LTE CAT4	-	1x RJ45, PoE in	Worldwide version, Panel/mast mounting	CELLULINK 4401-4G GL M25	1637527
	4G LTE CAT4	-	1x RJ45, PoE in	Worldwide version, control cabinet mounting, 10 … 30 V DC	CELLULINK 4401-4G GL M40	1637627
	5G	-	1x RJ45, PoE in	Worldwide version, Panel/mast mounting	CELLULINK 6501-5G GL M25	1637531
	5G	-	1x RJ45, PoE in	Worldwide version, control cabinet mounting, 10 … 30 V DC	CELLULINK 6501-5G GL M40	1637530
	-	-	-	Wall adapter for mounting the M25 versions on a wall	CELLULINK WALL MOUNT ADAPTER	1513259
	-	-	2x RJ45	Passive PoE injector for CELLULINK	ETH POWER ADAPTER	1679314
Security routers						
Integrated firewall for the protection of the machine network, Network Address Translation (NAT), VPN tunnel to the mGuard Secure Cloud, central device management						
	Operator network (RJ45)	2	2x RJ45	–	FL MGUARD 2102	1357828
		2	5x RJ45	–	FL MGUARD 2105	1153078
		Up to 250	2x RJ45	Extended firewall for complex security	FL MGUARD 4302	1357840
		Up to 250	5x RJ45		FL MGUARD 4305	1357875
Universal cellular routers						
Temperature range: -40°C … +70°C, up to four digital inputs and two digital outputs and serial interface (depending on version), device and patch management (TC Router Online Manager)						
	4G LTE	3 VPN connections via IPsec or OpenVPN	2x RJ45	Worldwide version	3002T-4G GL	1632697
	4G LTE + operator network (RJ45)	No limit, limited by system resources and available bandwidth	2x RJ45 (2x LAN or 1x WAN 1x LAN)	European version	4002T-4G EU	1234352
	4G LTE + operator network (WLAN / RJ45)				4102T-4G EU WLAN	1234353
					4202T-4G EU WLAN	1234354
	5G SA/NSA	3 VPN connections via IPsec or OpenVPN	4x RJ45	European version	5004T-5G EU	1439475

Routers

	Internet access (WAN)	VPN tunnel	Ports	Special features	Type	Item no.
Simple remote maintenance routers						
Configuration and operation via mGuard Secure Cloud, simplified web interface, two digital inputs, and one digital output						
	Operator network (RJ45)	1 tunnel to mGuard Secure Cloud	2x RJ45 (1x LAN, 1x WAN)	Worldwide	CLOUD CLIENT 1101T-TX/TX	1221706

Cellular communication accessories

Phoenix Contact offers a variety of antenna and cable accessories for its products.

Web code: #3803

Controllers

	Processor clock frequency	Main memory (RAM)	Number of tasks (min. cycle)	Security	Type	Item no.
Controllers						
PLC based on a Linux kernel. Real-time capable for IEC 61131-3 as well as for high-level languages such as C/C++ and Matlab® Simulink®						
	ARM Cortex A9, 2x 800 MHz	0.5 GB	32 (1 ms)	IEC 62443-4-1 ML 3 Full	AXC F 2152	2404267
	Intel Atom E3930, 2x 1.3 GHz	2 GB	32 (500 µs)	IEC 62443-4-1 ML 3 Full	AXC F 3152	1069208

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

Cloud-independent products

With our cloud-independent products, we enable the possibility of transmitting data securely and over long distances. End-to-end solutions for industrial remote communication – whether via cellular communication, Ethernet, or state-of-the-art wireless systems.

SMS relays

Monitor analog and digital values easily and securely via the cellular network. The TC MOBILE I/O X200 SMS relay keeps you up to date on the status or error state of your system, even in the field. You can send text messages via SMS or email and set switching outputs, for example, to disconnect machines.

Ethernet extenders

With Ethernet extenders, you can connect Ethernet networks economically over large distances. In Gigabit applications, you can even achieve ranges of up to 20 km. Use existing cables for sophisticated Ethernet installations to minimize investment costs.

Wireless system

Radioline is Phoenix Contact's transmission system for extensive 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.

FO converters

For high-level immunity to interference and long transmission ranges in industrial applications, media converters transparently convert Ethernet data to fiber optics. The media converters allow you to bridge distances up to 80 kilometers depending on your choice of device and cable.

Cloud-independent products

SMS relays

	Power supply	Analog inputs	Digital inputs	Relay outputs	Type	Item no.
Compact signaling system						
4G/LTE cellular interface, European version, switching via phone call and SMS, alerting via SMS and email, message in the event of power failure						
	DC supply (10 V DC ... 60 V DC)	2	4	4	TC MOBILE I/O X200-4G	1038567
	AC supply (93 V AC ... 250 V AC)	–	4	4	TC MOBILE I/O X200-4G AC	1038568

Extenders

	Managed/ unmanaged	Ports	On-site diagnostics	Topologies	Surge protection	Remote diagnostics	Type	Item no.
Ethernet extenders								
Overcome long ranges of up to 20 km with any 2-wire cables, plug-and-play commissioning								
	Managed	2x SHDSL 4x Ethernet	Display	Point-to-point, line, ring	SHDSL, integrated, can be replaced	Any location via IP	... 6004 ETH-2S	2702255
	Unmanaged	2x SHDSL 1x Ethernet	LED	Point-to-point, line, ring	–	Stationary connection via USB	... 2001 ETH-2S	2702409

	Range	Bandwidth	Cable type	Topologies	Connection	Supply function	Type	Item no.
Gigabit extenders								
Realize Gigabit applications over twisted pair/coaxial cable up to 1 km, plug-and-play commissioning								
	Up to 1 km	Up to 1 Gbps	Coaxial cable	Point-to-point	BNC female connector	PoL	... 1010 ETH COAX-G	1319319
						PoL and PoE	... 2010 ETH COAX-G	1319320
			2-wire cable		Push-in terminal block	PoL	... 1010 ETH TP-G	1319321
						PoL and PoE	... 2010 ETH TP-G	1319322

Wireless modules

	Function	Inputs	Outputs	Usage	Type	Item no.
Wireless modules, extension modules, and outdoor boxes						
Range up to 32 km, suitable for long distances with obstacles, transmission time typically 100 ms up to a few seconds, provider-independent						
	Outdoor box	Can be extended with up to three selectable I/O extension modules	Can be extended with up to three selectable I/O extension modules	Worldwide (wireless module selectable): 868 MHz, 900 MHz, or 2400 MHz	RAD-RUGGED-BOX-CONF	1091638
		2 digital 1 analog	2 digital 1 analog	America 900 MHz	RAD-900-DAIO6	2702877
 TRUSTED WIRELESS™	Wireless module	–	–	Europe 868 mHz	RAD-868-IFS	2904909
		–	–	North America 900 MHz	RAD-900-IFS	2901540
		–	–	Australia 900 MHz	RAD-900-IFS-AU	2702878
		–	–	Worldwide 2400 MHz	RAD-2400-IFS	2901541
		–	–	Japan 2400 MHz	RAD-2400-IFS-JP	2702863
 TRUSTED WIRELESS™	Extension module	4 digital	–	Can be combined with 2901536	RAD-DI4-IFS	2901535
		4 digital (NAMUR)	–	Can be combined with 2902811	RAD-NAM4-IFS	2316275
		8 digital	–	Can be combined with 2902811	RAD-DI8-IFS	2901539
		–	4 digital	Can be combined with 2901535	RAD-DOR4-IFS	2901536
		–	8 digital	Can be combined with 2316275 and 2901539	RAD-DO8-IFS	2902811
		2 digital 1 analog	2 digital 1 analog	Can be combined with 2901533	RAD-DAIO6-IFS	2901533
		4 analog (0/4...20 mA)	–	Can be combined with 2901538	RAD-AI4-IFS	2901537
		4 analog (0-5/10 V)	–	Can be combined with 2901538	RAD-AI4-U-IFS	2702290
		PT100 temperature module	–	Can be combined with 2901538	RAD-PT100-4-IFS	2904035
		–	4 analog	Can be combined with 2901537, 2904035, and 2702290	RAD-AO4-IFS	2901538

Cloud-independent products

Ethernet media converters

	FO connection	Range	Data rate	Special features	Type	Item no.
MC 1000 – media converters for applications with basic requirements						
Temperature range: -10°C ... +60°C, for an easy introduction to FO technology						
 	MM SC	Up to 10 km	10/100 Mbps	• Automatic switching between store-and-forward and cut-through mode • Short latency times for real-time protocols • Link Fault Pass Through (LFPT) – activated via DIP switch	MC 1000-MM SC	1329817
	MM ST				MC 1000-MM ST	1329818
	MM LC				MC 1000-MM LC	1329819
	SM SC	Up to 20 km			MC 1000-SM20 SC	1329820
	SM ST				MC 1000-SM20 ST	1329821
	MM WDM A	Up to 10 km			MC 1000-MM WDM A	1329822
	MM WDM B				MC 1000-MM WDM B	1329823
	MM SC		10/100/1000 Mbps		MC 1100-MM SC	1330888
	SFP	Depending on module			MC 1100-SFP	1330903
MC 1000T – media converters for applications in demanding industrial environments						
Temperature range: -40°C ... +75°C, robust metal housing, shipbuilding approval, redundant power supply						
  	MM SC	Up to 10 km	10/100 Mbps	• Automatic switching between store-and-forward and cut-through mode • Short latency times for real-time protocols • Link Fault Pass Through (LFPT) – activated via DIP switch • Redundant power supply • Digital output for reading out alarm messages • DNV-GL approval	MC 1000T-MM SC	1329827
	MM ST				MC 1000T-MM ST	1330244
	MM LC				MC 1000T-MM LC	1330259
	SM SC	Up to 20 km			MC 1000T-SM20 SC	1330262
	SM SC	Up to 40 km			MC 1000T-SM40 SC	1330276
	SM ST	Up to 20 km			MC 1000T-SM20 ST	1330282
	SM WDM A	Up to 40 km			MC 1000T-SM40 WDM A	1330293
	SM WDM B				MC 1000T-SM40 WDM B	1330296
	MM WDM A	Up to 10 km			MC 1000T-MM WDM A	1330494
	MM WDM B				MC 1000T-MM WDM B	1330509
	SFP	Depending on module	10/100/1000 Mbps		MC 1100T-SFP	1330902
	MM SC	Up to 10 km			MC 1100T-MM SC	1330900
	SM SC	Up to 20 km			MC 1100T-SM20 SC	1330898
MC 1000E – media converters for applications with requirements on special approvals						
Temperature range: -40°C ... +75°C, robust metal housing, extended approval package, redundant power supply						
  	MM SC	Up to 10 km	10/100 Mbps	• Automatic switching between store-and-forward and cut-through mode • Short latency times for real-time protocols • Link Fault Pass Through (LFPT) – activated via DIP switch • Redundant power supply • Digital output for reading out alarm messages • Increased resistance to EMI • DNV-GL, ATEX, IECEx, and UL HazLoc approval • IEC 61850 and IEEE 1613 for applications in the energy sector	MC 1000E-MM SC	1330507
	MM ST				MC 1000E-MM ST	1330504
	MM LC				MC 1000E-MM LC	1330611
	SM SC	Up to 20 km			MC 1000E-SM20 SC	1330728
	SM SC	Up to 40 km			MC 1000E-SM40 SC	1330725
	SM ST	Up to 20 km			MC 1000E-SM20 ST	1330723
	SM LC	Up to 40 km			MC 1000E-SM40 LC	1330722
	SM WDM A				MC 1000E-SM40 WDM A	1330885
	SM WDM B				MC 1000E-SM40 WDM B	1330892
	MM WDM A	Up to 10 km			MC 1000E-MM WDM A	1330588
	MM WDM B				MC 1000E-MM WDM B	1330890
	SFP	Depending on module	10/100/1000 Mbps		MC 1100E-SFP	1331375
	MM SC	Up to 10 km			MC 1100E-MM SC	1330896
	SM SC	Up to 20 km			MC 1100E-SM20 SC	1331377

Serial media converters

	Transmission	FO port	Range	Light wavelength	Type	Item no.
FO converters for PROFIBUS						
PROFIBUS applications up to 12 Mbps, bit retiming, bit oversampling, PROFIBUS Start Delimeter detection, redundant ring function, bar graph diagnostics of the optical link						
	Polymer / HCS	1x FSMA	Up to 400 m	660 nm	PSI-MOS-PROFIB/ FO 660 E	2708290
		2x FSMA			PSI-MOS-PROFIB/ FO 660 T	2708287
	Multimode fiberglass	1x BFOC (ST)	Up to 3.3 km	850 nm	PSI-MOS-PROFIB/ FO 850 E	2708274
		2x BFOC (ST)			PSI-MOS-PROFIB/ FO 850 T	2708261
	Singlemode fiberglass	1x SC	Up to 45 km	1300 nm	PSI-MOS-PROFIB/FO 1300 E	2708559
		2x SC			PSI-MOS-PROFIB/FO 1300 T	2708892
FO converters for RS-485						
RS-485 applications and Modbus, automatic data rate detection up to 500 kbps, bar graph diagnostics of the optical link						
	Polymer / HCS	1x FSMA	Up to 800 m	660 nm	PSI-MOS-RS485W2/ FO 660 E	2708313
		2x FSMA			PSI-MOS-RS485W2/ FO 660 T	2708300
	Multimode fiberglass	1 ST port	Up to 4.2 km	850 nm	PSI-MOS-RS485W2/ FO 850 E	2708339
		2 ST ports			PSI-MOS-RS485W2/ FO 850 T	2708326
	Singlemode fiberglass	1 SC duplex	Up to 45 km	1300 nm	PSI-MOS-RS485W2/ FO1300 E	2708562
FO converters for RS-232						
RS-232 applications, automatic data rate detection up to 115.2 kbps, bar graph diagnostics of the optical link						
	Polymer/HCS	1x FSMA	Up to 800 m	660 nm	PSI-MOS-RS232/FO 660 E	2708368
		2x FSMA			PSI-MOS-RS232/FO 660 T	2708410
	Multimode fiberglass	1 ST port	Up to 4.8 km	850 nm	PSI-MOS-RS232/FO 850 E	2708371
		2 ST ports			PSI-MOS-RS232/FO 850 T	2708423
	Singlemode fiberglass	1 SC duplex	Up to 45 km	1300 nm	PSI-MOS-RS232/FO 1300 E	2708588

Open communication with customers and partners worldwide

Phoenix Contact is a global market leader based in Germany. We are known for producing forward-thinking products and solutions for the comprehensive electrification, networking, and automation of all sectors of the economy and infrastructure. With a global network, we maintain close relationships with our customers, something we believe is essential for our common success.

You can find your local partner at

phoenixcontact.com

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