



Industrial Ethernet

One network,
all options

The Industrial Ethernet network portfolio from PHOENIX CONTACT

Phoenix Contact offers you more realtime, more wireless, more security, and more reliability. Industrial Ethernet from Phoenix Contact can be easily integrated into your automation infrastructure – because we make Ethernet easy.

Thanks to our many years of experience in automation and industrial Ethernet networks, we are familiar with and understand your expectations and requirements. This is evident and embodied in our products and solutions.



We make Ethernet easy

When we say "We make Ethernet easy", we are talking about controlling the complexity of high-performance Ethernet networks. Therefore, we have consistently designed our products with the knowledge, the tools, and the skills of the user in mind, the automation specialist.



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Find out more with the web code

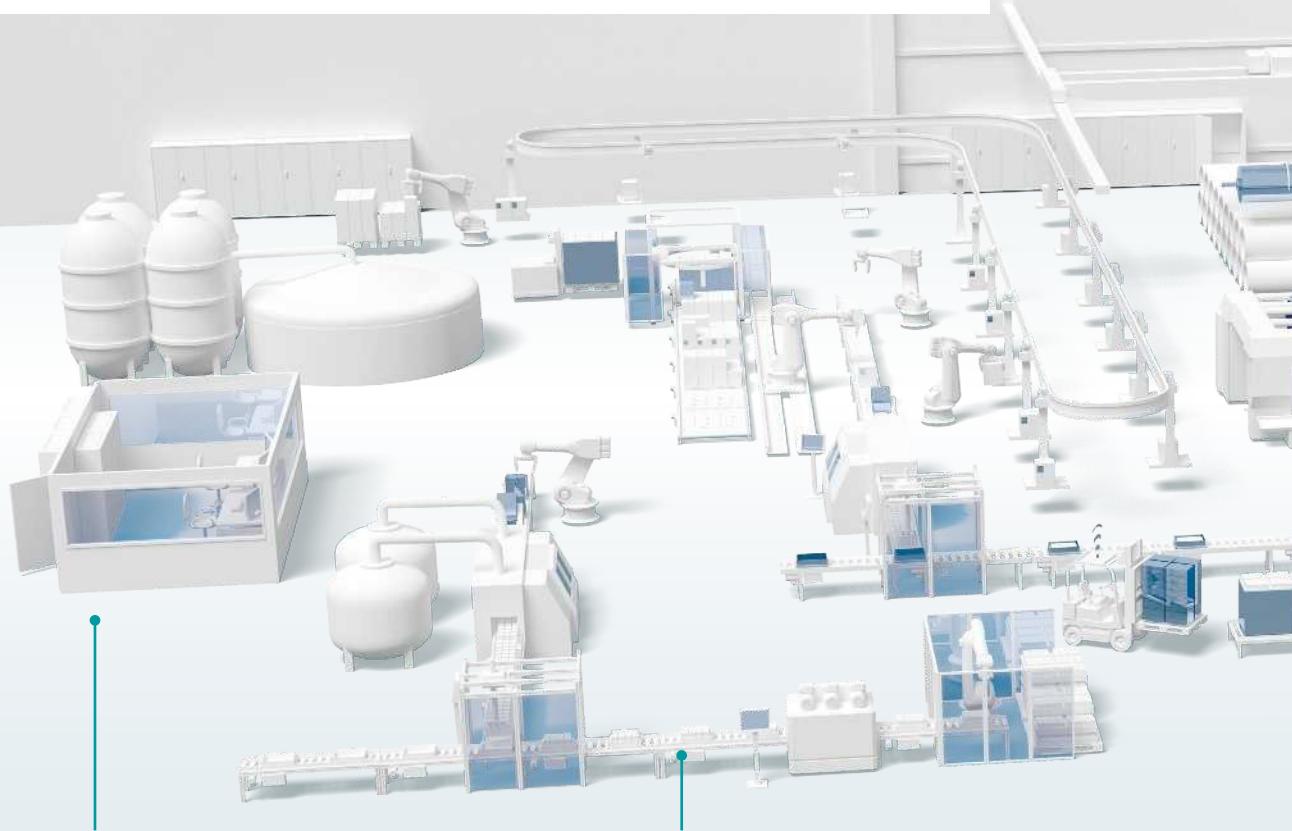
For detailed information, use the web codes provided in this brochure. Simply enter # and the four-digit number in the search field on our website.

Web code: #1234 (example)

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

Networked production

Highly productive and efficient production requires well structured, high-performance, and secure network infrastructure. The ideal concept and the right components protect your system against automation system failures and costly downtimes. With industrial network products from Phoenix Contact you can easily implement the high requirements of your production network in a future-proof manner. As well as the appropriate products, we also offer you support in planning your production network optimally.



High-availability production network

Without high-performance and robust network infrastructure, modern production no longer works. The ideal concept protects your system against costly failures. We offer the right redundancy solutions, from simple media redundancy through to parallel network structures.

Integration of machines

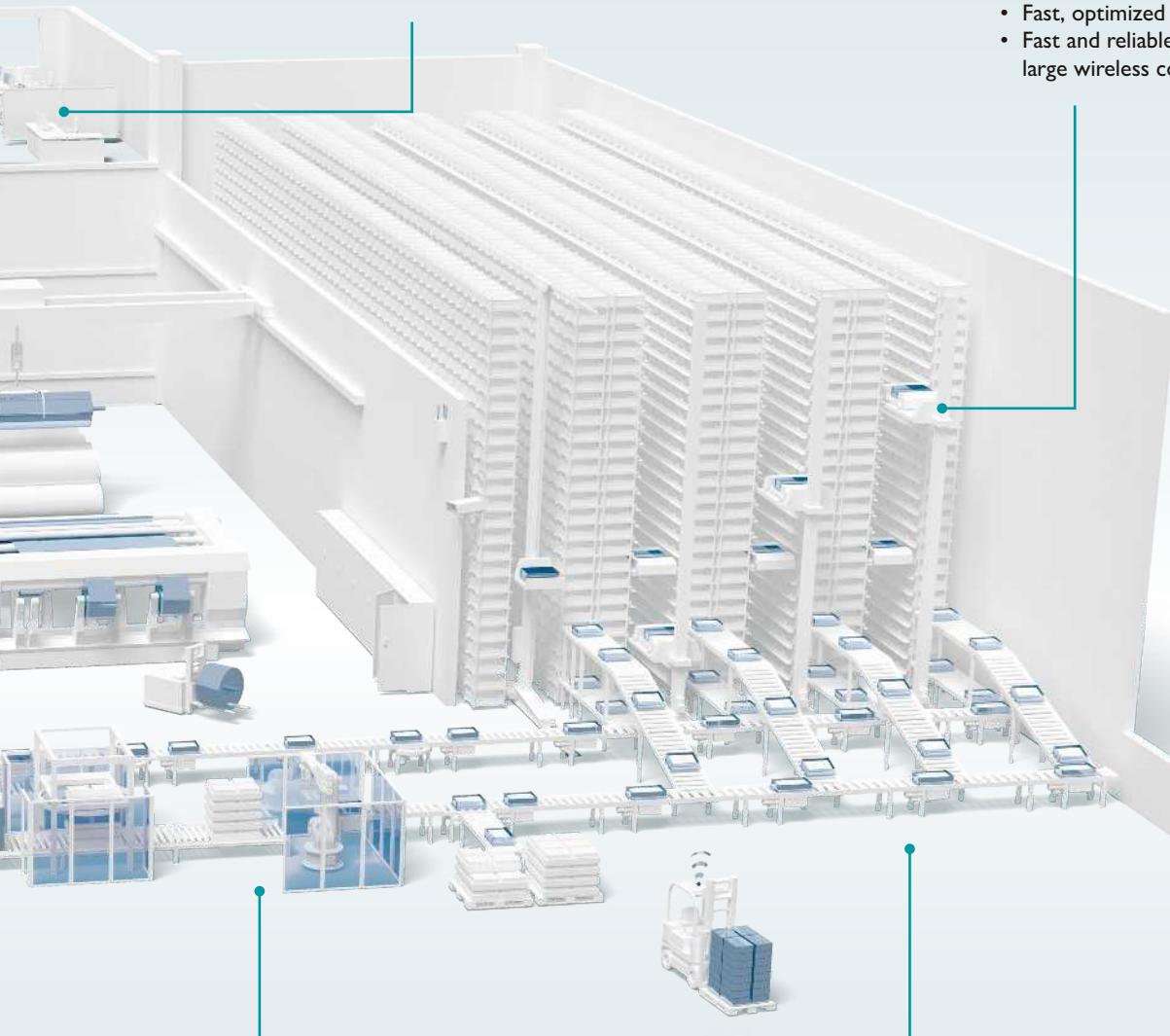
When integrating third-party machines into the production network, challenges such as IP address conflicts or different IP networks must be solved. We offer

- High-performance routing solutions between various subnetworks
- A simple solution to IP address conflicts with 1:1 NAT

Connection to the company network

When it comes to communication between company and production networks, different, sometimes contradictory requirements come into conflict with one another. We offer:

- Seamless integration through support of automation and IT standards
- High-performance and failsafe solutions
- Consistent communication between the different Ethernet subnetworks



Cyber security

In networked systems, secure protection against unauthorized access by people or malware is essential. We offer:

- Products and solutions for secure system networks according to IEC 62443 and ISA-99
- Secure access solutions for external service engineers via the Internet
- Industrial virus protection for Windows control systems

Network management

In order to detect problems in the production network prior to an actual failure, you must monitor your production network on a continual basis. However, if a failure does occur, the diagnostic data gathered helps you to swiftly find the error and eliminate it. We offer network management software for visualization and network configuration.

Communication with mobile systems

Communication with unmanned transport systems and warehouse shuttles requires a reliable and uninterrupted wireless LAN connection. We offer:

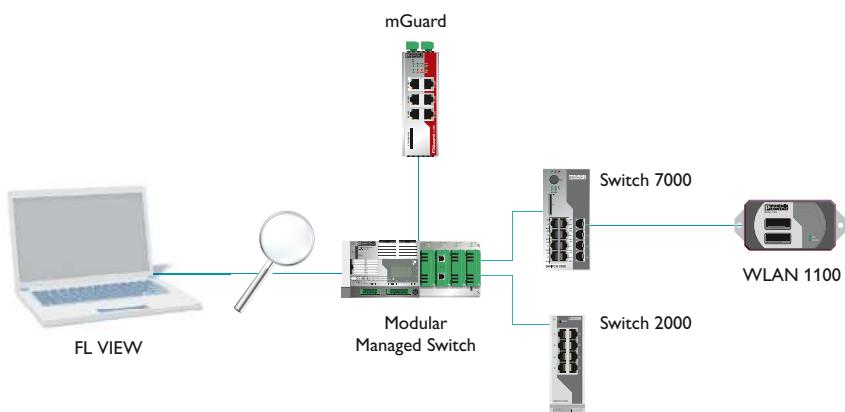
- Fast, optimized roaming
- Fast and reliable WLAN availability with large wireless coverage

Solutions for the production network

Network management

The visualization software enables you to display the network structure and devices clearly. Long-term monitoring means that even past events and temporary problems can be analyzed. With network management software, you can also centrally assign IP addresses for network devices, configure them, and update the firmware.

Further information on software on page 61

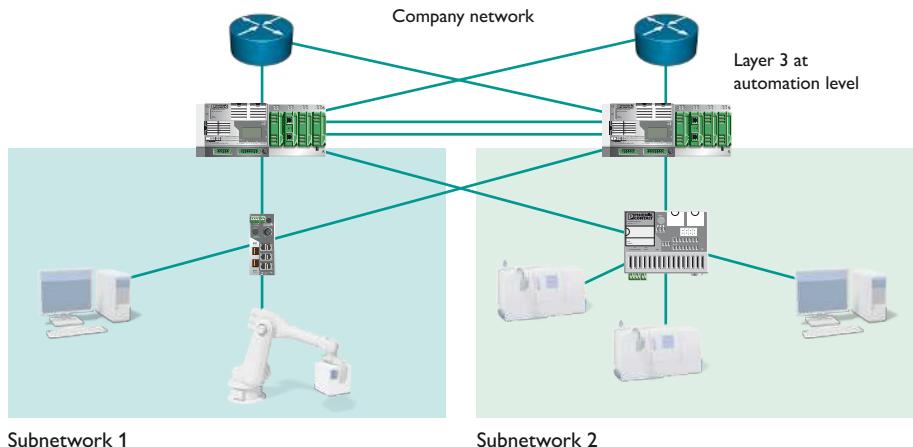


Network visualization with FL VIEW software

High-performance and failsafe connection to the company network

The Virtual Router Redundancy Protocol (VRRP) allows you to redundantly connect your routers to the company network. Gigabit performance ensures high data throughput, while support of IT standards provides seamless integration (e.g., VLAN, SNMP, RSTP). For consistent communication between up to 28 different IP subnetworks, you can use the Layer 3 function.

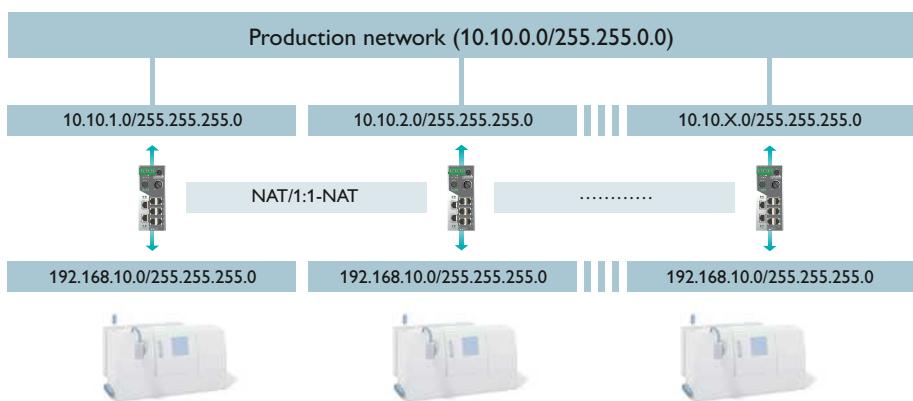
Further information on Modular Managed Switches on page 33



Integration of machines with the same IP address

Machines and their devices have their own, permanently configured IP addresses. When integrated into higher-level production networks, IP address conflicts may therefore occur. However, you do not need to adjust the IP addresses to the production network, which is a time-consuming task. Our NAT switches or mGuard routers easily translate the address areas within the machine to the desired IP address area in the higher-level automation network.

Further information on NAT switches on page 32 and mGuard security routers on page 48



Automatic IP address translation, thanks to switches with NAT function

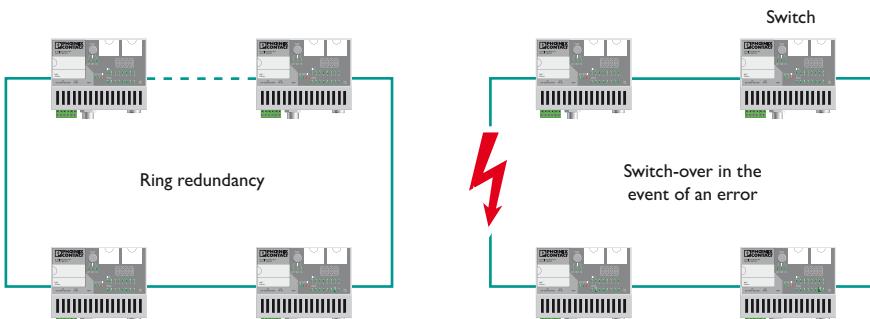
High network availability due to network redundancy

Fast redundancy switch-over ensures the uninterrupted operation of automation networks in the event of connection failure.

We offer:

- DLR (Device Level Ring) for EtherNet/IP™ networks
- MRP (Media Redundancy Protocol) for PROFINET networks
- RSTP (Rapid Spanning Tree Protocol) for standard industrial IT networks

Further information on Managed Switches from page 28

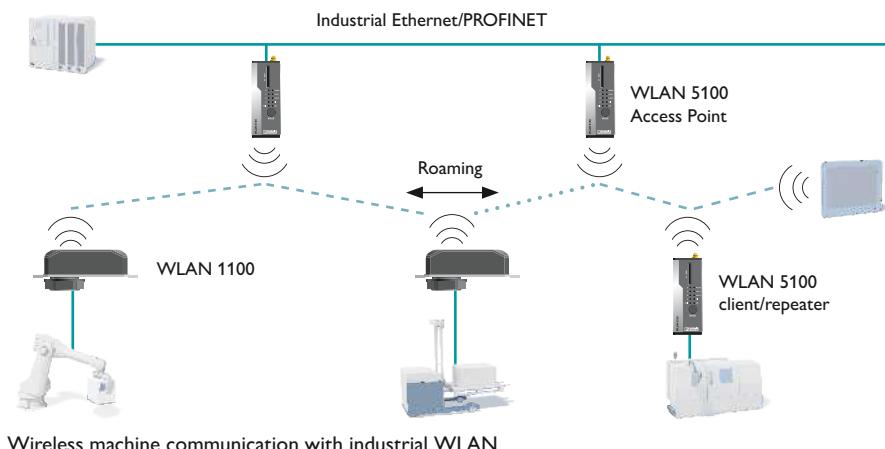


If an error occurs, the network structure is reorganized so that all devices can be reached again

Reliable wireless LAN solution for mobile systems

WLAN products from Phoenix Contact offer optimized roaming and enable wireless cells to be changed in a matter of milliseconds. Realtime communication between the controller and carry system is thus ensured, even in data-intensive applications. Observance of the 802.11n standard as well as use of MIMO antenna technology also ensure stable communication in the industrial environment.

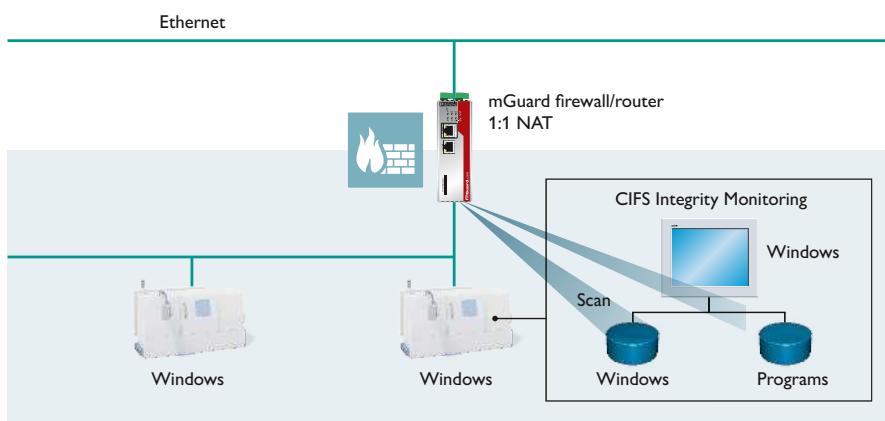
Further information on industrial WLAN on page 45



Industrial mGuard security solutions

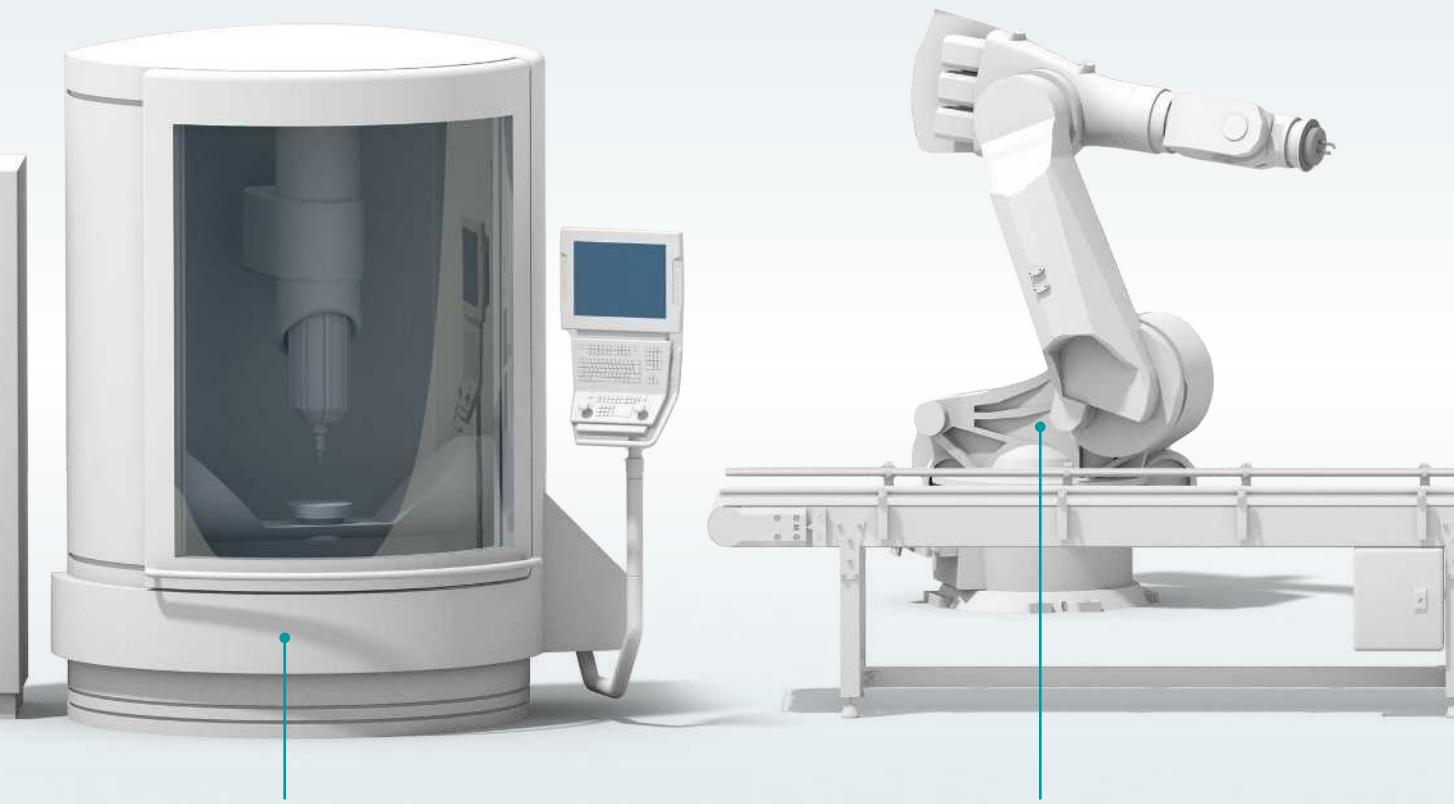
The mGuard firewall routers securely protect your network against hazards that result from increased networking. Firewall rules based on user authentication and the conditional firewall enable person, company, and situation-dependent activation of different firewall rules. CIFS Integrity Monitoring detects anomalies on Windows control computers.

Further information on mGuard security routers on page 48



The networked machine

Today, modern production machines are often networked in various ways. Whether it be with the Internet for remote maintenance, the company network for exchanging production data or with other machines and I/O systems for automated production. However, greater networking also means larger networks, more communication and increasing security requirements. Phoenix Contact offers you industrial Ethernet solutions and components specially tailored to machine networks, which can be used to tackle not just today's but also future requirements.



Central network configuration and monitoring

In order to start up network components quickly and easily, central network management software is needed. We provide easy, central configuration of components, initial IP address assignment as well as a fast and simple firmware update.

Stable machine networks

The number of Ethernet devices in the machine network continues to rise. In order to guarantee stability and availability in the future as well, intelligent networks are needed for automatic error detection and troubleshooting. We offer intelligent switches for growing networks.

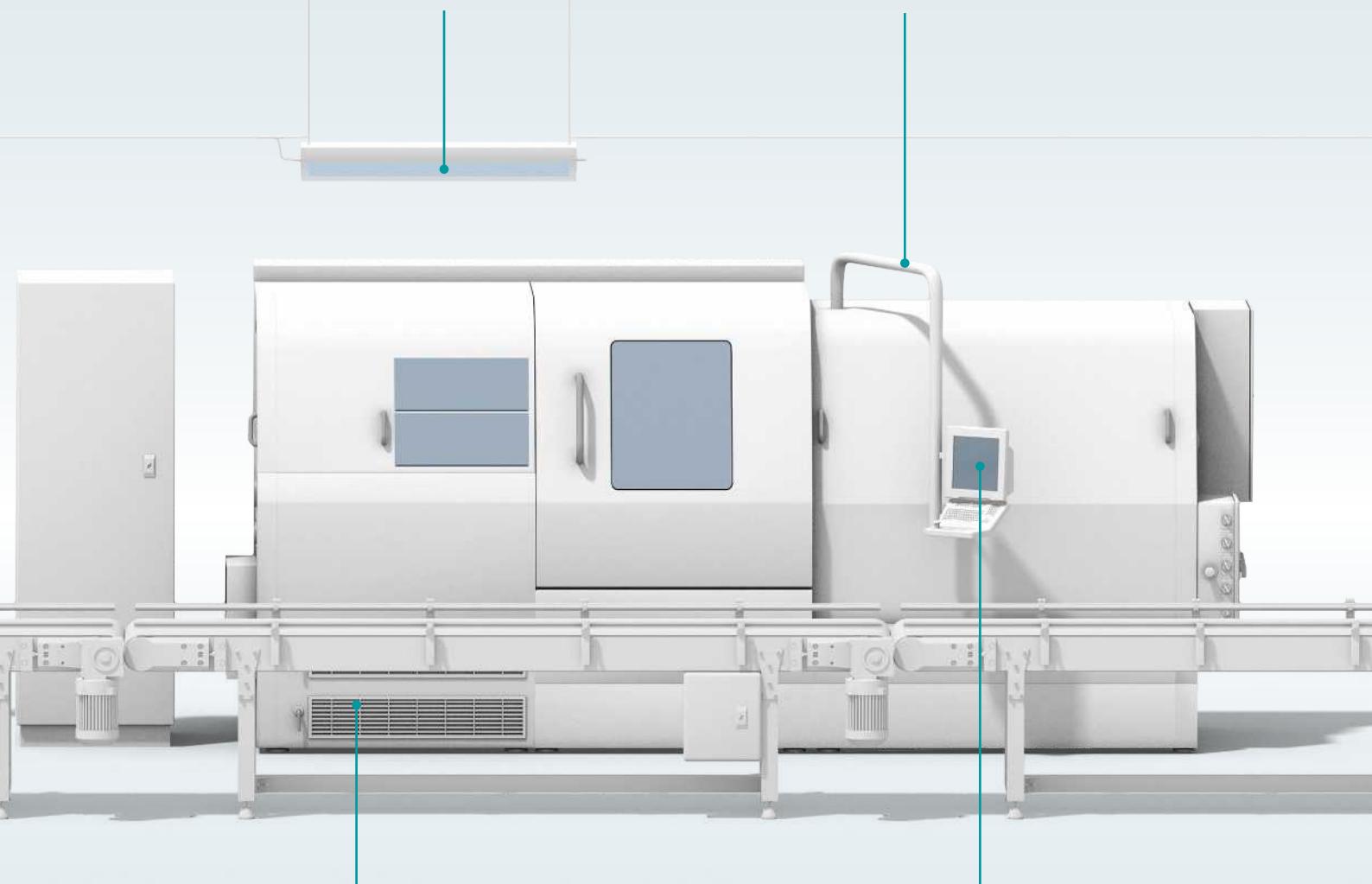
Realtime-capable control network

For realtime communication in PROFINET and EtherNet/IP™ control networks as well as optimum integration into the engineering systems, the use of high-performance automation switches is a prerequisite. We offer network components for PROFINET RT, IRT, and EtherNet/IP™.

Easy and secure remote maintenance

Simple and secure access to the machine network is a prerequisite for fast and efficient service. We offer:

- A remote maintenance solution for different operator networks and security standards
- Easy connection via the mGuard Secure Cloud
- Maximum security, thanks to IPsec and VPN



Operation with smart devices

The current trend is to use tablets or smart glasses to set up and operate machines or for visual support. WLAN access to the machine network is therefore a basic requirement. We offer Access Points with integrated antennas, extensive and reliable wireless reception as well as solutions for simple password management.

Integration into the production network

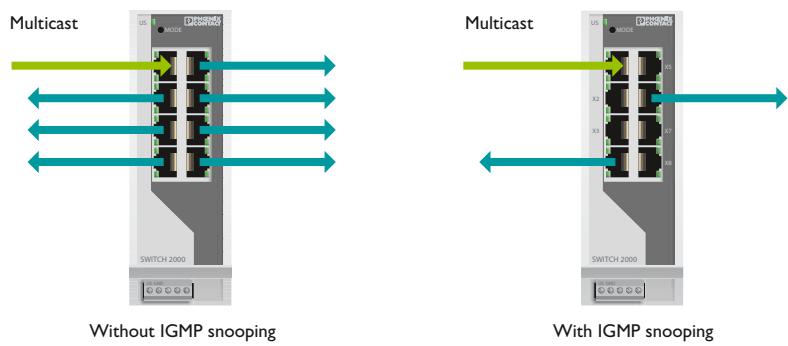
Today, machines are often integrated into a higher-level network. In spite of transparent data exchange, unauthorized access and undesired communication load must be prevented. We offer secure data exchange with the company network, protect the machine against undesired network load, and enable integration into any production networks without IP address adaptation.

Solutions for the machine and system network

Stable machine networks

Intelligent switches offer extensive configuration and monitoring options for the machine network. In doing so, the data load in the network is reduced using multicast filter functions. Redundancy mechanisms maintain communication even in the case of undesired loops or device failures.

Further information on switches for growing networks from page 28

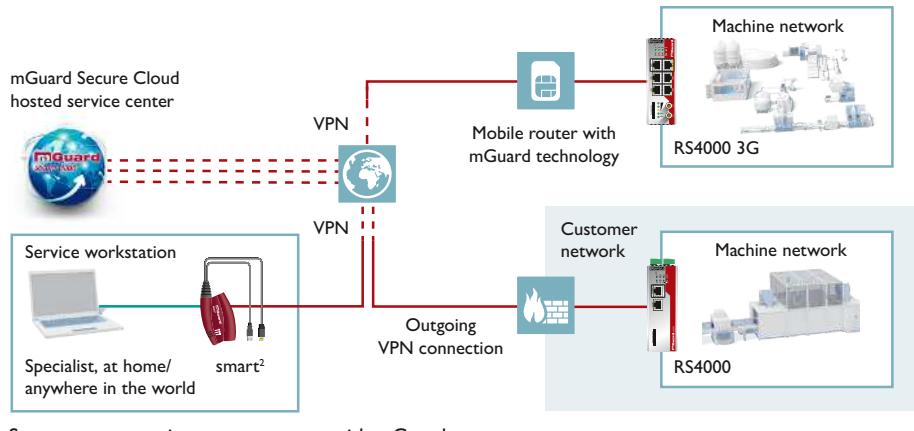


Multicast filters reduce the data load in the network

Easy and secure remote maintenance

mGuard Secure Cloud offers machine builders and system manufacturers a turnkey complete VPN solution, which enables secure remote maintenance without special IT knowledge – from a simple VPN Cloud Client to an extensive security solution including remote maintenance. The wide range of remote maintenance components means that the highly varied requirements of the network operator can be fulfilled.

Further information on secure remote maintenance on page 52

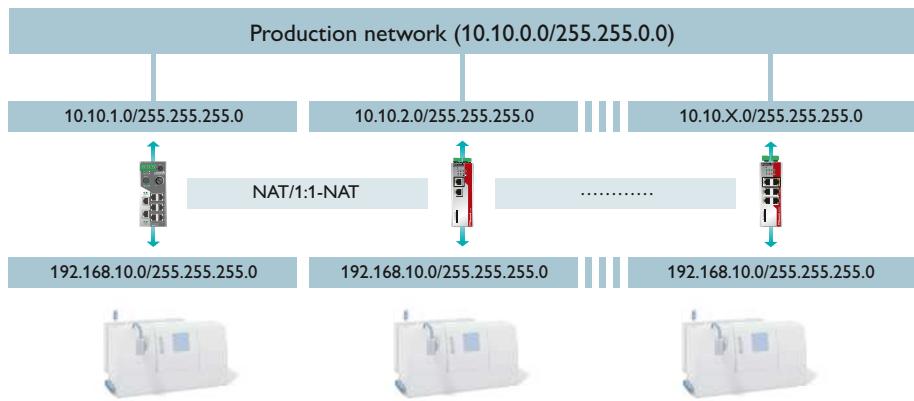


Secure remote maintenance concept with mGuard components

Secure integration into the production network

Machine connection via an NAT or security router enables transparent communication and protects the machine network against unwanted communication at the same time. Faults and threats from the production network are effectively kept away from the machine network. The availability and realtime capability of internal machine communication is thus ensured.

Further information on NAT switches on page 32 and mGuard security routers on page 48



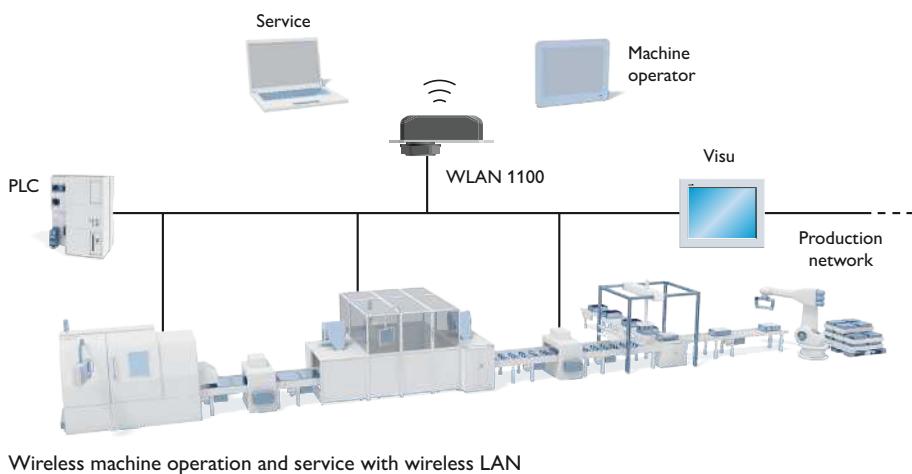
Machine connection with NAT and security routers

Machine operation with smart devices

Users should be able to connect their smart devices to the machine network as easily as possible. However, if the WLAN password is known and has not been changed in a long time, this also allows third parties uncontrolled access to the machine network.

The WLAN 1100 wireless module enables automated key management through the machine control system. This means that secure WLAN machine access can be easily implemented.

Further information on industrial WLAN on page 45

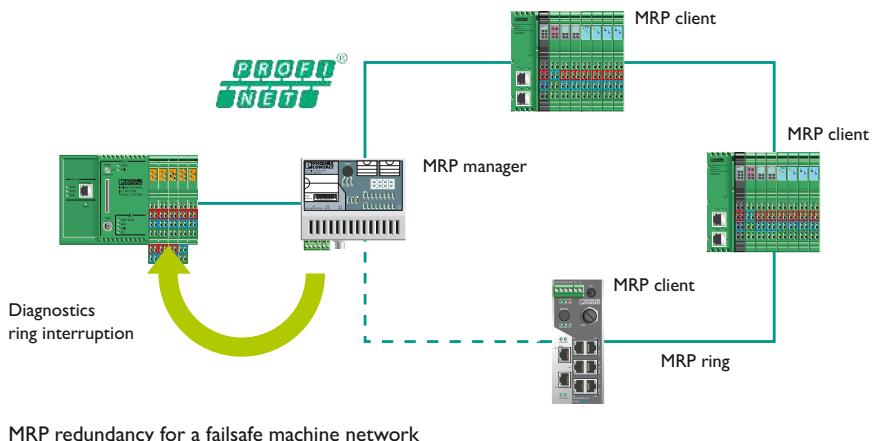


Realtime-capable control network

Automation switches combine IT functions with managed and realtime properties which optimally support PROFINET and EtherNet/IP™ protocols. They ensure stable and realtime-capable communication.

The integrated, fast redundancy methods, such as the Device Level Ring (DLR) for EtherNet/IP™ and the Media Redundancy Protocol (MRP) for PROFINET, prevent the control process from being adversely affected even in the case of device failure.

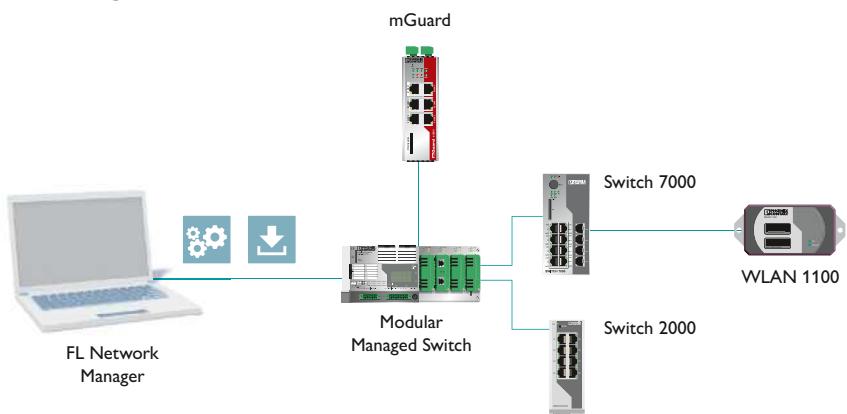
Further information on managed automation switches on page 28/29



Central network configuration and monitoring

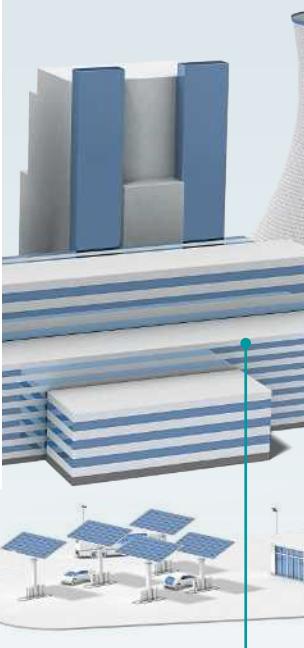
Following installation and cabling of the network devices, the central configuration and monitoring of the Phoenix Contact network components can be quickly and easily performed with the FL Network Manager software. This can be done individually or based on prepared machine projects, thereby simplifying configuration and startup for series machine builders in particular.

Further information on software on page 60/61



Networked infrastructure

In today's industry, virtually all plants are networked via Ethernet. High requirements are placed on the network infrastructure and network components used. Continuous network availability, support of application-specific standards and communication protocols, bridging of large distances, and reliable operation under harsh ambient conditions are just some of the requirements. In particular, to protect communication against attacks and tampering, protected network solutions are required. Phoenix Contact offers network solutions and components for secure and reliable networking of your systems.



High-availability networks for energy systems

The IEC 61850 standard stands for global standardization in regard to communication and engineering processes in energy systems. We offer network components for use under the harshest electromagnetic, electrostatic, and climatic ambient conditions in accordance with IEC 61850-3/IEEE 1613. Parallel network redundancy with PRP guarantees maximum availability.

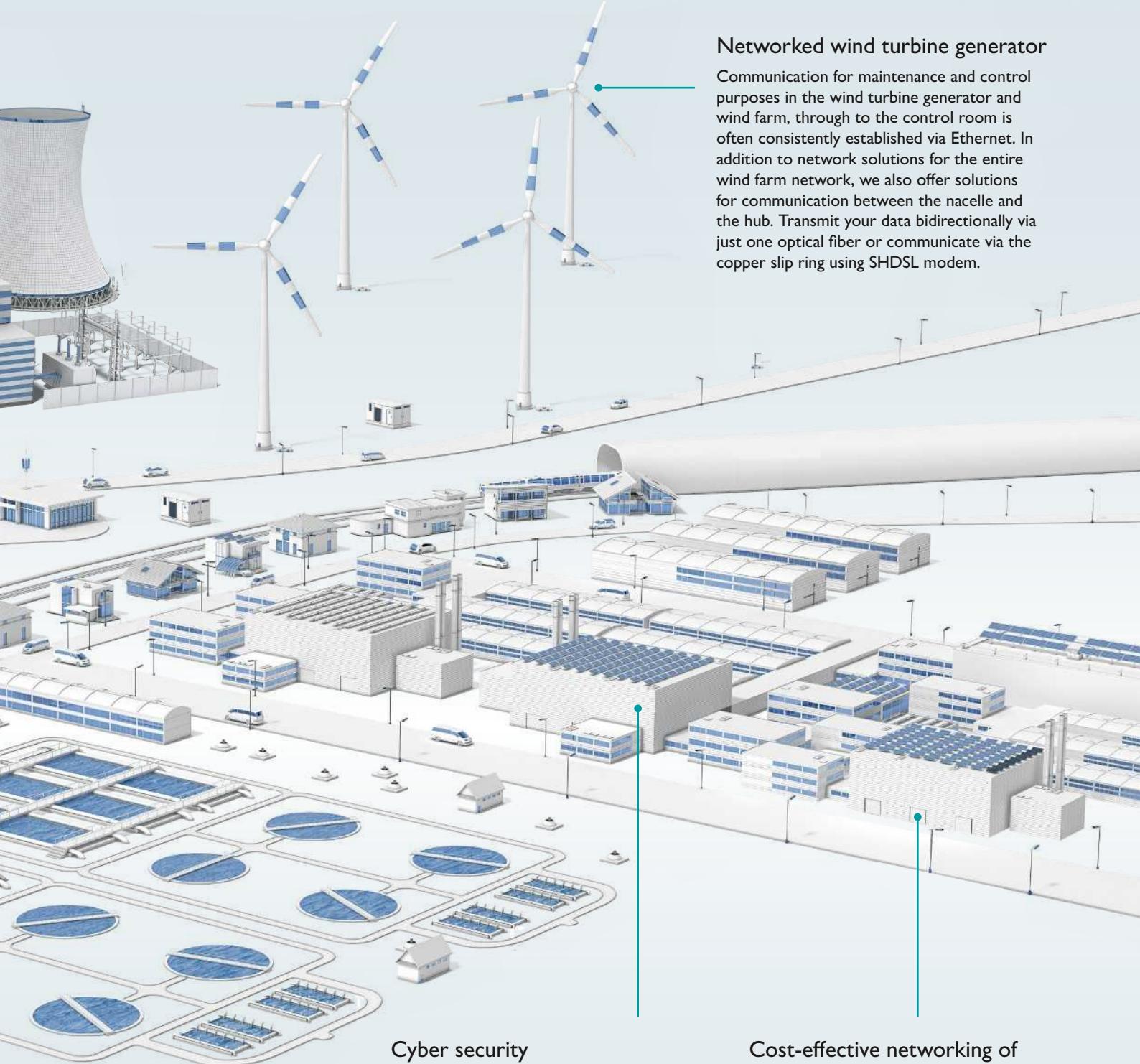


Network availability

In critical infrastructures, interference-free and failsafe communication even across large distances is a fundamental requirement. We offer robust switches with an extensive range of IT functions and fast redundancy mechanisms, which ensure uninterrupted communication in the event of connection failure.

Power over Ethernet

The installation of distributed network devices in the system, such as surveillance cameras or WLAN Access Points, can be extremely time consuming due to the long transmission paths. Here, Power over Ethernet technology considerably reduces cabling effort.



Networked wind turbine generator

Communication for maintenance and control purposes in the wind turbine generator and wind farm, through to the control room is often consistently established via Ethernet. In addition to network solutions for the entire wind farm network, we also offer solutions for communication between the nacelle and the hub. Transmit your data bidirectionally via just one optical fiber or communicate via the copper slip ring using SHDSL modem.

Cyber security

In particular, for communication in large-scale networked systems, special protective measures are required to prevent unauthorized access or tampering. We offer extensive mGuard security solutions, such as Deep Packet Inspection for the highest possible level of security in communication and help you to effectively plan a secure network.

Cost-effective networking of large IP networks

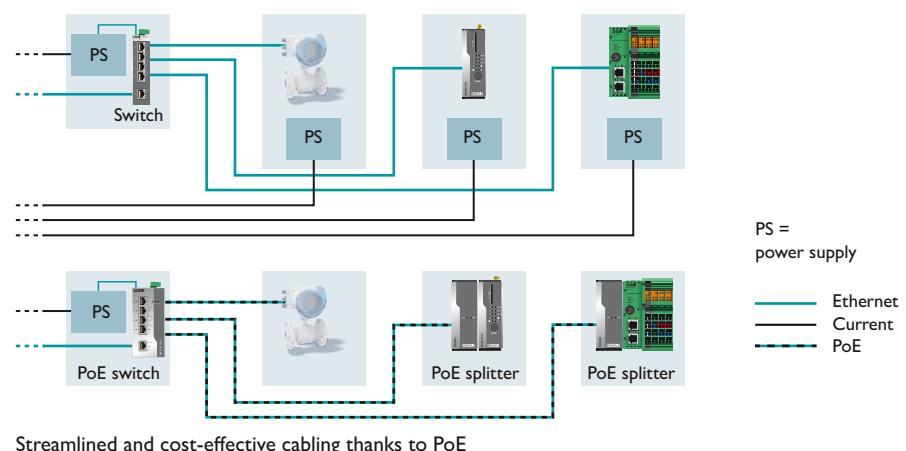
In extensive applications, subsequent networking for process data acquisition presents an economic challenge. Using existing, in-house copper wires in combination with Ethernet extenders is an inexpensive alternative to new installations.

Solutions for infrastructure networks

Power over Ethernet

In the case of Power over Ethernet (PoE), data and energy are transmitted over a standard Ethernet cable. This considerably reduces the cabling effort for the network devices installed in the field, such as surveillance cameras or WLAN Access Points. PoE is standardized in IEEE 802.3 and thus non-proprietary use is supported. Thanks to PoE splitters, you can also supply standard Ethernet devices with energy via PoE.

Further information on Power over Ethernet on page 42

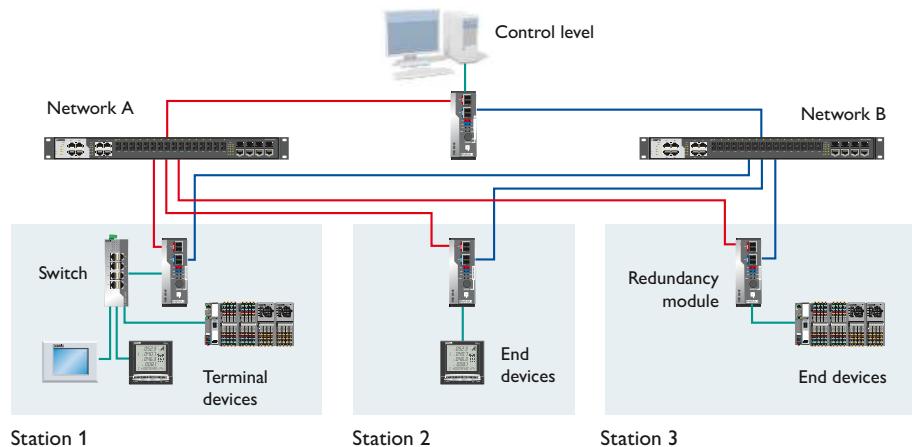


Streamlined and cost-effective cabling thanks to PoE

Parallel network redundancy with PRP

PRP network redundancy is based on two independent, active network paths between two devices. The transmitter uses two independent network interfaces that both send out the same data simultaneously. The redundancy control protocol therefore makes sure that the recipient only uses one data packet and discards the second. If just one packet is received, the recipient knows that a failure has occurred on the other path.

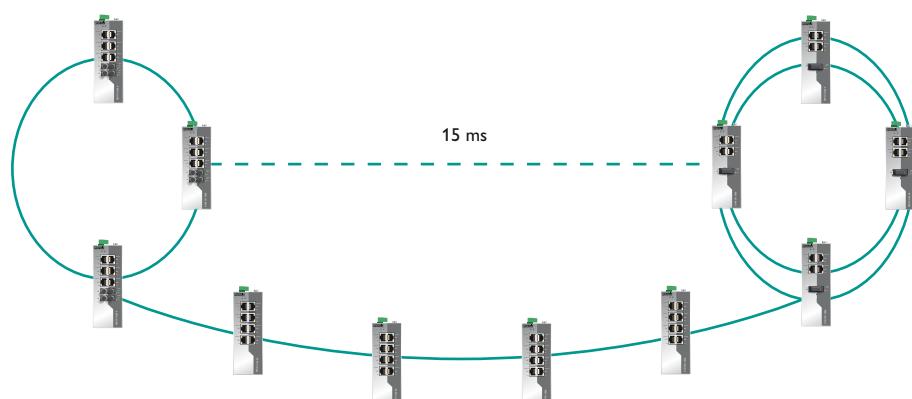
Further information on PRP redundancy modules on page 31



Extended ring redundancy for high network availability

In critical infrastructure applications, the extended ring redundancy offers a quick redundancy switch-over in the event of connection failure. This enables a switching time (recovery time) of a maximum of 15 ms for up to 200 devices in one ring. Up to three linked rings with up to 600 switches are also supported. Dual redundant rings enable maximum fault tolerance.

Further information on Managed Switches from page 28

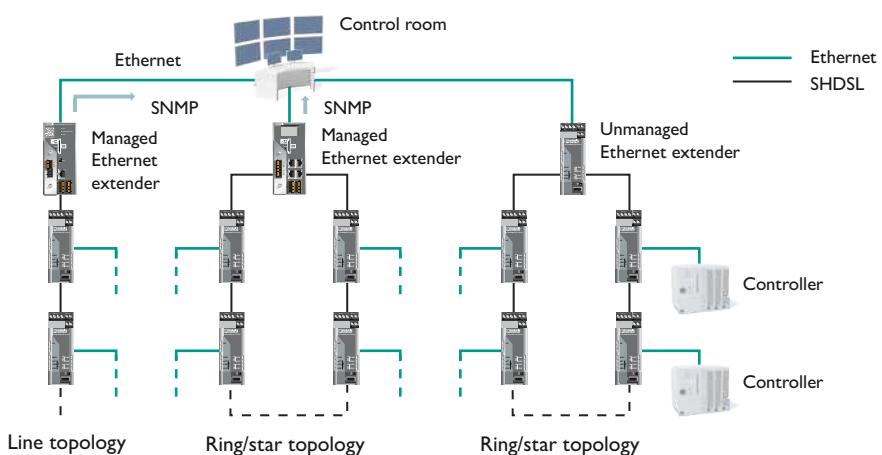


Extended ring redundancy for minimal switching times

Cost-effective networking of large IP networks

Thanks to managed Ethernet extenders, unmanaged Ethernet extenders can now also be diagnosed centrally via IP. The system generates a warning when unexpected events occur, such as path weakening. Status, warning, and error messages can be forwarded automatically to the control center via SNMP.

Further information on Ethernet extenders on page 53

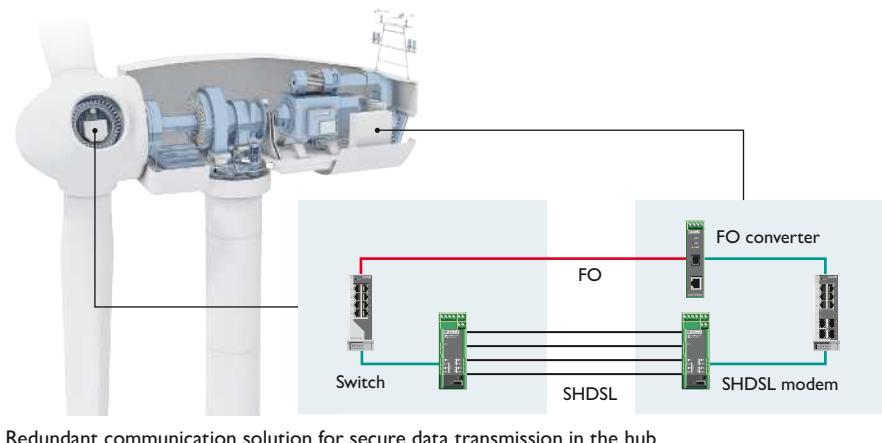


Networked wind turbine generator

With the WDM method, two different wavelengths (1310/1550 nm) enable data to be transmitted and received simultaneously – without limiting the transmission quality or bandwidth. This means that interference-free full duplex communication is possible in rotating applications. SHDSL modems enable double redundancy to be established via the copper slip ring.

Further information on products with WDM technology on page 22, 28, and 39

Further information on modems on page 52

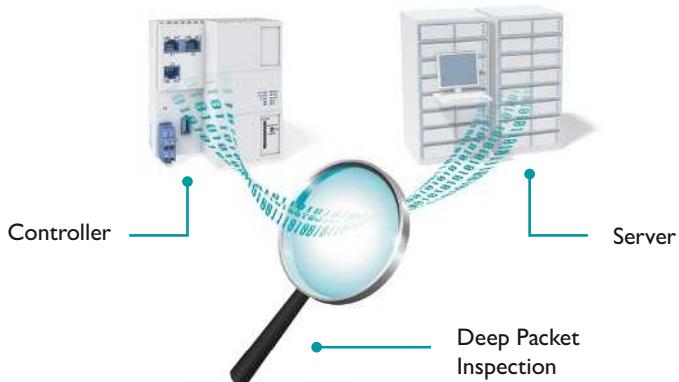


Redundant communication solution for secure data transmission in the hub

Cyber security

With distributed remote control solutions based on our mGuard security routers, you can protect your systems reliably against unauthorized access. In the case of Deep Package Inspection (DPI), the content of the data packet is also checked in addition to IP addresses and port regulation. This increases the safety level in the case of OPC Classic or Modbus/TCP communication, for example.

Further information on mGuard security routers on page 48 and remote maintenance on page 52



Deep Packet Inspection for OPC Classic and Modbus/TCP

The networked process system

Transparent communication from the sensor through to the control center is a prerequisite for optimum control of continuous processes in process engineering systems.

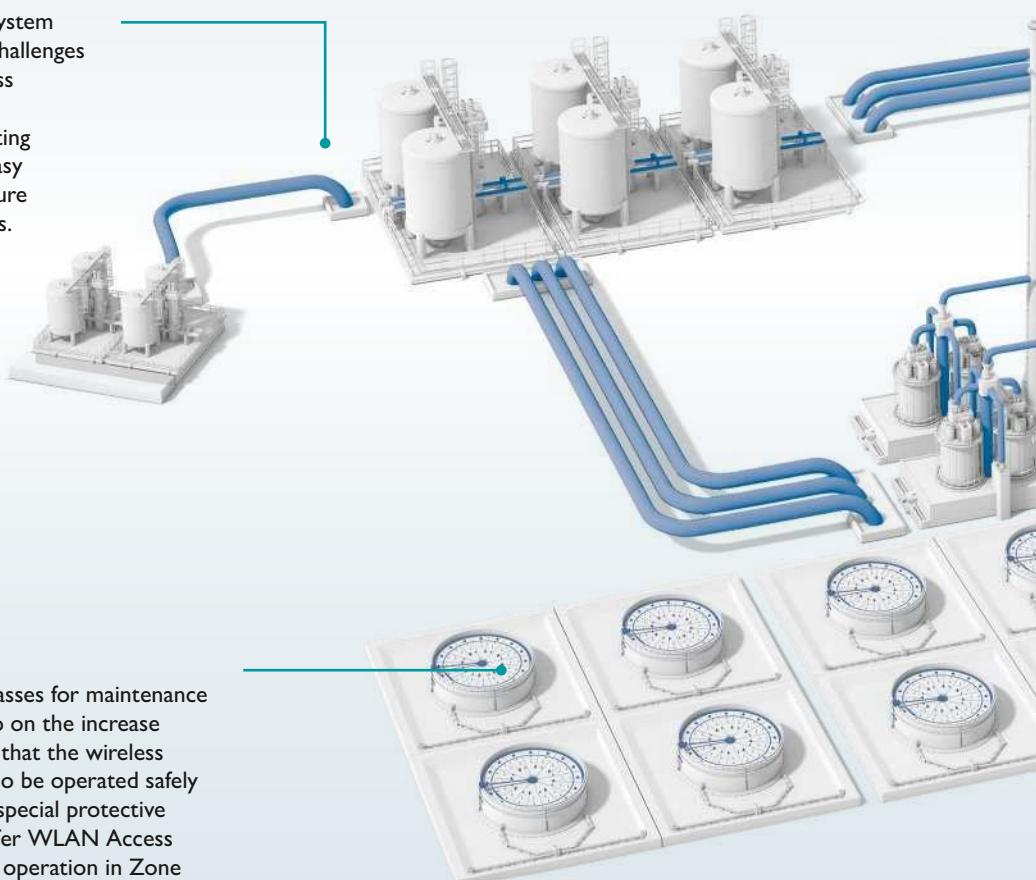
Therefore, robust, high-availability, and secure Ethernet networks are increasingly becoming the basis for communication in modern process systems. Secure protection against unauthorized access by people or malware is a must.

Phoenix Contact offers industrial Ethernet solutions and components for high-performance and secure networking of process systems.



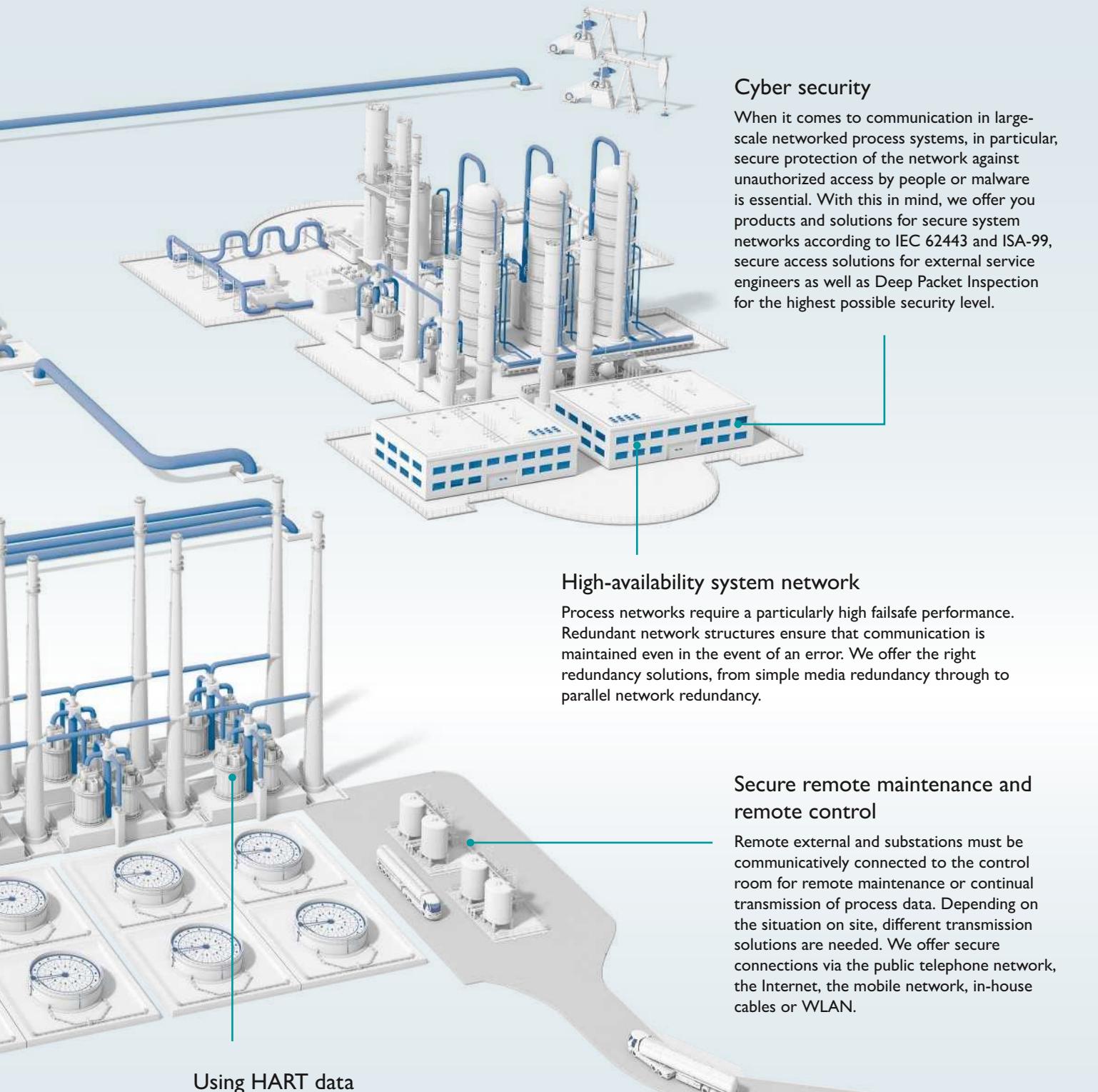
Integration of modular systems

When it comes to integrating new, modular system parts into the system network, a number of challenges need to be overcome. These include IP address conflicts or secure Internet access for remote maintenance. We offer high-performance routing solutions between various subnetworks, an easy solution for IP address conflicts as well as secure remote maintenance of individual system parts.



WLAN in the Ex area

The use of tablets or smart glasses for maintenance and diagnostic purposes is also on the increase in process systems. To ensure that the wireless Ethernet infrastructure can also be operated safely in potentially explosive areas, special protective measures are required. We offer WLAN Access Points, which are designed for operation in Zone 2 or can be mounted directly in control cabinets, thanks to integrated antennas.



Cyber security

When it comes to communication in large-scale networked process systems, in particular, secure protection of the network against unauthorized access by people or malware is essential. With this in mind, we offer you products and solutions for secure system networks according to IEC 62443 and ISA-99, secure access solutions for external service engineers as well as Deep Packet Inspection for the highest possible security level.

High-availability system network

Process networks require a particularly high failsafe performance. Redundant network structures ensure that communication is maintained even in the event of an error. We offer the right redundancy solutions, from simple media redundancy through to parallel network redundancy.

Secure remote maintenance and remote control

Remote external and substations must be communicatively connected to the control room for remote maintenance or continual transmission of process data. Depending on the situation on site, different transmission solutions are needed. We offer secure connections via the public telephone network, the Internet, the mobile network, in-house cables or WLAN.

Using HART data

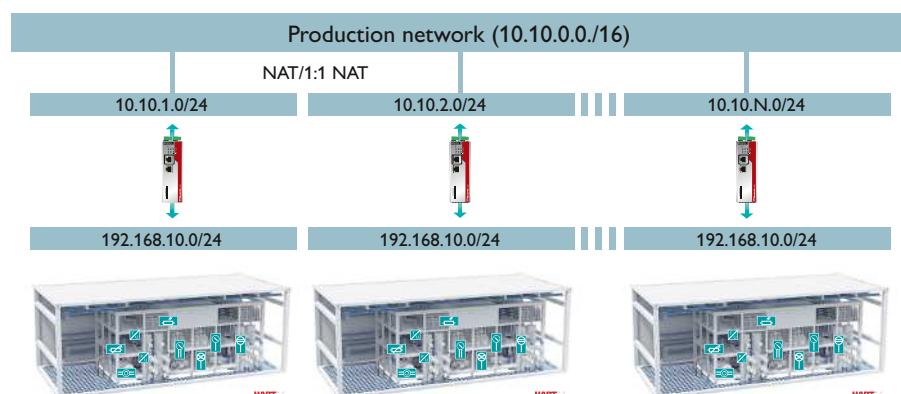
Today, HART is the most widely supported protocol standard in the process industry. We provide interface converters for integrating HART devices into your Ethernet network. For smooth processing, you can transmit the otherwise slow HART signals at Ethernet speed to the control system.

Solutions for process networks

Solution to IP address conflicts

Modular system parts and their devices have their own permanently configured IP addresses. When integrated into higher-level system networks, this can therefore cause IP address conflicts. To avoid the time-consuming process of adapting IP addresses to the production network, NAT switches or mGuard routers can easily translate the address areas within the machine to the desired IP address area in the higher-level automation network.

Further information on NAT switches on page 32 and mGuard security routers on page 48

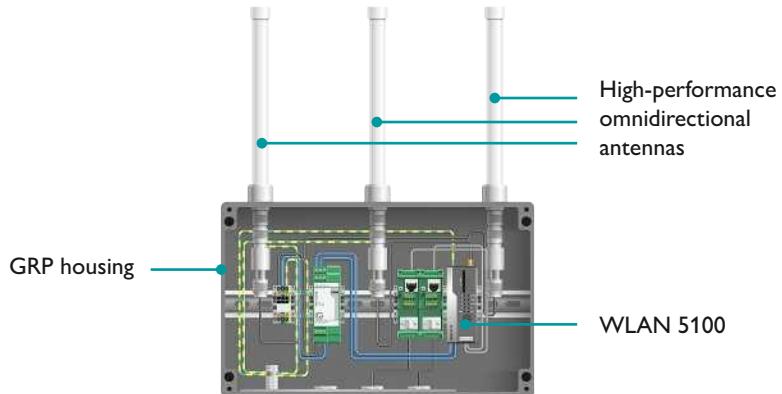


Access to system parts with the same IP addresses, thanks to 1:1 NAT function

WLAN in potentially explosive areas

You can also benefit from the advantages of well-established industrial WLAN products from Phoenix Contact in potentially explosive areas. In addition to compact WLAN modules for direct mounting on control cabinets and systems, we offer ready-made WLAN Access Point solutions for potentially explosive areas.

Further information on industrial WLAN on page 45

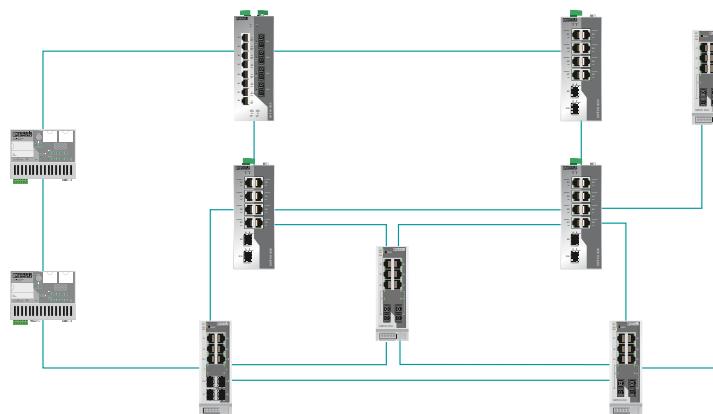


WLAN solutions for potentially explosive areas

Rapid Spanning Tree for high-availability systems

RSTP is a standardized redundancy method (IEEE 802.1D-2004) which is supported by virtually all Managed Switches from Phoenix Contact. It supports ring and tree topologies and meshed networks. Special extensions include Fast Ring Detection for faster switching times and Large Tree Support for networks with up to 57 devices.

Further information on Managed Switches from page 28

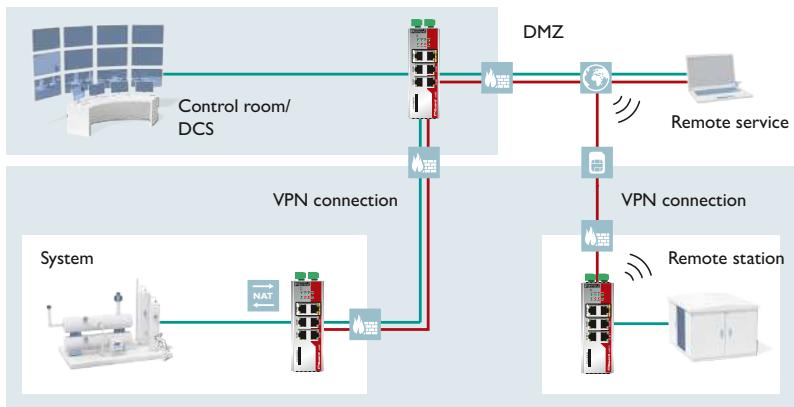


RSTP redundancy for high network availability

Cyber security

The mGuard firewall routers securely protect your network against many hazards that result from increased networking. Reliably protect your system parts against unauthorized access by using secure VPN connections with integrated firewall. Deep Packet Inspection (DPI) also inspects the content of data packets and increases the safety level in the case of OPC Classic or Modbus/TCP communication.

Further information on mGuard security routers on page 48

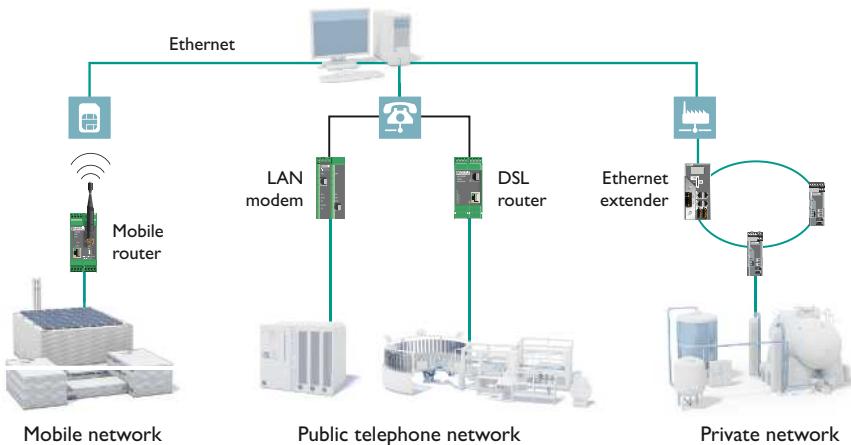


Protection of process systems with mGuard technology

Remote communication

Various communication methods are available for data transmission to remote or widespread networks or for monitoring systems all over the world. Communicate wirelessly at high speed via the mobile networks, access remote network devices via the telephone network, which is available worldwide, or use in-house cables for transmission speeds of up to 30 Mbps.

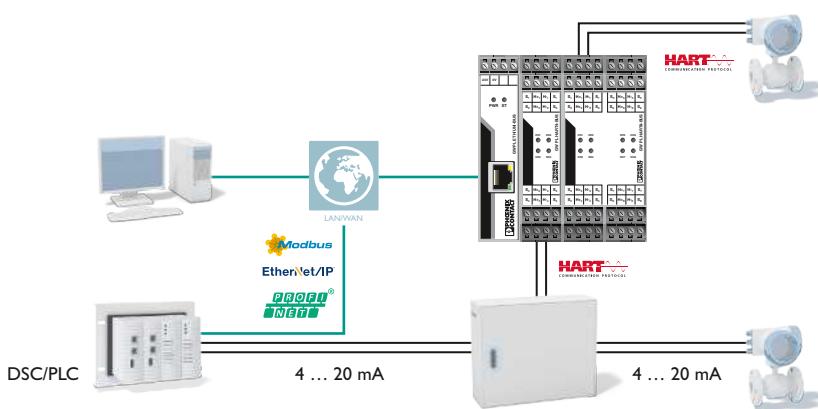
Further information about remote communication from page 52



Using HART data

Ethernet HART multiplexers are an easy and cost-effective option for converting HART signals into Ethernet-based protocols. You can connect up to 40 HART devices via your own HART master. This enables communication at Ethernet speed. The modular design provides a scalable solution for modern distributed control systems and phased roll-outs.

Further information on HART multiplexers on page 57



HART multiplexers can also be easily retrofitted in existing systems

Hubs: the quick and easy solution for Powerlink and FL Net

The industrial hubs are repeaters that are compliant with the IEEE 802.3 Ethernet standard and are best suited to automation applications with Powerlink or FL Net.

All components feature DIN rail mounting, a compact design, high electromagnetic compatibility, redundant power supply, and a wide temperature range. The hubs do not have to be configured and are transparent in the network.

 Web code: #1549



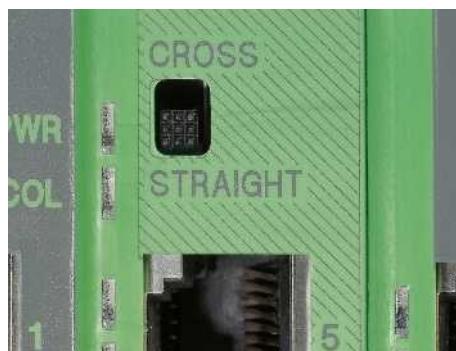
Hubs product overview

Hubs/repeaters				
Features	Copper ports	Port speed	Designation	Order No.
Supply voltage: 18.5 ... 30.5 V DC, temperature range: 0°C ... +60°C, certifications: CUL, CUL-EX LIS, UL, UL-EX LIS, KC, EAC				
	8 x RJ45	10/100 Mbps	FL HUB 8TX-ZF	2832551
	16 x RJ45	10/100 Mbps	FL HUB 16TX-ZF	2832564



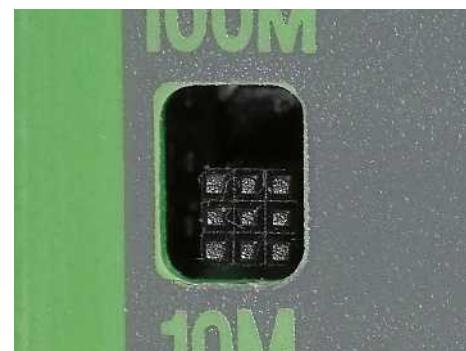
Repeater function

Thanks to the switchable outcross port, the hubs can be connected together directly and thus enable the connection of up to 44 end devices in a collision domain.



Outcross port

You can use the outcross port to cascade several hubs. This eliminates the need for crossed cables.



Data rate

The unique feature that enables the hubs to be switched from 10 to 100 Mbps means that they can be adapted to the transmission speed of the end devices.

Your advantages

- Create large networks cost-effectively thanks to hubs that are available with up to 16 ports
- Variable use thanks to selectable transmission speed
- Easy cascading with standard cables
- Fast data processing thanks to short latency

Media converters for conversion to fiber optics

For maximum immunity to interference and transmission ranges in industrial Ethernet applications, fiberglass media converters transparently convert Ethernet data to fiber optics. The media converters allow you to bridge distances up to 40 kilometers depending on your choice of device and cable.

The extended temperature range means that it can be used for numerous industrial applications. In addition to this, the media converters offer comprehensive diagnostic options, thereby increasing system availability.

 Web code: #1269



For standard applications

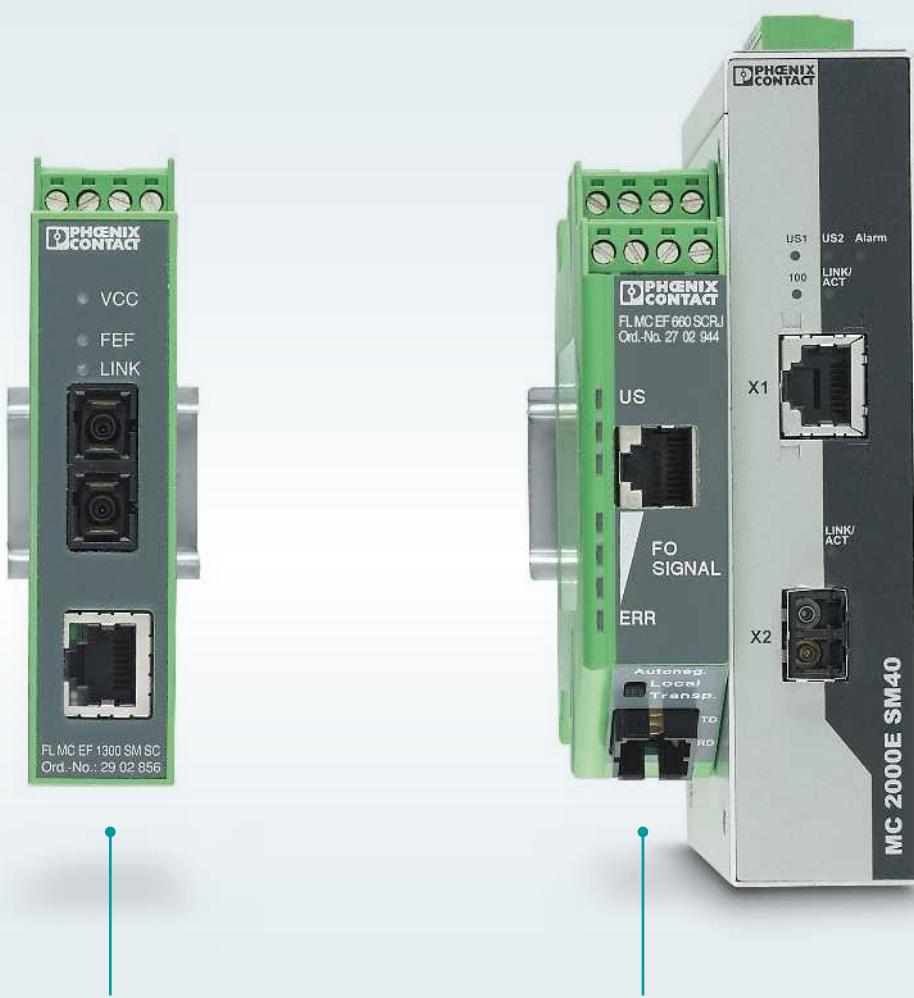
Class 1000 media converters are designed for applications with basic requirements. They offer an easy and inexpensive entry-level solution for converting to FO technology in industrial Ethernet networks.

For realtime protocols

Class 2000 media converters are ideal for applications with time-critical Ethernet protocols such as Powerlink, EtherCAT® or Sercos. Thanks to the switch-over to pass through operation, they enable very short delays (latency).

Your advantages

- Maximum immunity to interference and perfect electrical isolation, thanks to optical data transmission
- Maximum transmission distances with an extremely high data rate
- Use in potentially explosive areas – approved for zone 2



With special approvals

Thanks to the ATEX approval and DNV shipbuilding approval, you can use the devices from the FL MC EF class in the process industry, machine building and wind power, through to shipbuilding. With single-mode fiberglass, you can achieve transmission ranges of up to 36 km.

For special applications

We provide perfect solutions, even for special applications such as rotating applications, PROFINET networks or use in the energy industry.

Media converters product overview

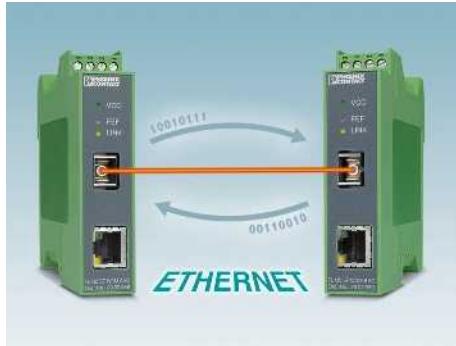
Features	Transmission	Connection method	Range	Light wavelength	Special features	Designation	Order No.			
Media converters for standard requirements										
Temperature range: 0°C ... +60°C, for an easy entry-level solution for converting to FO technology										
	Multimode fiberglass	SC duplex	Up to 9.6 km	1310 nm	Auto negotiation and MDI (x)	FL MC 1000 SC	2891320			
	Multimode fiberglass	B-FOC (ST®)	Up to 9.6 km			FL MC 1000 ST	2891321			
Media converters for realtime protocols										
Supply voltage: 12 ... 48 V DC (redundant), temperature range: -40°C ... +75°C, robust metal housing										
	Multimode fiberglass	SC duplex	Up to 9.6 km	1310 nm	Store-and-forward or pass through mode can be selected via DIP switch with a short latency time of 835 ns. They can therefore be used for realtime Ethernet protocols.	FL MC 2000T SC	2891315			
	Multimode fiberglass	B-FOC (ST®)	Up to 9.6 km			FL MC 2000T ST	2891316			
	Single mode fiberglass	SC duplex	Up to 20 km			FL MC 2000T SM20 SC	2891317			
	Single mode fiberglass	SC duplex	Up to 40 km			FL MC 2000T SM40 SC	2891318			
Media converters with special approvals for explosion protection or shipbuilding										
Temperature range: -40°C ... +65°C, approvals: ATEX, UL, and DNV										
	Multimode fiberglass	SC duplex	Up to 10 km	1310 nm	LFPT and FEF diagnostic functions, auto negotiation and auto MDI (x), backplane bus for redundant or alternative power supply	FL MC EF 1300 MM SC	2902853			
	Multimode fiberglass	B-FOC (ST®)	Up to 10 km			FL MC EF 1300 MM ST	2902854			
	Single mode fiberglass	SC duplex	Up to 36 km			FL MC EF 1300 SM SC	2902856			
Media converters according to IEC 61850-3 and IEEE1613										
Supply voltage: 12 ... 57 V DC (redundant), temperature range: -40°C ... +75°C										
	Multimode fiberglass	LC duplex	Up to 9.6 km	1310 nm	4 kV insulation voltage, high EMC protection	FL MC 2000E LC	2891056			
	Single mode fiberglass		Up to 40 km			FL MC 2000E SM40 LC	2891156			
Media converters for single-fiber transmission										
Temperature range: -40°C ... +65°C, full duplex data transmission on one fiber for rotating applications or saving fiber										
	Multimode and single mode fiberglass	SC simplex	Up to 38 km	1310/1550 nm	Converters A and B	FL MC EF WDM-SET SC	2902660			
					Converter A	FL MC EF WDM-A SC	2902658			
					Converter B	FL MC EF WDM-B SC	2902659			

Features	Transmission	Connection method	Range	Light wavelength	Special features	Designation	Order No.
Media converters for PROFINET, T-coupler							
Perfect electrical isolation over short distances with POF or PCF cable							
	Polymer fiber PCF	SC-RJ	Up to 100 m	660 nm	T-coupler with two FO connections and two RJ45 sockets	FL MC ETH/FO 660 T	2313164
					Single-port media converter	FL MC EF 660 SCRJ	2702944



Technology for every application

Different fiber optic connection technologies for short, medium, and large distances.



One fiber, numerous possibilities

Bidirectional transmission using a single optical fiber for rotating applications.



Continuous diagnostics

Fiber optic diagnostics with LED bar graph for high system availability.

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 provides 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 as transparent as it would be were communication purely copper-based. In the event of a network interruption, the transmission path is switched off. Redundancy mechanisms can be used directly. In the event of an error, this keeps the network load low and increases system availability. 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.

Use in time-critical applications

The FL MC 2000T series devices can switch between the standard store-and-forward operating mode with auto negotiation and the pass through operating mode. This makes it possible to achieve very short delays (latency) of 700 nanoseconds. These devices are therefore ideal for applications with time-critical Ethernet protocols such as PROFINET, Powerlink, EtherCAT, and Sercos.

EtherCAT®



ETHERNET
POWERLINK



SERCOS
the automation bus



PROFI
NET®



Unmanaged Switches

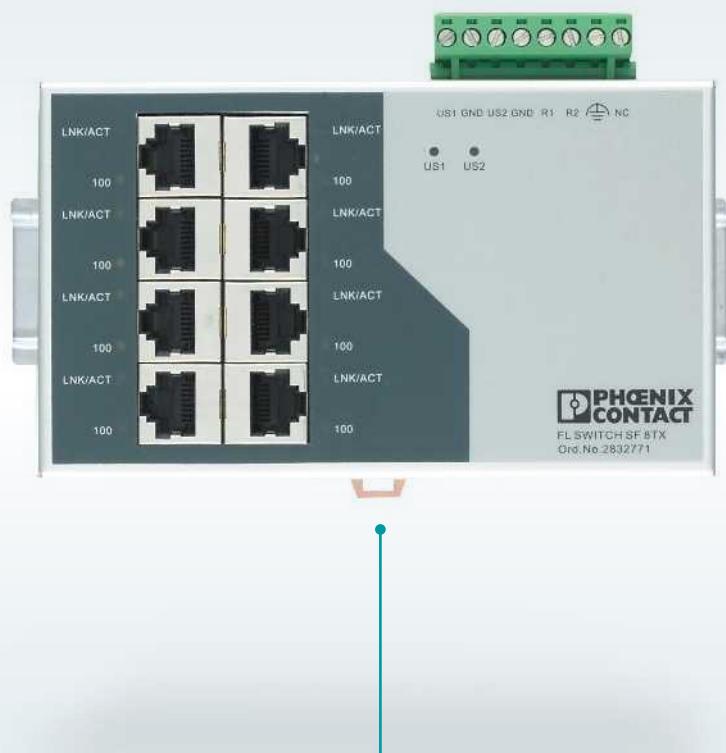
Unmanaged Switches from Phoenix Contact excel with standard functions, a variable number of ports, and various designs. Thanks to a high level of immunity, robust metal housing, and a wide temperature range, they are entirely suitable for industrial applications. Select the right switch for your application.

i Web code: #1550



Cost-optimized for basic applications

Available with 5 or 8-ports and optional fiberglass port, SNFB switches are ideal for small machines and monitoring applications with basic Ethernet functions.



For standard industrial applications

You can choose between ultra flat (SF) and narrow (SFN) devices with 5 to 16 ports. With up to three multimode fiberglass ports with SC or ST connectors, flexibility can be ensured in the network.

In addition, the Gigabit versions of the SFN ensure data transfer that also meets high performance requirements.

Your advantages

- Auto negotiation and autocrossing ensure easy network creation and expansion
- Gigabit variants for high data throughput
- Electrical isolation and fiber optic versions for failure-free operation in industrial environments



For harsh ambient conditions

SFNT devices are designed for use in very demanding applications for the Oil and Gas sector, shipbuilding, and other outdoor applications. All versions with a signal contact and link monitoring have important diagnostic options.



For field applications

Thanks to the unique narrow design and extended temperature range, the IP67 switch is ideal for use in machine building. Innovative SPEEDCON technology also enables easy and fast installation of M12 connections.

Managed Switches: Automation Switches

Communication in automation networks differs from communication in company networks in several key aspects. The switches must be tailored to the specific requirements of industrial environments as well as the automation protocols used there.

Phoenix Contact offers innovative Managed Switches tailored to your system with an optimum performance spectrum. Select the medium, connections, approvals, supported protocols, and scope of functions to suit your needs.



For growing networks

The 2000 series Managed Switches offer clear configuration and diagnostics options as well as automatic error detection and troubleshooting. Alongside a wider range of functions, the 2200 and 2300 versions also offer communication via fiberglass and approvals for the maritime sector or process industry.

Web code: #1551



For PROFINET Class B

The Smart Managed Switches offer excellent realtime properties with high data throughput. They are ideal for use in a PROFINET RT or EtherNet/IP™ environment. Through support of Fast Ethernet or Gigabit on all ports, they can be integrated into IT realtime services, such as video or voice-over IP.

Web code: #1552

Your advantages

- Easy integration into existing networks and flexible redundancy for all topologies thanks to the RSTP standard
- High availability thanks to rapid redundancy switch-over through fast ring detection
- Diagnostics and analysis options thanks to integrated software functions
- Varied connection methods for high flexibility



For PROFINET IRT

FL SWITCH IRT switches offer optimum realtime properties for PROFINET applications. They detect PROFINET data packets due to their ID and relay these data packets with the highest priority. The polymer fiber ports can form interference-free fiber optic rings that can be diagnosed – optionally with an additional fiber optic branch.

i Web code: #1553

Optimized for EtherNet/IP™

The 7000 series Managed Switches support the Device Level Ring (DLR) redundancy mechanism. The switch is integrated directly into the ring and provides you with the option to connect up to six devices to it. Thanks to the Common Industrial Protocol (CIP), the FL SWITCH 7000 switches can be fully integrated into your EtherNet/IP™ control system.

i Web code: #1554

Managed Switches: industrial IT switches

The 3000 series Managed Switches offer you optimum performance and availability for demanding infrastructure applications. They support a range of IEEE standards and IT functions for consistent integration into your network structures. The 4000 series also enables high-performance Gigabit data transmission and is therefore particularly well suited to connecting distributed devices in the field to the control level. For use in energy systems, versions are also available according to IEC 61850-3 and IEEE 1613.

 Web code: #1555



For standard applications

Switches from the 3000 and 4000 series are perfectly suited to challenging infrastructure applications. Thanks to rapid redundancy switch-over in less than 15 ms, they ensure a high level of availability. Fiber optic versions facilitate error-free communication over large distances. Special attention has been paid to user-friendly operation and configuration.

For high network availability

The PRP redundancy modules enable parallel network redundancy without switching time in case of failure and ensure high availability for your network.

They are suitable for use under the harshest electromagnetic, electrostatic, and climatic ambient conditions in accordance with IEC 61850-3/IEEE 1613.



For energy systems

The E-versions of the series 3000 and 4000 switches are even suitable for use under the harshest ambient conditions according to IEC 61850-3 and IEEE 1613. Thanks to the extended temperature range, impact resistance, shock resistance, and vibration resistance, the fanless switches are particularly robust. The products are resistant to electrostatic discharge (ESD), fast, transient disturbances (burst), surge voltages (surge), and magnetic fields.

Managed Switches: routers and Layer 3 switches

With industrial routers and Layer 3 switches from Phoenix Contact, you can integrate machines, production systems or entire subnetworks into your higher-level company network. The switch with NAT routing function combines the properties of a Managed Switch with those of a 1:1 NAT router – in a single DIN rail device. The Managed Switches with a modular design form the backbone of your automation application.

 Web code: #1556

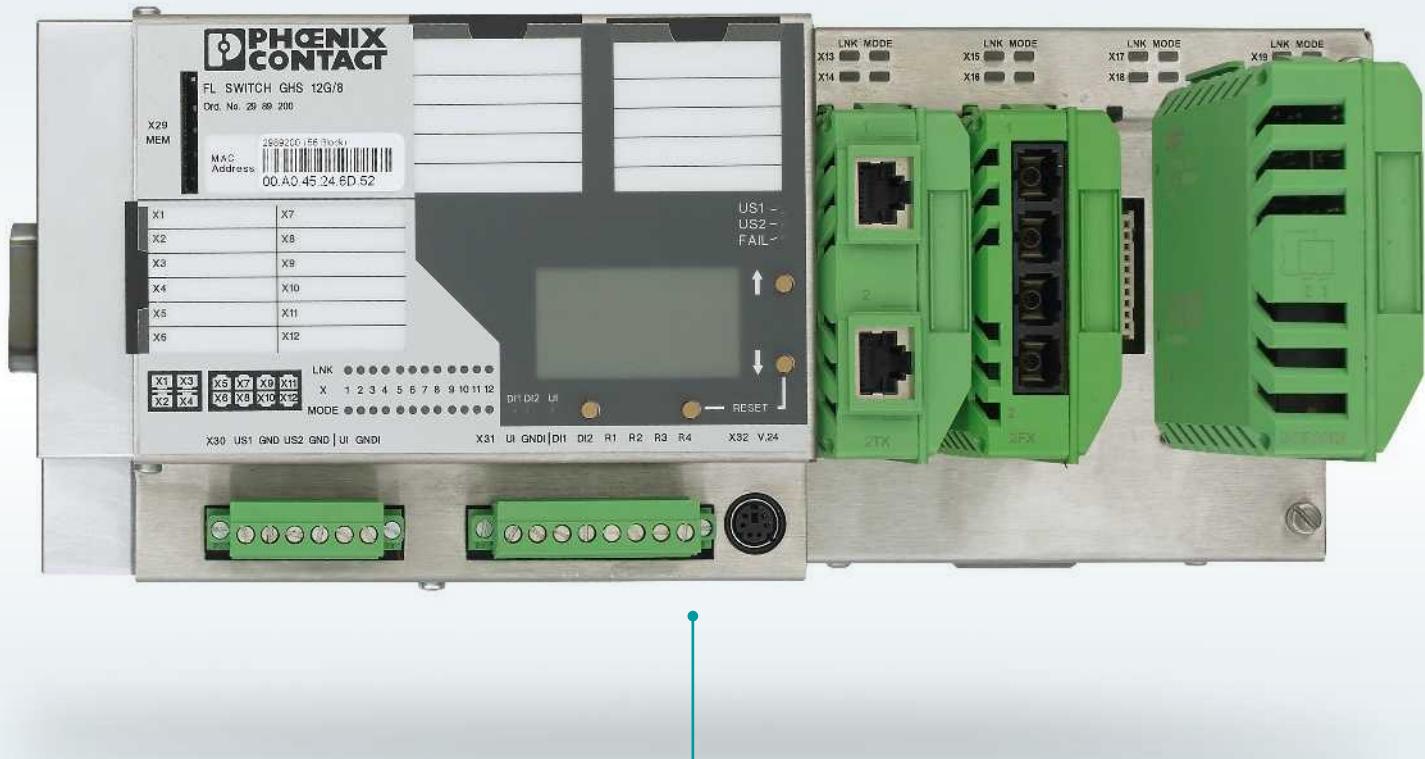


For easy integration into the network

The FL NAT SMN NAT switch offers you switch functions and NAT routing in just one DIN rail device. The network devices communicate via seven LAN ports within the machine. The eighth port is used as the WAN port for the connection to the higher-level company network.

Your advantages

- Optimum network structure, thanks to segmentation via Layer 3 switches
- Easy connection of machines to the production network irrespective of the address area
- Integration of systems with the same IP address areas into higher-level networks, thanks to switch with NAT function
- Connection of several subnetworks via various different types of media, thanks to Layer 3 function and wide range of media



For the most demanding requirements

Our most powerful switch is the Modular Managed Switch. As a Gigabit switch with optional Layer 3 function, it is particularly suitable for use as an automation backbone and for connection to the higher-level company network. A large range of combinable media modules as well as use in PROFINET RT and EtherNet/IP™ offer maximum flexibility.

Switches overview

Switches				
				
	Unmanaged Switches Page 36	2000/2100 class switches Page 38	2200/2300 class switches Page 38	3000 class switches Page 40
Port speed (Mbps)	10/100/1000	10/100/1000	10/100/1000	10/100
Alarm contact/alarm output	(●)	–	●	●
Filter functions				
Quality of Service	(●)	●	●	●
VLAN	–	●	●	●
Multicast/IGMP snooping	–	●	●	●
Redundancy				
Rapid Spanning Tree Redundancy (RSTP)	–	●	●	●
Fast Ring Detection (FRD)	–	–	●	–
Large Tree Support	–	–	●	–
Extended ring redundancy 15 ms	– / –	–	–	●
MRP manager/client	– / –	– / ●	● / ●	– / –
Management functions				
Address Conflict Detection (ACD)	–	●	●	–
Port configuration, statistics, and utilization	–	●	●	●
DHCP server	–	port-based	pool-/port-based, Option 82	–
Link Layer Discovery Protocol (LLDP)	–	●	●	●
Command Line Interface (CLI)	–	●	●	–
Automation protocols				
EtherNet/IP™, extended multicast filtering	–	●	●	–
EtherNet/IP™, CIP	–	–	–	–
PROFINET IO device	–	–	–	–
PROFINET conformance class	(A)	A	A	A
Approvals/certificates				
Maritime approvals	(●)	–	●	–
Ex approvals	(●)	–	●	(●)
IEC 61850-3	(●)	–	–	(●)

– not available, ● available, (●) available in selected models

					
4000/4800 class switches Page 40	Smart Managed Switches Page 38	PROFINET IRT-switches Page 39	7000 class switches Page 39	Modular Managed Switch Page 41	NAT switch Page 41
10/100/1000	10/100/1000	10/100	10/100/1000	10/100/1000	10/100
•	•	•	•	•	•
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A	B	C	A	B	A
–	(•)	–	–	–	(•)
(•)	(•)	–	–	–	–
(•)	–	–	–	–	–

Unmanaged Switches product overview

Features	Copper ports	Fiber optic ports	Port speed	Quality of Service	Special features	Order No.	
Switches with basic function: FL SWITCH SFNB							
Supply voltage: 12 ... 48 V DC, temperature range: -10°C ... +60°C							
	5 x RJ45	–	10/100 Mbps	–	–	2891001	
	4 x RJ45	1 x MM (SC duplex)		–	–	2891027	
		1 x MM (ST)		–	–	2891028	
		1 x SM (SC duplex)		–	–	2891029	
	8 x RJ45	–		–	–	2891002	
	Switches for universal use: FL SWITCH SF						
Supply voltage: 18 ... 36 V DC, temperature range: 0°C ... +55°C							
	8 x RJ45	–	10/100 Mbps	–	–	2832771	
	7 x RJ45	1 x MM (SC duplex)		–	–	2832726	
		1 x MM (ST)		–	–	2832577	
		2 x MM (SC duplex)		–	–	2832933	
	6 x RJ45	2 x MM (ST)		–	–	2832674	
	4 x RJ45	3 x MM (ST)		–	–	2832603	
	16 x RJ45	–		–	–	2832849	
	15 x RJ45	1 x MM (SC duplex)		–	–	2832661	
	14 x RJ45	2 x MM (SC duplex)		–	–	2832593	
Switches for universal use: FL SWITCH SFN							
Supply voltage: 9 ... 36 V DC, temperature range: 0°C ... +60°C							
	5 x RJ45	–	10/100 Mbps	●	–	2891152	
		–		●	With PTCP filter for PROFINET	2891151	
		–		●	12 ... 32 V DC/20-28 V AC	2891021	
		–	10/100/1000 Mbps	●	-25°C ... +75°C	2891444	
	8 x RJ45	–	10/100 Mbps	●	–	2891929	
		–		●	Flow control switched off	2891022	
		–		●	With PTCP filter for PROFINET	2891018	
		–		●	12 ... 32 V DC/20-28 V AC	2891020	
		–	10/100/1000 Mbps	●	-25°C ... +75°C	2891673	
	7 x RJ45	1 x MM (SC duplex)	10/100 Mbps	●	–	2891097	
		1 x MM (ST)		●	Flow control switched off	2891023	
		1 x MM (SC duplex)	10/100/1000 Mbps	●	-25°C ... +75°C	2891518	
		2 x MM (SC duplex)		●	-25°C ... +75°C	2891398	
	6 x RJ45	2 x MM (SC duplex)	10/100 Mbps	●	–	2891314	
		2 x MM (ST)		●	Flow control switched off	2891024	
		–	10/100 Mbps	●	–	2891411	

Features	Copper ports	Fiber optic ports	Port speed	Quality of Service	Special features	Order No.
	6 x RJ45	2 SM (SC duplex)	10/100/1000 Mbps	●	-25°C ... +75°C, 10 km	2891987
	4 x RJ45	1 x MM (SC duplex)		●	-25°C ... +75°C, 20 km	2891563
		1 x MM (ST)	10/100 Mbps	●	–	2891851
	16 x RJ45	–		●	–	2891453
	15 x RJ45	1 x MM (SC duplex)		–	12 ... 48 V DC	2891933
	14 x RJ45	2 x MM (SC duplex)		–		2891934
				–		2891935

Switches for universal use

Supply voltage: 120/220 V AC, temperature range: 0°C ... +55°C



24 x RJ45

–

10/100 Mbps

●

–

2891041

–

10/100/1000 Mbps

●

-25°C ... +75°C

2891057

Robust switches for harsh ambient conditions: FL SWITCH SFNT

Supply voltage: 9 ... 36 V DC, temperature range: -40°C ... +75°C



5 x RJ45

–

10/100 Mbps

●

ATEX, IECEx (Class I, Div. 2)

2891003

–

●

Protective coating

2891043

–

●

PoE, 18 ... 57 V DC

2891064

–

10/100/1000 Mbps

●

–

2891390

–

10/100/1000 Mbps

●

Protective coating

2891391

4 x RJ45

1 x MM (SC duplex)

●

ATEX, IECEx (Class I, Div. 2)

2891004

2 x MM (SC duplex)

●

Protective coating

2891044

8 x RJ45

–

●

ATEX, IECEx (Class I, Div. 2)

2891005

–

●

Protective coating

2891045

–

●

IEC 61850-3, 12 ... 57 V DC

2891065

7 x RJ45

1 x MM (SC duplex)

●

ATEX, IECEx (Class I, Div. 2)

2891006

1 x MM (ST)

●

Protective coating

2891046

6 x RJ45

2 x MM (SC duplex)

●

–

2891025

2 x MM (ST)

●

Protective coating

2891048

16 x RJ45

–

●

–

2891026

15 x RJ45

1 x MM (SC duplex)

●

Protective coating, 2 ... 48 V DC

2891049

14 x RJ45

2 x MM (SC duplex)

●

12 – 48 V DC

2891953

●

2891954

Robust switches with IP67 protection

Supply voltage: 24 V DC, temperature range: -40°C ... +70°C



5 x M12

–

10/100 Mbps

–

With PTCP filter for PROFINET

2700200

Managed automation switches product overview

Features	Copper ports	Fiber optic ports	Combo ports	Port speed	Special features	Designation FL SWITCH...	Order No.			
Switches for universal use: switch 2000										
Supply voltage: 18 ... 32 V DC, temperature range: 0°C ... +60°C, IP20										
	5 x RJ45	–	–	10/100 Mbps	–	2005	2702323			
	8 x RJ45	–	–		–	2008	2702324			
	5 x RJ45	–	–	10/100/1000 Mbps	–	2105	2702665			
	8 x RJ45	–	–		–	2108	2702666			
Supply voltage: 12 ... 57 V DC (redundant), temperature range: -40°C ... +70°C, IP20, approvals: DNV/GL, BV, ABS, LR, RINA, IECEx, ATEX-Zone 2										
  	5 x RJ45	–	–	10/100 Mbps	Digital alarm output, Fast Ring Detection, Large Tree Support, MRP Manager, up to 32 static VLANs, pool-based DHCP server and Option 82	2205	2702326			
	8 x RJ45	–	–			2208	2702327			
	7 x RJ45	1 x MM SC	–			2207-FX	2702328			
		1 x SM SC	–			2207-FX SM	2702329			
	6 x RJ45	2 x MM SC	–			2206-2FX	2702330			
		2 x SM SC	–			2206-2FX SM	2702331			
		2 x MM ST	–			2206-2FX ST	2702332			
		2 x SM ST	–			2206-2FX SM ST	2702333			
		2 x SFX	–			2206-2SFX	2702969			
	4 x RJ45	2 x SFX	2 x SFX/RJ45			2204-2TC-2SFX	2702334			
	8 x RJ45	–	–	10/100/1000 Mbps		2308	2702652			
	6 x RJ45	2 x SFP	–			2306-2SFP	2702970			
	4 x RJ45	2 x SFP	2 x SFP/RJ45			2304-2GC-2SFP	2702653			
Switches for PROFINET Class B: Smart Managed Switches										
Supply voltage: 18 ... 32 V DC (redundant), temperature range: 0°C ... +60°C, IP20										
	8 x RJ45	–	–	10/100 Mbps	PROFINET preset	SMN 8TX-PN	2989501			
	6 x RJ45	2 x MM FX-SC	–		–	SMN 6TX/2FX	2989543			
		2 x SM FX-SC	–		–	SMN 6TX/2FX SM	2989556			
		2 x POF SC-RJ	–		–	SMN 6TX/2POF-PN	2700290			
	4 x RJ45	–	–	10/100/1000 Mbps	PROFINET preset	SMCS 4TX-PN	2989093			
	–	–	SMCS 8TX			2989226				
	8 x RJ45	–	–		PROFINET preset	SMCS 8TX-PN	2989103			
		–	–		–	GL, BV, ABS, LR, DNV, and ATEX Zone 2	SMCS 8GT			
	6 x RJ45	2 x SFP	–		–	SMCS 6TX/2SFP	2989323			
		2 x SFP	–		GL, BV, ABS, LR, DNV, and ATEX Zone 2	SMCS 6GT/2SFP	2891479			
	16 x RJ45	–	–	10/100 Mbps	Extended temperature range: -40°C ... +70°C	SMCS 16TX	2700996			
	14 x RJ45	2 x MM FX-SC	–	10/100 Mbps		SMCS 14TX/2FX	2700997			
		2 x SM FX-SC	–	10/100 Mbps		SMCS 14TX/2FX-SM	2701466			

Features	Copper ports	Fiber optic ports	Combo ports	Port speed	Special features	Designation FL SWITCH...	Order No.
Switches for PROFINET IRT							
Supply voltage: 18.5 ... 30.2 V DC (redundant), temperature range: -25°C ... +60°C, IP20							



4 x RJ45	–	–	10/100 Mbps	–	IRT 4TX	2700689
2 x RJ45	2 x POF SC-RJ	–		–	IRT 2TX 2POF	2700691
1 x RJ45	3 x POF SC-RJ	–		–	IRT TX 3POF	2700692
		–	IP67		IRT IP TX/3POF	2700697

Switches for EtherNet/IP: Switch 7000

Supply voltage: 12 ... 58 V DC (redundant), temperature range: -40°C ... +70°C, IP20, DLR, CIP



8 x RJ45	–	–	10/100 Mbps	–	7008-EIP	2701418
6 x RJ45	2 x MM SC	–		–	7006/2FX-EIP	2701419
5 x RJ45	1 x MM SC 2 x SM SC	–		–	7005/FX-2FXSM-EIP	2701420
4 x RJ45		–	10/100 Mbps or 10/100/1000 Mbps	2 x Gigabit combo ports	7004-2TC-2GC-EIP	2702175
		–		4 x Gigabit combo ports	7004-4GC-EIP	2701553
6 x RJ45	–	2 x SFP or RJ45		2 x Gigabit combo ports	7006-2GC-EIP	2701554

Features	Port	Transmission speed	Transmission length	Wavelength	Special features	Designation FL SFP...	Order No.
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Accessories: SFP modules



LC MM	100 Mbps	2 km	1310 nm	–	FX	2891081
LC SM		40 km		–	FX SM	2891082
LC SM (WDM)	20 km	1310/1550 nm	WDM module A	FE WDM20-A	2702437	
		1500/1310 nm	WDM module B	FE WDM20-B	2702438	
		1310/1500 nm, 1550/1310 nm	WDM module A and B	FE WDM20-SET	2702439	
LC MM	1000 Mbps	1 km	850 nm	–	SX	2891754
		2 km	1310 nm	–	SX2	2702397
		30 km		–	LX	2891767
LC SM	80 km	1550 nm	Long haul	–	LH	2989912
		1310/1550 nm	WDM module A	WDM10-A	2702440	
		1550/1310 nm	WDM module B	WDM10-B	2702441	
LC SM (WDM)	10 km	1310/1500 nm, 1550/1310 nm	WDM module A and B	WDM10-SET	2702442	
		100 m	–	–	GT	2989420

Managed industrial IT switches product overview

Features	Copper ports	Fiber optic ports	Combo ports	Port speed	Special features	Designation FL SWITCH...	Order No.	
Switches for infrastructure applications: FL SWITCH 3000/4000								
Supply voltage: 24 ... 48 V DC (redundant), extended temperature range: -40°C ... +75°C, IP20								
								
	5 x RJ45	–	–	10/100 Mbps	-10°C ... +60°C	3005	2891030	
		–	–		–	3005T	2891032	
	8 x RJ45	–	–		-10°C ... +60°C	3008	2891031	
		–	–		ATEX, IECEx (CID2)	3008T	2891035	
	16 x RJ45	–	–		-10°C ... +60°C	3016	2891058	
		–	–		–	3016T	2891059	
	4 x RJ45	1 x MM FX-SC	–		–	3004T-FX	2891033	
		1 x MM FX-ST	–		–	3004T-FX ST	2891034	
	6 x RJ45	2 x MM FX-SC	–		ATEX, IECEx (CID2)	3006T-2FX	2891036	
		2 x MM FX-ST	–		–	3006T-2FX ST	2891037	
		2 x SM FX-SC	–		–	3006T-2FX SMSM	2891060	
	12 x RJ45	2 x SFP	–		–	3012E-2SFX	2891067	
	8 x RJ45	2 x SFP	–	10/100 Mbps or 1000 Mbps	ATEX, IECEx, CID2	4008T-2SFP	2891062	
	10 x RJ45	3 x SM FX-SC	–	8 x 10/100 Mbps 2 x 10/100/1000 Mbps 3 x 100 Mbps	–	4008T-2GT-3FX SM	2891160	
		4 x SM FX-SC	–	8 x 10/100 Mbps 2 x 10/100/1000 Mbps 4 x 100 Mbps	–	4008T-2GT-4FX SM	2891061	
	14 x RJ45	4 x FX-SC	–	12 x 10/100 Mbps 2 x 10/100/1000 Mbps 4 x 100 Mbps	–	4012T-2GT-2FX	2891063	
		4 x FX-ST	–	4 x 100 Mbps	–	4012T-2GT-2FX ST	2891161	
Switches according to IEC 61850-3/IEEE1613: FL SWITCH 3000E/4000E								
Extended temperature range: -40°C ... +70°C, IP20								
								
	16 x RJ45	–	–	10/100 Mbps	24 ... 48 V DC	3016E	2891066	
	12 x RJ45	2 x SFP	–			3012E-2SFX	2891067	
		2 x MM FX-SC	–			3012E-2FX	2891120	
		2 x SM FX-SC	–			3012E-2FX SM	2891119	
	8 x RJ45	16 x MM LC	4 x SFP or RJ45	8 x 10/100 Mbps 16 x 100 Mbps 4 x 1000 Mbps	Requires replaceable, redundant power supply (see accessories on P. 41)	4808E-16FX LC-4GC	2891073	
		16 x SM LC				4808E-16FX SM LC-4GC	2891074	
		16 x MM SC				4808E-16FX-4GC	2891079	
		16 x SM SC				4808E-16FX SM-4GC	2891080	
		16 x MM ST				4808E-16FX ST-4GC	2891085	
		16 x SM ST				4808E-16FX SM ST-4GC	2891086	
	24 x RJ45	–		24 x 100 Mbps 4 x 1000 Mbps		4824E-4GC	2891072	
		24 x MM SC				4800E-24FX-4GC	2891102	
		24 x SM SC				4800E-24FX SM-4GC	2891104	

Managed Switches with routing function and accessories product overview

Features	Copper ports	FO/combo ports	Port speed	Special features	Designation	Order No.			
Switches with routing functions									
Supply voltage: 18 V DC ... 32 V DC, temperature range: 0°C ... +55°C, IP20									
	8 x RJ45	–	10/100 Mbps	–	FL NAT SMN 8TX	2989365			
				Maritime approval	FL NAT SMN 8TX-M	2702443			
Modular Managed Switch									
Supply voltage: 18.5 ... 30.2 V DC, temperature range: -20°C ... +55°C, IP20									
	4x RJ45	4 x combo ports (SFP or RJ45)	10/100/1000 Mbps	Can be extended up to 24 ports	FL SWITCH GHS 4G/12	2700271			
				Can be extended up to 24 ports, Layer 3	FL SWITCH GHS 4G/12-L3	2700786			
	8 x RJ45	4 x SFP		Can be extended up to 28 ports	FL SWITCH GHS 12G/8	2989200			
				Can be extended up to 28 ports, Layer 3	FL SWITCH GHS 12G/8-L3	2700787			
				–	–	–			
Features	Function	Port configuration	Connection direction	Fiber optic length	Special features	Order No.			
Accessories for Modular Managed Switches									
 	Extension module	–	–	–	For up to 8 ports	2989307			
	Media module	Copper, RJ45	Bottom	–	–	2832357			
			Front	–	–	2832344			
			Front	–	PoE	2832904			
		FO, MM SC	Bottom	1300 nm	–	2832425			
			Front		–	2832412			
		FO, SM SC	Bottom		–	2832205			
		FO, MM ST	Bottom		–	2884033			
		POF/PCF, SC-RJ	Bottom	650 nm	–	2891084			
Features	Function	Port configuration	Voltage range	Designation	Order No.				
PRP redundancy modules according to IEC 62439									
	PRP redundancy module	2 x RJ45 as redundancy ports 1 x RJ45 for end device	24 ... 48 V DC	FL RED 2003E PRP	2701863				
	Modular power supply for 19" switches	2 x LC MM as redundancy ports 1 x RJ45 for end device	24 ... 48 V DC	FL RED 2001E PRP 2LC	2701864				
		–	110 V, 220 V DC/AC	4800E-P5	2891076				
Power supply units for 19" switches									
	Modular power supply for 19" switches	–	48 V DC	4800E-P1	2891075				
		–	110 V, 220 V DC/AC	4800E-P5					

Power over Ethernet (PoE)

Power over Ethernet devices suitable for industrial use enable the common transmission of power and data via an Ethernet connection (LAN). You can therefore integrate end devices, such as WLAN access points, IP phones, and IP cameras into your network quickly and cost-effectively.

 Web code: #1557



Injector

As a compact stand-alone solution, the FL PSE 2TX PoE module converts two standard Ethernet ports to Power over Ethernet ports. In doing so, the module generates the 48 V DC required for PoE.



Switches

The PoE switches enable easy networking of your PoE network. Robust versions are available with IP20 or IP67 protection.



Splitter

The PD 1001 PoE splitter splits data and power locally and therefore enables even non-PoE-capable devices to be installed in remote stations in an easy and inexpensive way.

PoE modules product overview

Features	Ports	Transmission speed	Typical current consumption	Special features	Designation	Order No.
PoE injector						
Supply voltage: 18.5 ... 30.5 V DC, temperature range: 0°C ... +55°C, IP20						
	2 x RJ45 2 x RJ45 PoE	10/100 Mbps	Approx. 100 mA in no-load operation Approx. 1800 mA at 24 V DC at the input, maximum permissible load and an ambient temperature of +25°C	According to IEEE 802.3af (PoE)	FL PSE 2TX	2891013
PoE switches						
Supply voltage: 18 ... 57 V DC (redundant), temperature range: -40°C ... +70°C						
	4 x RJ45 PoE	10/100 Mbps	440 mA + PoE load	IP20 According to IEEE 802.3af (PoE) and IEEE802.3at (PoE+)	FL SWITCH 1001T-4POE	2891064
	8 x M12 PoE	10/100/1000 Mbps	300 mA + PoE load	IP67 According to IEEE 802.3af (PoE) and IEEE802.3at (PoE+)	FL SWITCH 1708 M12 POE	2701883
PoE media module						
Supply voltage: 45.5 ... 53 V DC (redundant), temperature range: -20°C ... +55°C, IP20						
	2 x RJ45 PoE	10/100 Mbps	10 mA (max. 900 mA)	According to IEEE 802.3af (PoE)	FL IF 2PSE-F	2832904
PoE splitter						
Supply via PoE/PoE+, output voltage: 24 V DC, temperature range: -40°C ... +70°C, IP20						
	1 x RJ45 1 x RJ45 PoE	10/100/1000 Mbps	-	According to IEEE 802.3af (PoE) and IEEE802.3at (PoE+)	FL PD 1001 T GT	2891042

Your advantages

- Easy device installation, thanks to reduced cabling effort
- Non-proprietary use supported, thanks to standardization according to IEEE 802.3
- Fast retrofitting of existing systems, thanks to easy handling

Industrial Wireless

Industrial wireless systems open up new options for flexible and efficient automation solutions. With wireless LAN or Bluetooth, you can eliminate the need for expensive cable runs and integrate mobile devices easily and reliably into your automation network. Wireless Ethernet systems from Phoenix Contact ensure reliable communication even under harsh conditions and are optimized for fast and stable PROFINET and EtherNet/IP™ transmission.

In addition to a comprehensive range of products, we also offer you support to ensure the design of your individual wireless network is perfectly tailored to your requirements.



Your advantages

- Seamless and inexpensive integration into existing networks, thanks to flexible installation and configuration concepts
- Maximum reliability and availability with optimum properties for industrial applications
- Versatile use, thanks to Ethernet being used as the common communication standard – even for safety applications

Industrial Bluetooth

The EPA modules combine a reliable wireless module with an integrated special antenna in a robust IP65 housing. This allows you to establish functionally safe communication via PROFlsafe or SafetyBridge Technology. Typical Bluetooth features: the protocol-transparent Ethernet communication and interruption-free parallel operation for WLAN networks.

 Web code: #1558



Industrial WLAN

The new WLAN 1100 wireless module enables you to install a fast and stable WLAN network at the machine very easily. Featuring integrated antennas and extreme robustness, the space-saving wireless module has been carefully considered down to the last detail for applications in machine building.

i Web code: #1532



The WLAN 5100 Access Point combines maximum reliability, data throughput, and range in a compact metal housing. The central cluster management makes the configuration and maintenance of larger WLAN networks considerably easier.

Industrial Wireless product overview

Features	Function	Frequency band	Data rate	Special features	Designation	Order No.	
Bluetooth Ethernet adapter							
Temperature range: -40°C ... +65°C, IP65							
	Bluetooth Ethernet client adapter	2.4 GHz	Up to 3 Mbps	Client, integrated antenna	FL BT EPA	2692788	
	2-piece set incl. cables and plugs	FL BT EPA AIR SET		2693091			
	Bluetooth Ethernet Access Point and client adapter	2.4 GHz		Access Point and client, external, replaceable antennas (supplied), RSMA (male) connection	FL BT EPA MP	2701416	
WLAN 5100							
Temperature range: -25°C ... +60°C, WLAN Access Point, Client, Repeater, IP20							
	Wireless module	2.4/5 GHz	Up to 300 Mbps	–	FL WLAN 5100	2700718	
	USA and Canada only	FL WLAN 5101		2701093			
	Japan only	FL WLAN 5102		2701850			
WLAN 1100							
Temperature range: 0°C ... +60°C, WLAN Access Point and client with integrated antennas, IP54							
	Wireless module	2.4/5 GHz	Up to 300 Mbps	–	FL WLAN 1100	2702534	
	USA and Canada only	FL WLAN 1101		2702538			

Comparison: WLAN vs. Bluetooth

	Wireless standard	Frequency band	Range for line of sight	Range for industrial hall	Topology	Network structure
WLAN	IEEE 802.11	2.4 GHz, 5 GHz	< 1 km	< 100 m	Point-to-point, star, mesh	Mobile, roaming
 Bluetooth	IEEE 802.15.1	2.4 GHz	< 250 m	< 100 m	Point to point, star (1:7)	Static

Accessories product overview

Features	Function	Frequency band	Data rate	Special features	Designation	Order No.
Control box sets						
	With omnidirectional antennas	–	–	IP65, with DIN rail, F22 plugs, and screw connections	FL RUGGED BOX OMNI-1	2701430
	With omnidirectional antennas and power supply unit	–	–		FL RUGGED BOX OMNI-2	2701439
	With panel antenna	–	–		FL RUGGED BOX DIR-1	2701440
	Without antenna accessories	–	–		FL RUGGED BOX	2701204

Features	Function	Frequency band	Gain	Special features	Connection	Order No.
Accessories						
	SD card	–	–	–	–	2988162
	Omnidirectional antenna	2.4 GHz	2 dBi	Min. P55, -40°C ... +70°C, Including mounting bracket	RSMA (male) with 1.5 m cable	2701362
	Omnidirectional antenna, vandalism proof		3 dBi			2701358
	Omnidirectional antenna, salt water resistant		6 dBi		N (female)	2885919
	Panel antenna, salt water resistant	2.4/5 GHz	9 dBi	IP67, -40°C ... +70°C, ATEX-/IECEx approval	N (female)	2701186
	Antenna cable	0.3 ... 6 GHz	–	2 m length	RSMA (male) > N (male)	2903265

Additional accessories can be found on our website:

 **Web code:** #0569

Data rate	Latency	Shortest update time	Coexistence with WLAN	Robustness with regard to failures	Typical application	Network size
Up to 300 Mbps	1–2 ms	8 ms with PROFINET	Very good with good planning	Good	Ethernet, PROFINET, EtherNet/IP™	Can be extended freely
Up to 3 Mbps		32 ms with PROFINET	Very good	Very good	PROFINET, Modbus/TCP	Not extendable

Industrial security

Protect your systems against unauthorized access by people or malware with the mGuard security product range from Phoenix Contact. With industrial router/firewall solutions and virus protection which is suitable for industrial applications, you can organize individual protection for your automation network.

The VPN-compatible devices also enable sensitive data to be transmitted in encrypted form, providing secure remote maintenance of machines over public networks.

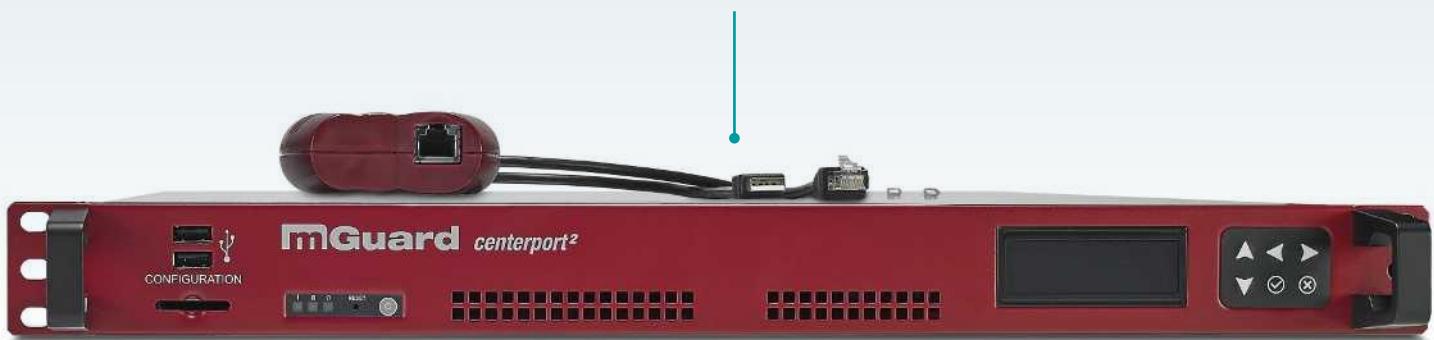


Protection of machines and production cells

Use mGuards to protect your machines and production cells against unauthorized access - regardless of whether access is from the local network or via the Internet. A wide range of security functions as well as central management software help to easily increase the security level of your production facilities.

High-performance firewall

The Centerport is a high-performance firewall, which can also be used as a central peer for up to 3000 VPN tunnels.



Your advantages

- Can be integrated into a defense-in-depth concept according to IEC 62443
- Can be easily retrofitted, thanks to Stealth Mode
- Central management software for global management of several thousand field devices
- Particularly secure, thanks to active CVE (Common Vulnerabilities and Exposures) management process

Industrial security product overview

Features	Port configuration	Port speed	VPN	Special features	Designation mGUARD...	Order No.
Basic security router for the DIN rail: mGuard RS2000						
1:1-NAT, NAT, port forwarding, standard routing, configurable firewall						
	2 x RJ45 6 x RJ45	10/100 Mbps	– Up to 2 parallel tunnels	Improved EMC properties 3G mobile phone interface 4G mobile phone interface Integrated 5-port switch (unmanaged)	RS2000 TX/TX-B RS2000 TX/TX VPN RS2000 3G VPN RS2000 4G VPN RS2005 TX VPN	2702139 2700642 2903441 2903588 2701875
High-performance security router for the DIN rail: mGuard RS4000						
Extended firewall scope of functions (Deep Package Inspection, user and conditional firewall, DMZ, etc.), can be extended with licenses						
	2 x RJ45 6 x RJ45	10/100 Mbps	Optional Up to 10 parallel tunnels (up to 250 as an option) 250 VPN tunnels	– 3G mobile phone interface 4G mobile phone interface Maritime approvals ATEX and IECEx, extended temperature range and scope of functions	RS4000 TX/TX RS4000 TX/TX VPN RS4000 3G VPN RS4000 4G VPN RS4000 TX/TX VPN-M RS4000 TX/TX-P	2700634 2200515 2903440 2903586 2702465 2702259
	2 x RJ45 2 x SFP	10/100/1000 Mbps	Optional Up to 10 parallel tunnels (up to 250 as an option)	Integrated 4-port Managed Switch and DMZ port, extended temperature range	RS4004 TX/DTX RS4004 TX/DTX VPN	2701876 2701877
	2 x RJ45	10/100 Mbps	– Up to 10 parallel tunnels (up to 250 as an option)	–	GT/GT GT/GT VPN	2700197 2700198
Security router in PCI and PCIE format: mGuard PCI						
Extended firewall scope of functions (Deep Package Inspection, user and conditional firewall, DMZ, etc.), can be extended with licenses						
	2 x RJ45	10/100 Mbps	Up to 10 parallel tunnels (up to 250 as an option) Up to 10 parallel tunnels (up to 250 as an option)	1:1-NAT, NAT, port forwarding, Standard routing, stealth mode, can be extended with licenses	PCI4000 VPN PCIE4000 VPN	2701275 2701278

Features	Port configuration	Port speed	VPN	Special features	Designation mGUARD...	Order No.			
Security routers for mobile applications: mGuard smart and mGuard Secure Client									
Router with firewall functions									
	2 x RJ45	10/100 Mbps	None, optionally up to 250	USB, stealth mode, can be extended with licenses	SMART2	2700640			
	-		Up to 10 parallel tunnels (up to 250 as an option)		SMART2 VPN	2700639			
	-	-	1 tunnel	Software for installation on the computer	SECURE VPN CLIENT LIC	2702579			
Security routers for desktop applications: mGuard delta									
Router with SD card slot, NAT/1:1 NAT and firewall with full scope of functions for maximum security									
	2 x RJ45	10/100 Mbps	None, optionally up to 250	Can be extended with licenses	Desktop device	2700967			
			Up to 10 parallel tunnels (up to 250 as an option)			2700968			
Security router for rack mounting: mGuard centerport									
High-performance firewall. Peer for up to 3000 VPN tunnels									
	4 x RJ45	10/100/1000 Mbps	None, optionally up to 3000	Can be extended with licenses	CENTERPORT	2702547			
			Up to 1000 parallel tunnels, (up to 3000 as an option)		CENTERPORT VPN- 1000	2702820			
Licenses for functional extension of mGuard RS4000									
Function description					Designation	Order No.			
License for lifetime software update of mGuard field devices					LIC LIFETIME FW	2700184			
License for lifetime software update of FL MGUARD CENTERPORT					LIC LFS CENTER	2702552			
License for up to 10 additional VPN online connections					LIC VPN-10	2700194			
License for up to 100 additional VPN online connections					LIC VPN-100	2702546			
License for up to 250 additional VPN online connections					LIC VPN-250	2700193			
License for activating the firewall/router redundancy function on an mGuard device pair					LIC FW RD	2701356			
License for activating the firewall/router and VPN redundancy function on an mGuard device pair					LIC FW/VPN RD	2702193			
License for activating the OPC inspector function on an mGuard					LIC OPC INSP	2702191			
License for activating the Modbus inspector function on an mGuard					LIC MODBUS INSPECTOR	2702980			
License for activating CIFS Integrity Monitoring (CIM) on an mGuard					LIC CIM	2701083			

Remote communication

Remote control technology and remote maintenance are important components of industrial communication solutions. They facilitate the smooth connection of remote stations or system components to your control system on different transmission paths.

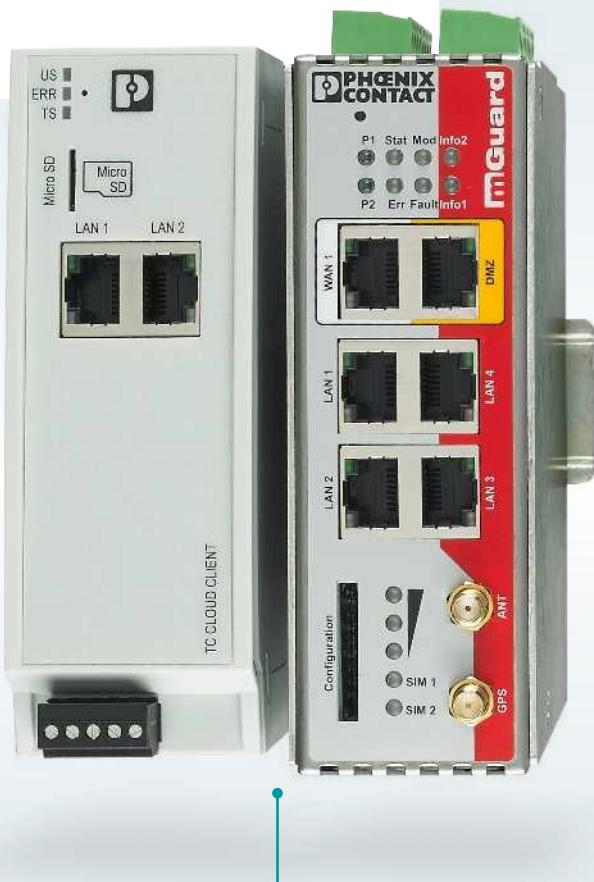
Phoenix Contact provides you with a large range of industrial remote communication products for implementing your individual solution.

i Web code: #0499



Remote maintenance via the public telephone network

LAN modems and DSL routers enable quick and easy startup and temporary remote access thanks to the use of proven analog and digital transmission technologies. Internationally recognized standards and extensive network expansion ensure worldwide availability.



Remote maintenance via the Internet and mobile network

TC Cloud Clients and mGuards enable secure connection to the mGuard Secure Cloud. Communication is established via Internet or mobile network. While the TC Cloud Client can only be connected to the mGuard Secure Cloud, the mGuards also offer peer-independent VPN tunnel, NAT, and firewall.



Remote maintenance: worldwide, direct access to controllers and Ethernet networks



Remote control: secure and continuous transmission of process data to the control center



Remote control via the mobile network

The TC ROUTER mobile routers from Phoenix Contact enable powerful data connections via 4G LTE networks with up to 150 Mbps. Even in harsh and demanding environments, they create a mobile broadband connection for highly flexible site networking wherever a cable-based Internet connection is not available.



Remote control via in-house cables

Connect extensive IP networks of up to 20 kilometers easily via existing two-wire cables with the Ethernet extender system. The innovative combination of unmanaged and managed extenders enables particularly cost-effective networking and central diagnostics of all devices and paths via IP.

Remote maintenance product overview

Features	Function	VPN tunnel	Firewall	Transmission medium	Special features	Designation	Order No.
Remote maintenance via the public telephone network							
	Modem	–	●	ADSL, Annex-A/B/J (support)	–	TC DSL ROUTER X400 A/B	2902709
	Router	●	●	ADSL, Annex A/B/J	Serial device server	TC DSL ROUTER X500 A/B	2902710
	Modem	–	–	Analog dial-up connection	–	PSI-MODEM/ETH	2313300
Remote maintenance via the mobile network: mGuard and TC Cloud Client							
	Cloud client	1 tunnel to mGuard Secure Cloud	–	4G LTE	Device configuration in mGuard Secure Cloud, simplified web interface	TC CLOUD CLIENT 1002-4G	2702886
			–	4G LTE Verizon, US		TC CLOUD CLIENT 1002-4G VZW	2702887
			–	4G LTE AT&T, US		TC CLOUD CLIENT 1002-4G ATT	2702888
	mGuard VPN router with integrated firewall	Up to 2 parallel tunnels	●	3G	2 SIM card slots	TC MGUARD RS2000 3G VPN	2903441
			●	4G LTE		TC MGUARD RS2000 4G VPN	2903588
		Up to 10 (250) parallel tunnels	Advanced	3G	Integrated WAN interface, scope of functions can be extended, 2 SIM card slots	TC MGUARD RS4000 3G VPN	2903440
			Advanced	4G LTE		TC MGUARD RS4000 4G VPN	2903586
Remote maintenance via the Internet: mGuard and TC Cloud Client							
	Cloud client	1 tunnel to mGuard Secure Cloud	–	Operator network	–	TC CLOUD CLIENT 1002-TX/TX	2702885
			●		–	FL MGUARD RS2000 TX/TX VPN	2700642
			●		Integrated Unmanaged Switch	FL MGUARD RS2005 TX VPN	2701875
	mGuard VPN router with integrated firewall	Up to 10 (250) parallel tunnels	Advanced		–	FL MGUARD RS4000 TX/TX VPN	2200515
			Advanced		Integrated Managed Switch	FL MGUARD RS4004 TX/DTX VPN	2701877
			Advanced		Flat design, Gigabit-compatible	FL MGUARD GT/GT VPN	2700198
			●		PCI format	FL MGUARD PCI4000 VPN	2701275
			●		PCIE format	FL MGUARD PCIE4000 VPN	2701278
			●		Portable, software-independent	FL MGUARD SMART2 VPN	2700639
			●		Desktop device	FL MGUARD DELTA TX/TX VPN	2700968
			●		19" design	FL MGUARD CENTERPORT	2702547
Remote maintenance via the Internet: mGuard Secure VPN Client							
Secure VPN connection for desktop, laptop, and tablet PC	1 tunnel	–	Internet	For Windows 10, 8.x, and 7	MGUARD SECURE VPN CLIENT LIC	2702579	

Remote control product overview

Features	Function	VPN tunnel	Firewall	Network, data rate	Special features	Designation TC ROUTER...	Order No.
Remote control via the mobile network: TC Router							
Temperature range: -40°C ... +70°C, data rate up to 150 Mbps							
	High-speed mobile router	–	●	3G	European version	2002T-3G	2702531
		–	●	4G LTE	European version	2002T-4G	2702530
		●	●	3G	European version	3002T-3G	2702529
		●	●	4G LTE	European version	3002T-4G	2702528
		●	●		For Verizon Wireless	3002T-4G VZW	2702532
		●	●	For AT&T		3002T-4G ATT	2702533

Features	Managed/ Unmanaged	Ports	Local diagnostics	Topologies	Surge protection	Remote diagnostics	Designation TC EXTENDER...	Order No.
Remote control via in-house cables: Ethernet extender								
Any 2-wire cable up to 20 km, Plug and Play startup								
	Managed	2 x SHDSL 4 x Ethernet	Display	Point-to-point, line, ring	SHDSL, integrated, can be replaced	Location-independent via IP	6004 ETH-2S	2702255
		1 x SHDSL 1 x Ethernet	LED	Point-to-point	4001 ETH-1S		2702253	
	Unmanaged	2 x SHDSL 1 x Ethernet		Point-to-point, line, ring	SHDSL, integrated, cannot be replaced	Location-independent via USB	2001 ETH-1S	2702409
	Unmanaged	12 x SHDSL 6 x Ethernet					TC ETH EXTENDER S19	2702077

mGuard Secure Cloud

The TC Cloud Client and mGuard security appliances connect your machines to the mGuard Secure Cloud securely over the Internet.

The cloud connects service employees with their remote maintenance targets and offers a turnkey complete VPN solution for operators, machine builders and system manufacturers. Service personnel connect quickly and securely to machines, industrial PCs, and controllers via a simple

web interface. In addition, secure remote maintenance can be performed at any location and any time without requiring specialist IT knowledge.

The mGuard Secure Cloud is available in EU countries as well as Norway and Switzerland. Different tariff conditions apply in North America.



Protocol converters and interface converters

Device servers and gateways enable easy integration of legacy serial devices and buses into modern Ethernet networks. The most common industrial data transmission protocols are supported, with various combinations of serial transmission.

Depending on the application, choose between simple device servers for interface conversion or gateways and proxies with integrated protocol conversion.

 Web code: #1559

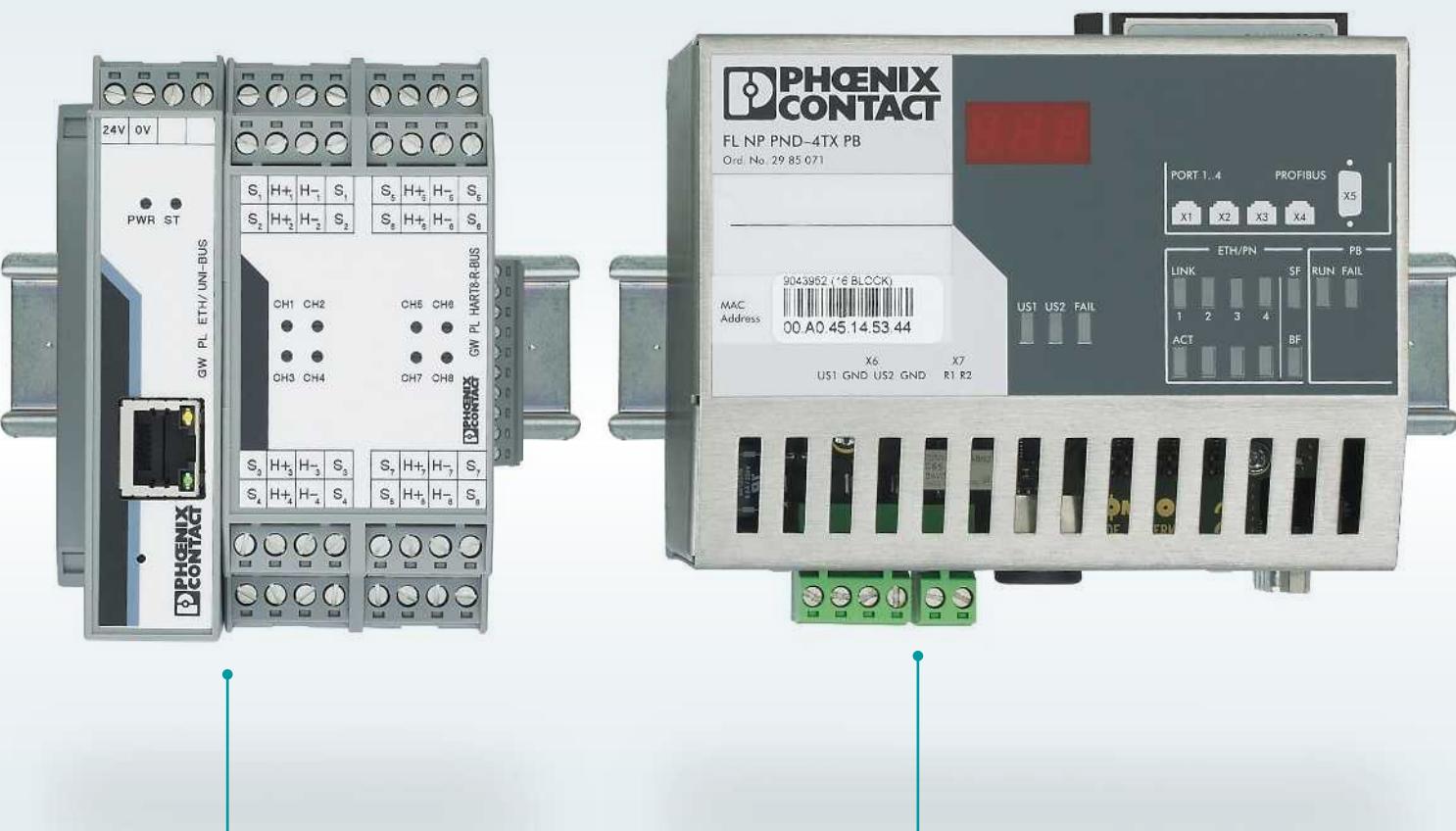


Converting serial interfaces

You can integrate any serial protocols into your Ethernet network using the serial device servers and gateways. Serial data can either be transmitted transparently over Ethernet or converted to Modbus/TCP or EtherNet/IP™ using the gateways.

Your advantages

- Universal use in various applications
- Network integration of serial devices via virtual COM ports
- Cable replacement in serial point-to-point connections



Converting HART protocol

The new HART gateways convert the digital HART protocol into Ethernet protocols, HART-IP, Modbus/TCP or PROFINET. This means you can easily parameterize and monitor HART field devices via Ethernet networks. Thanks to the modularity of the HART to Ethernet gateway, you can connect up to 40 HART devices.

Converting PROFIBUS and INTERBUS protocols

Use the gateways and proxies to smoothly integrate PROFIBUS and INTERBUS applications into a PROFINET network. Our gateways for PROFIsafe also enable controller-independent and comprehensive integration of functional safety.

Protocol and interface converters product overview

	Protocol	Ethernet interface	Serial interface (RS-232/422/485)	Special features	Designation	Order No.
Conversion of serial data to Ethernet data: serial device servers						
	Protocol-transparent	1 x RJ45 10/100 Mbps	1 x D-SUB 9	ATEX, UL (Class I, Division 2)	FL COMSERVER BASIC	2313478
					FL COMSERVER BASIC T	2904681
		1 x RJ45 10/100 Mbps	1 x D-SUB 9	ATEX, IECEEx, UL (Class I, Division 2)	GW DEVICE SERVER 1E/1DB9	2702758
					GW DEVICE SERVER 1E/2DB9	2702760
		2 x RJ45 10/100 Mbps	2 x D-SUB 9		GW DEVICE SERVER 2E/2DB9	2702761
			4 x D-SUB 9		GW DEVICE SERVER 2E/4DB9	2702763

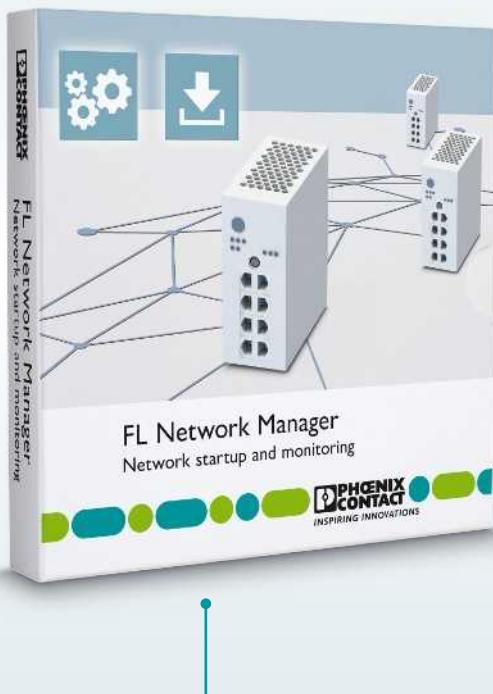
	Protocol	Ethernet interface	Serial interface (RS-232/422/485)	Special features	Designation	Order No.
Conversion of serial protocols to Ethernet protocols: gateways						
	Modbus/RTU to Modbus/TCP	1 x RJ45 10/100 Mbps	1 x D-SUB 9	ATEX, UL (Class I, Division 2)	FL COMSERVER UNI	2313452
		1 x RJ45 10/100 Mbps	1 x D-SUB 9		FL COMSERVER UNI-T	2904817
		2 x RJ45 10/100 Mbps	2 x D-SUB 9		GW MODBUS TCP/ RTU 1E/1DB9	2702764
		2 x RJ45 10/100 Mbps	4 x D-SUB 9		GW MODBUS TCP/ RTU 1E/2DB9	2702765
		1 x RJ45 10/100 Mbps	1 x D-SUB 9		GW MODBUS TCP/ RTU 2E/2DB9	2702766
		2 x RJ45	2 x D-SUB 9		GW MODBUS TCP/ RTU 2E/4DB9	2702767
	RAW, ASCII to Modbus/TCP	1 x RJ45 10/100 Mbps	4 x D-SUB 9	ATEX, IECEEx, UL (Class I, Division 2)	GW MODBUS TCP/ ASCII 1E/1DB9	2702768
		2 x RJ45	1 x D-SUB 9		GW MODBUS TCP/ ASCII 1E/2DB9	2702769
	RAW, ASCII to EtherNet/IP™	1 x RJ45	2 x D-SUB 9		GW MODBUS TCP/ ASCII 2E/2DB9	2702770
		2 x RJ45	4 x D-SUB 9		GW MODBUS TCP/ ASCII 2E/4DB9	2702771
	HART to Modbus/TCP, PROFINET, HART IP, FDT/DTM	1 x RJ45	—	Head station, supports five extension modules	GW PL ETH/ BASIC-BUS	2702321
		1 x RJ45	—		GW PL ETH/ UNI-BUS	2702233
		—	HART, 4-channel	Extension module	GW PL HART4-BUS	2702234
		—		Extension module with 250 Ω internal input resistor	GW PL HART4-R-BUS	2702879
		—	4-channel, digital inputs and outputs	Extension module	GW PL DIO4-BUS	2702237
		—	HART, 8-channel	Extension module with analog loop supply	GW PL HART8+AI-BUS	2702236
		—		Extension module	GW PL HART8-BUS	2702235
		—		Extension module with 250 Ω input internal resistance	GW PL HART8-R-BUS	2702880
	PROFIBUS to PROFINET	4 x RJ45 10/100 Mbps	1 x D-SUB 9 up to 12 Mbps	Conformance Class B	FL NP PND- 4TX PB	2985071
	INTERBUS to PROFINET	4 x RJ45 10/100 Mbps	1 x F-SMA 500 kbps / 2 Mbps (can be selected)		FL NP PND- 4TX IB-LK	2985929
	INTERBUS to PROFINET	4 x RJ45 10/100 Mbps	1 x D-SUB 9 500 kbps / 2 Mbps (can be selected)		FL NP PND- 4TX IB	2985974

Software

Configure and monitor your system intuitively using software tools from Phoenix Contact. We also offer a wide range of solutions that enable you to efficiently use Ethernet networks in automation systems.

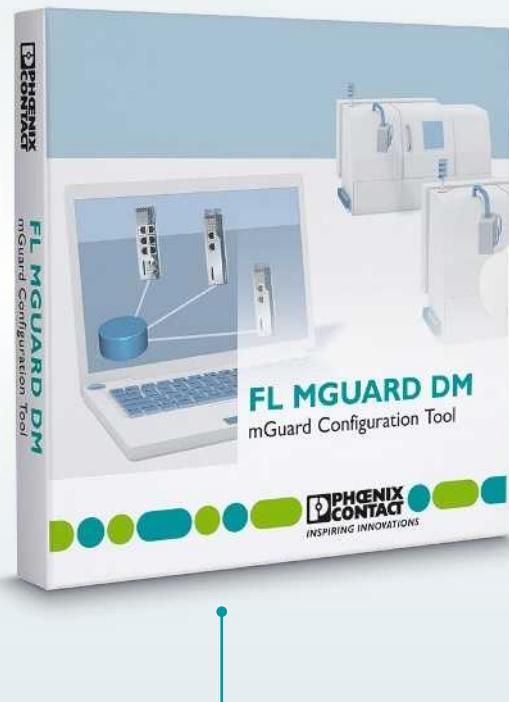
Benefit from easy configuration and startup of your network components with FL Network Manager and mGuard Device Manager software. With FL VIEW, you can clearly represent your network, with SNMP/OPC software you can ensure reliable communication between network management tools, automation hardware, and visualization software.

 Web code: #1560



Network configuration and startup

Start up your network quickly and easily with the FL Network Manager software. The software supports you when scanning an existing network, during IP assignment and device configuration, in the handling of configuration files as well as firmware updates.

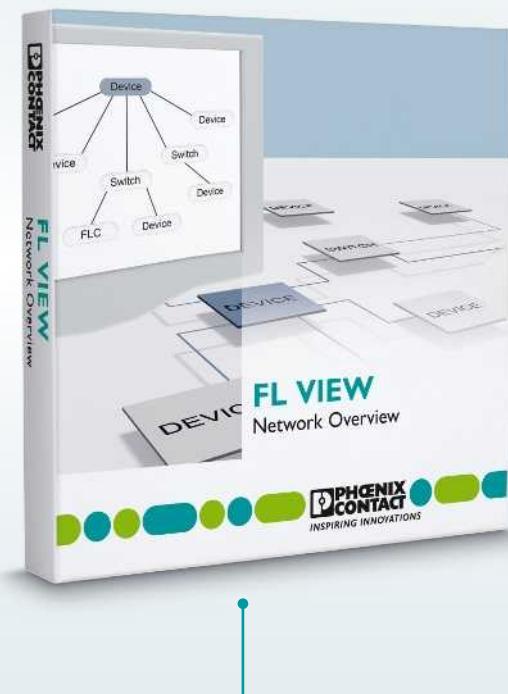


mGuard configuration and startup

The mGuard Device Manager provides support during the configuration, roll-out, and management of all mGuard devices. Centrally create and manage all safety-related mGuard settings and then transmit them to the desired devices.

Your advantages

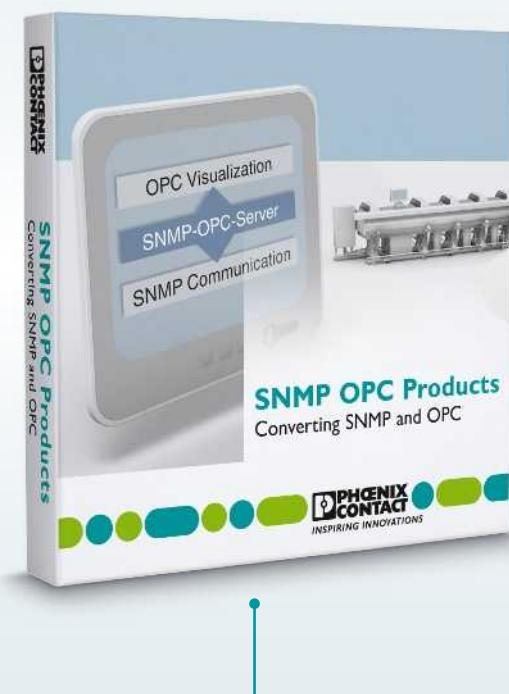
- Fast diagnostics thanks to continuous querying of the network devices
- Reduced downtimes and failures, thanks to the short response time in the network
- Direct access to the individual web interfaces of the devices
- Error detection even for temporary errors in the network



Network visualization and monitoring

FL VIEW automatically detects the network structure and devices of your system and displays them clearly. Different colors are used to indicate the status of network devices and connections.

With the long-term monitoring, you can even identify and analyze past events and temporary errors.



Consistent communication with OPC and SNMP protocols

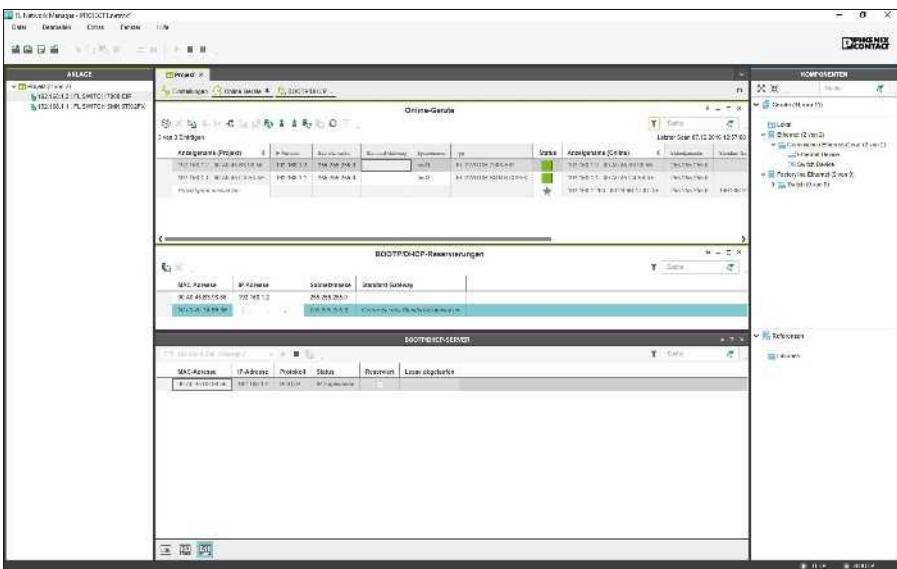
For reliable communication between network management tools, automation hardware, and visualization software, the SNMP and OPC protocol types must be converted. The FL SNMP OPC server ensures data exchange between OPC-based visualization software and SNMP automation components.

Software product overview

Features	Description	Language	Basis	Order No.
Network configuration and startup: FL Network Manager				
	Network configuration software	English	SNMP	2702889
mGuard configuration and startup: mGuard Device Manager				
	mGuard device management software for up to 100 mGuards	English	–	2700183
	mGuard device management software for up to 1000 mGuards			2702550
	mGuard device management software for an unlimited number of mGuards			2981974
Network visualization and monitoring: FL View				
	Monitoring of 64 nodes (network devices) in various subnetworks	English	SNMP	2701744
	Monitoring of 256 nodes (network devices) in various subnetworks			2701472
	Monitoring of 512 nodes (network devices) in various subnetworks			2701473
	Monitoring of 32 nodes (network devices) in a class C subnetwork			2701474
Consistent communication with OPC and SNMP protocols: SNMP OPC server				
	Monitoring and configuration of SNMP-compatible devices in HMI and SCADA systems	German, English	SNMP	2701139
	Extension license for 100 devices for the SNMP OPC server			2701138

Network Manager

The use of Managed Switches or WLAN components always involves configuration effort. At the very least, the IP parameters have to be configured. However, additional functions such as redundancy, segmentation by VLANs or the SSID in the case of WLAN components are often also involved. The Network Manager makes it easier to deal with an increasing number of manageable devices in a network, as network components can be monitored, configured and kept up to date with a tool. To also satisfy industrial Ethernet protocols EtherNet/IP™ and PROFINET, IP assignment is integrated via DHCP and DCP. Therefore, the Network Manager can also be used in your application field, regardless of whether you are involved in machine building, systems manufacturing or process engineering.



Central device management with the Network Manager

Startup support for mGuard Device Manager

The mGuard Device Manager is ideal for rolling out and managing large groups of mGuards that are configured identically. Widely distributed installations with thousands of systems can be implemented quickly and efficiently.

For easy initial startup of the software, support by means of remote access by a Phoenix Contact employee is included.



We support you during initial startup
of the mGuard Device Manager software

Surge protection

Uninterruptible production calls for the reliable transmission of all relevant data and signals. In addition to unauthorized access and malware, surge voltages caused by lightning strikes or switching operations also present a danger to your network. In particular where cabling extends beyond a building, it is primarily the devices that are connected to an Ethernet cable that are at risk.

Protect your components with surge protection from Phoenix Contact to avoid the expense of repairs and system downtimes and the loss of important data.

 Web code: #0145



Your advantages

- Protection according to Class EA (CAT.6A)
- Reliable transmission up to 10 Gbps
- Power over Ethernet (PoE+) "Mode A" and "Mode B"
- RJ45 attachment plug with separate grounding cable and ground connection snap-on foot for NS 35 DIN rails

Surge protection product overview

Description	IEC test classification EN type	Maximum continuous voltage	Nominal discharge current	Features	Type	Order No.
DATATRAB adapter/DIN rail module						
Ethernet (10GBase-T) & PoE, token ring, CDDI, according to Class Ea/Cat.6						
	B2/C1/C2/C3/D1	3.3 V DC	100 A/2 kA	–	DT-LAN-CAT.6+	2881007
DATATRAB 19" versions						
Ethernet (1000Base-T), token ring, CDDI, according to Class D/Cat. 5e, EN 50173						
	C1/C2/C3	6 V DC	350 A/350 A	24 ports	D-LAN-19"-24	2838791
				16 ports	D-LAN-19"-16	2880147
				8 ports	D-LAN-19"-8	2880163
PLUGTRAB type 3 protective device						
Type 3 surge protection for 1-phase power supplies						
	III/T3	230 V AC	3 kA/3 kA	Connector, base element	PLT-SEC-T3- 230-FM	2905229
		120 V AC			PLT-SEC-T3- 120-FM	2905228

Microelectronics are at particular risk

Sensitive electronic components are the most commonly affected by surge voltage damage.



The perfect fit

The DATATRAB series can be used as an adapter or DIN rail module.

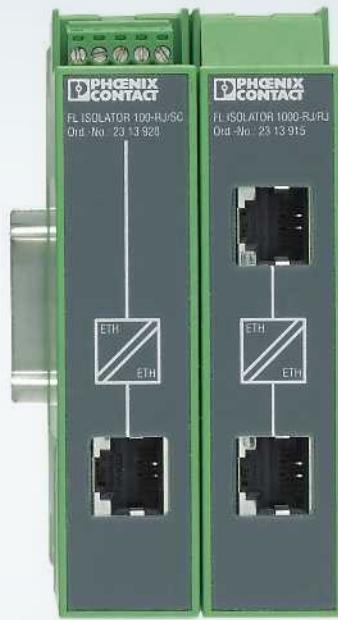


Network isolators for electrical isolation

The FL ISOLATOR electrically isolates copper-based Ethernet devices with transmission speeds of up to 1 Gbps. The Ethernet isolator is simply installed before the network device to be protected.

High-voltage areas in power distributions up to 4 kV can thus be safely decoupled from the data network, for example, and equipotential bonding currents avoided.

 Web code: #1561



Network isolators product overview

Features	Electrical isolation	Approvals	Connection technology	Transmission speed	Features	Designation FL ISOLATOR...	Order No.
Ethernet isolator							
	Up to 4 kV	EN 50155 - rolling stock EN 50121 - rail	M12/M12 D-coded	10/100 Mbps	Wall mounting	100-M12	2902985
					With adapter for DIN rail mounting	100-M12 RMS	2904671
	Up to 4 kV	EN 50155 - rolling stock EN 50121 - rail	RJ45 / RJ45	10/100/1000 Mbps	–	1000-RJ/RJ	2313915
				10/100 Mbps	–	100-RJ/RJ	2313931
	Up to 4 kV	EN 50155 - rolling stock EN 50121 - rail	RJ45/ screw terminal block	10/100 Mbps	–	100-RJ/SC	2313928

Ethernet isolators for special requirements

The FL ISOLATOR 100-M12 is equipped with vibration-resistant M12 connection technology and is used predominantly in rail vehicles. Here, large potential differences can occur between the individual train segments. The protocol-transparent Ethernet isolators ensure immediate electrical isolation of the data cable and cable shielding up to 4 kV.

The devices meet the requirements for railway applications according to EN 50155 and EN 50121.



Error-free data communication across all train segments

Your advantages

- High network availability thanks to electrical isolation of the data cables and cable shielding up to 4 kV
- Easy installation – no power supply required
- Fulfils the high environmental requirements of approval for railway applications

Copper-based data cabling for networks and fieldbuses

Complex automation processes call for high volumes of data at ever-increasing transmission speeds. Benefit now from high-performance connectors and cables for on-site assembly.

Whether it's future-proof high-speed cabling up to 10 Gbps or innovative hybrid cabling – we will find the perfect solution for your automation network.

 Web code: #0297








the automation bus



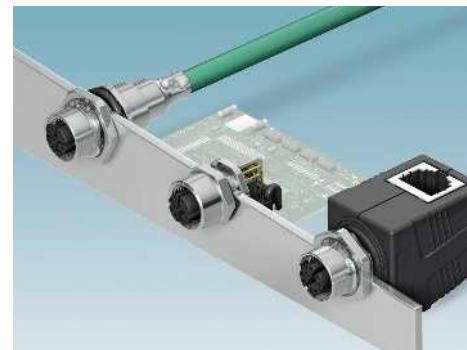
Fast assembly

Fast assembly without special tools – with IDC and pierce fast connection.



Wide range of connectors

Wide range of connectors from RJ45 to USB, D-SUB to M12.

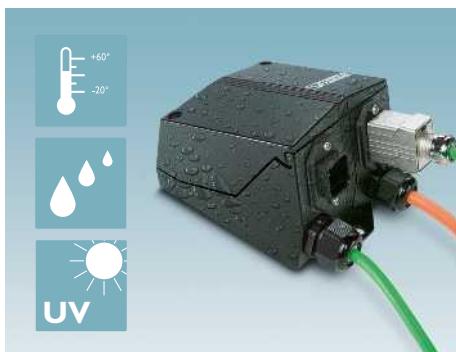
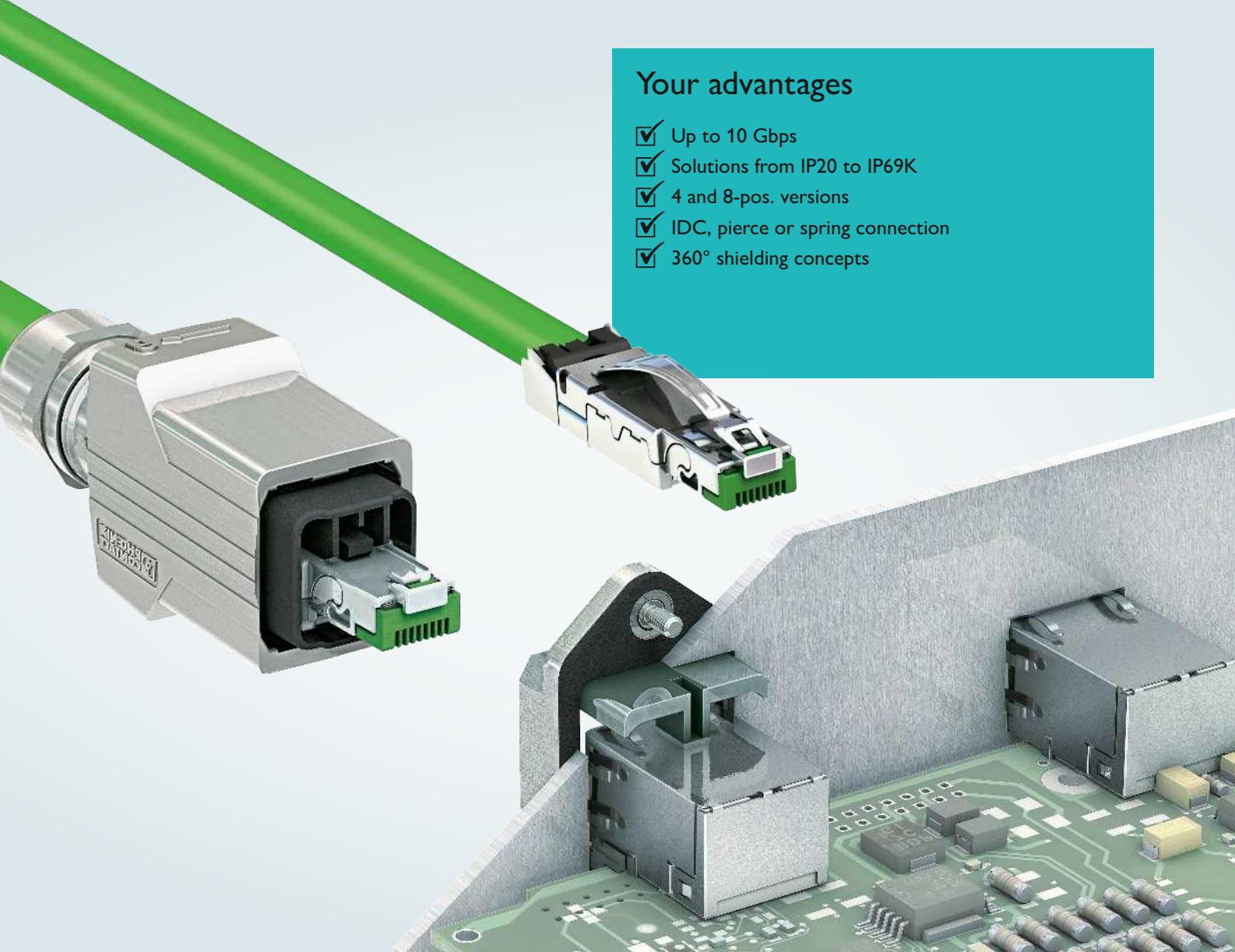


Flexible device connection

Flexible device connection thanks to versatile housing feed-throughs for devices and control cabinets.

Your advantages

- Up to 10 Gbps
- Solutions from IP20 to IP69K
- 4 and 8-pos. versions
- IDC, pierce or spring connection
- 360° shielding concepts



Reliable protection

Reliable protection against extreme temperatures, liquids, vibrations, and UV light.



Fast data transmission

Fast data transmission thanks to data rates up to 10 Gbps and components that meet the CAT6_A standard.



Special shielding concepts

Special shielding concepts with 360° EMC shielding guarantee a high level of resistance to EMI and ESD.

RJ45, connectors, and sockets, IP20

 Web code: #0330

	Cable outlet	Ethernet	PROFINET	Material	AWG	Connection method	Data rate	Order No.	
Connector									
	Straight	●	–	Plastic, gray	24 ... 27	Crimp connection	Up to 1 Gbps CAT5	1414382*	
		●	–				Up to 10 Gbps CAT6 _A	1414395*	
		●	–				Up to 1 Gbps CAT5	1414400*	
		●	–				Up to 10 Gbps CAT6 _A	1414402*	
		●	–	Plastic, black	24 ... 26	IDC fast connection	Up to 10 Gbps CAT6 _A	1419001	
		●	–	Plastic, gray	23 ... 26		Up to 1 Gbps CAT5	1656725	
		●	–	Plastic, black				1658008	
		–	●	Plastic, gray	22		Up to 100 Mbps CAT5	1658435	
		●	●	Die-cast zinc	26 ... 24		Up to 1 Gbps CAT5	1421607	
		–	●		23 ... 22			1421126	
		●	●		26 ... 24			1421877	
		–	●		23 ... 22			1421128	
		●	●		26 ... 24			1421876	
		–	●		23 ... 22			1421127	
Panel mounting frame									
	–	●	●	Plastic, gray	–	Square panel cutout	–	1689433	
Socket inserts									
	–	●	●	Metal	–	Cable module	Up to 10 Gbps CAT6 _A	1419021	
	–	●	●		–	Coupler module	Up to 1 Gbps CAT5	1689064	
	–	●	●		–		Up to 1 Gbps CAT6	1653155	

* Tool [1653265](#) required

	Mounting type	Specification	Order No.
Modular distribution panels			
	19" mounting	Mounting frame, black	1407986
		Mounting frame, gray	1409140
		RJ45 module, 6 x RJ45 to 6 x RJ45, CAT6	1407995
		Dummy module for 19" mounting frame	1407988
		Patch bay with plastic brackets	1407994
		Patch bay with metal brackets, gray	1409283
Patch panels			
	19" mounting	Patch panel for Freenet modules 16 installation slots, unequipped	1652994
		Patch panels for socket inserts, adapter-free 24 installation slots, unequipped, gray	1422978
		Patch panels for socket inserts, adapter-free 24 installation slots, unequipped, black	1422979
	DIN rail mounting	Cable module, up to 10 Gbps CAT6 _A	1419024
		Coupler module up to 1 Gbps, CAT6	1418094
Terminal box for Freenet modules			
	Surface mounting	Unequipped for 2 modules	1653003
		Unequipped for 6 modules	1653029
	Flush mounting	Unequipped for 2 modules	1653016
Socket inserts			
	–	Socket insert, adapter-free Cable module, up to 10 Gbps CAT6 _A	1417274
	–	Freenet modules Cable connection module, CAT6 _A	1418984
	–	Freenet modules Cable connection module, CAT5	1652936
	–	Freenet modules Coupler module, CAT6	1419022

	Material	Connection method	AWG	Specification	Order No.	
Connector						
	Die-cast zinc	Spring-cage connection	18 ... 13	Cable diameter 6.5 mm ... 9 mm	1421783	
				Cable diameter 9 mm ... 13 mm	1421785	
Panel mounting frames						
	–	Spring-cage connection	18 ... 13	Fixed coding	1405248	
				Variable coding	1409036	
		For PCB modules		Fixed coding	1608249	
				Variable coding	1408235	
Y-distributor						
	Metal housing	2 x push-pull / 1 x push-pull	–	5 x 2.5 mm ² / 0.2 m cable length	1404799	
		2 x push-pull 1 x 7/8" connector			1404812	
H distributor						
	Metal housing	2 x push-pull / 2 x push-pull	–	–	1405387	
Multi-ports						
	–	1 x power	18 ... 13	–	1403681	
		1 x power / 1 x power			1403684	
		1 x power / 1 x RJ45	18 ... 13 / 26 ... 22		1403682	
		2 x power / 2 x RJ45			1406395	
		1 x power / 1 x SC-RJ	18 ... 13		1404321	
Terminal outlets						
 	–	1 x power / 1 x RJ45	18 ... 13 / 24 ... 22	–	1404333	
		1 x power / 1 x SC-RJ	18 ... 13		1404346	

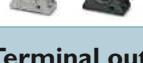
* Tool 1653265 required

	Cable outlet	Material	AWG	Connection method	Data rate	Specification	Order No.
Connector							
	Straight	Zinc die-cast	26 ... 24	IDC fast connection	Up to 1 Gbps CAT5	—	1422661
			23 ... 22			—	1422664
	Angled bottom		26 ... 24			—	1422662
			23 ... 22			—	1422665
	Angled top		26 ... 24			—	1422663
			23 ... 22			—	1422667
			26 ... 24			—	1403367
	Straight		26 ... 24	Crimp connection	Up to 10 Gbps CAT6 _A	—	1422108*
			23 ... 22	IDC fast connection	Up to 100 Mbps CAT5	—	1403366
Panel mounting frames							
	—	Zinc die-cast	—	Square panel cutout	Assembled, CAT6 _A , socket insert, cable connection	—	1413961
	—		—		Assembled, CAT6 _A , socket insert, coupler module	—	1413962
	—		—		Unequipped, for PCB modules	—	1413963
	—		—	Round panel cutout	Unequipped, for Freenet modules	—	1405222
Socket inserts							
	—	Zinc die-cast	—	Cable module	Up to 1 Gbps CAT5	Freenet	1652936
	—		—		Up to 10 Gbps CAT6 _A		1418984
	—		—	Coupler module	Up to 1 Gbps CAT6	—	1419022
	—		—	PCB module	Up to 10 Gbps CAT6 _A	—	1420401
Couplings							
	—	Die-cast aluminum	—	1 x RJ45, 1 x RJ45	—	—	1405183
Multi-ports							
	—	Die-cast aluminum	—	Cable module	—	1 x RJ45	1403678
	—		—		—	1 x RJ45, 1 x power	1403682
	—		—	Coupler module	—	1 x RJ45, 1 x RJ45	1403685
	—		—		—	2 x RJ45, 2 x power	1406395
	—		—		—	—	—
Terminal outlets							
	—	Die-cast aluminum	—	—	—	2 x RJ45	1404281
	—		—	—	—	1 x RJ45, 1 x power	1404333

* Tool 1653265 required

RJ45, snap-in locking (V6), IP65/67

 Web code: #0329

	Material	AWG	Connection method	Data rate	Features	Order No.
Connector						
	Plastic, gray	23 ... 26	IDC fast connection	Up to 1 Gbps CAT5	–	1656990
		24 ... 27	Crimp connection		–	1414383*
	Plastic, black	23 ... 26	IDC fast connection	Up to 1 Gbps CAT5	–	1658493
		24 ... 27	Crimp connection		–	1414408*
Panel mounting frames						
	Plastic, gray	–	Round panel cutout	–	For Keystone modules	1689844
		–		–	For Freenet modules	1653744
	Plastic, black	–		–	For Keystone modules	1658053
		–		–	For Freenet modules	1658668
	Plastic, gray	–	Square panel cutout	–	For Keystone modules	1689080
		–		–	For PCB modules	1689446
	Plastic, black	–		–	For Keystone modules	1658642
		–		–	For PCB modules	1658655
Socket inserts						
	Metal	–	Cable module	Up to 1 Gbps CAT5	Freenet module	1652936
		–		Up to 10 Gbps CAT6 _A		1418984
	Metal	–	Coupler module	Up to 1 Gbps CAT5	Keystone module	1689064
		–		Up to 1 Gbps CAT6		1653155
	Metal	–	PCB module	Up to 1 Gbps CAT6	Freenet module	1419022
		–		–	Straight, CAT6	1653090
		–		–	Angled, CAT5	1688586
	Metal	–		–	Angled, CAT6	1653087
Couplings						
	Plastic, gray	–	–	–	1 x RJ45/RJ45	1689268
		–	–	–	1 x RJ45/RJ45	1658684
Terminal outlets						
	Die-cast aluminum	–	–	–	2 x RJ45	1404278

RJ45, patch cables for PROFINET, up to 100 Mbps

 Web code: #0326

	IP20 cables			IP65/67 cables				
								
	Open cable end	RJ45 connector, straight	RJ45 connector, angled	RJ45 connector, version 14, metal	RJ45 connector, version 14, plastic	M12 connector, SPEEDCON, straight	M12 connector, SPEEDCON, angled	
IP20 cables, variable cable length								
	RJ45 connector, straight	1411857	1411861	1411862	1411863	1411864	1408639	1408613
	RJ45 connector, angled	1411858	1411862	1411865	—	—	1408638	1408612
IP65/67 cables, variable cable length								
	RJ45 connector, version 14, metal	1411859	1411863	—	1411866	—	1408636	1408610
	RJ45 connector, version 14, plastic	1411860	1411864	—	—	1411867	1408635	1408609
	M12 connector, SPEEDCON, straight	1408640	1408639	1408638	1408636	1408635	1408634	1408608
	M12 connector, SPEEDCON, angled	1408633	1408632	1408631	1408628	1408626	1408625	1408624
	M12 socket, SPEEDCON, straight	1408623	1408622	1408621	1408619	1408618	1408617	1408616
	M12 socket, SPEEDCON, angled	1408615	1408613	1408612	1408610	1408609	1408608	1408607
IP65/67 cables, limited cable length								
	1 m, 1437779	0.5 m, 1404367	—	—	—	—	—	—
	2 m, 1437782	1 m, 1404368	—	—	—	—	—	—
	5 m, 1437795	5 m, 1404369	—	—	—	—	—	—

PROFINET cable, type 93B

The PROFINET type 93B cable is designed for flexible installation and is oil resistant up to a degree. It is suitable for outdoor use, as it is UV-resistant for 1200 seconds according to UL 1581. Its transmission properties meet CAT5.

- Outer sheath material: PVC
- Minimum bending radius: 7 x D
- Tested at: +20°C ... +25°C

RJ45, patch cables for Ethernet, up to 1 Gbps

 Web code: #0327

	IP20 cables			IP65/67 cables				
								
IP20 cables, variable cable length								
	RJ45 connectors	1411838	1411842	1411843	1411844	1411845	1408681	1408674
IP65/67 cables, variable cable length								
	RJ45 connector, version 6	1411839	1411843	1411846	–	–	1408679	1408671
	RJ45 connector, version 14, metal	1411840	1411844	–	1411847	–	1408678	1408670
	RJ45 connector, version 14, plastic	1411841	1411845	–	–	1411848	1408677	1408668
	M12 connector, SPEEDCON, straight	1408682	1408681	1408679	1408678	1408677	1408676	1408667
	M12 connector, SPEEDCON, angled	1408675	1408674	1408671	1408670	1408668	1408667	1408666
	M12 socket, SPEEDCON, straight	1408665	1408664	1408662	1406661	1408660	1408659	1408658
	M12 socket, SPEEDCON, angled	1408657	1408655	1408653	1408652	1408651	1408650	1408649
IP65/67 cables, limited cable length, 5 m								
	M12 flush-type socket, rear mounting	1407877	1412082	1412231	1412503	1412590	–	–

Ethernet cable, type 94B

The Ethernet type 94B cable is designed for flexible installation. The cable is resistant to oil and chemicals and is flame-retardant. Its transmission properties meet CAT5.

- Outer sheath material: PUR
- Minimum bending radius: 5 x D

RJ45, patch cables for Ethernet, up to 10 Gbps

 Web code: #0328

	IP20 cables		IP65/67 cables				
							
	Open cable end	RJ45 connector	RJ45 connector, version 6, plastic	RJ45 connector, version 14, metal	RJ45 connector, version 14, plastic	M12 connector, SPEEDCON	
IP65/67 cables, variable cable length							
	RJ45 connector, plastic	1411853	1411854	1414321	1411855	1411856	—
	RJ45 connector, version 6	1415639	1414321	1414322	—	—	—
	RJ45 connector, version 14, metal	1415637	1411855	—	1414323	—	—
	RJ45 connector, version 14, plastic	1415638	1411856	—	—	1414324	—
	M12 connector, SPEEDCON, straight	1408648	1408647	—	1408646	1408645	1408644
IP65/67 cables, limited cable length							
	M12 flush-type socket, rear mounting	1 m 1424148	—	—	—	—	—
		2 m 1424151	—	—	—	—	—
		5 m 1424164	—	—	—	—	—

Ethernet cable, type 94F

The Ethernet type 94F cable is designed for flexible installation. The cable is resistant to oil and chemicals and is flame-retardant. It is also halogen-free and its transmission properties meet CAT6A.

- Outer sheath material: PUR
- Minimum bending radius: 10 x D

Assembled office patch cables, IP20		
Outer sheath material: LSFROH external diameter: 5.5 mm material of single wires: Cu litz wires single wires per module: 8 cross section of single wires: 0.14 mm ²		
Ethernet	CAT5, S/UTP shielding	CAT6, S/FTP shielding
0.3 m	2832250	2891181
0.5 m	2832263	2891288
1 m	2832276	2891385
1.5 m	2832221	2891482
2 m	2832289	2891589
3 m	2832292	2891686
5 m	2832580	2891783
7.5 m	2832616	2891880
10 m	2832616	2891877
12.5 m	–	2891369
15 m	–	2891372
20 m	–	2891576

Accessories for office patch cables and sockets						
Color coding	Security element	Color coding	Safe clip	Security frame	Dust protection cap	
For easy visual color coding	Self-locking, against unintentional release, lockable	For easy visual color coding of the security elements	Self-locking, against unintentional release	For SFN switches and patch fields, including key	For RJ45 sockets	
Black 2891194	Lockable element 2891424	Black 2891136	2891246	Green 2891615	2832991	
Blue 2891291		Blue 2891233	–	Red 2891712	–	
Brown 2891495	Key 2891521	Orange 2891330	–	White 2891819	–	
Yellow 2891592	–	Yellow 2891437	–	Lock 2891220	–	
Gray 2891699	–	Turquoise 2891534	–	Key 2891327	–	
Green 2891796	–	Green 2891631	–	–	–	
Red 2891893	–	Red 2891738	–	–	–	
Violet 2891990	–	Violet 2891835	–	–	–	

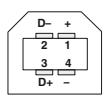
USB, patch cables, and panel mounting frames

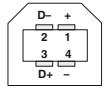
 Web code: #0335

Assembled USB cables, type A



IP20, open cable end	Length	IP20	IP67
	1 m	1655771	1655742
	2 m	2655784	1655755
	5 m	1655797	1655768

IP20, USB plug type B	Length	IP20	IP67
 	1 m	1654853	–
	2 m	1653935	1653896
	5 m	1653948	1653906

IP67, USB plug type B	Length	IP20	IP67
 	2 m	1653919	1653870
	5 m	1653922	1653883

IP67, M12 Mini USB, SPEEDCON	Length	IP20	IP67
	1 m	1420168	–
	2 m	1420171	–
	4 m	1420184	–

IP65/67 panel mounting frames				
Panel mounting frames, equipped	Plastic, gray, round panel cutout		Pin connector	Die-cast zinc, solder connection
With USB socket A/ socket B	1411904	–	–	–
With USB socket B/ socket A	1411905	–	–	–
Panel mounting frames, unequipped				
For Freenet modules	–	1653744	–	–
Freenet modules				
USB type A socket	–	–	1653854	–
USB type B socket	–	–	1653867	–
Panel-mount connector				
M12 with mini USB B	–	–	–	1440711

RJ45 patch panel, IP20

 Web code: #1561

	Connection method	Description	Ethernet, 8-pos.	Ethernet, 4-pos.
RJ45 patch panel, IP20, CAT5e, for DIN rail mounting				
	With screw connection	Shielding, directly on the DIN rail (8 and 4-pos.) or optionally via RC combination (only 8-pos.)	2901643	2744610
	With spring-cage connection	Shielding either directly on DIN rail or via RC combination	2901642	—
	With LSA connection	Shielding either directly on DIN rail or via RC combination	2901645	—
	With socket/ socket connection	Shielding either directly on DIN rail or via RC combination	2901646	—
	With socket/ socket connection	Consistent shield, extended temperature range -40°C ... +85°C, narrow overall width	2904933	—
	With spring-cage connection	Cable sharing module with cable outlet to the front, option of shield contacting on DIN rail via jumpers	2903532	—
	With spring-cage connection	Cable sharing module with cable outlet to the top, option of shield contacting on DIN rail via jumpers	2904577	—

IP65/67 M12 connectors

 Web code: #0338

		IDC connection		Spring connection		Piercecon® connection		Screw connection	
Networks		Straight	Angled	Straight	Angled	Straight	Angled	Straight	Angled
Ethernet CAT5, 4-pos.	Pin	1411066	1553624	—	—	—	—	1521261	—
	Socket	1411069	1553637	—	—	—	—	—	—
Ethernet 8-pos.	Pin	1421679	1553653	—	—	—	—	—	—
	Socket	1421680	1553666	—	—	—	—	—	—
Ethernet CAT6A, 8-pos.	Pin	1411043	—	—	—	1417430	1417443	—	—
	Socket	1414586	—	—	—	—	—	—	—
	Pin	1411068	1554539	1436738	1436754	—	—	1521261	—
	Socket	1411071	1554542	1436741	1436767	—	—	—	—
	Pin	1429130	1429156	—	—	—	—	—	—
	Socket	1429143	1429169	—	—	—	—	—	—
Fieldbuses									
	Pin	—	—	1432800	1432813	—	—	1507764	1430417
	Socket	—	—	1432826	1432839	—	—	1507777	1430420
	Pin	1413931	—	1432842	1432855	—	—	1507764	1430417
	Socket	1413932	—	1432868	1432871	—	—	1507777	1430420
	Pin	1422759	—	1432761	1432774	—	—	1508352	—
	Socket	1422760	—	1432787	1432790	—	—	1508365	—
	Pin	—	—	1559767	—	—	—	—	—
	Socket	—	—	1559770	—	—	—	—	—

IP65/67 M12 device connectors

		Wave soldering		THR soldering	
					
Networks		Pin	Socket	Pin	Socket
Ethernet	CAT5, 4-pos.	1456514	1456527	1552214*	1551451*
	CAT5, 4-pos., cable type 93E 2 m	—	—	—	—
	CAT5, 8-pos.	1456530	1456543	1557578	1557549
	CAT5, 8-pos., cable type 94B 5 m	—	—	—	—
	CAT5, 8-pos., cable type 94C 2 m	—	—	—	—
	CAT6A, 8-pos.	—	1424177	—	1402457*
	CAT6A, 8-pos., cable type 94F 0.5 m	—	—	—	—
	CAT6A, 8-pos., cable type 94F 1 m	—	—	—	—
	CAT6A, 8-pos., cable type 94F 2 m	—	—	—	—
	CAT6A, 8-pos., cable type 94F 5 m	—	—	—	—
	CAT5, 8-pos., hybrid	—	1407503	—	1405225*
	CAT5, 8-pos., hybrid, cable type 94H 0.5 m	—	—	—	—
	CAT5, 8-pos., hybrid, cable type 94H 1 m	—	—	—	—
	CAT5, 8-pos., hybrid, cable type 94H 2 m	—	—	—	—
	CAT5, 8-pos., hybrid, cable type 94H 5 m	—	—	—	—
PROFINET	4-pos.	1456556	1456569	1552175	1542648
	4-pos., cable type 93B 0.5 m	—	—	—	—
	4-pos., cable type 93B 1 m	—	—	—	—
	4-pos., cable type 93B 2 m	—	—	—	—
	4-pos., cable type 93B 5 m	—	—	—	—
	4-pos., cable type 93C 2 m	—	—	—	—
	4-pos., cable type 93R 3 m	—	—	—	—
Sercos	4-pos.	1457979	1457966	—	—
	4-pos., cable type 93K	—	—	—	—
	4-pos., cable type 93K	—	—	—	—
	4-pos., cable type 93K	—	—	—	—
	4-pos., cable type 93K	—	—	—	—
EtherCAT	4-pos.	1456556	1456569	—	—
	4-pos., cable type 93K	—	—	—	—
	4-pos., cable type 93K	—	—	—	—
	4-pos., cable type 93K	—	—	—	—
	4-pos., cable type 93K	—	—	—	—
M12 for fieldbuses		Pin	Socket	Pin	Socket
PROFIBUS	5-pos. 0.5 m	1456475	1456488	—	—
INTERBUS	5-pos. 0.5 m	1456572	1456585	—	—
CANopen® EtherNet/IP™	5-pos. 0.5 m	1456491	1456501	—	—
CC-Link	4-pos.	1457856	1457869	—	—
FOUNDATION Fieldbus	4-pos.	1457872	1457885	—	—

SMD soldering		Bulkheads, M12 to RJ45					
Pin	Socket	Straight	Angled	Pin	Socket	Pin	Socket
1411956*	1411950*	—	—	—	—	1411592	1411585
—	—	—	—	—	1405866	—	—
—	—	1414396	1414393	—	—	—	—
—	—	—	—	—	1407877	—	—
—	—	—	—	—	1412820	—	—
—	1411964*	1404549	1404548	—	—	—	—
—	—	—	—	—	1424135	—	—
—	—	—	—	—	1424148	—	—
—	—	—	—	—	1424151	—	—
—	—	—	—	—	1424164	—	—
—	1411965*	—	—	—	—	—	1407618
—	—	—	—	—	1407504	—	—
—	—	—	—	—	1407505	—	—
—	—	—	—	—	1407506	—	—
—	—	—	—	—	1407507	—	—
—	—	1414398	1414397	—	—	—	—
—	—	—	—	1427805	1437766	—	—
—	—	—	—	1437818	1437779	—	—
—	—	—	—	1437821	1437782	—	—
—	—	—	—	1437834	1437795	—	—
—	—	—	—	—	1416209	—	—
—	—	—	—	—	1416263	—	—
—	—	—	—	—	—	—	—
—	—	—	—	1410158	1419154	—	—
—	—	—	—	1419159	1419155	—	—
—	—	—	—	1419160	1419156	—	—
—	—	—	—	1419161	1419157	—	—
—	—	—	—	—	—	—	—
—	—	—	—	1419138	1419134	—	—
—	—	—	—	1419139	1419135	—	—
—	—	—	—	1419140	1419136	—	—
—	—	—	—	1419141	1419137	—	—
Pin	Socket	Straight	Angled	Pin	Socket	Pin	Socket
—	—	—	—	1534342	1534384	—	—
—	—	—	—	1534504	1534546	—	—
—	—	—	—	1534423	1534465	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	1431432	1431429

Assembled cables for Ethernet networks

	Cable structure	Conduct. construction/ signal line	Description	By the meter	100 m ring	Assembled
93E						
	2 x 2 x AWG 28	7 x 0.25 m	Ethernet cable for flexible use. The cable is halogen-free, oil resistant, and fulfills transmission properties according to CAT5e.	1416415	1416305	—
94A						
	4 x 2 x AWG 24	Single-strand, twisted pair	Ethernet cable for fixed installation. The cable meets transmission properties according to CAT5e.	1416415	1416305	—
94B						
	4 x 2 x AWG 28	7 x 0.25 mm	Ethernet cable for flexible installation. The cable is resistant to oil and chemicals and is flame-retardant. The cable meets transmission properties according to CAT5e.	1417333	1416567	1416428
94D						
	4 x 2 x AWG 26	7 x 0.18 m, twisted pair	Ethernet cable for flexible installation. The cable is oil resistant up to a degree. It is UV-resistant according to UL1581 Sec.1200 and therefore also suitable for outdoor use. The cable meets transmission properties according to CAT5e.	1416444	1416334	—
94E						
	4 x 2 x AWG 23	Single-strand, twisted pair	Ethernet cable for fixed installation. The cable is resistant to oil and chemicals and is flame-retardant. It is also halogen-free and its transmission properties meet CAT6A.	1416460	1416334	—
94F						
	4 x 2 x AWG 26	7 x 0.16 mm, twisted pair	Ethernet cable for flexible installation. The cable is resistant to oil and chemicals and is flame-retardant. It is also halogen-free and its transmission properties meet CAT6A.	1417359	1416347	1402609

Assembled cables for PROFINET networks

	Cable structure	Conduct. construction/ signal line	Description	By the meter	100 m ring	Assembled
93A						
	4 x AWG 22	Single-strand	PROFINET cable for fixed installation. The cable is flame-retardant and fulfills transmission properties according to CAT5e.	1416486	1416392	—
93B						
	4 x AWG 22	7 x 0.25 mm	PROFINET cable for flexible installation. The cable is oil resistant up to a degree. It is UV-resistant according to UL1581 Sec.1200 and therefore also suitable for outdoor use. The cable's transmission properties meet CAT5e.	1417362	1416389	1416499
93C						
	4 x AWG 22	7 x 0.25 mm	PROFINET cable for use in drag chains. The cable is halogen-free and oil resistant. It is UV-resistant and therefore suitable for outdoor use. The cable's transmission properties meet CAT5e.	1417491	1416376	1416509
93R						
	4 x AWG 22	19 x 0.15 mm	PROFINET cable for robot applications. The cable is oil resistant up to a degree. It is UV-resistant according to UL1581 Sec.1200 and therefore also suitable for outdoor use. The cable's transmission properties meet CAT5e.	1417388	1416363	1416512
937						
	4 x AWG 22	7 x 0.25 mm	PROFINET cable for railway applications. The cable is oil resistant. It meets fire safety standard BS6853. The cable's transmission properties meet CAT5e.	1402687	1416363	1402611

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	Cable outlet	Material	Connection method	Data rate	Specification	Order No.
Connector						
	Straight	Die-cast zinc	POF	Up to 100 Mbps	–	1407896
			PCF		–	1407897
	Angled bottom		POF		–	1407902
			PCF		–	1407904
	Angled, top		POF		–	1408028
			PCF		–	1408055
Panel mounting frames						
	–	Die-cast zinc	Round panel cutout	–	Assembled, with coupler module, for POF, PCF, and GOF	1405235
	–		Square panel cutout	–	Assembled, with coupler module, for POF, PCF, and GOF	1413964
	–			–	Unequipped, for AVAGO transceiver	1413981
Coupling						
	–	Die-cast zinc	–	–	1 x SC-RJ / 1 x SC-RJ	1405206
Multi-ports						
	–	Die-cast aluminum	–	–	1 x SC-RJ	1404319
	–		–	–	1 x SC-RJ / 1 x power	1404321
Terminal outlets						
	–	Die-cast aluminum	–	–	2 x SC-RJ	1404320
	–		–	–	1 x SC-RJ / 1 x power	1404346
Tool sets						
	–	–	–	–	For POF	1405246
	–	–	–	–	For PCF	1411051

SC-RJ, snap-in locking (V6), IP65/67

 Web code: #0334

	Material	Connection method	Data rate	Specification	Order No.
Connector					
	Plastic	POF	Up to 100 Mbps	–	1657009
		PCF			1657012
Panel mounting frames					
	Plastic, gray	Round panel cutout	–	Unequipped, for Freenet modules	1653744
	Plastic, black			Unequipped, for AVAGO transceiver	1658545
				Unequipped, for Freenet modules	1658668
Socket insert for panel mounting frames					
	Plastic	POF, PCF, and GOF	–	Freenet coupler module	1652978
Coupling					
	Plastic	–	–	1 x SC-RJ 1 x SC-RJ	1410050
Terminal outlets					
	Die-cast aluminum	–	–	2 x SC-RJ	1404317
Tool sets					
	–	–	–	For POF	1405246
				For PCF	2708876

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Fiber optics, connectors for assembly

 Web code: #0332

	Function	Fiber type	Specification	Order No.		
LC						
	Connector	GOF	Multimode	1411294		
			Single mode PC	1411295		
			Single mode APC	1412476		
			Multimode	1411052		
			Single mode PC	1411053		
			Single mode APC	1412472		
Coupling			–	2700312		
SC						
	Connector	GOF	Multimode	1411296		
			Single mode PC	1411297		
			Single mode APC	1412478		
			Multimode	1411292		
			Single mode PC	1411293		
			Single mode APC	1412474		
		PCF	SC, SC-RJ (\varnothing 2.2 mm)	2313779		
Coupling			–	2901788		
SC-RJ						
	Connector	GOF	Multimode	1411290		
			Single mode PC	1411291		
			Single mode APC	1412473		
		PCF	SC, SC-RJ (\varnothing 2 ... 3 mm)	1411304		
			SC, SC-RJ (\varnothing 2.2 mm)	1404087		
		POF	SC-RJ (\varnothing 2.9 mm)	1654866		
		Coupling	GOF, PCF, POF	–		
Coupling			–	1652978		
F-SMA						
	Connector	PCF	F-SMA (\varnothing 2.9 mm)	2799487		
		POF	–	2799720		
	Coupling	GOF, PCF, POF	–	2799416		
ST (B-FOC)						
	Connector	PCF	ST (\varnothing 2.2 mm)	2313782		
			ST (\varnothing 2.9 mm)	2708481		
	Coupling	GOF, PCF, POF	–	2799429		
Tool sets						
	Tool set	GOF	Multimode and single mode	1411049		
		PCF	SC, SC-RJ (\varnothing 2 ... 3 mm)	1411051		
			SC, SC-RJ (\varnothing 2.2 mm), SC-RJ (\varnothing 2.9 mm)	2708876		
			ST (\varnothing 2.2 mm), ST (\varnothing 2.9 mm)	2708465		
			F-SMA (\varnothing 2.9 mm)	2799526		
		POF	SC-RJ	1405246		
			F-SMA	2744131		

Fiber optics, patch panels, and socket inserts, IP20

 Web code: #0336

	Mounting type	Material	Specification	Order No.
Patch panels				
	DIN rail mounting	Plastic, gray	Incl. coupler module, SC-RJ, for POF, PCF, and GOF	1658121
	19" mounting		16 installation slots, for Freenet modules, unequipped	1652994
Terminal boxes for Freenet modules				
	Surface mounting	Plastic, white	Unequipped, for 2 modules	1653003
			Unequipped, for 6 modules	1653029
	Flush-mounted		Unequipped, for 2 modules	1653016
Socket inserts, Freenet modules				
	Coupler module	–	SC-RJ, for POF, PCF, and GOF	1654358
			LC duplex, multimode	2700312
			LC duplex, single mode	2700313

Fiber optics, splice boxes, IP20

 Web code: #0336

	Mounting type	Material	Specification	Order No.
Splice boxes				
	DIN rail mounting	6 x LC duplex	Multimode, unequipped	1411901
			OM2, equipped and splice-ready	1420318
		6 x SC duplex	Multimode, unequipped	1411902
	19" mounting	12 x ST simplex	Multimode, unequipped	1411903
		12 x LC duplex	OM2, gray, equipped and splice-ready	1418815
			OM4, black, equipped and splice-ready	1418817
		24 x LC duplex	OM2, gray, equipped and splice-ready	1418816
			OM4, black, equipped and splice-ready	1418818

		Variable lengths 1 m ... 1000 m				
						
F-SMA	Fiber type	FSMA	SC-RJ	SC duplex	ST (B-FOC)	LC duplex
	OM1	1409855	–	1406536	1406535	1413787
	OM2	–	–	–	–	–
	OM3	–	–	–	–	–
	OM4	–	–	–	–	–
SC-RJ						
	OM1	–	–	–	–	–
	OM2	–	1405703	1405700	1405710	1405694
	OM3	–	1405704	1405701	1405711	1405695
	OM4	–	1405705	1405702	–	1405696
SC duplex						
	OM1	1406536	–	1413790	1413791	1413789
	OM2	–	1405700	1405697	1405708	1405691
	OM3	–	1405701	1405698	1405709	1405692
	OM4	–	1405702	1405699	–	1405693
ST (B-FOC)						
	OM1	1406535	–	1413791	1413821	1413792
	OM2	–	1405710	1405708	1405712	1405706
	OM3	–	1405711	1405709	–	1405707
	OM4	–	–	–	–	–
ST (B-FOC)						
	OM1	1413787	–	1413789	1413792	1413788
	OM2	–	1405694	1405691	1405706	1405688
	OM3	–	1405695	1405692	1405707	1405689
	OM4	–	1405696	1405693	–	1405690

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Fiber optics, fiberglass zip cords, single mode, IP20

 Web code: #0333

		Fixed lengths		
LC duplex	Cable length	LC duplex, OS2	SC duplex, OS2	ST (B-FOC), OS2
	1 m	2989187	2989190	2989242
	2 m	2989284	2989297	2989349
	5 m	2901826	2901827	2901828
SC duplex				
	1 m	2989190	2901829	2901832
	2 m	2989297	2901830	2901833
	5 m	2901827	2901831	2901834
ST (B-FOC)				
	1 m	2989242	2901832	2901836
	2 m	2989349	2901833	2901837
	5 m	2901828	2901834	2901838

Zipcord fiber classes					
Multimode	Wire structure	Sheath color	Fiber type	Typical range	Typical wavelength
	 62.5 µm 125 µm	Orange	OM1	1000Base-SX: min. 350 m 1000Base-LX: min. 550 m	850 nm 1300 nm
	 50 µm 125 µm	Orange	OM2	1000Base-SX: min. 525 m 1000Base-LX: min. 1000 m	850 nm 1300 nm
	 50 µm 125 µm	Aqua	OM3	1000Base-SX: min. 1000 m 1000Base-LX: min. 550 m 10GBase-SX: min. 300 m	850 nm 1300 nm
	 50 µm 125 µm	Heather violet	OM4	1000Base-SX: min. 1040 m 1000Base-LX: min. 600 m 10GBase-SX: min. 550 m	850 nm 1300 nm
Single mode					
	 8 µm 125 µm	Yellow	OS2	10GBase-LR: min. 10 km 10GBase-ER: min. 40 km	1310 nm 1550 nm

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