Industrial Ethernet

One network, all options

PHOENIX CONTACT
INSPIRING INNOVATIONS

The industrial Ethernet network portfolio from PHOENIX CONTACT

Phoenix Contact offers you more real-time, 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. We do this by consistently designing our products with the knowledge, tools, and skills of the automation specialist in mind.

Contents

Find out more with the web code

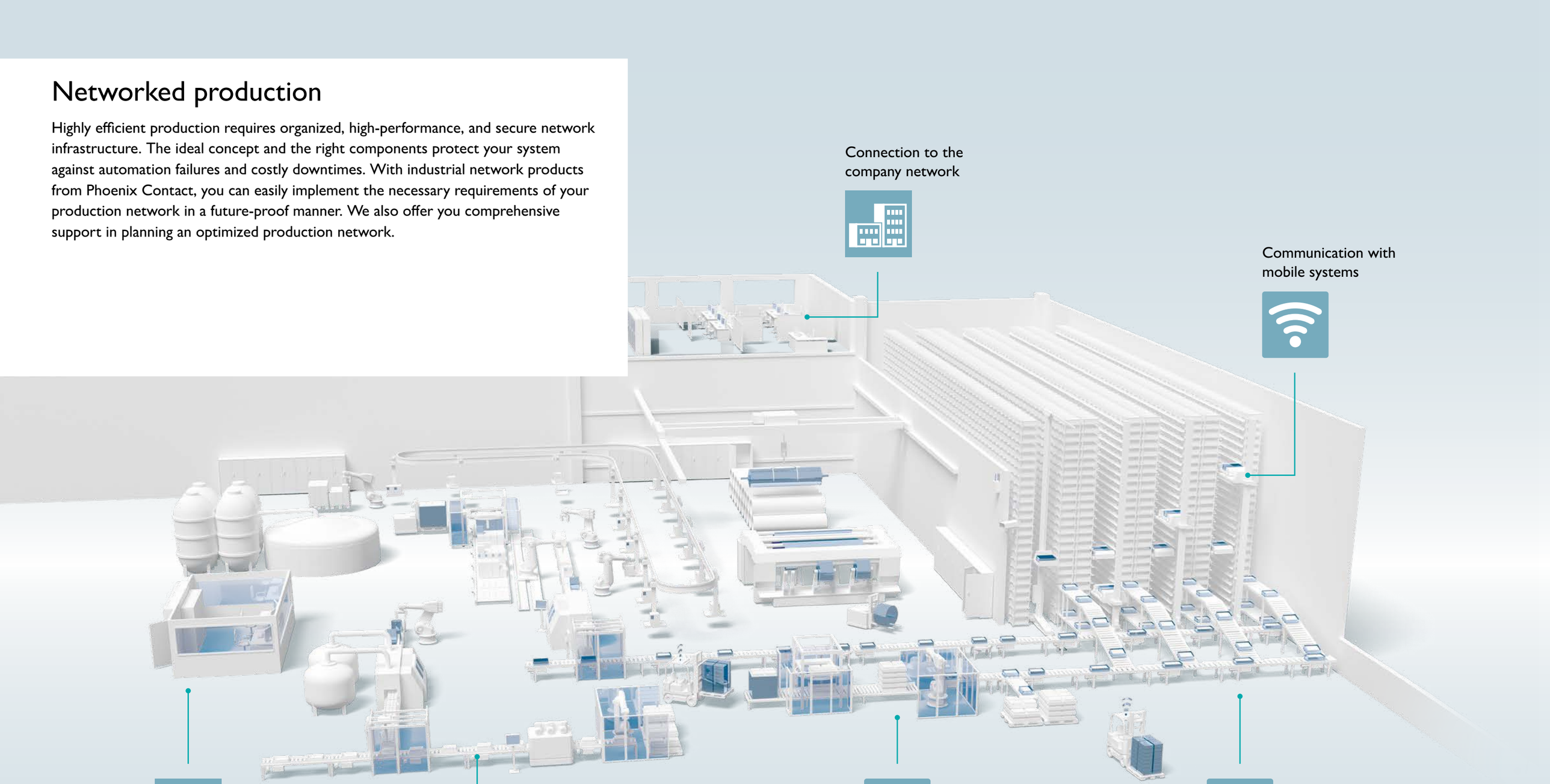
For detailed information, use the web codes provided in this brochure. Simply enter the # and the four-digit number in the search field on our website.

Web code: #1234 (example)

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

Networked production

Highly efficient production requires organized, high-performance, and secure network infrastructure. The ideal concept and the right components protect your system against automation failures and costly downtimes. With industrial network products from Phoenix Contact, you can easily implement the necessary requirements of your production network in a future-proof manner. We also offer you comprehensive support in planning an optimized production network.

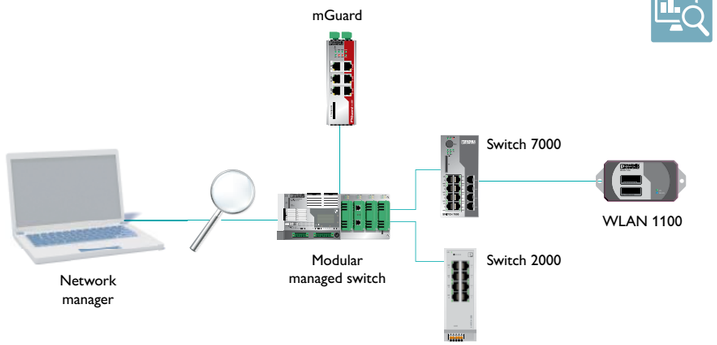


Solutions for the production network

Network management

Large production networks include many different components that all have to be configured and diagnosed. Easily integrate Phoenix Contact managed switches, WLAN components, and security appliances into operations using network management software. You can centrally assign IP addresses for network devices, configure several devices at the same time, and also update the firmware.

Further information on software from page 66



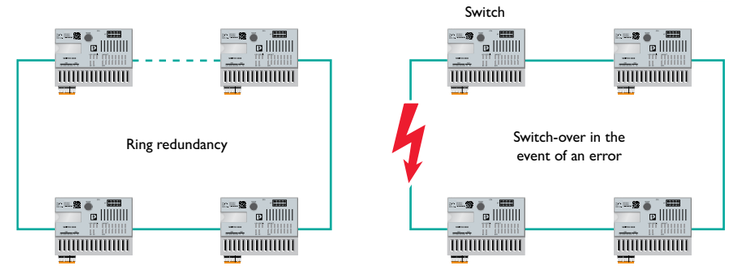
Network management with FL NETWORK MANAGER software

High network availability due to 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
- ERR (Extended Ring Redundancy)

Further information on managed switches from page 28

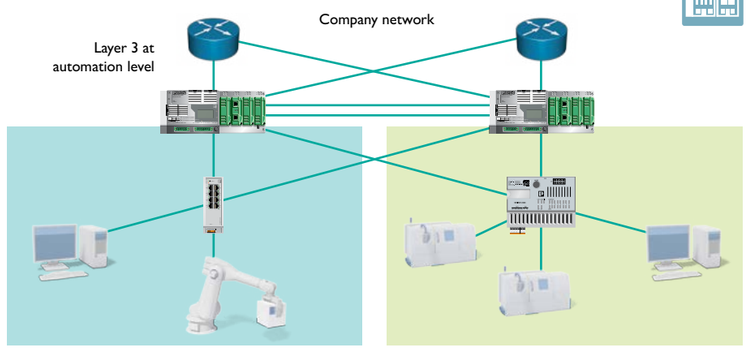


If an error occurs, the network structure is reorganized so that all devices can be reached again

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 from page 28

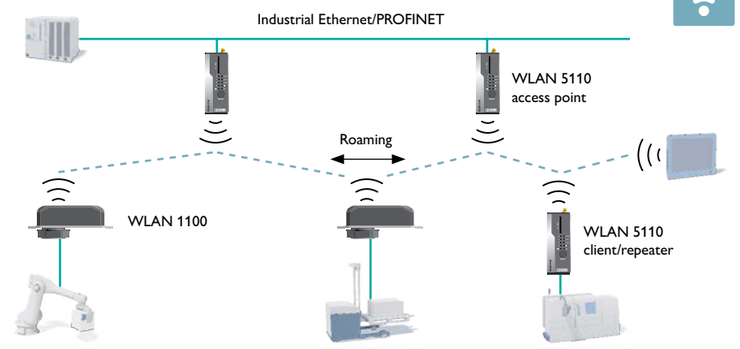


Subnet 1 Subnet 2

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. Real-time communication between the controller and carry system is thus ensured, even in data-intensive applications. Compliance with 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 from page 49

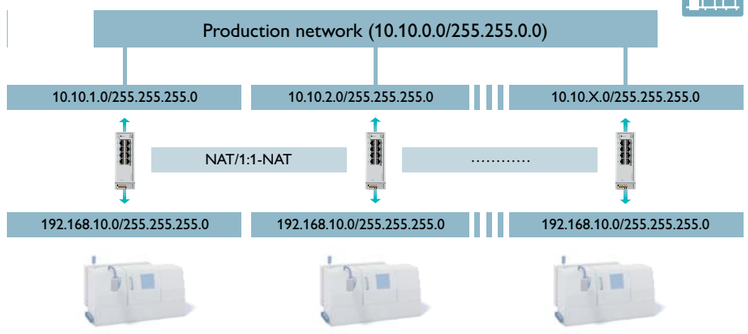


Wireless machine communication with industrial WLAN

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 adapt 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 from page 32 and mGuard security routers from page 52

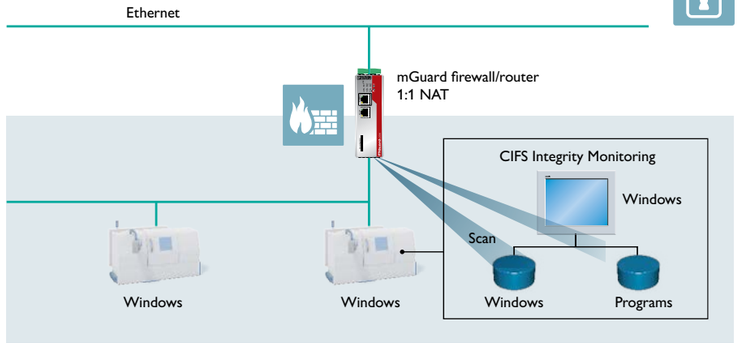


Automatic IP address translation using switches with NAT function

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.

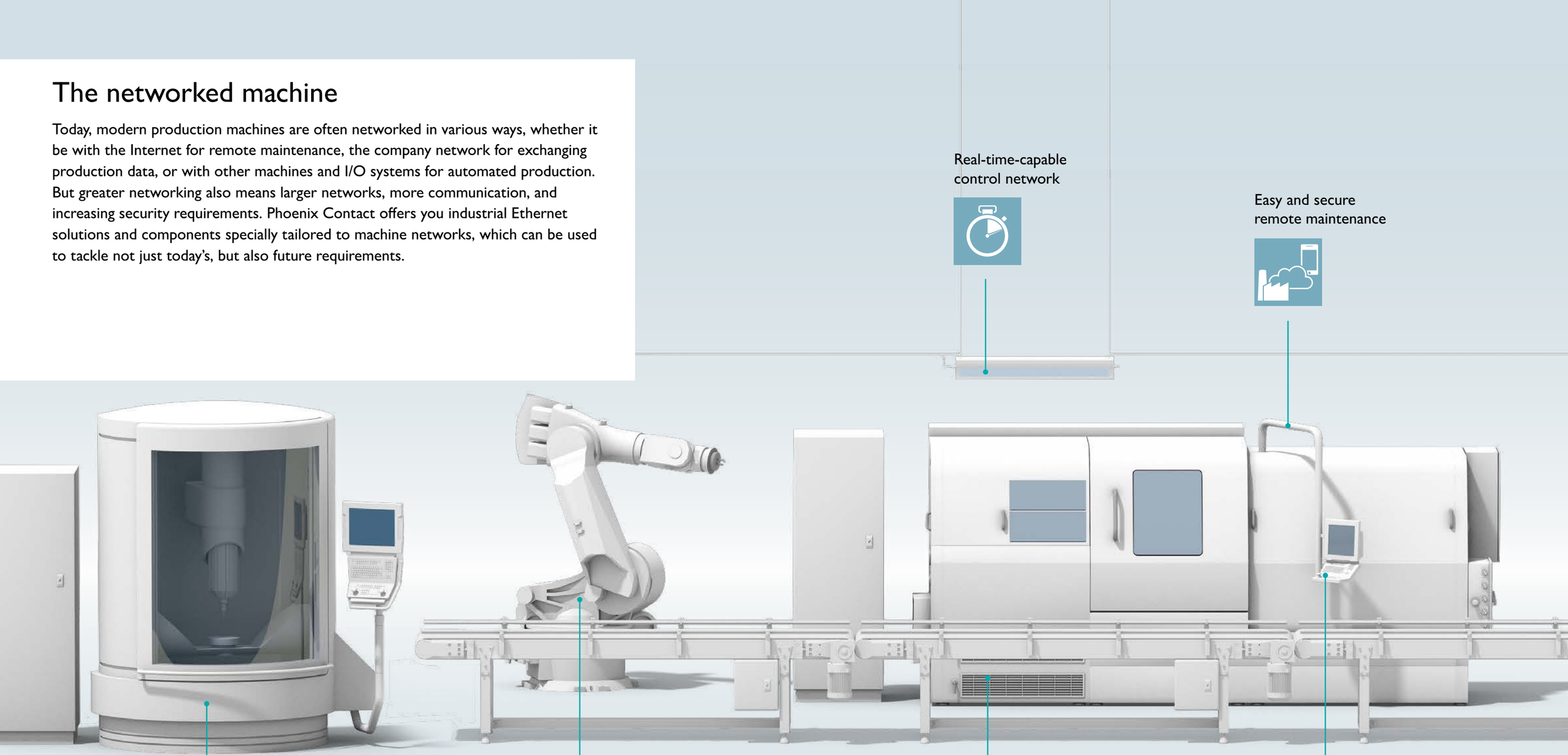
Further information on mGuard security routers from page 52



CIFS Integrity Monitoring protects computers with Windows operating systems

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. But 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.



Real-time-capable control network

Easy and secure remote maintenance

Central network configuration and monitoring

Stable machine networks

Operation with smart devices

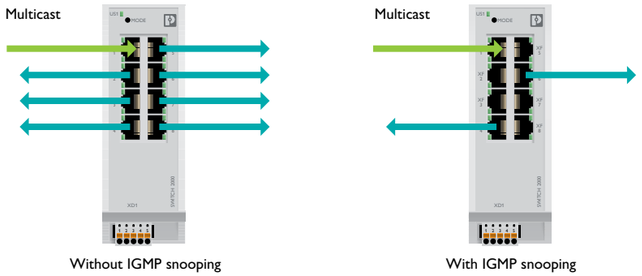
Integration into the production network

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 26

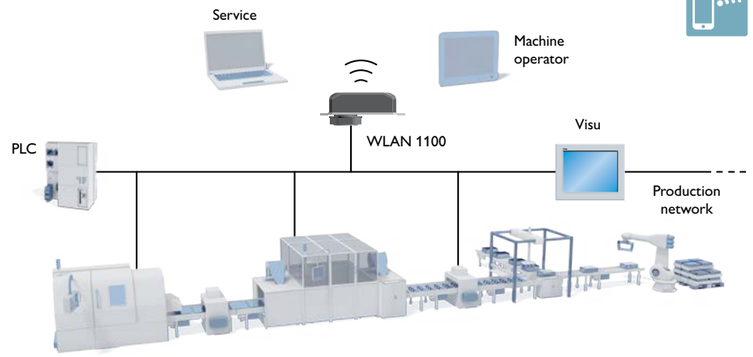


Multicast filters reduce the data load in the network

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 from page 49

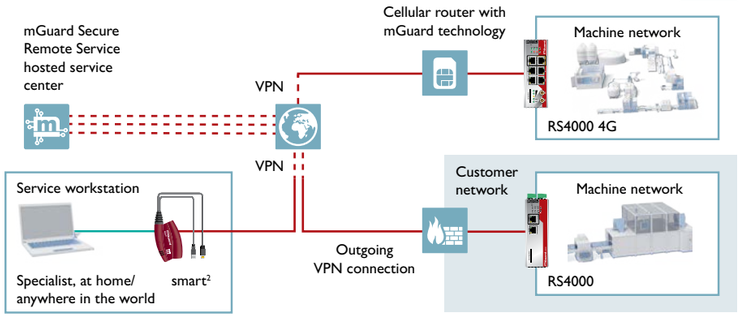


Wireless machine operation and service with wireless LAN

Easy and secure remote maintenance

The mGuard Secure Remote Service offers machine builders and system manufacturers a turnkey complete VPN solution. This 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 easily be fulfilled.

Further information on secure remote maintenance from page 56

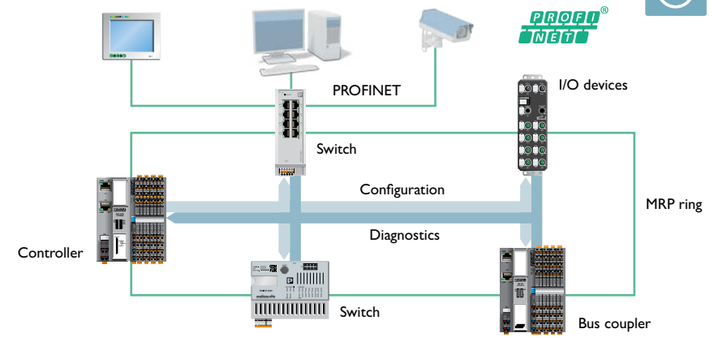


Secure remote maintenance concept with mGuard components

Real-time-capable control network

Automation switches combine IT functions with managed and real-time properties which optimally support PROFINET and EtherNet/IP™ protocols. They ensure stable and real-time-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 from page 28

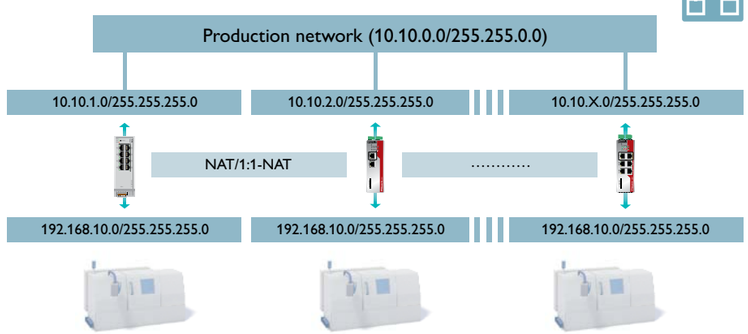


MRP redundancy for a failsafe machine network

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 real-time capability of internal machine communication is thus ensured.

Further information on NAT switches from page 32 and mGuard security routers from page 52

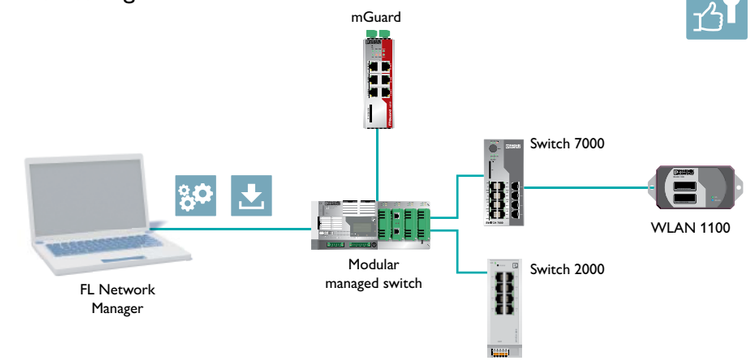


Machine connection with NAT and security routers

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 simplifying configuration and startup for series machine builders.

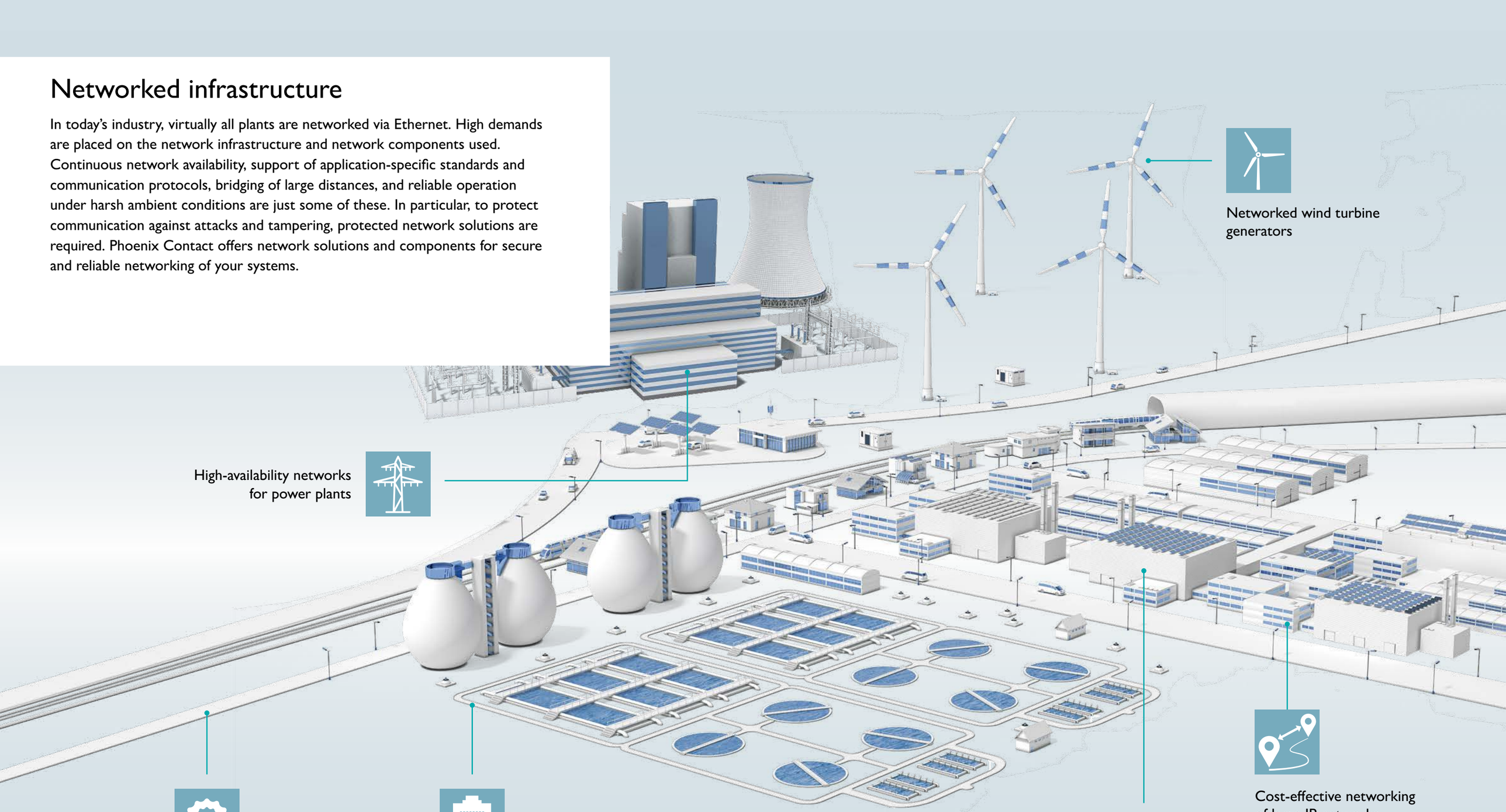
Further information on software from page 66



Network configuration and startup with FL Network Manager software

Networked infrastructure

In today's industry, virtually all plants are networked via Ethernet. High demands 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 these. 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.



Networked wind turbine generators

High-availability networks for power plants

Network availability

Power over Ethernet

Cybersecurity

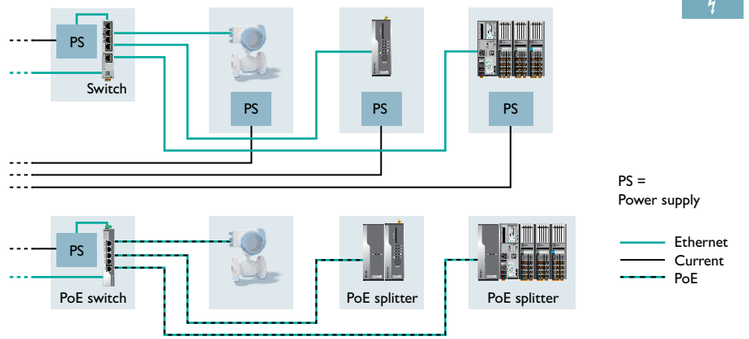
Cost-effective networking of large IP networks

Solutions for infrastructure networks

Power over Ethernet

With 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. Using PoE splitters, you can also supply standard Ethernet devices with energy via PoE.

Further information on Power over Ethernet from page 44

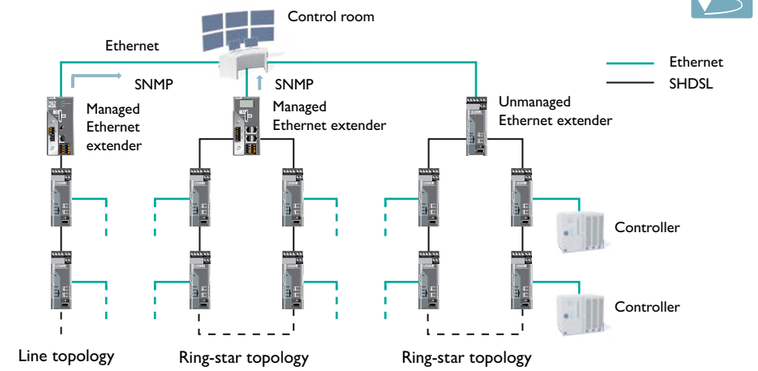


Streamlined and cost-effective cabling, thanks to PoE

Ethernet communication via any 2-wire cable up to 20 km

With the Ethernet extenders, not only can you connect simple point-to-point Ethernet applications, but also extended IP networks of up to 20 km. Thanks to managed Ethernet extenders, unmanaged Ethernet extenders can now also be diagnosed centrally via IP. The system generates a warning using SNMP when unexpected events occur, such as path weakening.

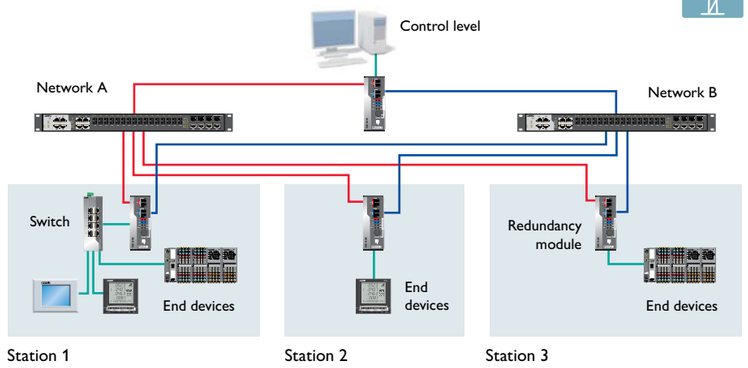
Further information on Ethernet extenders from page 57



Parallel network redundancy with PRP

PRP network redundancy is standardized in accordance with IEC 62439-3 and 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.

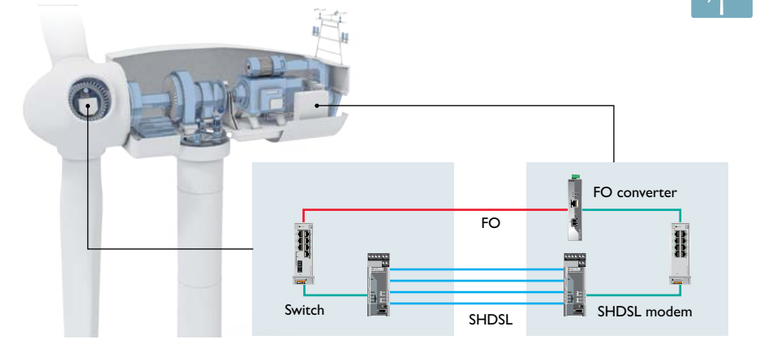
Further information on PRP redundancy modules from page 71



Networked wind turbine generators

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 slipring using SHDSL technology and two Ethernet extenders.

Further information on WDM products from page 23 and 75 and modems from page 56

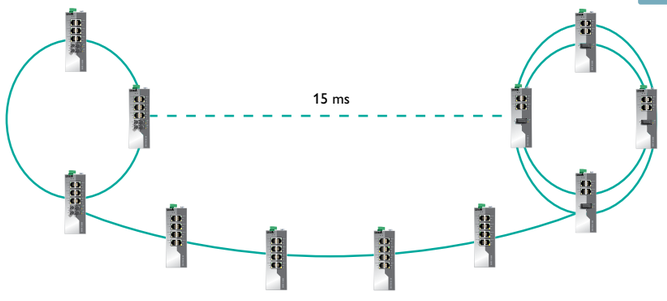


Redundant communication solution for secure data transmission to the hub

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

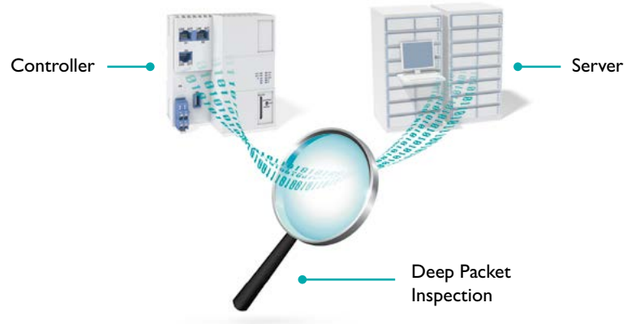


Extended ring redundancy for minimal switching times

Cybersecurity

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 Packet 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 from page 52 and remote maintenance from page 56

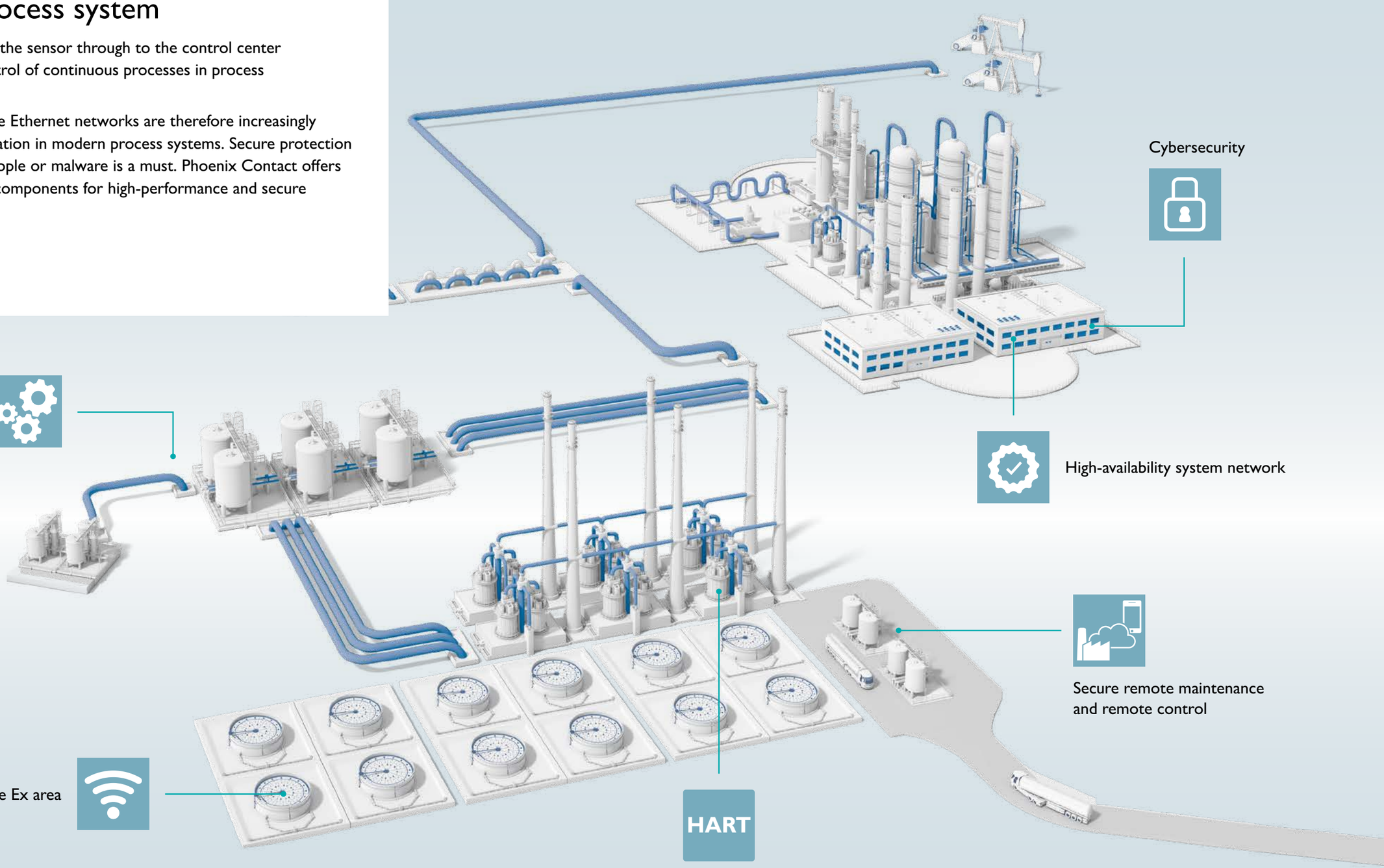


Deep Packet Inspection for OPC Classic and Modbus/TCP

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.

Robust, high-availability, and secure Ethernet networks are therefore 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.

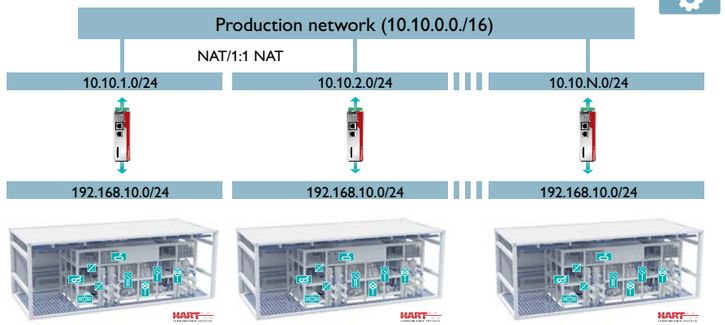


Solutions for process networks

Solutions for 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 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 from page 32 and mGuard security routers from page 52

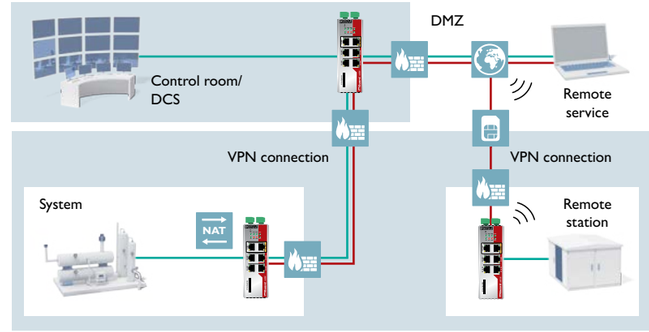


Access system parts with the same IP addresses with 1:1 NAT function

Cybersecurity

The mGuard firewall routers securely protect your network against the many dangers associated with increased networking. Reliably protect your system parts against unauthorized access by using secure VPN connections with an 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 from page 52

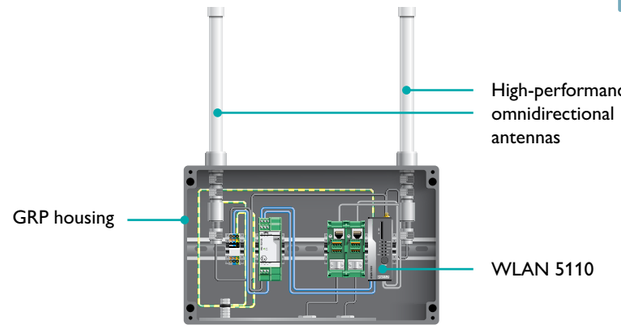


Protection of process systems with mGuard technology

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 from page 49

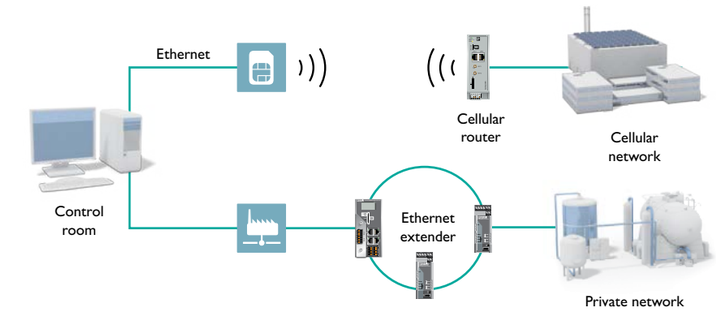


WLAN solutions for potentially explosive areas

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 cellular networks. Access remote network devices via the telephone network, which is available worldwide, or use 2-wire in-house cables for transmission speeds of up to 30 Mbps.

Further information on remote communication from page 56

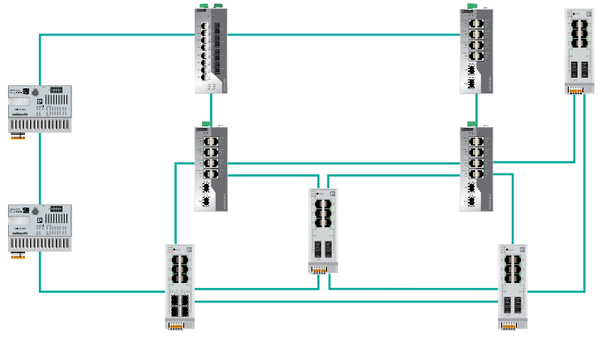


Remote communication via cellular and private networks

Rapid Spanning Tree for high-availability systems

RSTP is a standardized redundancy method (IEEE 802.1D-2004) that 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

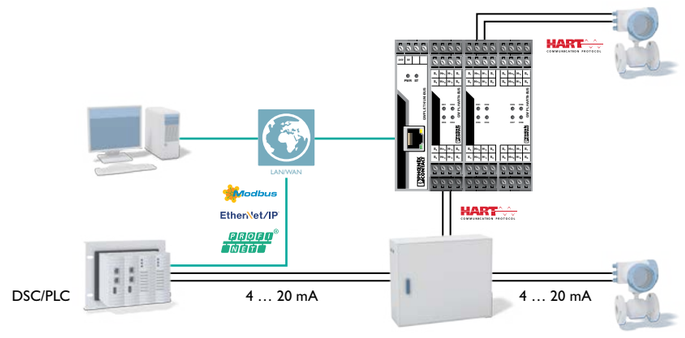


RSTP redundancy for high network availability

Utilization of 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 participants using 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.

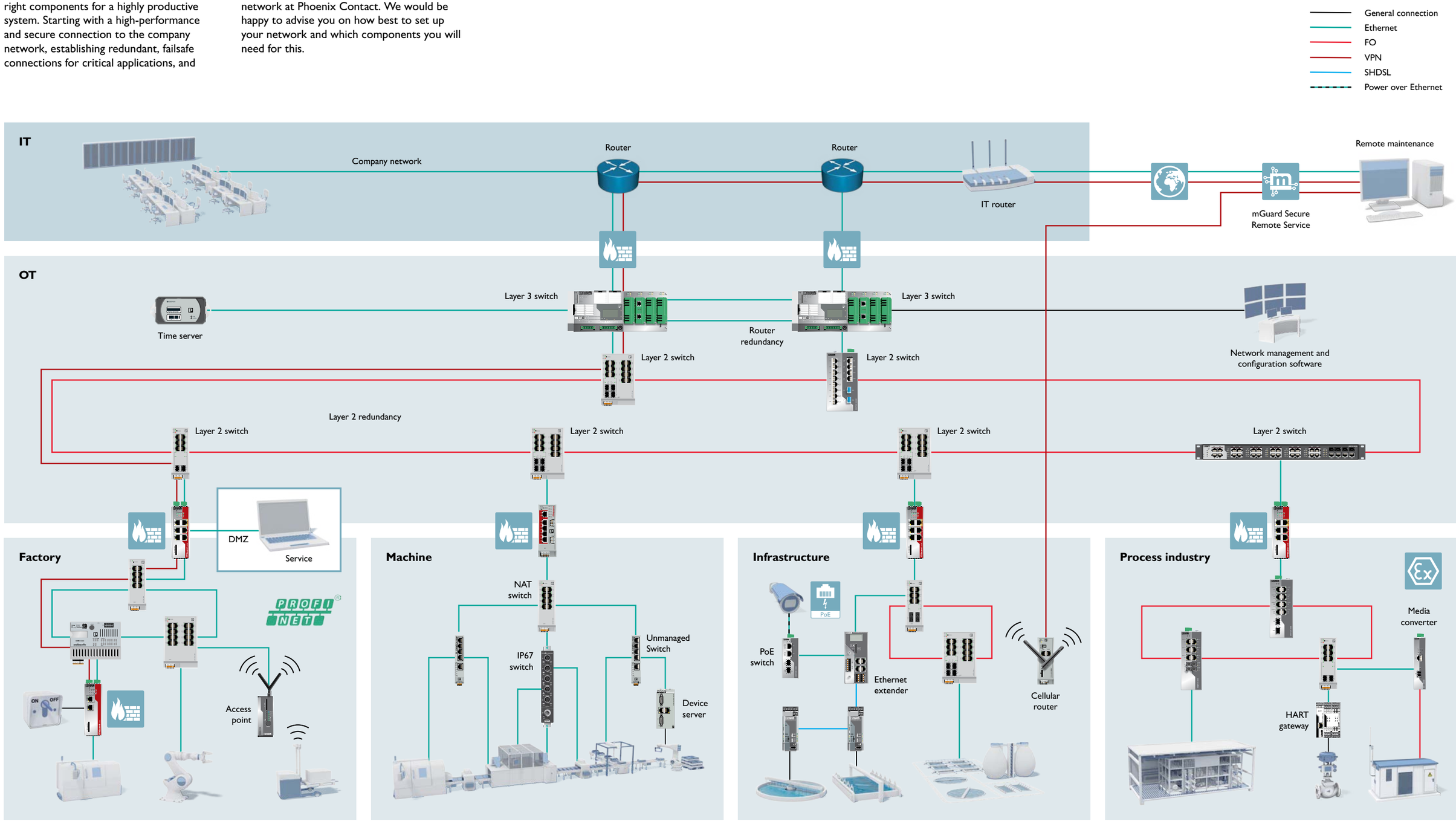
Further information on HART multiplexers on page 63



HART multiplexers can also be easily retrofitted in existing systems

The right network setup

Whether for factory, infrastructure, or process industry applications – you need the right network concept and the right components for a highly productive system. Starting with a high-performance and secure connection to the company network, establishing redundant, failsafe connections for critical applications, and maintaining firewalls and solutions for communication with remote locations, you will find the right solution for your network at Phoenix Contact. We would be happy to advise you on how best to set up your network and which components you will need for this.



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.

Your advantages

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

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 real-time protocols

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

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, in machine building and wind power, as well as shipbuilding. With single-mode fiberglass, you can achieve transmission ranges of up to 36 km.

For special applications

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

Product overview: Media converters

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 real-time 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. The media converters can therefore be used for real-time 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 in accordance with IEC 61850-3 and IEEE 1613							
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 converter 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	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 along the optical path is therefore just as transparent as it would be with purely copper-based communication. In the event of a network interruption, the transmission path is switched off. Redundancy mechanisms can be used directly. In 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 (latencies) 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 PROFINET®

Unmanaged switches

Unmanaged switches from Phoenix Contact excel with standard functions, a variable number of ports, and various designs. With a high level of immunity and a wide temperature range, they are entirely suitable for continuous operation in industrial applications. Select the right switch for your application.

Web code: #1550

Your advantages

- Auto negotiation and auto crossing ensure easy network creation and expansion
- Gigabit versions for high data throughput
- Electrical isolation and fiber optic versions for failure-free operation in industrial environments
- Quality of Service for the prioritization of automation protocols

For standard applications

The 1000 series unmanaged switches feature compact designs with gigabit transmission speeds and flexible installation options. The prioritization of traffic ensures a more stable network and increases your system availability.

For flat control cabinets

Using the mounting accessories, the FL SWITCH 1000 can also be mounted flat in the control cabinet or on the wall. At the same time, the port outlet direction can be freely selected: upward, downward. to the left or right. This enables flexible use for a large number of applications.

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

With the unique narrow design and extended temperature range, the IP67 switch is ideal for use in machine building. In addition, the M12 connections enable quick and easy startup of the switch.

Managed 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.

Phoenix Contact provides the universal 2000 series managed switches that are tailored to your system with an optimum performance spectrum for standard and PROFINET applications – simply select the design, approvals, and connections appropriate for your needs.

Web code: #1555

Your advantages

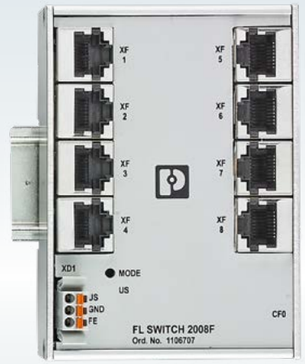
- Easy integration into existing networks and flexible redundancy for all topologies with the RSTP standard
- High availability with rapid redundancy switch-over by means of fast ring detection and MRP
- Diagnostics and analysis options with integrated software functions
- Varied connection methods for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

For standard applications

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 process industry.

For flat control cabinets

With the low overall depth and downward port output direction, the FL SWITCH 2400 and 2500 versions are ideally suited for use in flat control cabinets. The devices with 8 or 16 ports can also be used in extreme ambient conditions due to their robust metal housings.



For confined spaces

The FL SWITCH 2008F provides the proven functions of the FL-SWITCH-2000 range in the tightest of spaces. With an extremely flat design, the 8-port device with a forward port outlet direction can be used in very flat control cabinets.

For field applications

The FL SWITCH 2600 and 2700 devices are available for applications directly in the field. The robust housings enable mounting on a profile or on the wall and support classic M12 and M12 push-pull connections, which makes then extremely flexible in application. Moreover, a redundant power input/output also enables scalable networks.

Managed switches

The 3000 to 7000 series are designed for applications with special demands. The managed switches provide you with a range of IEEE standards and IT functions or properties in accordance with IEC 61850 and IEEE 1613. Furthermore, there are also switches that are specially optimized for use in PROFINET IRT or EtherNet/IP™ networks.

Web code: #1555

For high network availability

The PRP redundancy modules ensure high availability for your network. In the event of a failure, the modules enable parallel network redundancy without switching time, and they are suitable for use under the harshest electromagnetic, electrostatic, and climatic ambient conditions in accordance with IEC 61850-3/IEEE 1613.

More information on PRP modules on page 71

For failsafe applications

Switches from the 3000 and 4000 series are perfectly suited to challenging infrastructure applications. With 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 power plants

The E versions of the 3000 and 4000 switch series are even suitable for use under the harshest ambient conditions in accordance with IEC 61850-3 and IEEE 1613. With an extended temperature range, impact resistance, shock resistance, and vibration resistance, the fanless switches are particularly robust. Furthermore, the products are resistant to electrostatic discharge (ESD), transient disturbance variables (burst), surge voltages (surge), and magnetic fields.

For PROFINET IRT

The FL SWITCH IRT switches offer optimum real-time properties for PROFINET applications. They detect PROFINET data packets based on their ID and forward these data packets with the highest priority. The polymer fiber ports can be configured to create interference-free fiber optic rings that can be optionally diagnosed with an additional fiber optic branch.

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. With the Common Industrial Protocol (CIP), the FL SWITCH 7000 switches can be fully integrated into your EtherNet/IP™ control system.

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 switches with NAT routing function combine the properties of a managed switch with those of a 1:1 NAT router – in a single DIN rail device. The modular design of the managed switches forms the backbone of your automation application.

Your advantages

- Optimized network structure with segmentation via layer 3 switches
- Easy connection of machines to the production network regardless of the address area
- Switch with NAT function provides simple integration with higher-level networks for systems with the same IP address areas
- Connect several subnetworks via a wide range of media types using layer 3 function

Web code: #1556

For easy integration into the network

The FL NAT 2000 switches offer switch functions and NAT routing in just one DIN rail device. The NAT switches have a total of 8 ports that you can use as LAN or WAN ports depending on the application. This enables a redundant connection of machines to your higher-level network.

For particularly demanding tasks

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. The wide range of combinable media modules and use in PROFINET RT and EtherNet/IP™ offers advanced flexibility.

Switches overview

	Unmanaged switches		Managed switches								
											
	1000/1100	**SFNT**	**2000/2100**	**2200/2300/ 2400/2500**	**2600/2700**	**3000**	**4000/4800**	**PROFINET IRT**	**7000**	**NAT 2000/2200/2300**	**GHS Modular Managed**
Port speed (Mbps)	10/100/(1000)	10/100/(1000)	10/100/(1000)	10/100/(1000)	10/100/(1000)	10/100	10/100/1000	10/100	10/100/(1000)	10/100/(1000)	10/100/1000
Alarm contact/alarm output	– / –	● / –	– / –	(●) / (●)	– / –	● / –	● / –	● / –	● / –	– / (●)	● / –
Filter functions											
Quality of Service: Class of Service / DSCP	● / (●)	(●) / –	● / ●	● / ●	● / ●	● / ●	● / ●	● / –	● / –	● / ●	● / ●
Static VLANs	–	–	●	●	●	●	●	–	●	●	●
Multicast filters: IGMP snooping/querier	–	–	●	●	●	●	●	–	●	●	●
Traffic delimiter	–	–	●	●	●	●	●	–	●	●	●
Management functions											
Role-based user management	–	–	●	●	●	●	●	–	–	●	–
Port configuration	–	–	●	●	●	●	●	●	●	●	●
IP configuration: BootP/DHCP/DCP	– / – / –	– / – / –	● / ● / –	● / ● / ●	● / ● / ●	● / ● / –	● / ● / –	– / – / ●	● / ● / –	● / ● / (●)	● / ● / ●
Command Line Interface (CLI)	–	–	●	●	●	–	–	–	–	●	●
Time synchronization: SNTP client/server	– / –	– / –	● / –	● / –	● / –	● / ●	● / ●	– / –	– / –	● / –	● / –
Diagnostic functions											
Port statistics and utilization	–	–	●	●	●	●	●	●	●	●	●
SNMP (v1/v2/v3)	–	–	●	●	●	●	●	● (v1/v2 only)	●	●	●
Event messages: Syslog/SNMP traps	– / –	– / –	● / ●	● / ●	● / ●	– / ●	– / ●	– / –	– / ●	● / ●	– / ●
N:1 port mirroring	–	–	●	●	●	●	●	●	●	●	●
Link Layer Discovery Protocol (LLDP)	–	–	●	●	●	●	●	●	●	●	●
Address Conflict Detection (ACL)	–	–	●	●	●	–	–	–	●	●	–
Redundancy functions											
Rapid Spanning Tree Protocol (RSTP)	–	–	●	●	●	●	●	–	●	●	●
Fast Ring Detection / Large Tree Support	– / –	– / –	– / –	● / ●	● / ●	– / –	– / –	– / –	● / ●	(●) / (●)	● / ●
Extended ring redundancy	–	–	–	–	–	●	●	–	–	–	–
MRP manager/client	– / –	– / –	– / ●	● / ●	● / ●	– / –	– / –	● / ●	– / –	(●) / ●	● / ●
Device Level Ring (DLR)	–	–	–	–	–	–	–	–	●	–	–
Link aggregation: static trunking/LACP	– / –	– / –	– / –	● / ●	● / ●	● / ●	● / ●	– / –	● / –	(●) / (●)	● / ●
Security functions											
Port security: MAC-based	–	–	–	●	●	●	●	–	●	(●)	●
RADIUS authentication (IEEE 802.1x)	–	–	–	●	●	●	●	–	–	●	●
Layer 3 functions											
Routing / NAT	– / –	– / –	– / –	– / –	– / –	– / –	– / –	– / –	– / –	● / ●	● / ●
Router redundancy (VRRP)	–	–	–	–	–	–	–	–	–	–	●
Automation protocols											
PROFINET: conformance class/PN device	(A) / –	(A) / –	A / –	B / ●	B / ●	A / –	A / –	C / ●	A / –	(B) / ●	B / ●
EtherNet/IP™: extended multicast filter/CIP	– / –	– / –	● / –	● / –	● / –	– / –	– / –	– / –	● / ●	● / –	● / –
Diagnostics via Modbus/TCP	–	–	–	–	–	●	●	–	–	–	–
Approvals / certificates											
Maritime/Ex approvals	– / (●)	(●) / (●)	– / –	(●) / (●)	● / –	– / ●	– / ●	– / –	– / ●	(●) / (●)	– / –
IEC 61850-3	(●)	–	–	–	–	(●)	(●)	–	–	–	–

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

Product overview: Unmanaged switches

Features	Copper ports	Fiber optic ports	Port speed	Quality of Service	Special features	Order no.
Unmanaged switches for universal use: FL SWITCH 1000 and 1100						
Supply voltage: 9 … 32 V DC, 18 … 30 V AC, temperature range: -10°C … +60°C						
	5 x RJ45	–	10/100 Mbps	●	–	1085039
	4 x RJ45	1 x MM SC		●	–	1084159*
		1 x MM ST		●	–	1085179*
		1 x SM SC		●	–	1085214*
		1 x SFX		●	–	1085177*
	5 x RJ45	2 x SFX		●	–	1085176*
	8 x RJ45	–		●	–	1085256
	16 x RJ45	–		●	–	1085255
	5 x RJ45	–	10/100/1000 Mbps	●	Jumbo frames	1085254
	4x RJ45	1x SFP		●		1085173*
	5 x RJ45	2 x SFP		●		1085171*
	8 x RJ45	–		●		1085243

* Available from Summer 2020

Features	Mounting type	Width	Designation	Order no.
Mounting accessories for DIN rail devices				
Adapters for wall mounting or flat mounting on the DIN rail, or for devices of the FL SWITCH 1000 series				
	Wall mounting	22.5 mm	FL PANEL ADAPTER 22.5	1085488
		40 mm	FL PANEL ADAPTER 40	1085486
	Flat DIN rail mounting	22.5 mm	FL DIN-RAIL ADAPTER 22.5	1085485
		40 mm	FL DIN-RAIL ADAPTER 40	1085484

Features	Copper ports	Fiber optic ports	Port speed	Quality of Service	Special features	Order no.
Unmanaged switches for rack mounting: FL SWITCH 1800 and 1900						
Supply voltage: 120/220 V AC, temperature range: 0°C … +60°C						
	24 x RJ45	–	10/100 Mbps	●	19" mounting	2891041
		–	10/100/1000 Mbps	●		2891057
Robust unmanaged 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
		–	10/100/1000 Mbps	●	–	2891390
		–		●	Protective coating	2891391
	4 x RJ45	1 x MM SC	10/100 Mbps	●	ATEX, IECEx (Class I, Div. 2)	2891004
		2 x MM SC		●	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		●	ATEX, IECEx (Class I, Div. 2)	2891006
				●	Protective coating	2891046
		1 x MM ST		●	–	2891007
				●	Protective coating	2891047
	6 x RJ45	2 x MM SC		●	–	2891025
				●	Protective coating	2891048
		2 x MM ST		●	–	2891026
				●	Protective coating, 12 … 48 V DC	2891049
	16 x RJ45	–		●	ATEX, IECEx, 12 … 48 V DC	2891952
	14 x RJ45	2 x MM SC		●	12 … 48 V DC	2891954

Product overview: Unmanaged switches

Features	Copper ports	Fiber optic ports	Port speed	Quality of Service	Special features	Order no.
Robust unmanaged switches with IP67: FL SWITCH 1600						
Supply voltage: 24 V DC, temperature range: -40°C … +70°C						
	5 x M12	–	10/100 Mbps	●	With PTCP filter for PROFINET	2700200
Unmanaged power over Ethernet switches: FL SWITCH 1000 PoE						
Supply voltage: 18 … 57 V DC, extended temperature range: -40°C … +75°C, IEEE 802.3 af/at (PoE+)						
	8 x M12 PoE	–	10/100/1000 Mbps	●	-40°C … + 70°C, 18…32 V DC, 30 W per port, max. 200 W	2701883
	4 x RJ45 (PoE), 1 x RJ45	–	10/100 Mbps	●	30 W per port, max. 120 W	2891064
	2 x RJ45 (PoE)	2 x SFP	10/100/1000 Mbps	●	52…57 V DC, 30 W per port, max. 60 W	1026765
	4 x RJ45 (PoE), 1 x RJ45	–		●	30 W per port, max. 120 W	1026937
	4 x RJ45 (PoE), 1 x RJ45	1 x SFP		●		1026932
	8 x RJ45 (PoE)	2 x SFP		●		1026929
Supply voltage: 18 … 57 V DC, extended temperature range: -10°C … +60°C, IEEE 802.3 af/at (PoE+)						
	4 x RJ45 (PoE), 1 x RJ45	–	10/100/1000 Mbps	●	30 W per port, max. 120 W, electrical isolation, IEEE 802.3 af/at (PoE+)	1102077
	8 x RJ45 (PoE)	–		●		1102079

Flexible fields of application

Different versions enable flexible application scenarios for narrow, flat, or 19" designs in the control cabinet or in the field.

Power over Ethernet versions

Series 1000 Power over Ethernet switches enable connection of PoE-capable end devices without additional configuration.

Detect disconnections

The 1000 PoE and SFNT switches feature link monitoring, and can therefore identify disconnections and enable fast elimination of faults.

Product overview: Managed switches

Features	Copper ports	Fiber optic ports	Combo ports	Port speed	Special features	Designation FL SWITCH…	Order no.
Intelligent switches for the machine: FL SWITCH 2000 and 2100							
Supply voltage: 18 … 32 V DC, temperature range: 0°C … +60°C, IP20, front port outlet direction							
	5 x RJ45	–	–	10/100 Mbps	–	2005	2702323
	8 x RJ45	–	–		–	2008	2702324
					Flat design	2008F	1106707*
	16 x RJ45	–	–		–	2016	2702903
	5 x RJ45	–	–	10/100/1000 Mbps	–	2105	2702665
	8 x RJ45	–	–		–	2108	2702666
	16 x RJ45	–	–		–	2116	2702908
Managed switches for universal use: FL SWITCH 2200 and 2300							
Supply voltage: 12 … 57 V DC (redundant), temperature range: -40°C … +70°C, IP20, front port outlet direction, PROFINET Class B Approvals: DNV/GL, BV, ABS, LR, RINA, NK, IECEx, ATEX zone 2							
	5 x RJ45	–	–	10/100 Mbps	–	2205	2702326
	8 x RJ45	–	–			2208	2702327
	8 x RJ45	–	–		Conformal coating	2208C	1095627
	7 x RJ45	1 x MM SC	–		–	2207-FX	2702328
	7 x RJ45	1 x SM SC	–			2207-FX SM	2702329
	6 x RJ45	2 x MM SC	–			2206-2FX	2702330
	6 x RJ45	2 x MM SC	–		Conformal coating	2206C-2FX	1095628
	6 x RJ45	2 x SM SC	–		–	2206-2FX SM	2702331
	6 x RJ45	2 x MM ST	–			2206-2FX ST	2702332
	6 x RJ45	2 x SM ST	–			2206-2FX SM ST	2702333
	6 x RJ45	2 x SFX	–			2206-2SFX	2702969
	4 x RJ45	2 x SFX	2 x SFX/RJ45			2204-2TC-2SFX	2702334
	16 x RJ45	–	–			2216	2702904
	14 x RJ45	2 x MM SC	–			2214-2FX	2702905
	14 x RJ45	2 x SM SC	–			2214-2FX SM	2702906
	14 x RJ45	2 x SFX	–			2214-2SFX	1006188
	12 x RJ45	2 x SFX	2 x SFX/RJ45			2212-2TC-2SFX	2702907
	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
	16 x RJ45	–	–			2316	2702909
	14 x RJ45	2 x SFP	–			2314-2SFP	1006191
	12 x RJ45	2 x SFP	2 x SFP/RJ45			2312-2GC-2SFP	2702910
	8 x RJ45	–	–	10/100 Mbps	PROFINET preset, PROFINET status LEDs, PROFINET certified	2208 PN	1044024
	6 x RJ45	2 x SFX	–			2206-2SFX PN	1044028
	16 x RJ45	–	–			2216 PN	1044029
	14 x RJ45	2 x SFX	–			2214-2SFX PN	1044030
	8 x RJ45	–	–	10/100/1000 Mbps		2308 PN	1009220
	6 x RJ45	2 x SFP	–			2306-2SFP PN	1009222
	16 x RJ45	–	–			2316 PN	1031673
	14 x RJ45	2 x SFP	–			2314-2SFP PN	1031683

* Available from Fall 2020

Product overview: Managed switches

Features	Copper ports	Fiber optic ports	Combo ports	Port speed	Special features	Designation FL SWITCH…	Order no.
Managed switches for use in flat control cabinets: FL SWITCH 2400 and 2500							
Supply voltage: 19.2 … 32 V DC (redundant), temperature range: -40°C … +70°C, IP20, downward port outlet direction, PROFINET Class B Approvals: DNV/GL, BV, ABS, LR, RINA							
	8 x RJ45	–	–	10/100 Mbps	–	2408	1043412
	6 x RJ45	2 x SFX	–		–	2406-2SFX	1043414
	4 x RJ45	2 x SFX	2 x SFX/RJ45		–	2404-2TC-2SFX	1088853
	16 x RJ45	–	–		–	2416	1043416
	14 x RJ45	2 x SFX	–		–	2414-2SFX	1043423
	12 x RJ45	2 x SFX	2 x SFX/RJ45		–	2412-2TC-2SFX	1088875
	8 x RJ45	–	–	10/100/1000 Mbps	–	2508	1043484
	6 x RJ45	2 x SFP	–		–	2506-2SFP	1043491
	4 x RJ45	2 x SFP	2 x SFP/RJ45		–	2504-2GC-2SFP	1088872
	16 x RJ45	–	–		–	2516	1043496
	14 x RJ45	2 x SFP	–		–	2514-2SFP	1043499
	12 x RJ45	2 x SFP	2 x SFP/RJ45		–	2512-2GC-2SFP	1088856
	8 x RJ45	–	–	10/100 Mbps	PROFINET preset, PROFINET status LEDs, PROFINET certified	2408 PN	1089133
	6 x RJ45	2 x SFX	–			2406-2SFX PN	1089126
	16 x RJ45	–	–			2416 PN	1089150
	14 x RJ45	2 x SFX	–			2414-2SFX PN	1089139
	8 x RJ45	–	–	10/100/1000 Mbps		2508 PN	1089134
	6x RJ45	2 x SFP	–			2506-2SFP PN	1089135
	16 x RJ45	–	–			2516 PN	1089205
	14 x RJ45	2 x SFP	–			2514-2SFP PN	1089154
Robust managed switches with IP67: FL SWITCH 2600 and 2700							
Supply voltage: 12 … 57 V DC (redundant), temperature range: -40°C … +70°C, IP67, PROFINET Class B							
	8 x M12	–	–	10/100 Mbps	–	FL SWITCH 2608	1106500*
		–	–		PROFINET preset and certified, status LEDs	FL SWITCH 2608 PN	1106616*
		–	–	10/100/1000 Mbps	–	FL SWITCH 2708	1106615*
		–	–		PROFINET preset and certified, status LEDs	FL SWITCH 2708 PN	1106610*

* Available Fall 2020

Features	Copper ports	Fiber optic ports	Combo ports	Port speed	Special features	Designation FL SWITCH…	Order no.
Managed switches for infrastructure applications: FL SWITCH 3000 and 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
		–	–		ATEX, IECEx, C1D2	3005T	2891032
	8 x RJ45	–	–		-10°C … +60°C	3008	2891031
		–	–		ATEX, IECEx, C1D2	3008T	2891035
	16 x RJ45	–	–		-10°C … +60°C	3016	2891058
		–	–		ATEX, IECEx, C1D2	3016T	2891059
	4 x RJ45	1 x MM SC	–			3004T-FX	2891033
		1 x MM ST	–			3004T-FX ST	2891034
	6 x RJ45	2 x MM SC	–			3006T-2FX	2891036
		2 x MM ST	–			3006T-2FX ST	2891037
		2 x SM SC	–			3006T-2FX SM	2891060
	12 x RJ45	2 x SFX	–		–	3012E-2SFX	2891067
	8 x RJ45	2 x SFP	–	10/100 Mbps or 1000 Mbps	ATEX, IECEx, C1D2	4008T-2SFP	2891062
	10 x RJ45	4 x SM SC	–	8 x 10/100 Mbps 2 x 10/100/1000 Mbps 4 x 100 Mbps	–	4008T-2GT-4FX SM	2891061
	14 x RJ45	2 x MM SC	–	12 x 10/100 Mbps 2 x 10/100/1000 Mbps 4 x 100 Mbps	–	4012T-2GT-2FX	2891063
		2 x MM ST	–		–	4012T-2GT-2FX ST	2891161
Managed switches in accordance with IEC 61850-3/IEEE 1613: FL SWITCH 3000E and 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 SC	–			3012E-2FX	2891120
		2 x SM SC	–			3012E-2FX SM	2891119
	8 x RJ45	16 x MM LC	4 x SFP/RJ45	8 x 10/100 Mbps 16 x 100 Mbps 4 x 1000 Mbps	Requires replaceable, redundant power supply	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
	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

Features	Function	Port configuration	Voltage range	Designation	Order no.
Replaceable power supply for FL SWITCH 4800E					
	Modular power supply for 19” switches	–	48 V DC	4800E-P1	2891075
		–	110 V, 220 V DC/AC	4800E-P5	2891076

Product overview: Managed switches

Features	Copper ports	Fiber optic ports	Combo ports	Port speed	Special features	Designation FL SWITCH…	Order no.
Managed power over Ethernet switches: FL SWITCH 4000 PoE							
Supply voltage: 52 … 57 V DC, extended temperature range: -40°C … +75°C, IEEE 802.3 af/at (PoE+), prepared for IEEE 802.3 bt (PoE ++)							
	4 x RJ45 (PoE)	1 x SFP	–	10 / 100 Mbps (RJ45) 1000 Mbps (SFP)	60 W per port, max. 180 W	4000T-4POE-SFP	1026924
	8 x RJ45 (PoE)	2 x SFP				4000T-8POE-2SFP	1026923
	8 x RJ45 (PoE), 4 x RJ45	4 x SFP		10/100/1000 Mbps	60 W per port, max. 240 W	4004T-8POE-4SFP	1026922
Managed switches for PROFINET IRT: FL SWITCH 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
	4 x RJ45	–	–		IP67	IRT IP 4TX	2700694
Managed switches for EtherNet/IP™: FL 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	–	4 x SFP/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	–	4 x SFP/RJ45		2 x gigabit combo ports	7006-2GC-EIP	2701554

Easy configuration

Managed switches enable configuration via web browser, SD card, SNMP, CLI, or controller.

PROFINET®

EtherNet/IP™

Support of conventional protocols

Phoenix Contact managed switches support functions for use in PROFINET and EtherNet/IP™ applications.

Flexible transmission length

SFP ports and compatible SFP modules allow you to adapt the switches to your application and bridge large distances.

Product overview: Managed switches with routing function

Features	Copper ports	FO/combo ports	Port speed	Special features	Designation	Order no.
Managed switches with routing functions: FL NAT 2000						
Supply voltage: 18 V DC … 32 V DC, temperature range: 0°C … +60°C, IP20						
	8 x RJ45	–	10/100 Mbps	–	FL NAT 2008	2702881
Supply voltage: 12 … 57 V DC, temperature range: -40°C … +70°C, IP20 Approvals: DNV/GL, BV, ABS, LR, NK, RINA, IECEx, ATEX zone 2						
	8 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	FL NAT 2208	2702882
	4 x RJ45	2 x combo ports (SFP or RJ45), 2 x SFP	10/100/1000 Mbps		FL NAT 2304-2GC-2SFP	2702981
Modular managed switches: FL SWITCH GHS						
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	Light wavelength	Special features	Order no.
Accessories for modular managed switches						
	Extension module	–	–	–	For up to 4 media modules or 8 ports	2989307
	Media module	2 x copper, RJ45	Downward	–	–	2832357
			Front	–	–	2832344
			Front	–	PoE	2832904
		2 x FO, MM SC	Downward	1,300 nm	–	2832425
			Front		–	2832412
		2 x FO, SM SC	Downward		–	2832205
		2 x FO, MM ST	Downward		–	2884033
		2 x POF/PCF, SC-RJ	Downward	650 nm	–	2891084

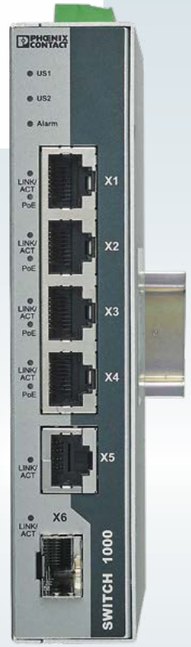
Power over Ethernet (PoE)

Power over Ethernet devices suitable for industrial use enable the combined 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

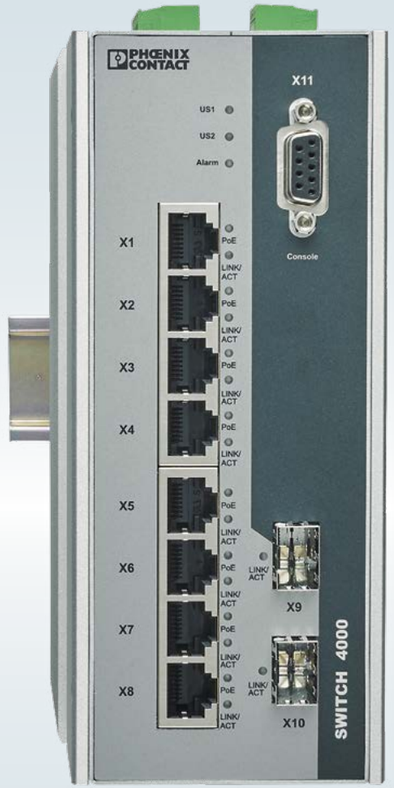
Injectors

This compact stand-alone solution is available in various performance classes of up to 60 watts. In addition to the RJ45 jack, the PoE injectors feature alternative connection technologies for the field cable and integrated surge protection.



Unmanaged switches

The extended temperature range of the unmanaged PoE switches allows reliable operation in harsh environments. The switches have full gigabit ports and jumbo frames developed specifically for the high data requirements of surveillance cameras.



Managed switches

The managed PoE switches offer a high level of flexibility with multiple port constellations and high power budgets of 60 watts per port for the use of PoE-operated high power devices. PoE-specific managed features make it possible to control, plan, and monitor devices from a remote location.

Smart camera box

The smart camera box securely connects IP surveillance cameras to the video server. The box integrates the functions of conventional connection boxes assembled with standard DIN rail components in one compact device. This saves planning and installation time. The integrated mounting adapter for wall and mast mounting makes installation much easier and quicker. Numerous management and monitoring functions ensure reliable operation of the video system.

Splitter

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

Product overview: PoE modules

Features	Connection method	Temperature range	Power budget	Special features	PoE standard	Designation	Order no.
PoE injectors							
 	RJ45/RJ45	0°C … +55°C	2 x 15 W	Electrical isolation in the power supply unit	IEEE 802.3 af	FL PSE 2TX	2891013
		0°C … +60°C	15/30 W	–	IEEE 802.3 af/at (PoE+)	INJ 1000	2703005
			60 W		Prepared for IEEE 802.3 bt (PoE++)	INJ 1010	2703007
		- 40°C … +75°C	15/30 W		IEEE 802.3 af/at (PoE+)	INJ 1000T	2703006
			60 W		Prepared for IEEE 802.3 bt (PoE++)	INJ 1010T	2703008
			15/30 W	Electrical isolation in the power supply unit, ATEX	IEEE 802.3 af/at (PoE+)	INJ 1100T	2703009
			60 W		Prepared for IEEE 802.3 bt (PoE++)	INJ 1110T	2703010
	RJ45/IDC		15/30 W	Electrical isolation in the power supply unit, surge protection and shield current diagnostics, ATEX	IEEE 802.3 af/at (PoE+)	INJ 2102T	2703012
			60 W		Prepared for IEEE 802.3 bt (PoE++)	INJ 2112T	2703014
	RJ45/Push-in		15/30 W		IEEE 802.3 af/at (PoE+)	INJ 2103T	1004065
			60 W		Prepared for IEEE 802.3 bt (PoE++)	INJ 2113T	1004066
	RJ45/screw		15/30 W		IEEE 802.3 af/at (PoE+)	INJ 2101T	2703011
			60 W		Prepared for IEEE 802.3 bt (PoE++)	INJ 2111T	2703013

Features	Connection method	Transmission speed	Power budget	Special features	PoE standard	Designation	Order no.
PoE splitter							
Supply voltage: 24 V DC, extended temperature range: -40°C … +70°C							
	RJ45/RJ45	10/100/1000 Mbps	30 W	–	IEEE 802.3 af/at (PoE+)	FL PD 1001 T GT	2891042
PoE media module							
	2 x RJ45	10/100 Mbps	15 W	–	IEEE 802.3af (PoE)	FL IF 2PSE-F	2832904

Features	Connection method	Transmission speed	Power budget	Special features	PoE standard	Designation	Order no.
Unmanaged power over Ethernet switches: FL SWITCH 1000 PoE							
Supply voltage: 18 … 57 V DC, extended temperature range: -40°C … +75°C							
 	8 x M12 PoE	10/100/1000 Mbps	30 W per port, max. 200 W	IP67 18…32 V DC -40°C … + 70°C	IEEE 802.3 af/at (PoE+)	FL SWITCH 1708 M12 POE	2701883
	4 x RJ45 (PoE), 1 x RJ45	10/100 Mbps	30 W per port, max. 120 W	–		FL SWITCH 1001T-4POE	2891064
	2 x RJ45 (PoE), 2 x SFP	10/100/1000 Mbps	30 W per port, max. 60 W	52…57 V DC		FL SWITCH 1000T-2POE-GT-2SFP	1026765
	4 x RJ45 (PoE), 1 x RJ45	10/100/1000 Mbps	30 W per port, max. 120 W	–		FL SWITCH 1001T-4POE-GT	1026937
	4 x RJ45 (PoE), 1 x RJ45, 1 x SFP	10/100/1000 Mbps	30 W per port, max. 120 W	–		FL SWITCH 1001T-4POE-GT-SFP	1026932
	8 x RJ45 (PoE), 2 x SFP	10/100/1000 Mbps	30 W per port, max. 120 W	–		FL SWITCH 1000T-8POE-GT-2SFP	1026929
Supply voltage: 18 … 57 V DC, extended temperature range: -10°C … +60°C							
	4 x RJ45 (PoE), 1 x RJ45	10/100/1000 Mbps	30 W per port, max. 120 W	Electrical isolation	IEEE 802.3 af/at (PoE+)	FL SWITCH 1001-4POE-GT	1102077
	8 x RJ45 (PoE)					FL SWITCH 1000-8POE-GT	1102079
Managed power over Ethernet switches: FL SWITCH 4000 PoE							
Supply voltage: 52 … 57 V DC, extended temperature range: -40°C … +70°C							
	4 x RJ45 (PoE), 1 x SFP	10/100 Mbps (RJ45) 1000 Mbps (SFP)	60 W per port, max. 180 W	–	IEEE 802.3 af/at (PoE+) Prepared for IEEE 802.3 bt (PoE++)	FL SWITCH 4000T-4POE-SFP	1026924
	8 x RJ45 (PoE), 2 x SFP	10/100 Mbps (RJ45) 1000 Mbps (SFP)	60 W per port, max. 180 W	–		FL SWITCH 4000T-8POE-2SFP	1026923
	8 x RJ45 (PoE), 4 x RJ45, 4 x SFP	10/100/1000 Mbps	60 W per port, max. 240 W	–		FL SWITCH 4004T-8POE-4SFP	1026922

Features	Uplink ports	Camera connections	Type	Order no.
Smart camera box				
Supply voltage: 100 … 240 V AC, temperature range: -40°C … +70°C				
	2 x FO	4 x PoE	SCX 4POE 2LX	1102626
		2 x PoE	SCX 2POE 2LX	1108543
	2 x copper Ethernet	4 x PoE	SCX 4POE 2T	1108542
		2 x PoE	SCX 2POE 2T	1108544
	1 x 2-wire Ethernet	4 x PoE	SCX 4POE 1C	1108541*
		2 x PoE	SCX 2POE 1C	1108539*

* Available from Spring 2021

Industrial wireless

Industrial wireless systems open up new options for flexible and efficient automation. 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 support to ensure the design of your individual wireless network is perfectly tailored to your requirements.

Your advantages

- ☑ Seamless and cost-effective integration into existing networks with flexible installation and configuration concepts
- ☑ Maximum reliability and availability with advanced properties for industrial applications
- ☑ Versatile use with Ethernet as the common communication standard – even for safety applications

Web code: #0562

Bluetooth Low Energy

The FL BLE 1300 wireless module connects Bluetooth Low Energy sensor technology with Ethernet-capable controllers and computers. This enables, for example, access to sensor data from a machine controller. The robust and highly compact wireless module features an internal antenna and can therefore be mounted very easily via two M12 connections.

Industrial Bluetooth

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

Industrial WLAN

The new WLAN 1100 and WLAN 2100 wireless modules make it easy to install a fast and stable WLAN network on your machines. The devices feature two integrated antennas and single-hole mounting and are therefore particularly easy to mount. The 1010 and 2010 versions also feature an IP20 solution with external antennas and connections.

The WLAN 5110 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.

Product overview: Industrial wireless

Features	Function	Frequency band	Data rate	Special features	Designation	Order no.
Ethernet port adapters						
Supply voltage: 9 V DC … 30 V DC, extended temperature range: -40°C … +65°C, IP65						
	Combined WLAN and Bluetooth wireless module	2.4 GHz and 5 GHz	Up to 65 Mbps	Internal antenna	FL EPA 2	1005955
				External antenna	FL EPA 2 RSMA	1005957
	Bluetooth wireless module	–	Up to 3 Mbps	Internal antenna	FL BT EPA 2	1005869
Bluetooth low energy						
Supply voltage: 9 … 32 V DC, extended temperature range: -40°C … +65°C, IP65						
	Bluetooth LE 5.0 wireless module	2.4 GHz	–	Internal antenna	FL BLE 1300	1118418*
Compact wireless module						
Supply voltage: 9 … 32 V DC, WLAN access point and client						
	WLAN access point and client with IP54, 0°C … +60°C	2.4 GHz and 5 GHz	Up to 300 Mbps	Internal antennas	FL WLAN 1100	2702534
				Internal antennas, USA and Canada only	FL WLAN 1101	2702538
	WLAN access point and client with IP65-IP68, -40°C … +60°C			Internal antennas	FL WLAN 2100	2702535
				Internal antennas, USA and Canada only	FL WLAN 2101	2702540
	WLAN access point and client with IP20, 0°C … +60°C			External antennas	FL WLAN 1010	2702899*
				External antennas, USA and Canada only	FL WLAN 1011	2702900*
	WLAN access point and client with IP20, -40°C … +60°C			External antennas	FL WLAN 2010	1119246*
				External antennas, USA and Canada only	FL WLAN 2011	1119248*
High-performance wireless module: WLAN 5110						
Supply voltage: 10 … 36V, WLAN access point and client with RSMA connection for connecting external antennas, IP20						
	WLAN access point and client, -40°C … +60°C	2.4 GHz/5 GHz	Up to 300 Mbps	External antennas	FL WLAN 5110	1043193
				External antennas, USA and Canada only	FL WLAN 5111	1043201

* Available Summer 2020

Product overview: Accessories

	Description	Features	Property	Order no.
Control box sets for outdoor installation				
	Set for constructing wireless systems	For industrial applications, IP65, with DIN rail, plugs, and screw connections, without devices	With omnidirectional antennas	1088098
			With omnidirectional antennas and power supply unit	1088095
			With omnidirectional antennas and PoE splitter	1088097
			Without antenna accessories	2701204

	Description	Gain	Connection	Features	Order no.
Accessories					
2.4 GHz antennas					
	Omnidirectional antenna	2 dBi	RSMA (male) with 1.5 m cable	Temperature range: -40°C … +70°C, degree of protection: at least IP65, including mounting bracket	2701362
	Omnidir. antenna, vandalism proof	3 dBi	RSMA (male) with 1.5 m cable		2701358
	Bracket for wall mounting	–	For 2701358		2885870
	Omnidir. antenna, salt water resistant	6 dBi	N (female)		2885919
5 GHz antennas					
	Omnidirectional antenna	5 dBi	N (female)	Temperature range: -40°C … +70°C, degree of protection: at least IP65, including mounting bracket	2701347
2.4 GHz and 5 GHz antennas					
	Omnidirectional antenna	2.5 dBi at 2.4 GHz 5 dBi at 5 GHz	N (male)	Temperature range: -40°C … +70°C, degree of protection: at least IP65, including mounting bracket	2701408
	Omnidir. antenna, vandalism proof	Up to 6 dBi at 2.4 GHz up to 8 dBi at 5.6 GHz	N (female)		2702898
	Dir. antenna for panel, salt water resistant	9 dBi	N (female)		2701186
Leaky wave cables (LCX)					
	Leaky wave cable 2.4 GHz	Longitudinal loss: 14.7 dB/100 m, coupling attenuation 95%: 60 dB, temperature range: -40°C … +85°C			2702553
	Leaky wave cable 5 GHz	Longitudinal loss: 19.1 dB/100 m, coupling attenuation 95%: 71 dB, temperature range: -40°C … +85°C			2702860

Additional accessories can be found on our website:

Web code: #0569

Comparison: WLAN vs. Bluetooth

	Wireless standard	Frequency band	Range* line of sight/ industrial hall	Topology	Network structure	Data rate
WLAN	IEEE 802.11	2.4 GHz, 5 GHz	< 1 km / < 100 m	Point-to-point, star, mesh	Mobile, roaming	Up to 300 Mbps
Bluetooth	IEEE 802.15.1	2.4 GHz	< 250 m / < 100 m	Point-to-point, star (1:7)	Static	Up to 3 Mbps

* Depending on the antenna and the ambient conditions

Industrial security

Protect your systems against unauthorized access by people or malware with the mGuard security product family from Phoenix Contact. Use industrial routers and firewall solutions with industrial-level virus protection to secure 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.

Your advantages

- Can be integrated into a defense-in-depth concept in accordance with IEC 62443
- Can be retrofitted easily with stealth mode
- Central management software provides global management of several thousand field devices
- Extremely secure with the active CVE (Common Vulnerabilities and Exposures) management process

Web code: #1270

Protection of machines and production cells

Use mGuard devices 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 center port is a high-performance firewall that can also be used as a central peer for up to 3000 VPN tunnels.

Product overview: Industrial security

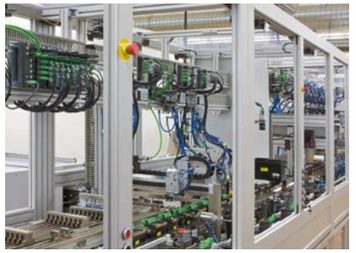
Features	Port configuration	Port speed	VPN	Special features	Designation MGUARD...	Order no.
Basic security routers for the DIN rail: mGuard 1000						
NAT, firewall						
	2 x RJ45	10/100/1000 Mbps	–	Easy Protect Mode, Firewall Assistant, Test Mode	FL MGUARD 1102	1153079
	5 x RJ45				FL MGUARD 1105	1153078
Remote maintenance security routers for the DIN rail: mGuard RS2000						
NAT, firewall, VPN (with and without cloud connection)						
	2 x RJ45	10/100 Mbps	–	Improved EMC properties	RS2000 TX/TX-B	2702139
			Up to 2 parallel tunnels	–	RS2000 TX/TX VPN	2700642
				3G cellular interface	RS2000 3G VPN	2903441
				4G cellular interface	RS2000 4G VPN	2903588
	6 x RJ45			Integrated 5-port switch (unmanaged)	RS2005 TX VPN	2701875
High-performance security routers for the DIN rail: mGuard RS4000						
Extended firewall functional scope (Deep Packet Inspection, user and conditional firewall, DMZ, etc.), can be extended with licenses						
	2 x RJ45	10/100 Mbps	Optional	–	RS4000 TX/TX	2700634
			Up to 10 parallel tunnels (up to 250 as an option)	–	RS4000 TX/TX VPN	2200515
				3G cellular interface	RS4000 3G VPN	2903440
				4G cellular interface	RS4000 4G VPN	2903586
				Maritime approvals	RS4000 TX/TX VPN-M	2702465
			Up to 250 VPN tunnels	ATEX and IECEx, extended temperature range and scope of functions	RS4000 TX/TX-P	2702259
	6 x RJ45		Optional	Integrated 4-port Managed Switch and DMZ port, extended temperature range	RS4004 TX/DTX	2701876
			Up to 10 parallel tunnels (up to 250 as an option)		RS4004 TX/DTX VPN	2701877
	2 x RJ45 2 x SFP	10/100/1000 Mbps	Optional	–	GT/GT	2700197
			Up to 10 parallel tunnels (up to 250 as an option)	–	GT/GT VPN	2700198

Features	Port configuration	Port speed	VPN	Special features	Designation MGUARD...	Order no.
High-performance security plug-in card for IPCs: mGuard PCI/PCIE						
Extended firewall functional scope (Deep Packet Inspection, user and conditional firewall, etc.), can be extended with licenses						
	2 x RJ45	10/100 Mbps	Up to 10 parallel tunnels (up to 250 as an option)	1:1-NAT, NAT, port forwarding, standard routing, stealth mode	PCI4000 VPN	2701275
					PCIE4000 VPN	2701278
High-performance security routers as mobile version: mGuard SMART/Secure Client						
Discrete hardware or secure customer software						
	2 x RJ45	10/100 Mbps	None, up to 250 as an option	USB, stealth mode	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
High-performance security router as a desktop version: mGuard DELTA						
Secure VPN remote station						
	2 x RJ45	10/100 Mbps	Up to 10 parallel tunnels (up to 250 as an option)	Desktop device	DELTA TX/TX VPN	2700968
High-performance security router for rack mounting: mGuard CENTERPORT						
High-performance firewall, central peer for up to 3,000 VPN tunnels						
	4 x RJ45	10/100/1000 Mbps	None, up to 3,000 as an option	19” rack	CENTERPORT	2702547
Central device and patch management: mGuard Device Manager (MDM)						
	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.			English	DM UNLIMITED	2981974

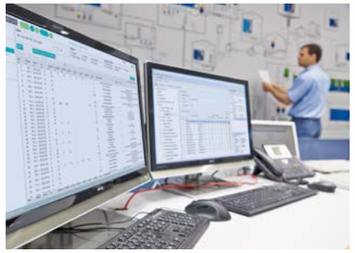
Remote communication

Remote control technology and remote maintenance are important components of industrial communication solutions. They facilitate seamless 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.



Remote maintenance: global direct access to controllers and Ethernet networks



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

Web code: #0499

Remote maintenance via the Internet and cellular network

TC Cloud Clients and mGuards enable secure connection to the mGuard Secure Remote Service. Communication is established via internet or cellular network. While the TC Cloud Client can only connect to the mGuard Secure Remote Service, the mGuards also offer peer-independent VPN tunnels, NAT, and a firewall.

Remote control via the cellular network

TC ROUTER cellular 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 cellular broadband connection for highly flexible site networking wherever a cable-based internet connection is not available.

Remote control via in-house cabling

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.

Product overview: Remote maintenance

Features	Function	VPN tunnel	Firewall	Transmission medium	Special features	Designation	Order no.
Remote maintenance via the cellular network: mGuard and TC Cloud Client							
	Cloud client	1 tunnel to the mGuard Secure Remote Service	Not configurable	4G LTE	Device configuration via mGuard Secure Remote Service, 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 the mGuard Secure Remote Service	Not configurable	Operator network	–	TC CLOUD CLIENT 1002-TX/TX	2702885
	mGuard VPN router with integrated firewall	Up to 2 parallel tunnels	●		–	FL MGUARD RS2000 TX/TX VPN	2700642
			●		Integrated unmanaged switch	FL MGUARD RS2005 TX VPN	2701875
		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-capable	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
		Up to 3000	●		19” design	FL MGUARD CENTERPORT	2702547
Remote maintenance via the Internet: mGuard Secure VPN Client							
Secure VPN connection for desktop, laptop, and tablet computer		1 tunnel	Not configurable	Internet	For Windows 10, 8.x, and 7	MGUARD SECURE VPN CLIENT LIC	2702579

Product overview: Remote control

Features	Function	VPN tunnel	Firewall	Network, data rate	Special features	Designation TC ROUTER…	Order no.
Remote control via the cellular network: TC routers							
Temperature range: -40°C … +70°C, data rate up to 150 Mbps							
	High-speed cellular router	–	●	3G	European version	2002T-3G	2702531
		–	●	4G LTE		2002T-4G	2702530
		●	●	3G		3002T-3G	2702529
		●	●	4G LTE		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 extenders								
Any 2-wire cable up to 20 km, Plug and Play startup, VLAN and RSTP functionality from firmware 5.xx / Q4 / 2020								
	Managed	2 x SHDSL 4 x Ethernet	Display	Point-to-point, line, ring	SHDSL, integrated, can be replaced	Remote connection 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	–	Stationary connection via USB	2001 ETH-1S	2702409

mGuard Secure Remote Service

The TC Cloud Client and mGuard security appliances connect your machines to the mGuard Secure Remote Service 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 Remote Service is available in EU countries as well as Norway and Switzerland. Different tariff conditions apply in North America.

TIMESERVER for Ethernet networks

The TIMESERVER makes time and location information available in the Ethernet network via NTP protocol. The time is received via GPS, GALILEO, or GLONASS even without an internet connection. The IP68 housing with integrated antenna is suitable for outdoor installation.

Web code: #2459

Your advantages

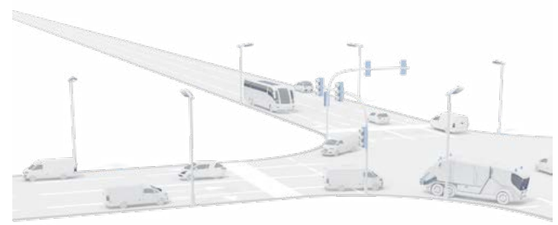
- ☑ NTP time server for Ethernet networks
- ☑ GNSS (Global Navigation Satellite System) receiver for GPS, GALILEO, and GLONASS
- ☑ Location information can be obtained via NMEA, SNMP, or web-based management
- ☑ Diagnostic LEDs for power supply and satellite reception

Product overview: TIMESERVER

NTP time server with GNSS receiver			
	Main features	**Designation**	**Order no.**
	• Power over Ethernet supply via the network cable • Alternative 10 … 30 V DC supply • IP68 housing • Integrated antenna • Temperature range: -40°C … +70°C • Outdoor installation including panel feed-through (40 mm diameter)	FL TIMESERVER NTP	1107132

Geolocation

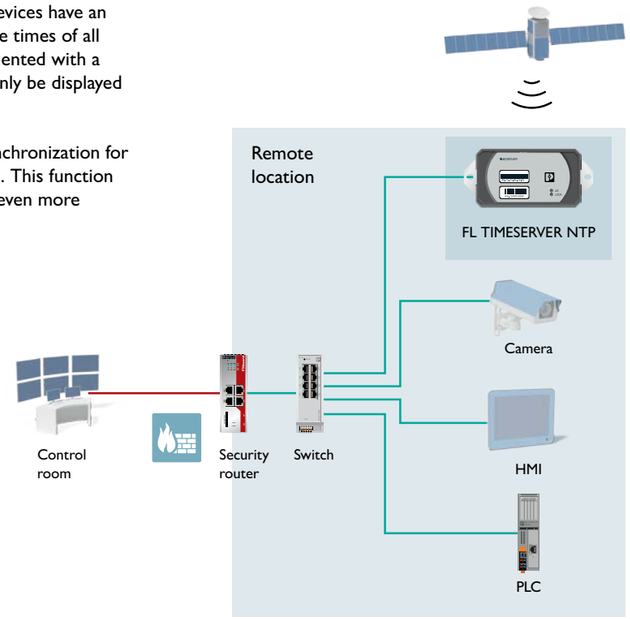
The FL TIMESERVER NTP provides precise geolocation information (GPS coordinates). This information can be used for determining the exact location of equipment and assets such as containers, vehicles, and buildings. Precise position determination is executed via web-based management, SNMP, NMEA, or JSON streaming.



Time synchronization

In Ethernet networks, it is very important that all devices have an accurate, synchronized system time. This enables the times of all decentral activities within the network to be documented with a high degree of accuracy. A sequence of events can only be displayed if all of the devices display exactly the same time.

The FL TIMESERVER NTP provides precise time synchronization for Ethernet devices in a network via the NTP protocol. This function does not require internet access, which guarantees even more security in the network.



Protocol and interface converters

Device servers and gateways enable the easy integration of serial legacy 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.

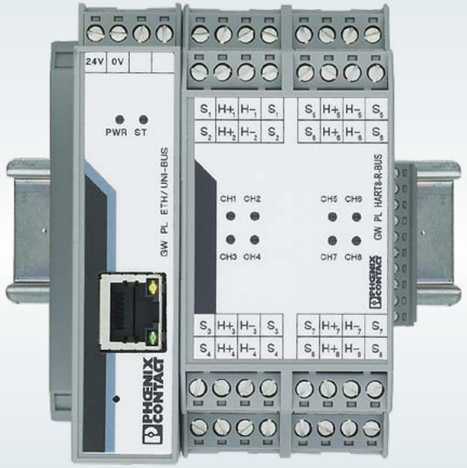
Web code: #1909

Your advantages

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

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, PROFINET, or EtherNet/IP™ using the gateways.



Converting the 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 the 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.

Product overview: Protocol and interface converters

	Protocol	Ethernet interface	Serial interface (RS-232/422/485)	Special features	Designation	Order no.
Conversion of serial data into Ethernet data: Serial device servers						
	Protocol-transparent	1 x RJ45	1 x D-SUB 9	ATEX, IECEx, UL (Class I, Division 2)	FL COMSERVER BASIC	2313478
					GW DEVICE SERVER 1E/1DB9	2702758
			2 x D-SUB 9		GW DEVICE SERVER 1E/2DB9	2702760
		2 x RJ45			GW DEVICE SERVER 2E/2DB9	2702761
			4 x D-SUB 9		GW DEVICE SERVER 2E/4DB9	2702763
Conversion of serial protocols to Ethernet protocols: Gateways						
	Modbus/RTU to Modbus/TCP	1 x RJ45	1 x D-SUB 9	ATEX, UL (Class I, Division 2)	FL COMSERVER UNI	2313452
		1 x RJ45	1 x D-SUB 9	ATEX, IECEx, UL (Class I, Division 2)	GW MODBUS TCP/ RTU 1E/1DB9	2702764
			2 x D-SUB 9		GW MODBUS TCP/ RTU 1E/2DB9	2702765
		2 x RJ45			GW MODBUS TCP/ RTU 2E/2DB9	2702766
			4 x D-SUB 9		GW MODBUS TCP/ RTU 2E/4DB9	2702767
	RAW, ASCII to Modbus/TCP	1 x RJ45	1 x D-SUB 9		GW MODBUS TCP/ ASCII 1E/1DB9	2702768
			2 x D-SUB 9		GW MODBUS TCP/ ASCII 1E/2DB9	2702769
		2 x RJ45			GW MODBUS TCP/ ASCII 2E/2DB9	2702770
			4 x D-SUB 9		GW MODBUS TCP/ ASCII 2E/4DB9	2702771
	RAW, ASCII to PROFINET	1 x RJ45	1 x D-SUB 9		GW PN/ASCII 1E/1DB9	1021080
			2 x D-SUB 9		GW PN/ASCII 1E/2DB9	1021058
		2 x RJ45			GW PN/ASCII 2E/2DB9	1021056
			4 x D-SUB 9		GW PN/ASCII 2E/4DB9	1020882
	RAW, ASCII to EtherNet/IP™	1 x RJ45	1 x D-SUB 9		GW EIP/ASCII 1E/1DB9	2702772
			2 x D-SUB 9		GW EIP/ASCII 1E/2DB9	2702773
		2 x RJ45			GW EIP/ASCII 2E/2DB9	2702774
			4 x D-SUB 9		GW EIP/ASCII 2E/4DB9	2702776
	Modbus RTU/ ASCII/TCP to EtherNet/IP™	1 x RJ45	1 x D-SUB 9		GW EIP/MODBUS 1E/1DB9	1062540
			2 x D-SUB 9		GW EIP/MODBUS 1E/2DB9	1062423
		2 x RJ45			GW EIP/MODBUS 2E/2DB9	1062380
			4 x D-SUB 9		GW EIP/MODBUS 2E/4DB9	1062388

	Protocol	Ethernet interface	Second interface	Special features	Designation	Order no.
Conversion of serial protocols to Ethernet protocols: Gateways						
	Modbus RTU/ ASCII/TCP to PROFINET	1 x RJ45	1 x D-SUB 9	ATEX, IECEx, UL (Class I, Division 2)	GW PN/MODBUS 1E/1DB9	1105707
			2 x D-SUB 9		GW PN/MODBUS 1E/2DB9	1105708
		2 x RJ45			GW PN/MODBUS 2E/2DB9	1105709
			4 x D-SUB 9		GW PN/MODBUS 2E/4DB9	1105710
	PROFIBUS DP to PROFINET	1x RJ45	1x D-SUB 9 up to 12 Mbps	FDT/DTM	GW PN/DP 1E/2DB9	1108712
	IO-Link to PROFINET, Modbus/TCP and OPC UA	2 x RJ45	8 x DI	–	IOL MA8 PN DI8	1072838
	IO-Link to EtherNet/IP™, Modbus/TCP and OPC UA	2 x RJ45	8 x DI	–	IOL MA8 EIP DI8	1072839
	PROFIBUS PA to PROFINET	2 x RJ45	–	Bus coupler	AXL P BK PN AF	2316390
		–	–	Power distributor	AXL P FBPS BASE	2316393
		–	–	Power module	AXL P FBPS 28DC/0.5A	2316394
		–	–	Termination resistor	AXL P TERM PAIR	2316402
	HART to Modbus/TCP, PROFINET, HART IP, FDT/DTM, OPC UA	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 resistance	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 internal input 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 setup of your network components with FL Network Manager and mGuard Device Manager software.
With SNMP/OPC software you can ensure reliable communication between network management tools, automation hardware, and visualization software.

Web code: #1560

Your advantages

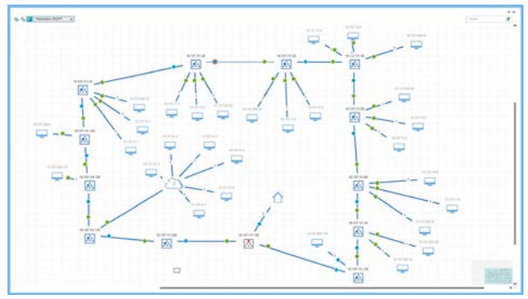
- Fast diagnostics with continuous querying of the network devices
- Reduced failure and downtime with a shorter response time in the network
- Direct access to the individual web interfaces of devices
- Error detection even for temporary errors in the network

Product overview: Software

	Description	Language	Basic	Order no.
Network configuration and startup: FL Network Manager				
	Start up your network quickly and easily with the FL Network Manager software. This software provides support in scanning and displaying existing networks, in IP assignment configuration of several devices, in handling configuration data, and with firmware updates.	English	SNMP	2702889
mGuard configuration and commissioning: mGuard Device Manager				
	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.	English	–	2981974
Consistent communication with OPC and SNMP protocols: SNMP OPC server				
	To ensure 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.	German, English	SNMP	2701139
	Additional license for 100 devices for the SNMP OPC server			2701138

Network Manager

The use of managed switches or WLAN components always involves configuration effort. 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 meet the need for industrial Ethernet protocols EtherNet/IP™ and PROFINET, IP assignment is integrated via DHCP and DCP. To check the configuration, a topology with redundancy diagnostics can be displayed.



Commissioning support for the 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.

Surface protection

Uninterruptible production calls for the reliable transmission of all relevant data and signals. In addition to unauthorized access and malware, overvoltages caused by lightning strikes or switching operations also pose a danger to your network. Especially 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

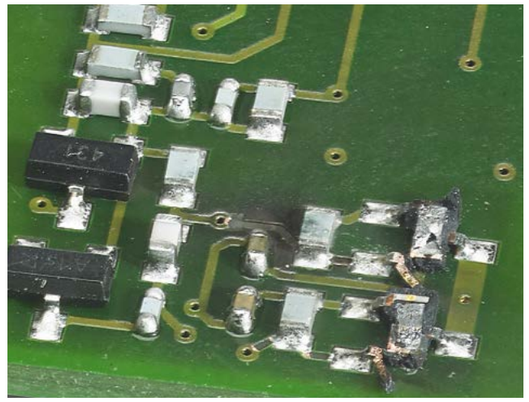
- Protection in accordance with Class EA (CAT 6A)
- Reliable transmission up to 10 Gbps
- Power over Ethernet (PoE+) “Mode A” and “Mode B”
- RJ45 attachment plug with separate grounding cable and ground connection snap-on foot for NS 35 DIN rails

Product overview: Surface protection

Description	IEC test class/ EN type	Maximum continuous voltage	Nominal discharge current	Features	Designation	Order no.
DATATRAB adapter/DIN rail module						
Ethernet (10GBase-T) and PoE, token ring, CDDI, in accordance with Class Ea/Cat.6						
	B2/C1/C2/C3/D1	3.3 V DC	100 A/2 kA	1 port	DT-LAN-CAT.6+	2881007
DATATRAB 19" versions						
Ethernet (1000Base-T), token ring, CDDI, in accordance with 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	5 kA	Male connector, base element	PLT-SEC-T3-230-FM-UT	2907919
		120 V AC			PLT-SEC-T3-120-FM-UT	2907918

Microelectronics are at particular risk

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



Always fits

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

Installation technology

In addition to the permissible active components, a high-performance network requires a robust installation. Phoenix Contact installation technology offers you all the components required for implementing industrial networks.

Web code: #1561

Injectors

This compact stand-alone solution is available in various performance classes of up to 60 watts. In addition to the RJ45 jack, the PoE injectors feature alternative connection technologies for the field cable and integrated surge protection.

Patch panels

Ethernet patch panels allow quick and easy connection between your field and control cabinet cabling. In the covered wiring space, the IDC, Push-in, or screw connection simplifies installation of the field cable. Optionally, these interface modules are also available with surge protection and shield current monitoring.

Network isolators

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. As such, high-voltage ranges in power distributions up to 4 kV can be disconnected securely from the data network and equipotential bonding currents are prevented.

SFP modules

SFP (small form-factor pluggable) modules enable you to flexibly use the SFP ports of your Ethernet switches. Whether you require single-mode or multimode transmission, fast Ethernet or gigabit, Phoenix Contact offers the right SFP modules for your application.

PRP redundancy modules

The PRP redundancy modules enable parallel network redundancy without switching time in the event of a failure and ensure high availability of your network. They are suitable for use under the harshest electromagnetic, electrostatic, and climatic ambient conditions in accordance with IEC 61850-3/IEEE 1613.

Product overview: Installation technology

	Connection method	Temperature range	Power budget	Special features	PoE standard	Designation	Order no.
PoE injectors							
 	RJ45 / RJ45	0°C … +55°C	2 x 15 W	Electrical isolation in the power supply unit	IEEE 802.3 af	FL PSE 2TX	2891013
		0°C … +60°C	15/30 W	–	IEEE 802.3 af/at (PoE+)	INJ 1000	2703005
			60 W		Prepared for PoE bt (PoE ++)	INJ 1010	2703007
		-40°C … +75°C	15/30 W		IEEE 802.3 af/at (PoE+)	INJ 1000-T	2703006
			60 W		Prepared for PoE bt (PoE ++)	INJ 1010-T	2703008
			15/30 W	Electrical isolation in the power supply unit, ATEX	IEEE 802.3 af/at (PoE+)	INJ 1100-T	2703009
			60 W		Prepared for PoE bt (PoE ++)	INJ 1110-T	2703010
	RJ45 / IDC		15/30 W	Electrical isolation in the power supply unit, surge protection and shield current diagnostics, ATEX	IEEE 802.3 af/at (PoE+)	INJ 2102-T	2703012
			60 W		Prepared for PoE bt (PoE ++)	INJ 2112-T	2703014
	RJ45 / Push-in		15/30 W		IEEE 802.3 af/at (PoE+)	INJ 2103-T	1004065
			60 W		Prepared for PoE bt (PoE ++)	INJ 2113-T	1004066
	RJ45 / screw		15/30 W		IEEE 802.3 af/at (PoE+)	INJ 2101-T	2703011
			60 W		Prepared for PoE bt (PoE ++)	INJ 2111-T	2703013

	Connection method	Description	Shielding	Cable shield connection	Surge protection	Designation	Order no.
Patch panels							
	RJ45/RJ45	Standard Ethernet patch panel, 8-pos., 10/100/1000 Mbps, ATEX	Directly on the DIN rail	Via RJ45 jack	No	PP-RJ-RJ	2703015
	RJ45/screw			Tool-free via shield contact spring		PP-RJ-SC	2703016
	RJ45/Push-in					PP-RJ-SCC	2703018
	RJ45/IDC					PP-RJ-IDC	2703019
	RJ45/RJ45	Function version Ethernet patch panel 8-pos., 10/100/1000 Mbps, ATEX With surge protection and shield current diagnostics		Via RJ45 jack	Integrated	PP-RJ-RJ-F	2703020
	RJ45/screw			Tool-free via shield contact spring		PP-RJ-SC-F	2703021
	RJ45/Push-in					PP-RJ-SCC-F	2703022
	RJ45/IDC					PP-RJ-IDC-F	2703023
	RJ45/screw	4-pos., 10/100 Mbps	Directly on the DIN rail	Clamp with screws	No	FL CAT5 TERMINAL BOX	2744610
	RJ45/screw	8-pos., 10/100/1000 Mbps, ATEX	Either directly on DIN rail or via RC combination			FL-PP-RJ45-SC	2901643
	Spring-cage connection					FL-PP-RJ45-SCC	2901642
	LSA connection	8-pos., 10/100/1000 Mbps				FL-PP-RJ45-LSA	2901645
	RJ45/RJ45	8-pos., 10/100/1000 Mbps, ATEX		Via RJ45 jack		FL-PP-RJ45/RJ45	2901646
	RJ45/RJ45	Extended temperature range -40°C … +85°C, narrow overall width	Continuous shield			FL-PP-RJ45/ RJ45-B	2904933
	Spring-cage connection	Cable sharing module with cable outlet facing the front	Either directly on DIN rail or via RC combination	Clamp with screws		FL-PP-RJ45-SCC/ SC041	2903532
	Spring-cage connection	Cable sharing module with cable outlet facing upward				FL-PP-RJ45-SCC/ SC045	2904577

Electrical isolation

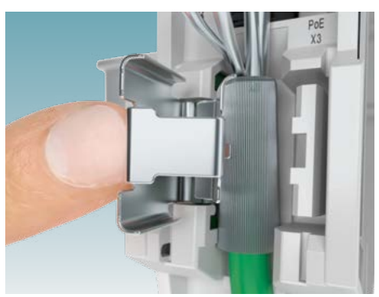
The high-quality isolation protects your installation from short circuits on the supply side.

Wide range input

The injectors feature a redundant feed-in, 18 … 57 V DC are possible.

Surge protection

Integrated surge protection reliably protects the connected network.



Tool-free shield connection

Connect the cable shielding to the DIN rail without tools – with strain relief assured at the same time.

Shield current diagnostics

The reliable display of hazardous shield currents increases the safety of your installation.

Quick and easy installation

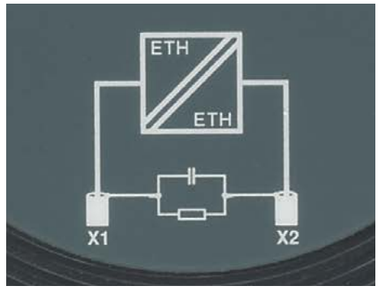
Installation takes 60% less time, thanks to patented cable connection technology.

Product overview: Installation technology

	Electrical isolation	Approvals	Connection technology	Transmission speed	Features	Designation FL ISOLATOR	Order no.
Ethernet isolators							
	Up to 4 kV	EN 50155 – rolling stock, EN 50121 – rail	M12/M12 D-coded	10/100 Mbps	Wall mounting	100-M12	2902985
	–	–	–	–	Adapter for DIN rail mounting	FL EPA RMS	2701133
	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

	Port	Transmission speed	Transmission length	Wavelength	Special features	Designation FL SFP...	Order no.
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
				1550/1310 nm	WDM module B	FE WDM20-B	2702438
				1310/1550 nm, 1550/1310 nm	WDM module A and B	FE WDM20-SET	2702439
	LC MM	1000 Mbps	1 km	850 nm	–	SX	2891754
	LC SM		2 km	1310 nm	–	SX2	2702397
			10 km		–	LX10-B	1025401
			30 km		–	LX	2891767
			40 km		–	LX40	1113081
			80 km	1550 nm	Long haul	LH	2989912
	LC SM (WDM)		10 km	1310/1550 nm	WDM module A	WDM10-A	2702440
				1550/1310 nm	WDM module B	WDM10-B	2702441
				1310/1550 nm, 1550/1310 nm	WDM module A and B	WDM10-SET	2702442
	RJ45		100 m	–	–	GT	2989420

	Function	Port configuration	Voltage range	Designation	Order no.
PRP redundancy modules in accordance with 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
		2 x LC MM as redundancy ports 1 x RJ45 for end device		FL RED 2001E PRP 2LC	2701864



Protecting network devices

With high-quality isolation for up to 4 kV, you can protect your Ethernet devices and interfaces and increase immunity.

Flexible mounting

Available either as a DIN rail module with RJ45 connection or for wall mounting with an M12 connection.

Permitted for railway applications

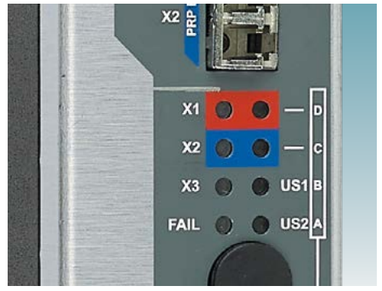
Thanks to vibration-resistant M12 connection technology, the railway requirements are fulfilled in accordance with EN 50155 and EN 50121.

Maximum availability

PRP redundancy modules enable parallel network redundancy without switching time to ensure high network availability.

Ideal for the energy industry

The modules can be used in accordance with IEC 61850-3 and IEEE 1613 under the harshest ambient conditions.



No configuration required

Color coding of the device ports and the assigned diagnostic LEDs make commissioning easy.

Copper-based data cabling for networks and fieldbuses

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

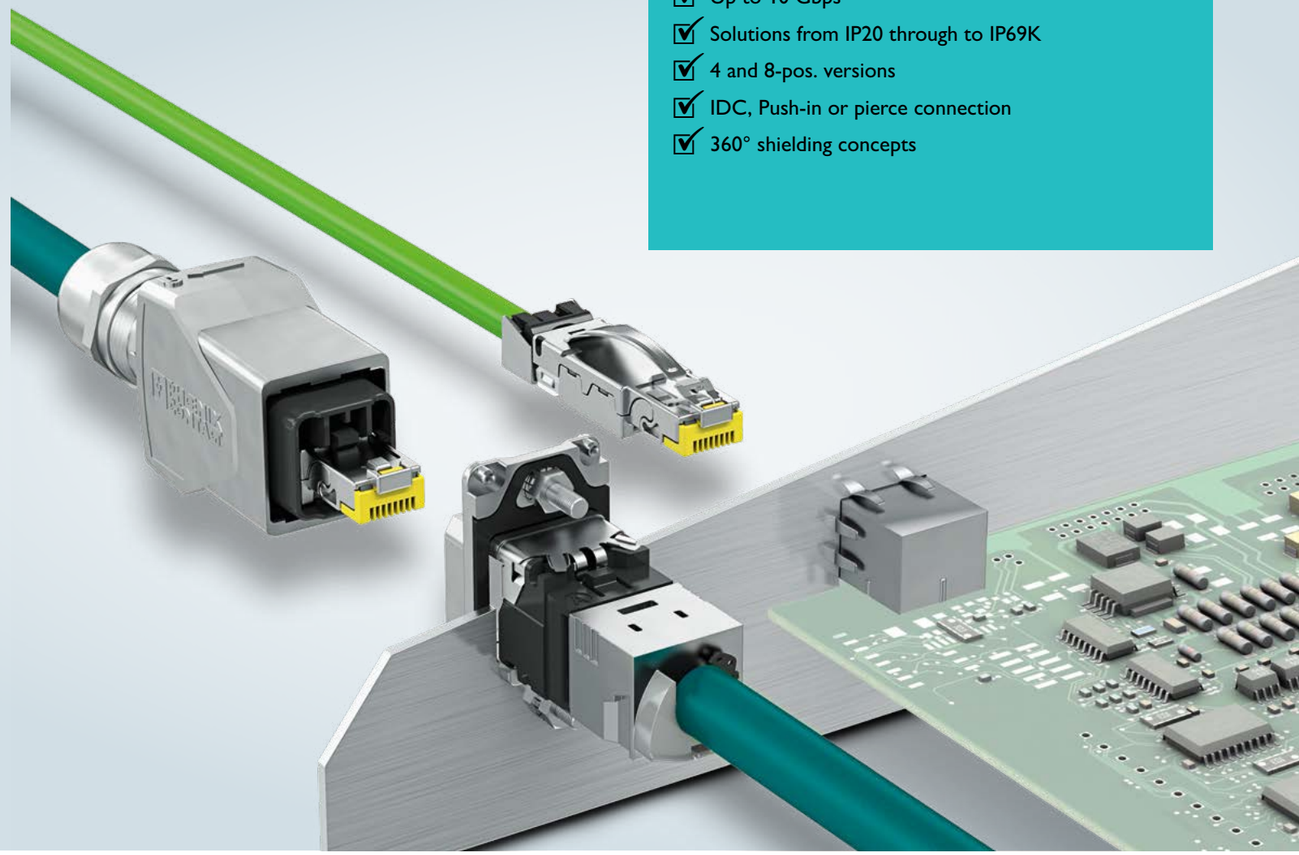
Whether it's future-proof high-speed cabling up to 10 Gbps, or innovative hybrid cabling, we will find the perfect solution for your automation network.

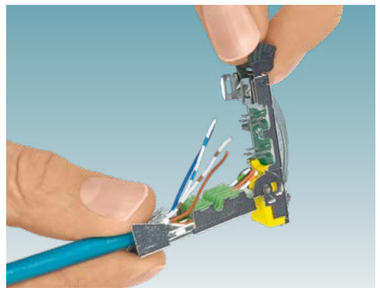
Web code: #0297

CANopen · CC-Link · DeviceNet · EtherCAT · Ethernet · EtherNet/IP · INTERBUS · VARAN · PROFIBUS · PROFINET · sercos the automation bus

Your advantages

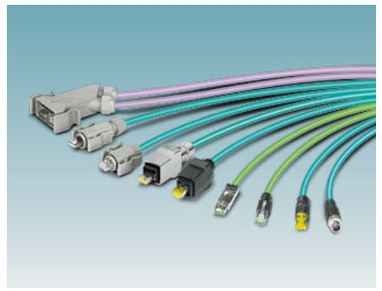
- ☑ Up to 10 Gbps
- ☑ Solutions from IP20 through to IP69K
- ☑ 4 and 8-pos. versions
- ☑ IDC, Push-in or pierce connection
- ☑ 360° shielding concepts





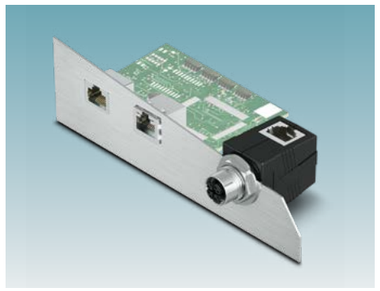
Fast assembly

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



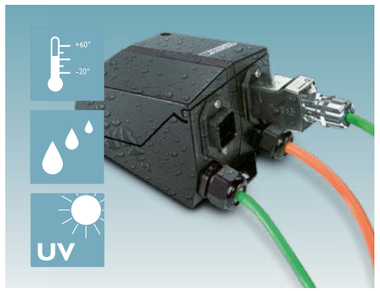
Wide range of connectors

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.

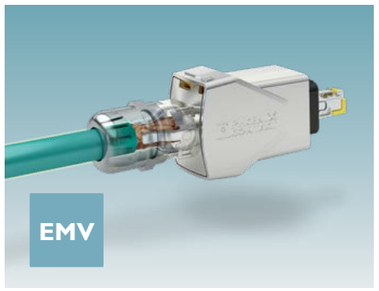


Reliable protection

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

Fast data transmission

Fast data transmission, with 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 EMC and ESD.

RJ45 connectors and sockets, IP20

Web code: #0330

	Cable outlet	Ethernet	PROFINET	Material	AWG	Connection method	Data rate	Order no.
Connectors								
	Straight	●	–	Plastic, gray	24 … 27	Crimp connection	Up to 1 Gbps CAT5	1414382*
		●	–				Up to 10 Gbps CAT6$_A$	1414395*
		●	–	Plastic, green			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
	Downward	●	–		26 … 24			1421877
		●	●		23 … 22			1421128
	Upward	●	–		26 … 24			1421876
		●	●		23 … 22			1421127
	Straight	●	–		26 … 24		Up to 10 Gbps CAT6$_A$	1149846
		●	●		23 … 22			1149847
Panel mounting frame								
	–	●	●	Plastic, gray	–	Square panel cutout	–	1689433
Socket inserts								
	Straight	●	●	Metal	26 … 22	Cable module	Up to 10 Gbps CAT6$_A$	1419021
	Straight	●	●		–	Coupler module	Up to 1 Gbps CAT5	1689064
	Straight	●	●		–		Up to 10 Gbps CAT6$_A$	1086108

* Tool 1653265 required

RJ45 distributors and modules, IP20

Web code: #0330

	Mounting type	Specification	Order no.
Modular distribution panels			
	19" mounting	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, unassembled	1652994
		Patch panel for socket inserts, adapter-free, 24 installation slots, unassembled, gray	1422978
		Patch panel for socket inserts, adapter-free, 24 installation slots, unassembled, black	1422979
	DIN rail mounting	Housing that integrates RJ45 and FO module inserts	1041740
		Housing with cable module, up to 10 Gbps CAT6$_A$	1100077
Terminal boxes for Freenet modules			
	Surface mounting	Unequipped for 2 modules	1653003
		Unequipped for 6 modules	1653029
	Flush mounting	Unequipped for 2 modules	1653016
Socket inserts			
	Adapter-free	Cable module, up to 10 Gbps CAT6$_A$	1417274
	Freenet system	Cable module, up to 10 Gbps CAT6$_A$	1418984
	Freenet system	Cable module, up to 1 Gbps CAT5	1652936
	Adapter-free	Cable module, up to 10 Gbps CAT6$_A$	1041760
	Freenet system		1086111

RJ45 PCB connectors, IP20

Web code: #2059, #2341

	Soldering process	Alignment	Specification	Order no. without LED	Order no. with LED
RJ45 industrial PCB jacks					
	Wave/THR	90° horizontal	Housing shield springs: Yes	1099280	1099281
			Housing shield springs: No	1091946	1091950
		180° vertical	Housing shield springs: Yes	1099279	1099282
			Housing shield springs: No	1091942	1091947
RJ45 single-port PCB jacks					
	SMD	180° vertical	–	1149611	–
		90° horizontal	Locking latch at top	1149882	1149873
			Locking latch at bottom	1149874	–
	Wave	180° vertical	–	1149872	1149871
		90° horizontal	Locking latch at top	1149870	1149867
			Locking latch at bottom	1149868	1149866
RJ45 multi-port PCB jacks					
	Wave	90° horizontal	2 RJ45 ports, locking latch at top	1149858	1149854
			2 RJ45 ports, locking latch at bottom	1149855	1149852
			4 RJ45 ports, locking latch at top	1149851	1149848
			4 RJ45 ports, locking latch at bottom	1149849	1149616

RJ45 push-pull locking (V14), IP65/67

Web code: #0325

	Cable outlet	Material	AWG	Connection method	Data rate	Specification	Order no.
Connectors							
	Straight	Die-cast zinc	26 … 24	IDC fast connection	Up to 10 Gbps CAT6$_A$	Push-pull (Version 14)	1149841
			23 … 22				1149843
			26 … 24		Up to 1 Gbps CAT5		1422661
			23 … 22				1422664
	Angled, downward		26 … 24				1422662
			23 … 22				1422665
	Angled, upward		26 … 24				1422663
			23 … 22				1422667
	Straight		26 … 24				1403367
			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							
	Straight	Die-cast zinc	26 … 22	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							
	Straight	Die-cast zinc	–	Cable module	Up to 1 Gbps CAT5	Freenet	1652936
			–		Up to 10 Gbps CAT6$_A$		1418984
			–	Coupler module	Up to 1 Gbps CAT6		1419022
Couplings							
	Straight	Die-cast aluminum	–	1 x RJ45, 1 x RJ45	Up to 1 Gbps CAT5	Push-pull (Version 14)	1405183
Multi-ports							
	Straight	Die-cast aluminum	22 … 26	Cable module	Up to 10 Gbps CAT6$_A$	1 x RJ45	1403678
						1 x RJ45, 1 x power	1403682
			–	Coupler module	Up to 1 Gbps CAT5	1 x RJ45, 1 x RJ45	1403685
			–			2 x RJ45, 2 x power	1406395
Terminal outlets							
	Straight	Die-cast aluminum	22 … 26	Cable module	Up to 1 Gbps CAT5	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.
Connectors						
	Plastic, gray	23 … 26	IDC fast connection	Up to 1 Gbps CAT5	–	1656990
		24 … 27	Crimp connection		–	1414383*
				Up to 10 Gbps $CAT6_A$	–	1414406*
	Plastic, black	23 … 26	IDC fast connection	Up to 1 Gbps CAT5	–	1658493
		24 … 27	Crimp connection		–	1414408*
				Up to 10 Gbps $CAT6_A$	–	1414410*
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	22 … 24	Cable module	Up to 1 Gbps CAT5	Freenet module	1652936
		22 … 26		Up to 10 Gbps $CAT6_A$		1418984
		–	Coupler module	Up to 1 Gbps CAT5	Keystone module	1689064
		–		Up to 1 Gbps CAT6		1653155
		–		Up to 1 Gbps CAT6	Freenet module	1419022
		–	PCB module		Straight, CAT6	1653090
		–		Up to 1 Gbps CAT5	Angled, CAT5	1688586
		–		Up to 1 Gbps CAT6	Angled, CAT6	1653087
Couplings						
	Plastic, gray	–	Coupling	Up to 1 Gbps CAT5	1 x RJ45/RJ45	1689268
	Plastic, black	–			1 x RJ45/RJ45	1658684
Terminal outlets						
	Die-cast aluminum	22 … 24	IDC fast connection	Up to 1 Gbps CAT5	2 x RJ45	1404278

RJ45 patch cables for PROFINET, up to 100 Mbps

Web code: #0326

		IP20 cables			IP65/IP67 cables			
								
		Open cable end	RJ45 connector, straight	RJ45 connector, angled	RJ45 connector, version 14, metal	RJ45 connector, version 14, plastic	M12 male, straight	M12 male, 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/IP67 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 male, straight	1408640	1408639	1408638	1408636	1408635	1408634	1408608
	M12 male, angled	1408633	1408632	1408631	1408628	1408626	1408625	1408624
	M12 female, straight	1408623	1408622	1408621	1408619	1408618	1408617	1408616
	M12 female, angled	1408615	1408613	1408612	1408610	1408609	1408608	1408607
IP65/67 cables, limited cable length								
	M12 flush-type socket, rear mounting	1 m, 1437779	0.5 m, 1404367	–	–	–	–	–
		2 m, 1437782	1 m, 1404368	–	–	–	–	–
		5 m, 1437795	5 m, 1404369	–	–	–	–	–

PROFINET cable, type 93B

The type 93B PROFINET cable is designed for flexible installation and is oil resistant up to a degree. It is UV-resistant for 1,200 seconds in accordance with UL 1581, which makes it suitable for outdoor use.
Its transmission properties are in accordance with 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/IP67 cables			
								
		Open cable end	RJ45 connector	RJ45 connector, version 6	RJ45 connector, version 14, metal	RJ45 connector, version 14, plastic	M12 male, straight	M12 male, angled
IP20 cables, variable cable length								
	RJ45 connector	1411838	1411842	1411843	1411844	1411845	1408681	1408674
IP65/IP67 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 male, straight	1408682	1408681	1408679	1408678	1408677	1408676	1408667
	M12 male, angled	1408675	1408674	1408671	1408670	1408668	1408667	1408666
	M12 female, straight	1408665	1408664	1408662	1406661	1408660	1408659	1408658
	M12 female, 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 type 94B Ethernet cable is designed for flexible installation.
The cable is resistant to chemicals and oil, and is flame-retardant.
Its transmission properties are in accordance with 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/IP67 cables						
										
		Open cable end	RJ45 conn.	RJ45 conn., version 6, plastic	RJ45 conn., version 14, metal	RJ45 conn., version 14, plastic	M12 male, straight	M12 male, angled	M12 female, straight	M12 male, angled
IP65/IP67 cables, variable cable length										
	Open cable end	–	1411853	1415639	1415637	1415638	1408648	1080716 1080717 1080718 1080719	1080728 1080729 1080731 1080732	1080746 1080747 1080748 1080750
	RJ45 connector, plastic	1411853	1411854	1414321	1411855	1411856	–	–	1080733 1080734 1080736 1080737	–
	RJ45 connector, version 6	1415639	1414321	1414322	–	–	–	–	–	–
	RJ45 connector, version 14, metal	1415637	1411855	–	1414323	–	–	–	1080738 1080739 1080740 1080741	–
	RJ45 connector, version 14, plastic	1415638	1411856	–	–	1414324	–	–	–	–
	M12 male, straight	1408648	1408647	–	1408646	1408645	1408644	1080724 1080725 1080726 1080727	1080742 1080743 1080744 1080745	1080751 1080752 1080753 1080754
	M12 male, angled	1080716 1080717 1080718 1080719	–	–	–	–	1080724 1080725 1080726 1080727	1080720 1080721 1080722 1080723	–	–
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 type 94F Ethernet cable is designed for flexible installation.
The cable is resistant to chemicals and oil, and is flame-retardant.
It is also halogen-free and its transmission properties meet CAT6$_A$.

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

RJ45 patch cables and accessories, IP20

Web code: #0331

RJ45 office patch cables

					
Transmission		CAT5		CAT6	$CAT6_A$
Shielding		U/UTP	SF/UTP	S/FTP	S/FTP
Length	**0.3 m**		2832250	2891181	1413158
	0.5 m	1413086	2832263	2891288	1413159
	1 m	1410595	2832276	2891385	1413160
	2 m	1410596	2832289	2891589	1413161
	3 m	1413019	2832292	2891686	1413162
	5 m	1410694	2832580	2891783	1413163
	10 m	1412973	2832629	2891877	1413164
	15 m	1412971	–	2891372	1413165
	20 m	1412974	–	2891576	1413166

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 jacks
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	1655784	1655755
	5 m	1655797	1655768
IP20, USB plug type B			
 	1 m	1654853	–
	2 m	1653935	1653896
	5 m	1653948	1653906
IP67, USB plug type B			
 	2 m	1653919	1653870
	5 m	1653922	1653883
IP67, M12 Mini USB, SPEEDCON			
	1 m	1420168	–
	2 m	1420171	–
	4 m	1420184	–

IP65/IP67 panel mounting frames

				
Panel mounting frames, assembled	**Plastic, gray, round panel cutout**		**Post connector**	**Zinc die-cast, solder connection**
With USB socket A/ socket B	1411904	–	–	–
With USB socket B/ socket A	1411905	–	–	–
Panel mounting frames, unassembled				
For Freenet modules	–	1653744	–	–
Freenet modules				
USB type A socket	–	–	1653854	–
USB type B socket	–	–	1653867	–
Panel-mount connectors				
M12 with mini USB B	–	–	–	1440711

		IDC connection		Push-in connection		Crimp connection		Piercecon connection		Screw connection	
											
Networks		**Straight**	**Angled**	**Straight**	**Angled**	**Straight**	**Angled**	**Straight**	**Angled**	**Straight**	**Angled**
Ethernet CAT5, 4-pos.	Male	1411066	1553624	–	–	–	–	–	–	1521261	–
	Female	1411069	1553637	–	–	–	–	–	–	–	–
Ethernet 8-pos.	Male	1421679	1553653	–	–	–	–	–	–	–	–
	Female	1421680	1553666	–	–	–	–	–	–	–	–
Ethernet CAT6$_A$, 8-pos.	Male	1411043	–	–	–	1422844	1422845	1417430	1417443	–	–
	Female	1414586	–	–	–	–	–	–	–	–	–
PROFINET®	Male	1411068	1554539	1424682	1424684	1422846	1422847	–	–	1521261	–
	Female	1411071	1554542	1424683	1424685	1422848	1422849	–	–	–	–
VARAN	Male	1429130	1429156	–	–	–	–	–	–	–	–
	Female	1429143	1429169	–	–	–	–	–	–	–	–
Fieldbuses											
INTERBUS	Male	–	–	1424674	1424676	–	–	–	–	1507764	1430417
	Female	–	–	1424675	1424677	–	–	–	–	1507777	1430420
PROFIBUS®	Male	1413931	–	1424678	1424679	–	–	–	–	1507764	1430417
	Female	1413932	–	1424680	1424681	–	–	–	–	1507777	1430420
DeviceNet™	Male	1422759	–	1424670	1424671	–	–	–	–	1508352	–
	Female	1422760	–	1424672	1424673	–	–	–	–	1508365	–
CC-Link	Male	–	–	1424699	–	–	–	–	–	–	–
	Female	–	–	1424700	–	–	–	–	–	–	–

			Wave soldering		THR soldering		SMD soldering		Bulkheads, M12 to RJ45					
														
Networks			**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Straight**	**Angled**	**Male**	**Female**	**Male**	**Female**
Ethernet	CAT5, 4-pos.		1456514	1456527	1552214*	1551451*	1411956*	1411950*	–	–	–	–	1411592	1411585
	CAT5, 4-pos., cable type 93E	2 m	–	–	–	–	–	–	–	–	–	1405866	–	–
	CAT5, 8-pos.		1456530	1456543	1557578	1557549	–	–	1414396	1414393	–	–	–	–
	CAT5, 8-pos., cable type 94B	5 m	–	–	–	–	–	–	–	–	–	1407877	–	–
	CAT5, 8-pos., cable type 94C	2 m	–	–	–	–	–	–	–	–	–	1412820	–	–
	$CAT6_A$, 8-pos.		–	1424177	–	1402457*	–	1411964*	1404549	1404548	–	–	–	–
	$CAT6_A$, 8-pos., cable type 94F	0.5 m	–	–	–	–	–	–	–	–	–	1424135	–	–
	$CAT6_A$, 8-pos., cable type 94F	1 m	–	–	–	–	–	–	–	–	–	1424148	–	–
	$CAT6_A$, 8-pos., cable type 94F	2 m	–	–	–	–	–	–	–	–	–	1424151	–	–
	$CAT6_A$, 8-pos., cable type 94F	5 m	–	–	–	–	–	–	–	–	–	1424164	–	–
	CAT5, 8-pos., hybrid		–	1407503	–	1405225*	–	1411965*	–	–	–	–	–	1407618
	CAT5, 8-pos., hybrid, cable type 94H	0.5 m	–	–	–	–	–	–	–	–	–	1407504	–	–
	CAT5, 8-pos., hybrid, cable type 94H	1 m	–	–	–	–	–	–	–	–	–	1407505	–	–
	CAT5, 8-pos., hybrid, cable type 94H	2 m	–	–	–	–	–	–	–	–	–	1407506	–	–
	CAT5, 8-pos., hybrid, cable type 94H	5 m	–	–	–	–	–	–	–	–	–	1407507	–	–
PROFINET	4-pos.		1456556	1456569	1552175	1542648	–	–	1414398	1414397	–	–	–	–
	4-pos., cable type 93B	0.5 m	–	–	–	–	–	–	–	–	1437805	1437766	–	–
	4-pos., cable type 93B	1 m	–	–	–	–	–	–	–	–	1437818	1437779	–	–
	4-pos., cable type 93B	2 m	–	–	–	–	–	–	–	–	1437821	1437782	–	–
	4-pos., cable type 93B	5 m	–	–	–	–	–	–	–	–	1437834	1437795	–	–
	4-pos., cable type 93C	2 m	–	–	–	–	–	–	–	–	–	1416209	–	–
	4-pos., cable type 93R	3 m	–	–	–	–	–	–	–	–	–	1416263	–	–
Sercos	4-pos.		1457979	1457966	–	–	–	–	–	–	–	–	–	–
	4-pos., cable type 93K		–	–	–	–	–	–	–	–	1419158	1419154	–	–
	4-pos., cable type 93K		–	–	–	–	–	–	–	–	1419159	1419155	–	–
	4-pos., cable type 93K		–	–	–	–	–	–	–	–	1419160	1419156	–	–
	4-pos., cable type 93K		–	–	–	–	–	–	–	–	1419161	1419157	–	–
EtherCAT®	4-pos.		1456556	1456569	–	–	–	–	–	–	–	–	–	–
	4-pos., cable type 93K		–	–	–	–	–	–	–	–	1419138	1419134	–	–
	4-pos., cable type 93K		–	–	–	–	–	–	–	–	1419139	1419135	–	–
	4-pos., cable type 93K		–	–	–	–	–	–	–	–	1419140	1419136	–	–
	4-pos., cable type 93K		–	–	–	–	–	–	–	–	1419141	1419137	–	–
M12 for fieldbuses			**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Straight**	**Angled**	**Male**	**Female**	**Male**	**Female**
PROFIBUS	5-pos.	0.5 m	1456475	1456488	–	–	–	–	–	–	1534342	1534384	–	–
INTERBUS	5-pos.	0.5 m	1456572	1456585	–	–	–	–	–	–	1534504	1534546	–	–
CANopen® EtherNet/IP™	5-pos.	0.5 m	1456491	1456501	–	–	–	–	–	–	1534423	1534465	–	–
CC-Link	4-pos.		1457856	1457869	–	–	–	–	–	–	–	–	–	–
FOUNDATION Fieldbus	4-pos.		1457872	1457885	–	–	–	–	–	–	–	–	1431432	1431429

Assembled cables for Ethernet networks

	Cable structure	Conductor/ 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 in accordance with CAT5e.	1416415	1416305	–
94A						
	4 x 2 x AWG 24	Single-strand, twisted pair	Ethernet cable for fixed installation. The cable meets transmission properties in accordance with 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 in accordance with 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 in accordance with UL1581 Sec.1200 and therefore also suitable for outdoor use. The cable meets transmission properties in accordance with 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 $CAT6_A$.	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 $CAT6_A$.	1417359	1416347	1402609

Assembled cables for PROFINET networks

	Cable structure	Conductor/ 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 in accordance with 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 in accordance with 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 in accordance with 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

Fiber optic-based data cabling for networks and fieldbuses

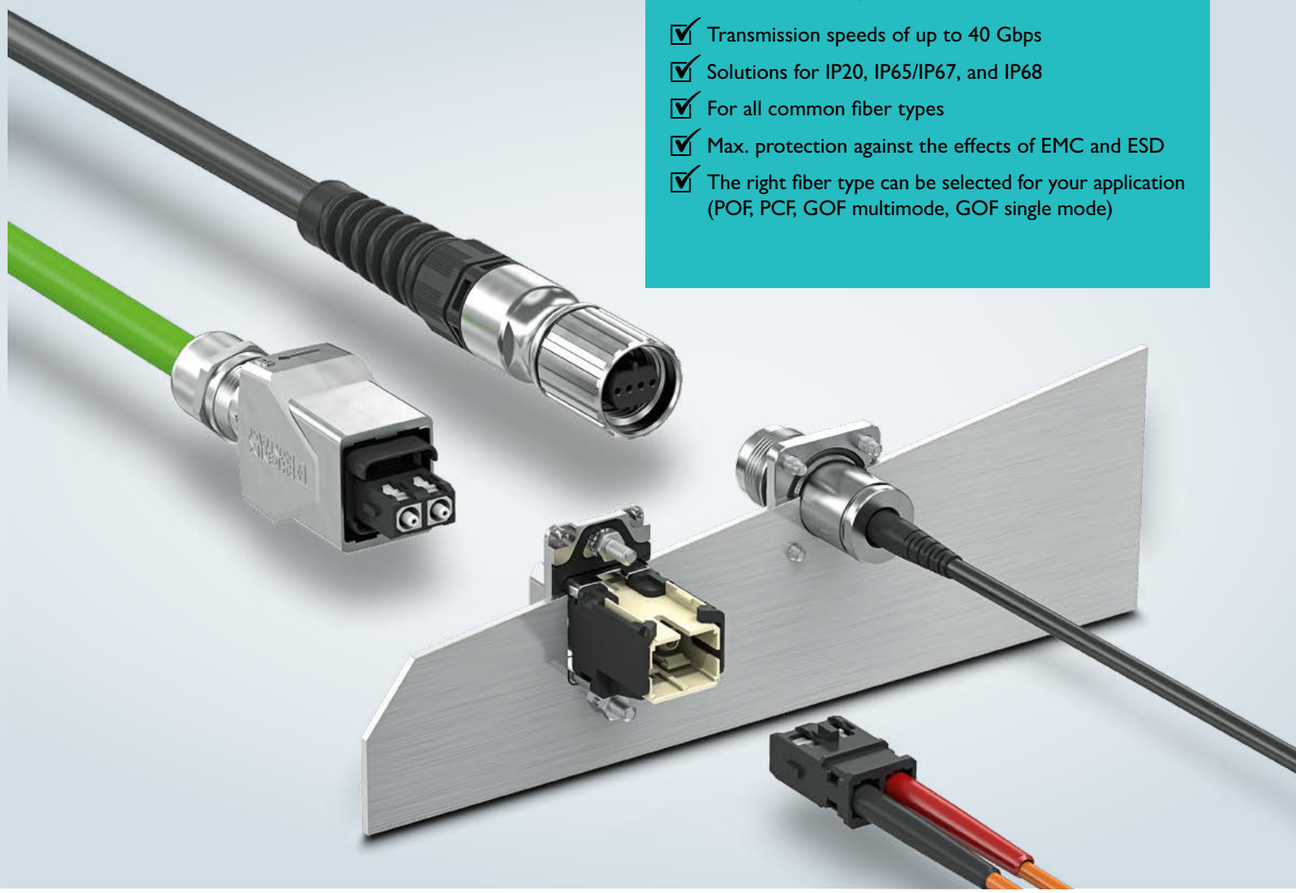
High transmission speed, low attenuation, resistance to electromagnetic interference: FO cables are a modern transmission medium for industrial systems and infrastructure applications. Whatever the fiber type or interface – the right connection technology is available in our extensive portfolio.

Web code: #0298

CANopen DeviceNet EtherCAT Ethernet

EtherNet/IP INTERBUS Modbus

PROFIBUS PROFINET sercos the automation bus

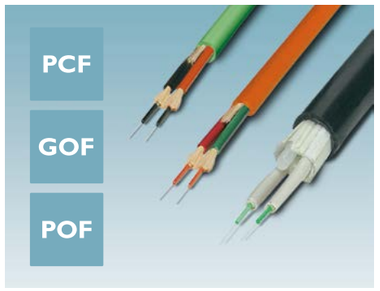


Your advantages

- Transmission speeds of up to 40 Gbps
- Solutions for IP20, IP65/IP67, and IP68
- For all common fiber types
- Max. protection against the effects of EMC and ESD
- The right fiber type can be selected for your application (POF, PCF, GOF multimode, GOF single mode)

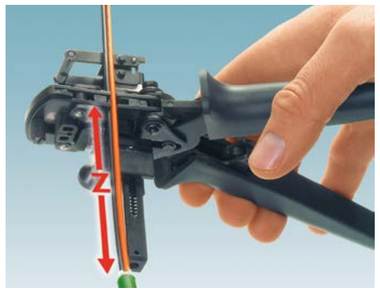
Wide variety

Choose from SC-RJ, LC, SC, F-SMA to ST, plus POF, PCF, and GOF fiber types.



Comprehensive range of cables

Extensive range of cables for all applications, networks, and standard interfaces.

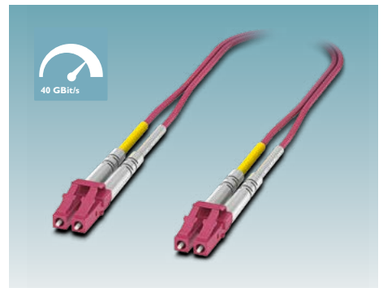


Fast assembly

Fast assembly in the field using professional tools.

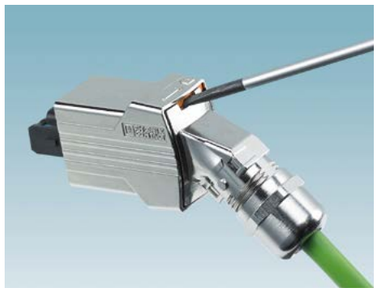
Reliable protection

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



High-quality patch cables

Large selection of patch cables for all typical connection methods.



Push-pull locking technology

Push-pull ADVANCE locking technology protects against unintentional unplugging.

SC-RJ, V14, IP65/67

Web code: #0334

	Cable outlet	Material	Connection method	Data rate	Specification	Order no.
Connectors						
	Straight	Die-cast zinc	POF	Up to 100 Mbps	–	1407896
	Angled, downward		POF		–	1407902
	Angled, upward		POF		–	1408028
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
Tool sets						
	–	–	–	–	For POF	1658820
	–	–	–	–	For PCF	2708876

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

Web code: #0334

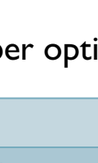
	Material	Connection method	Data rate	Specification	Order no.
Connectors					
	Plastic	POF	Up to 100 Mbps	–	1657009
		PCF			1657012
Panel mounting frames					
	Plastic, gray	Round panel cutout	–	Unequipped, for Freenet modules	1653744
				Unequipped, for AVAGO transceiver	1658545
	Plastic, black			Unequipped, 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
Tool sets					
	–	–	–	For POF	1658820
				For PCF	2708876

For further information and our video animation on FO-based data connectors, use the following web code.

Web code: #0298

Fiber optic connectors for assembly

Web code: #0332

	Function	Fiber type	Specification	Order no.
LC				
	Connector	GOF	Multimode	1411294
			Single mode PC	1411295
			Singlemode APC	1412476
			Multimode	1411052
			Single mode PC	1411053
			Singlemode APC	1412472
	Coupling		Multimode	2700312
			Single mode	2700313
SC				
	Connector	GOF	Multimode	1411296
			Single mode PC	1411297
			Singlemode APC	1412478
			Multimode	1411292
			Single mode PC	1411293
			Singlemode APC	1412474
		PCF	SC, SC-RJ (Ø 2.2 mm)	2313779
	Coupling	GOF, PCF, POF	–	2901788
SC-RJ				
	Connector	GOF	Multimode	1411290
			Single mode PC	1411291
			Singlemode APC	1412473
		PCF	SC, SC-RJ (Ø 2 … 3 mm)	1411304
			SC, SC-RJ (Ø 2.2 mm)	1404087
			SC-RJ (Ø 2.9 mm)	1654866
		POF	SC-RJ (Ø 2.2 mm)	1654879
	Coupling	GOF, PCF, POF	–	1652978
F-SMA				
	Connector	PCF	F-SMA (Ø 2.9 mm)	2799487
		POF	–	2799720
	Coupling	GOF, PCF, POF	–	2799416
ST (B-FOC)				
	Connector	PCF	ST (Ø 2.2 mm)	2313782
			ST (Ø 2.9 mm)	2708481
	Coupling	GOF, PCF, POF	–	2799429
Tool sets				
	Tool set	GOF	Multimode and single mode	1411049
		PCF	SC, SC-RJ (Ø 2 … 3 mm)	1411051
			SC, SC-RJ (Ø 2.2 mm), SC-RJ (Ø 2.9 mm)	2708876
			ST (Ø 2.2 mm), ST (Ø 2.9 mm)	2708465
			F-SMA (Ø 2.9 mm)	2799526
		POF	SC-RJ	1658820
			F-SMA	2744131

Fiber optic 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
Junction 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				
	Coupling module	–	SC-RJ, for POF, PCF, and GOF	1654358
			LC duplex, multimode	2700312
			LC duplex, single mode	2700313

Fiber optic splice boxes, IP20

Web code: #0336

Splice boxes

	Mounting type	Material	Without pigtails	OM1 G62.5/125 µm	OM2 G50/125 µm	OM4 G50/125 µm	OS2 (PC) E9/125 µm	OS2 (APC) E9/125 µm
	DIN rail mounting	6 x LC duplex	1019710	–	1019713	1019712	1019711	1083665
		12 x LC duplex	1019705	–	1019709	1019708	1019707	–
		6 x SC duplex	1019686	–	1019700	1019698	1019692	–
		6 x ST duplex	1019681	1019684	1019683	–	1019682	–
		6 x LSH duplex	–	–	–	–	–	1019680
	19" mounting	12 x SC duplex	–	–	1145408	1145406	1143631	–
		24 x SC duplex	–	–	1145407	1145403	1145400	–
		12 x LC duplex	–	–	1145416	1145415	1145411	–
		24 x LC duplex	–	–	1145375	1145413	1145409	–
		12 x ST duplex	–	1145399	1145398	–	1145395	–
		24 x ST duplex	–	1145389	1145397	–	1145392	–

Fiber optics, fiberglass zip cords, multimode, IP20

Web code: #0333

		Variable lengths 1 m ... 1,000 m			
					
F-SMA	**Fiber type**	**FSMA**	**SC duplex**	**ST (B-FOC)**	**LC duplex**
	OM1	1406532	1406536	1406535	1413787
	OM2	–	–	–	–
	OM3	–	–	–	–
	OM4	–	–	–	–
SC duplex					
	OM1	1406536	1413790	1413791	1413789
	OM2	–	1405697	1405708	1405691
	OM3	–	1405698	1405709	1405692
	OM4	–	1405699	–	1405693
ST (B-FOC)					
	OM1	1406535	1413791	1413821	1413792
	OM2	–	1405708	1405712	1405706
	OM3	–	1405709	–	1405707
	OM4	–	–	–	–
LC duplex					
	OM1	1413787	1413789	1413792	1413788
	OM2	–	1405691	1405706	1405688
	OM3	–	1405692	1405707	1405689
	OM4	–	1405693	–	1405690

For further information and our video animation on FO-based data connectors, use the following web code.

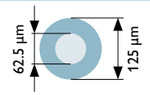
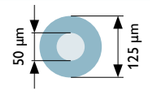
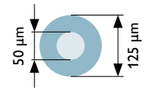
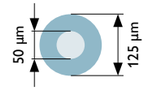
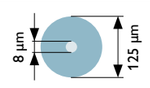
Web code: #0298

Fiber optics, fiberglass zip cords, single mode, IP20

Web code: #0333

	FO patch cables							
								
	OM1			**OM2**			**OM3**	
Type	**LC**	**SC**	**ST**	**LC**	**SC**	**ST**	**LC**	**SC**
LC	1146497	1146498	1146499	1115633	1115607	1115588	1185476	1185480
SC	1146498	1146504	–	1115536	1115536	1115574	1185480	1185485
ST	1146499	–	1146501	1115574	1115574	1115560	–	–
								
	OS2 PC			**OS2 APC**			**OM4**	
Type	**LC**	**SC**	**ST**	**LC**	**SC**	**ST**	**LC**	**SC**
LC	1115636	1115618	1115596	1115630	1115613	–	1115625	1115601
SC	1115618	1115550	1115582	1115613	1115544	–	1115601	1115424
ST	1115596	1115582	1115565	–	–	–	–	–

Zip cord fiber classes

Multimode	Fiber structure	Sheath color	Fiber category	Typical range	Typical wavelength
		Orange	OM1	1000Base-SX: min. 350 m 1000Base-LX: min. 550 m	850 nm 1,300 nm
		Orange	OM2	1000Base-SX: min. 525 m 1000Base-LX: min. 1,000 m	850 nm 1,300 nm
		Aqua	OM3	1000Base-SX: min. 1,000 m 1000Base-LX: min. 550 m 10GBase-SX: min. 300 m	850 nm 1,300 nm
		Heather violet	OM4	1000Base-SX: min. 1,040 m 1000Base-LX: min. 600 m 10GBase-SX: min. 550 m	850 nm 1,300 nm
Single mode					
		Yellow	OS2	10GBase-LR: min. 10 km 10GBase-ER: min. 40 km	1,310 nm 1,550 nm

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