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. Therefore, we have consistently designed our products with the knowledge, the tools, and the skills of the user in mind, the automation specialist.

Contents

Find out more with the web code

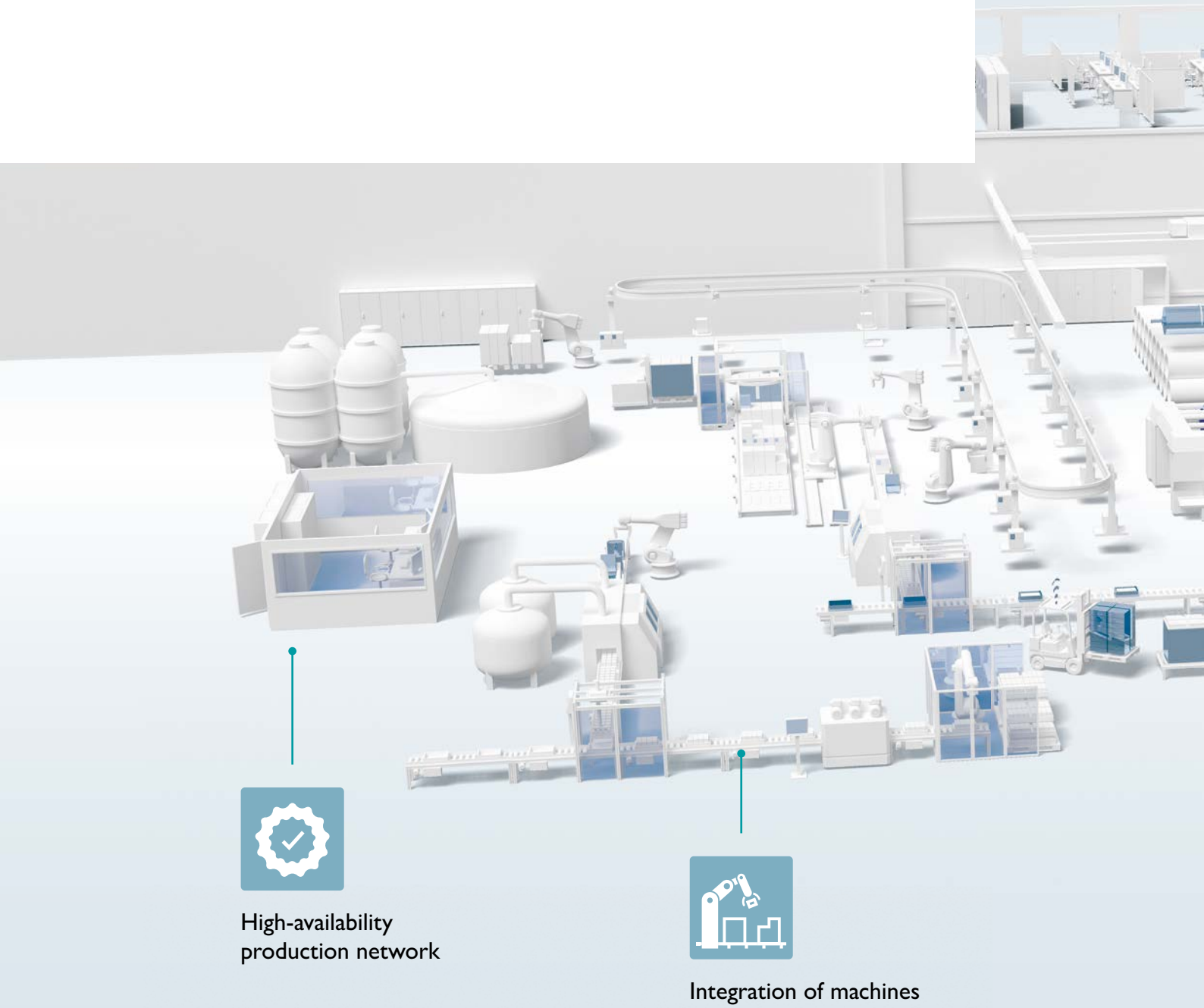
For detailed information, use the web codes provided in this brochure. Simply enter # and the four-digit number in the search field on our website.

Web code: #1234 (example)

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

Networked production

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

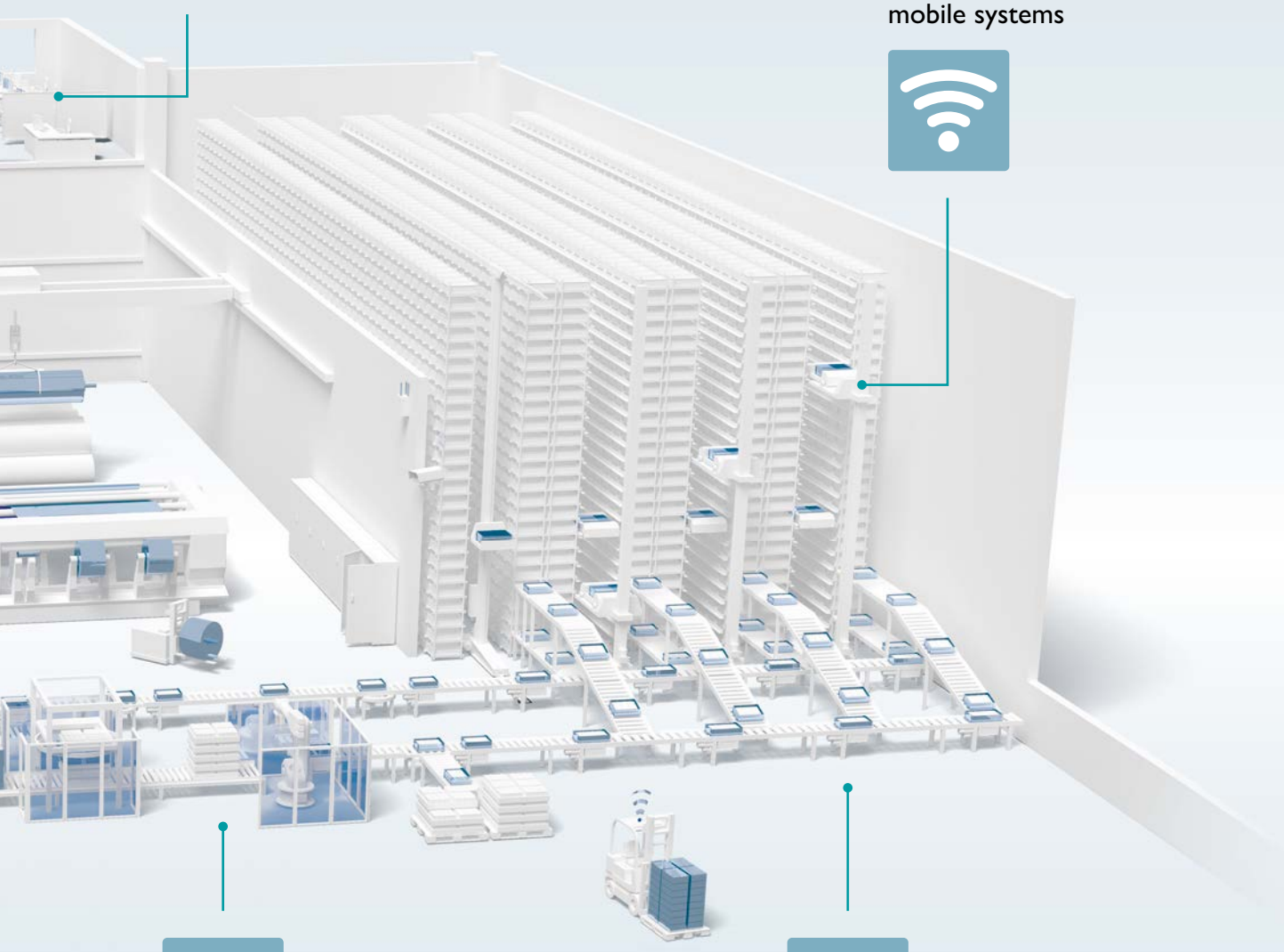


High-availability production network

Integration of machines

Connection to the company network

Communication with mobile systems



Cybersecurity

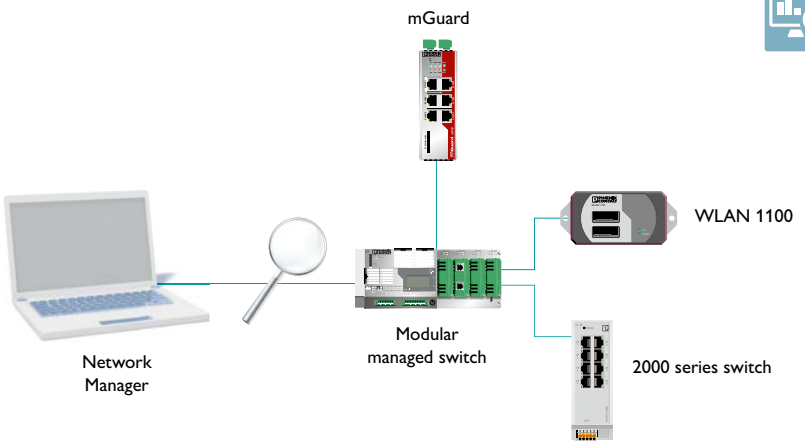
Network management

Solutions for the production network

Network management

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

Further information on software from page 66

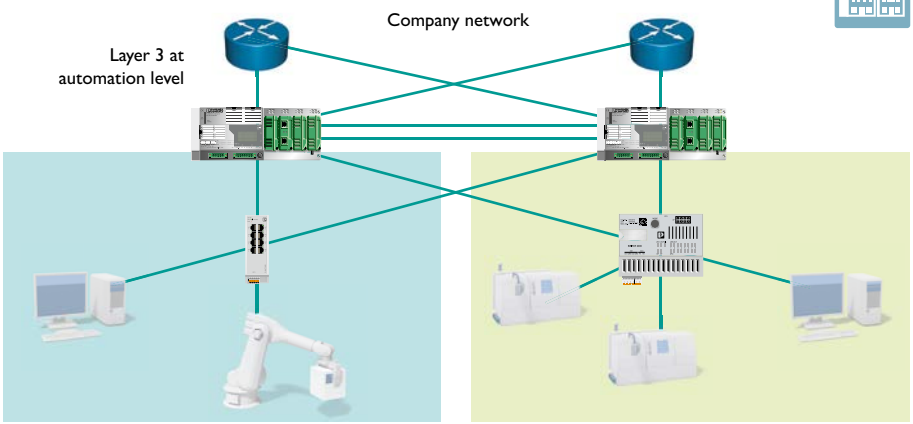


Network management with the FL Network Manager software

High-performance and failsafe connection to the company network

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

Further information on modular managed switches from page 28

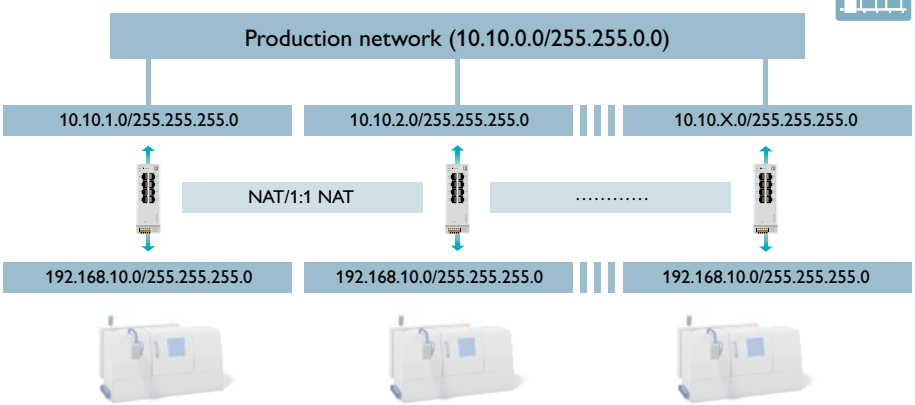


Subnet 1 Subnet 2

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 ranges within the machine to the desired IP address range in the higher-level automation network.

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



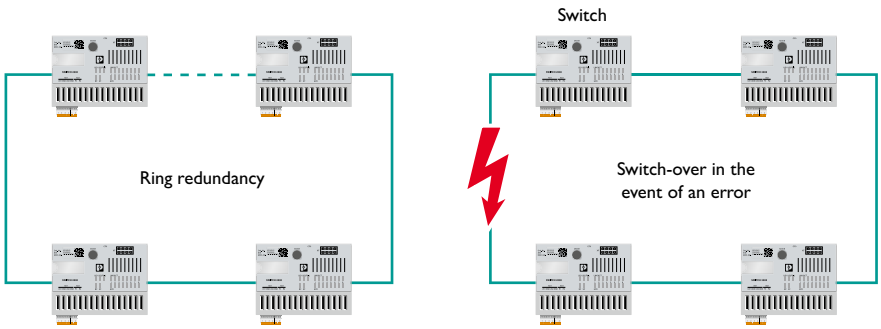
Automatic IP address translation using switches with NAT function

High network availability due to network redundancy

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

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

Further information on managed switches from page 28

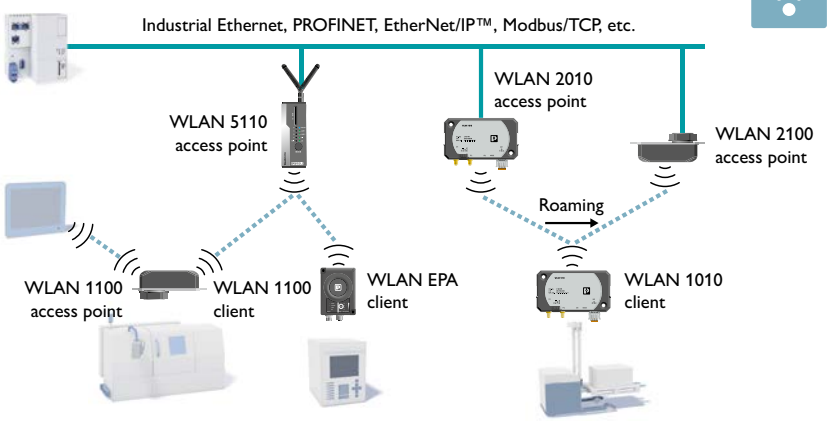


If an error occurs, the network structure is reorganized so that all devices can be reached again

Reliable wireless LAN solution for mobile systems

WLAN products from Phoenix Contact offer optimized roaming and enable radio cells to be changed in a matter of milliseconds. Real-time communication between the controller and an automated guided vehicle system is thus ensured, even in data-intensive applications. Compliance with the 802.11n standard as well as the use of MIMO antenna technology also ensure stable communication in industrial environments.

Further information on Industrial WLAN from page 49

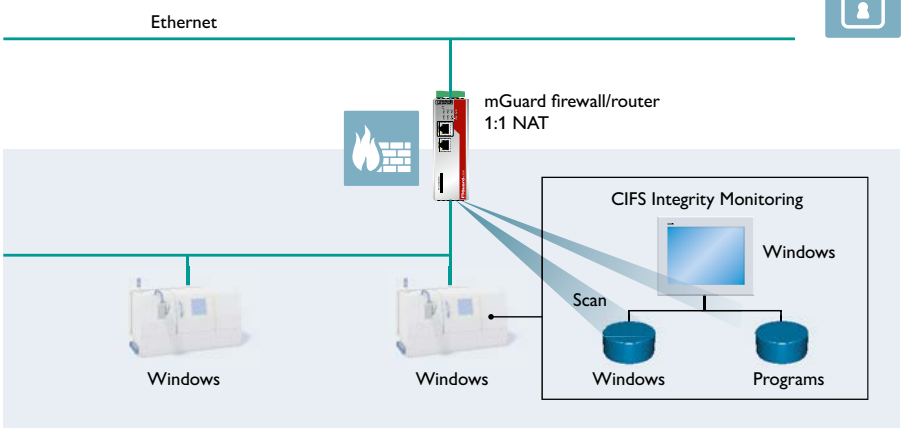


Wireless machine communication with Industrial WLAN

Industrial mGuard security solutions

The mGuard firewall routers securely protect your network against the dangers associated with 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.

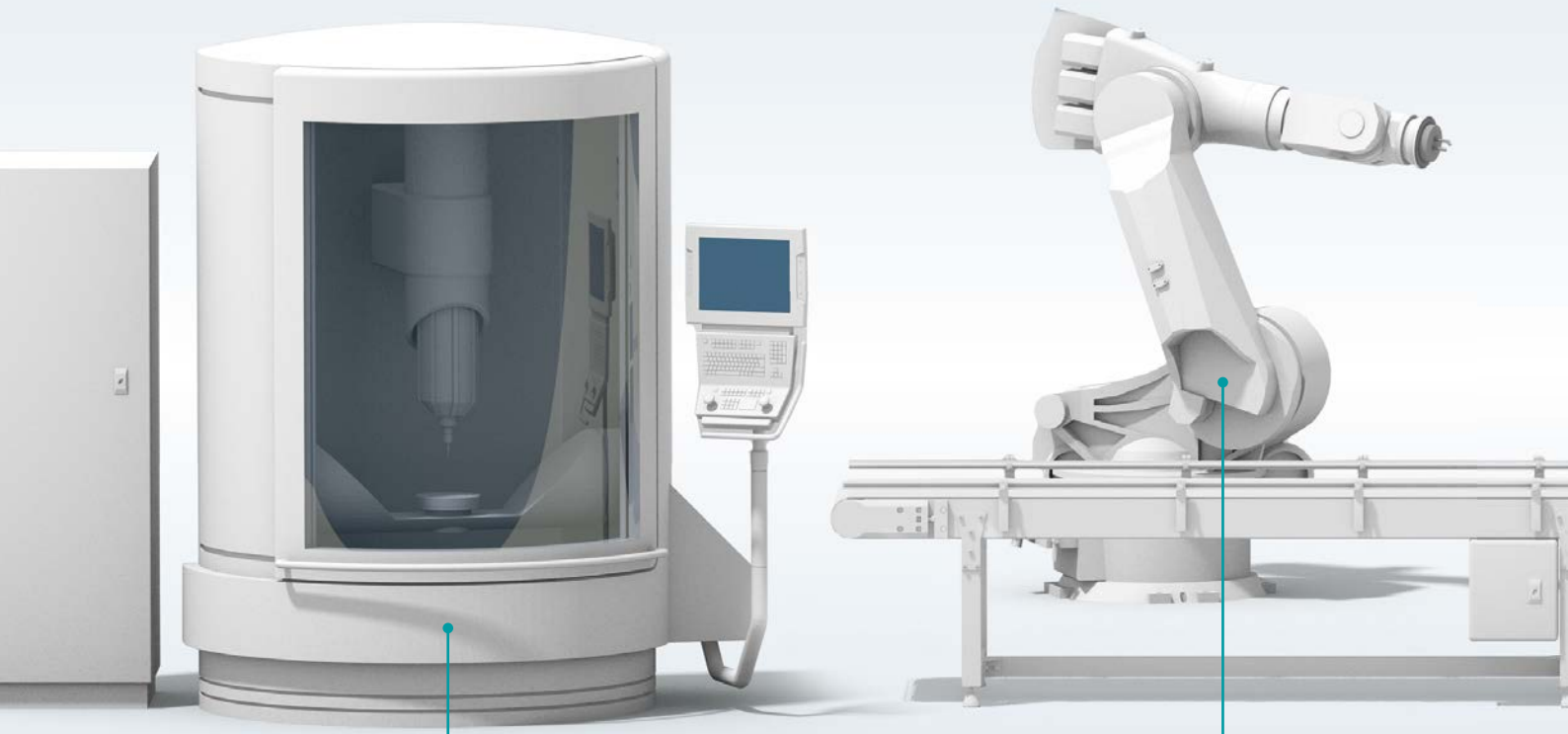
Further information on mGuard security routers from page 52



CIFS Integrity Monitoring for protecting computers with Windows operating systems

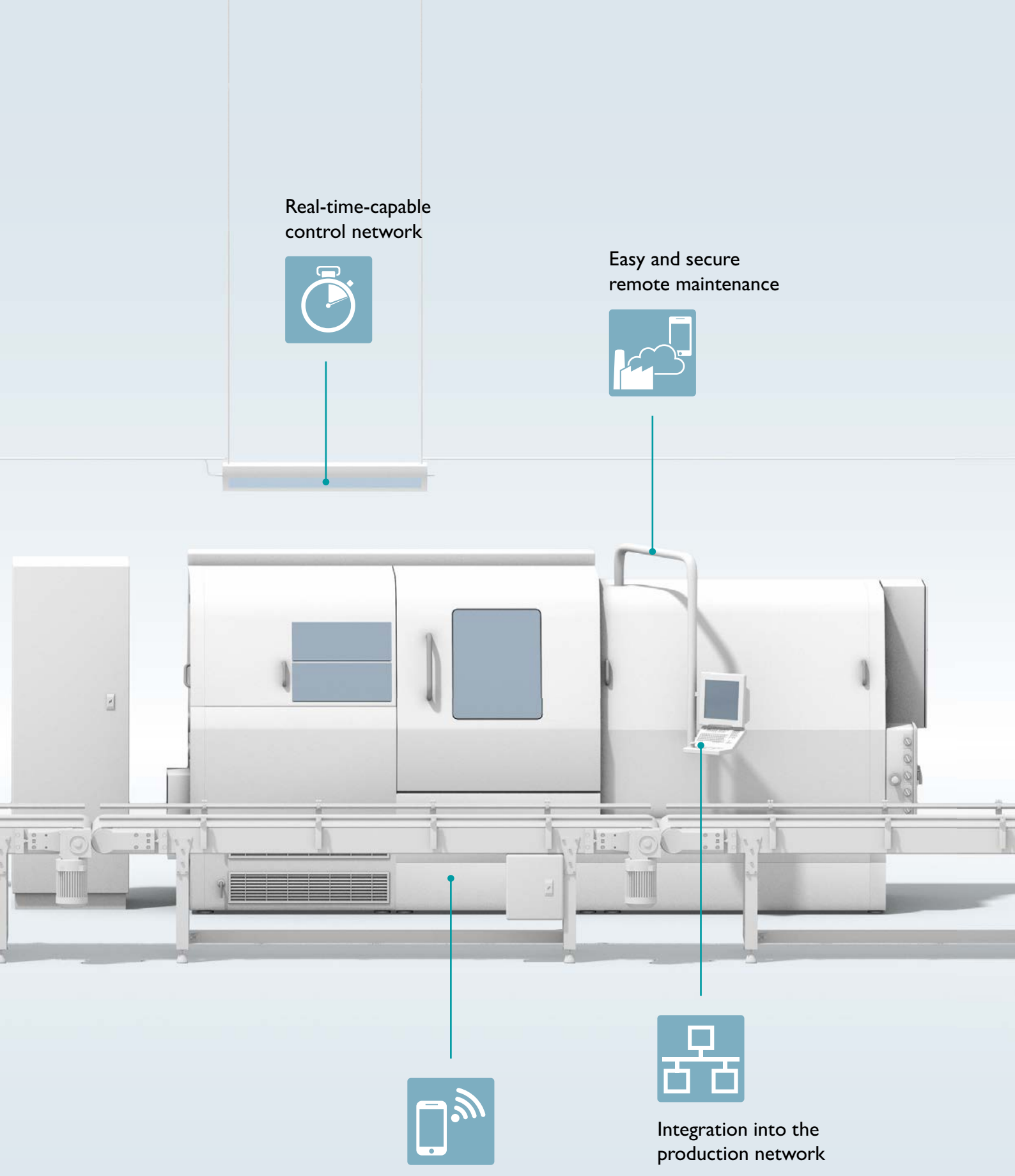
Networked machine

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



Central network configuration and monitoring

Stable machine networks

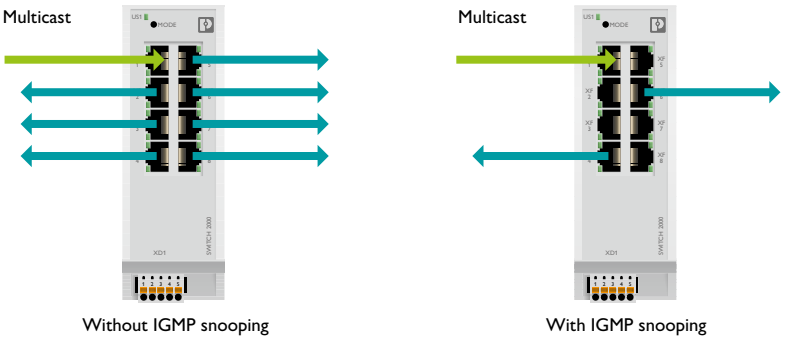

Real-time-capable
control network
Easy and secure
remote maintenance
Operation with
smart devices
Integration into the
production network

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

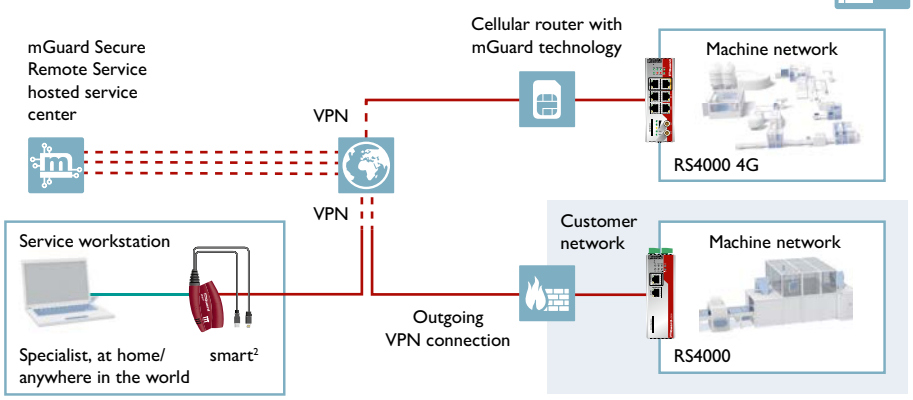


Multicast filters reduce the data load in the network

Easy and secure remote maintenance

The mGuard Secure Remote Service offers machine builders and system manufacturers a turnkey comprehensive VPN solution, which enables secure remote maintenance without specialist IT knowledge – from a simple VPN cloud client to an extensive security solution, including remote maintenance. The wide range of remote maintenance components means that the highly varied requirements of the network operator can be met.

Further information on secure remote maintenance from page 56

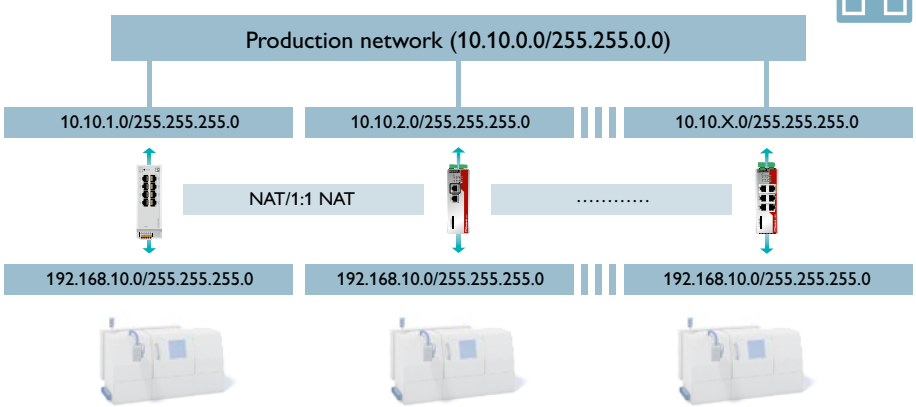


Secure remote maintenance concept with mGuard components

Secure integration into the production network

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

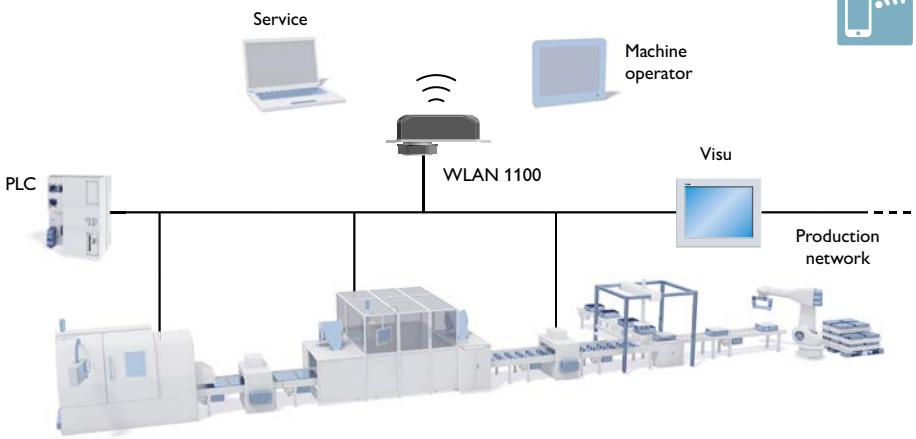


Machine connection with NAT and security routers

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 by the machine control system. This means that secure WLAN machine access can be easily implemented.

Further information on Industrial WLAN from page 49

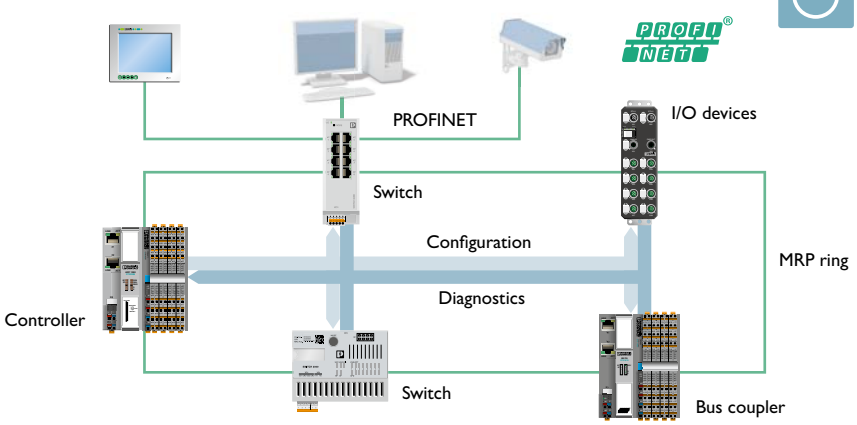


Wireless machine operation and service with wireless LAN

Real-time-capable control network

Automation switches combine IT functions with managed and real-time properties which optimally support the 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

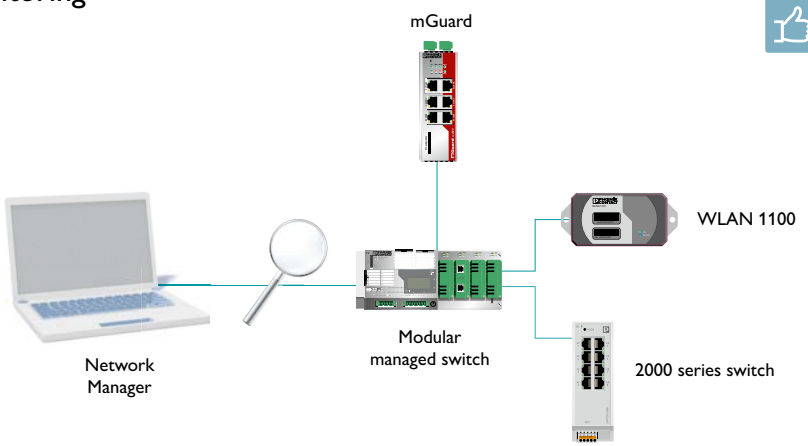


MRP redundancy for a failsafe machine network

Central network configuration and monitoring

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

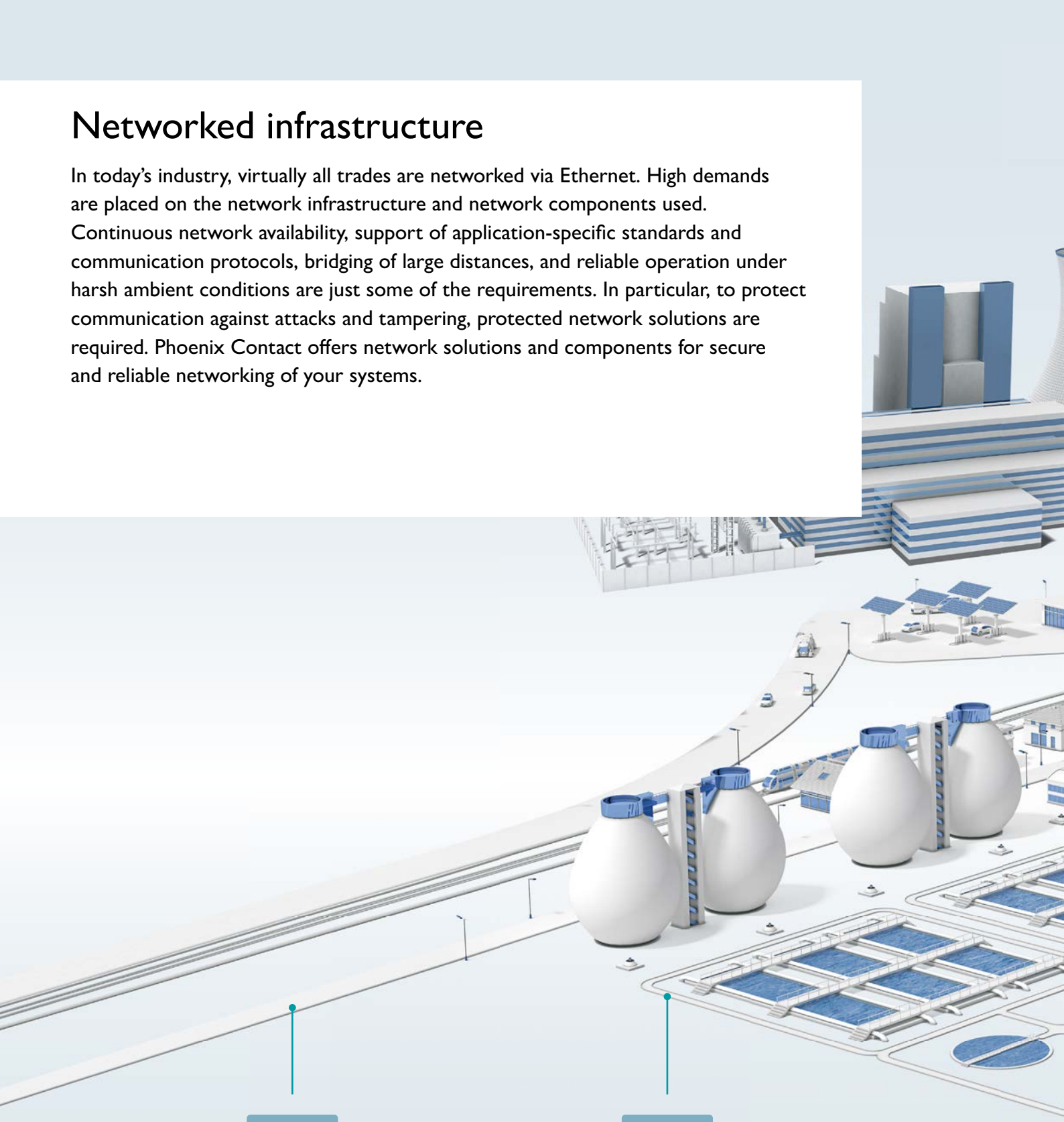
Further information on software from page 66



Network configuration and startup with the FL Network Manager software

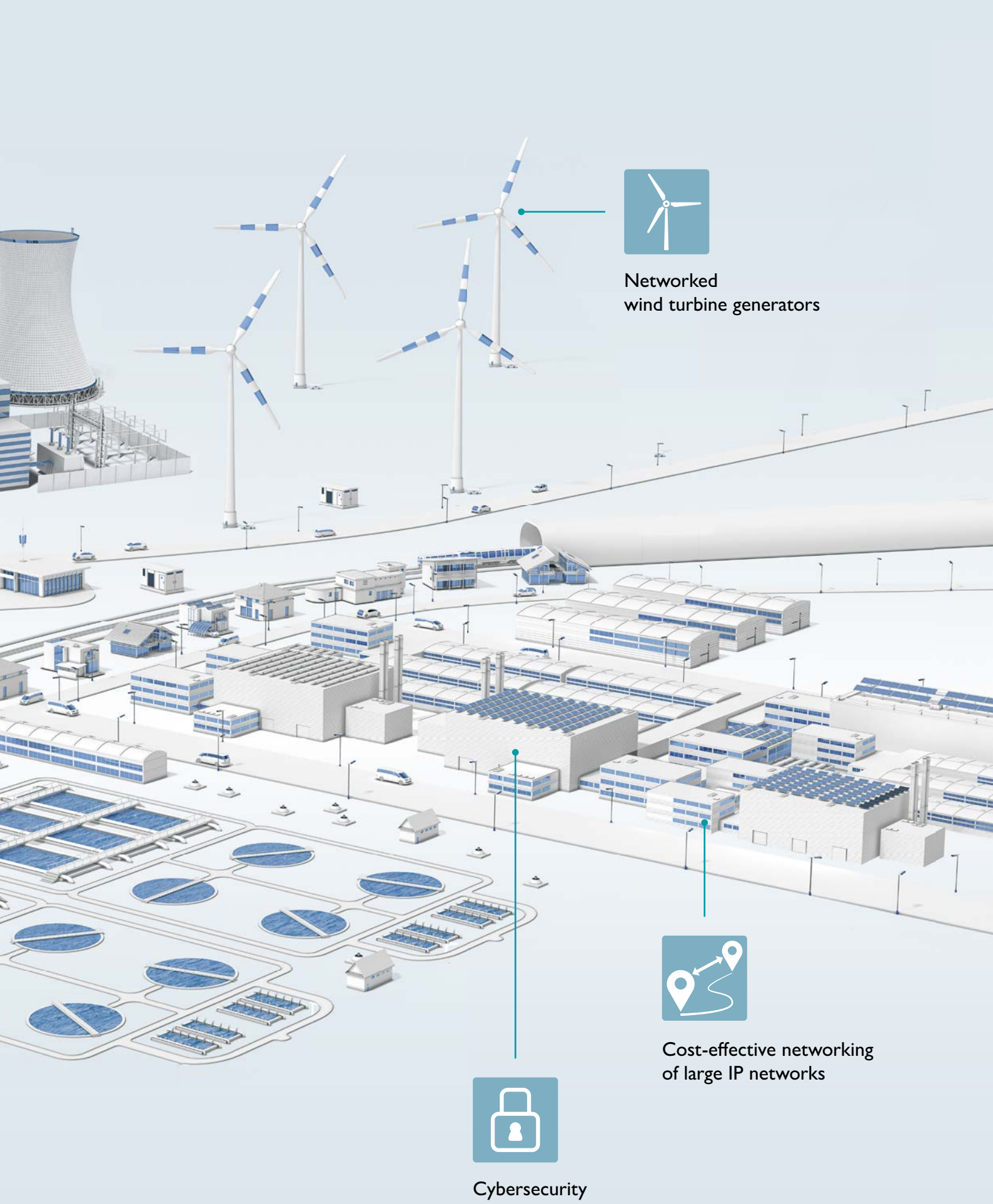
Networked infrastructure

In today's industry, virtually all trades 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 the requirements. In particular, to protect communication against attacks and tampering, protected network solutions are required. Phoenix Contact offers network solutions and components for secure and reliable networking of your systems.



Network availability

Power over Ethernet

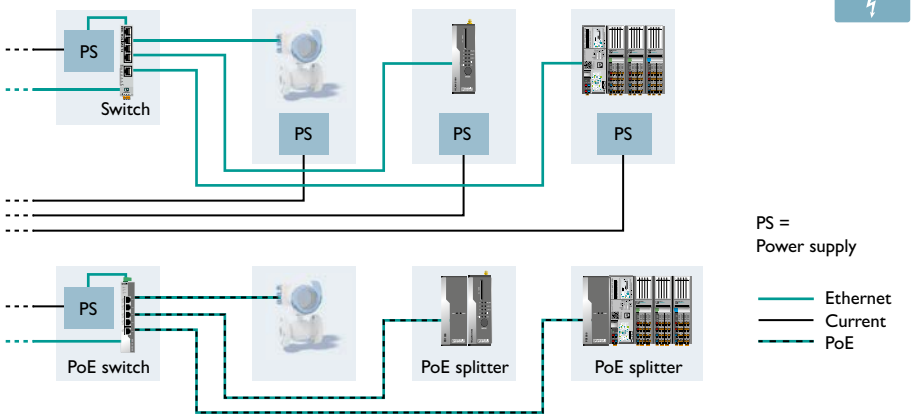

Networked
wind turbine generators
Cost-effective networking
of large IP networks
Cybersecurity

Solutions for infrastructure networks

Power over Ethernet

With Power over Ethernet (PoE), data and power are transmitted via the same 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 power via PoE.

Further information on Power over Ethernet from page 44

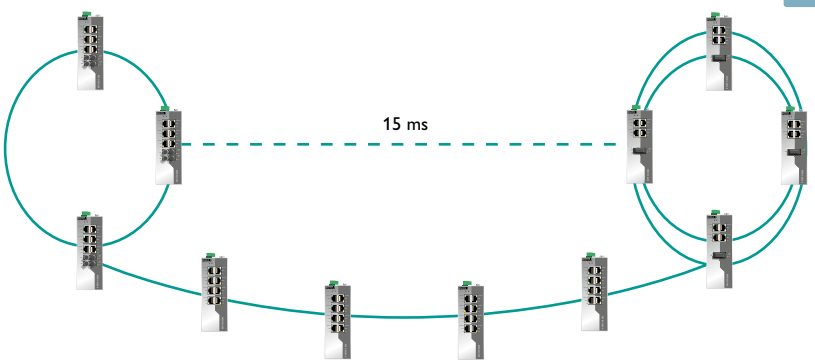


Streamlined and cost-effective cabling, thanks to PoE

Extended ring redundancy for high network availability

In critical infrastructure applications, extended ring redundancy offers fast 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

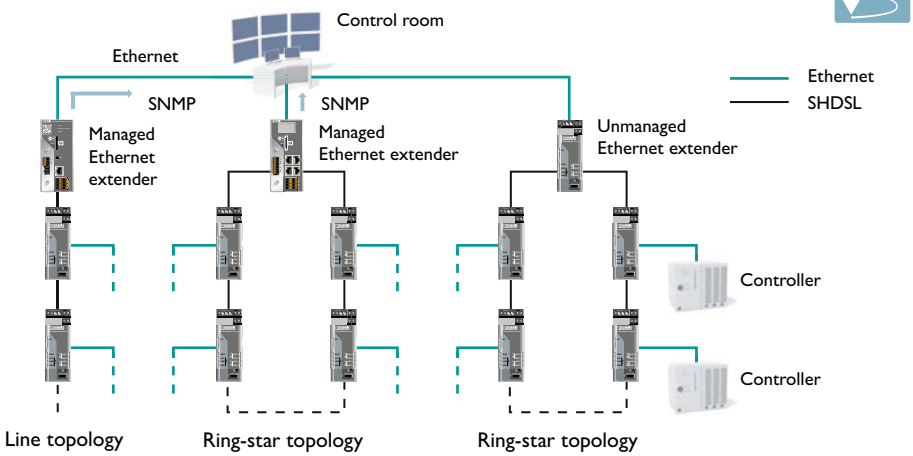


Extended ring redundancy for minimal switching times

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

With the Ethernet extenders, not only can you connect simple point-to-point Ethernet applications, but also large IP networks over distances 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 via SNMP when unexpected events occur, such as path weakening.

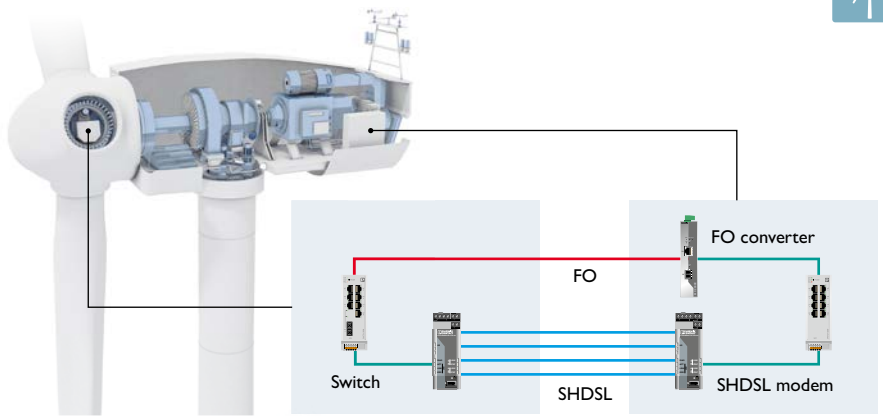
Further information on Ethernet extenders from page 57



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. Double redundancy can be established via the copper slip ring using SHDSL technology and two Ethernet extenders.

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

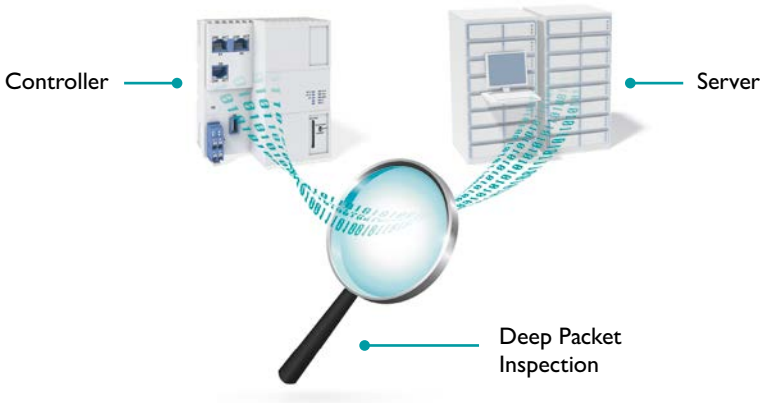


Redundant communication solution for secure data transmission to the hub

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 Package Inspection (DPI), the content of the data packet is also checked in addition to IP addresses and port regulation. This increases the security level in the case of OPC Classic or Modbus/TCP communication, for example.

Further information on mGuard security routers from page 52 and secure remote maintenance from page 56



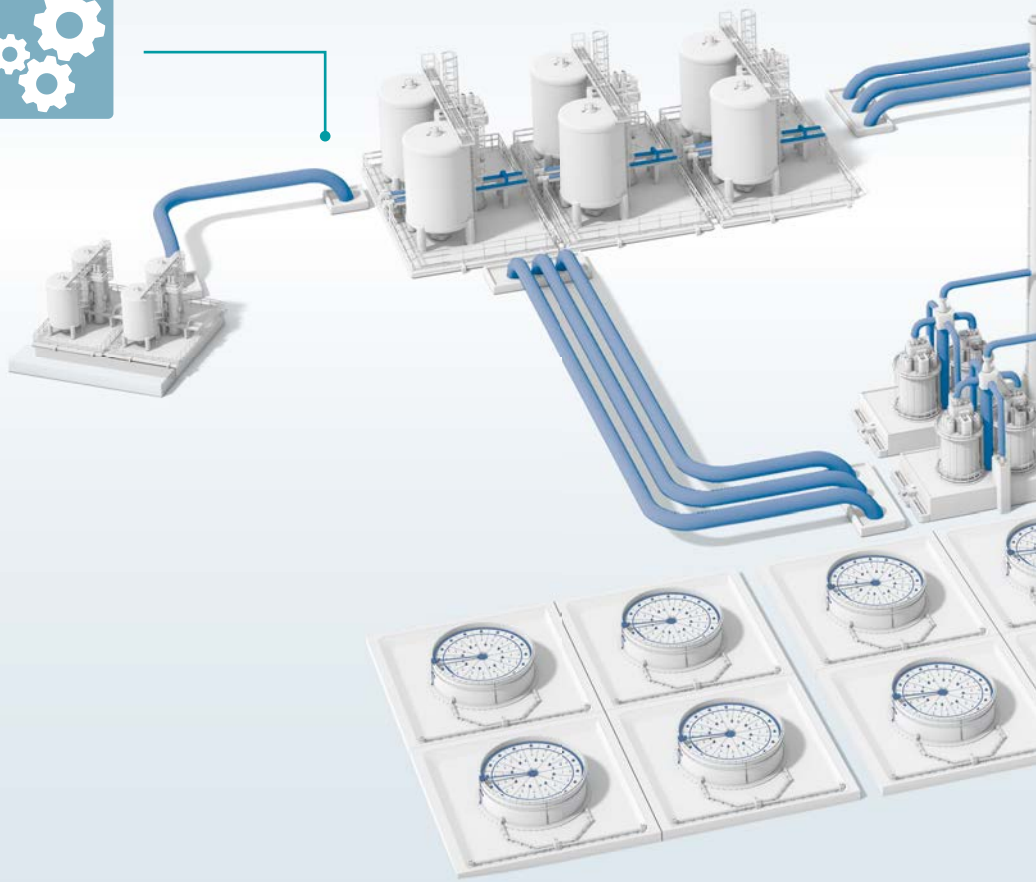
Deep Packet Inspection for OPC Classic and Modbus/TCP

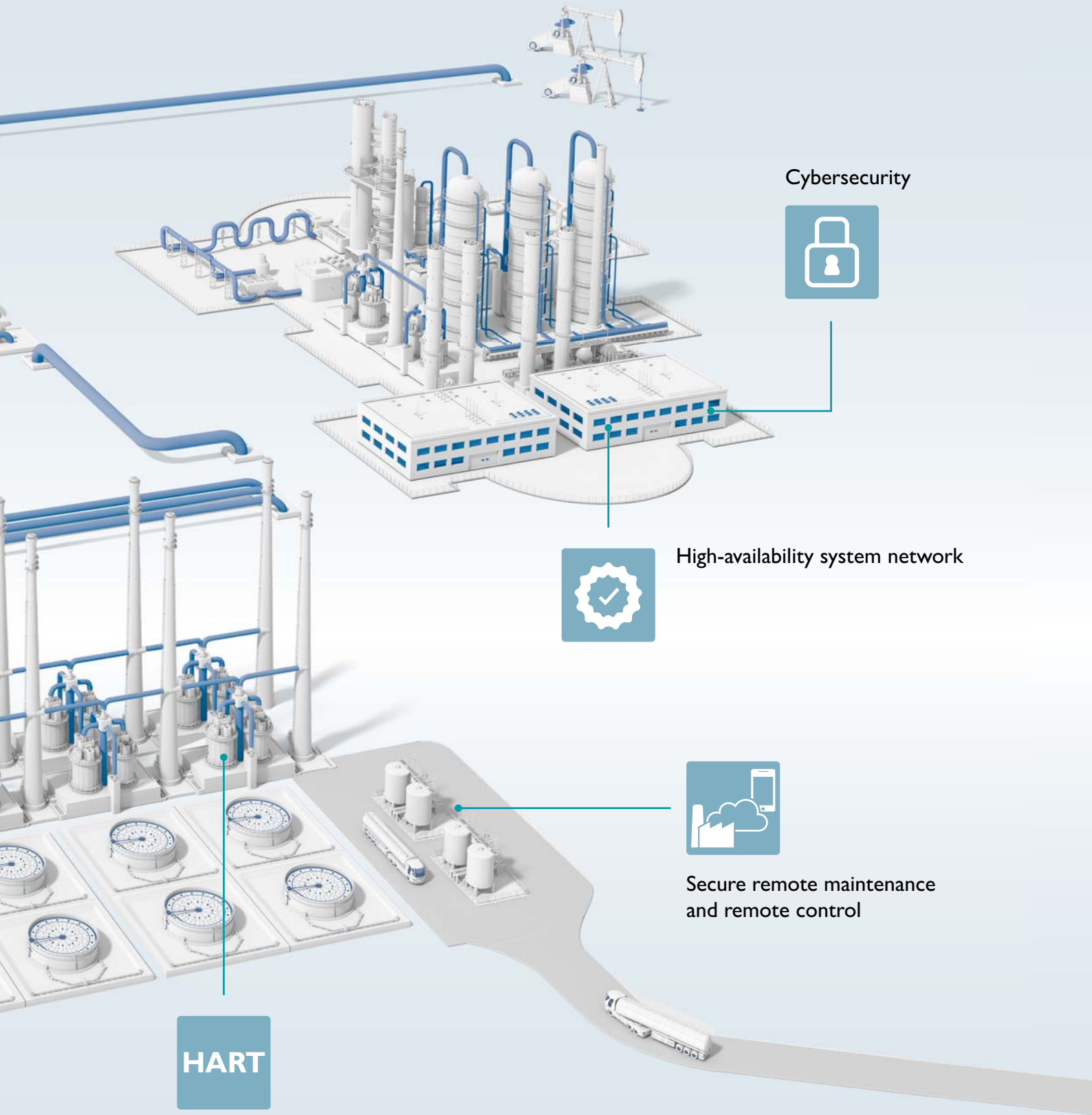
Networked process plant

Transparent communication from the sensor to the control room is a prerequisite for optimum control of continuous processes in process engineering plants.

Robust, high-availability, and secure Ethernet networks are therefore increasingly becoming the basis for communication in modern process plants. 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 plants.

Integration of modular systems



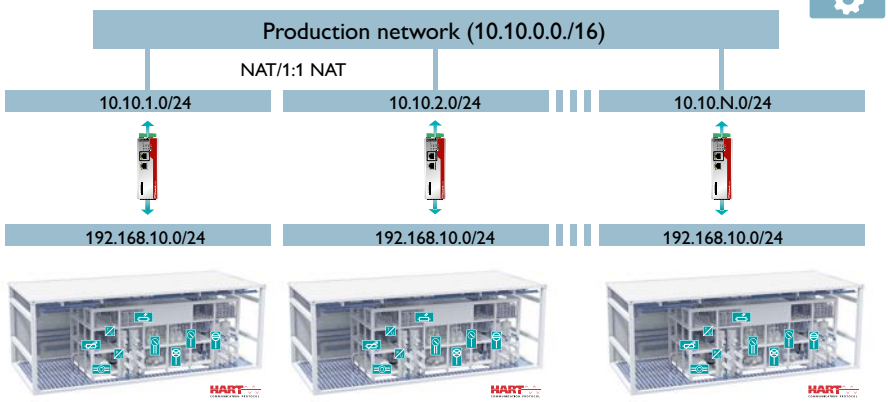

Cybersecurity
High-availability system network
Secure remote maintenance
and remote control
HART
Utilization of HART data

Solutions for process networks

Solution to IP address conflicts

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

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

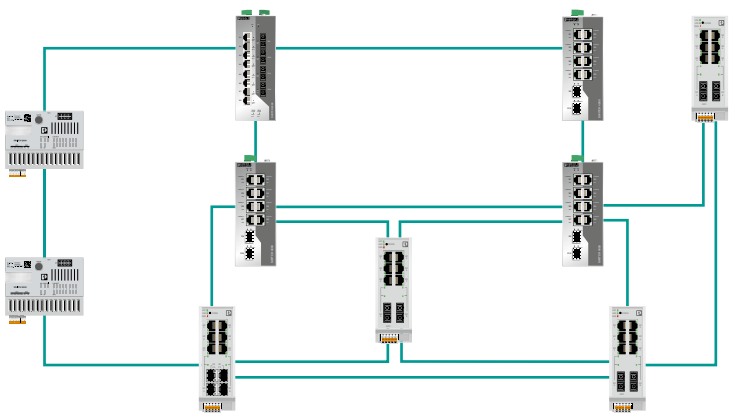


Access to system parts with the same IP addresses, thanks to 1:1 NAT function

Rapid Spanning Tree for high-availability systems

RSTP is a standardized redundancy method (IEEE 802.1D-2004) which is supported by virtually all managed switches from Phoenix Contact. The redundancy method 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

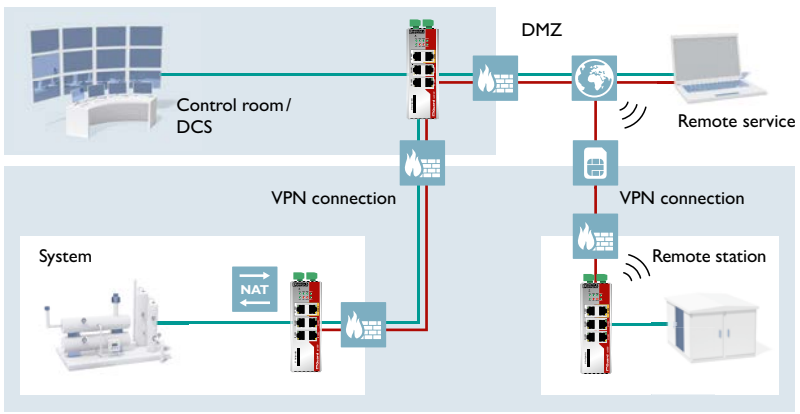


RSTP redundancy for high network availability

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 security level in the case of OPC Classic or Modbus/TCP communication.

Further information on mGuard security routers from page 52

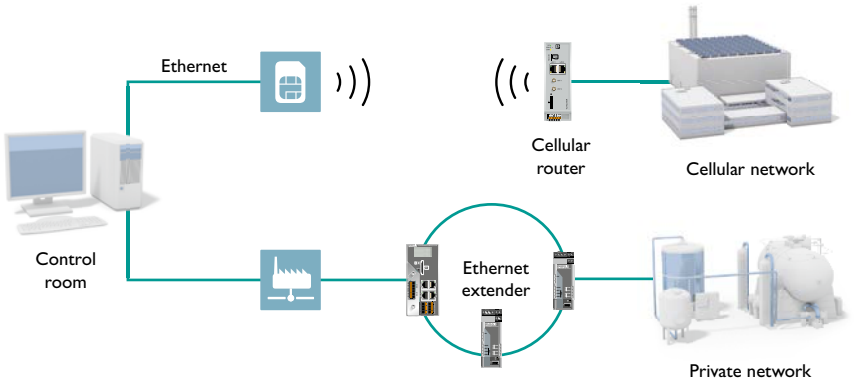


Protection of process plants with mGuard technology

Remote communication

Various communication methods are available for data transmission in remote or large networks and 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

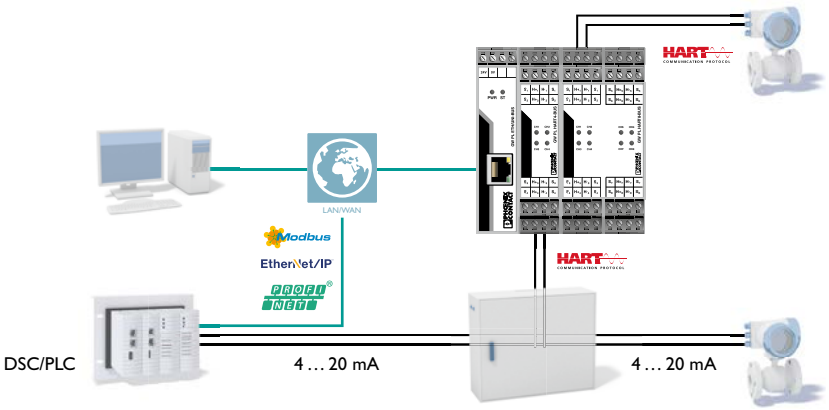


Remote communication via cellular and private networks

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 devices via your own HART master. This enables communication at Ethernet speed. The modular design provides a scalable solution for modern distributed control systems and phased roll-outs.

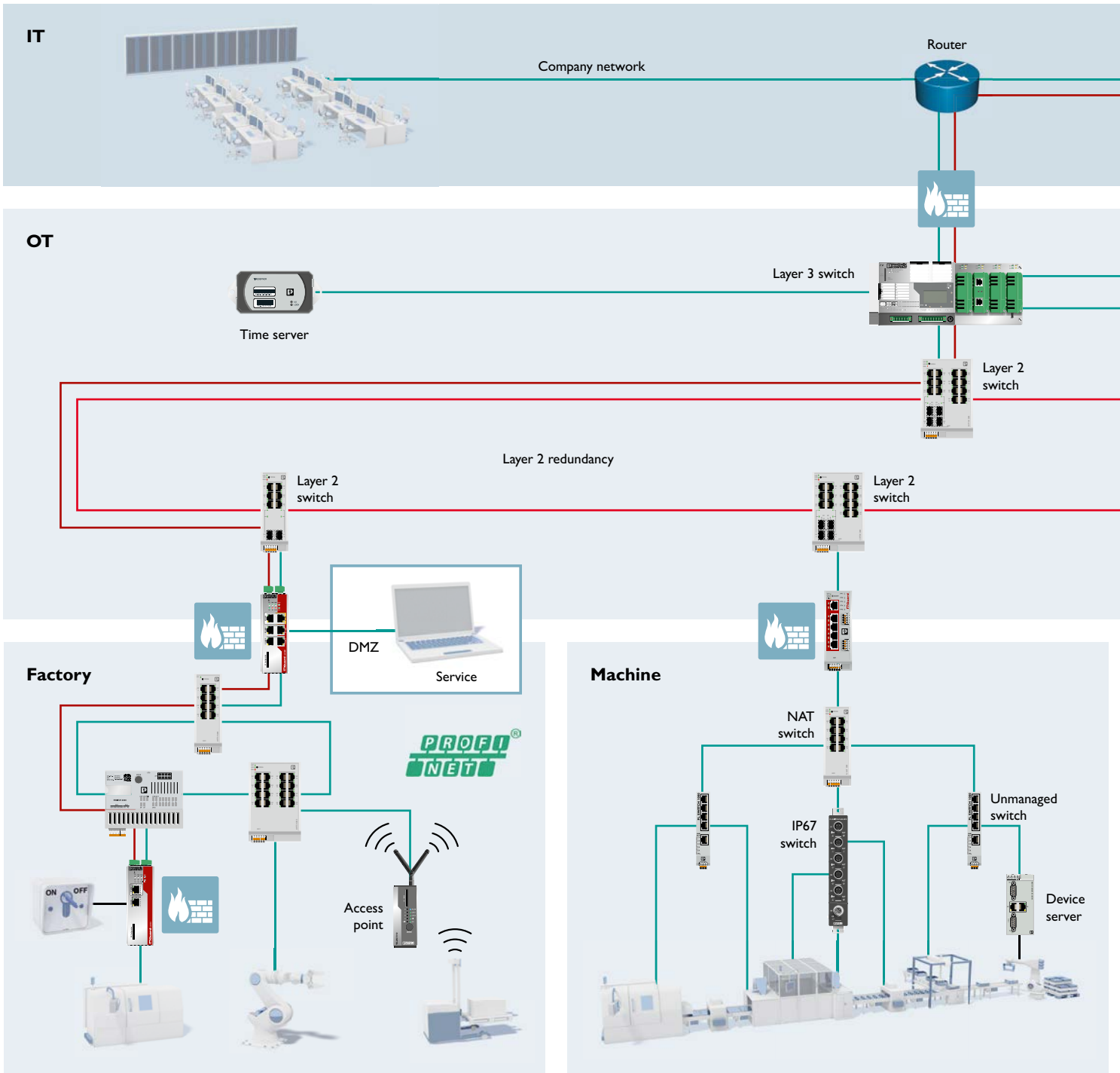
Further information on HART multiplexers on page 62

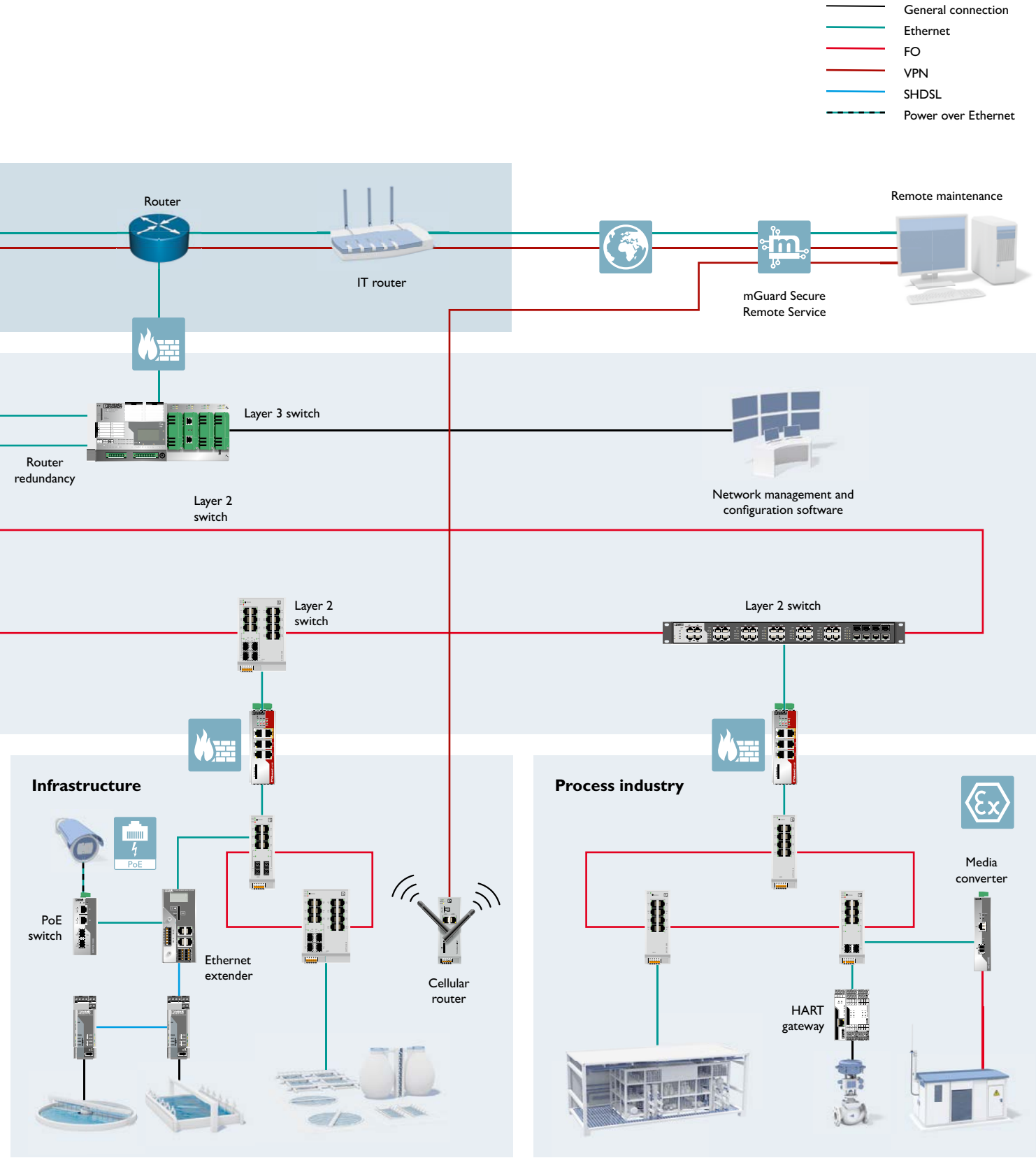


HART multiplexers can also be easily retrofitted in existing systems

How to set up your network reliably

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, through redundant, failsafe connections for critical applications, to firewalls and solutions for communication with remote locations, you will find the right solution for your network at Phoenix Contact. We will be happy to advise you on how best to set up your network and which components you will need for this.




General connection
Ethernet
FO
VPN
SHDSL
Power over Ethernet
Router
IT router
Remote maintenance
mGuard Secure
Remote Service
Layer 3 switch
Router
redundancy
Layer 2
switch
Network management and
configuration software
Layer 2
switch
Layer 2 switch
Infrastructure
PoE
PoE
switch
Ethernet
extender
Cellular
router
Process industry
Media
converter
HART
gateway

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 enables you to implement a wide range of industrial applications. In addition to this, the media converters offer comprehensive diagnostic options, thereby increasing system availability.

Web code: #1269

For standard applications

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

For real-time protocols

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

Your advantages

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

With special approvals

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

For special applications

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

Product overview for media converters

Features	Transmission	Connection method	Range	Light wavelength	Special features	Designation	Item 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 V DC … 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 with a very short latency time of 835 ns can be selected via DIP switch. This enables use 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
	Singlemode fiberglass	SC duplex	Up to 20 km			FL MC 2000T SM20 SC	2891317
	Singlemode 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
	Singlemode 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 V DC … 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
	Singlemode 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 singlemode 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	Item 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 FO connection technologies for short, medium, and large distances.

One fiber, numerous possibilities

Bidirectional transmission using a single optical fiber for rotating applications.

Continuous diagnostics

FO diagnostics with LED bar graphs for high system availability.

Fast diagnostics in the event of a malfunction

In addition to numerous diagnostic LEDs, the media converter also features the link management function (link fault pass through). This function 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

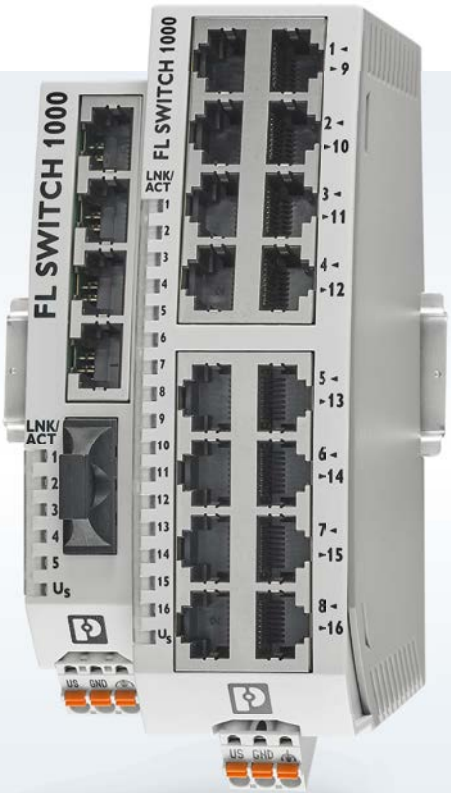
The FL MC 2000T series devices can switch between the standard store-and-forward operating mode with auto negotiation and the pass-through operating mode. This makes it possible to achieve very short delays (latencies) of 700 nanoseconds. These devices are therefore ideal for applications with time-critical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

EtherCAT. ETHERNET POWERLINK sercos the automation bus PROFINET

Unmanaged switches

Unmanaged switches from Phoenix Contact stand out thanks to their standard functions, variable number of ports, and various designs. Thanks to 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



For standard applications

The 1000N series unmanaged switches feature compact designs and flexible installation options. The 1100N switch versions also feature transmission speeds in the Gigabit range. The prioritization of data traffic ensures a more stable network and increases system availability.

For flat control cabinets

Using the mounting accessories, you can also mount the FL SWITCH 1000N(T) flat in the control cabinet or on the wall. At the same time, you can freely select the port outlet direction: upwards, downwards, to the left or right. This enables flexible use for a large number of applications.

Your advantages

- ☑ Auto negotiation and autocrossing ensure easy network creation and expansion
- ☑ Gigabit versions for high data throughput
- ☑ Electrical isolation and FO versions for interference-free operation in industrial environments
- ☑ Quality of Service for the prioritization of automation protocols

For harsh ambient conditions

Thanks to the extended temperature range, the 1000NT series is designed for use in very demanding applications for the oil and gas industry, shipbuilding, and other outdoor applications. Fiberglass versions also enable long transmission distances.

For field installation

With IP65/IP66/IP67 degrees of protection and M12 connection technology, the 1600 and 1700 series devices are particularly resistant to environmental influences and mechanical strain. The use of filtering and prioritization mechanisms ensures consistent behavior in the network.

Managed automation switches

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

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

Web code: #1555

For standard applications

The 2000 series managed switches offer clear configuration and diagnostic options as well as automatic error detection and troubleshooting. In addition to the extended scope of functions, the 2200 and 2300 versions offer communication via fiberglass as well as approvals for the process industry and maritime sector.

For flat control cabinets

With their low depth and downward port outlet direction, the FL SWITCH 2400 and 2500 versions are particularly suitable for use in flat control cabinets. The devices with eight or 16 ports can also be used in extreme ambient conditions due to their robust metal housing.

Your advantages

- Easy integration into existing networks and flexible redundancy for all topologies with the RSTP standard
- High availability with fast redundancy switch-over by means of Fast Ring Detection and MRP
- Diagnostics and analysis possible with integrated software functions
- Various connection methods for high flexibility

For flat control cabinets

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

For field applications

The FL SWITCH 2600 and 2700 versions 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 them extremely flexible in application. Moreover, a redundant power input/output also enables scalable networks.

Managed industrial IT switches

For demanding applications, the managed switches of the 3000 and 4000 series combine comprehensive diagnostic, performance, and safety functions. They also offer redundancy switch-over times of just 15 ms and user-friendly application features.

In addition to use in classic applications, the FL SWITCH TSN 2300 switches also enable you to implement real-time-capable Ethernet networks with innovative TSN technology.

Web code: #1555

For demanding applications

The 3000 and 4000 series switches are ideal for demanding infrastructure applications. With fast redundancy switch-over in less than 15 ms, they ensure a high level of availability. FO versions enable interference-free communication over large distances. Special attention has been paid to user-friendly operation and configuration.

Your advantages

- ☑ Uninterrupted operation of automation networks with fast redundancy switch-over
- ☑ Optimum user support with the use of IT standards and automation protocols
- ☑ Convenient operation via web-based management
- ☑ Maximum flexibility, thanks to a wide range of media

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 FO rings that can be diagnosed – optionally with an additional FO branch.

For Time-Sensitive Networking

With precise time synchronization in accordance with IEEE 802.1AS, frame preemption, and PROFINET stream, the FL SWITCH TSN 2300 switches enable you to implement innovative TSN applications.
The TSN mechanisms increase the performance, robustness, and availability of Ethernet networks.

Routers and layer 3 switches

With industrial routers and layer 3 switches from Phoenix Contact, you can integrate machines, production plants, or entire subnets 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 managed switches with a modular design form the backbone of your automation application.

Web code: #1556

For easy integration into the network

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

Your advantages

- ☑ Optimum network structure, thanks to segmentation via layer 3 switches
- ☑ Easy connection of machines to the production network irrespective of the address range
- ☑ Integration of systems with the same IP address ranges into higher-level networks, thanks to switch with NAT function
- ☑ Connection of multiple subnets via various different types of media, thanks to layer 3 function and wide range of media

For very stringent requirements

Our most powerful switch is the modular managed switch. As a Gigabit switch with optional layer 3 function, it is particularly suitable for use as an automation backbone and for connection to the higher-level company network. A huge range of combinable media modules as well as use in PROFINET RT and EtherNet/IP™ provide outstanding flexibility.

Overview of switches

	Unmanaged switches			
				
	1000N/1100N	**1000NT/1100NT**	**2000/2100**	**2200/2300/ 2400/2500**
Port speed (Mbps)	10/100/(1000)	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)	–	–	●	●
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 / ●
Diagnostics via Modbus/TCP	–	–	–	–
Approvals/certificates				
Maritime/Ex approvals	– / (●)	● / ●	– / –	(●) / (●)

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

Managed switches						
						
2600/2700	**TSN 2300**	**3000**	**4000/4800**	**PROFINET IRT**	**NAT 2000/2200/2300**	**GHS modular managed**
10/100/(1000)	10/100/1000	10/100	10/100/1000	10/100	10/100/(1000)	10/100/1000
– / –	– / ●	● / –	● / –	● / –	– / (●)	● / –
● / ●	● / ●	● / ●	● / ●	● / –	● / ●	● / ●
●	●	●	●	–	●	●
●	●	●	●	–	●	●
●	●	●	●	–	●	●
●	●	●	●	–	●	–
●	●	●	●	●	●	●
● / ● / ●	● / ● / ●	● / ● / –	● / ● / –	– / – / ●	● / ● / (●)	● / ● / ●
●	●	–	–	–	●	●
● / –	● / –	● / ●	● / ●	– / –	● / –	● / –
●	●	●	●	●	●	●
●	●	●	●	● (v1/v2 only)	●	●
● / ●	● / ●	– / ●	– / ●	– / –	● / ●	– / ●
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●	●	–	–	–	●	–
●	●	●	●	–	●	●
● / ●	● / ●	– / –	– / –	– / –	(●) / (●)	● / ●
–	–	●	●	–	–	–
● / ●	● / ●	– / –	– / –	● / ●	(●) / ●	● / ●
–	–	–	–	–	–	–
● / ●	● / ●	● / ●	● / ●	– / –	(●) / (●)	● / ●
●	●	●	●	–	(●)	●
●	●	●	●	–	●	●
– / –	– / –	– / –	– / –	– / –	● / ●	● / ●
–	–	–	–	–	–	●
B / ●	B / ●	A / –	A / –	C / ●	(B) / ●	B / ●
–	–	●	●	–	–	–
– / –	– / –	– / ●	– / ●	– / –	(●) / (●)	– / –

Product overview for unmanaged switches

Features	Copper ports	FO ports	Port speed	Quality of Service	Special features	Item No.
Unmanaged switches for universal use: FL SWITCH 1000N and 1100N						
Supply voltage: 9 V DC … 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 SFP		●	–	1085177
	5 x RJ45	2 x SFP		●	–	1085176
	8 x RJ45	–		●	–	1085256
	16 x RJ45	–		●	–	1085255
	5 x RJ45	–	10/100/1000 Mbps	●	Jumbo frames, extended Quality of Service functionality (e.g., EtherNet/IP™, BACnet)	1085254
	4 x RJ45	1 x SFP		●		1085173
	5 x RJ45	2 x SFP		●		1085171
	8 x RJ45	–		●		1085243
	16 x RJ45	–		●		1085219

Features	Mounting type	Width	Designation	Item No.
Mounting accessories for DIN rail devices				
Adapters for wall mounting or flat mounting on the DIN rail, e.g., for FL SWITCH 1000N(T) series devices				
	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

* DC supply only

Features	Copper ports	FO ports	Port speed	Quality of Service	Special features	Item 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 1000NT and 1100NT						
Supply voltage: 9 V DC … 32 V DC, 18 V AC … 30 V AC, temperature range: -40°C … +75°C, approvals: DNV/GL, process (ATEX, IECEx, C1D2)						
	5 x RJ45	–	10/100 Mbps	●	–	1085170
	4 x RJ45	1 x SFP		●	–	1085169
	8 x RJ45	–		●	–	1085165
	5 x RJ45	2 x SFP		●	–	1085164
	12 x RJ45	2 x SFP	10/100 Mbps (RJ45), 10/100/1000 Mbps (SFP)	●	–	1249598*
	5 x RJ45	2 x MM SC	10/100/1000 Mbps	●	Jumbo frames, extended Quality of Service functionality (e.g., EtherNet/IP™, BACnet)	1085163
	8 x RJ45	–		●		1085162

* DC supply only

Product overview for unmanaged switches

Features	Copper ports	FO ports	Port speed	Quality of Service	Special features	Item No.
Robust unmanaged switches with IP67: FL SWITCH 1600 and 1700						
Supply voltage: 24 V DC, temperature range: -40°C … +70°C						
	5 x M12	–	10/100 Mbps	●	With PTCP filter for PROFINET	2700200
	8 x M12	–	10/100 Mbps	●	M12 push-pull, Quality of Service functionality (PROFINET)	1196227
	8 x M12	–	10/100/1000 Mbps	●	M12 push-pull, extended Quality of Service functionality (e.g., BACnet, PROFINET, EtherNet/IP™)	1196228
Unmanaged Power over Ethernet switches: FL SWITCH 1000 PoE						
Supply voltage: 18 V DC … 57 V DC, extended temperature range: -40°C … +75°C, IEEE 802.3 af/at (PoE+)						
	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
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, narrow, flat, or 19" designs, in the control cabinet or in the field.

Power over Ethernet versions

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

Detect disconnections

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

Product overview for managed switches

Features	Copper ports	FO ports	Combo ports	Port speed	Special features	Designation FL SWITCH…	Item No.
Intelligent switches for the machine: FL SWITCH 2000 and 2100							
Supply voltage: 18 V DC … 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 V DC … 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 SFP	–			2206-2SFX	2702969
	4 x RJ45	2 x SFP	2 x SFP/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 SFP	–			2214-2SFX	1006188
	12 x RJ45	2 x SFP	2 x SFP/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 SFP	–			2206-2SFX PN	1044028
	16 x RJ45	–	–			2216 PN	1044029
	14 x RJ45	2 x SFP	–			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

Product overview for managed switches

Features	Copper ports	FO ports	Combo ports	Port speed	Special features	Designation FL SWITCH...	Item No.
Managed switches for use in flat control cabinets: FL SWITCH 2400 and 2500							
Supply voltage: 19.2 V DC … 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 SFP	–		–	2406-2SFX	1043414
	4 x RJ45	2 x SFP	2 x SFP/RJ45		–	2404-2TC-2SFX	1088853
	16 x RJ45	–	–		–	2416	1043416
	14 x RJ45	2 x SFP	–		–	2414-2SFX	1043423
	12 x RJ45	2 x SFP	2 x SFP/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 SFP	–			2406-2SFX PN	1089126
	16 x RJ45	–	–			2416 PN	1089150
	14 x RJ45	2 x SFP	–			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

Features	Copper ports	FO ports	Combo ports	Port speed	Special features	Designation FL SWITCH...	Item No.
Robust managed switches with IP67: FL SWITCH 2600 and 2700							
Supply voltage: 12 V DC … 57 V DC (redundant), temperature range: -40°C … +70°C, IP67, PROFINET Class B							
	8 x M12	–	–	10/100 Mbps	–	2608	1106500
		–	–		PROFINET preset and certified, status LEDs	2608 PN	1106616
		–	–	10/100/1000 Mbps	–	2708	1106615
		–	–		PROFINET preset and certified, status LEDs	2708 PN	1106610
Managed switches with real-time capability for Time Sensitive Networking							
Supply voltage: 12 V DC … 57 V DC, temperature range: -40°C … +60°C, port outlet direction: front							
	16 x RJ45	–	–	10/100/1000 Mbps	TSN functions (frame preemption, gPTP (IEEE 802.1AS), streams (in acc. with PROFINET V2.4))	TSN 2316	1232304

Features	Copper ports	FO ports	Combo ports	Port speed	Special features	Designation FL SWITCH...	Item No.
Managed switches for infrastructure applications: FL SWITCH 3000 and 4000							
Supply voltage: 24 V DC … 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
		–	–			3016	2891058
		–	–		ATEX, IECEx, C1D2	3008T	2891035
	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
	8 x RJ45	2 x SFP	–	10/100 Mbps (RJ45) 1000 Mbps (SFP)		4008T-2SFP	2891062

Product overview for managed switches

Features	Copper ports	FO ports	Combo ports	Port speed	Special features	Designation FL SWITCH…	Item No.
Managed Power over Ethernet switches: FL SWITCH 4000 PoE							
Supply voltage: 52 V DC … 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 V DC … 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

Easy configuration

The managed Switches enable configuration via web browser, SD card, SNMP, CLI, or controller.

PROFINET®

EtherNet/IP™

Common protocols supported

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

Flexible transmission distance

Thanks to SFP ports and compatible SFP modules, you can adapt the switches to your application and bridge even large distances.

Product overview for managed switches with routing function

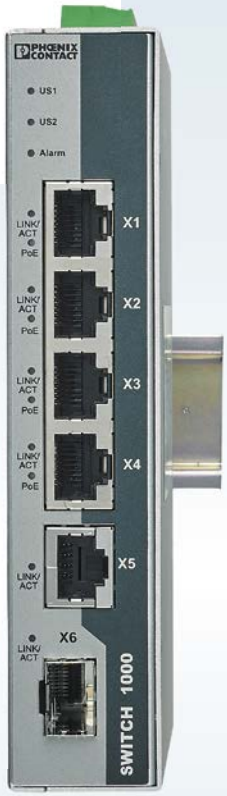
Features	Copper ports	FO/combo ports	Port speed	Special features	Designation	Item No.
Managed switches with routing functions: FL NAT 2000						
Supply voltage: 18 V DC … 32 V DC, temperature range: 0°C … +60°C, IP20						
	8 x RJ45	–	10/100 Mbps	–	FL NAT 2008	2702881
Supply voltage: 12 V DC … 57 V DC, 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 V DC … 30.2 V DC, temperature range: -20°C … +55°C, IP20						
	4 x 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	Item 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	1300 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

The compact stand-alone solution is available in various performance classes 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 enables reliable operation in harsh environments. Furthermore, the switches have full Gigabit ports and jumbo frames that were developed specifically for the high data requirements of surveillance cameras.

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 devices into one compact device. This saves you time during planning and installation. 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.

Managed switches

The managed PoE switches offer a high degree 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.

Splitter

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

Product overview for PoE modules

Features	Connection method	Temperature range	Power budget	Special features	PoE standard	Designation	Item No.
PoE injector							
	RJ45 / RJ45	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	Item 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	Item No.
Unmanaged Power over Ethernet switches: FL SWITCH 1000 PoE							
Supply voltage: 18 V DC … 57 V DC, extended temperature range: -40°C … +75°C							
	4 x RJ45 (PoE), 1 x RJ45	10/100 Mbps	30 W per port, max. 120 W	–	IEEE 802.3 af/at (PoE+)	FL SWITCH 1001T-4POE	2891064
	2 x RJ45 (PoE), 2 x SFP	10/100/1000 Mbps	30 W per port, max. 60 W	52 V DC … 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
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 V DC … 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	Transmission speed	Power budget	PoE standard	PoE ports	Designation	Item No.
Smart Camera Box							
Supply voltage: 100 V AC … 240 V AC, temperature range: -40°C … +70°C							
	2 x FO	10/100/1000 Mbps	90 W per port (max. 165 W)	IEEE 802.3bt, at, af	4 x RJ45	SCX 4POE 2LX	1102626
					2 x RJ45	SCX 2POE 2LX	1108543
	2 x RJ45				4 x RJ45	SCX 4POE 2T	1108542
					2 x RJ45	SCX 2POE 2T	1108544

Industrial Wireless

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

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

Web code: #0562

Bluetooth Low Energy

The FL BLE 1300 wireless module connects Bluetooth Low Energy sensor technology with Ethernet-capable controllers and computers. 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.

Contactless power and data transmission

With NearFi couplers, power (24 V, 2 A) and real-time Ethernet data (100 Mbps, full duplex) can be transmitted across an air gap of a few centimeters.

Your advantages

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

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. Central cluster management makes the configuration and maintenance of larger WLAN networks considerably easier.

Product overview for Industrial Wireless

Features	Function	Frequency band	Data rate	Special features	Designation	Item No.
Ethernet port adapter						
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 V DC … 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 V DC … 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 V DC … 36 V DC, 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 and 5 GHz	Up to 300 Mbps	External antennas	FL WLAN 5110	1043193
				External antennas, USA and Canada only	FL WLAN 5111	1043201

Product overview for NearFi couplers and accessories

	Function	Coupling type	Designation	Item No.
Contactless power and data transmission				
	24 V/2 A power and 100 Mbps Ethernet, full duplex	Base coupler	NEARFI PD 2A ETH B	1234224
		Remote coupler	NEARFI PD 2A ETH R	1234225
Contactless power couplers				
	24 V/2 A power	Base coupler	NEARFI P 2A B	1234226
		Remote coupler	NEARFI P 2A R	1234229
Contactless data couplers				
	100 Mbps Ethernet, full duplex	Base coupler	NEARFI D ETH B	1234232
		Remote coupler	NEARFI D ETH R	1234234

	Description	Features	Property	Item 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 omnidir. antennas and power supply unit	1088095
			With omnidirectional antennas and PoE splitter	1088097
			Without antenna accessories	2701204

	Description	Gain	Connection	Features	Item 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: min. IP65, incl. 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, seawater-resistant	6 dBi	N (female)		2885919
5 GHz antennas					
	Omnidirectional antenna	5 dBi	N (female)	Temperature range: -40°C … +70°C, degree of protection: min. IP65, incl. 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: min. IP65, incl. 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
	Panel dir. antenna, seawater-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

Further accessories can be found on our website: Web code: #0569

Industrial security

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

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.

Your advantages

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

High-performance firewall

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

Product overview for industrial security

Features	Port configuration	Port speed	VPN	Special features	Designation FL MGUARD...	Item 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	1102	1153079
	5 x RJ45				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
				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 scope of firewall functions (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
				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 FL MGUARD...	Item No.
High-performance security plug-in card for IPCs: mGuard PCI/PCIE						
Extended scope of firewall functions (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, peer for up to 3000 VPN tunnels						
	4 x RJ45	10/100/1000 Mbps	None, up to 3000 as an option	19" rack	CENTERPORT	2702547
Central device and patch management: mGuard Device Manager (MDM)						
	The mGuard Device Manager provides support for the configuration, roll-out, and management of all mGuard devices. Create and manage all security-related mGuard settings centrally and then transfer them to the desired devices.			English	DM UNLIMITED	2981974

Remote communication

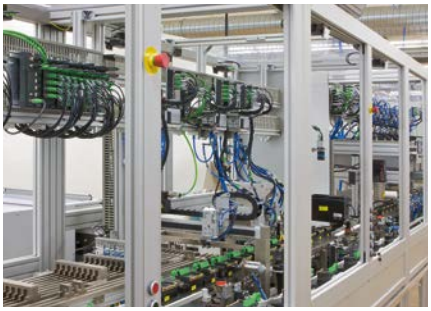
Remote control technology and remote maintenance are important components of industrial communication solutions. They allow you to easily connect remote stations or remote system parts to your control center using different transmission paths.

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

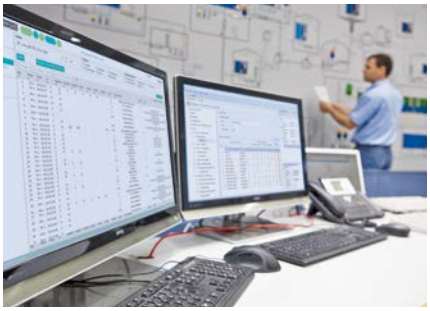
Web code: #0499

Remote maintenance via the Internet

The cloud clients and mGuard devices enable secure connection to the mGuard Secure Remote Service. Communication takes place via the operator network (Ethernet/WLAN) or cellular communication. While the cloud client can only connect to the mGuard Secure Remote Service, the mGuard devices also offer peer-independent VPN tunnels, NAT, and more powerful firewalls.



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



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

Remote control via the cellular network

The TC ROUTER cellular routers enable robust data connections over 4G LTE networks. This allows you to establish a mobile broadband connection for highly flexible site networking even in harsh and demanding environments where a wired Internet connection is not available.

Remote control via in-house cabling

With the Ethernet extender system, you can easily connect large IP networks over distances of up to 20 kilometers using existing 2-wire cables. The combination of unmanaged and managed extenders enables particularly cost-effective networking and central diagnostics of all devices and paths via IP.

Product overview for remote maintenance

Features	Function	VPN tunnel	Internet access (WAN)	Special features	Designation	Item No.
Secure remote maintenance via the Internet with integrated firewall: mGuard and cloud client						
	Cloud client	1 tunnel to the mGuard Secure Remote Service	4G LTE EU	Device configuration via mGuard Secure Remote Service, simplified web interface	CLOUD CLIENT 2002T-4G EU	1234355
			4G LTE Verizon, US		TC CLOUD CLIENT 1002-4G VZW	2702887
			4G LTE AT&T, US		TC CLOUD CLIENT 1002-4G ATT	2702888
			4G LTE EU + WLAN		CLOUD CLIENT 2102T-4G EU WLAN	1234357
			WLAN		CLOUD CLIENT 2002T-WLAN	1234360
	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 parallel tunnels (up to 250 as an option)	3G	Integrated WAN interface, scope of functions can be extended, 2 SIM card slots	TC MGUARD RS4000 3G VPN	2903440
			4G LTE		TC MGUARD RS4000 4G VPN	2903586
	Cloud client	1 tunnel to the mGuard Secure Remote Service	Operator network (RJ45)	Device configuration via mGuard Secure Remote Service, simplified web interface	CLOUD CLIENT 1101-TX/TX	1221706
	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 parallel tunnels (up to 250 as an option)		–	FL MGUARD RS4000 TX/TX VPN	2200515
				Integrated managed switch	FL MGUARD RS4004 TX/DTX VPN	2701877
				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 PC		1 tunnel	Internet	For Windows 10, 8.x, and 7	MGUARD SECURE VPN CLIENT LIC	2702579

Product overview for remote control

Features	Function	Firewall	Internet access (WAN)	Special features	Designation TC ROUTER…	Item No.
Remote control via the Internet: TC routers						
Temperature range: -40°C … +70°C, data rate up to 150 Mbps						
	Industrial cellular router	•	4G LTE + operator network (RJ45)	European version	4002T-4G EU	1234352
		•	4G LTE + operator network (WLAN/RJ45)		4102T-4G EU WLAN	1234353
		•			4202T-4G EU WLAN	1234354
		•	4G LTE	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…	Item 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	Any location 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 cloud client and mGuard security appliances connect your machines to the mGuard Secure Remote Service securely over the Internet.
The cloud connects service personnel to their remote maintenance targets and offers a turnkey comprehensive 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 EMEA countries as well as North and South America.

Time server

The FL 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

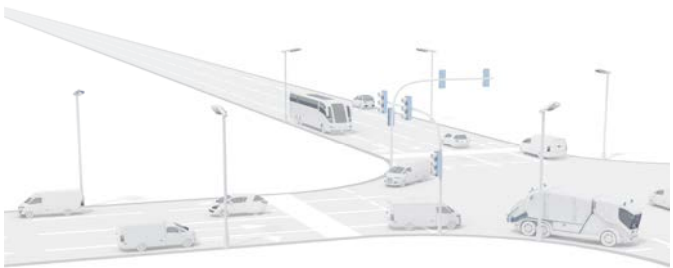
- NTP time server for Ethernet networks
- GNSS (Global Navigation Satellite System) receiver for GPS, Galileo, and GLONASS
- Location information can be obtained via NMEA, SNMP, or web-based management
- Diagnostic LEDs for power supply and satellite reception

Product overview for time server

NTP time server with GNSS receiver			
	Main features	**Designation**	**Item 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

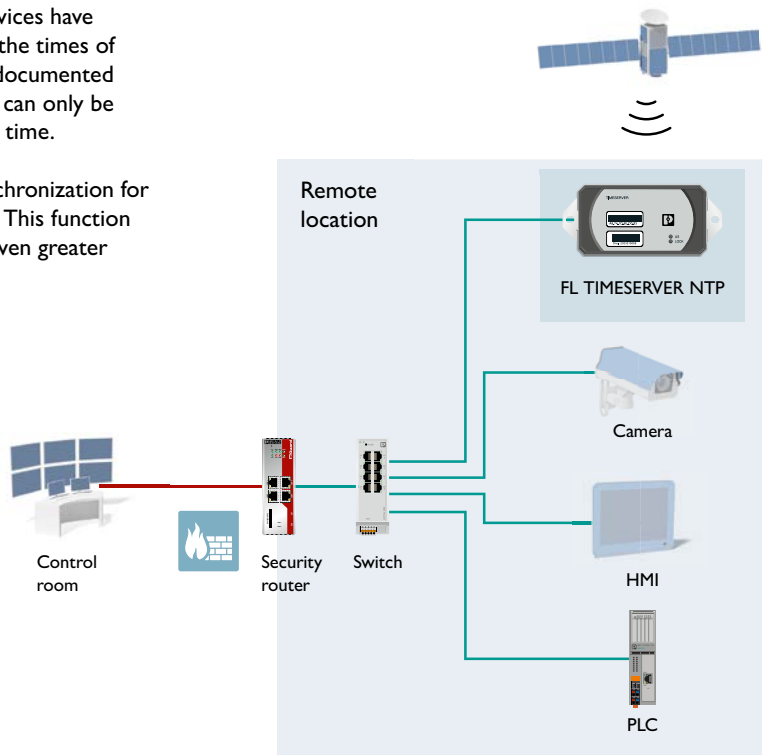
The FL TIMESERVER NTP provides precise geolocation information (GPS coordinates). This information can be used for determining the exact location, e.g., of containers, vehicles, and buildings. Precise position determination via web-based management, SNMP, NMEA, or JSON streaming.



Time synchronization

In Ethernet networks, it is very important that all devices have an accurate, synchronized system time. This enables the times of all decentralized 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 greater security in the network.



Protocol and interface converters

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

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

Web code: #1909

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.

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 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 modular 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 for protocol and interface converters

	Protocol	Ethernet interface	Serial interface (RS-232/422/485)	Special features	Designation	Item 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 into 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	Item No.
Conversion of serial protocols into 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
	INTERBUS to PROFINET	4 x RJ45 10/100 Mbps	1 x F-SMA 500 Kbps/2 Mbps (can be selected)	Conformance class B	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

Network management software

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

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

Web code: #1560

Your advantages

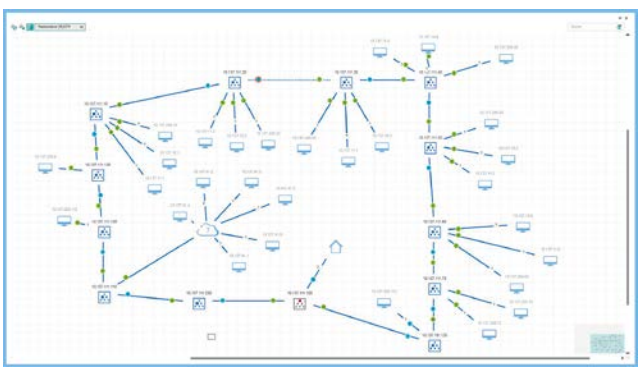
- Fast diagnostics with continuous querying of the network devices
- Reduced downtimes and failure times, thanks to shorter response time in the network
- Direct access to the individual web interfaces of the devices
- Error detection even for temporary errors in the network

Product overview for software

	Description	Language	Basis	Item No.
Network configuration and startup: FL Network Manager				
	Start up your network quickly and easily with the FL Network Manager software. The software provides support for the scanning and display of existing networks, the IP assignment and configuration of multiple devices, handling configuration files, and firmware updates.	English	SNMP	2702889
mGuard configuration and startup: mGuard Device Manager				
	The mGuard Device Manager provides support for the configuration, roll-out, and management of all mGuard devices. Create and manage all security-related mGuard settings centrally and then transfer them to the desired devices.	English	–	2981974

Network Manager

The use of managed switches or WLAN components always involves configuration effort. The Network Manager makes it easier to deal with the growing number of managed devices in a network, as network components can be monitored, configured, and kept up to date using one tool. To also satisfy 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.



Startup support for the mGuard Device Manager

The mGuard Device Manager is ideal for rolling out and managing large groups of mGuard devices 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 from a member of the Phoenix Contact team by means of remote access is included.

Surge protection

To ensure uninterrupted production, all the relevant data and signals must be transmitted reliably. In addition to unauthorized access and malware, overvoltages caused by lightning strikes or switching operations also pose a danger to your network. In particular where cabling extends beyond a building, it is primarily the devices that are connected to an Ethernet cable that are at risk.
Protect your components with surge protection from Phoenix Contact to avoid the expense of repairs and system downtimes and the loss of important data.

Web code: #0145

Your advantages

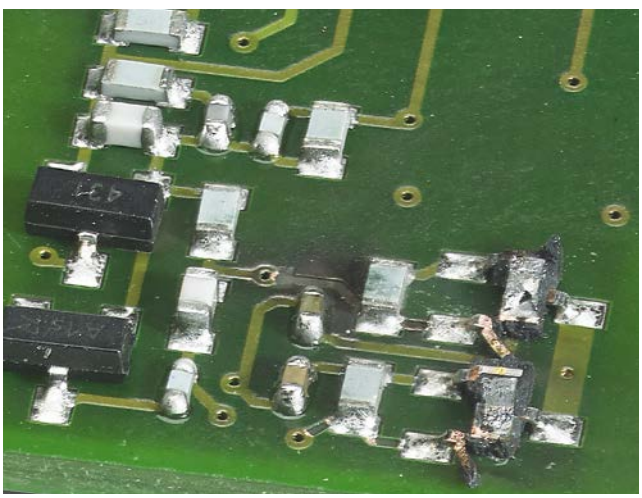
- Protection in accordance with Class E_A ($CAT6_A$)
- Reliable transmission up to 10 Gbps
- Power over Ethernet (PoE+) “Mode A” and “Mode B”
- RJ45 intermediate plug with separate grounding cable and ground connection snap-on foot for NS 35 DIN rails

Product overview for surge protection

Description	IEC test classif. EN type	Maximum continuous voltage	Nominal discharge current	Features	Designation	Item No.
DATATRAB adapter/DIN rail module						
Ethernet (10GBase-T) and PoE, token ring, CDDI, in accordance with Class E_A/$CAT6_A$						
	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/CAT5e, 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	Plug, 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 the most commonly affected by damage caused by overvoltages.



Customized use

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

Installation technology

In addition to reliable active components, a high-performance network requires a robust installation. Phoenix Contact installation technology provides you with all the necessary components for implementing industrial networks.

Web code: #1561

Injectors

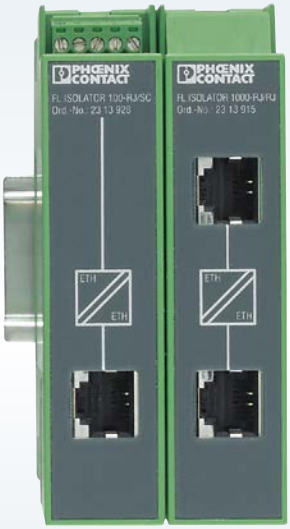
The compact stand-alone solution is available in various performance classes up to 60 watts. In addition to the RJ45 jack, the PoE injectors feature alternative connection technologies for the field cable and integrated surge protection.

Patch panels

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

SFP modules

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



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

Product overview for installation technology

	Connection method	Temperature range	Power budget	Special features	PoE standard	Designation	Item No.
PoE injector							
 	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

Electrical isolation

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

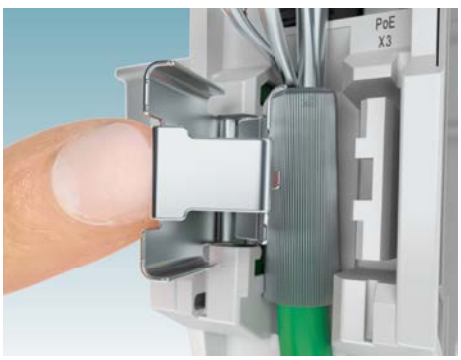
Wide-range input

The injectors feature redundant feed-in, 18 to 57 V DC is possible.

Surge protection

The integrated surge protection reliably protects the connected network.

	Connection method	Description	Shielding	Cable shield connection	Surge protection	Designation	Item 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
	RJ45 / spring-cage connection					FL-PP-RJ45-SCC	2901642
	RJ45 / LSA	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 of -40°C … +85°C, narrow overall width	Continuous shield			FL-PP-RJ45/ RJ45-B	2904933
	RJ45 / spring-cage connection	Cable sharing module with front cable outlet	Either directly on DIN rail or via RC combination	Clamp with screws		FL-PP-RJ45-SCC/ SC041	2903532
	RJ45 / spring-cage connection	Cable sharing module with upward cable outlet				FL-PP-RJ45-SCC/ SC045	2904577



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

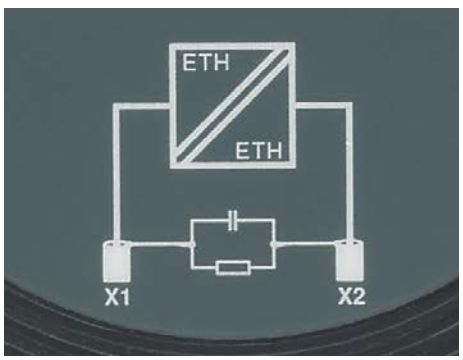
The reliable display of hazardous shield currents increases the safety of your installation.

Quick and easy installation

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

Product overview for installation technology

	Electrical isolation	Approvals	Connection method	Transmission speed	Features	Designation FL ISOLATOR	Item 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	10/100 Mbps	–	100-RJ/SC	2313928



Protect network devices

With the 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.

Approved for railway applications

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

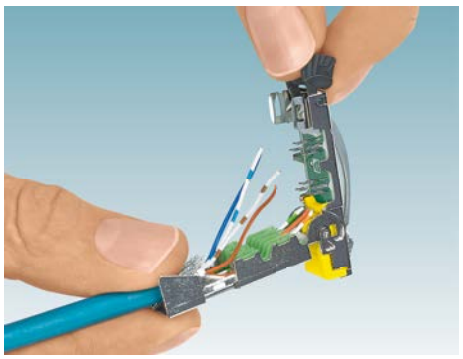
	Port	Transmission speed	Transmission distance	Wavelength	Special features	Designation FL SFP...	Item No.
Accessories: SFP modules							
   	LC MM	100 Mbps	2 km	1310 nm	–	FX	2891081
	LC SM		40 km		–	FX SM	2891082
	LC SM (WDM)		20 km	1310/1550 nm	WDM module A	FE WDM20-A	2702437
				1550/1310 nm	WDM module 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

Copper-based data cabling for networks and fieldbuses

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

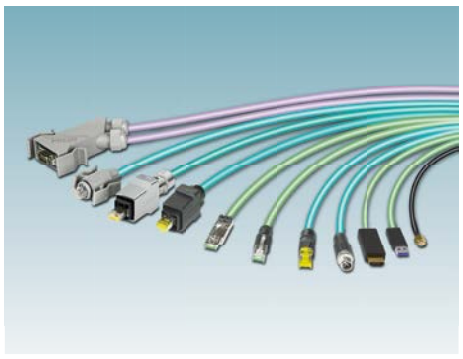
Whether future-proof high-speed cabling up to 10 Gbps or innovative hybrid cabling – we have the perfect solution for your automation network.

Web code: #0297



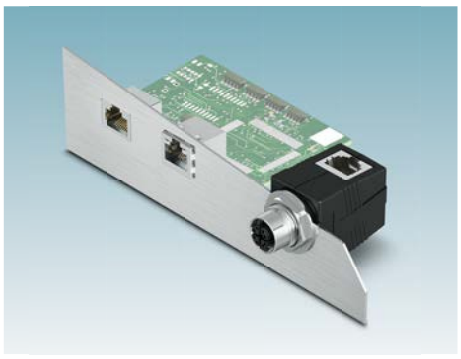
Fast assembly

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



Wide range of connectors

From SPE and RJ45 through USB, HDMI, coaxial, and D-SUB to M12.

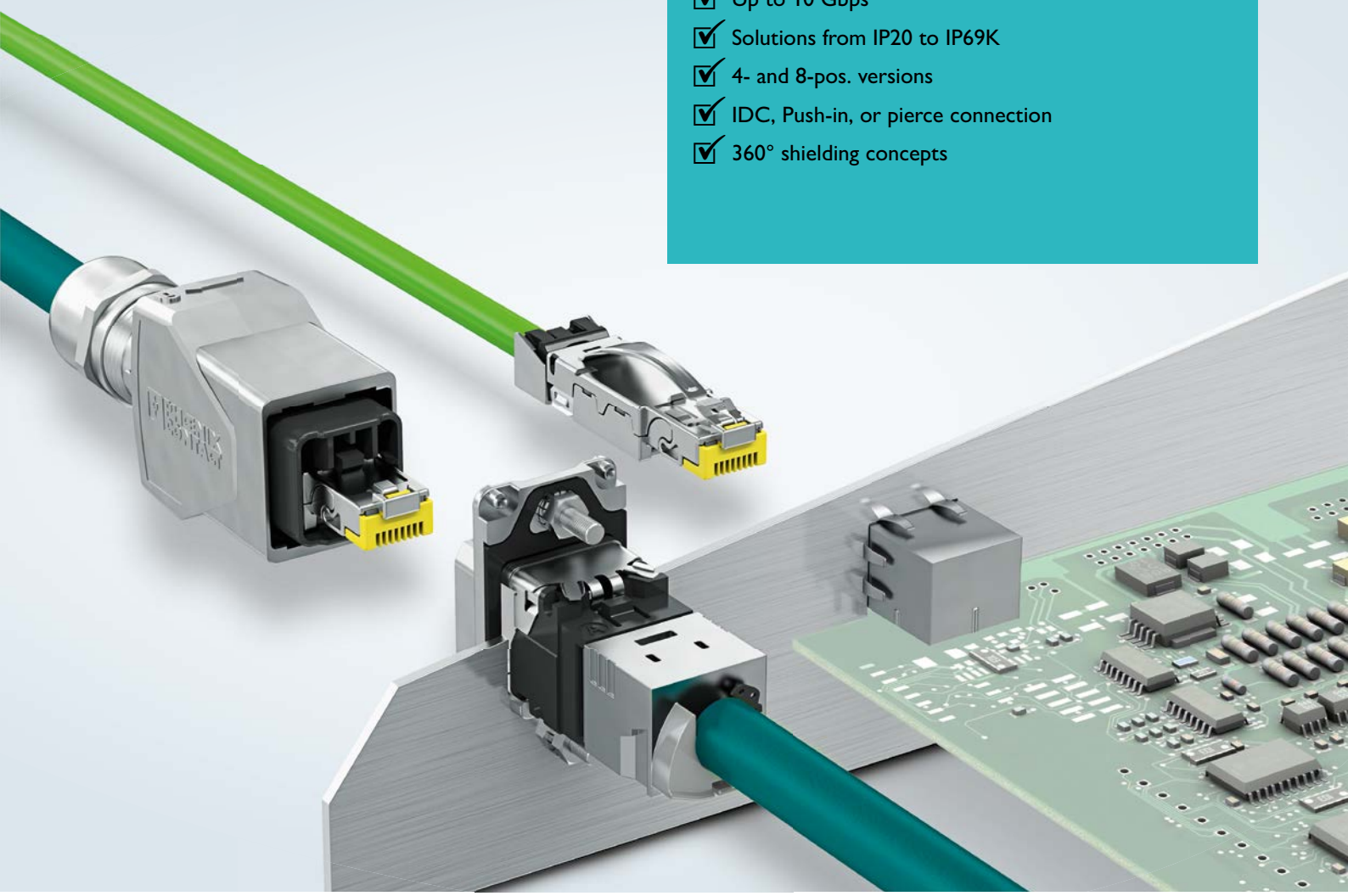


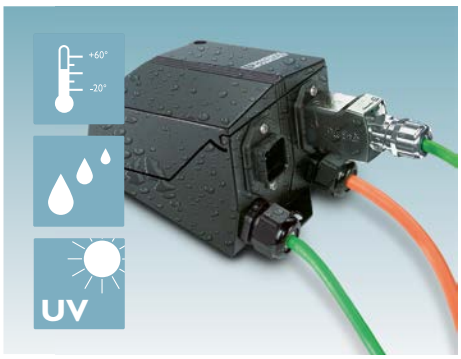
Flexible device connection

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

Your advantages

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



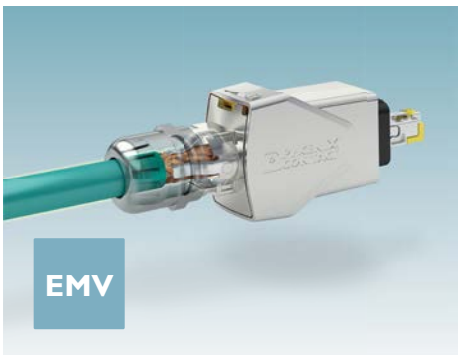


Reliable protection

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 EMI and ESD.

RJ45, connectors and sockets, IP20

Web code: #0330

	Cable outlet	Ethernet	PROFINET	Material	AWG	Connection method	Data rate	Item No.
Connectors								
	Straight	●	–	Plastic, gray	27 … 24	Crimp connection	Up to 1 Gbps CAT5	1414382*
		●	–				Up to 10 Gbps $CAT6_A$	1414395*
		●	–	Plastic, black	26 … 24	IDC fast connection	Up to 10 Gbps $CAT6_A$	1419001
		●	–	Plastic, gray	26 … 23		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-mount frames								
	–	●	●	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	Item 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	Unassembled for 2 modules	1653003
	Flush mounting	Unassembled 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	Orientation	Specification	Item No. without LED	Item No. with LED	Item No. without LED, short solder contacts	Item No. with LED, short solder contacts
RJ45 INDUSTRIAL PCB jacks							
	Wave / THR	90° horizontal	Housing shield springs: Yes	1099280	1099281	1321248	1321246
			Housing shield springs: No	1091946	1091950	1321104	1321101
		180° vertical	Housing shield springs: Yes	1099279	1099282	1321249	1321247
			Housing shield springs: No	1091942	1091947	1321106	1321102
RJ45 single-port PCB jacks							
	Wave	180° vertical	–	1149872	1149871	–	–
		90° horizontal	Locking clip at top	1149870	1149867	–	–
			Locking clip at bottom	1149868	1149866	–	–
	Wave / THR	180° vertical	–	–	–	1337238	1337239
		90° horizontal	Top	–	–	1337240	1337243
	SMD	180° vertical	–	1149611	–	–	–
		90° horizontal	Locking clip at top	1149882	1149873	–	–
			Locking clip at bottom	1149874	–	–	–
RJ45 multi-port PCB jacks							
	Wave	90° horizontal	2 RJ45 ports, locking clip at top	1149858	1149854	–	–
			2 RJ45 ports, locking clip at bottom	1149855	1149852	–	–
			4 RJ45 ports, locking clip at top	1149851	1149848	–	–
			4 RJ45 ports, locking clip at bottom	1149849	1149616	–	–
	Wave / THR		2 RJ45 ports, locking clip at top	–	–	1337251	1337254

RJ45, push-pull locking (V14), IP65/IP67

Web code: #0325

	Cable outlet	Material	AWG	Connection method	Data rate	Specification	Item 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-mount 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
	–		–		Unassembled, for PCB modules		1413963
	–		–	Round panel cutout	Unassembled, 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 10 Gbps CAT6$_A$		1086111
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
Terminal outlets							
	Straight	Die-cast aluminum	22 … 26	Cable module	Up to 1 Gbps CAT5	2 x RJ45	1404281

* Tool 1653265 required

RJ45, snap-in locking (V6), IP65/IP67

Web code: #0329

	Material	AWG	Connection method	Data rate	Features	Item 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-mount 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		1419022
		–		Up to 10 Gbps $CAT6_A$	Freenet module	1086108
		–				1086111
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			
								
		Free 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/IP67 cables, limited cable length								
	M12 flush-type female connector, 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 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 meet CAT5.

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

RJ45, patch cables for Ethernet, up to 1 Gbps

Web code: #0327

		IP20 cables			IP65/IP67 cables			
								
		Free 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	–	1408660	1408659	1408658
	M12 female, angled	1408657	1408655	1408653	1408652	1408651	1408650	1408649
IP65/IP67 cables, limited cable length, 5 m								
	M12 flush-type female connector, rear mounting	1407877	1412082	–	1412503	1412590	–	–

Ethernet cable, type 94B

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

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

RJ45, patch cables for Ethernet, up to 10 Gbps

Web code: #0328

		IP20 cables		IP65/IP67 cables						
										
		Free cable end	RJ45 connector	RJ45 connec., version 6, plastic	RJ45 connec., version 14, metal	RJ45 connec., version 14, plastic	M12 male, straight	M12 male, angled	M12 female, straight	M12 female, angled
IP65/IP67 cables, variable cable length										
	Free cable end	–	1411853	1415639	1415637	1415638	1408648	1 m 1080716 2 m 1080717 5 m 1080718 10 m 1080719	1 m 1080728 2 m 1080729 5 m 1080731 10 m 1080732	1 m 1080746 2 m 1080747 5 m 1080748 10 m 1080750
	RJ45 connector, plastic	1411853	1411854	1414321	1411855	1411856	–	–	1 m 1080733 2 m 1080734 5 m 1080736 10 m 1080737	–
	RJ45 connector, version 6	1415639	1414321	1414322	–	–	–	–	–	–
	RJ45 connector, version 14, metal	1415637	1411855	–	1414323	–	–	–	1 m 1080738 2 m 1080739 5 m 1080740 10 m 1080741	–
	RJ45 connector, version 14, plastic	1415638	1411856	–	–	1414324	–	–	–	–
	M12 male, straight	1408648	1408647	–	1408646	1408645	1408644	1 m 1080724 2 m 1080725 5 m 1080726 10 m 1080727	1 m 1080742 2 m 1080743 5 m 1080744 10 m 1080745	1 m 1080751 2 m 1080752 5 m 1080753 10 m 1080754
	M12 male, angled	1 m 1080716 2 m 1080717 5 m 1080718 10 m 1080719	–	–	–	–	1 m 1080724 2 m 1080725 5 m 1080726 10 m 1080727	1 m 1080720 2 m 1080721 5 m 1080722 10 m 1080723	–	–
IP65/IP67 cables, limited cable length										
	M12 flush-type female connector, 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 oil and chemicals, 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: #2675, #2676

RJ45 office/building patch cables

								
Transmission	CAT5 (up to 1 Gbps)				$CAT6_A$ (up to 10 Gbps)			
Sheath material	LSZH							
Cable structure	4 x 2 x AWG 26/7							
Shielding	S/UTP				S/FTP			
Length	**0.3 m**	1227558	**5.0 m**	1227564	**0.3 m**	1227572	**5.0 m**	1227583
	0.5 m	1227559	**7.5 m**	1227565	**0.5 m**	1227573	**7.5 m**	1227585
	1.0 m	1227560	**10.0 m**	1227566	**1.0 m**	1227575	**10.0 m**	1227588
	1.5 m	1227561	**12.5 m**	1227567	**1.5 m**	1227578	**12.5 m**	1227590
	2.0 m	1227562	**15.0 m**	1227570	**2.0 m**	1227580	**15.0 m**	1227591
	3.0 m	1227563	**20.0 m**	1227571	**3.0 m**	1227581	**20.0 m**	1227593

Cable overview: RJ45 INDUSTRIAL

Cable	**93B**	**93C**	**93M**	**93K**	**93R**	**94C**	**94F**
Schema							
Sheath	PVC	PUR	PUR	PVC	PUR	PUR	PUR
Number of positions	4	4	4	4	4	8	8
Design	AWG 22/7	AWG 22/19	AWG 22/7	AWG 22/7	AWG 22/7	AWG 26/7	AWG 26/7
Shielding	SFTQ	SFTQ	SFTQ	SFTQ	SFTQ	SF/UTP	S/FTP
Protocol	PROFINET	PROFINET	PROFINET	Sercos	PROFINET	Ethernet	Ethernet
Transmission category	CAT5 (100 Mbps)	CAT5 (100 Mbps)	CAT5 (100 Mbps)	CAT5 (100 Mbps)	CAT5 (100 Mbps)	CAT5 (1 Gbps)	$CAT6_A$ (10 Gbps)
Application	Type B Flexible	Type C Drag chain	Type B Flexible	Type B Flexible	Type R Robot	Type C Drag chain	Type B Flexible

Detailed information on our cables can be found in the technical data for the item in our web shop

RJ45 INDUSTRIAL patch cables

										
Item No.	1247656	1247661	1247629	1247649	1247658	1247660	1247630	1247634	1247639	1247647
Cable Configurable length between 0.5 and 50 m	93B 93K 93M 93C 93R	93B 93K 93M 93C 93R	93B 93K 93M 93C 93R	93B 93K 93M 93C 93R	93B 93K 93M 93C 93R	93B 93K 93M 93C 93R	93B 93K 93M 93C 93R	93B 93K 93M 93C 93R	94C 94F	94C 94F

USB and HDMI, patch cables and device connectors

Web code: #2888, #2889

Patch cables

					
Version	USB 2.0	USB 3.2 Gen. 1		USB 3.2 Gen. 2	HDMI high speed with Ethernet channel
Head 1 type	Type A			Type C	HDMI type A
Head 2 type	Type A		Type C		HDMI type A
Sheath material	PVC				–
0.3 m	1333130	1333148	1333158	1333194	1332077
0.5 m	1333131	1333150	1333160	1333195	1332078
1.0 m	1333136	1333151	1333165	1333197	1332079
1.5 m	1333137	1333153	1333166	1333210*	1332081
1.8 m	1333138	1333155	1333185	1333211*	1332082
2.0 m	1333139	1333156	1333187	1333213*	1332083
3.0 m	1333140	1333157	1333190	1333214*	1332084
5.0 m	1333145	–	–	–	1332086

* USB 3.2 Gen. 1

Device connectors

							
Version	USB 2.0				USB 3.2 Gen. 1		
Type	Type A						
Orientation	90° horizontal	90° vertical	180° vertical	90° horizontal	90° horizontal	180° vertical	90° vertical
Soldering process	Wave			SMD	THR		
Item No.	1332630	1332631	1332632	1332634	1332637	1332638	1332636

Device connectors

					
Version	USB 3.2 Gen. 2			HDMI 2.0	
Type	Type C			HDMI type A	
Orientation	90° horizontal	180° vertical	90° horizontal	90°	180°
Soldering process	SMD/THR	SMD	SMD	SMD	
Item No.	1332643	1332645	1332646	1332071	1332073

M12, connectors, IP65/IP67

Web code: #0338

M12 connectors										
			Push-in connection		IDC connection		Piercecon connection		Screw connection	
										
			Straight	Angled	Straight	Angled	Straight	Angled	Straight	Angled
Networks										
Ethernet	**CAT5, 4-pos.**	Male			1411066	1553624			1521261	
		Female			1411069	1553637				
	CAT5, 8-pos.	Male			1421679	1553653				
		Female			1421680	1553666				
	CAT6$_A$, 8-pos.	Male			1411043		1417430	1417443		
		Female			1414586					
PROFINET		Male	1424682	1424684	1411068	1554539			1521261	
		Female	1424683	1424685	1411071	1554542				
VARAN		Male			1429130	1429156				
		Female			1429143	1429169				
Fieldbuses										
INTERBUS		Male	1424674	1424675					1507764	1430417
		Female	1424676	1424677					1507777	1430420
PROFIBUS		Male	1424678	1424679	1413931				1507764	1430417
		Female	1424680	1424681	1413932				1507777	1430420
CANopen®, DeviceNet™		Male	1424670	1424671	1422759				1508352	
		Female	1424672	1424673	1422760				1508365	
CC-Link		Male	1424699							
		Female	1424700							

Coaxial cables

Assembled coaxial cables						
						
Head 1	N (m)	N (f) BH	N (m)	N (f) BH	N (m)	SMA (m)
Head 2	N (m)	R-SMA (m)	R-SMA (m)	SMA (m)	SMA (m)	SMA (f)
0.5 m	1340122	1340129	1340130	1340138	1340139	
1.0 m			1340131		1340143	
1.5 m			1340133			
2.0 m			1340135			
3.0 m	1340123		1340136		1340144	
5.0 m	1340124		1340137		1340147	1340149
10 m	1340125					1340148
15 m	1340126					
30 m	1340127					

M12, device connectors, IP65/IP67

			Wave soldering		THR soldering	
						
Networks			**Male**	**Female**	**Male**	**Female**
Ethernet	CAT5, 4-pos.		1456514	1456527	1552214*	1551451*
	CAT5, 4-pos., cable type 93E	2 m	–	–	–	–
	CAT5, 8-pos.		1456530	1456543	1557578	1557549
	CAT5, 8-pos., cable type 94B	5 m	–	–	–	–
	CAT5, 8-pos., cable type 94C	2 m	–	–	–	–
	$CAT6_A$, 8-pos.		–	1424177	–	1402457*
	$CAT6_A$, 8-pos., cable type 94F	0.5 m	–	–	–	–
	$CAT6_A$, 8-pos., cable type 94F	1 m	–	–	–	–
	$CAT6_A$, 8-pos., cable type 94F	2 m	–	–	–	–
	$CAT6_A$, 8-pos., cable type 94F	5 m	–	–	–	–
	CAT5, 8-pos., hybrid		–	1407503	–	1405225*
	CAT5, 8-pos., hybrid, cable type 94H	0.5 m	–	–	–	–
	CAT5, 8-pos., hybrid, cable type 94H	1 m	–	–	–	–
	CAT5, 8-pos., hybrid, cable type 94H	2 m	–	–	–	–
	CAT5, 8-pos., hybrid, cable type 94H	5 m	–	–	–	–
PROFINET	4-pos.		1456556	1456569	1552175	1542648
	4-pos., cable type 93B	0.5 m	–	–	–	–
	4-pos., cable type 93B	1 m	–	–	–	–
	4-pos., cable type 93B	2 m	–	–	–	–
	4-pos., cable type 93B	5 m	–	–	–	–
	4-pos., cable type 93C	2 m	–	–	–	–
	4-pos., cable type 93R	3 m	–	–	–	–
Sercos	4-pos.		1457979	1457966	–	–
	4-pos., cable type 93K		–	–	–	–
	4-pos., cable type 93K		–	–	–	–
	4-pos., cable type 93K		–	–	–	–
	4-pos., cable type 93K		–	–	–	–
EtherCAT®	4-pos.		1456556	1456569	–	–
	4-pos., cable type 93K		–	–	–	–
	4-pos., cable type 93K		–	–	–	–
	4-pos., cable type 93K		–	–	–	–
	4-pos., cable type 93K		–	–	–	–
M12 for fieldbuses			**Male**	**Female**	**Male**	**Female**
PROFIBUS	5-pos.	0.5 m	1456475	1456488	–	–
INTERBUS	5-pos.	0.5 m	1456572	1456585	–	–
CANopen® EtherNet/IP™	5-pos.	0.5 m	1456491	1456501	–	–
CC-Link	4-pos.		1457856	1457869	–	–
FOUNDATION Fieldbus	4-pos.		1457872	–	–	–

SMD soldering		Bulkheads, M12 to RJ45					
							
Male	**Female**	**Straight**	**Angled**	**Male**	**Female**	**Male**	**Female**
1411956*	1411950*	–	–	–	–	1411592	1411585
–	–	–	–	–	1405866	–	–
–	–	1414396	1414393	–	–	–	–
–	–	–	–	–	1407877	–	–
–	–	–	–	–	1412820	–	–
–	1411964*	1404549	1404548	–	–	–	–
–	–	–	–	–	1424135	–	–
–	–	–	–	–	1424148	–	–
–	–	–	–	–	1424151	–	–
–	–	–	–	–	1424164	–	–
–	1411965*	–	–	–	–	–	1407618
–	–	–	–	–	1407504	–	–
–	–	–	–	–	1407505	–	–
–	–	–	–	–	1407506	–	–
–	–	–	–	–	1407507	–	–
–	–	1414398	1414397	–	–	–	–
–	–	–	–	1437805	1437766	–	–
–	–	–	–	1437818	1437779	–	–
–	–	–	–	1437821	1437782	–	–
–	–	–	–	1437834	1437795	–	–
–	–	–	–	–	1416209	–	–
–	–	–	–	–	1416263	–	–
–	–	–	–	–	–	–	–
–	–	–	–	1419158	1419154	–	–
–	–	–	–	1419159	1419155	–	–
–	–	–	–	1419160	1419156	–	–
–	–	–	–	1419161	1419157	–	–
–	–	–	–	–	–	–	–
–	–	–	–	1419138	1419134	–	–
–	–	–	–	1419139	1419135	–	–
–	–	–	–	1419140	1419136	–	–
–	–	–	–	1419141	1419137	–	–
Male	**Female**	**Straight**	**Angled**	**Male**	**Female**	**Male**	**Female**
–	–	–	–	1534342	1534384	–	–
–	–	–	–	1534504	1534546	–	–
–	–	–	–	1534423	1534465	–	–
–	–	–	–	–	–	–	–
–	–	–	–	–	–	1431432	1431429

Assembled cables for Ethernet networks

	Cable structure	Conduc. structure/ signal line	Description	By the meter	100 m ring
93E					
	2 x 2 x AWG 28	7 x 0.25 m	Ethernet cable for flexible installation. The cable is halogen-free, oil-resistant, and its transmission properties meet CAT5e.	1416415	1416305
94A					
	4 x 2 x AWG 24	Solid, twisted pair	Ethernet cable for fixed installation. The cable's transmission properties meet 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. Its transmission properties meet CAT5e.	1417333	1416567
94D					
	4 x 2 x AWG 26	7 x 0.18 m, twisted pair	Ethernet cable for flexible installation. The cable is oil-resistant to a degree. It is UV-resistant in accordance with UL 1581 Sec. 1200 and therefore also suitable for outdoor use. The cable's transmission properties meet CAT5e.	1416444	1416334
94E					
	4 x 2 x AWG 23	Solid, 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

Assembled cables for PROFINET networks

	Cable structure	Conduc. structure/ signal line	Description	By the meter	100 m ring
93A					
	4 x AWG 22	Solid	PROFINET cable for fixed installation. The cable is flame-retardant and its transmission properties meet CAT5e.	1416486	1416392
93B					
	4 x AWG 22	7 x 0.25 mm	PROFINET cable for flexible installation. The cable is oil-resistant to a degree. It is UV-resistant in accordance with UL 1581 Sec. 1200 and therefore also suitable for outdoor use. The cable's transmission properties meet CAT5e.	1417362	1416389
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
93R					
	4 x AWG 22	19 x 0.15 mm	PROFINET cable for robot applications. The cable is oil-resistant to a degree. It is UV-resistant in accordance with UL 1581 Sec. 1200 and therefore also suitable for outdoor use. The cable's transmission properties meet CAT5e.	1417388	1416363
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 BS 6853. The cable's transmission properties meet CAT5e.	1402687	1416363

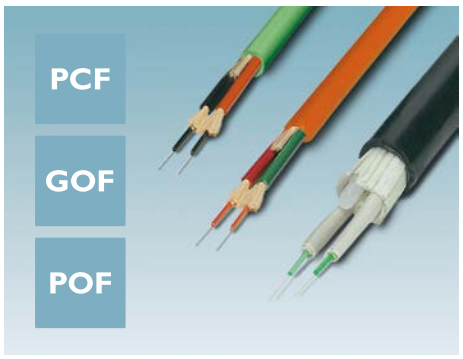
FO-based data cabling for networks and fieldbuses

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 – you can choose the right connection technology from our extensive portfolio.

Web code: #0298

Wide choice of versions

Wide choice of versions from SC-RJ, LC, SC, F-SMA to ST, plus POF, PCF, and GOF fiber types.



Comprehensive range of cables

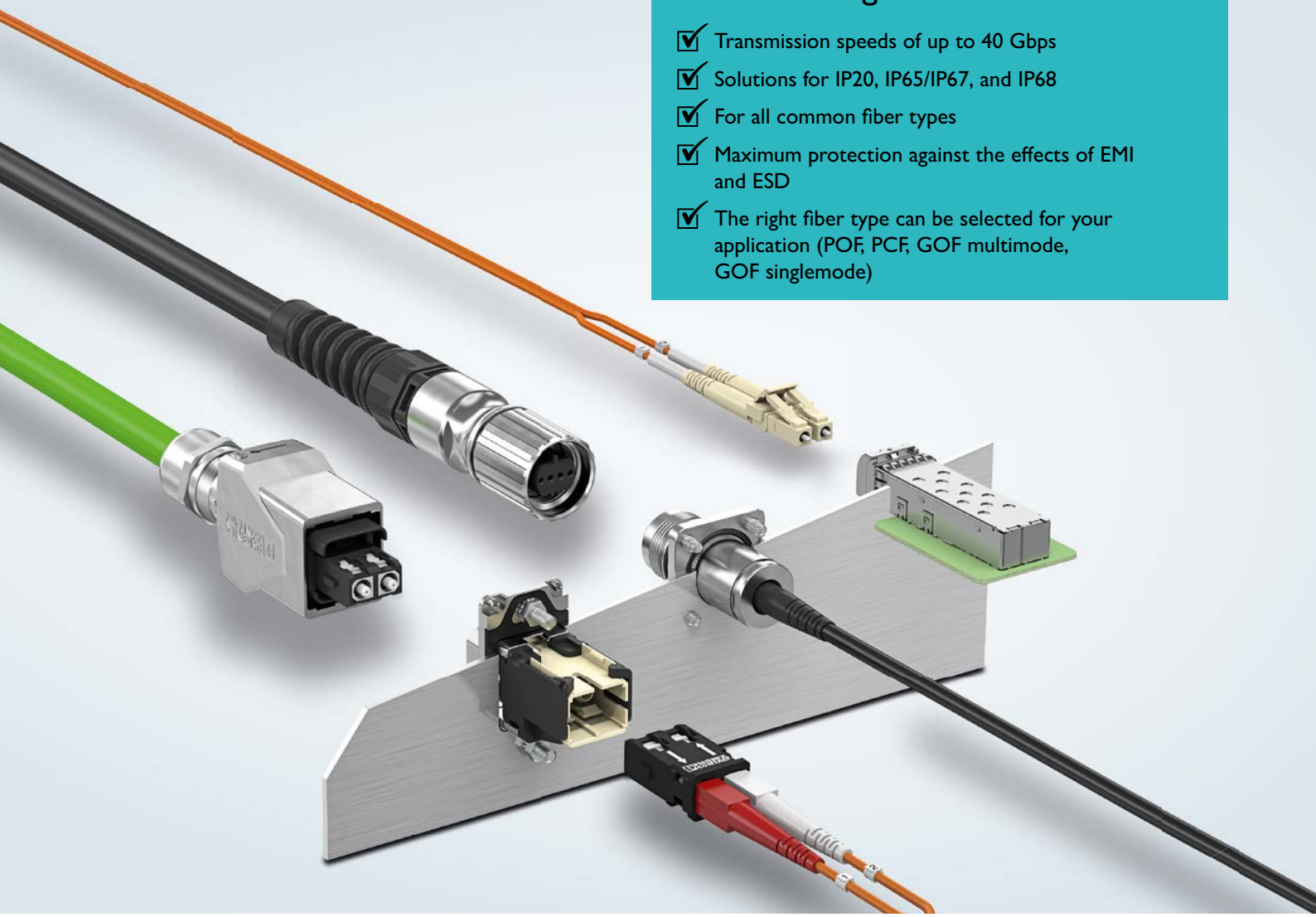
Extensive range of cables for all applications, networks, and standard interfaces.

Fast assembly

Fast assembly in the field using professional tools.

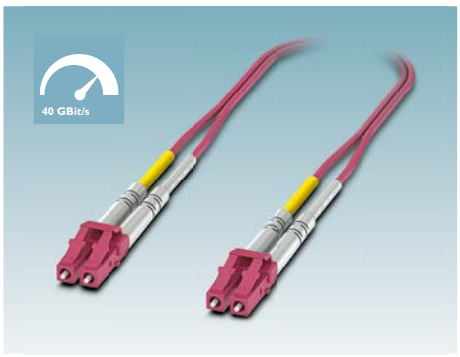
Your advantages

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



Reliable protection

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



High-quality patch cables

Large selection of patch cable versions for all typical connection methods.

High packing density

High packing density and large splice tray in splice boxes for DIN rail and 19" mounting.

SC-RJ, V14, IP65/IP67

Web code: #0334

	Cable outlet	Material	Connection method	Data rate	Specification	Item No.
Connectors						
	Straight	Die-cast zinc	POF	Up to 100 Mbps	–	1407896
	Angled, downward		POF		–	1407902
	Angled, upward		POF		–	1408028
Panel-mount 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
	–			–	Unassembled, for AVAGO transceiver	1413981
Coupling						
	–	Die-cast zinc	–	–	1 x SC-RJ 1 x SC-RJ	1405206
Tool sets						
	–	–	–	–	For POF	1658820
	–	–	–	–	For PCF	2708876

SC-RJ, snap-in locking (V6), IP65/IP67

Web code: #0334

	Material	Connection method	Data rate	Specification	Item No.
Connectors					
	Plastic	POF	Up to 100 Mbps	–	1657009
Panel-mount frames					
	Plastic, gray	Round panel cutout	–	Unassembled, for Freenet modules	1653744
				Unassembled, for AVAGO transceiver	1658545
	Plastic, black			Unassembled, for Freenet modules	1658668
Socket insert for panel-mount 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 further information and our video animation on FO-based data connectors:
Simply enter the web code in the search field on our website.

Web code: #0298

FO, connectors designed for assembly

Web code: #0332

	Function	Fiber type	Specification	Item No.
LC				
	Connector	GOF	Multimode	1089521
			Singlemode PC	1089520
			Singlemode APC	1089519
	Coupling		Multimode	1207355
			Multimode metal	1208069
			Singlemode PC	1208073
			Singlemode APC	1208077
SC				
	Connector	GOF	Multimode	1089518
			Singlemode PC	1089517
			Singlemode APC	1089516
		PCF	–	2313779
	Coupling	GOF, PCF, POF	–	2901788
		GOF	Multimode	1208081
			Multimode metal	1208083
			Singlemode PC	1208086
			Singlemode APC	1208088
SC-RJ				
	Connector	PCF	SC, SC-RJ (Ø 2 mm … 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	Ø 2.9 mm	2799487
		POF	–	2799720
	Coupling	GOF, PCF, POF	–	2799416
ST (B-FOC)				
	Connector	PCF	Ø 2.2 mm	2313782
			Ø 2.9 mm	2708481
	Coupling	GOF, PCF, POF	–	1208099
Tool sets				
	Tool set	GOF	Multimode and singlemode	1089515
		PCF	SC, SC-RJ (Ø 2 mm … 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

FO, patch panels and socket inserts, IP20

Web code: #0336

	Mounting type	Material	Specification	Item 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, unassembled	1652994
Terminal boxes for Freenet modules				
	Surface mounting	Plastic, white	Unassembled, for 2 modules	1653003
	Flush mounting		Unassembled, for 2 modules	1653016
Socket inserts, Freenet modules				
	Coupling module	–	SC-RJ, for POF, PCF, and GOF	1654358
			LC duplex, multimode	2700312
			LC duplex, singlemode	2700313

FO, splice boxes, IP20

Web code: #0336

FO splice boxes, FDX 20 series, IP20						
						
	DIN rail mounting					
	6 x LC duplex	12 x LC duplex	6 x SC duplex	6 x ST duplex 6 x SC duplex	6 x ST duplex 6 x ST duplex	6 x LSH duplex
Without pigtails, multimode, polymer couplings	1019710	1019705	1019686			
Without pigtails, multimode, metal couplings	1343385		1343387	1343388	1343383	
Without pigtails, singlemode, polymer couplings	1343386		1084827			
Without pigtails, singlemode, metal couplings					1343384	
OM1 (G62.5/125 µm)	1343377		1343380	1019684		
OM2 (G50/125 µm)	1019713	1019709	1019700	1019683		
OM3 (G50/125 µm)	1343378		1343381			
OM4 (G50/125 µm)	1019712	1019708	1019698			
OS2 PC (E9/125 µm)	1019711	1019707	1019692	1019682		
OS2 APC (E9/125 µm)	1083665		1343382			1019680

FO, fiberglass zip cords, multimode, IP20

Web code: #0333, #0336

FO splice boxes, FDX 20 series, 19" mounting

	12 x LC duplex	24 x LC duplex	12 x SC duplex	24 x SC duplex	12 x ST duplex	24 x ST duplex
OM1 (G62.5/125 µm)					1145399	1145389
OM2 (G50/125 µm)	1145416	1145375	1145408	1145407	1145398	1145397
OM4 (G50/125 µm)	1145415	1145413	1145406	1145403		
OS2 (PC) (E9/125 µm)	1145411	1145409	1143631	1145400	1145395	1145392

FO patch cables (length: 1.0 m*)






Description	OM1			OM2		
Type	LC	SC	ST	LC	SC	ST
LC	1146497	1146498	1146499	1115633	1115607	1115588
SC	1146498	1146504		1115607	1115536	1115574
ST	1146499		1146501	1115588	1115574	1115560




Description	OM3			OM4		
Type	LC	SC	ST	LC	SC	ST
LC	1185473	1185480		1115625	1115601	
SC	1185480	1185485		1115601	1115424	
ST						





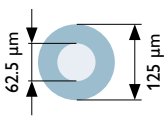
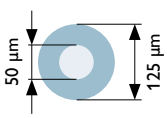
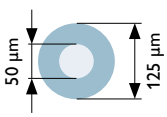
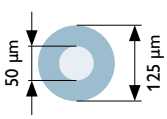
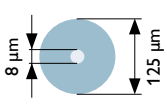
Description	OS2 UPC			OS2 APC		
Type	LC	SC	ST	LC	SC	ST
LC	1115636	1115618	1115596	1115630	1115613	
SC	1115618	1115550	1115582	1115613	1115544	
ST	1115596	1115582	1115565			

FO, fiberglass zip cords, singlemode, IP20

FO cables by the meter

										
Type	Loose tube (new)									
Fiber category	OM1	OM2	OM3	OM4	OS2	OM1	OM2	OM3	OM4	OS2
Number of fibers	12					24				
Item No.	1286223	1286222	1286221	1286220	1286219	1286217	1286215	1286214	1286211	1286210
										
Type	Full breakout				Mini breakout (new)		Zip cord			
Fiber category	OM2			PCF	OM4		OM1	OM2	OM3	OM4
Number of fibers	2	2	4	2	12	24	2			
Item No.	1406429	1406430	1406431	1406432	1286209	1286208	1411566	1411561	1411563	1411564

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 1300 nm
		Orange	OM2	1000Base-SX: min. 525 m 1000Base-LX: min. 1000 m	850 nm 1300 nm
		Aqua	OM3	1000Base-SX: min. 1000 m 1000Base-LX: min. 550 m 10GBase-SX: min. 300 m	850 nm 1300 nm
		Heather violet	OM4	1000Base-SX: min. 1040 m 1000Base-LX: min. 600 m 10GBase-SX: min. 550 m	850 nm 1300 nm
Singlemode					
		Yellow	OS2	10GBase-LR: min. 10 km 10GBase-ER: min. 40 km	1310 nm 1550 nm

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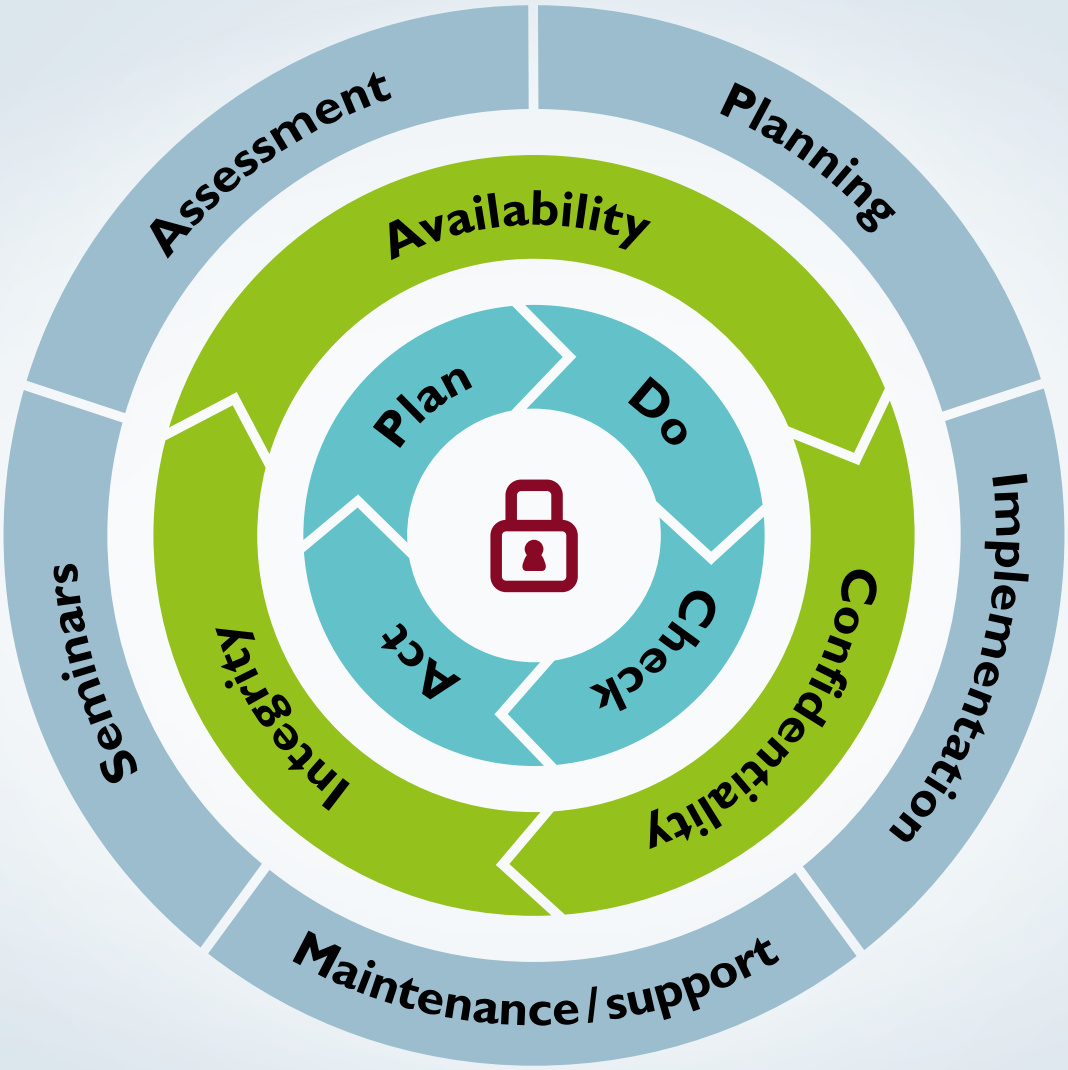
Web code: #2829



Our range of services at a glance

Assessment and planning

Together, we will inspect your system and analyze your individual threat and risk situation, documentation, and processes. You will receive a detailed report of vulnerabilities, recommended actions, and a list of measures required in order to provide standard protection for your system in compliance with IT baseline protection.

We will develop customized solutions and concepts for you which are based on the industry standard. Whether you need failsafe network structures, concepts for the protection or remote maintenance of your machinery, or high-performance wireless networks: we will find the right solution for you.

Implementation

We implement your security and network requirements for you, so you can continue to focus on your actual core competencies. We provide assistance on site or handle complete subtasks, which we implement according to your specifications.

After our analysis has been carried out, we will optimize the communication relationships in your network to increase performance and availability.

Maintenance and support

To ensure the availability of your system, updates must be installed on a regular basis, the firewall rules adapted, and messages evaluated. As a user, there is little administrative effort for you. In addition, you will satisfy the burden of proof for implementing measures in accordance with state-of-the-art technology.

We focus on eliminating anomalies, such as incorrect device configurations and any security vulnerabilities that are identified. If you have any questions about ICS security and industrial communication, do not hesitate to contact us.

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