Industrial Ethernet

One network, all options

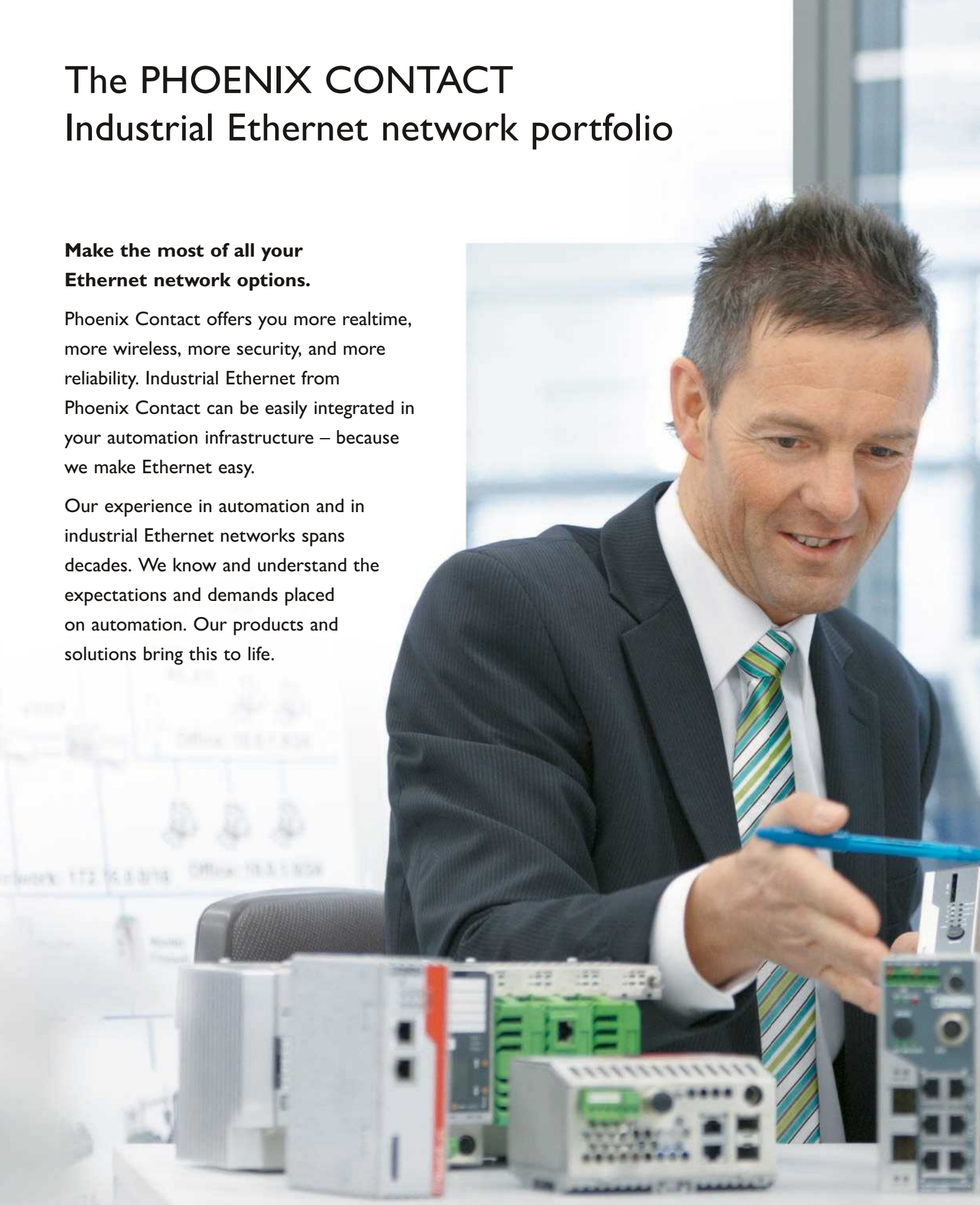
PHOENIX CONTACT
INSPIRING INNOVATIONS

The PHOENIX CONTACT Industrial Ethernet network portfolio

Make the most of all your Ethernet network options.

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

Our experience in automation and in industrial Ethernet networks spans decades. We know and understand the expectations and demands placed on automation. Our products and solutions bring this to life.



We make Ethernet easy

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

Table of contents

You can count on us

Much more than products, we also offer you support whenever you need it.

We offer on-demand professional support, from consultation, to network analysis and design, right through to configuration support and startup. We not only support you over the phone or by e-mail, but also directly on site, if you so desire. Contact us for more information.

Our specialists are also on hand to offer practical support, on site.

We offer support during the configuration and startup phases. We measure and assess the performance, availability, and security of your network and show you how you can optimize it. What's more, if your network is not working according to your expectations, we will eliminate any faults.

We will turn you into network specialists

Do you want to gain a better insight into network engineering for yourself or your staff? We provide instruction and practical training in automation which is tailored to your individual requirements.

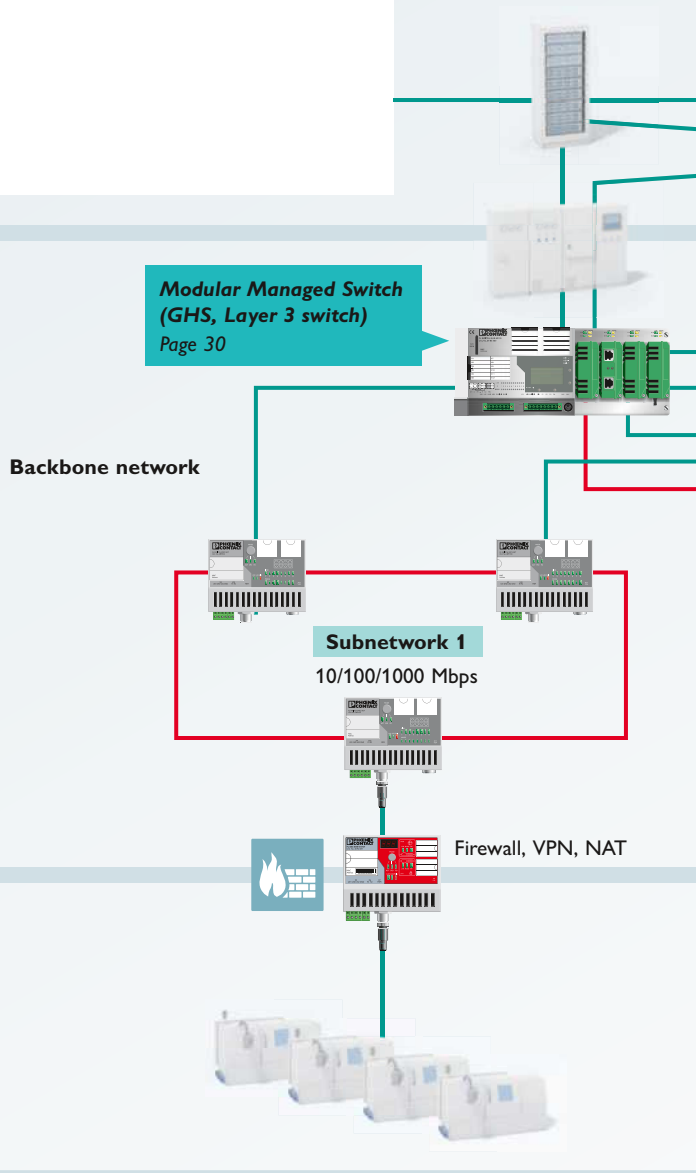
We support you in the design and planning of your network.

We will develop unique solutions for you which are tailored to your exact requirements. Whether it's fail-safe network structures, concepts for protecting or remotely maintaining your machinery or high-performance wireless networks, we will find the right solution for you.

Automation switches for the production network

Highly productive and efficient production requires well structured, high-performance, and robust network infrastructure. The ideal concept and the right components protect your system against automation system failures and costly downtimes.

With industrial switches from Phoenix Contact you can easily implement the high requirements of your production network with forward planning. As well as the appropriate products, we also offer you support in planning your production network optimally.

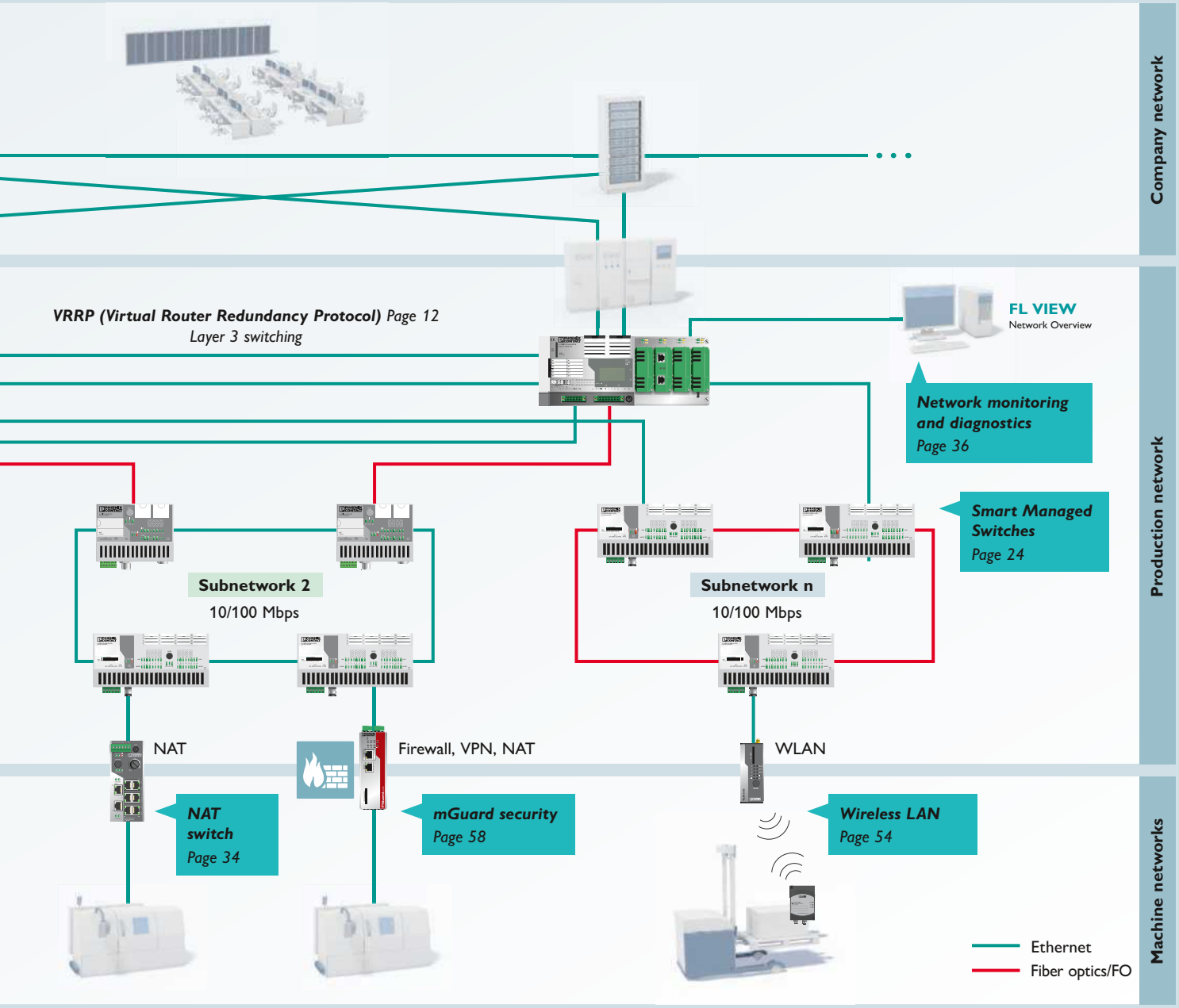


Your advantages:

- Easy integration into automation and IT environments
- Various interfaces for high flexibility – optical, electrical or wireless
- Easy, consistent configuration and efficient diagnostics
- High reliability thanks to network that is structured into various subnetworks (Layer 3 switching)

High-performance and failsafe connection between the production networks and the company network

- High flexibility thanks to the modular design of the industrial switches (Modular Managed Switch, GHS)
- Redundant connection to the company network via VRRP (Virtual Router Redundancy Protocol)
- Gigabit performance for high data throughput
- Support of IT standards (such as VLAN, SNMP, RSTP) for seamless integration
- Routing functions (Layer 3 switching) for consistent communication between the different IP subnetworks



High-availability and powerful production networks

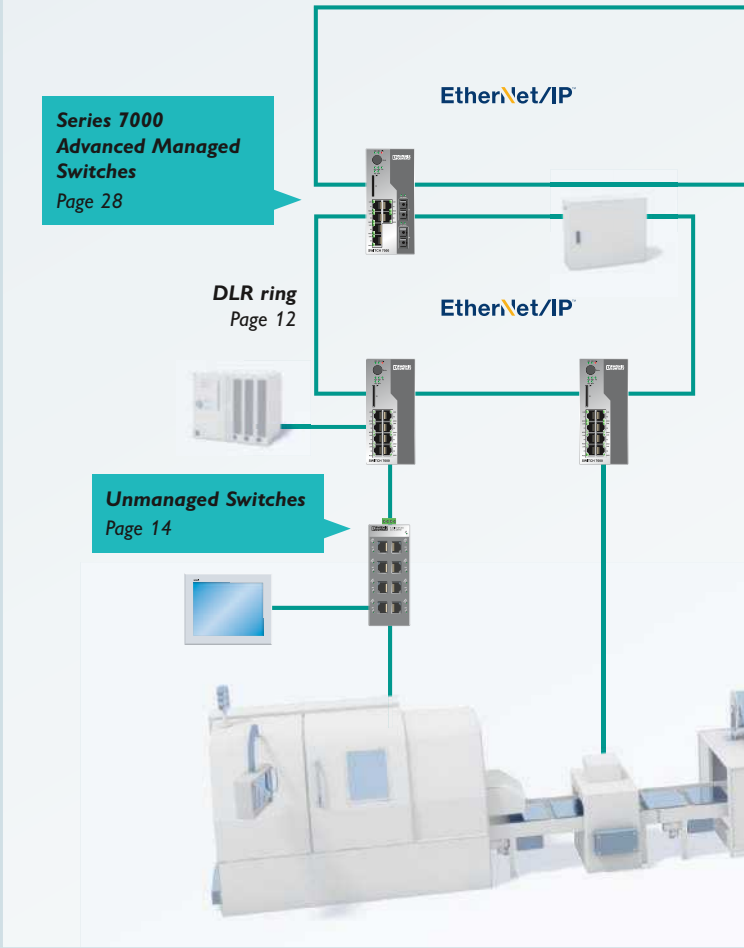
- High network availability thanks to ring redundancy
- Flexible design of optical or electrical networks
- Flexible network structures such as line, ring or star
- Optimum PROFINET and EtherNet/IP support
- Configuration of virtual network structures via VLAN
- Easy device replacement thanks to replaceable configuration memory

Reduction of downtimes thanks to automatic 24/7 network monitoring

- Central monitoring of industrial networks
- Early alarm signaling of changes in the network
- Automatic detection and clear representation, even for complex networks
- Rapid error location even for temporary network problems
- Quick removal of errors thanks to comprehensive diagnostic functions and continual recording of network information

Automation switches for the machine and system network

Communication in automation networks differs from communication in company networks in several key aspects. The switches must be tailored accordingly to the special requirements of the automation protocols such as PROFINET and EtherNet/IP. Automation switches combine IT functions with managed and realtime properties which optimally support these protocols. All necessary default settings are combined in user-friendly application profiles. Optionally, the switches can be easily configured and diagnosed from the controller's engineering tools.

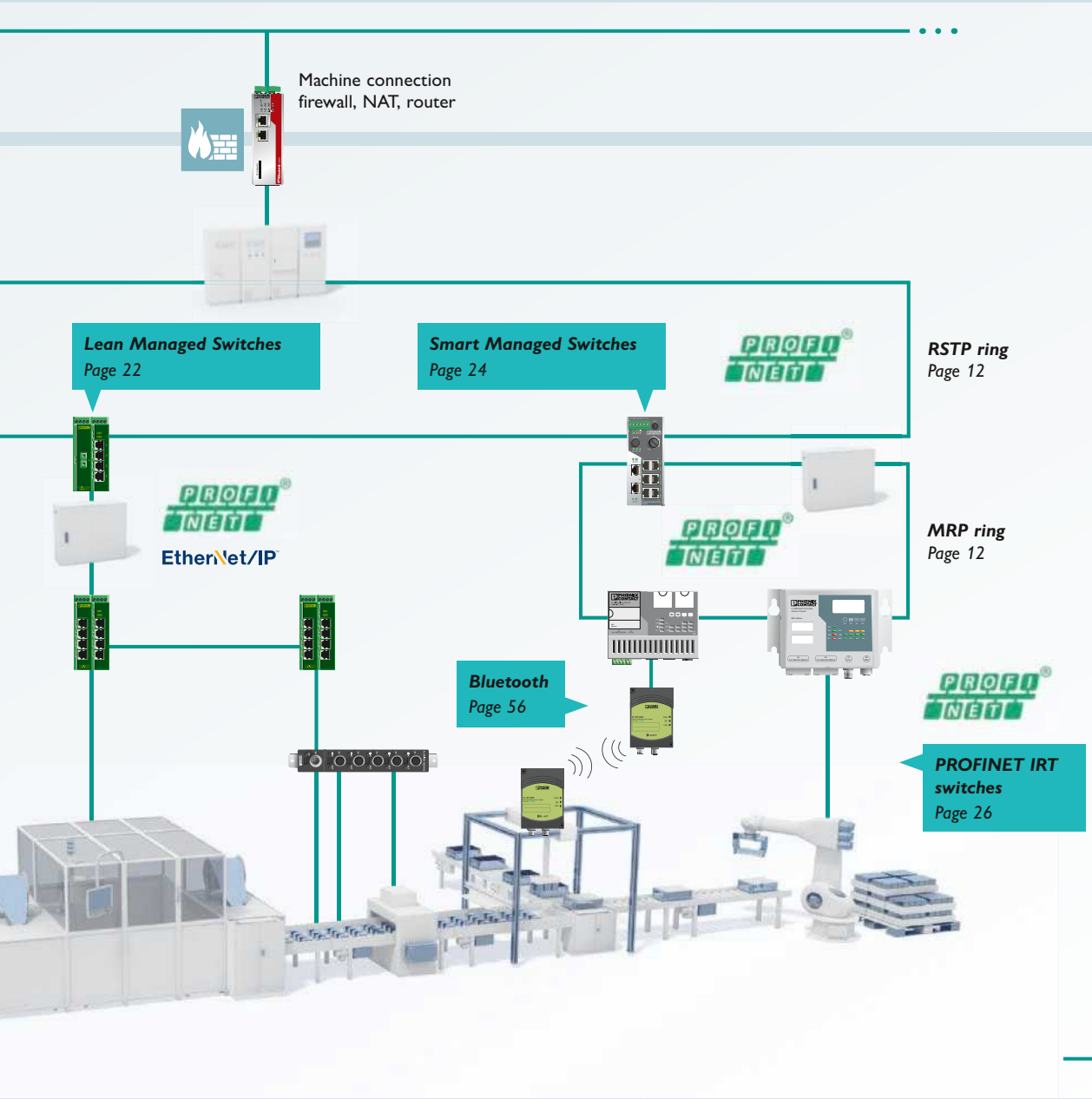


Your advantages:

- Ideal realtime properties
- High fault tolerance for communication
- Optimum integration into the engineering
- Preset automation profiles, easily activated by button
- Easy device replacement thanks to parameterization memory
- Configuration of virtual network structures in a production network via VLAN
- Easy configuration and diagnostics

Network infrastructure for EtherNet/IP

- Optimum integration of the network infrastructure into EtherNet/IP based automation and engineering systems
- The integrated Device Level Ring (DLR) EtherNet/IP redundancy mechanism prevents adverse effects to the control process in the event of a media failure
- Stable and realtime capable communication in Ethernet/IP networks



Lean network infrastructure for industrial control networks

- Robust realtime communication in control networks such as EtherNet/IP and PROFINET
- Minimized data load in the network and high availability
- EtherNet/IP data streams are routed only to those devices that require them
- Increased fault tolerance thanks to the RSTP standard redundancy method

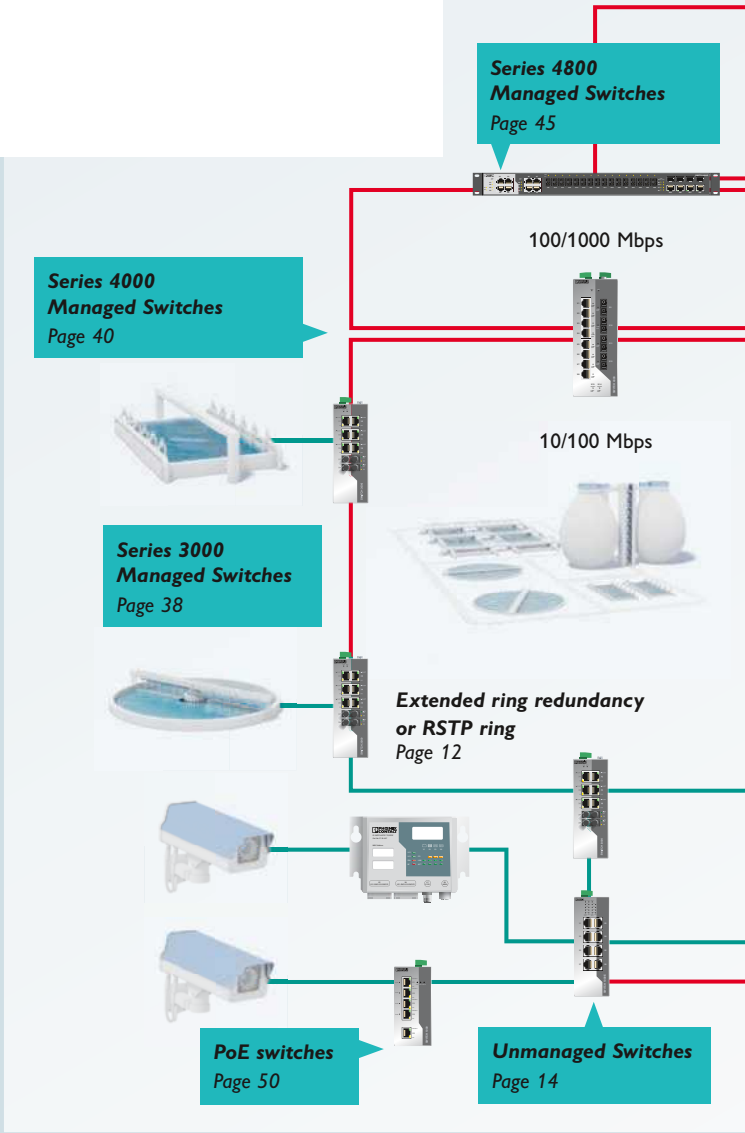
Network infrastructure for PROFINET RT and IRT

- Optimum integration into PROFINET automation and engineering systems
- The integrated MRP PROFINET redundancy mechanism prevents adverse effects to the control process in the event of a media failure
- Stable and realtime-capable communication in PROFINET RT and PROFINET IRT networks
- Priority transmission of PROFINET packets using the cut-through method, independent of the remaining data traffic (IRT switches)

Components for infrastructure networks

Industrial networks in the infrastructure have special requirements when it comes to the network components used.

The standard 3000 and 4000 series Managed Switches from Phoenix Contact offer you comprehensive IT-compatible functions for optimal networking of your system as well as connection to the control system. Robust components in accordance with IEC 61850-3 and IEEE 1613 offer maximum availability even under extreme ambient conditions, particularly for use in energy systems.

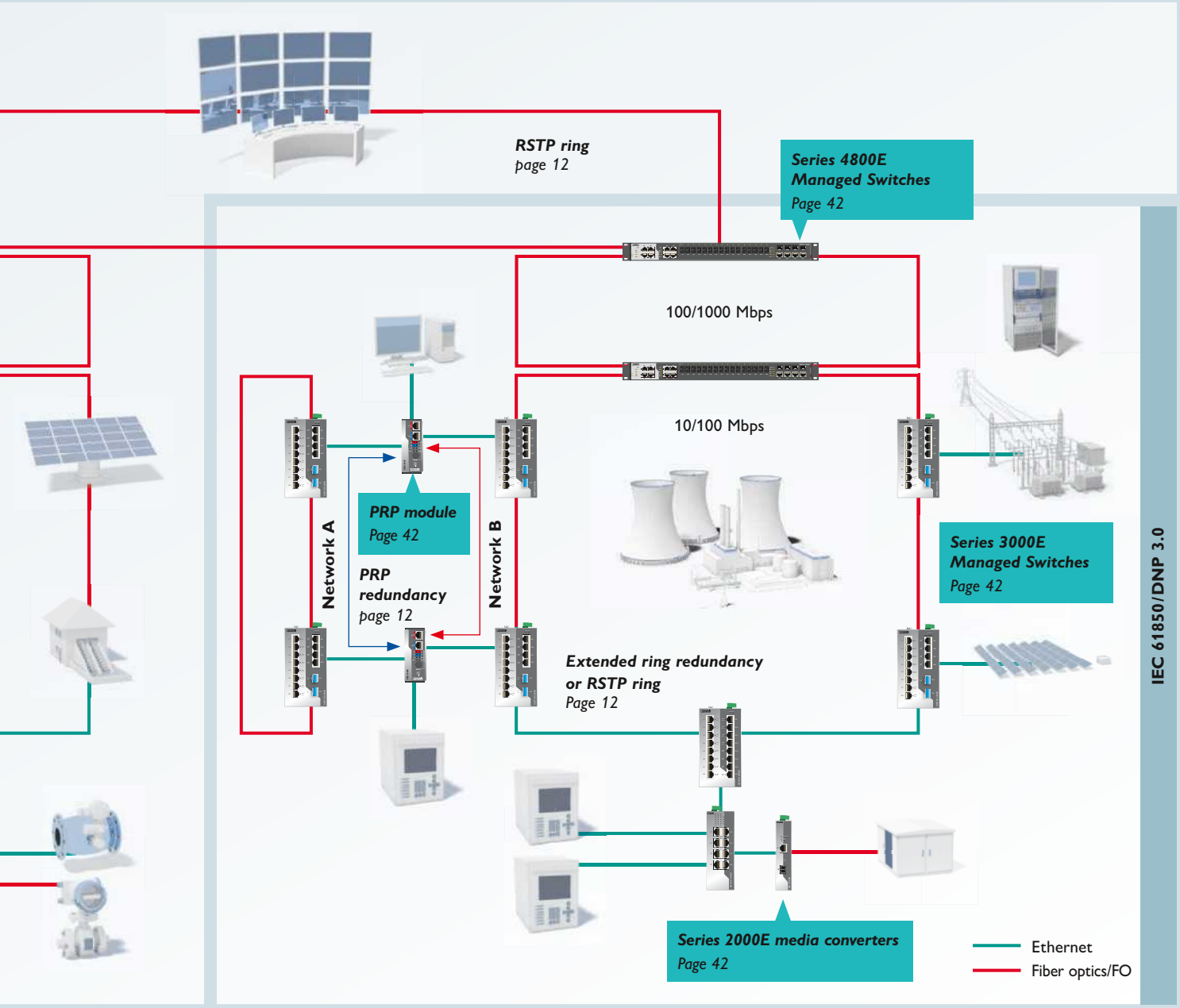


Your advantages:

- Robust industrial switches with comprehensive IT functions
- Consistent integration into IT network management
- Optimized for communication according to IEC 60870-5-104, DNP3, and IEC 61850
- Comprehensive product portfolio

Robust IT-compatible network infrastructure

- Comprehensive IT-compatible functions regarding security (security policies), redundancy, and network management
- Fiber optic transmission via multi-mode or single-mode fibers for error-free communication even over large distances



Fault tolerance thanks to fast redundancy mechanisms – including bumpless redundancy

- High network availability and fault tolerance thanks to ring redundancy
- Extremely short recovery times ensure uninterrupted operation in the event of an error
- No recovery times or loss of packets in the event of network failure or failure of individual network components with the PRP redundancy module (Parallel Redundancy Protocol) according to IEC 62439

Network infrastructure according to IEC 61850/DNP 3 for energy systems

- Designed for the harshest electromagnetic, electrostatic, and climatic ambient conditions according to IEC 61850-3 and IEEE 1613
- Optimum support of realtime protocols such as GOOSE in accordance with IEC 61850
- Data packets are routed only to those devices that require them
- Minimized data load in the network for high availability

Redundant networks for industrial applications

A communication failure in production can cause cost-intensive downtimes, the loss of important data or serious damages. Redundant network structures ensure that the availability of communication continues even if there is an error, which protects against production downtimes.
Phoenix Contact offers you the right redundancy solution for various areas of application – from simple media redundancy through to parallel network redundancy.

Your advantages:

- Failsafe networks in the event of an error
- Higher productivity thanks to higher network
- The right redundancy method for various areas of application
- Easy, consistent configuration and efficient diagnostics

	Products	Standard	Reconfiguration time	Topologies	Max. devices	Ring coupling	Applications
RSTP/STP Rapid spanning tree protocol	LM, SMCS, series 7000, Modular Managed Switch, series 3000, series 4000, series 4800	IEEE 802.1D-2004	Up to several seconds	Ring, meshed structures, star, tree	15 (for ring structure)	Yes	IT and automation networks
RSTP Fast ring detection + Large Tree Support	LM, SMCS, series 7000, GHS	–	100 to 500 ms	Ring, meshed structures, star, tree	57 (for ring structure)	Yes	Automation networks
MRP Media Redundancy Protocol	SMCS, Modular Managed Switch	IEC 62439-2	200 ms	Ring	50	No	PROFINET automation networks
DLR Device Level Ring	7000 series	–	3 ms	Ring	50	No	EtherNet/IP automation networks
PRP Parallel Redundancy Protocol	RED 2000E	IEC 62439-3	Bumpless	Double networks in line, ring, star or tree formation	Any	–	Energy systems, infrastructure
ERR Extended ring redundancy	3000 series 4000 series 4800 series	–	15 ms	Ring	200	Yes	Infrastructure
VRRP Virtual Router Redundancy Protocol	RFC 3768	–	Up to several seconds	Double and multiple routers	Any	–	Connection to the company network

Redundancy in PROFINET networks

MRP (Media Redundancy Protocol)

The MRP redundancy protocol is part of the IEC 62439 standard. MRP guarantees maximum recovery times of 200 ms in the event of an interruption in a ring topology with a maximum of 50 devices. MRP is supported by PROFINET switches and many PROFINET field devices to achieve increased reliability at device level in the machine network.

The integrated error diagnostics allow errors to be removed quickly.

Redundancy in EtherNet/IP networks

DLR (Device Level Ring)

The DLR redundancy protocol is part of the EtherNet/IP standard. It offers recovery times under 3 ms and therefore almost bumpless switch-over. DLR is supported by many EtherNet/IP field devices such as I/O modules or programmable controllers with an integrated 2-port switch function. The integrated error diagnostics allow errors to be removed quickly.

Router redundancy for network coupling

VRRP (Virtual Router Redundancy Protocol)

Redundant routers and VRRP are used to substantially increase network availability – particularly network transmissions, such as between office and production networks. This involves combining several physical routers to create a logical group, which appears as a logical virtual router in the network.

Redundancy for infrastructure networks

RSTP – Rapid Spanning Tree

RSTP is a standardized redundancy method (IEEE 802.1D-2004), which is supported by a range of switches regardless of their manufacturer. It supports ring and tree topologies and meshed networks.

Special add-ons:

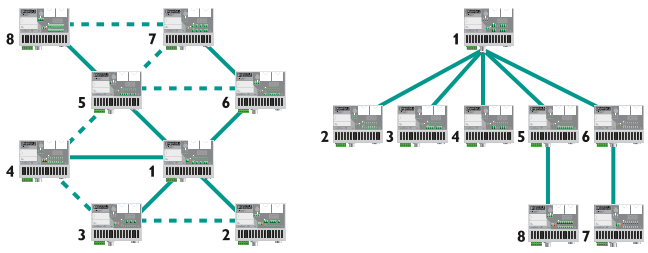
- Fast ring detection for shorter recovery times
- Large Tree Support for networks with up to 57 devices

Extended ring redundancy

In critical infrastructure applications, this proprietary redundancy function offers a quick redundancy switch-over in the event of connection failure. The recovery time for up to 200 devices in a ring is just 15 ms. In total, up to three linked rinks with more than 300 switches are possible.

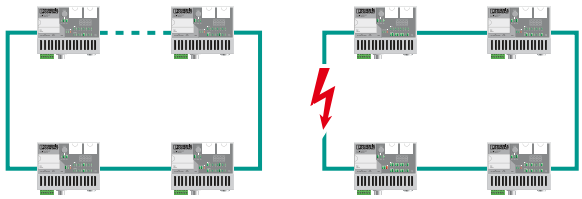
PRP (Parallel Redundancy Protocol)

In parallel redundant transmission according to the IEC 62439-3 PRP standard, all telegrams are transmitted twice via two autonomous networks. This means that uninterruptible (bumpless) communication is ensured even if a network fails. PRP does not require any reconfiguration time and is used particularly in critical areas of application such as in energy switchgear systems.



Meshed network structure *Logical tree structure*

The redundancy protocol resolves physical ring or mesh structures in a logical line or tree topology and thus prevents unwanted cycling of telegrams.



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

Unmanaged Switches

The SF, SFN, and 1000 series Unmanaged Switches are particularly reliable and maintenance-friendly. They are ideal for inexpensive, reliable Ethernet networks.

For applications over long distances or with high levels of interference, you have the choice between various versions with fiber optic ports. You can choose from a variety of twisted pair/fiber optic combinations with various ST and SC plugs.

Your advantages:

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

SF and **SFN** devices with 5 to 16 ports are ideal for standard industrial applications. You can choose between ultra-narrow (SF) and narrow (SFN) devices for DIN rails. With up to three multi-mode fiberglass ports with SC or ST connectors, flexibility can be ensured in the network.

Properties:

- LEDs and optional alarm contact
- Cable and port locking can be mounted on the switch

SFNB devices are cost-optimized switches for basic applications. Available as a 5-port or 8-port version and with additional fiberglass port, they are suitable for small machines and monitoring applications with basic Ethernet functions.

Properties:

- Basic LED

SFNT devices are designed for use under extreme ambient conditions and in very demanding applications for the oil/gas sector, shipbuilding, and other outdoor applications. In addition, all SFNT switches have an alarm contact and link monitoring via important diagnostic options.

Properties:

- Temperature range: -40°C - +75°C
- LEDs and standard alarm contact
- Cable and port locking can be mounted on the switch
- Redundant power supply

The **SFN** series with **Gigabit performance** is ideal for use in complex systems with high requirements for transmission speeds.
In addition to the comprehensive range of functions of the SFN, the Gigabit version of the switch ensures data transfer that also meets high performance requirements thanks to the 1000 Mbps bandwidth.

Properties:

- LEDs
- Cable and port locking can be mounted on the switch
- Redundant power supply

Unmanaged Switches order overview

	Order No.	Designation	Port configuration			
			10/100 Mbps copper ports	100 Mbps multi-mode-fiber optic ports	10/100/1000 Gbps copper ports	10/100/1000 Gbps fiber optic ports
Switches with basic function: narrow						
	2891001	FL SWITCH SFNB 5TX	5	–	–	–
	2891014	FL SWITCH SFNB 5TX-50PK	5	–	–	–
	2891002	FL SWITCH SFNB 8TX	8	–	–	–
	2891027	FL SWITCH SFNB 4TX/FX	4	1 MM (SC duplex)	–	–
	2891028	FL SWITCH SFNB 4TX/FX ST	4	1 MM (SC duplex)	–	–
	2891029	FL SWITCH SFNB 4TX/FX SM20	4	1 SM (SC duplex)	–	–
Switches for universal use: flat						
	2832771	FL SWITCH SF 8TX	8	–	–	–
	2832577	FL SWITCH SF 7TX/FX ST	7	1 MM (ST)	–	–
	2832726	FL SWITCH SF 7 TX/FX	7	1 MM (SC duplex)	–	–
	2832674	FL SWITCH SF 6TX/2FX ST	6	2 MM (ST)	–	–
	2832933	FL SWITCH SF 6TX/2FX	6	2 MM (SC duplex)	–	–
	2832603	FL SWITCH SF 4TX/3FX ST	4	3 MM (ST)	–	–
	2832849	FL SWITCH SF 16TX	16		–	–
	2832661	FL SWITCH SF 15TX/FX	15	1 MM (SC duplex)	–	–
	2832593	FL SWITCH SF 14TX/2FX	14	2 MM (SC duplex)	–	–
	2891041	FL SWITCH 1824	24	–	–	–
Switches for universal use: narrow						
	2891152	FL SWITCH SFN 5TX	5	–	–	–
	2891020	FL SWITCH SFN 8TX-24VAC	8	–	–	–
	2891021	FL SWITCH SFN 5TX-24VAC	5	–	–	–
	2891022	FL SWITCH SFN 8TX-NF	8	–	–	–
	2891023	FL SWITCH SFN 7TX/FX-NF	7	1 MM (SC duplex)	–	–
	2891024	FL SWITCH SFN 6TX/2FX-NF	6	2 MM (SC duplex)	–	–
	2891097	FL SWITCH SFN 7TX/FX	7	1 MM (SC duplex)	–	–
	2891110	FL SWITCH SFN 7TX/FX ST	7	1 MM (ST)	–	–
	2891314	FL SWITCH SFN 6TX/2FX	6	2 MM (SC duplex)	–	–
	2891411	FL SWITCH SFN 6TX/2FX ST	6	2 MM (ST)	–	–
	2891453	FL SWITCH SFN 4TX/FX ST	4	1 MM (ST)	–	–
	2891851	FL SWITCH SFN 4TX/FX	4	1 MM (SC duplex)	–	–
	2891929	FL SWITCH SFN 8TX	8	–	–	–
	2891933	FL SWITCH SFN 16TX	16	–	–	–
	2891934	FL SWITCH SFN 15TX/FX	15	1 MM (SC duplex)	–	–
	2891935	FL SWITCH SFN 14TX/2FX	14	2 MM (SC duplex)	–	–
Switches with Gigabit ports						
	2891673	FL SWITCH SFN 8GT	–	–	8	–
	2891518	FL SWITCH SFN 7GT/SX	–	–	7	1 MM (SC duplex)
	2891398	FL SWITCH SFN 6GT/2SX	–	–	7	2 MM (SC duplex)
	2891987	FL SWITCH SFN 6GT/2LX	–	–	6	2 SM, 10 km (SC duplex)
	2891563	FL SWITCH SFN 6GT/2LX-20	–	–	6	2 SM, 20 km (SC duplex)
	2891057	FL SWITCH 1924	–	–	24	–
Robust switches for harsh ambient conditions						
	2891003	FL SWITCH SFNT 5TX	5	–	–	–
	2891004	FL SWITCH SFNT 4TX/FX	4	1 MM (SC duplex)	–	–
	2891005	FL SWITCH SFNT 8TX	8	–	–	–
	2891007	FL SWITCH SFNT 7TX/FX ST	7	1 MM (ST)	–	–
	2891006	FL SWITCH SFNT 7TX/FX	7	1 MM (SC duplex)	–	–
	2891025	FL SWITCH SFNT 6TX/2FX	6	2 MM (SC duplex)	–	–
	2891026	FL SWITCH SFNT 6TX/2FX ST	6	2 MM (ST)	–	–
	2891043	FL SWITCH SFNT 5TX-C	5	–	–	–
	2891044	FL SWITCH SFNT 4TX/FX-C	4	1 MM (SC duplex)	–	–
	2891045	FL SWITCH SFNT 8TX-C	8	–	–	–
	2891046	FL SWITCH SFNT 7TX/FX-C	7	1 MM (SC duplex)	–	–
	2891047	FL SWITCH SFNT 7TX/FX ST-C	7	1 MM (ST)	–	–
	2891048	FL SWITCH SFNT 6TX/2FX-C	6	2 MM (SC duplex)	–	–
	2891049	FL SWITCH SFNT 6TX/2FX ST-C	6	2 MM (ST)	–	–
	2891952	FL SWITCH SFNT 16TX	16	–	–	–
	2891953	FL SWITCH SFNT 15TX/FX	15	1 MM (SC duplex)	–	–
	2891954	FL SWITCH SFNT 14TX/2FX	14	2 MM (SC duplex)	–	–
	2891064	FL SWITCH 1001T-4POE	5	–	–	–
	2891065	FL SWITCH 1008E	8	–	–	–

Form factor			Functions					
Narrow	Flat	19" format	Supply voltage	Redundant power supply with alarm contact	Link down alarm contact	QoS data prioritization	Cable locking	Port locking
x	–	–	12 – 48 V DC	–	–	–	x	–
x	–	–	12 – 48 V DC	–	–	–	x	–
x	–	–	12 – 48 V DC	–	–	–	x	–
x	–	–	12 – 48 V DC	–	–	–	x	–
x	–	–	12 – 48 V DC	–	–	–	x	–
x	–	–	12 – 48 V DC	–	–	–	x	–
–	x	–	18 – 36 V DC	x	–	–	x	–
–	x	–	18 – 36 V DC	x	–	–	x	–
–	x	–	18 – 36 V DC	x	–	–	x	–
–	x	–	18 – 36 V DC	x	–	–	x	–
–	x	–	18 – 36 V DC	x	–	–	x	–
–	x	–	18 – 36 V DC	x	–	–	x	–
–	x	–	18 – 36 V DC	x	–	–	x	–
–	x	–	18 – 36 V DC	x	–	–	x	–
–	x	–	18 – 36 V DC	x	–	–	x	–
–		x	120/220 V AC	–	–	x	x	–
x	–	–	9 – 36 V DC	–	–	x	x	x
x	–	–	12 – 32 V DC/20-28 V AC	–	–	x	x	x
x	–	–	12 – 32 V DC/20-28 V AC	–	–	x	x	x
x	–	–	9 – 36 V DC	–	–	x	x	x
x	–	–	9 – 36 V DC	–	–	x	x	x
x	–	–	9 – 36 V DC	–	–	x	x	x
x	–	–	9 – 36 V DC	–	–	x	x	x
x	–	–	9 – 36 V DC	–	–	x	x	x
x	–	–	9 – 36 V DC	–	–	x	x	x
x	–	–	9 – 36 V DC	–	–	x	x	x
x	–	–	9 – 36 V DC	–	–	x	x	x
x	–	–	9 – 36 V DC	–	–	x	x	x
x	–	–	12 – 48 V DC	x	–	–	x	–
x	–	–	12 – 48 V DC	x	–	–	x	–
x	–	–	12 – 48 V DC	x	–	–	x	–
x	–	–	9 – 36 V DC	x	–	x	x	x
x	–	–	9 – 36 V DC	x	–	x	x	x
x	–	–	9 – 36 V DC	x	–	x	x	x
x	–	–	9 – 36 V DC	x	–	x	x	x
x	–	–	9 – 36 V DC	x	–	x	x	x
–	–	x	120/220 V AC	–	–	x	x	–
x	–	–	9 – 36 V DC	x	x	x	x	x
x	–	–	9 – 36 V DC	x	x	x	x	x
x	–	–	9 – 36 V DC	x	x	x	x	x
x	–	–	9 – 36 V DC	x	x	x	x	x
x	–	–	9 – 36 V DC	x	x	x	x	x
x	–	–	9 – 36 V DC	x	x	x	x	x
x	–	–	9 – 36 V DC	x	x	x	x	x
x	–	–	9 – 36 V DC	x	x	x	x	x
x	–	–	9 – 36 V DC	x	x	x	x	x
x	–	–	9 – 36 V DC	x	x	x	x	x
x	–	–	9 – 36 V DC	x	x	x	x	x
x	–	–	9 – 36 V DC	x	x	x	x	x
x	–	–	9 – 36 V DC	x	x	x	x	x
x	–	–	12 – 48 V DC	x	–	–	x	–
x	–	–	12 – 48 V DC	x	–	–	x	–
x	–	–	12 – 48 V DC	x	–	–	x	–
x	–	–	18 – 57 V DC	x	–	–	x	–
x	–	–	12 – 57 V DC	x	–	–	x	–

Unmanaged Switches with IP67 protection

The industrial Ethernet switches for field applications offer clear advantages in terms of installation and assembly.

With a unique narrow design and symmetrical fixing clips with M6 threading, the IP67 switches are optimized for use in machine building.

Your advantages:

- Quick and easy installation thanks to symmetric fastening points and innovative SPEEDCON technology
- Optimal support for PROFINET applications
- High degree of protection for adverse ambient conditions
- Universal use thanks to the extended temperature range

Narrow design width

Thanks to its particularly narrow design, the switch can be easily integrated anywhere.

SPEEDCON LOCKING

M12 circular connectors

M12 circular connectors in straight or angled form offer the user optimized assembly for the application.

Standard switch – IP67

FL SWITCH 1605 M12
Order No. 2700200

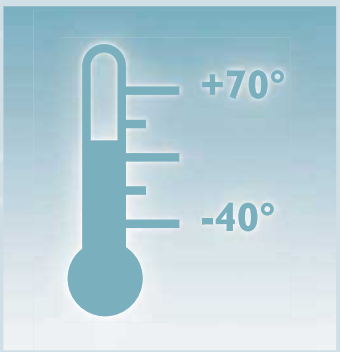
Ethernet interface	
Number of ports	5
Transmission speed	10/100 Mbps
Connection method	M12 D-encoded
Function	
Basic functions	Unmanaged switch/auto negotiation, complies with standard IEEE 802.3, store-and-forward switching mode, PTCP filter
Status and diagnostics indicators	LEDs: U_s (power supply), Link, and Activity per port
Properties	
Supply voltage	24 V DC (M12 connector)
Typical current consumption	40 mA (24 V DC)
Protection	IP65/IP66/IP67
Ambient temperature (operation)	-40°C – +70°C

Ethernet connectors that can be assembled

Thanks to the IDC displacement connection, quick and easy installation in the field is possible for Ethernet connectors that can be assembled.

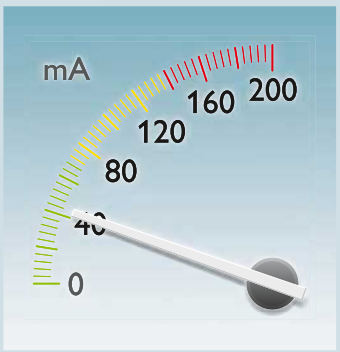
Y-distributor

The Y-distributor simplifies voltage distribution in the field thanks to reduced wiring effort.



Extended temperature range

The extended temperature range enables universal use.



Low current consumption

Thanks to its particularly low power consumption, the switch is suitable for autonomous applications.

Hubs for industrial networking

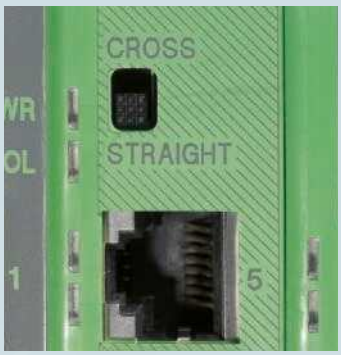
The industrial hubs are repeaters that are compliant with the IEEE 802.3 Ethernet standard and are best suited to automation applications with Powerlink or FL Net.

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

Your advantages:

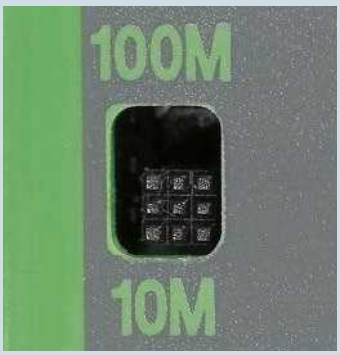
- Create large networks cost-effectively thanks to hubs that are available with up to 16 ports
- Variable use thanks to selectable transmission speed
- Easy cascading with standard cables
- Fast data processing thanks to short latency

	Hub/repeater (IEEE 802.3)	Hub/repeater (IEEE 802.3)
	FL HUB 8TX-ZF 8 RJ45 ports Order No. 2832551	**FL HUB 16TX-ZF** 16 RJ45 ports Order No. 2832564
Properties		
Certification	CUL, CUL-EX LIS, UL, UL-EX LIS	CUL, CUL-EX LIS, UL, UL-EX LIS
Copper Ethernet interface		
Transmission speed	10/100 Mbps (can be selected)	10/100 Mbps (can be selected)
Cable length	100 m	100 m
Functions		
Configuration	Transmission speed of 10 Mbps or 100 Mbps	
Status and diagnostics indicators	LEDs: U_S (supply voltage), COL (collision) when receiving data, link status LED per port	



Outcross port

The outcross port can be used to cascade several hubs. This eliminates the need for crossed cables.



Data rate

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

Repeater function

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

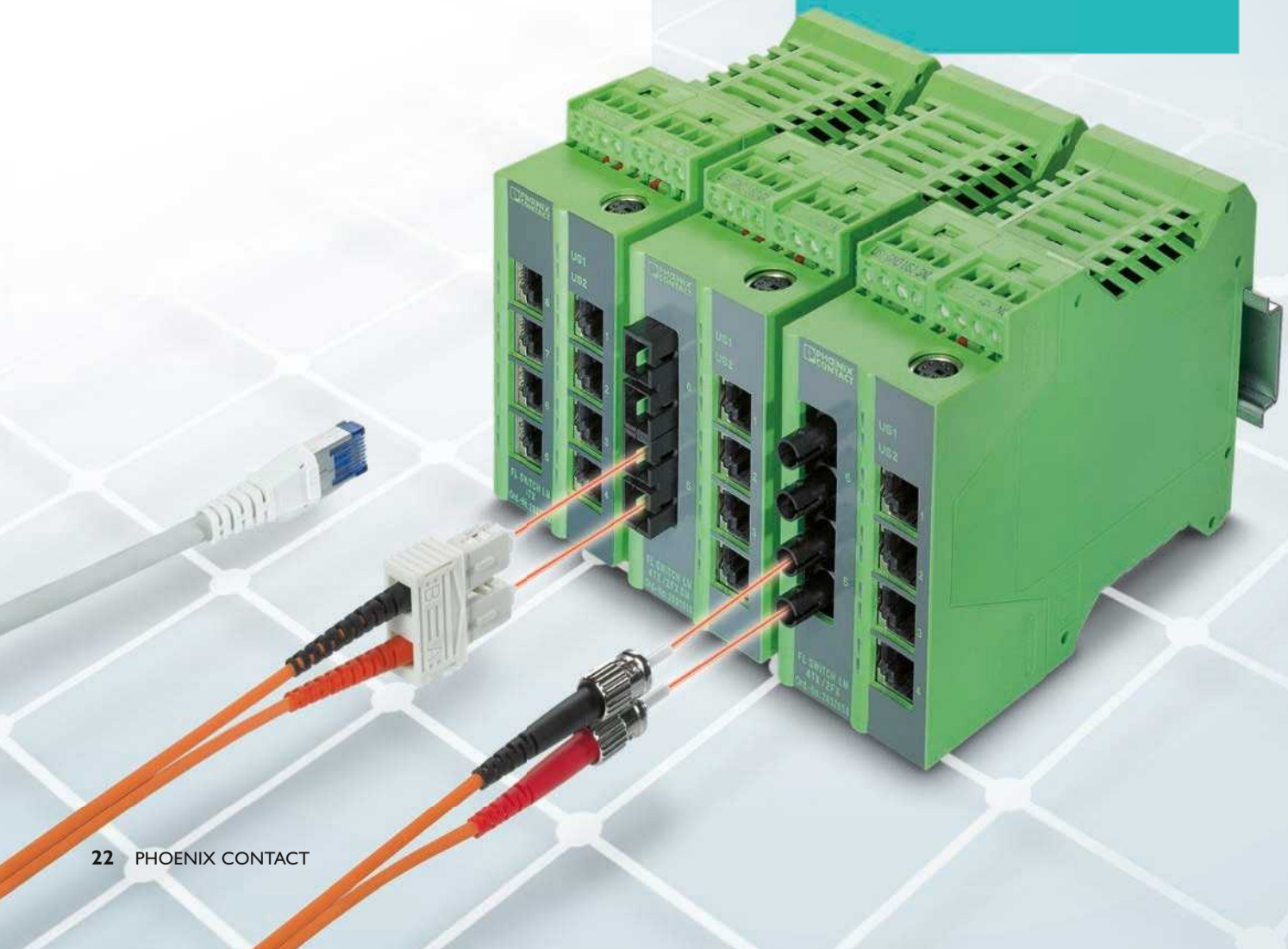
Lean Managed Switches

Maximum diagnostics in the minimum amount of space.

Use the compact Lean Managed Switches to connect copper-based Ethernet devices or network segments to any fiber optic Ethernet network. Connection can be established directly or via redundant cables in any topologies. Data streams and connected automation devices can be diagnosed and analyzed comprehensively using the integrated software functions.

Your advantages:

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



Lean Managed Switch, 5 copper ports

FL SWITCH LM 5TX
Order No. 2989527

FL SWITCH LM 5TX-E
Order No. 2989336

Lean Managed Switch, 8 copper ports

FL SWITCH LM 8TX
Order No. 2832632

FL SWITCH LM 8TX-E
Order No. 2891466

FL SWITCH LM 8TX-B
Order No. 2989446

Lean Managed Switch, 1 fiber optic port

FL SWITCH LM 4TX/1FX
Order No. 2989624

FL SWITCH LM 4TX/1FX SM
Order No. 2989828

FL SWITCH LM 4TX/1FX ST
Order No. 2989721

FL SWITCH LM 4TX/1FX SM ST
Order No. 2989925

FL SWITCH LM 4TX/1FX-E
Order No. 2989433

FL SWITCH LM 4TX/1FX SM-E
Order No. 2989637

FL SWITCH LM 4TX/1FX ST-E
Order No. 2989530

FL SWITCH LM 4TX/1FX SM ST-E
Order No. 2989734

Lean Managed Switch, 2 fiber optic ports

FL SWITCH LM 4TX/2FX
Order No. 2832658

FL SWITCH LM 4TX/2FX SM
Order No. 2891916

FL SWITCH LM 4TX/2FX ST
Order No. 2989132

FL SWITCH LM 4TX/2FX SM ST
Order No. 2989239

FL SWITCH LM 4TX/2FX-E
Order No. 2891660

FL SWITCH LM 4TX/2FX SM-E
Order No. 2891864

FL SWITCH LM 4TX/2FX ST-E
Order No. 2989831

FL SWITCH LM 4TX/2FX SM ST-E
Order No. 2989938

Functions

Store-and-forward switch, complies with standard IEEE 802.3, PROFINET conformance class A, PTCP filter, two priority classes according to IEEE 802.1P (QoS), BootP-compatible, Rapid Spanning Tree (RSTP), Large Tree Support, fast ring detection, IGMP snooping, port mirroring, static VLANs, status and diagnostic LEDs: US1 and US2 (redundant power supply), link and receive LED per port, 24 V power supply, DHCP server, saving the configuration on an external PC possible, multicast source detection, broadcast limiter, extended temperature range -40°C – +70 °C

Multi-mode ports: up to 11 km, **single-mode ports:** up to 36 km, **copper ports:** up to 100 m, **standard versions:** UL, GL, DNV, BV, **E versions:** UL, UL Ex, IGMP snooping activated on delivery, **B versions:** temperature range 0°C – +55°C

Redundancy switch-over

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

Extended temperature range

The extended temperature range enables universal use even under extreme temperature conditions.

Connection versatility

Thanks to the wide range of connection methods, the Lean Managed Switch can be optimally integrated in existing and newly created networks.

Smart Managed Switches

The Smart Managed Switches offer excellent realtime properties with high data throughput at the same time.

They are ideal for use in the PROFINET RT or EtherNet/IP environments and support Fast Ethernet or Gigabit on all ports. They also provide the bandwidth required for the integration of IT realtime services such as video or voice-over-IP in automation networks.

Your advantages:

- High data throughput thanks to Fast Ethernet or Gigabit on all ports
- Optimum user support thanks to the use of IT standards and automation protocols
- Easy configuration and diagnosis of switch functions thanks to web-based management, SNMP, and PROFINET device

Smart Managed Narrow Switch

FL SWITCH SMN 8TX-PN
Order No. 2989501

FL SWITCH SMN 6TX/2POF-PN
Order No. 2700290

Smart Managed Compact Switch

FL SWITCH SMCS 16 TX
Order No. 2700996

FL SWITCH SMCS 14TX/2FX
Order No. 2700997

FL SWITCH SMCS 14 TX/2FX-SM
Order No. 2701466

Smart Managed Compact Switch

FL SWITCH SMCS 8GT
Order No. 2891123

FL SWITCH SMCS 8TX
Order No. 2989226

FL SWITCH SMCS 8TX PN
Order No. 2989103

Smart Managed Compact Switch

FL SWITCH SMCS 6GT/2SFP
Order No. 2891479

FL SWITCH SMCS 6TX/2SFP
Order No. 2989323

Functions

Store-and-forward switch, complies with standard IEEE 802.3, four priority classes according to IEEE 802.1p (QoS), autocrossing, auto negotiation, Smart mode, N:1 port mirroring, SNMP v1 & v2c TCP/IP protocol, PROFINET device, multicast filtering with IGMP snooping and querier function, extended multicast filtering, auto query port, VLAN, LLDP, simple network time protocol (SNTP), Rapid Spanning Tree (RSTP) according to IEEE 802.1w, fast ring detection (FRD), Large Tree Support, MRP, an alarm contact, external configuration memory

PROFINET mode is activated by default.

The FL SWITCH SMCS 8GT and FL SWITCH SMCS 6GT/2SFP Gigabit versions also have an ATEX zone II approval and maritime approvals GL, BV, ABS, LR, and DNV.

Replaceable configuration memory

Replaceable configuration memory for storing device settings for easy device replacement and startup. In addition, the Media Redundancy Manager function is stored on the FL MEM PLUG/MRM.

Smart mode

Smart Managed Switches are suitable for use in PROFINET or even Ethernet/IP applications. The various operating modes can be configured easily on site without web-based management.

Flexible transmission distances

The optical SFP fiberglass plug-in modules are available in three versions: SX, LX, and longhaul. They enable transmission with 1000 Mbps over distances of up to 80 km.

Switches for PROFINET IRT

Achieve Ethernet switching with maximum speed for PROFINET applications.

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

Your advantages:

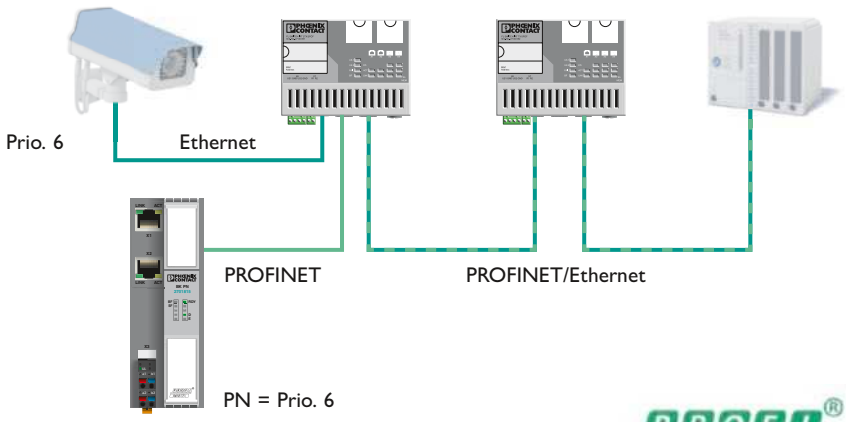
- Excellent realtime properties thanks to integrated ERTEC technology
- Optimum PROFINET integration thanks to hardware-based transmission of distances and fiber optic diagnostics
- Ideal for use in the field thanks to its IP67 protection class and push-pull connection technology
  (FL SWITCH IRT IP TX/3POF)

PROFINET
Real Time

	IRT switch	IRT switch	IP67 IRT switch
	FL SWITCH IRT 4TX Order No. 2700689	**FL SWITCH IRT TX 3POF** Order No. 2700692 **FL SWITCH IRT 2TX 2POF** Order No. 2700691	**FL SWITCH IRT IP TX/3POF** Order No. 2700697
Ethernet interface			
Number of ports	4	2 or 1	1
Transmission speed	10/100 Mbps	10/100 Mbps	10/100 Mbps
Connection method	RJ45 socket	RJ45 socket	RJ45 socket
Fiber optic interface			
Number of ports	–	2 or 3	3
Transmission speed	–	100 Mbps (full duplex)	100 Mbps (full duplex)
Transmission length	–	Up to 250 m (depending on the fiber used)	Up to 250 m (depending on the fiber used)
Functions			
Basic functions	Cut-through/store-and-forward switch, two priority classes according to IEEE 802.1P (QoS), TCP/IP protocol, DCP-compatible, integrated web server function, PROFINET device		
Status and diagnostics indicators	2 status LEDs per Ethernet port: LINK and Activity, supply voltage US1 and US2 (redundant supply voltage), and BF		

Prioritized PROFINET data transmission

The IRT switches scan the header of incoming data packets for a PROFINET ID and always forward PROFINET telegrams with the highest priority – and in the realtime data phase in the case of PROFINET IRT bandwidth reservation. In this way, even Ethernet telegrams with the highest priority rating (priority 6), which video streams also use for example, do not adversely affect PROFINET realtime communication.



Advanced Managed Switches 7000 series

The Managed Switches in the 7000 series are the first switches available with the Device Level Ring (DLR) redundancy mechanism. The FL SWITCH 7000 is integrated directly into the ring and provides you with the option to connect up to six devices to the ring via this switch. Thanks to the Common Industrial Protocol (CIP), the FL SWITCH 7000 switches can be fully integrated into your EtherNet/IP network and configured and diagnosed from the control system. It can also be used in harsh industrial environments thanks to the extended temperature range of -40°C to +70°C and the robust metal housing.

Your advantages:

- Minimum recovery time of < 3 milliseconds for high-availability networks thanks to DLR
- Full configuration and diagnostics from the control system thanks to CIP
- Flexible universal applications thanks to different versions with copper and fiberglass ports

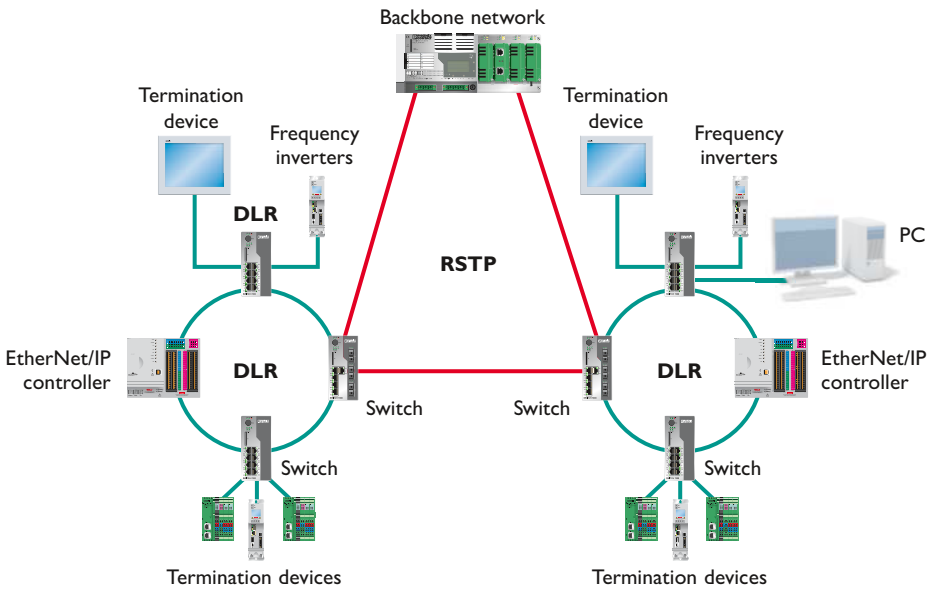
EtherNet/IP™

CIP

	Advanced Managed Switch	Advanced Managed Switch	Advanced Managed Switch
	FL SWITCH 7008-EIP Order No. 2701418	**FL SWITCH 7006/2FX-EIP** Order No. 2701419	**FL SWITCH 7005/FX-2FX-SM-EIP** Order No. 2701420
Properties			
	8 x 10/100 Mbps RJ45 ports	6 x 10/100 Mbps RJ45 ports and 2 x 100 Mbps multi mode SC ports	5x 10/100 Mbps RJ45 ports and 1x 100 Mbps multi-mode SC port and 2x 100 Mbps single-mode SC ports
Functions			
	Store-and-forward switch, complies with standard IEEE 802.3, eight priority classes according to IEEE 802.1p (QoS), autocrossing, auto negotiation, Smart mode, N:1 port mirroring, SNMP v1 & v2c TCP/IP protocol, EtherNet/IP, Common Industrial Protocol (CIP), PROFINET conformance class A, multicast filtering with IGMP snooping and querier, extended multicast filtering, auto query port functionality, static VLAN (IEE 802.1Q), link aggregation (802.3ad), MAC-based port security, link layer discovery protocol (LLDP), DHCP relay agent (option 82), address conflict detection (ACD), redundancy mechanisms: device level ring (DLR), Rapid Spanning Tree in accordance with IEEE 802.1w (RSTP) with fast ring detection (FRD), two relay contacts, SD card as external configuration memory, multi-mode fibers: up to 11 km, single-mode fibers: up to 36 km		

Device Level Ring redundancy

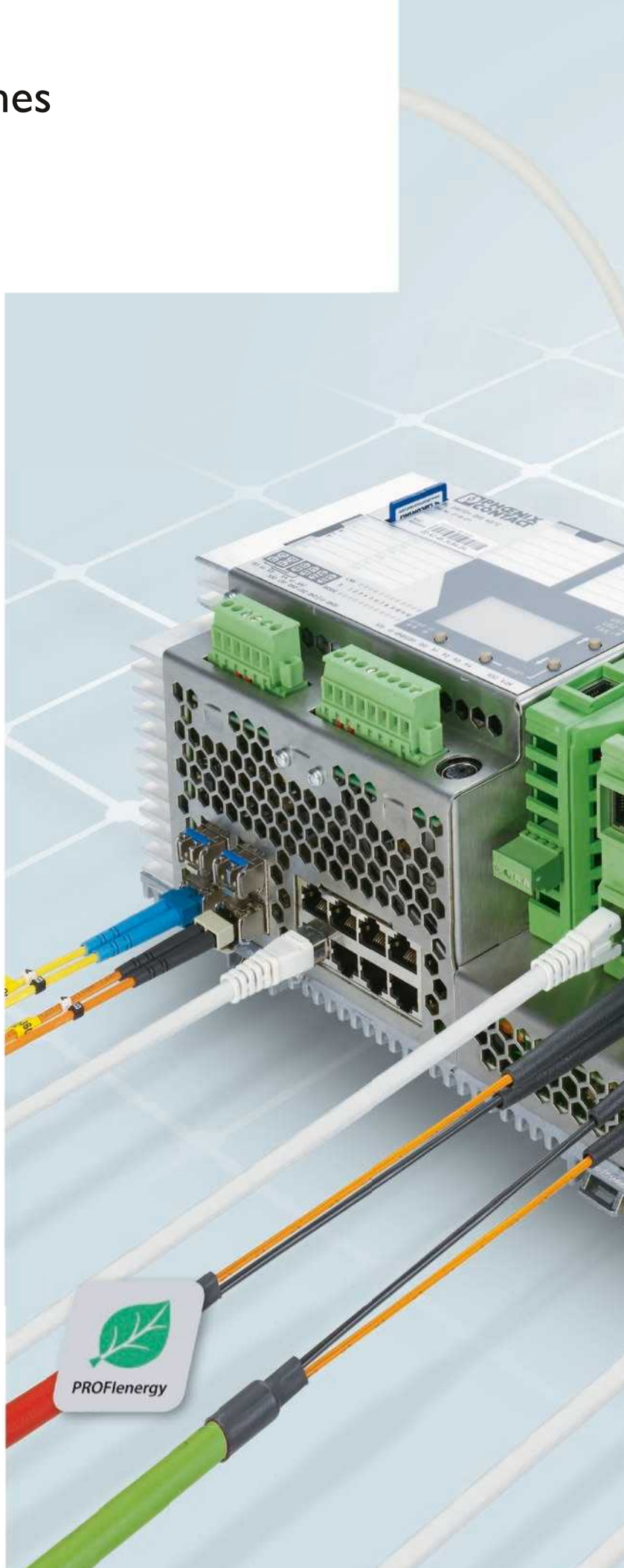
The FL SWITCH 7000 gives you the option to couple your DLR redundantly to a higher-level switch via RSTP. This also allows you to increase the availability of your network.



Modular Managed Switches

Our most powerful switch is the Modular Managed Switch. As a Gigabit switch, it is particularly suitable for use as an automation backbone and for connection to the higher-level company network.

There are two types of the Modular Managed Switch: you can choose between four or twelve Gigabit ports. Both versions offer four SFP slots, which can be fitted individually for various Gigabit fiberglass transmission standards.
The Modular Managed Switch is also available with Layer 3 function.



Your advantages:

- Maximum performance with up to 12 integrated Gigabit ports
- User-friendly diagnostics and configuration thanks to the large operator display
- Fast connection to higher-level networks with optional Layer 3 function
- Energy-efficient operation thanks to PROFIenergy profile
- Flexible applications thanks to the wide range of media

Easy operation

The display operator interface provides user-friendly options for diagnostics and configuration without the need for additional software or tools. This makes the handling particularly easy and saves time.

Flexibility thanks to a wide range of media

Whether multi-mode and single-mode fiber optics, polymer or HCS technology, twisted pair or Power over Ethernet – the Gigabit Modular Switch is flexible for all connections.

Replaceable configuration memory

Replaceable configuration memory for storing device settings for easy installation or fast device replacement. The media redundancy and Layer 3 function can also be stored on the SD card.

Gigabit head station

FL SWITCH GHS 4G/12
Order No. 2700271

FL SWITCH GHS 12G/8
Order No. 2989200

FL SWITCH GHS 4G/12-L3
Order No. 2700787

FL SWITCH GHS 12G/8-L3
Order No. 2700786

Software functions

Store-and-forward switch, TCP/IP protocol, BootP-compatible, port mirroring, port security, PROFINET device, DHCP option 82 relay agent, autocrossing, auto negotiation, Smart mode, Rapid Spanning Tree (RSTP), fast ring detection, Media Redundancy Protocol, SNTP, EtherNet/IP, multicast filtering with IGMP snooping, static VLAN (IEEE 802.1Q) and GVRP configuration, SNMP, CLI, authentication according to IEEE 802.1X, port-specific storm control for broadcast, multicast, and unicast

Extension station 8 ports

FL FXT
Order No. 2989307

Properties

Using the extension station, up to 8 additional ports can be connected to the Modular Managed Switch.

SFP module

FL SFP SX
Order No. 2891754

FL SFP LX
Order No. 2891767

FL SFP LX LH
Order No. 2989912

Transmission mode:

LC socket with 1000 Mbps

SFP SX: wavelength: 850 nm; transmission length: 550 m for 50/125 µm fiberglass, 300 m for 62.5/125 µm fiberglass

SFP LX: wavelength: 1310 nm; transmission length: 30 km for 9/125 µm fiberglass, 250 m for 62.5/125 µm fiberglass

SFP LX LH: wavelength: 1550 nm; transmission length: 80 km for 9/125 µm fiberglass

SD Flash card with Layer 3 or MRM

SD FLASH 512 MB
Order No. 2988120

FL SD FLASH/MRM
Order No. 2700270

FL SD FLASH/L3/MRM
Order No. 2700607

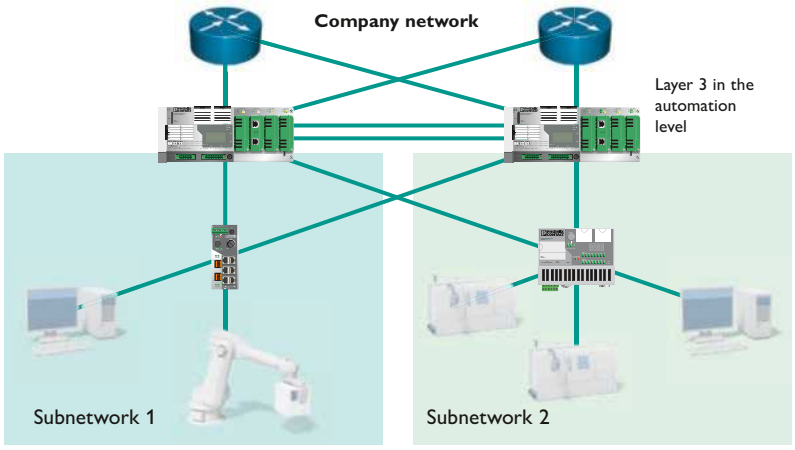
The **SD FLASH 512 MB** stores the configuration.

FL SD FLASH/MRM: This SD card not only stores switch configurations, but also includes the MRP master function. When the card is inserted, the FL SWITCH GHS becomes the master in the MRP ring.

FL SD Flash/L3/MRM: In addition to the two functions described above, this card also includes the Layer 3 function. This enables port-specific routing, VLAN-based routing, and the use of VRRP.

Layer 3 function

The Modular Managed Switch can be purchased with an integrated Layer 3 function or subsequently extended using an SD card with a Layer 3 license. This also means that the switch is able to support up to 28 instances of port-specific routing, static routing or the VRRP protocol for redundant router applications (Virtual Router Redundancy Protocol) (see graphic).



Twisted pair ports

FL IF 2TX VS RJ-F
Order No. 2832344

Properties

Replaceable interface module with 2 RJ45 ports, 10/100 Mbps, outlet direction forward

Certifications

ABS, cUL, cUL Ex LIS, GL, GLSW, DNV, UL, UL Ex LIS, BV

Twisted pair ports

FL IF 2TX VS RJ-D
Order No. 2832357

Replaceable interface module with 2 RJ45 ports, 10/100 Mbps, outlet direction downward

ABS, cUL, cUL Ex LIS, GL, GLSW, DNV, UL, UL Ex LIS, BV

Diagnostic function (SCRJ)

FL IF 2POF SCRJ-D
Order No. 2891084

Replaceable interface module with 2 POF/HCS ports, 650 nm, 10/100 Mbps, SCRJ connection, outlet direction downward

UL, cUL

Two SC multi-mode ports

FL IF 2FX SC-F
Order No. 2832412

Replaceable interface module with 2 SC multi-mode ports, 1300 nm, 100 Mbps full duplex, SC duplex connection, outlet direction forward

cUL, cUL Ex LIS, UL, UL Ex LIS, ABS

Two SC multi-mode ports

FL IF 2FX SC-D
Order No. 2832425

Properties

Replaceable interface module with 2 SC multi-mode ports, 1300 nm, 100 Mbps, SC duplex connection, outlet direction downward

Certifications

ABS, cUL, cUL Ex LIS, DNV, GL, GLSW, UL, UL Ex LIS, BV

Two SC single-mode ports

FL IF 2FX SM SC-D
Order No. 2832205

Replaceable interface module with 2 SC single-mode ports, 1300 nm, 100 Mbps, SC duplex connection, outlet direction downward

cUL, cUL Ex LIS, GL, GLSW, UL, UL Ex LIS, BV, DNV

Two ST multi-mode ports

FL IF 2FX SM ST-D
Order No. 2884033

Replaceable interface module with 2 ST multi-mode ports, 1300 nm, 100 Mbps, ST duplex socket, outlet direction downward

cUL, UL, UL Ex LIS, cUL Ex LIS

Two Power over Ethernet ports

FL IF 2SPE-F
Order No. 2832904

Replaceable interface module with Power over Ethernet IEEE 802.3af, Power Source Equipment (PSE), with 10/100 Mbps, outlet direction forward

cUL, cUL Ex LIS, UL, UL Ex LIS

Smart Managed Narrow NAT switch

The FL NAT SMN 8TX offers you switch functions and NAT routing in just one DIN rail device. The network devices within the machine communicate via seven LAN ports. The eighth port is used as the WAN port for the connection to the higher-level company network.

Your advantages:

- Particularly cost-effective thanks to switch and router function in one device
- Short configuration time thanks to optimum user interface
- Higher degree of availability thanks to support for redundant topologies
- Save space in the control cabinet with a design width of just 58 mm

The NAT switch supports the following functions:

- Choice of four router modes:
  - 1:1 NAT router
  - IP masquerading
  - Virtual routing
  - Static routing
- Filtering data traffic by isolating broadcast domains
- Redundancy mechanisms
  - Rapid Spanning Tree
  - Fast ring detection
  - Media Redundancy Protocol (MRP)
- Configuration via web-based management
- Port mirroring
- IP address assignment via BootP, DHCP or statically
- MEM PLUG support

Routing
Switching
NAT

Easy integration

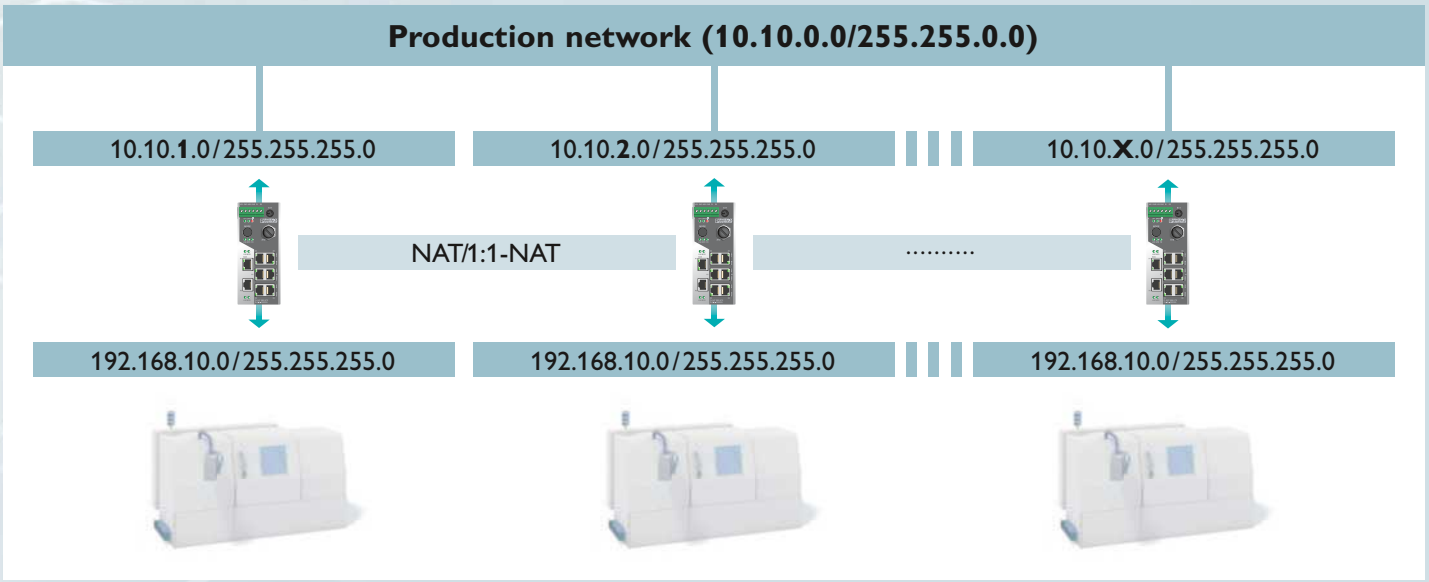
In order that machines can be integrated into a network, all Ethernet devices must use individual IP addresses from the same higher-level network.

The FL NAT SMN 8TX with integrated 1:1 NAT ensures that the address areas within the machine remain the same, but are jumpered to the desired IP address area for the higher-level automation network.

NAT switch

FL NAT SMN 8TX
Order No. 2989365

Ethernet interface	
Number of ports	8
Transmission speed	10/100 Mbps
Connection method	RJ45
Function	
Basic functions	Store-and-forward switch, complies with standard IEEE 802.3, BootP-compatible, Rapid Spanning Tree (RSTP), router, 1:1 NAT router, Spanning Tree 802.1d, Rapid Spanning Tree 802.1w, fast ring detection
Diagnostics	
Status and diagnostics indicators	2 status LEDs per port: LINK and selection of Status Activity, 100 Mbps, full duplex, supply voltage U_{S1} and U_{S2} (redundant supply voltage), and FAIL



Software –
Network management and diagnostics

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.

Display complex networks and their devices clearly with the latest generation of the FL VIEW software. You can therefore speed up error detection and get hold of your system data more quickly.

The SNMP-OPC products ensure reliable communication between network management tools, automation hardware, and visualization software.

Your advantages:

- Fast diagnostics thanks to continuous querying of the network devices
- Reduced downtimes and failure times thanks to a 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

FL VIEW
Network Overview

CONFIG+
Network Configuration

FL VIEW

FL VIEW 32 LITE
Order No. 2701744

FL VIEW 64
Order No. 2701472

FL VIEW 256
Order No. 2701473

FL VIEW 512
Order No. 2701474

Properties

- FL VIEW is a software product for detecting and monitoring industrial Ethernet networks with advanced features for PROFINET applications.
- FL VIEW automatically detects the topology and status of the networks and devices and transmits this in an animated realtime graphic.
- Different colors are used to display the status of network connections and network devices.
- Detection of the imminent failure of network components.

SNMP OPC SERVER

FL SNMP OPC SERVER V3
Order No. 2701139

FL SNMP OPC SERVER V3 LIC 100
Order No. 2701138

- The SNMP OPC server enables the integration of SNMP-compatible devices in any OPC-based HMI/ SCADA system, thus transforming it into an inexpensive industrial network management system. It is designed to gather important information about the device and the connected network.
- Monitoring and configuration of SNMP-compatible devices in HMI and SCADA systems.
- SNMP Version v1 and v2c supported
- OPC clients OPC Data Access 1.0A/2.0 and OPC AE 1.0A (Alarms and Events) supported
- Integrated MIB browser for quick integration of data points
- Support of device profiles for easy configuration

SNMP OPC AGENT

FL SNMP OPC AGENT V3
Order No. 2701136

FL SNMP OPC AGENT V3 LIC 100
Order No. 2701135

- The OPC SNMP agent enables seamless vertical integration of OPC-based/connected automation systems into existing SNMP management structures. It can be used, for example, to monitor the operating states of Field Controllers in central network management systems (e.g., HP OpenView, IBM Tivoli, etc.).
- Monitoring of OPC servers
- Access to OPC servers
- SNMP proxy agent
- SNMP Version V1 and V2c supported
- Creation of SNMP traps from OPC alarms

CONFIG+

CONFIG+ DEMO CD DVD-ROM
Order No. 2868046

CONFIG+ DVD-ROM
Order No. 2868059

CONFIG+ CPY Copy license
Order No. 2868062

- Config+ enables the connection of third-party software via FDT interface, whereby special device user interfaces for company or third-party devices (DTMs) can be integrated directly and the corresponding devices can be parameterized. The integrated diagnostic functions offered by Diag+ ensure fast and clear error localization in the event of an error.
- Project transfer to SafetyProg
- Configuration of Ethernet configurations
- Configuration of address assignment
- Configuration of multi-master projects
- Comparison of real and configured bus configurations

Consistent automation

The FL VIEW software automatically detects the network structure and devices of your system and displays them clearly. Different colors are used to indicate the status of network devices and connections. Long-term monitoring means that even past events can be identified and temporary errors can be analyzed.

Standard Managed Switches 3000 series

The series 3000 standard Managed Switches offer you optimum performance and availability for demanding infrastructure applications. The standard Managed Switches support a range of IEEE standards and IT functions for consistent integration into your network structures. Special attention has been given to user-friendly operation and configuration.

Your advantages:

- Ideally suited to demanding infrastructure applications thanks to versions with an extended temperature range
- High availability thanks to rapid redundancy switch-over in less than 15 ms
- Fiber optic versions for error-free communication over large distances
- Easy configuration and diagnostics thanks to user-friendly web-based management

Standard Managed Switches

FL SWITCH 3005
Order No. 2891030

FL SWITCH 3005T
Order No. 2891032

- 5 RJ45 ports

FL SWITCH 3008
Order No. 2891031

FL SWITCH 3008T
Order No. 2891035

- 8 RJ45 ports

Standard Managed Switches

FL SWITCH 3016
Order No. 2891058

FL SWITCH 3016T
Order No. 2891059

- 16 RJ45 ports

Standard Managed Switches

FL SWITCH 3004T-FX
Order No. 2891033

- 4 RJ45 ports, 1 fiber optic port with SC connection

FL SWITCH 3004T-FX ST
Order No. 2891034

- 4 RJ45 ports, 1 fiber optic port with ST connection

Standard Managed Switches

FL SWITCH 3006T-2FX
Order No. 2891036

- 6 RJ45 ports, 2 fiber optic ports with SC connection

FL SWITCH 3006T-2FX ST
Order No. 2891037

- 6 RJ45 ports, 2 fiber optic ports with ST connection

FL SWITCH 3006T-2FX SM
Order No. 2891060

- 6 RJ45 ports, 2 fiber optic ports with SC connection, single mode

Technical features

Store-and-forward switch, complies with standard IEEE 802.3, autocrossing, auto negotiation, port mirroring, BootP & DHCP, SNTP, IGMP snooping, GMRP, 256 multicast groups, 64 VLANs, GVRP, trunking, QoS (4 queues), Diff Serve, ToS, CoS/configuration: web-based management, web adaptation to unique user, integrated help pages, SNMP (V1, V2, V3), serial interface, Telnet/security: user accounts, port security (24 MAC addresses/port) IEEE 802.1X Radius authentication, HTTPS

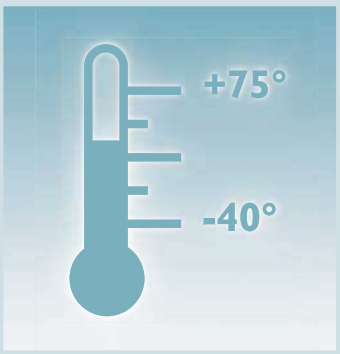
T versions with extended temperature range of -40°C – +75°C

Easy diagnostics

Easy configuration and diagnostics via web-based management, SNMP, and V.24.

User-oriented WBM

Configurable web pages and user roles provide an overview.



Extended temperature range

The extended temperature range enables universal use.

Standard Managed Switches 4000 series

You can implement infrastructure networks with high-performance Gigabit data transmission using series 4000 standard Managed Switches. They are particularly suitable for connecting distributed devices in the field to the control level, thanks to integrated IT functions and high data throughput. The extended ring redundancy with recovery times of less than 15 ms ensures high availability.

Your advantages:

- High-performance Gigabit data transmission
- Optimum integration of the network components in the company IT networks
- High availability thanks to rapid redundancy switch-over in less than 15 ms
- Easy configuration and diagnostics thanks to user-friendly web-based management

Gigabit-Trunk-Ports

Standard Managed Switches

FL SWITCH 4008T-2SFP
Order No. 2891062
- 8 RJ45 ports, 2 SFP ports

Standard Managed Switches

FL SWITCH 4008T-2GT-4FX SM
Order No. 2891061
- 8 RJ45 ports, 2 of which with Gigabit interface, 4 fiber optic ports, single mode (40 km), with SC connection

FL SWITCH 4008T-2GT-3FX SM
Order No. 2891160
- 8 RJ45 ports, 2 of which with Gigabit interface, 3 fiber optic ports, single mode (40 km), with SC connection

Standard Managed Switches

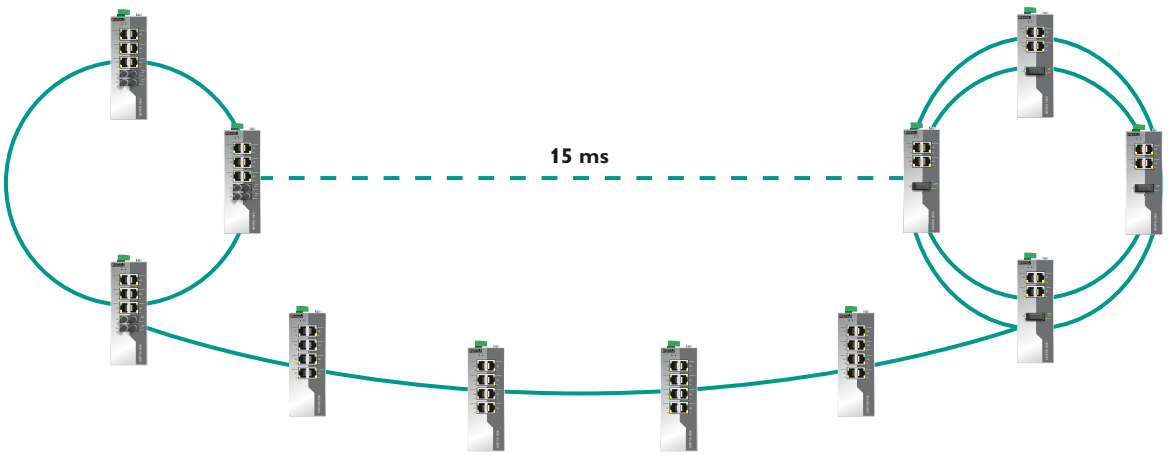
FL SWITCH 4012T-2GT-2FX
Order No. 2891063
- 12 RJ45 ports, 2 of which with Gigabit interface, 3 fiber optic ports with SC connection

FL SWITCH 4012T-2GT-2FX ST
Order No. 2891161
- 12 RJ45 ports, 2 of which with Gigabit interface, 2 fiber optic ports, multi mode, with ST connection

Technical features

Store-and-forward switch, complies with standard IEEE 802.3, autocrossing, auto negotiation, port mirroring, BootP & DHCP, SNTP, IGMP snooping, GMRP, 256 multicast groups, 64 VLANs, GVRP, trunking, QoS (4 queues), Diff Serve, ToS, CoS/configuration: web-based management, web adaptation to unique user, integrated help pages, SNMP (V1, V2, V3), serial interface, Telnet/security: user accounts, port security (24 MAC addresses/port) IEEE 802.1X Radius authentication, HTTPS

T versions with extended temperature range of -40°C – +75°C



Extended ring redundancy

In critical infrastructure applications, the function offers a quick redundancy switch-over in the event of connection failure.

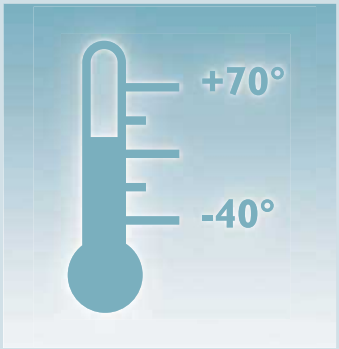
- 15 ms maximum recovery time for up to 200 devices in a ring
- Up to three linked rings with up to 600 switches supported
- Dual redundant rings for maximum fault tolerance

Network infrastructure for energy systems

Network your energy system – with robust network infrastructure from Phoenix Contact. Our switches, media converters, and redundancy modules are suitable for the harshest ambient conditions according to IEC 61850-3 and IEEE 1613 and ensure high availability.

Your advantages:

- Suitable for use under the harshest electromagnetic, electrostatic, and climatic ambient conditions
- Reliable, error-free data transmission over long distances thanks to fiber optic technology
- Fast redundancy mechanisms for high availability
- Wear-free and maintenance-free thanks to fanless device design



Robust

Extended temperature range, impact resistance, shock resistance, and vibration resistance ensure that the products are particularly robust.

Reliable

The products are resistant to electrostatic discharge (ESD), fast, transient disturbance variables (burst), surge voltages (surge), and magnetic fields.

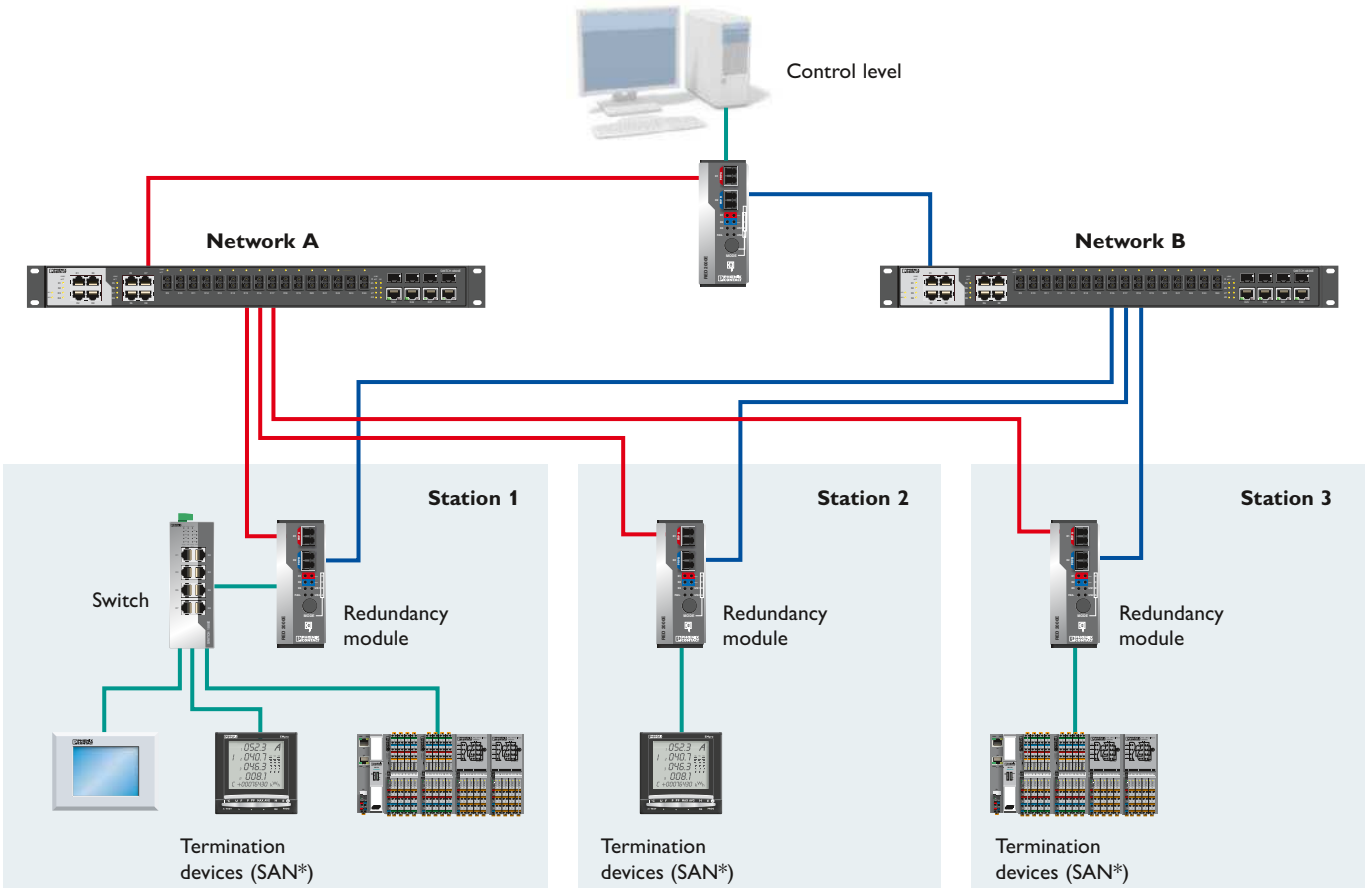
Available

Uninterrupted operation, even when voltage fluctuations occur, increases availability.

Robust Ethernet infrastructure for energy systems:

- Switches in 19" format and for the DIN rail
- Media converter for interference-free fiber optic connections
- Redundancy modules for maximum availability thanks to parallel network redundancy

Parallel network redundancy with PRP



*SAN = Single Attached Node

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

The advantages:

- Integration of non-PRP-capable devices in parallel networks for maximum availability
- No recovery times for uninterrupted operation in the event of an error (0 ms)
- No loss of packets in the event of network failure or failure of individual network components

Managed Switches for 19" cabinets (without power supply)

FL SWITCH 4824E-4GC
Order No. 2891072
- 24 RJ45 ports and 4 Gigabit combo ports

FL SWITCH 4808E-16FX LC-4GC
Order No. 2891073
- 8 RJ45 ports, 16 LC multi-mode ports, and 4 Gigabit combo ports

FL SWITCH 4808E-16FX SM40 LC-4GC
Order No. 2891074
- 8 RJ45 ports, 16 LC single-mode ports, and 4 Gigabit combo ports

FL SWITCH 4808E-16FX-4GC
Order No. 2891079
- 8 RJ45 ports, 16 SC multi-mode ports, and 4 Gigabit combo ports

FL SWITCH 4808E-16FX SM-4GC
Order No. 2891080
- 8 RJ45 ports, 16 SC single-mode ports, and 4 Gigabit combo ports

Store-and-forward switch, extended ring and IEEE redundancy, multicast control, IGMP snooping, trunking, Port and Tagging VLANs, Port and IEEE 802.1x security, SNMP V3, user accounts

Managed Switches for the DIN rail

FL SWITCH 3016E
Order No. 2891066
- 16 RJ45 ports

FL SWITCH 3012E 2SFX
Order No. 2891067
- 12 RJ45 ports, 2 100 Mbps SFP ports

Unmanaged Switch

FL SWITCH 1008E
Order No. 2891065
- 8 RJ45 ports

Store-and-forward switch, LED diagnostics, alarm signal contact, connection diagnostics which can be adjusted via DIP switches

PRP redundancy modules

FL RED 2003E PRP
Order No. 2701863
- 2 RJ45 ports as redundancy ports, 1 RJ45 port for termination device

FL RED 2001E PRP 2LC
Order No. 2701864
- 2 LC multi-mode ports as redundancy ports, 1 RJ45 port for termination device

Media converters

FL MC 2000E LC
Order No. 2891056
- 1 RJ45 port and 1 LC multi-mode port

FL MC 2000E SM40 LC
Order No. 2891156
- 1 RJ45 port and 1 LC single-mode port

Modular power supply for 19" switches

FL SWITCH 4000E-P1
Order No. 2891075
- Voltage range: 48 V DC

FL SWITCH 4000E-P5
Order No. 2891076
- Voltage range: 110 V, 220 V DC, AC

SFP modules

FL SFP FX multi mode
Order No. 2891081 100 Mbps

FL SFP FX SM single mode
Order No. 2891082 100 Mbps

FL SFP SX multi mode
Order No. 2891754 1000 Mbps

FL SFP LX single mode
Order No. 2891767 1000 Mbps

FL SFP LX single mode
Order No. 2989912 long haul 1000 Mbps

Media converters for optical 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 makes it possible to convert numerous industrial applications. In addition to this, the media converters offer comprehensive diagnostic options, increasing system availability.

Advantages of optical communication

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

Technology for every application

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

WDM – one fiber, numerous possibilities

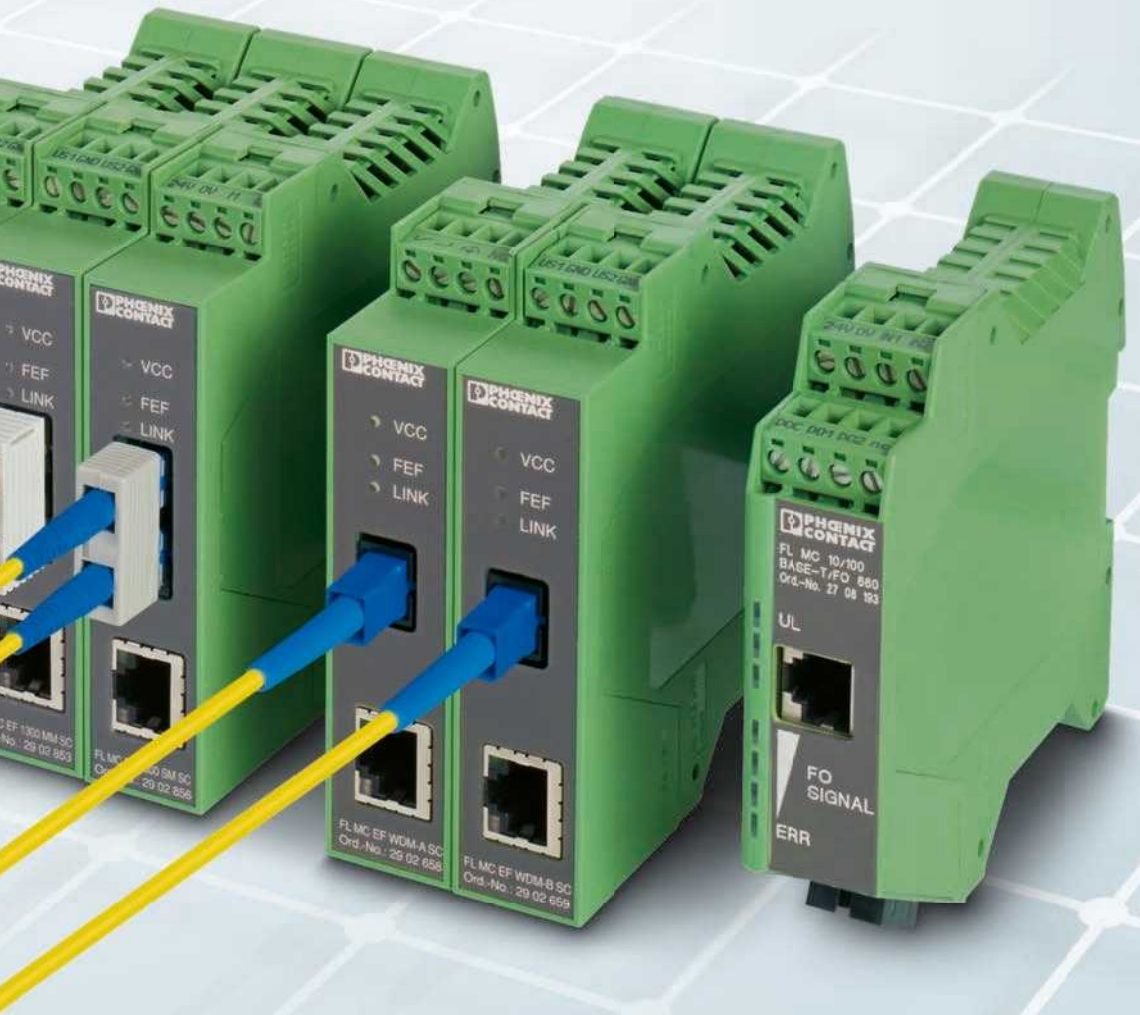
Bidirectional transmission using a single optical fiber for rotating applications.

High system availability

Fiber optic diagnostics with LED bar graph for continuous diagnostics.

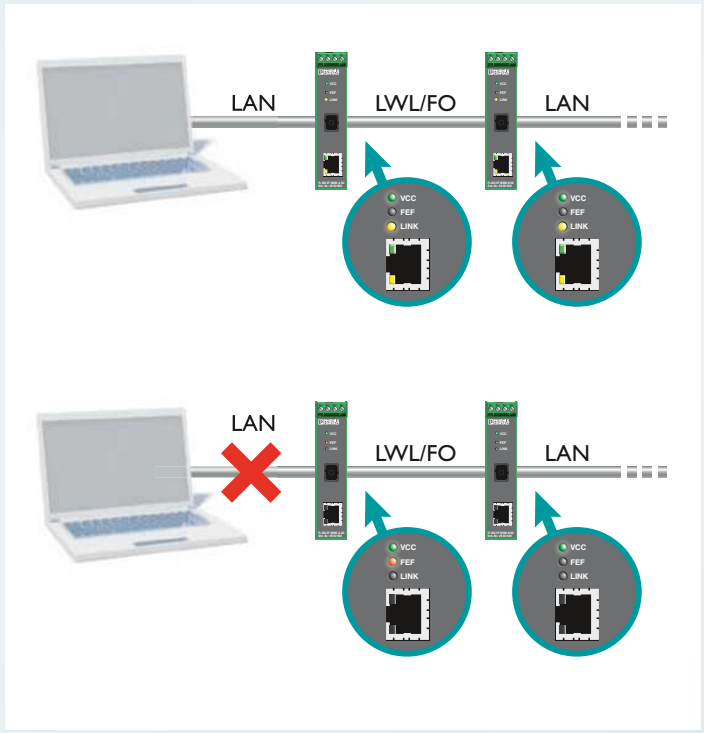
The alternative solution for copper transmission

When copper cables reach their limits, this is where optical transmission comes into play. Fast Ethernet media converters from Phoenix Contact provide the right device for every application.



Use in time-critical applications

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



Fast diagnostics in the event of a malfunction

In addition to numerous diagnostics LEDs, the media converter also has the link management function (link fault pass through). This provides permanent connection monitoring. Both sides of the network connection can therefore detect a lost link immediately. The entire connection over the optical path is therefore as transparent as it would be were communication purely copper-based. In the event of a network interruption, the transmission path is switched off. Redundancy mechanisms can be used directly. In the event of an error, this keeps the network load low and increases system availability.

In addition, when the FEF (far end fault) function signals a lost link to the media converters, this also enables the faulty segment to be localized.

HCS(PCF) fibers for triple the transmission distance

With the special structure of its mixed fiber, the HCS gradient index fiber allows you to combine the advantages of two cables. Like fiberglass, it offers much larger ranges than a standard polymer or HCS(PCF) fiber. But the HCS GI fiber can be assembled in the field easily and quickly, in a similar way to a conventional plastic fiber.

FO converter Standard

FL MC EF 1300 MM SC
Order No. 2902853

FL MC EF 1300 MM ST
Order No. 2902854

FL MC EF 1300 SM SC
Order No. 2902856

Properties

- 1300 nm light wavelength
- Devices for multi-mode or single-mode fibers and various connection technologies, SC and B-FOC(ST)
- LFTP (link fault pass through) and FEF (far end fault) diagnostic functions for continuous link monitoring for optimum availability
- Auto negotiation and auto MDI (x) for easy startup
- Ex approval for use in potentially explosive areas

FO converter POF/HCS fibers

FL MC 10/100 BASE-T/FO 660
Order No. 2708193

- 660 mm light wavelength
- For distances up to 300 m with easy-to-use POF/HCS technology
- Bar graph function for permanent monitoring of optical connection and two potential-free relay outputs
- Pass through mode with short latency for time-critical applications

FO converter Single fiber

FL MC EF WDM-SET
Order No. 2902660

FL MC EF WDM-A SC
Order No. 2902658

FL MC EF WDM-B SC
Order No. 2902659

- 1310/1550 nm light wavelength
- Modulation of two light wavelengths on one optical fiber thanks to WDM (wavelength division multiplex) technology
- Full duplex communication using only one glass fiber
- Devices are used as a set
- Single-fiber transmission of optical signals in rotating applications with optical slip rings
- Save on cable fibers and plugs and also double the bandwidth of existing cable connections

FO converter Short latency

FL MC 2000T SC
Order No. 2891315

FL MC 2000T ST
Order No. 2904816

FL MC 2000T SM20 SC
Order No. 2904817

FL MC 2000T SM40 SC
Order No. 2904818

- 1300 nm light wavelength
- Robust design in metal housing for EMC requirements
- Devices for multi-mode and single-mode fibers, up to 40 km
- SC duplex and B-FOC(ST) connection
- Redundant power supply
- Can be switched between store-and-forward with auto negotiation and pass through operating mode with short latency for time-critical applications

Bidirectional transmission via a single optical fiber

The FL MC EF WDM series media converters enable full duplex communication with a single glass fiber via WDM technology. With the wavelength division multiplex method, two different wavelengths (1310/1550 nm) enable data to be transmitted and received (bidirectionally) – without limiting the transmission quality and bandwidth.

In rotating applications, the WDM media converters allow the installation of optical rotary joints, which are designed for a single optical fiber and have a cost advantage over fiber optic rotary transformers for multiple fibers.

Single-fiber media converters are particularly suitable for bidirectional transmission for rotating applications.

Power over Ethernet (PoE) – Power and data transmission via Ethernet connections

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

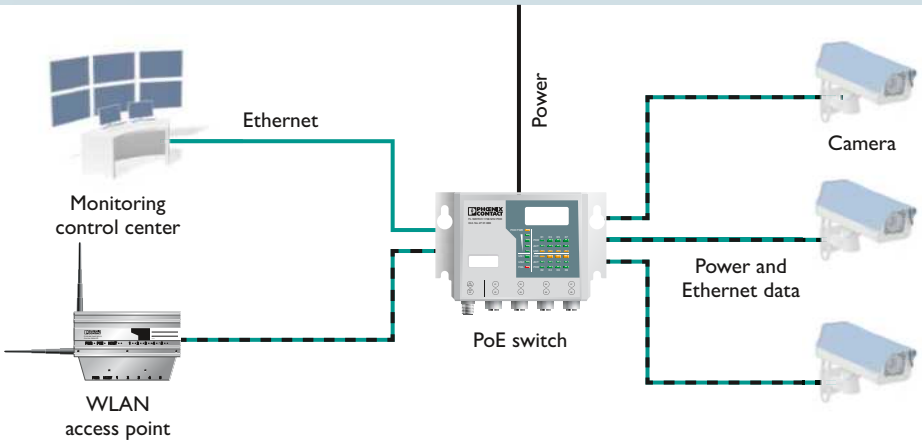
Your advantages:

- Easy device installation even at difficult-to-access places thanks to reduced cabling effort
- No additional power supply unit required for termination devices thanks to PoE on all ports
- Non-proprietary use supported thanks to standardization according to IEEE 802.3
- Fast retrofitting of existing systems thanks to easy handling

	IP67 Power over Ethernet switch	Power-over-Ethernet switch	Power over Ethernet module
	FL SWITCH 1708-POE Order No. 2701883 8 M12 PoE ports	**FL SWITCH 1001T-4POE** Order No. 2891064 4 RJ45 PoE ports	**FL PSE 2TX** Order No. 2891013 2 RJ45 PoE ports
Properties			
Function	Store-and-forward switch, auto negotiation, complies with standard IEEE 802.3, 4 priority classes according to IEEE 802.1p, PoE according to IEEE 802.3at/802.3af, jumbo frames up to 9720 bytes	Unmanaged switch/auto negotiation, complies with standard IEEE 802.3at	Simultaneous transmission of power and data on one Ethernet cable according to IEEE 802.3af
Copper Ethernet interface			
Transmission speed	10/100/1000 Mbps	10/100 Mbps	10/100 Mbps
Cable length	100 m	100 m (twisted pair)	100 m (between transmitter and receiver)
Power supply			
Supply voltage	24 V DC M12, T-coded	24 V DC (redundant)	24 V DC
Typical current consumption	300 mA (at U_S = 24 V DC) + PoE load	440 mA (at U_S = 24 V DC) + PoE load	approximately 100 mA, in no-load operation; approximately 1800 mA, with 24 V DC at the input and with maximum permissible load and 25°C ambient temperature

Integrate cameras easily

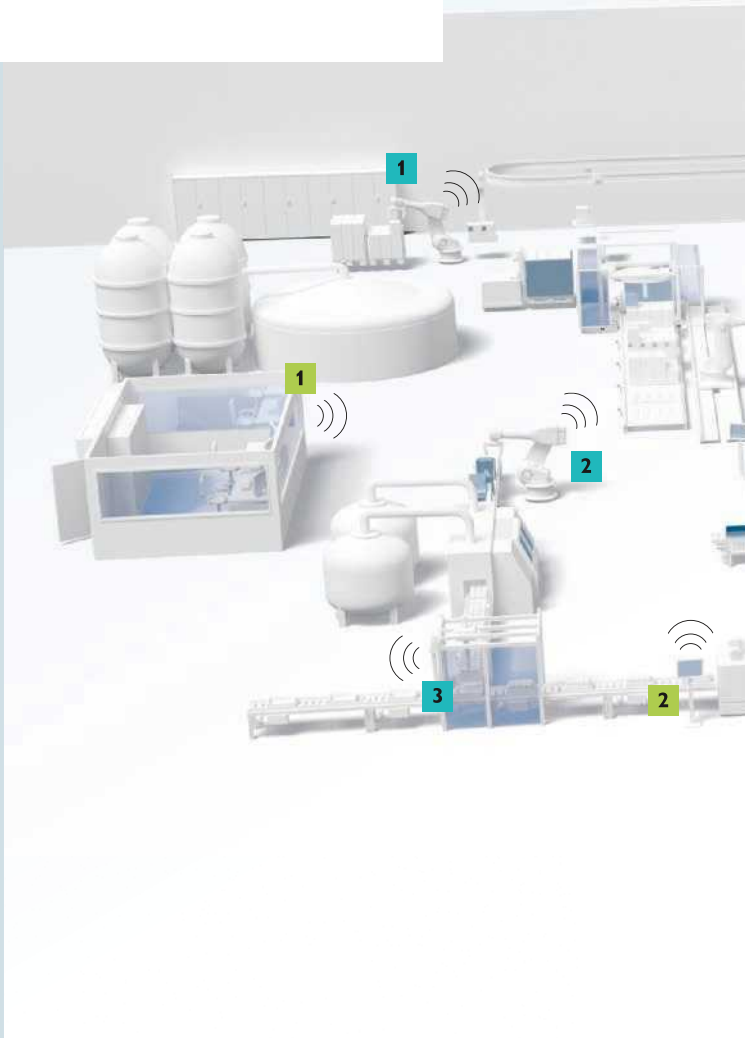
Integrate Power over Ethernet devices such as Gigabit cameras into your network without a control cabinet or additional supply voltage with the FL SWITCH 1708 M12 PoE. Thanks to its robust IP67 housing, you can install this communication node exactly where it is needed.



Wireless Ethernet

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

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



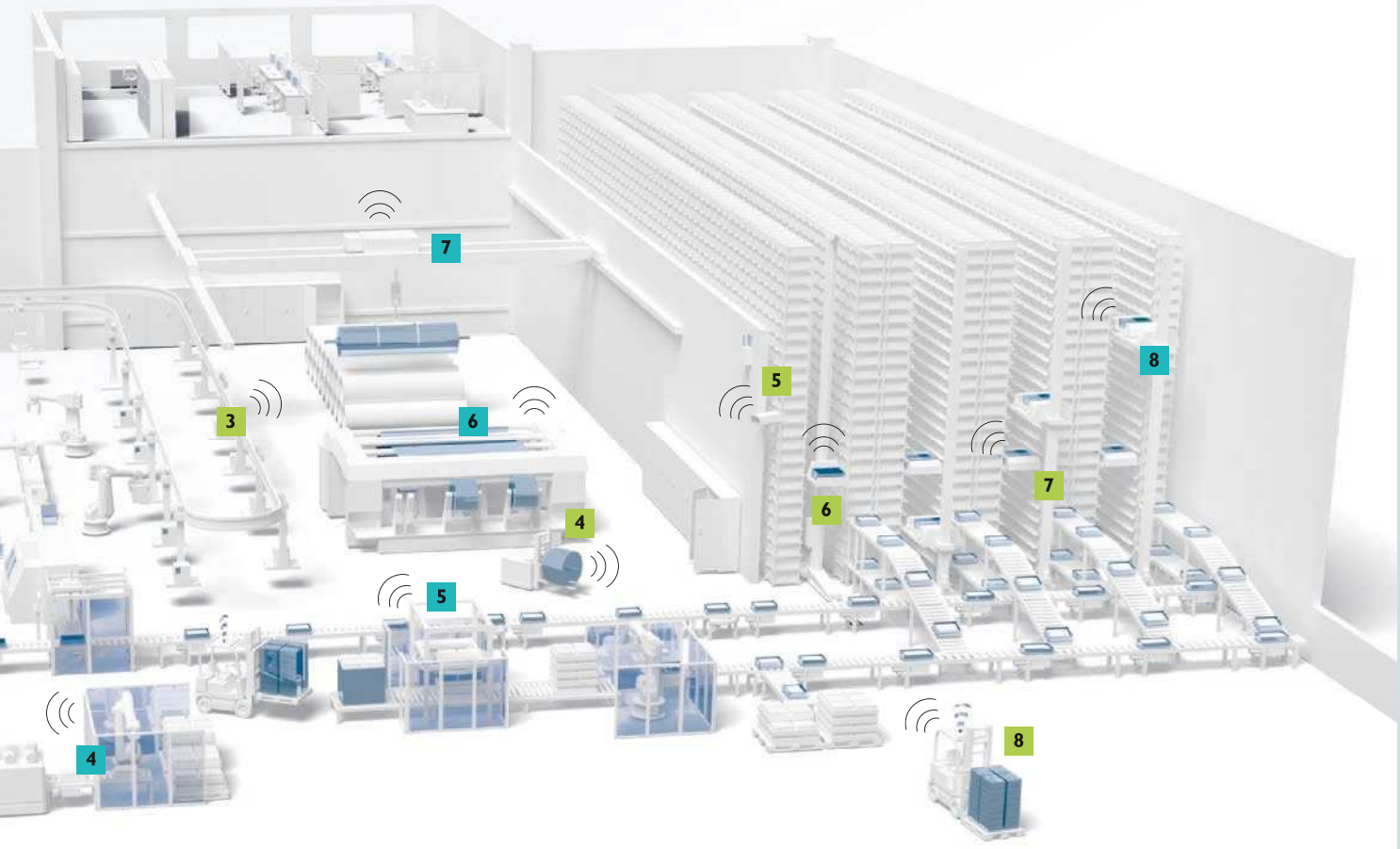
Your advantages:

- Easy and reliable communication with mobile or difficult-to-access automation devices such as controllers or I/O modules
- Location-independent realtime access to network resources simplifies maintenance and reduces service costs and downtimes
- Easy and inexpensive construction of wireless network

Reliable wireless communication for mobile automation systems

- Numerous industrial wireless applications are already in use and have proven their reliability even under the harshest conditions
- Safe wireless communication can also be achieved via SafetyBridge or PROFINET with PROFIsafe
- A comprehensive range of antennas means you can use the optimum antenna technology for any application

Typical areas of application for wireless Ethernet



Bluetooth

1 Robots
2 Process robots
3 Handling machines
4 Packaging machines
5 Pallet wrapping machines
6 Moving machine parts
7 Cranes
8 Lifting equipment

Wireless LAN

1 Mobile maintenance
2 Terminals
3 Electric monorail systems
4 Automated guided vehicle systems
5 Video monitoring
6 Stacker crane
7 Warehouse shuttles
8 Fork-lift truck

Bluetooth for wireless device integration in industrial control networks

- Extremely robust wireless transmission even under harsh ambient conditions
- Ideal for replacing an Ethernet cable connection (point-to-point connection) to a moving or difficult-to-access automation device with a wireless solution
- Interference-free parallel operation with WLAN networks thanks to extended coexistence functions
- Parallel operation of numerous Bluetooth systems thanks to efficient frequency usage
- High working range – up to 250 m in free field

Wireless LAN for a system-wide wireless infrastructure

- Sufficient reserves even for data-intensive applications thanks to fast data rates up to 300 Mbps
- MIMO antenna technology (multiple input, multiple output) for high reliability and performance in wireless communication in industrial, metal environments
- Devices move freely in the network thanks to fast roaming

Wireless Ethernet – Industrial WLAN

The industrial WLAN modules combine robust industrial technology with high performance and modern MIMO (multiple input, multiple output) antenna technology. The central cluster management at the WLAN 5100 access point makes the configuration and maintenance of larger WLAN networks considerably easier. Using the Ethernet adapters, you can integrate automation components such as controllers or I/O modules into the WLAN network quickly and easily.

Your advantages:

- Space-saving installation thanks to very compact device design
- Quick and easy startup
  - Great distances thanks to high transmission power
  - Optimized for operation in PROFINET and EtherNet/IP networks
  - Reliable wireless communication thanks to MIMO technology
  - Compatible with standards IEEE 802.11 a/b/g/n

WLAN 5100 access point

FL WLAN 5100
Order No. 2700718

FL WLAN 5101
Order No. 2701093
- For USA and Canada

FL WLAN 5102
Order No. 2701850
- For Japan

SD-FLASH 2 GB
Order No. 2988162

WLAN Ethernet adapter

FL WLAN EPA
Order No. 2692791
- Integrated antenna IEEE 802.11b/g/n, 2.4 GHz

FL WLAN EPA 5N
Order No. 2700488
- Integrated antenna IEEE 802.11a/n, 5 GHz

FL WLAN EPA RSMA
Order No. 2701169
- External, replaceable omnidirectional antenna

Control box sets

FL RUGGED BOX OMNI-1
Order No. 2701430
- With omnidirectional antennas

FL RUGGED BOX OMNI-2
Order No. 2701439
- With omnidirectional antennas and power supply unit

FL RUGGED BOX DIR-1
Order No. 2701440
- With panel antenna

FL RUGGED BOX
Order No. 2701204
- Without antenna accessories

Antenna accessories

ANT-DIR-2459-01
Order No. 2701186
- Panel antenna, 2.4/5 GHz, N connection

RAD-ISM-2459-ANT-FOOD-6-0
Order No. 2692526
- Omnidirectional antenna, 2.4/5 GHz, vandalism proof, N connection

RAD-PIG-RSMA/N-2
Order No. 2903265
- Antenna cable, 2 m long, N (male) > RSMA (male) connection

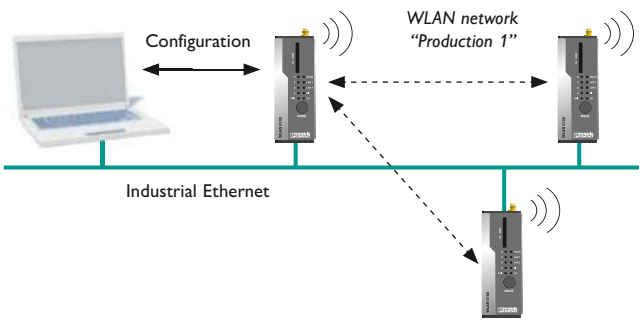
Technical features

IEEE 802.11 a/b/g/n, WLAN access point, client, repeater, frequency band 2.4 GHz and 5 GHz, MIMO technology 3 x 3:2, up to 300 Mbps, cluster management

WLAN client, IEEE 802.11n, MIMO technology 1 x 1:1, IP65, M12 connections, power supply 9 – 30 V DC, operating mode: single-client and multi-client

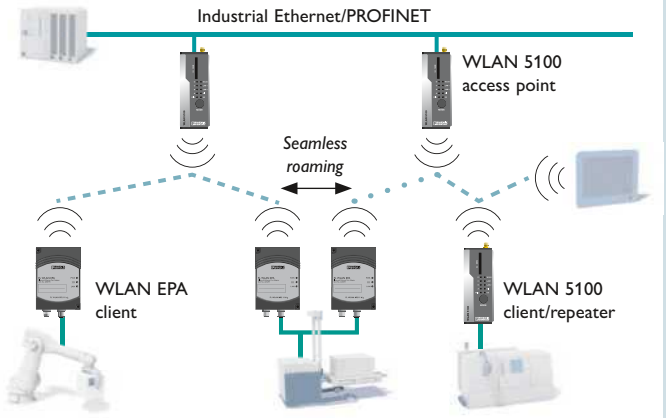
Control box set for constructing wireless systems for industrial applications, IP65, with DIN rail, plugs, and screw connections

Omnidirectional and panel antennas, IP68, other antennas and accessories at phoenixcontact.com



Cluster management makes things easier

Cluster management, a feature of WLAN 5100, enables the quick configuration and startup of all access points via a single web interface.



Typical WLAN network structure

The WLAN EPA enables interruption-free roaming in duo mode.

Wireless Ethernet – Industrial Bluetooth

The industrial Bluetooth modules allow you to wirelessly transmit control data to mobile or difficult to access automation devices quickly and easily. Bluetooth communication is characterized by particularly robust transmission under difficult ambient conditions. This allows you to establish functionally safe communication via PROFIsafe or SafetyBridge technology.

Your advantages:

- Interference-free parallel operation with WLAN networks thanks to adaptive frequency hopping (AFH), low emission mode (LEM), and black channel list (BCL)
- Quick and easy startup using the MODE button
- Integrated special antennas for reliable wireless connections in industrial environments (only EPA and EPA AIR SET)
- Optimized for operation in PROFINET networks
- Protected against manipulation and tapping thanks to encrypted communication
- High working range of up to 250 m
- Ethernet access point for Bluetooth devices which support PAN (Personal Area Network) Bluetooth profiles

SafetyBridge Technology

Designed by PHOENIX CONTACT

Bluetooth Ethernet adapter

FL BT EPA
Order No. 2692788

- Internal antenna, max. 1 wireless connection

Bluetooth Ethernet adapter set

FL BT EPA AIR SET
Order No. 2693091

- Solution set consisting of: 2 x FL BT EPA, cable, and plug, internal antennas

Bluetooth access point

FL BT EPA MP
Order No. 2701416

- External, replaceable antenna (supplied), RSMA (male) connection, max. 7 wireless connections

Antenna accessories

RAD-ISM-2400-ANT-VAN-3-0-RSMA
Order No. 2701358

- Omnidirectional antenna, vandalism proof, 3 dBi gain

RAD-ISM-2400-ANT-OMNI-2-1-RSMA
Order No. 2701362

- Omnidirectional antenna, 2 dBi gain

Technical features

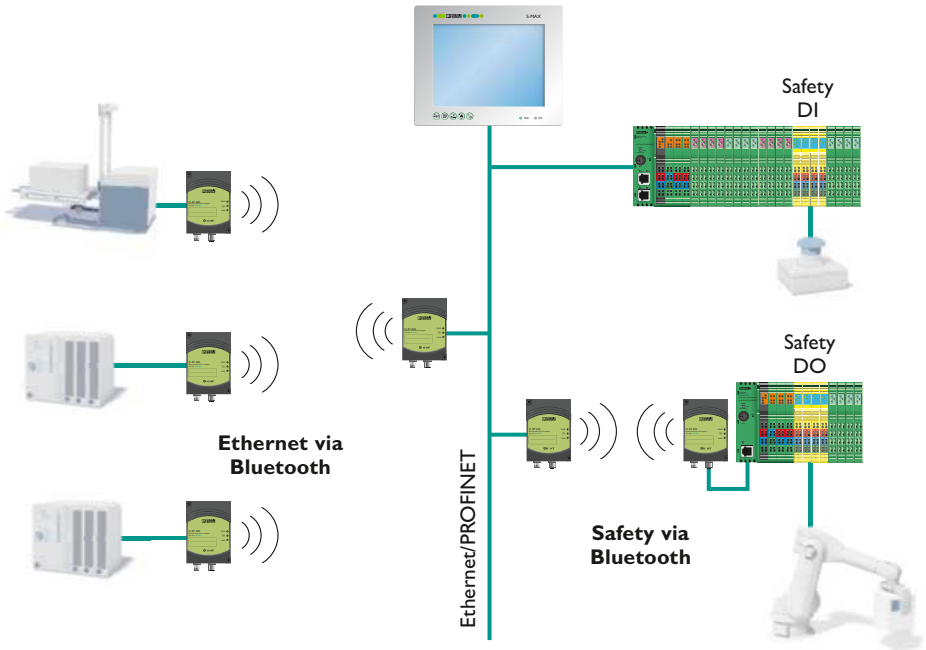
Bluetooth V2.1+EDR, frequency band 2.4 GHz, WLAN Black Channel List, Low Emission Mode (LEM), IP65 protection, M12 connections for voltage and LAN, power supply 9 – 30 V DC, autocrossing, PROFINET prioritizing, LLDP, 128-bit data encryption, ambient temperature -40°C – +65°C, web interface, SNMP, AT commands, UL/cUL Class 1 Div 2 hazardous location

Omnidirectional antennas with cables for FL BT EPA MP for remote mounting. Other antennas at phoenixcontact.com

Bluetooth applications

The Bluetooth BT EPA modules replace individual Ethernet or PROFINET cables leading to automation devices with a reliable wireless connection.

The BT EPA MP enables up to seven Bluetooth modules to be connected to the Ethernet network at the same time.

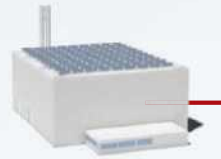


Security for industrial networks

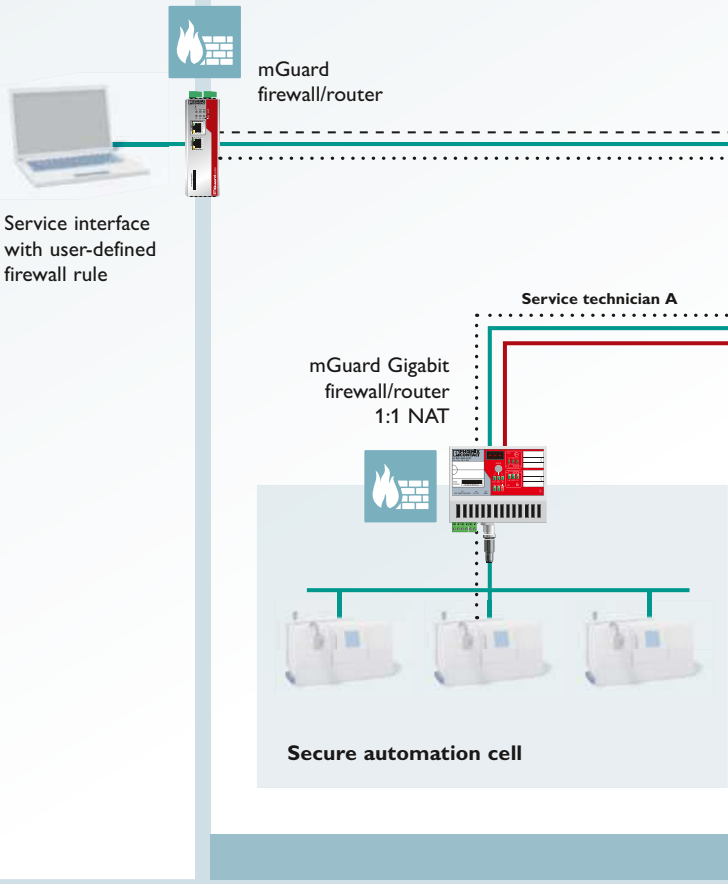
Failures, sabotage or data loss can lead to a great deal of economic damage. Secure your production with the mGuard industrial firewall/router solution from Phoenix Contact.

Based on a robust operating system, the mGuard industrial security product range offers perfectly coordinated security components: a bidirectional firewall, a flexible NAT router, a high-security VPN router, and industrial protection against malware as an option.

We are happy to assist you in creating a security concept for your network on request.



Secure site networking via VPN

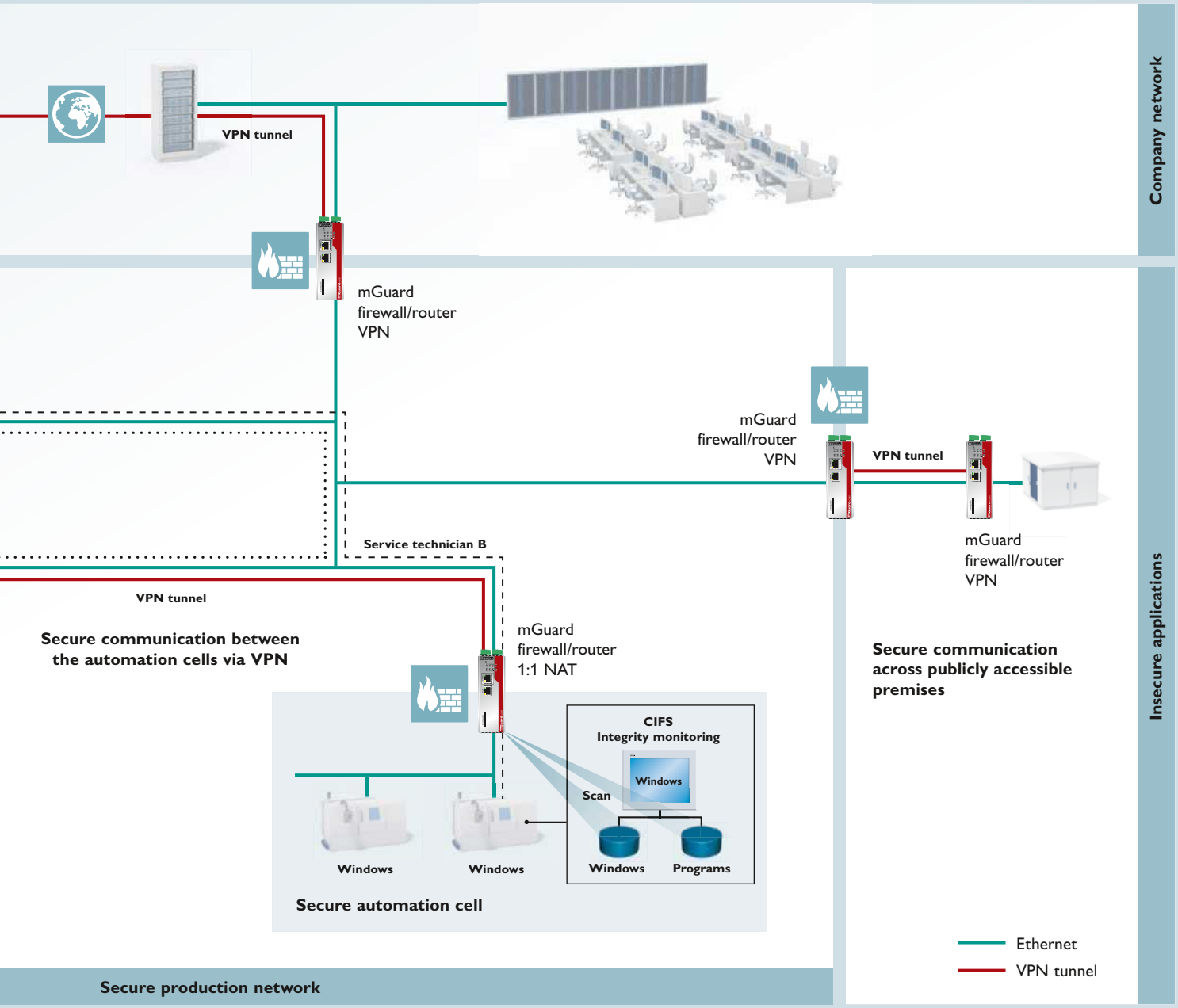


Your advantages:

- Network segmentation in protected automation cells
- Reduced susceptibility of the production system to interference and increased availability
- Protects production or automation cells against the operator network and vice versa
- Easy and secure integration of machines into customer networks

Secure connection of automation cells to the production network thanks to mGuard firewall and VPN

- Monitoring and filtering of the data traffic to and from the protected production and automation cells thanks to predefined firewall rules
- Secure communication between the automation cells via VPN tunnel with IPsec
- Stateful inspection firewall for dynamic filtering
- High data throughput thanks to high-performance hardware and hardware-based encryption



Secure virus protection for Windows PCs thanks to mGuard CIFS Integrity Monitoring

- Dynamic monitoring of Windows-based automation systems (controller, operator interface, PC)
- Secure and reliable detection of changes and manipulations to files
- No virus patterns or regular updates required
- Low system loads and no influence on the realtime process
- Ideal for protecting computers with operating systems for which support has been set up (e.g., Windows XP)

High-performance routing and easy machine integration via 1:1 NAT

- Virtual addressing (1:1 NAT) for easy integration of machines of the same design with an identical IP address area in the production network
- Increased reliability thanks to network that is structured into various subnetworks (routing)
- High data throughput thanks to high-performance hardware
- Latest certificates supported (x509.v3)

Industrial security – Routers with integrated firewall

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

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

Your advantages:

- VPN, routing, and firewall in just one device
- High-performance encryption for the secure transmission of sensitive data
- Configuration memory for easy device replacement
- Management software for central configuration of remote devices

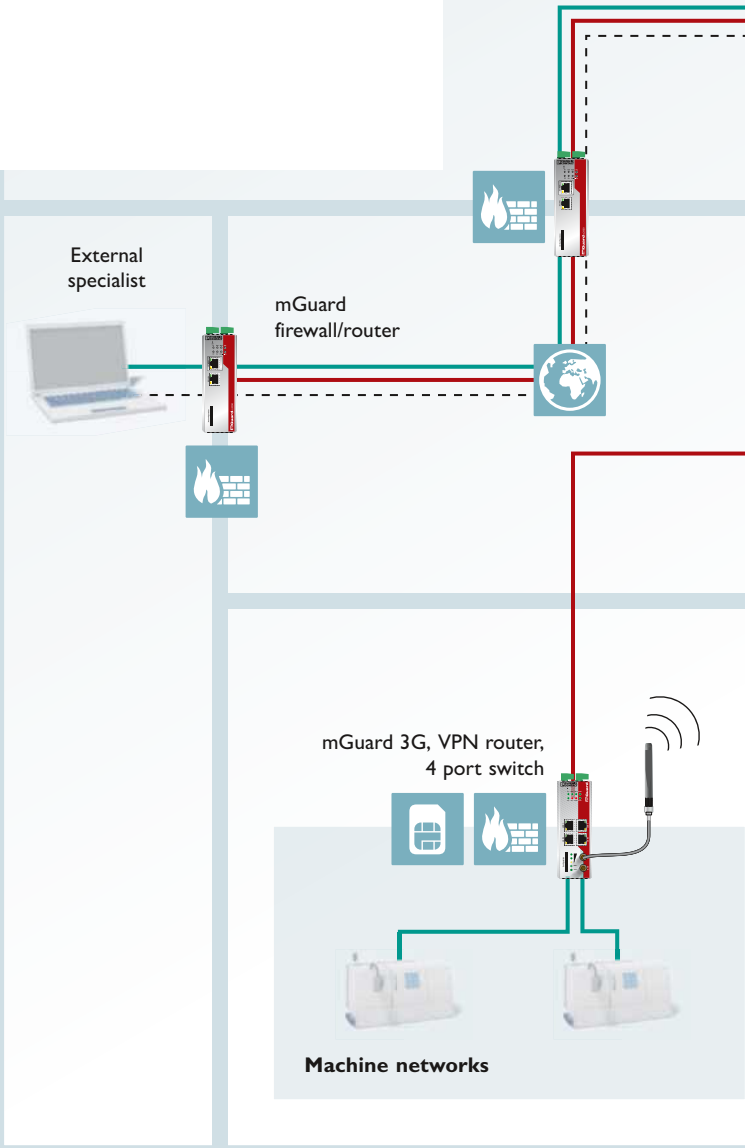
	2-click firewall/ router	Firewall/ router	Gigabit firewall/ router
	FL MGUARD RS2000 TX/TX VPN Order No. 2700642	**FL MGUARD RS4000 TX/TX** Order No. 2700634 **FL MGUARD RS4000 TX/TX VPN** Order No. 2200515	**FL MGUARD GT/GT** Order No. 2700197 **FL MGUARD GT/GT VPN** Order No. 2700198
Ethernet interface			
Copper interface	2 RJ45 ports, 10/100 Mbps	2 RJ45 ports, 10/100 Mbps	2 RJ45 ports, 10/100/1000 Mbps
Fiber optic interface	–	–	2 SFP ports, 1000 Mbps
Function			
Routing	1:1 NAT, NAT, port forwarding, standard routing	1:1 NAT, NAT, port forwarding, standard routing	1:1 NAT, NAT, port forwarding, standard routing
Firewall	Simple 2-click firewall	Stateful inspection firewall, separate incoming and outgoing rules	Stateful inspection firewall, separate incoming and outgoing rules, also filtering for fiber optics
VPN	Up to 2 parallel tunnels, secure encryption according to IPsec standard	Up to 10 parallel tunnels (optionally up to 250), secure encryption according to IPsec standard	

Central management software	CIFS – Integrity Monitoring	Firewall/router for mobile applications	Firewall/router with PCI connection
FL MGUARD DM 100 Order No. 2700183 **FL MGUARD DM UNLIMITED** Order No. 2981974	**FL MGUARD LIC CIM** Order No. 2701083	**FL MGUARD SMART2** Order No. 2700640 **FL MGUARD SMART2 VPN** Order No. 2700639	**FL MGUARD PCI4000** Order No. 2701274 **FL MGUARD PCI4000 VPN** Order No. 2701275
Function			
Central management software for up to 100 (DM 100) or an unlimited number of (DM UNLIMITED) FL MGUARD devices in the field, for installation on a PC. Additional service required.	Virus protection suitable for industrial applications for Windows-based systems, works without updates or virus patterns, detects every change to the system	Firewall/router for office use or mobile service technicians, VPN version: 10 parallel tunnels (optionally up to 250), stateful inspection firewall, 1:1 NAT, NAT, port forwarding, standard routing	Router with stateful inspection firewall for PCI, VPN version: 10 parallel tunnels (optionally up to 250), stateful inspection firewall, 1:1 NAT, NAT, port forwarding, standard routing

Secure remote maintenance

Secure remote maintenance systems offer you worldwide access to the components connected in your machine network, such as drives or controllers.

mGuard security routers from Phoenix Contact are the basis for your secure Internet-based remote maintenance solution. Thanks to their integrated firewall, the security routers protect your systems and machine networks and monitor all incoming and outgoing data packets based on predefined rules. All data that is transmitted is securely encrypted.

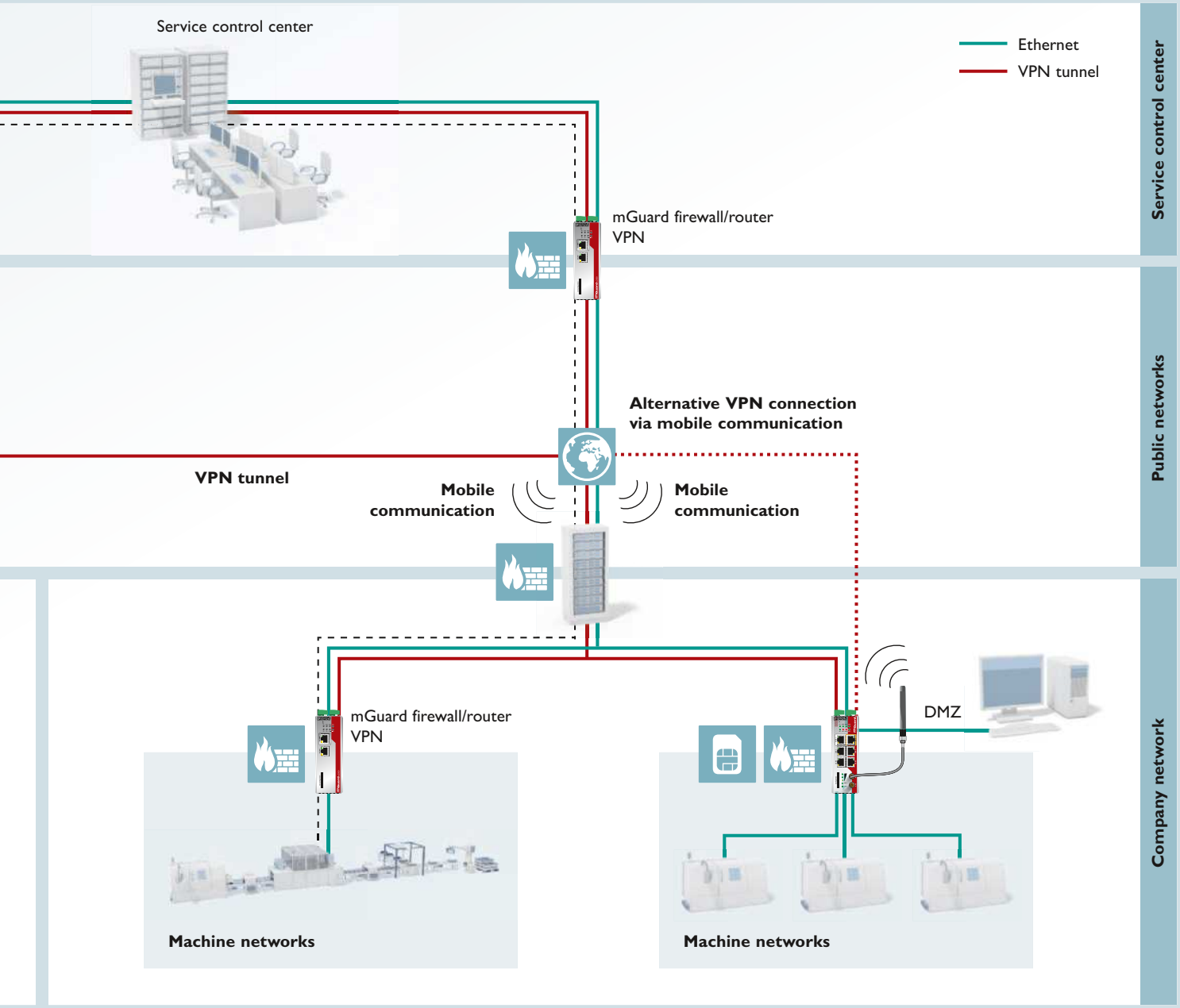


Your advantages:

- Save travel costs and reduce downtimes thanks to location-independent VPN access
- Secure communication thanks to IPsec protocol and encryption according to AES (Advanced Encryption Standard)
- Company network and machines protected against unauthorized access during remote maintenance

Secure VPN access to machines and systems

- The VPN connection is only established for maintenance purposes and always from the endpoint (e.g., machine) to the control center
- Controlled setup of the VPN connection using a key switch, SMS or software interface
- Protected against tapping and manipulation thanks to VPN tunnels with IPsec protocol and 256 bit AES encryption
- Additional security thanks to the combination of a firewall and VPN technology



Easy integration of machines

- Flexible connection to the Internet via the company network or mobile phone networks
- Option to access machine networks with the same IP addresses thanks to 1:1 NAT function
- Establishment of secure VPN communication without changes to the company firewall thanks to TCP encapsulation (variable packaging of VPN packets)
- Plug-and-protect solution for secure Internet teleservices: transparent integration into machines and systems without installing software

Flexible communication interfaces

- Secure communication directly over the customer's company network
- Worldwide access via the mobile communication interface (3G/UMTS/HSPA/CDMA)
- Mobile communication interface can be switched to WAN interface as redundancy path
- Integrated RS-232 interface for integrating existing serial equipment
- DMZ port (demilitarized zone) with dedicated firewall rules for increased security thanks to even stronger segmentation

Industrial security – Routers for worldwide network access

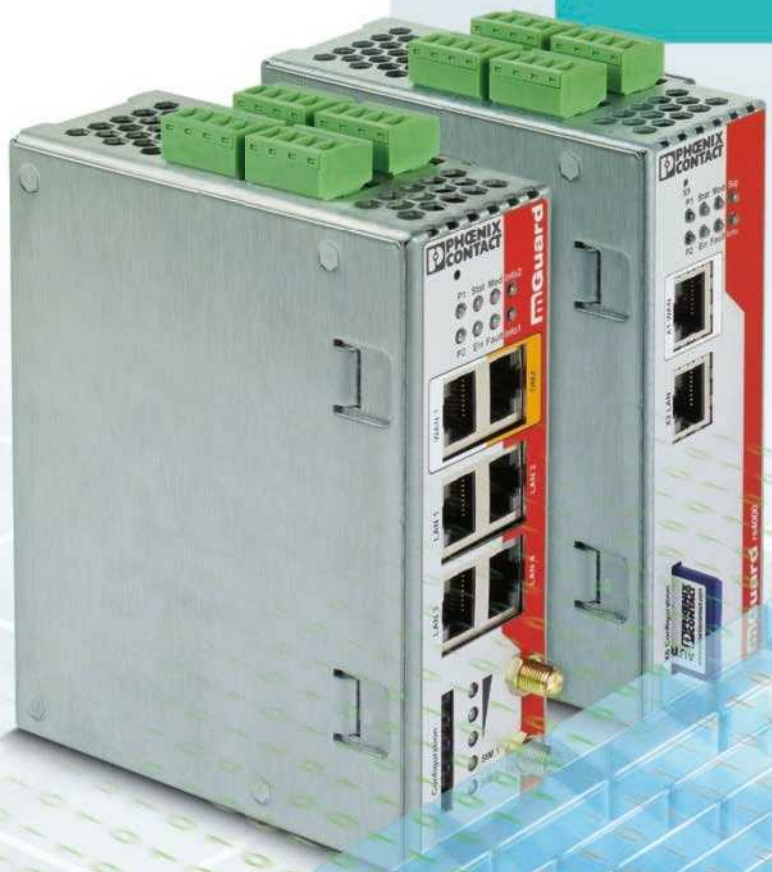
The VPN-compatible FL MGUARDs are suitable for wired applications. They enable secure and easy remote maintenance of machines via the company network.

The TC MGUARDs are high-performance security wireless network routers and transmit sensitive data securely worldwide via the highspeed mobile phone networks.

The integrated firewall and encryption via IPsec enable safe remote maintenance of machines and systems.

Your advantages:

- Maximum level of security with encrypted VPN connection and IPsec protocol
- VPN, routing, and firewall in just one device
- Highspeed data transmission via 3G and CDMA mobile phone networks
- Central management for remote configuration and current firmware updates
- COM server function for integrating existing serial devices



Security router

FL MGUARD RS2000 TX/TX VPN
Order No. 2700642

Properties

- Simple routing and remote maintenance applications
- Up to 2 VPN tunnels
- Secure encryption according to IPsec standard
- Configuration memory
- VPN enable button and VPN status LED
- Simple 2-click firewall

Security router

FL MGUARD RS4000 TX/TX VPN
Order No. 2200515

- Router with full scope of functions for demanding security and remote maintenance applications
- Up to 10 VPN tunnels
- Secure encryption according to IPsec standard
- Configuration memory
- VPN enable button and VPN status LED
- High-performance stateful inspection firewall

Mobile phone router

TC MGUARD RS2000 3G VPN
Order No. 2903441

- Remote maintenance applications via UMTS/HSPA and American CDMA mobile phone networks
- Up to 2 VPN tunnels
- Secure encryption according to IPsec standard
- Configuration memory
- Two SIM card slots
- VPN enable button and VPN status LED
- Simple 2-click firewall
- Integrated four-port switch

Mobile phone router

TC MGUARD RS4000 3G VPN
Order No. 2903440

- Remote maintenance applications via UMTS/HSPA and American CDMA mobile phone networks
- Up to 10 VPN tunnels
- Secure encryption according to IPsec standard
- Configuration memory
- Two SIM card slots
- VPN enable button and VPN status LED
- High-performance stateful inspection firewall
- Managed four port switch

GPS interface

Enables tracking and positioning for mobile applications and precise time synchronization.

SIM card redundancy

Two SIM card slots for maximum availability thanks to mobile communication redundancy.

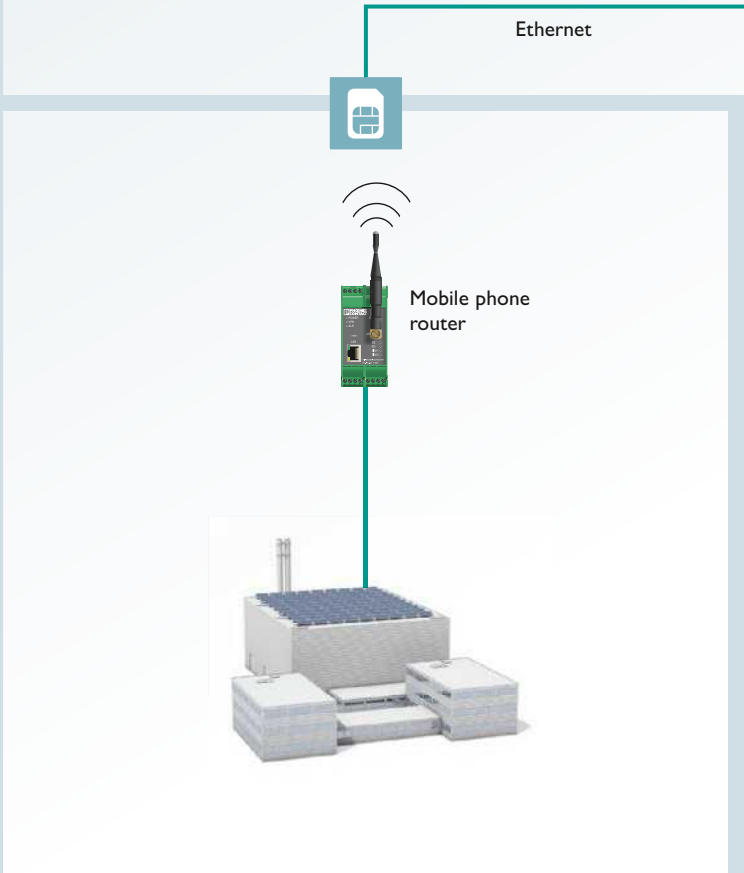
SD memory card

For saving configurations for fast startup and easy device replacement.

Remote communication – We connect the world

Various communication methods are available for data transmission to remote or widespread networks or for monitoring machines and systems all over the world. The transmission methods involved are as different as the applications.

With remote communication products from Phoenix Contact, we offer you the optimum choice for your application.



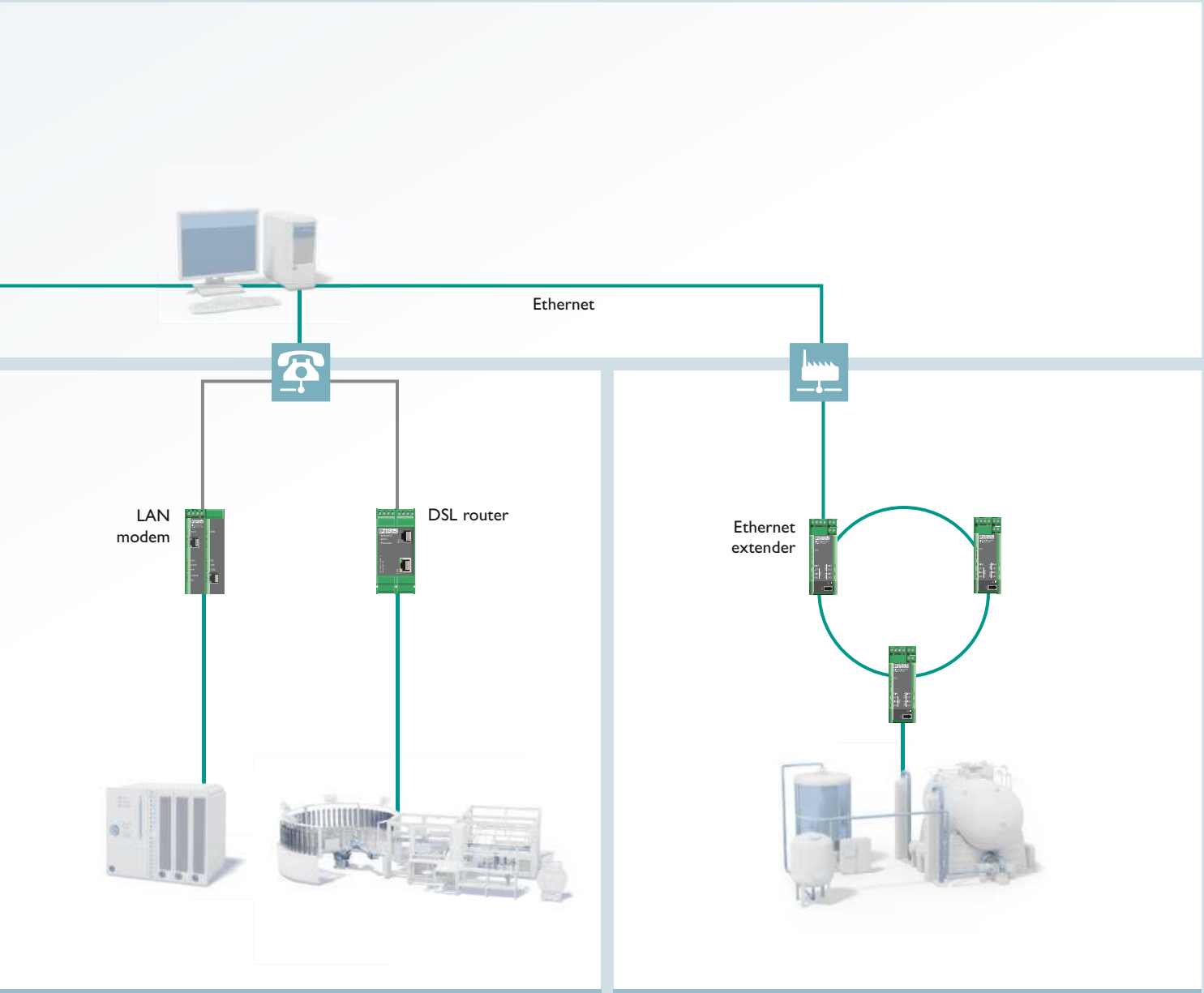
Mobile phone network

Your advantages:

- Mobile phone networks:
  Communicate wirelessly at high speed with up to 7.2 Mbps
- Public telephone network:
  Access remote network devices directly using the telephone network, which is available worldwide
- Private network:
  Use existing copper cables for transmission speeds of up to 30 Mbps

Mobile phone networks

- High-performance connections to remote machines or Ethernet networks via the Internet
- Mobile phone networks available worldwide mean that telephone connections and cables are no longer required
- Secure transmission of sensitive data via mobile communication thanks to VPN support and IPsec encryption
- Continuous data acquisition even from remote stations and efficient remote maintenance – everywhere and at all times



Public telephone network

Private network

Public telephone network

- Internationally recognized standards and extensive network expansion ensure worldwide availability
- Quick and easy startup and remote access thanks to the use of proven analog and digital transmission technologies
- Fast Internet connections thanks to the use of broadband ADSL (asymmetric digital subscriber line) technology in existing analog telephone infrastructure

Private network

- Communication with remote Ethernet devices up to 20 km away via any existing copper cables such as in-house telephone lines
- Fast and cost-effective network construction as no special Ethernet cables are required
- Redundant ring structures ensure high availability

Remote communication – We connect the world

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

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

Your advantages:

- Universal data links – worldwide and control-independent
- Secure communication – integrated security functions protect your applications and expertise.
- Robust hardware – durable, high-performance, and reliable use in harsh industrial environments

Mobile phone router

PSI-MODEM-3G/ROUTER
Order No. 2314008
PSI-MODEM-GSM/ETH
Order No. 2313355

Properties

- Worldwide data links and alarm generation via GSM and 3G mobile phone networks
- Data rates of up to 7.2 Mbps
- 2 optional SIM card slots for maximum network availability
- Alarm generation by SMS and e-mail
- Support for IPsec and OpenVPN
- Easy configuration via web-based management
- Integrated firewall

DSL router

TC DSL ROUTER X400 A/B
Order No. 2902709
TC DSL ROUTER X500 A/B
Order No. 2902710

- DSL modem and router in a single device
- All common DSL standards are supported
- Integrated Annex A/B switch-over
- Easy configuration via web-based management
- Alarm generation by e-mail
- COM server functionality
- Support for IPsec and OpenVPN
- Integrated firewall

LAN modem

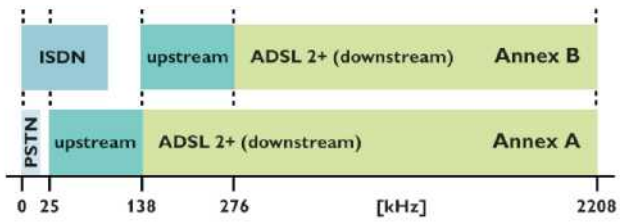
PSI-MODEM/ETH
Order No. 2313300

- Worldwide data acquisition via the public telephone network
- Data rates of up to 56 kbps
- Dialing into remote networks with dial-up connection for quick and easy access to network devices
- Automatic link to remote networks for status transmission or in the case of malfunction

Ethernet extender

PSI-MODEM-SHDSL/ETH
Order No. 2313643

- Network very remote devices over distances of up to 20 km
- Transmission speed of up to 30 Mbps
- Fast startup, plug and play
- Point-to-point and line structure
- Ring redundancy for increased availability
- Two digital outputs for alarm generation
- Improved diagnostics



Annex A/B

The integrated Annex A/Annex B switch-over and individual selection between modem/router functionality offer maximum flexibility. Extensive preclarification of the provider requirements is not necessary.

Diagnostics

Built-in diagnostics for recording the strength of the mobile communication signal, monitoring the IP connection via the public network, and, for SHDSL, diagnosing cables with early warning.

Integration of serial devices into the Ethernet network

The COM server closes the gap between the serial interfaces of automation devices and Ethernet communication of PC networks. By using the device server, you can also access non-network-capable devices via local networks or the Internet, e.g., to request the system state, perform a software update, carry out remote maintenance.

Depending on your application, choose between a basic device with standard functions, a universal device with integrated Modbus gateway, and a WLAN device for wireless connection of moving devices.

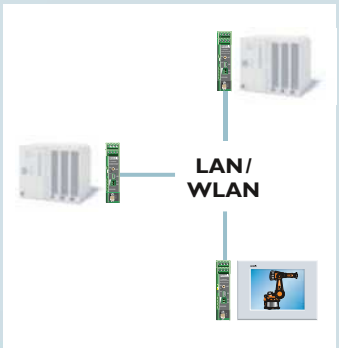
Advantages for all device types:

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

Additional advantages with the universal device:

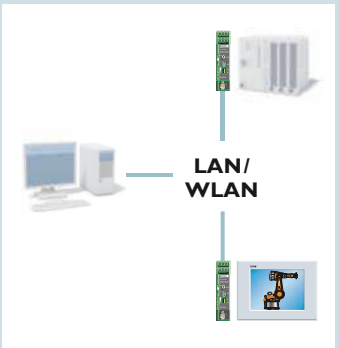
- Modbus gateway for bidirectional conversion of Modbus master and slaves with ASCII or RTU protocol to Modbus TCP protocol
- Conversion of RS-232/485 multipoint networks to Ethernet by means of adjustable address evaluation

	Serial device server for 10/100 Base-T(X)	Serial device server for 10/100 Base-T(X)	Serial device server for 802.11 WLAN
	FL COMSERVER UNI 232/422/485 Order No. 2313452 TCP, UDP, Modbus TCP **FL COMSERVER BASIC 232/422/485** Order No. 2313478 TCP, UDP	**FL COMSERVER UNI 232/422/485T** Order No. 2904817 TCP, UDP, Modbus TCP **FL COMSERVER BAS 232/422/485T** Order No. 2904681 TCP, UDP	**FL COMSERVER WLAN 232/422/485** Order No. 2313559 TCP, UDP
Copper Ethernet interface			
Transmission speed/length	10/100 Mbps/100 m, shielded		54 Mbps WLAN acc. to IEEE 802.11 b/g
Protocols	TCP/IP, UDP, Modbus TCP depending on the version		TCP/IP, UDP
Serial interface			
Interfaces	RS-232, RS-422, RS-485		RS-232, RS-422, RS-485
Transmission speed	300 – 230400 bps, can be set via web-based management		300 – 230400 bps, can be set via configuration software
Data format/coding	UART/NRZ, 7/8 Data, 1/2 Stop, 1 Parity, 10/11 bits		UART/NRZ, 7/8 Data, 1/2 Stop, 1 Parity, 10/11 bits
Data flow control/protocols	Software handshake, Xon/Xoff, hardware handshake RTS/CTS, 3964R-compatible, Modbus RTU/ASCII		Software handshake, Xon/Xoff or hardware handshake RTS/CTS
Functions			
Management	Web-based management, SNMP, Telnet and serial emergency access		Configuration software
Operating temperature range	-25°C – +60°C	-40°C – +70°C	-25°C – +60°C
Power supply	19.2 – 28.8 V AC/DC	12 – 30 V AC/DC	19.2 – 28.8 V AC/DC



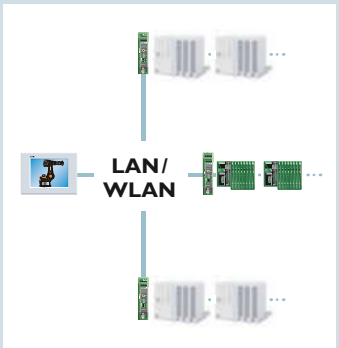
Serial tunneling

COM servers replace serial cables by using existing Ethernet networks.



Virtual COM ports

Virtual COM ports redirect serial PC applications to Ethernet. The COM servers create new COM ports in the field.



Modbus gateway

The UNI COM sever connects Modbus RTU to Modbus TCP networks and vice versa.

Effective surge protection prevents unexpected failure

Uninterruptible production calls for the reliable transmission of all relevant data and signals.

In addition to unauthorized access and malware, surge voltages caused by lightning strikes or switching operations also present a danger to your network. In particular where cabling extends beyond a building, it is primarily the devices that are connected to an Ethernet cable that are at risk.

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

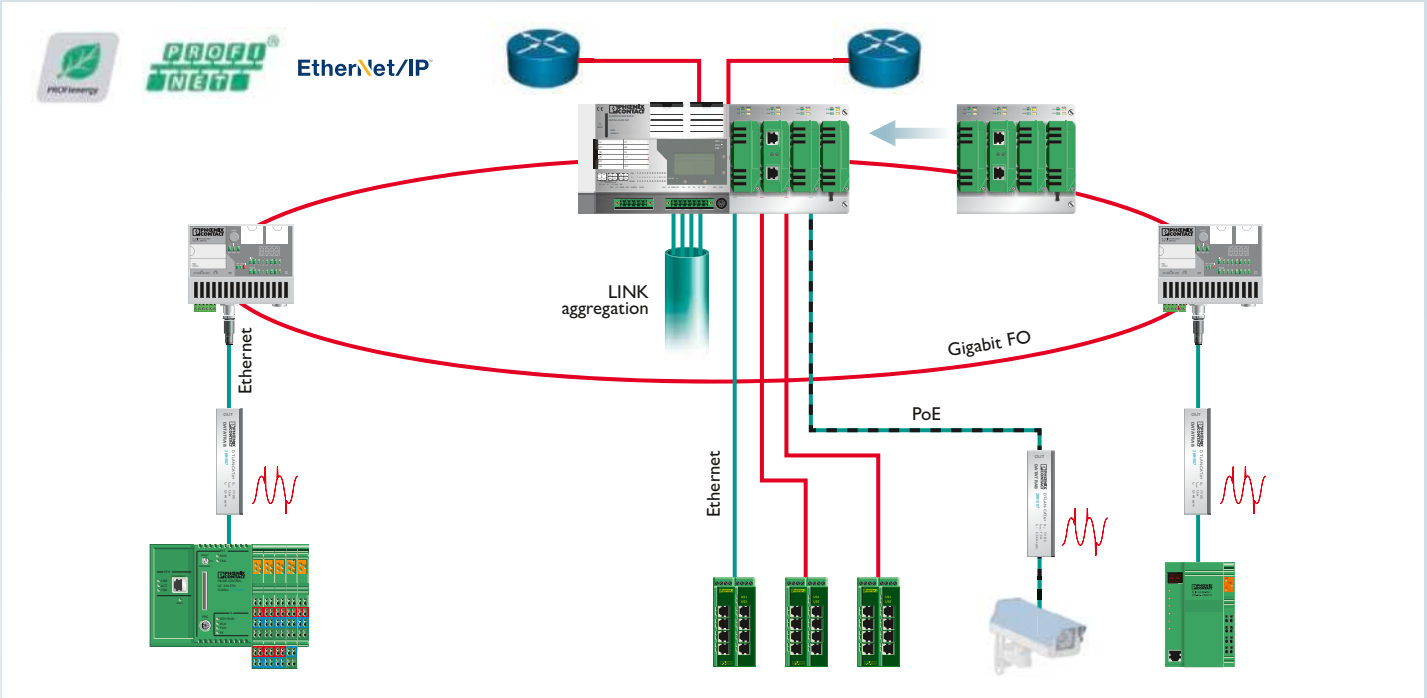
Your advantages:

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

Microelectronics are at particular risk

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

	DATATRAB adapter/ DIN rail module	DATATRAB 19" versions	PLUGTRAB type 3 arresters
	DT-LAN-CAT.6+ Order No. 2881007	**D-LAN-19"-24** 24 Ports Order No. 2838791 **D-LAN-19"-16** 16 Ports Order No. 2880147 **D-LAN-19"-8** 8 Ports Order No. 2880163	**PT 2-PE/S-230AC/FM** Order No. 2858357 plug, base element, 230 V AC **PT 2-PE/S-120AC/FM** Order No. 2856812 plug, base element, 120 V AC
Description			
	Ethernet (10GBaseT) & PoE, token ring, CDDI, according to Class Ea/ CAT6	Ethernet (1000 Base T), token ring, CDDI, according to Class D/Cat. 5e, EN 50173	Type 3 surge protection for 1-phase power supplies
Technical data			
IEC test classification/EN type	B2/C1/C2/C3/D1	C1/C2/C3	III/T3
Maximum continuous voltage U_C	3.3 V DC	6 V DC	230 V AC/120 V AC
Nominal discharge current I_n (8/20)µs (Core-Core/Core-Ground)	100 A/2 kA	350 A/350 A	3 kA/2.5 kA



DATATRAB: *High-speed surge protection for unrivaled Gigabit performance*

Network isolators for electrical isolation up to 4 kV

The FL ISOLATOR electrically isolates copper-based Ethernet devices with transmission speeds of up to 1 Gbps. The Ethernet isolator is simply installed before the network device to be protected. High-voltage areas in power distributions up to 4 kV can thus be safely decoupled from the data network, for example, and voltage equalization currents avoided.

Your advantages:

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

Ethernet

Modbus

PROFINET®

	Ethernet isolator up to 100 Mbps	Ethernet isolator up to 1000 Mbps	Ethernet isolator up to 100 Mbps
	Network isolator for electrical isolation up to 4 kV, 2 x M12 connection, for transmission speeds up to 100 Mbps, mounting on the wall or DIN rail	Network isolator for electrical isolation up to 4 kV, 2 x RJ45 socket for transmission speeds up to 100 Mbps and 1000 Mbps	Network isolator for electrical isolation up to 4 kV, 1 x RJ45 socket, 1 x COMBICON plug-in screw terminal block, for transmission speeds of up to 100 Mbps
	FL ISOLATOR 100-M12 Order No. 2902985 **FL ISOLATOR 100-M12 RMS** Order No. 2904671 with adapter for DIN rail mounting	**FL ISOLATOR 1000-RJ/RJ** Order No. 2313915 transmission speed 1000 Mbps **FL ISOLATOR 100-RJ/RJ** Order No. 2313931 transmission speed 100 Mbps	**FL ISOLATOR 100-RJ/SC** Order No. 2313928
Ethernet interface			
Transmission speed	10/100 Mbps	10/100/1000 Mbps	10/100 Mbps
Connection method	M12/M12	RJ45 socket/RJ45 socket, shielded	RJ45 socket/COMBICON plug-in screw terminal block, shielded
Transmission length	≤ 100 m (depending on the data rate and cable used)	≤ 100 m (depending on the data rate and cable used)	≤ 100 m (depending on the data rate and cable used)
General data			
Ambient temperature (operation)	-40°C – +70°C	-25°C – +75°C	-25°C – +75°C
Electrical isolation	Ethernet/Ethernet	Ethernet/Ethernet	Ethernet/Ethernet
Test voltage	4 kV AC (50 Hz, 1 min.)	4 kV AC (50 Hz, 1 min.)	4 kV AC (50 Hz, 1 min.)
Standards/specifications	EN 50121 and EN 50155 (for railway applications)	EN 50121 and EN 50155 (for railway applications)	EN 50121 and EN 50155 (for railway applications)

Ethernet isolators for special requirements

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

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

Error-free data communication across all train segments

19" components for data technology based on copper and fiber optics

The standardized 19" technology permits space-saving, efficient, and safe data communication in computing centers and control rooms.

The coordinated range of 19" products from Phoenix Contact includes system components and connection technology.

Design your unique 19" application with us – from the field level to the control system.

Your advantages:

- Coordinated connection technology and system components from a single source
- Application-specific design thanks to a comprehensive 19" product range
- The cost of expanding existing systems is minimized thanks to modular 19" components
- Unique identifiers thanks to markings and marking systems for terminal blocks, conductors, cables, and devices

Reliable network communication

Managed Switches

- High port density in a unit of a certain height
- RJ45 ports and multi-mode or single-mode fiber optic connection available as options
- High availability, due to replaceable or redundant power supplies available as an option

Unmanaged switches

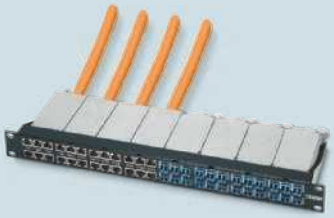
- High port density in a unit of a certain height with 24 RJ45 ports

Page 23/Page 9

High system availability

- Surge protection for the power supply
- Suitable for installation in storey distributors
- Protection of all eight signal wires of the data cable
- Reliable transmission speeds up to 1 Gbps
- Up to 24 ports with RJ45 connection
- Option of direct and indirect ground connection

Page 73



Easy distribution

- 19" distribution field with space for eight modules, with a total of 48 ports with RJ45 connection
- Easy front release without the need for special tools
- Plug and play thanks to pre-assembled modules
- Transmission speeds of up to 10 Gbps
- Cable length according to customer requirements
- Optimized strain relief for every module
- GHMT certification

Page 87

Structured cabling

Standardized connectors, if desired, with UL approval for:

Copper

- Transmission speeds of up to 10 Gbps
- Consistent shielding concept

Fiber optics

- Fiber qualities: OM2, OM3, OM4 (50/125 µm) and OM1 (62.5/125 µm)
- Use of low bend fibers
- Free from halogen and fire retardant (LSFH)

Page 78-97/Page 98-105

Ethernet extender in 19" format

Uninterruptible power supplies

Robust industrial PCs

For more system components and matching accessories, please visit phoenixcontact.com

Copper-based data cabling for networks and fieldbuses

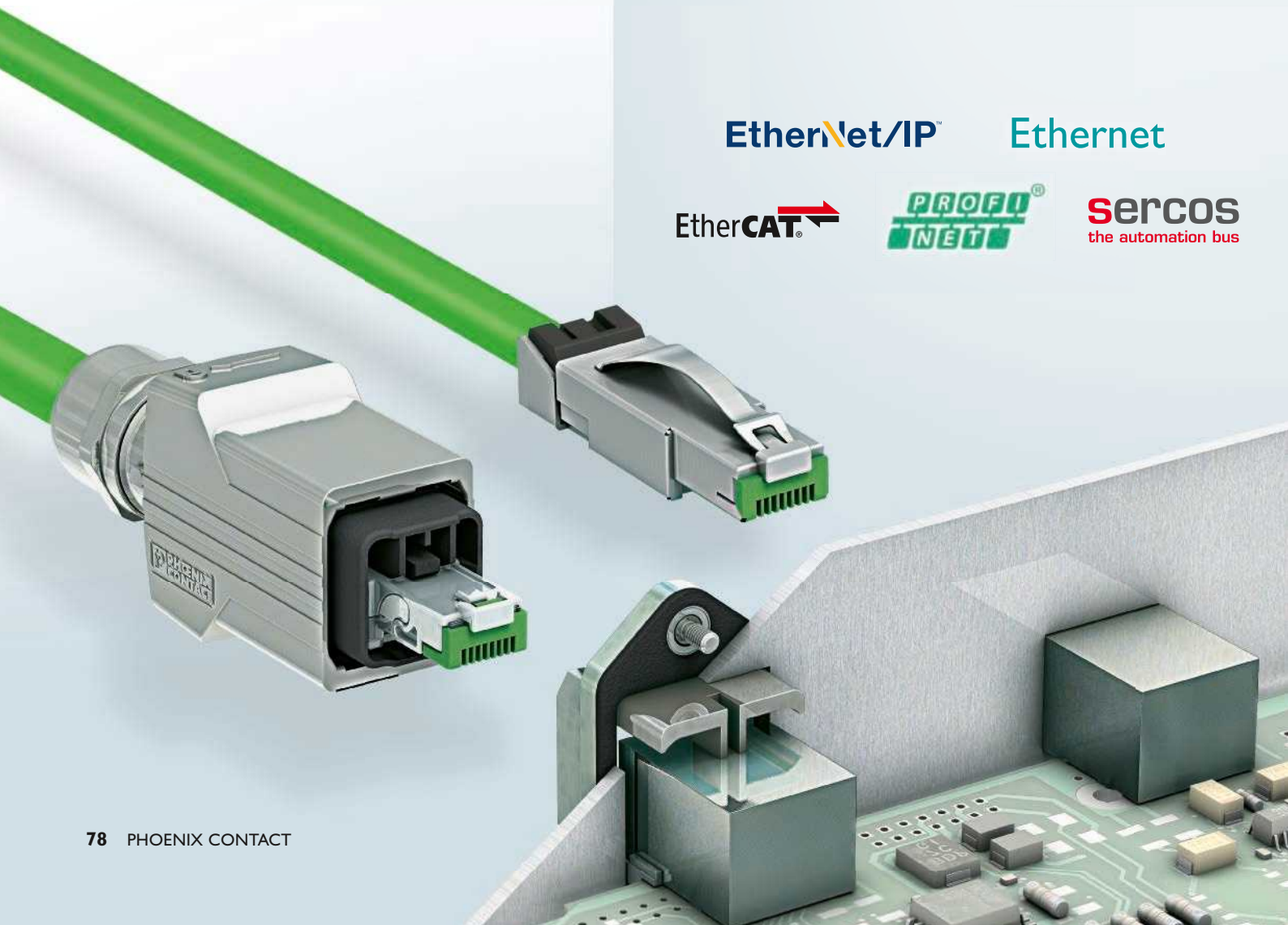
Complex automation processes call for high volumes of data at ever-increasing transmission speeds. Benefit now from high-performance connectors and cables for on-site assembly.
Whether it's future-proof high-speed cabling up to 10 Gbps or innovative, efficient hybrid cabling – we will find the perfect solution for your automation network.

Main features

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

EtherNet/IP™ Ethernet

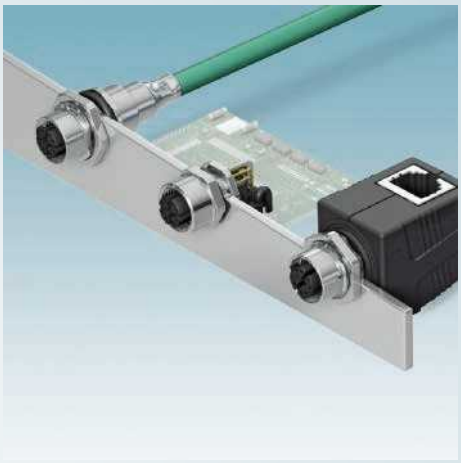
EtherCAT® PROFINET® sercos the automation bus



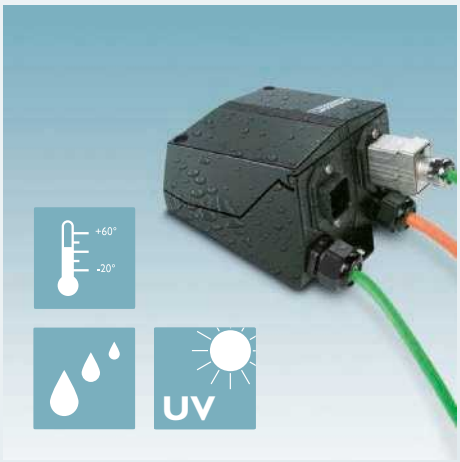
Advantages at a glance

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

Wide range of plugs from RJ45 to M12



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



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

Fast data transmission thanks to data rates up to 10 Gbps and components that meet the CAT6$_A$ standard

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

Why 10 Gbps?

Transmission speeds and data volumes are constantly increasing. Data transmission speeds of up to 10 Gbps are being used in more and more applications. This can also be achieved in industrial environments using special CAT6$_A$ components. This means that you can now achieve fast and smooth data exchange throughout your entire company network.

CAT6$_A$
10 Gigabit/s

RJ45 connectors

Contact insert		IP20 connectors						
		RJ45 Crimp		RJ45 QUICKON	RJ45 INDUSTRIAL			Version 1
		 Crimp connection		 IDC displacement connection	 IDC displacement connection, straight	 IDC displacement connection, angled TOP	 IDC displacement connection, angled BOTTOM	 Displacement connection, bayonet locking
Ethernet		Plastic, gray	Plastic, green	Plastic, black	Metal	Metal	Metal	Metal
8-pos., CAT5				1402420				1419182
8-pos., CAT5 IDC crimp	1652716	1654743	1654756					
8-pos., CAT6 IDC crimp	1652729							
8-pos., CAT6 pierce crimp	1404388							
8-pos., $CAT6_A$ IDC				1419001	1406333	1406339	1406336	
8-pos., $CAT6_A$ crimp	1418853	1654743	1654756					
PROFINET								
4-pos., CAT5				1658435				
8-pos., CAT5e					1406334	1406340	1406337	
VARAN								
6 pos.					1406335	1406341	1406338	

M12 connector

		M12 connectors, IP65/67					
		 IDC connection		 Piercecon connection		 Screw connection	
Networks		Straight	Angled	Straight	Angled	Straight	Angled
Ethernet CAT5, 4 pos.,	Pin	1543223	1553624				
	Socket	1553611	1553637				
Ethernet CAT5, 8-pos.,	Pin	1543236	1553653				
	Socket	1553640	1553666				
Ethernet CAT6A, 8-pos.,	Pin			1417430	1417443		
	Pin Pg7	1554513	1554539			1521258	
PROFINET	Pin Pg9					1521261	
	Socket	1554526	1554542				
VARAN	Pin	1429130	1429156				
	Socket	1429143	1429169				

IP65/67 connectors

Version 4	Version 6		Version 14			Version 14 RJ45 ADVANCE			
			  						
IDC displacement connection, push-pull interlocking	IDC displacement connection, push-pull interlocking		IDC displacement connection, push-pull interlocking			IDC displacement connection, push-pull interlocking			
Plastic, black	Bend protection sleeve	Pin insert	Plastic	Metal	Metal EMC	Zinc die-cast, straight	Stainless steel, straight	Zinc die-cast, angled	Stainless steel, angled
	1656990	1658493	1657834	1608016	1403367				
	1652732	1658671							
	1652732	1658671							
	1652732	1658671							
1407413			1422205	1422108		1407890	1407906	1408011	1407912
	1652732	1658671							
			1608126	1608100	1403366				
						1407889	1407908	1407895	1407914
						1464014		1464016	

M12 flush-type connectors

		M12 flush-type connectors, IP65/67			
		 Solder connection		 Cable connection	
Networks	Cable length	Pin	Socket	Pin	Socket
Ethernet CAT5, 4-pos., solder connection		1456514	1456527		
Ethernet CAT5, 4-pos., cable type 93E	2 m				1405866
Ethernet CAT5, 8-pos., solder connection		1456530	1456543		
Ethernet CAT5, 8-pos., solder connection, THR			1557549		
Ethernet CAT5, 8-pos., cable type 94B	5 m				1407877
Ethernet CAT5, 8-pos., cable type 94C	2 m				1412820
Ethernet CAT6A, 8-pos., solder connection			1440669		
Ethernet CAT6A, 8-pos., cable type 94F	0.5 m				1424135
	1 m				1424148
	2 m				1424151
	5 m				1424164
Ethernet CAT5, 8-pos., hybrid, solder connection			1407503		
Ethernet CAT5, 8-pos., hybrid, cable type 94H	0.5 m				1407504
	1 m				1407505
	2 m				1407506
	5 m				1407507
PROFINET 4-pos., solder connection		1456556	1456569		
PROFINET 4-pos., solder connection, THR			1542648		
PROFINET 4-pos., with polarity protection			1542619		
PROFINET 4-pos., cable type 93B	0.5 m			1427805	1437766
	1 m			1437818	1437779
	2 m			1437821	1437782
	5 m			1437834	1437795
PROFINET 4-pos., cable type 93C	2 m				1416209
PROFINET 4-pos., cable type 93R	3 m				1416263
Sercos solder connection		1457979	1457966		
Sercos cable type 93K	0.5 m			1410158	1419154
	1 m			1419159	1419155
	2 m			1419160	1419156
	5 m			1419161	1419157
EtherCAT solder connection		1456556	1456569		
EtherCAT cable type 93K	0.5 m			1419138	1419134
	1 m			1419139	1419135
	2 m			1419140	1419136
	5 m			1419141	1419137

Heavy-duty connectors HEAVYCON design B

	Contact inserts							
	 Ethernet connector, crimp connection VS 1,0, connection cross section 0.08 – 0.5 mm²		 Module for Ethernet connector		 EMC connector, crimp connection, CK 1,6, connection cross section 0.14 – 2.5 mm²		 EMC module for the EMC connector	
Networks	Socket	Pin	Socket	Pin	Socket	Pin	Socket	Pin
Ethernet 8-pos.	1587726	1587713						
1 module slot			1587700	1587690				
Ethernet 4-pos.					1636091	1636088		
2 module slots							1678570	1678567

Sensor/actuator cabling and industrial connectors

	M12 connector with crimp connection		M12 Y-distributor for power connectors
	 Bus system connectors for assembly with Pg9 screw connection, crimp connection, IP67, 5 – 8 mm cable diameter, for Ethernet and PROFINET		 M12 SPEEDCON Y-distributor, IP65/67, M12 pin to 2 x M12 socket
	straight	angled	Hybrid
4 pos.	1411046	1411047	1410632

IP67 panel feed-throughs and couplings

	Panel feed-through		M12 flush-type socket			RJ45 coupling		
	 Control cabinet panel feed-through, IP65/IP67, M12 to RJ45, straight and angled		 M12 flush-type socket for 10 Gbps (CAT6A), M12 flush-type socket hybrid (CAT5e) for up to 4 x 6 A, Y-coded			 IP67, CAT5e, with protective cover		 IP67, CAT5e, with protective cover for push/pull interlocking
Networks	90°	180°	straight	angled	Hybrid	gray	black	nickel-plated
Ethernet 8-pos., A-coded	1405057	1405060						
Ethernet 8-pos., X-coded	1404548	1404549						
Ethernet/PROFINET 4-pos., D-coded	1657261	1657494						
Ethernet 8-pos.			1440669	1424180	1456666			
Ethernet/PROFINET						1689268	1658684	1405183

RJ45 panel mounting frames and socket inserts, IP20 RJ45 patch panels

			IP20 panel mounting frame			
			IP20	Version 1	Version 4	
						
Socket inserts			1-way, for modular socket inserts	Bayonet locking	Push-pull interlocking	For round push-pull
Cable connection		Order No.	Plastic, gray	Metal	Plastic, black	Plastic, gray
	Keystone, CAT5	1689459	1689433			1689844
	Keystone, CAT6$_A$	1653168	1689433			1689844
	Freenet, CAT5	1652936				1653744
	Freenet, CAT6$_A$	1424009				1653744
	Contact insert for bayonet locking			1419185		
PCB mounting						
	Straight, CAT6	1653090				
	Angled, CAT5	1688586				
	Angled, CAT6	1653087				
	Angled, CAT6$_A$	1420401				
	Straight, CAT5	1407409			1407411	
	Angled, CAT5	1407408			1407410	
Socket to socket						
	Keystone, CAT5	1689064	1689433			1689844
	Keystone, CAT6	1653155	1689433			1689844
	Freenet, CAT5	1405617				1653744
	Version 1 panel mounting frame set			1419184		
	Version 4 panel mounting frame set				1407412	

RJ45 patch panels, IP20, CAT5e, for DIN rail mounting

			
Shielding, either directly on DIN rail (8 and 4-pos.) or via RC combination (8-pos. only)	Shielding, either directly on DIN rail or via RC combination	Shielding, either directly on DIN rail or via RC combination	Shielding, either directly on DIN rail or via RC combination
Networks	with screw connection	with spring-cage connection	with IDC connection	with socket/socket connection
Ethernet 8-pos.	2901643	2901642	2901645	2901646
Ethernet 4-pos.	2744610			

IP65/67 panel mounting frames

Version 6			Version 14		
					
mounting cutout interlocking	For a square mounting cutout Push-pull interlocking			Push-pull interlocking	
Plastic, black	Plastic, gray	Plastic, black	Metal, round	Metal, square	Plastic, square
1658053	1689080	1658642			
1658053	1689080	1658642			
1658668			1405222	1405358	1608197
1658668			1405222	1405358	1608197
	1689446	1658655			
	1689446	1658655			
	1689446	1658655			
				1608029	1657847
1658053	1689080	1658642			
1658053	1689080	1658642			
1658668			1405222	1405358	1608197

		
Consistent shield, extended temperature range -40°C – +85°C, narrow overall width	Cable sharing module with cable outlet on the front, option of shield contacting on DIN rail via jumpers	Cable sharing module with cable outlet on the top, option of shield contacting on DIN rail via jumpers
with socket/socket connection	with spring-cage connection	with spring-cage connection
2904933	2903532	2904577

RJ45 patch panels and terminal outlets

Components for 19" technology	Order No.	RJ45 patch panel, IDC connection	RJ45 patch fields
			
19" frame, empty (gray, black)			
Jumpering panel, 19"			
Dummy frame, size of one module, for use in the frame			
RJ45 module, 6 x RJ45 to 6 x RJ45, 10 Gbps, can be unlocked from the front, variable length			
Socket insert, Freenet			
Socket to cable, CAT5	1652936		
Socket to cable, $CAT6_A$	1424009		
Socket to socket, CAT5	1405617		
Patch fields			
2 RJ45 network connections, CAT5e			2891165
2 RJ45 network connections, CAT6			2891068
8 RJ45 network connections, CAT5e			2891178
9 RJ45 network connections, CAT6			2891071
Patch panel		1658118	

Connections	RJ45 coupling, gray	RJ45 coupling, black
		Version 6
		
1 x RJ45, cable diameter 5 mm – 8 mm		
1 x RJ45, cable diameter 7 mm – 10.5 mm		
1 x RJ45/1 x power, cable diameter 5 mm – 8 mm		
1 x RJ45/1 x power, cable diameter 7 mm – 10.5 mm		
1 x RJ45/RJ45	1689268	1658684
1 x power/power		
2 x RJ45		
1 x RJ45/1 x power		

RJ45 patch panels, IP20

			
19" frame, empty, for 8 modules	Patch panel, 19" mounting, with 16 slots	Surface-mounted socket, for RJ45 inserts	Flush-type socket, for RJ45 inserts
1407986 / 1409140			
1407994 / 1409283 / 1409284			
1407988			
1407995			
	1652994	1653003	1653016
	1652994	1653003	1653016
	1652994	1653003	1653016

RJ45 terminal outlets, IP65/67

	Version 14		
			
Terminal outlet	Terminal outlet	RJ45 and power robot interface	RJ45 robot interface
			1403678
			1403686
		1403682	
		1403688	
			1403685
			1403684
1404278	1404281		
	1404333		

Ethernet industrial patch cables

RJ45 plug, IP20

Ethernet patch cable, transmission category: CAT5, outer sheath material: PUR, structure: 4x2xAWG26 SF/UTP, outside diameter: 6.4 mm, temperature: -40°C – +70°C

Networks		straight/straight	straight/angled	angled/angled
Ethernet	0.3 m	1417993	1418002	1418015
	0.5 m	1418028	1418031	1418044
	1 m	1418067	1418070	1418099
	2 m	1418109	1418125	1418138
	5 m	1418141	1418154	1418167
	10 m			
PROFINET	0.3 m			
	1 m			
	2 m			

Accessories

Color-coding

Color coding for IP20 patch cables, for easy visual color coding of connections (for office patch cables only)

for IP20 patch cables	
Black	2891194
Blue	2891291
Brown	2891495
Yellow	2891592
Gray	2891699
Green	2891796
Red	2891893
Violet	2891990

RJ45 protective cap

Dust protection caps for RJ45 sockets

CAT6, S/FTP shielding
2832991

Accessories (for office patch cables only)

Security frame

Security frame for SFN switches and patch fields including key

Green	2891615
Red	2891712
White	2891819
Lock	2891220
Key	2891327

Security element

Self-locking security element for IP20 patch cables, to prevent malicious disconnection of Ethernet connections

Lockable element	2891424
Key	2891521

Safe clip

Safe clip for IP20 patch cables, to prevent accidental disconnection of Ethernet connections

2891246

Ethernet hybrid cables

M12 plug, IP67/IP69K | Open cable end

Ethernet hybrid patch cable, transmission category: CAT5e, outer sheath material: PUR, structure: 1x4xAWG26/1x4xAWG20, outside diameter: 7.6 mm, temperature: -40°C – +90°C

straight/straight	straight/open cable end
1407491	1407487
1407492	1407488
1407493	1407489
1407494	1407490

PROFINET industrial patch cables

RJ45 plug, IP20

PROFINET patch cable, transmission category: CAT5, outer sheath material: PVC, structure: SF/Q, outside diameter: 6.5 mm, temperature: -40°C – +70°C

straight/straight	straight/angled	angled/angled
1418413	1418183	1418196
1418235	1418248	1418251
1418264	1418277	1418280

Color-coding

Marking label for FL PATCH GUARD

for office patch cables	
Black	2891136
Blue	2891233
Orange	2891330
Yellow	2891437
Turquoise	2891534
Green	2891631
Red	2891738
Violet	2891835

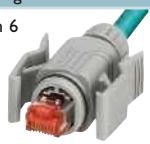
Office patch cables

Assembled patch cable, IP20

Outer sheath material: LSFROH, outside diameter: 5.5 mm, material of individual wires: Cu litz wire, individual wires per module: 8, cross section of individual wires: 0.14 mm²

Ethernet	CAT5, S/UTP shielding	CAT6, S/FTP shielding
0.3 m	2832250	2891181
0.5 m	2832263	2891288
1 m	2832276	2891385
1.5 m	2832221	2891482
2 m	2832289	2891589
3 m	2832292	2891686
5 m	2832580	2891783
7.5 m	2832616	2891880
10 m	2832629	2891877
12.5 m		2891369
15 m		2891372
20 m		2891576

Assembled cables, Ethernet, 4-pos., shielded

		M8 plug	M8 socket	RJ45 plug		
				IP20	Version 6	Version 14, metal
						
Open cable end	OE	M8MS	M8FS	R4AC	R4MC	R4RC
	1 m	1407344		1405633		
	2 m	1407345			1405675	
	5 m	1407346				1405743
	10 m	1407347				
	Variable	1408719	1408716			
M8 plug	M8M2					
	1 m	1407348				
	2 m	1407349				
	5 m	1407350				
	10 m	1407351				
	Variable	1408718	1408715			
RJ45 plug, IP20	R4AC					
	1 m	1407352		1408933		
	2 m	1407353		1408934	1405921	
	5 m	1407354		1408935		1405992
	10 m	1407355		1408936		
	Variable	1408717	1408714			
RJ45 plug	R4MC					
Version 6 	1 m				1408937	
	2 m				1408938	
	5 m				1408939	
	10 m				1408940	
	Variable					
RJ45 plug, metal	R4RC					
Version 14 	1 m					1408941
	2 m					1408942
	5 m					1408943
	10 m					1408945
	Variable					
RJ45 plug, plastic	R4QC					
Version 14 	1 m					
	2 m					
	5 m					
	10 m					
	Variable					
M12 plug, SPEEDCON	MSD SCO					
	1 m					
	2 m					
	5 m					
	10 m					
	Variable					
M12 plug, SPEEDCON	MRD SCO					
	1 m					
	2 m					
	5 m					
	10 m					
	Variable					

	M12 plug		M12 socket		M12 flush-type socket
Version 14, plastic	SPEEDCON		SPEEDCON		Rear mounting
					
R4QC	MSD SCO	MRD SCO	FSD SCO	FRD SCO	FSDBP
	1407356		1407380		
	1407357		1407381		1405866
1405772	1407358		1407382		
	1407359		1407383		
	1408713	1408705	1408697	1408690	
	1407360		1407384		
	1407361		1407385		1406085
1406030	1407362		1407386		
	1407363		1407387		
	1408712	1408704	1408696	1408698	
	1407364		1407388		
	1407365		1407389		1406247
	1407366		1407390		
	1407367		1407391		
	1408710	1408703	1408695	1408688	
	1407368		1407392		
	1407369		1407393		1406519
	1407370		1407394		
	1407371		1407395		
	1408709	1407802	1408694	1408687	
1408947	1407372		1407396		
1408948	1407373		1407397		1406603
1408946	1407374		1407398		
1408949	1407375		1407399		
	1408707	1408701	1408693	1408686	
	1407376		1407400		
	1407377		1407401		
	1407378		1407402		
	1407379		1407403		
	1408706	1408700	1408692	1408684	
		1408699	1408691	1408683	

Assembled cables, Ethernet, 8-pos., shielded

		RJ45 plug			
		IP20	Version 6	Version 14, metal	Version 14, plastic
					
Open cable end	OE	R4AC	R4MC	R4RC	R4QC
	1 m				
	2 m				
	5 m	1407699	1407725	1407783	1407819
	10 m				
	Variable				
RJ45 plug, IP20	R4AC				
	1 m	1408950			
	2 m	1408951			
	5 m	1408952	1407932	1407990	1412024
	10 m	1408953			
	Variable				
RJ45 plug	R4MC				
Version 6 	1 m		1408955		
	2 m		1408956		
	5 m		1408954		
	10 m		1408958		
	Variable				
RJ45 plug, metal	R4RC				
Version 14 	1 m			1408961	
	2 m			1408962	
	5 m			1408959	
	10 m			1408963	
	Variable				
RJ45 plug, plastic	R4QC				
Version 14 	1 m				1408965
	2 m				1408966
	5 m				1408964
	10 m				1408967
	Variable				
M12 plug, SPEEDCON	MS SCO				
	1 m				
	2 m				
	5 m				
	10 m				
	Variable				
M12 plug, SPEEDCON	MR SCO				
	1 m				
	2 m				
	5 m				
	10 m				
	Variable				

M12 plug		M12 socket		M12 flush-type socket
SPEEDCON		SPEEDCON		Rear mounting
				
MS SCO	MR SCO	FS SCO	FR SCO	FSBP
1407404		1407439		
1407405		1407440		
1407406		1407441		1407877
1407507		1407442		
1408682	1408675	1408665	1408657	
1407414		1407443		
1407415		1407444		
1407416		1407445		1412082
1407417		1407446		
1408681	1408674	1408664	1408655	
1407422		1407451		
1407423		1407452		
1407424		1407453		1412231
1407425		1407454		
1408679	1408671	1408662	1408653	
1407426		1407455		
1407427		1407456		
1407428		1407457		1412503
1407429		1407458		
1408678	1408670	1408661	1408652	
1407430		1407459		
1407431		1407460		
1407432		1407461		1412590
1407433		1407462		
1408677	1408668	1408660	1408651	
1407434		1407463		
1407435		1407464		
1407436		1407465		
1407437		1407466		
1408676	1408667	1408659	1408650	
	1408666	1408658	1408649	

Assembled cables for Ethernet networks

	Type 93E	Type 94A	Type 94B
	2 x 2 x 28 AWG 7 x 0.25 mm	4 x 2 x 24 AWG single-strand, twisted pair	4 x 2 x 28 AWG 7 x 0.25 mm
			
	Ethernet cable for flexible use. The cable is halogen-free, oil-resistant, and its transmission properties meet CAT5e.	Ethernet cable for fixed installation. The cable's transmission properties meet CAT5e.	Ethernet cable for flexible installation. The cable is resistant to oil and chemicals and is flame-retardant. The cable's transmission properties meet CAT5e.
By the meter	1416415	1416415	1417333
100 m ring	1416305	1416305	1416567
Assembled cables			1416428

Assembled cables for PROFINET networks

	Type 93A	Type 93B	Type 93C
	4 x 22 AWG single-strand	4 x 22 AWG, 7 x 0.25 mm	4 x 22 AWG, 7 x 0.25 mm
			
	PROFINET cable for fixed installation. The cable is flame-retardant and its transmission properties meet CAT5e.	PROFINET cable for flexible installation. The cable is oil resistant. It is UV-resistant according to UL1581 Sec.1200 and therefore also suitable for outdoor use. The cable's transmission properties meet CAT5e.	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.
By the meter	1416486	1417362	1417491
100 m ring	1416392	1416389	1416376
Assembled cables		1416499	1416509

Type 94D	Type 94E	Type 94F
4 x 2 x 26 AWG 7 x 0.18 mm, twisted pair	4 x 2 x 23 AWG single-strand, twisted pair	4 x 2 x 26 AWG 7 x 0.16 mm, twisted pair
		
Ethernet cable for flexible installation. The cable is oil resistant. It is UV-resistant according to UL1581 Sec.1200 and therefore also suitable for outdoor use. The cable's transmission properties meet CAT5e.	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 $CAT6_A$.	Ethernet cable for flexible installation. The cable is resistant to oil and chemicals and is flame-retardant. It is also halogen-free and the cable's transmission properties meet $CAT6_A$.
1416444	1416460	1417359
1416334	1416334	1416347
		1402609

Type 93R	Type 937
4 x 22 AWG, 19 x 0.15 mm	4 x 22 AWG, 7 x 0.25 mm
	
PROFINET cable for robot applications. The cable is oil resistant. It is UV-resistant according to UL1581 Sec.1200 and therefore also suitable for outdoor use. The cable's transmission properties meet CAT5e.	PROFINET cable for railway applications. The cable is oil resistant. It meets fire safety standard BS6853. The cable's transmission properties meet CAT5e.
1417388	1402687
1416363	1416363
1416512	1402611

Assembled cables, PROFINET, 4-pos., shielded

		RJ45 plug			
		IP20		Version 14, metal	Version 14, plastic
					
Open cable end	OE	R4AC	R4ACR	R4RC	R4QC
	1 m				
	2 m				
	5 m			1416162	1416168
	10 m				
	Variable				
RJ45 plug, IP20	R4AC				
	1 m	1408968	1418248		
	2 m	1408969	1418277		
	5 m	1408970		1416138	1416141
	10 m	1408971			
	Variable				
RJ45 plug, IP20	R4ACR				
	1 m		1409002		
	2 m		1409003		
	5 m		1409004		
	10 m		1409005		
	Variable				
RJ45 plug, metal	R4RC				
Version 14 	1 m			1408974	
	2 m			1408975	
	5 m			1408972	
	10 m			1408976	
	Variable				
RJ45 plug, plastic	R4QC				
Version 14 	1 m				1408978
	2 m				1408979
	5 m				1408977
	10 m				1408980
	Variable				
M12 plug, SPEEDCON	MSD SCO				
	1 m				
	2 m				
	5 m				
	10 m				
	Variable				
M12 plug, SPEEDCON	MRD SCO				
	1 m				
	2 m				
	5 m				
	10 m				
	Variable				

M12 plug		M12 socket		M12 flush-type socket
SPEEDCON		SPEEDCON		Rear mounting
				
MSD SCO	MRD SCO	FSD SCO	FRD SCO	FSDBP
1407495		1407528		1437779
1407496		1407529		1437782
1407497		1407530		1437795
1407498		1407531		
1408640	1408633	1408623	1408615	
1407499		1407532		
1407500		1407533		
1407501		1407534		
1407502		1407535		
1408639	1408632	1408622	1408613	
1407508		1407536		
1407509		1407537		
1407510		1407538		
1407511		1407539		
1408638	1408631	1408621	1408612	
1407516		1407544		
1407517		1407545		
1407518		1407546		
1407519		1407547		
1408636	1408628	1408619	1408610	
1407520		1407548		
1407521		1407549		
1407522		1407551		
1407523		1407552		
1408635	1408626	1408618	1408609	
1407524		1407553		
1407525		1407554		
1407526		1407555		
1407527		1407556		
1408634	1408625	1408617	1408608	
	1408624	1408616	1408607	

Fiber-optic-based data cabling for networks

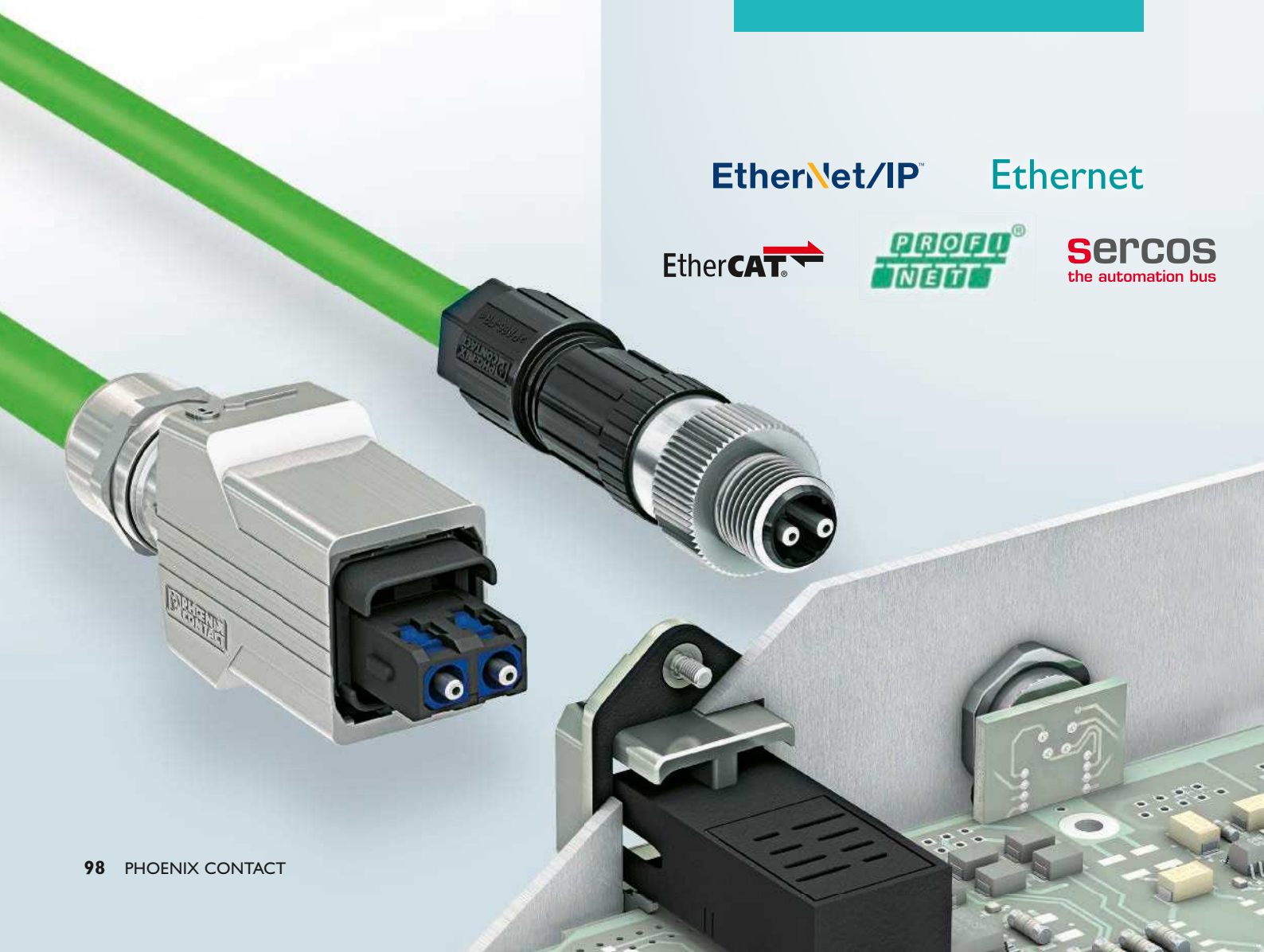
High transmission speed, low attenuation, resistant to electromagnetic interference: fiber optic cables are among the modern transmission media for industrial systems and infrastructure applications. Whatever the fiber type or interface – you can choose the right connection technology from our extensive portfolio.

Main features

- Up to 40 Gbps
- Solutions from IP20 to IP65/IP67
- For all common fiber types
- Maximum protection against the effects of EMI and ESD

EtherNet/IP™ Ethernet

EtherCAT® PROFINET® sercos the automation bus



Advantages at a glance

Wide choice of versions from SC-RJ, LC, SC, FSMA to ST, plus fiber types POF, PCF, GOF

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

Fast assembly in the field using professional tools

Reliable protection against extreme temperatures, liquids, and UV light

High data rates up to 40 Gbps

Integrated locking prevents accidental disconnection

Choose the right fiber type for your application

- POF (polymer optical fiber) for short transmission paths up to 100 m and a maximum data rate of up to 100 Mbps
- PCF (polymer-clad fiber) for medium-length transmission paths up to 500 m and a maximum data rate of up to 1 Gbps
- GOF (glass optical fiber) multi mode for long transmission paths up to 550 m at 10 Gbps
- GOF single mode for up to 50 km and a data rate of up to 40 Gbps

Fiber optic connectors, panel mounting frames, and socket inserts

Description	Socket insert	Connectors			
	Freenet system	IP20	IP65/IP67		
			M12 OPTIC	Version 1	Version 6
					
	SC-RJ to SC-RJ	SC-RJ, fast connection technology	M12, adhesive connection technology	SC-RJ, adhesive connection technology	SC-RJ, fast connection technology
Polymer fiber 980/1000 µm (POF)				Metal	
SC-RJ		1654879		1419189	1657009
Freenet system, SC-RJ to SC-RJ	1652978				
M12 to M12, pre-assembled cable			1416680		
M12 to SC-RJ, pre-assembled cable			1416648		
AVAGO transceiver (type: AFBR5978Z)					
SC-RJ to SC-RJ					
Polymer-clad fiber 200/230 µm (PCF)					
SC-RJ single-wire diameter 2.9 mm		1654866			
SC-RJ single-wire diameter 2.2 mm		1404087			1657012
F-SMA set, 4 connectors, single-wire diameter 2.9 mm		2799487			
B-FOC (ST) set, 4 connectors, single-wire diameter 2.9 mm		2708481			
Freenet system, SC-RJ to SC-RJ	1652978				
M12 to M12, pre-assembled cable			1416693		
M12 to SC-RJ, pre-assembled cable			1416651		
AVAGO transceiver (type: AFBR5978Z)					
SC-RJ to SC-RJ					
Fiberglass multi mode 50/125 µm; single mode (GOF)					
SC-RJ, multi mode		1657070		1419187	1657083
SC-RJ, single mode				1419188	
SC duplex, multi mode		1658529			
LC duplex, multi mode				1419190	
LC duplex, single mode				1419191	
Freenet system, SC-RJ to SC-RJ	1652978				
AVAGO transceiver (type: AFBR5978Z)					
SC-RJ to SC-RJ multi mode					
SC-RJ to SC-RJ single mode					
Multi-mode LC duplex/LC duplex					
Single-mode LC duplex/LC duplex					

Panel mounting frames

IP65/IP67

Version 14		Version 1	Version 6		Version 14		
							
SC-RJ, fast connection technology	SC-RJ, fast connection technology	SC-RJ, bayonet locking	For a round mounting cutout		Push-pull interlocking	Push-pull interlocking	Push-pull interlocking
Metal	Plastic		Plastic, gray	Plastic, black	Metal, round cutout	Metal, square cutout	Plastic
1608032	1657850						
			1653744	1658668	1405235	1405374	1608210
			1658545			1608061	1657889
		1420197					
1608045	1657863						
			1653744	1658668	1405235	1405374	1608210
			1658545			1608061	1657889
		1420197					
			1653744	1658668			
			1658545				
		1420197					
		1420207					
		1420210					
		1420223					

Fiber optic patch cables

		with single-mode fiberglass (OS1)		
		 B-FOC (ST) plug to B-FOC (ST) plug	 SC duplex plug to SC duplex plug	 LC plug to LC plug
Diameter of individual wires: 2.8 mm, outside dimensions: 2.8 mm x 5.7 mm, outer cable sheath: FRNC, halogen-free, flame-retardant, ambient temperature (operation): -5°C – +70°C		ST-ST plug	SC-SC plug	LC-LC plug
	1 m	2901836	2901829	2989187
	2 m	2901837	2901830	2989284
	5 m	2901838	2901831	2901826
		 SC duplex plug to B-FOC (ST) plug	 LC plug to SC duplex plug	 LC plug to B-FOC (ST) plug
Diameter of individual wires: 2.8 mm, outside dimensions: 2.8 mm x 5.7 mm, outer cable sheath: FRNC, halogen-free, flame-retardant, ambient temperature (operation): -5°C – +70°C		SC-ST plug	LC-SC plug	LC-ST plug
	1 m	2901832	2989190	2989242
	2 m	2901833	2989297	2989349
	5 m	2901834	2901827	2901828

Assembled fiber optic cables (POF)

	Fiber optic polymer fiber cables				
	Type KDHEAVY-1011	Type RUGGED-1012	Type RUGGED FLEX-1013	Type PROFINET-B-1000	Type PROFINET-C-1003
	 Universal POF cable that can be assembled, 980/1000, type KDHEAVY-1011, UV and oil-resistant, halogen-free, PUR sheath	 Robust POF cable that can be assembled, 980/1000, type RUGGED-1012, UV and oil-resistant, halogen-free, reinforced PUR sheath	 Robust POF cable that can be assembled, 980/1000, type RUGGED-FLEX-1013, suitable for drag chains and torsion, UV and oil-resistant, halogen-free, reinforced PUR sheath	 Robust POF cable that can be assembled, 980/1000, type PROFINET-B-1000, UV and oil-resistant, halogen-free, reinforced PUR sheath	 Rugged POF cable that can be assembled, 980/1000, type PROFINET-C-1003, suitable for drag chains and torsion, UV and oil-resistant, halogen-free, reinforced PUR sheath
	POF	POF	POF	POF	POF
By the meter	2744319	2744322	2744335	2313397	2313407
IP20	2901553	2901548	2901549	2901551	2901552
IP65	1402188	1402185	1402187	1402172	1402175

with multi-mode fiberglass (OM2)

 B-FOC (ST) plug to B-FOC (ST) plug	 SC duplex plug to SC duplex plug	 LC plug to LC plug	 SCRJ plug to SCRJ plug	 SC duplex plug to SCRJ plug
ST-ST plug	SC-SC plug	LC-LC plug	SCRJ-SCRJ plug	SC-SCRJ plug
2901815	2901805	2989158	2901823	2901812
2901816	2901807	2989255	2901824	2901813
2901817	2901808	2901799	2901825	2901814
 SC duplex plug to B-FOC	 LC plug to SC duplex plug	 LC plug to B-FOC (ST) plug	 B-FOC (ST) plug to SCRJ plug	 LC plug to SCRJ plug
SC-ST plug	LC-SC plug	LC-ST plug	ST-SCRJ plug	LC-SCRG plug
2901809	2989161	2989174	2901820	2901802
2901810	2989268	2989271	2901821	2901803
2901811	2901800	2901801	2901822	2901804

Fiber optic HCS (PCF) cables

Fiber optic fiberglass cables

Type PROFINET-B-HCS-1018	Type PROFINET-C-HCS-GI-1005	Type HCS-RUGGED-1014	Type HCS-Outdoor-1015	Type GDM-RUGGED-1016	Type GD-Outdoor-1017
 Rugged HCS cable that can be assembled, 200/230, type PROFINET-B-HCS-1018, increased temperature range, halogen-free, PVC sheath	 Rugged HCS GI cable that can be assembled, 200/230, type PROFINET-C-HCS-GI-1005, suitable for drag chains and torsion, UV and oil-resistant, halogen-free, reinforced PUR sheath, increased bandwidth for applications up to 1 Gbps	 Rugged HCS cable that can be assembled, 200/230, type HCS-RUGGED-1014, increased temperature range, UV and oil-resistant, halogen-free, reinforced PUR sheath	 HCS outdoor cable that can be assembled, 200/230, type HCS-OUTDOOR-1015, UV-resistant, for underground runs, non-metal rodent protection, longitudinally and transversely watertight, PE sheath	 Rugged fiberglass multi-mode cable that can be assembled, 50/125, type GDM-RUGGED-1016, UV and oil-resistant, halogen-free, reinforced PUR sheath	 Fiberglass multi-mode cable that can be assembled, 50/125, type GD-OUTDOOR-1017, UV-resistant, for underground runs, non-metal rodent protection, longitudinally and transversely watertight, PE sheath
HCS	HCS-GI	HCS	HCS	Glass	Glass
2313766	2313410	2799885	2799445	2799322	2799432
2901556	2901554	2901555	2901557	2901558	2901559
1402190	1402189	1402191		1402193	

Push-pull power connectors and panel mounting frames

Description			Panel mounting frames		
					
Connection technology	Voltage	Contact insert	Metal	Plastic	Metal, square cutout
Solder connection, angled	24 V	1657915	1608087	1608281	
Solder connection, straight	24 V	1609565	1608087	1608281	
Solder connection, angled	400 V	1609549	1608087	1608281	
Solder connection, straight	400 V	1609581	1608087	1608281	
Spring connection, fixed coding	24 V				1405248
Spring connection, fixed coding	400 V				1405167
Spring connection, free coding	24 V				1408235
2 x MSTB to 1 x MSTB connector	24 V				
2 x MSTB to 1 x 7/8" connector	24 V				
4 x MSTB	24 V				

Fiber optic terminal outlets and couplings

		IP20 patch panels and couplings
Patch panel		Order No.
	SC-RJ, 1 slot, DIN rail mounting	1658121
	SC-RJ, 16 slots, 19" mounting, for Freenet contact inserts	1652994
Outlet box		Order No.
	Surface-mounted socket, 2 slots	1653003
	Surface-mounted socket, 6 slots	1653029
	Flush-type socket, 2 slots	1653016
Couplings		Order No.
	2 x F-SMA/F-SMA	2799416
	2 x B-FOC(ST®)/B-FOC(ST®)	2799429
	1 x SC-RJ/SC-RJ (duplex)	1652978
	1 x LC duplex/LC duplex (multi mode)	2700312
	1 x LC duplex/LC duplex (single mode)	2700313
	1 x SC duplex/SC duplex	2901788

IP65/67 panel mounting frames and connectors, version 14

		Connectors		Y-distributor	H-distributor
					
Metal, round cutout	Plastic, square cutout	Metal, push-pull interlocking	Plastic, push-pull interlocking	Metal, push-pull interlocking	Metal, push-pull interlocking
1608249	1608294	1608074	1657892		
1608252	1608304		1608236		
		1409036			
				1404799	
				1404812	
					1405387

IP65/67 terminal outlets and couplings

Couplings		Order No.
	1 x M12/M12	1416677
	1 x SC-RJ/SC-RJ version 6	1410050
	1 x SC-RJ/SC-RJ version 14	1405206
Terminal outlets		**Order No.**
	2 x SC-RJ version 14	1404320
	2 x SC-RJ version 6	1404317
	1 x SC-RJ/1 x power	1404346
Robot interfaces		**Order No.**
	1 x SC-RJ, cable diameter 5 mm – 8 mm	1404319
	1 x SC-RJ, cable diameter 7 mm – 10.5 mm	1404324
	1 x SC-RJ/1 x power, cable diameter 5 mm – 8 mm	1404321
	1 x SC-RJ/1 x power, cable diameter 7 mm – 10.5 mm	1404325
M12 transceiver for POF		**Order No.**
	Transceiver with 650 nm	1416716

Tools

	Assembly tool, HCS		Fiber cleaving tool, HCS	
				
	Assembly tool for HCS fiber, for local assembly of IP20 and IP67 fiber optic plugs, for B-FOC (ST), SC duplex, and SCRJ pin arrangements		Fiber cleaving tool for HCS and HCS GI fiber, suitable for B-FOC, SC duplex, and SCRJ plugs	
	B-FOC	SCRJ	B-FOC	SCRJ
	2708465	2708876	2708478	2313122
Refill set				

Polishing tool, POF		Cutting tool, POF	Stripping tool	Crimping pliers
				
Polishing tool set for polymer fibers, for field assembly of IP20 and IP67 SCRJ connectors		Cutting tool set for polymer fibers, for field assembly of IP20 SCRJ connectors	Stripping tool for multi-stage stripping of shielded cables	Pliers with die, for RJ45 connector crimp contacts
with magnifier	without magnifier			
1658820	2477131	1405246	1657407	1652365
1656673	2799348			

Always up-to-date, always available to you. Here you'll find everything on our products, solutions and service:

phoenixcontact.com

Product range

- Cables and wires
- Connectors
- Controllers
- Electronics housings
- Electronic switchgear and motor control
- Fieldbus components and systems
- Functional safety
- HMIs and industrial PCs
- I/O systems
- Industrial communication technology
- Industrial Ethernet
- Installation and mounting material
- Lighting and signaling
- Marking and labeling
- Measurement and control technology
- Monitoring
- PCB terminal blocks and PCB connectors
- Power supply units and UPS
- Protective devices
- Relay modules
- Sensor/actuator cabling
- Software
- Surge protection and interference filters
- System cabling for controllers
- Terminal blocks
- Tools
- Wireless data communication

ION01-13.000.L3
MNR 52003209/2014-03-11/06

PHOENIX CONTACT GmbH & Co. KG
Flachsmarktstraße 8
32825 Blomberg, Germany
Phone: +49 52 35 3-00
Fax: +49 52 35 3-4 12 00
E-mail: info@phoenixcontact.com
phoenixcontact.com

PHOENIX CONTACT
INSPIRING INNOVATIONS