

Industrial network solutions | Factory Line

Security, Wired and Wireless

A complete offer of industrial Ethernet solutions

Factory Line, the comprehensive range of industrial Ethernet products and services, provides solutions for all configuration levels of an Ethernet-based automation solution.

The range of Factory Line products goes from passive components (such as cables and patch fields) and active infrastructure (media converters, hubs, switches) to proxy and gateway solutions for automation networks. The automator has complete control over his/her automation network at all times via the user-friendly network management tools.

The security concept

If Ethernet-based production systems are directly coupled to the company network, they must be protected from unauthorized access and malware.

Phoenix Contact has therefore developed a three-stage security concept for safe encryption (remote access) for industrial automation:

- Simple access locking for mechanical protection,
- Managed switches with integrated IEEE security functions,
- Security devices with firewall and router function suitable for industrial applications.

We provide you with the optimum security solution for every requirement!

Industrial Wireless in automation

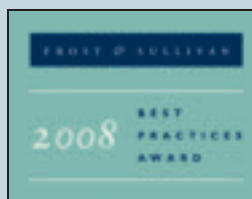
Modern wireless transmission systems simplify installation, reduce maintenance and downtimes, increase system availability, and thus result in increased productivity.

Phoenix Contact offers the ideal industrial wireless solution for your requirements. The wireless products have been specially designed for use in harsh industrial environments and offer a high degree of reliability and data integrity, whilst still being easy to handle.

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You can find information regarding our product and solution-oriented services from page 11 onwards as well as in our online catalog (www.phoenixcontact.net/eshop).



The international consulting company Frost & Sullivan has presented Phoenix Contact with the "2008 European Industrial Wireless Marketing Strategy Leadership of the Year Award".



Security in automation

The introduction of Ethernet-based communication solutions in many industrial production sectors is one of the driving forces for open and flexible automation systems. The production level, however, is oriented to the Ethernet standards used in the office environment. A switch-over from fieldbus to Ethernet communication not only brings about significant changes and adaptations, but also opens up new automation options, e.g. security and routing functions.

Advantageous layer 3 functions

The use of Ethernet with layer 3 functions offers the following advantages:

- Reduction in complexity thanks to a non-variable part strategy for the automation components
- Time and cost saving due to avoidance of individual configuration along with the corresponding testing efforts
- Easier troubleshooting as devices of various machines can be interchanged
- No loss of guarantee even if changes are made to the machine
- Restrictive use of IP addresses
- Conscious use of security devices and functions for the protection of properties as well as for access control.

Factory Line security

The Factory Line products help in implementing a three-stage concept that offers four devices for safe remote access/teleservice.

This concept is integrated into the entire production network in stages depending on the risk potential. It fulfills the high automation technology requirements, thereby offering extensive protection.

Fast Ring Detection/Large Ring Support

Unlike the RSTP standard, redundant networks can now be connected under the root with up to 28 devices, instead of seven devices as before, thanks to the Fast Ring Detection procedure supported in the managed switches. Here, unlike other redundancy procedures, the ring can be integrated into a higher-level RSTP network. The recovery time of Fast Ring Detection is just 100 ms which allows isolated switch-over to PROFINET networks.

Ethernet IO and automation protocols

Automation protocols such as PROFINET IO and EtherNet/IP play an important role in the transmission of time-critical IO data. The switch infrastructure must thus be designed accordingly.

For PROFINET IO, the managed switches support priority-controlled forwarding of Ethernet frames. For this, priority-related information in the VLAN (Virtual Local Area Network) tag is evaluated as per IEEE 802.1Q standard. Prioritization of data packets ensures that higher-priority data traffic, such as time-sensitive process data, is not disturbed by low-priority data traffic, such as non-time-critical parameterizations, in the case of a large traffic load. Time-critical IO data can thus be given higher priority and can reach the destination faster.

In EtherNet/IP applications, the use of multicast data streams for IO data transmission results in further requirements for the Ethernet infrastructure. For this purpose, the modular managed switches and managed compact switches have intelligent multicast filtering and support the IGMP snooping mechanism. Multicast groups can thus be created dynamically and automatically in the switch, in addition to static entries. This stops uncontrolled spreading of multicast data streams in the network, thus preventing them from consuming bandwidth unnecessarily and affecting the network performance.



Switch with standard functions

The SF and SFN switch series have been developed for the control cabinet or bus housing requirements.

The SF switch series is characterized by the flat structure of just 30 mm and optionally has 8 or 16 ports, of which 0, 1 or 2 ports are available as glass fiber interfaces.

The SFN switches are designed for use in the control cabinet and have a design width of 30 mm in the five-port versions and 53 mm in the eight-port versions. Here too, up to 2 ports are available in glass fiber connection method.

If required, the SFN switches can be equipped with security accessories in order to prevent unauthorized connections and disconnections efficiently.



Gigabit Ethernet

The standard switches (SFN) as well as the managed switches have uniform gigabit-compatible twisted-pair ports. Optionally, the gigabit glass fiber technology IEEE 802.3z can also be used here. This technology enables up to 20 km transmission depending on the type.

The Factory Line Smart Managed Switches allow the configuration of redundant gigabit networks. They are therefore suitable when a redundant and high-performance coupling is required between the automation network and the higher-level company network. For this, SX and LX fiber optics transceivers are available for ranges of up to 80 km.

Configuration with plug-in module

Memory modules are available for easy device configuration during start-up as well as when replacing the device.

During replacement as well as during the initial startup, the memory module is simply plugged in, the switch is started and the module thus gets configured automatically.



High network availability through fiber optics diagnostics

The unique fiber optics diagnostics with polymer fibers (POF) and HCS fibers (Hard Clad Silica) enables continuous monitoring also for the Ethernet-fiber optics paths. The modules with SCRJ connector technology constantly monitor practical transmission parameters. Critical changes in the transmission path are detected and can be eliminated before they result in a breakdown.

Clear presentation of topology

For a diagnostics and network topology presentation in the engineering tool (e. g. PC Worx or STEP7), the Link Layer Discovery Protocol (LLDP) has been integrated into the Smart Managed Switches which leads the user accurately to the error location in the event of an error.

	MMS/MCS	SMCS	LMS	SF	SFN	ME	SFN Gigabit	HUB
Redundancy								
RSTP	x	x	x					
Fast Ring Detection	x	x	x					
MRP	x	x						
PROFINET RTsupport	x	x	x					
PROFINET IO device	x	x						
EtherNet/IP support	x	x	x					
Powerlink / FL Net								x
Gigabitsupport		x					x	
POU	x							
Flat design	x	x		x				
Slim design			x		x	x	x	x
Maritime approval	x		x			x		

We convert your requirements into highly efficient radio solutions



Modern wireless transmission systems simplify installation, reduce maintenance and downtimes, increase system availability, and thus result in increased productivity. Phoenix Contact offers the ideal industrial wireless solution for your requirements. The wireless products have been specially designed for use in harsh industrial environments and offer a high degree of reliability and data integrity, whilst still being easy to handle. Irrespective of whether you want to transfer a few IO signals or large volumes of data; whether the communication is to take place in realtime over short distances or over several hundred meters; whether the production hall has a metallic environment or is an outdoor area, the product range provides the ideal solution and the required accessories for every requirement.

Bluetooth



Bluetooth (IEEE 802.15.1) is a standardized wireless technology that enables extremely rugged and reliable data transmission in metallic environments as well as in environments with high levels of interference. Bluetooth has become established as a standard for wireless transmission of control data in automation networks and has, among other things, been included in the Profinet standard.

- Additional features include:
- Several Bluetooth systems can be operated simultaneously
 - Tap-proof and manipulation-proof
 - High range in industrial halls

Factory Line Bluetooth is the standard-compliant optimization for industrial factory automation. Advantages:

- Interference-free operation parallel to WLAN
- Higher performance
- Effective integration into automation systems

WLAN



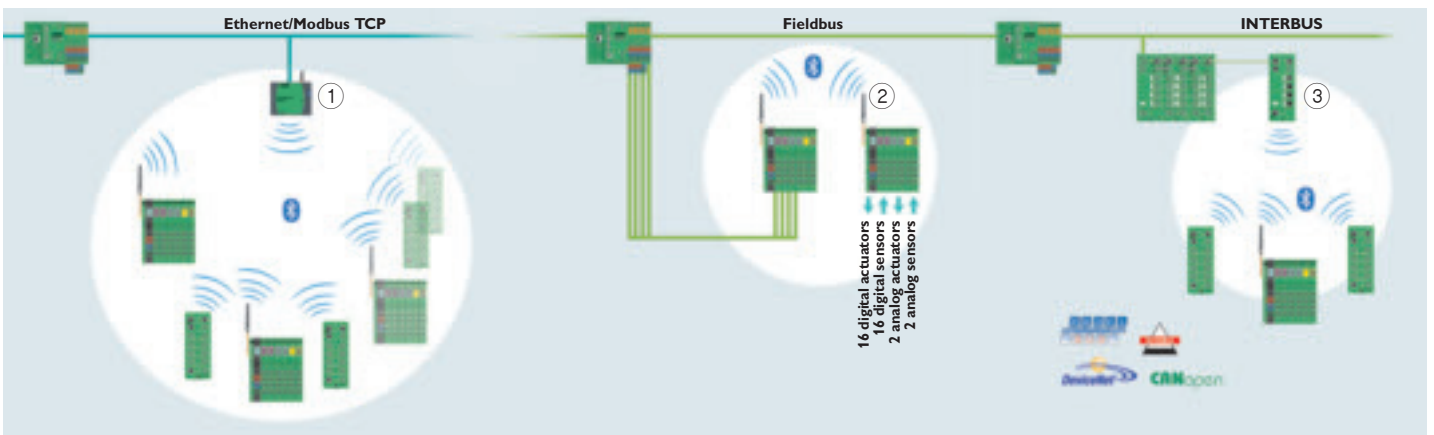
WLAN (IEEE 802.11) is the standardized wireless technology for high-performance, system-wide wireless networks with many mobile devices. It can be effectively integrated into the IT and system network. WLAN has proved its worth in industry as a wireless network infrastructure as well as in the area of controlling mobile transport systems.

- Additional features include:
- High data rates of up to 54 Mbps gross
 - Wide networks can be implemented
 - Mobility of network devices through automatic roaming.

Factory Line WLAN is the standard-compliant optimization for industrial automation. The advantages are:

- Greater reliability
- High performance and wide range
- Extremely fast roaming in a few milliseconds.

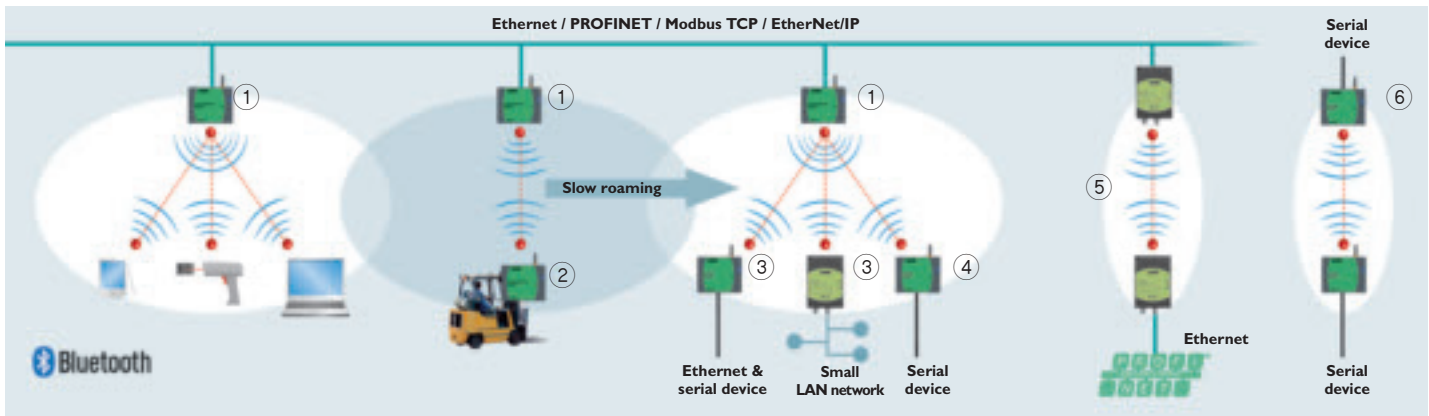
Wireless IO



Wireless IO is the solution for wireless transmission of time-critical digital and analog control signals in an automation network. Speed, reliability and ease of handling are the features of this solution.

- ① Up to seven wireless IO modules can be integrated into an Ethernet / Modbus-TCP network in a wireless manner via the FL BT MOD IO AP.
- ② The Wireless MUX allows easy and quick wireless connection of a few digital and analog signals to the controller via the available input and output channels.
- ③ Up to three wireless IO modules can be connected with the most important fieldbuses in a wireless manner via the FL BT BS3 base station.

Factory Line Bluetooth



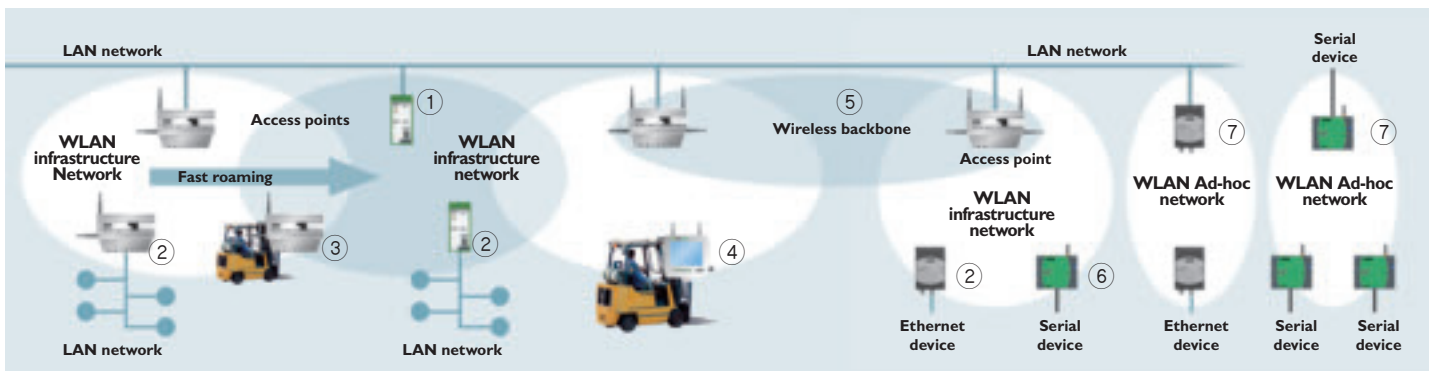
Factory Line Bluetooth allows reliable and easy wireless integration of automation components in the automation network.

① The Bluetooth access point can be used to integrate up to seven devices with the SPP (Serial Port Profile) or PAN (Personal Area Network) Bluetooth profiles in the network.

② Automatic roaming between different access points is possible.
③ Field devices with Ethernet connection are integrated in the network via Bluetooth client modules.
④ Devices with serial connection (RS-232, RS-422, RS-485) are integrated in the Ethernet network via the serial port adapter and the COM server integrated in the BLUETOOTH AP.

⑤ The data transmission is protocol-transparent, thus enabling easy integration into industrial Ethernet networks such as PROFINET, Modbus/TCP or EtherNet/IP.
⑥ Serial point to point connections are also possible.

Factory Line WLAN



Factory Line WLAN is a full coverage high-speed wireless access to your Ethernet network.





① The Factory Line WLAN access points are reliable, safe and high-performance wireless access points for the network.
② Ethernet-compatible devices can be integrated quickly and easily in the WLAN network via WLAN client adapters.






③ Special fast roaming functions allow fast roaming between the radio cells.
④ Panel PCs with IP65 allow wireless operation and monitoring of systems.
⑤ High-performance wireless backbone connections can be easily implemented with dual access points.





⑥ Devices with RS-232, RS-422 or RS-485 connection can also be integrated into the WLAN network via serial port adapters.
⑦ Smaller networks can also be implemented as ad-hoc networks without access points.

Industrial network solutions






Factory Line Security/Wired – Product overview




Security solutions				
				
Type Order No.	FL MGuard RS 2989310	FL SEC SGW GT/GT 2892009	FL MGuard RS-B 2989899	FL MGuard PCI/266 2989019
Type Order No.	FL MGuard RS VPN 2989611			FL MGuard PCI/533 2989213
Type Order No.	FL MGuard RS VPN ANALOG 2989718			FL MGuard PCI/266 VPN 2989514
Type Order No.	FL MGuard RS VPN ISDN 2989815			FL MGuard PCI/533 VPN 2989417
Description	Firewall/router in ME45 format	Firewall/router/gateway	Router in ME45 format	Firewall/router in PCI format
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Lean Managed Switches			Smart Managed Compact Switches		
					
Type Order No.	FL SWITCH LM 5TX 2989527	FL SWITCH LM 4TX/1FX 2989624	FL SWITCH LM 4TX/1FX ST 2989721	FL SWITCH SMCS 8TX 2989226	FL SWITCH SMCS 6TX/2SFP 2989323
Type Order No.	FL SWITCH LM 8TX 2832632	FL SWITCH LM 4TX/1FX SM 2989828	FL SWITCH LM 4TX/1FX SM ST 2989925	FL SWITCH SMCS 8GT 2891123	FL SWITCH SMCS 6GT/2SFP 2891479
Type Order No.	FL SWITCH LM 8TX-E 2891466	FL SWITCH LM 4TX/2FX... 28...	FL SWITCH LM 4TX/2FX ST 2989132		
Type Order No.		FL SWITCH LM 4TX/2FX SM... 2891...	FL SWITCH LM 4TX/2FX SM ST 2989239		
Description	Lean Managed Switch with RJ45 ports	Lean Managed Switch with RJ45 ports and SC fiber optics ports	Lean Managed Switch with RJ45 ports and ST fiber optics ports	Smart Managed Compact Switch with RJ45 ports	Smart Managed Compact Switch with RJ45 ports and gigabit glass fiber interfaces
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Managed Compact Switches		Modular Managed Switches		
				
Type Order No.	FL SWITCH MCS 16TX 2832700	FL SWITCH MCS 14TX/2FX 2832713	FL SWITCH MM HS 2832328	FL MXT 2832331
Type Order No.			FL SWITCH MM HS/M 2832522	FL MXT/M 2832535
Description	Managed Switch, 16 twisted pair ports 10/100Base-T(X)	Managed Switch, 14 twisted pair ports 10/100Base-T(X) two 100Base-FX multi-mode glass fiber interfaces	Modular Managed Switch (MMS), head station with 4 integrated slots (8 ports), 10/100 Mbps	Extension module with 4 slots (8 ports)
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Accessories – Configuration memory and interface modules







					
Type Order No.	FL IF MEM 2TX-D 2832483	FL MEM PLUG 2891259	FL IF 2TX VS-RJ-F 2832344	FL IF 2FX SC-F 2832412	FL IF 2FX SM SC-D 2832205
Type Order No.	FL IF MEM 2TX-D/MRM 2891770	FL MEM PLUG/MRM 2891275	FL IF 2TX VS-RJ-D 2832357	FL IF 2FX SC-D 2832425	
Type Order No.			FL IF 2PSE-F 2832904	FL IF 2FX ST-D 2884033	
Description	Configuration memory, 2 twisted pair 10/100Base-T(X) ports	Configuration memory, replaceable, for easy device replacement and start-up	2 twisted pair 10/100Base-T(X) ports, 2 x RJ45 connection from below or from front	2 100Base-FX multi-mode glass fiber ports, 2 x SC connection from below or from front	2 100Base-FX single-mode glass fiber ports, 2 x SC connection from below, max. 36000 m range
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Type Order No.	FL IF 2HCS 100-D 2832742	FL IF TX/POF 10/100-D 2832807	FL IF 2POF SCRJ-D 2891084
Type Order No.	FL IF 2POF 10/100-D 2832852	FL IF TX/HCS 100-D 2832739	
Description	2 HCS/polymer fiber ports, 2 x F-SMA connection from below	One twisted pair and HCS/polymer fiber port each, 1 x RJ45 and 1 x F-SMA connection from below	2 POF/HCS fiber ports, connection from below, diagnostics-compatible
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Standard Function Switches Narrow with gigabit

				
Type Order No.	FL SWITCH SFN 8GT 2891673	FL SWITCH SFN 7GT/SX 2891518	FL SWITCH SFN 6GT/2SX 2891398	FL SWITCH SFN 6GT/2LX 2891987
Type Order No.				FL SWITCH SFN 6GT/2LX-20 2891563
Description	8 TP-RJ45 ports 10/100/1000 Mbps (auto negotiation), auto crossing, floating alarm contact, redundant 24 V DC supply	7 TP-RJ45 ports 10/100/1000 Mbps (auto negotiation), auto crossing; 1 fiber optics port (SC-D, full duplex mode, 1000 Mbps), floating alarm contact, redundant 24 V DC supply	6 TP-RJ45 ports 10/100/1000 Mbps (auto negotiation), auto crossing; 2 fiber optics ports (SC-D, full duplex mode, 1000 Mbps), floating alarm contact, redundant 24 V DC supply	6 TP-RJ45 ports 10/100/1000 Mbps (auto negotiation), auto crossing; 2 fiber optics ports (SC-D, full duplex mode, 1000 Mbps), floating alarm contact, redundant 24 V DC supply
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Standard function switches narrow

						
Type Order No.	FL SWITCH SFN 5TX 2891152	FL SWITCH SFN 4TX/FX... 2891...	FL SWITCH SFN 6TX/2FX 2891314	FL SWITCH SFNB 5TX 2891001	FL SWITCH SFNT 5TX 2891003	FL SWITCH SFNT 7TX/FX 2891006
Type Order No.	FL SWITCH SFN 8TX 2891929	FL SWITCH SFN 7TX/FX... 2891...	FL SWITCH SFN 6TX/2FX ST	FL SWITCH SFNB 8TX 2891002	FL SWITCH SFNT 8TX 2891005	FL SWITCH SFNT 7TX/FX ST2891007
Type Order No.					FL SWITCH SFNT 4TX/FX 2891004	
Description	5(8) TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing	4(7) TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, 1 fiber optics port (SC-D or ST, full duplex mode, 100 Mbps)	6 TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, 2 fiber optics ports (SC-D or ST, full duplex mode, 100 Mbps)	5(8) TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, Basic version	5 (8/4) TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, 1 fiber optics port (SC-D full duplex mode, 100 Mbps), Wide temperature range	7 TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, 1 fiber optics port (SC-D or ST, full duplex mode, 100 Mbps), Wide temperature range
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Standard function switches

					
Type Order No.	FL SWITCH SF 8TX 2832771	FL SWITCH SF 7TX/FX 2832726	FL SWITCH SF 6TX/2FX 2832933	FL SWITCH SF 6TX/2FX ST 2832674	FL SWITCH SF 4TX/3FX ST 2832603
Type Order No.	FL SWITCH SF 16TX 2832849	FL SWITCH SF 15TX/FX 2832661	FL SWITCH SF 14TX/2FX 2832593	FL SWITCH SF 7TX/FX ST 2832577	
Description	8(16) TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, floating alarm contact, redundant 24 V DC supply	7(15) TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, 1 fiber optics port (SC-D, full duplex mode, 100 Mbps), floating alarm contact, redundant 24 V DC supply	6(14) TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing; 2 fiber optics ports (SC-D, full duplex mode, 100 Mbps), floating alarm contact, redundant 24 V DC supply	6(7) TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, 2(1) fiber optics ports (ST, full duplex mode, 100 Mbps), floating alarm contact, redundant 24 V DC supply	4 TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, 3 fiber optics ports (ST, full duplex mode, 100 Mbps), floating alarm contact, redundant 24 V DC supply
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Unmanaged switches

Hubs

Power over Ethernet

					
Type Order No.	FL SWITCH 5TX 2832085	FL SWITCH 8TX 2832218	FL HUB 8TX-ZF 2832551	FL HUB 16TX-ZF 2832564	FL IF 2PSE-F 2832904
Description	5 TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, floating alarm contact, redundant 24 V DC supply	8 TP-RJ45 ports 10/100 Mbps (auto negotiation), auto crossing, floating alarm contact, redundant 24 V DC supply	8 TP-RJ45 ports 10/100 Mbps	16 TP-RJ45 ports 10/100 Mbps	Power over Ethernet interface module for the Modular Managed Switch, 2 x RJ45 connection from the front
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Patch cable, patch fields and accessories

					
Type Order No.	FL MM PATCH ... 2989...	FL CAT5 PATCH... 2832...	FL PF 2TX CAT... 2891...	FL RA SF8 2832519	FL RJ45 PROTECT CAP 2832991
Type Order No.	FL SM PATCH ... 2989...	FL CAT6 PATCH... 2891...	FL PF 8TX CAT... 2891...		
Description	Fiber optics patch cable, pre-assembled, cable length 1 m or 2 m	Patch cable, CAT5/CAT6, pre-assembled, cable length 0.3 m to 10 m	Patch field, 2(8) RJ45 ports CAT5e(CAT6)	Rail adapter, for vertical mounting position	Dust protection cap for RJ45 female connector
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Accessories for Factory Line patch cables




					
Type Order No.	FL DUST CVR ... 2891...	FL PATCH CCODE ... 2891...	FL IP 54 FLANGE ... 2891...	FL IP 54 SPOUT 2891440	FL IP 54 ASSEMBLY TOOL 2891547
Description	Dust protection elements with color marking, for SFN switch and an angled patch connector	Color marking for FL CAT...Patch...	IP54 protection with color marking, for SFN switch and an angled patch connector	IP54 protection for patch cable, used with FL IP 54 FLANGE ...	Assembly tool for FL IP 54 SPOUT
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Security with Factory Line patch cables

					
Type Order No.	FL PATCH SAFE CLIP 2891246	FL PLUG GUARD ... 2891...	FL PORT GUARD 2891220	FL PATCH GUARD 2891424	FL PATCH GUARD CCODE 2891...
Type Order No.			FL PLUG GUARD KEY 2891327	FL PATCH GUARD KEY 2891521	
Description	Security element for FL CAT...Patch...	Security frame for SFN switch and patch fields	Locking element and key for security frame FL PLUG GUARD...	Lockable security element and key for FL PATCH...	Color marking for FL PATCH GUARD
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Software

Accessories

			
Type Order No.	FL SNMP OPC SERVER 2832166	FL SNMP AGENT 2832179	...-CABLE-... ...
Description	For monitoring and configuration of SNMP-compatible devices in HMI and SCADA systems	Integration of OPC-based automation solutions in company-wide network management systems	Suitable cables and connectors can be found in our online catalog
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Industrial network solutions

Factory Line Wireless – Product overview

Wireless MUX IO

				
Type Order No.	ILB BT ADIO MUX-OMNI... 2884...	ILB BT ADIO MUX-PANEL... 28845...	ILB BT ADIO MUX-OMNI 8/M 2693185	IL MODULAR MUX SD 2700047
Description	Wireless MUX set, two modules with 16 digital inputs and outputs each and 2 analog inputs and outputs each 2 OMNI antennas	Wireless MUX set, two modules with 16 digital inputs and outputs each and 2 analog inputs and outputs each 2 PANEL antennas	Wireless MUX set, with maritime approval	SD memory card with special modular MUX firmware
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Wireless IO





				
Type Order No.	FLM BT BS 3... 2...	FL BT MOD IO AP 2884758	FLM BT DIO 8/8 M12... 2...	ILB BT ADIO 2/2/16/16... 2884282
Description	Fieldline Modular Wireless IO base station for up to three wireless IO devices	Bluetooth Modbus IO access point	Fieldline Modular Wireless IO device, 8 digital inputs, 8 digital outputs, M12	Inline Block Wireless IO device, 16 digital inputs, 16 digital outputs, 2 analog inputs, 2 analog outputs
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Factory Line Bluetooth






				
Type Order No.	FL BLUETOOTH AP 2737999	FL BT EPA 2692788	FL BT EPA AIR SET 2693091	FL BT SPA 2884952
Description	Bluetooth access point	Bluetooth Ethernet port adapter	Installation set comprising two FL BT EPAs and connecting cables	Bluetooth serial port adapter
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Wireless LAN access point

WLAN				
Type Order No.	FL WLAN 24 AP 802-11 2884075	FL WLAN 24 DAP 802-11 2884279	FL WLAN 230 AP 802-11 2884444	FL WLAN 24 AP 802-11 XDB 2990037
Description	Wireless LAN access point, 1 wireless interface, 2 antennas	Wireless LAN access point, 2 wireless interfaces, 4 antennas	Wireless LAN access point, 1 wireless interface, 2 antennas	Wireless LAN access point or client
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Wireless Ethernet				Software
WLAN				
	Type Order No. FL WLAN 24 EC 802-11 2884130	Type Order No. FL WLAN EPA 2692791	Type Order No. FL WLAN SPA 2884761	Type Order No. FL WST BASIC 2692254
Description	Wireless LAN Ethernet client	Wireless LAN Ethernet port adapter	Wireless LAN serial port adapter	Simulation software
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Antennas 2.4 GHz and 5 GHz					
					
Type Order No.	RAD-ISM-2400-ANT-PAN-8-0 2867610	RAD-ISM-2400-ANT-CIR-8-0 2884936	RAD-ISM-2400-ANT-OMNI-5-0 2884923	RAD-ISM-2400-ANT-VAN-3-0-SMA 2885867	RAD-ISM-5000-ANT-PAR-18-N 5606613
Type Order No.			RAD-ISM-2400-ANT-OMNI-6-0 2885919	RAD-ISM-2400-ANT-VAN-3-1-MCX 2885702	RAD-ISM-5000-ANT-PAR-22-N 5606174
Description	PANEL directional wireless antenna, incl. assembly material	PANEL directional wireless antenna, incl. assembly material,	OMNI omnidirectional antenna, incl. assembly material	OMNI omnidirectional antenna with protection against vandalism	Parabolic directional wireless antenna (5 GHz), incl. assembly material
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Antenna cable, adapter and surge protection					
					
Type Order No.	RAD-CAB-EF142-... 28845...	RAD-CAB-EF393-... 28676...	RAD-PIG-EF316-...-SMA 286...	RAD-ADP-...SMA/F... 28...	CN-LAMBDA/4-... 28188...
Description	Antenna extension cable Type EF 142, SMA (male) connection on both ends	Antenna extension cable Type EF 393, N (male) connection on both ends	Adapter cable (pigtaills) type EF 316	Adapter for adaptation between devices and cables or for adaptation among cables,	Surge protection
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Leaky wave conductors and accessories					
					
Type Order No.	FL LCX CABLE METER 2884774	FL LCX CON-N/F 2884965	FL LCX 50-OHM 2884978	FL LCX TOOL 2884981	FL LCX CLAMP 2884994
Description	Leaky wave conductors	Connectors	Termination resistors	Alignment tool	Cable tie
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Security solutions for Ethernet-based production networks

Companies are successful only when the operation of their production systems is safe and trouble-free. Since accidents, sabotage or data loss can cause large-scale economic damage, Phoenix Contact offers FL MGUARD RS ... an industrial Firewall/router solution that can be used to secure decentrally distributed automation systems individually. The devices have been specially designed for use in a rough industrial environment and unlike the security solutions from the Office field, they fulfill the high automation requirements for data transmission and mechanical ruggedness.

Increased safety through decentral protection concepts

A central Firewall that secures the entire company network does not provide protection against mostly internal destructive actions. Production cells can be protected only using a decentrally effective concept that is based on a solution for the safety of termination devices. With FL MGUARD..., Phoenix Contact provides a product range that completely protects your automation system against unauthorized access.

The devices can be mounted on DIN rails and are integrated into the network as independent systems. There, they protect a part of the system network or an individual automation component without having a negative effect on the system to be secured.

Virtual addressing/NAT

If machines with similar structures are operated simultaneously in one network, each machine must be individually configured so that it is possible to integrate it into the higher-level communication system. Our FL MGUARD components support the 1:1-NAT function, so that production cells occupying identical IP addressing space can be used in a higher-level network. Individual configuration of serial machines is no longer required.



FL MGUARD RS

Firewall/Router in the ME45 format

Description	Type	Order No.	Pcs. / Pkt.
Firewall/Router in the ME45 format	FL MGUARD RS	2989310	1
Firewall/Router in the ME45 format, VPN support			
- Integrated analog modem - Integrated ISDN terminal adapter			
Technical data			
Ethernet interface			
Number of ports	2		
Transmission speed	10/100 Mbps		
Type of connection	RJ45		
Other completions			
Potential-free signaling contact	Plug-in/screw connection via COMBICON		
VPN - release button	-		
Function			
Basic functionality	Router with intelligent Firewall		
Supported browsers	HTTPS support required		
SNMP – Simple Network Management Protocol	SNMPv1, v2, v3		
VLAN – Virtual Local Area Network	As per 802.1Q		
Status and diagnostics displays	LEDs: P1, P2, Fault, State, Error, LAN, WAN		
Security functions			
Dynamic host configuration protocol (DHCP) support	Server or Relay Agent		
Network time protocol (NTP) client	Client		
Link layer discovery protocol (LLDP)	As per protocol 802.2		
Remote syslog logging	On externals server		
VPN throughput	-		
Number of VPN tunnels	-		
Encryption methods	-		
Internet protocol security (IPsec) mode	-		
Authentication	-		
Data integrity	-		
1:1 Network address translation (NAT) in the VPN	-		
Firewall data throughput	Up to 99 Mbps		
Firewall rules	Configurable stateful inspection firewall		
Filtering	MAC and IP addresses, ports, protocols		
Protection against	IP spoofing, DoS and SYN flood protection		
Routing	Standard routing, NAT, 1:1-NAT, port forwarding		
Power supply			
Supply voltage	24 V DC		
Residual ripple	3.6 V _{pp} (within the permitted voltage range)		
Range of supply voltages	9 V DC ... 36 V DC		
Typical current consumption	170 mA		
General data			
Weight	250 g		
Width	45 mm		
Height	99 mm		
Depth	112 mm		
Degree of protection	IP20		
Ambient temperature (operation)	0°C ... 55°C		
Permissible humidity (operation)	10% ... 95% (non-condensing)		
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC		
Emitted interference	EN 61000-6-4		
Immunity to interference	EN 61000-6-2		



FL MGuard RS VPN

Firewall/Router in the ME45 format, VPN support



FL MGuard RS VPN Analog

Firewall/Router in the ME45 format, VPN support and an integrated analog modem



FL MGuard RS VPN ISDN

Firewall/Router in the ME45 format, VPN support and an integrated ISDN terminal adapter

Type	Order No.	Pcs. / Pkt.
FL MGuard RS VPN	2989611	1

Type	Order No.	Pcs. / Pkt.
FL MGuard RS VPN Analog	2989718	1

Type	Order No.	Pcs. / Pkt.
FL MGuard RS VPN ISDN	2989815	1

2
10/100 Mbps
RJ45

Plug-in/screw connection via COMBICON
Connectable and optional LED

Router with intelligent Firewall and VPN

HTTPS support required
SNMPv1, v2, v3
As per 802.1Q
LEDs: P1, P2, Fault, State, Error, LAN, WAN

Server or Relay Agent

Client
As per protocol 802.2
On external server
Up to 70 Mbps
10 (Up to 250 with license possible)
DES, 3DES, AES-128, -192, -256
ESP-Tunnel / ESP-Transport
X.509v3- certificates with RSA or PSK
MD5, SHA-1
Supported
Up to 99 Mbps
Configurable stateful inspection firewall
MAC and IP addresses, ports, protocols
IP spoofing, DoS and SYN flood protection
NAT, 1:1-NAT, Port Forwarding

24 V DC
3.6 V_{pp} (within the permitted voltage range)

9 V DC ... 36 V DC
170 mA

250 g
45 mm
99 mm
112 mm
IP20
0°C ... 55°C
10% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC
EN 61000-6-4
EN 61000-6-2

2
10/100 Mbps
RJ45

Plug-in/screw connection via COMBICON
Connectable and optional LED

Router with intelligent Firewall, VPN and integrated analog modem

HTTPS support required
SNMPv1, v2, v3
As per 802.1Q
LEDs: P1, P2, Fault, State, Error, LAN, WAN

Server or Relay Agent

Client
As per protocol 802.2
On external server
Up to 70 Mbps
10 (Up to 250 with license possible)
DES, 3DES, AES-128, -192, -256
ESP-Tunnel / ESP-Transport
X.509v3- certificates with RSA or PSK
MD5, SHA-1
Supported
Up to 99 Mbps
Configurable stateful inspection firewall
MAC and IP addresses, ports, protocols
IP spoofing, DoS and SYN flood protection
NAT, 1:1-NAT, Port Forwarding

24 V DC
3.6 V_{pp} (within the permitted voltage range)

9 V DC ... 36 V DC
170 mA

250 g
45 mm
99 mm
112 mm
IP20
0°C ... 55°C
10% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC
EN 61000-6-4
EN 61000-6-2

2
10/100 Mbps
RJ45

Plug-in/screw connection via COMBICON
Connectable and optional LED

Router with intelligent Firewall, VPN and an integrated ISDN terminal adapter

HTTPS support required
SNMPv1, v2, v3
As per 802.1Q
LEDs: P1, P2, Fault, State, Error, LAN, WAN

Server or Relay Agent

Client
As per protocol 802.2
On external server
Up to 70 Mbps
10 (Up to 250 with license possible)
DES, 3DES, AES-128, -192, -256
ESP-Tunnel / ESP-Transport
X.509v3- certificates with RSA or PSK
MD5, SHA-1
Supported
Up to 99 Mbps
Configurable stateful inspection firewall
MAC and IP addresses, ports, protocols
IP spoofing, DoS and SYN flood protection
NAT, 1:1-NAT, Port Forwarding

24 V DC
3.6 V_{pp} (within the permitted voltage range)

9 V DC ... 36 V DC
170 mA

250 g
45 mm
99 mm
112 mm
IP20
0°C ... 55°C
10% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC
EN 61000-6-4
EN 61000-6-2

Security Gateway



FL SEC SGW GT/GT

Firewall/router/gateway

The FL SEC SGW GT/GT Security Gateway is an ideal distributed Firewall modules for use in the control cabinet wherever access to automation networks is controlled and/or limited.

With data rates of up to 1000 Mbps at the RJ45 and SFP port, the Security Gateway offers maximum performance in automation applications.

A web server and an SNMP agent are provided for diagnostics, maintenance, and configuration via the network. A remote access point via the RS232 interface can be used for local operation.

A part of the comprehensive safety concept is the easy configuration of the Firewall thanks to the pre-defined smart rules. The filter rules required for this have already been pre-configured in FL SEC SGW GT/GT and can be easily selected via the web interface and the relevant device menus. Automation-typical applications such as PROFINET communication or Modbus/TCP can usually be released. Experts also have the option of editing filter functions.

The FL SEC SGW GT/GT can be flexibly used in networks using copper lines or pluggable glass fiber modules FL SFP... for multimode or single mode with transmission ranges of up to 80 km.

Description	Type	Order No.	Pcs. / Pkt.
Router, 1:1 NAT, pre-configured Firewall			
	FL SEC SGW GT/GT	2892009	1
Technical data			
Ethernet interface			
Number of ports	1		
Transmission speed	10/100/1000 Mbps		
Type of connection	RJ45		
Fiber optic interface			
Transmission speed	1000 Mbps (full duplex)		
Type of connection	SFP ports		
Other connections			
Serial (RS-232)	RS-232-C, 6-pos. MINI-DIN female connector (PS/2)		
Function			
Basic functionality	Router with intelligent Firewall		
Management	Web based management, SNMP or over V.24 (RS232)		
Supported browsers	HTTPS support required		
SNMP – Simple Network Management Protocol	SNMPv1, v2, v3		
VLAN – Virtual Local Area Network	-		
Redundancy	-		
Security functions			
Dynamic host configuration protocol (DHCP) support	Server or Relay Agent		
Network time protocol (NTP) client	Client		
Link layer discovery protocol (LLDP)	As per protocol 802.2		
Firewall rules	Configurable stateful-inspection-firewall preconfigured		
Filtering			
Protection against	MAC and IP addresses, ports, protocols		
Routing	-		
Power supply			
Supply voltage	24 V DC		
Residual ripple	3.6 V _{pp} (within the permitted voltage range)		
Range of supply voltages	18 V DC ... 32 V DC		
Typical current consumption	-		
General data			
Weight	660 g		
Width	128 mm		
Height	110 mm		
Depth	69 mm		
Degree of protection	IP20		
Ambient temperature (operation)	-20°C ... 60°C		
Permissible humidity (operation)	5% ... 95% (non-condensing)		
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC		
Emitted interference	EN 61000-6-4		
Immunity to interference	EN 61000-6-2		



Economical configuration and addressing

The introduction of Ethernet-based communication solutions in various industrial manufacturing fields is one of the driving forces for open and flexible automation systems. Here, the production level is oriented towards the standards used in office environments. With the IT-powered automation, Phoenix Contact provides devices that have been specially designed for use in a rough industrial environment and unlike the security solutions from the office field, they fulfill the high automation requirements for data transmission and mechanical ruggedness.

Increased safety through decentral protection concepts

Production cells can be protected only using a decentrally effective concept that is based on a solution for the safety of termination devices. With FL MGUARD ..., Phoenix Contact provides a product range that completely protects your automation system against unauthorized access.

The devices can be mounted on DIN rails and are integrated into the network as independent systems. There, they protect a part of the system network or an individual automation component without having a negative effect on the system to be secured.

Virtual addressing/NAT

If machines with similar structures are operated simultaneously in one network, each machine must be individually configured so that it is possible to integrate it into the higher-level communication system. Our FL MGUARD components support the 1:1-NAT function, so that production cells occupying identical IP addressing space can be used in a higher-level network. Individual configuration of serial machines is no longer required.



FL MGUARD RS-B

Router in ME45 format

Description	Type	Order No.	Pcs. / Pkt.
Router in the ME45 format	FL MGUARD RS-B	2989899	1
Technical data			
Ethernet interface			
Number of ports	2		
Transmission speed	10/100 Mbps		
Type of connection	RJ45		
Other connections			
Potential-free signaling contact	Plug-in/screw connection via COMBICON		
Function			
Basic functionality	Router for standard routing, NAT, 1:1-NAT and port forwarding		
Supported browsers	HTTPS support required		
SNMP – Simple Network Management Protocol	SNMPv1, v2, v3		
VLAN – Virtual Local Area Network	-		
Status and diagnostics displays	LEDs: P1, P2, Fault, State, Error, LAN, WAN		
Security functions			
Dynamic host configuration protocol (DHCP) support	Server or Relay Agent		
Network time protocol (NTP) client	Client		
Link layer discovery protocol (LLDP)	As per protocol 802.2		
Remote syslog logging	On external server		
VPN throughput	-		
Number of VPN tunnels	-		
Encryption methods	-		
Internet protocol security (IPsec) mode	-		
Authentication	-		
Data integrity	-		
1:1 Network address translation (NAT) in the VPN	-		
Firewall data throughput	-		
Firewall rules	-		
Filtering	-		
Protection against	-		
Routing	Standard routing, NAT, 1:1-NAT, port forwarding		
GRP_Routing data throughput	Up to 2 x 85.00 Mbps		
Power supply			
Supply voltage	24 V DC		
Residual ripple	3.6 V _{PP} (within the permitted voltage range)		
Range of supply voltages	9 V DC ... 36 V DC		
Typical current consumption	170 mA		
General data			
Weight	250 g		
Width	45 mm		
Height	99 mm		
Depth	112 mm		
Degree of protection	IP20		
Ambient temperature (operation)	0°C ... 55°C		
Permissible humidity (operation)	10% ... 95% (non-condensing)		
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC		
Emitted interference	EN 61000-6-4		
Immunity to interference	EN 61000-6-2		

Security solutions in the PCI format for Ethernet-based production networks

Companies are successful only when the operation of their production systems is safe and trouble-free. Since accidents, sabotage or data loss can cause large-scale economic damage, Phoenix Contact offers FL MGUARD PCI ... an industrial Firewall/router solution in the PCI format that can be used to secure decentrally distributed automation systems individually. The devices have been specially designed for use in industrial PCs without driver and independent from the operating system.

Increased safety through decentral protection concepts

A central Firewall that secures the entire company network does not provide protection against mostly internal destructive actions. Production cells can be protected only using a decentrally effective concept that is based on a solution for the safety of termination devices. With FL MGUARD..., Phoenix Contact provides a product range that completely protects your automation system against unauthorized access.

The FL MGUARD devices in the PCI format are integrated into IPCs and there, they protect a part of the system network or an individual automation component – without affecting the system to be secured. All incoming and outgoing data packets are monitored in accordance with prescribed rules.

Virtual addressing/NAT

If machines with similar structures are operated simultaneously in one network, each machine must be individually configured so that it is possible to integrate it into the higher-level communication system. Our FL MGUARD components support the 1:1-NAT function, so that production cells occupying identical IP addressing space can be used in a higher-level network. Individual configuration of serial machines is no longer required.



FL MGUARD PCI/266

Firewall/router in the PCI format,
 processor cycle frequency 266 MHz



Description	Type	Order No.	Pcs. / Pkt.
Firewall/router in the PCI format - 266 MHz processor clock frequency - 533 MHz processor clock frequency Firewall/router in the PCI format, VPN support - 266 MHz processor clock frequency - 533 MHz processor clock frequency	FL MGUARD PCI/266	2989019	1
Technical data			
Ethernet interface			
Number of ports	2		
Transmission speed	10/100 Mbps		
Type of connection	RJ45		
Function			
Basic functionality	Firewall/router		
Supported browsers	HTTPS support required		
SNMP – Simple Network Management Protocol	SNMPv1, v2, v3		
VLAN – Virtual Local Area Network	As per 802.1Q		
Status and diagnostics displays	Link/activity per port		
Security functions			
Dynamic host configuration protocol (DHCP) support	Server or Relay Agent		
Network time protocol (NTP) client	Client		
Link layer discovery protocol (LLDP)	As per protocol 802.2		
Remote syslog logging	On externals server		
VPN throughput	-		
Number of VPN tunnels	-		
Encryption methods	-		
Internet protocol security (IPsec) mode	-		
Authentication	-		
Data integrity	-		
1:1 Network address translation (NAT) in the VPN	-		
Firewall data throughput	Up to 90 Mbps		
Firewall rules	Configurable stateful inspection firewall		
Filtering	MAC and IP addresses, ports, protocols		
Protection against	IP spoofing, DoS and SYN flood protection		
Routing	NAT, 1:1-NAT, Port Forwarding		
Power supply			
Connection supply	Via PCI bus		
General data			
Weight	200 g		
Format	PCI		
Degree of protection	IP00		
Ambient temperature (operation)	0°C ... 70°C		
Permissible humidity (operation)	20% ... 90% (non-condensing)		
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC		



FL MGuard PCI/533

Firewall/router in the PCI format,
processor cycle frequency 533 MHz



FL MGuard PCI/266 VPN

Firewall/router in the PCI format, VPN support,
processor cycle frequency 266 MHz



FL MGuard PCI/533 VPN

Firewall/router in the PCI format, VPN support,
processor cycle frequency 533 MHz



Type	Order No.	Pcs. / Pkt.
FL MGuard PCI/533	2989213	1



Type	Order No.	Pcs. / Pkt.
FL MGuard PCI/266 VPN	2989514	1



Type	Order No.	Pcs. / Pkt.
FL MGuard PCI/533 VPN	2989417	1

2
10/100 Mbps
RJ45

Firewall/router
HTTPS support required
SNMPv1, v2, v3
As per 802.1Q
Link/activity per port

Server or Relay Agent

Client
As per protocol 802.2
On externals server
-
-
-
-
-
-
Up to 99 Mbps
Configurable stateful inspection firewall
MAC and IP addresses, ports, protocols
IP spoofing, DoS and SYN flood protection
NAT, 1:1-NAT, Port Forwarding

Via PCI bus

200 g
PCI
IP00
0°C ... 70°C
20% ... 90% (non-condensing)
Conformance with EMC directive 89/336/EEC

2
10/100 Mbps
RJ45

Firewall/router
HTTPS support required
SNMPv1, v2, v3
As per 802.1Q
Link/activity per port

Server or Relay Agent

Client
As per protocol 802.2
On externals server
Up to 30 Mbps
10
DES, 3DES, AES-128, -192, -256
ESP-Tunnel / ESP-Transport
X.509v3- certificates with RSA or PSK
MD5, SHA-1
Supported
Up to 90 Mbps
Configurable stateful inspection firewall
MAC and IP addresses, ports, protocols
IP spoofing, DoS and SYN flood protection
NAT, 1:1-NAT, Port Forwarding

Via PCI bus

200 g
PCI
IP00
0°C ... 70°C
20% ... 90% (non-condensing)
Conformance with EMC directive 89/336/EEC

2
10/100 Mbps
RJ45

Firewall/router
HTTPS support required
SNMPv1, v2, v3
As per 802.1Q
Link/activity per port

Server or Relay Agent

Client
As per protocol 802.2
On externals server
Up to 70 Mbps
10
DES, 3DES, AES-128, -192, -256
ESP-Tunnel / ESP-Transport
X.509v3- certificates with RSA or PSK
MD5, SHA-1
Supported
Up to 99 Mbps
Configurable stateful inspection firewall
MAC and IP addresses, ports, protocols
IP spoofing, DoS and SYN flood protection
NAT, 1:1-NAT, Port Forwarding

Via PCI bus

200 g
PCI
IP00
0°C ... 70°C
20% ... 90% (non-condensing)
Conformance with EMC directive 89/336/EEC

Lean Managed Switch

As much diagnostics as possible – as little space as necessary! The new compact fiber optics compatible and managed Ethernet switches (Factory Line Lean Managed range) connect copper-based Ethernet devices or network segments to any fiber optics Ethernet networks. The connection can be established either directly or via redundant lines in any topology forms. With the help of integrated software functions, data streams and connected automation equipment can be comprehensively diagnosed and analyzed.

The compact Lean Managed Switches are available as pure RJ45 10/100 Twisted Pair design with five or eight ports or in variants with four RJ45 ports and one or two glass fiber interfaces, 100BASE-FX as multimode or single mode. The glass fiber interfaces are available in SC or ST connection methods.

All twisted-pair ports have autonegotiation and autocrossing functions, thus providing the best conditions for "Plug and Work". The lean managed switches support redundant non-proprietary network structures via the IEEE 802.1w rapid spanning tree protocol and network management via SNMP. Furthermore, you have an integrated web server for extensive configuration and diagnostic options.

The lean managed switches are also suitable for the extended temperature range from -40°C to +70°C.



FL SWITCH LM 5TX

Lean managed switch with RJ45 ports

Description	Type	Order No.	Pcs. / Pkt.
Lean Managed Switch - 5 RJ45 ports - 8 RJ45 ports - 8 RJ45 ports, pre-configured for Ethernet/IP - 4 RJ45 ports, 1 SC fiber optics port (multi-mode) - 4 RJ45 ports, 1 ST fiber optics port (multi-mode) - 4 RJ45 ports, 1 SC fiber optics port (single mode) - 4 RJ45 ports, 1 ST fiber optics port (single mode)	FL SWITCH LM 5TX	2989527	1
Technical data Ethernet interface Number of ports Transmission speed Type of connection Fiber optic interface Number of ports Type of connection Wave length Transmission length	5 RJ45 ports 10/100 Mbps RJ45 female connector, autonegotiation - - - - - -		
Other connections Serial (RS-232) Function Basic functionality	RS-232-C, 6-pos. MINI-DIN female connector (PS/2) Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, Rapid Spanning Tree (RSTP)		
Supported browsers SNMP – Simple Network Management Protocol Redundancy Status and diagnostics displays	Internet Explorer 5.5 or higher Supported SNMP-MIBs: Enterprise, MIB II, Bridge Rapid Spanning Tree 802.1w, Fast Ring Detection Per Ethernet 2 status LEDs: LINK and status activity, 100, full-duplex, supply voltage U _{S1} and U _{S2} (redundant supply voltage)		
Network extension parameters Cascading depth Maximum conductor length ((twisted pair) Power supply Supply voltage Residual ripple Range of supply voltages Typical current consumption General data Weight Width Height Depth Degree of protection Ambient temperature (operation) Permissible humidity (operation) Electromagnetic compatibility Emitted interference Immunity to interference	Network, line and star structure: any 100 m 24 V DC 3.6 V _{pp} 18.5 V DC ... 30.5 V DC 250 mA (at U _S = 24 V DC) 230 g 45 mm 99 mm 112 mm IP20 in acc. with DIN 40050/IEC 60529 -40°C ... 70°C 30% ... 95% (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-3/-4 EN 61000-6-2		



FL SWITCH LM 8TX...

Lean managed switch with RJ45 ports



FL SWITCH LM 4TX/1FX...

Lean managed switch with RJ45 ports and SC multimode ports



FL SWITCH LM 4TX/1FX SM...

Lean managed switch with RJ45 ports and SC single mode ports

Applied for: UL-EX / CUL-EX

Type	Order No.	Pcs. / Pkt.
FL SWITCH LM 8TX	2832632	1
FL SWITCH LM 8TX-E	2891466	1

Type	Order No.	Pcs. / Pkt.
FL SWITCH LM 4TX/1FX	2989624	1
FL SWITCH LM 4TX/1FX ST	2989721	1

Type	Order No.	Pcs. / Pkt.
FL SWITCH LM 4TX/1FX SM	2989828	1
FL SWITCH LM 4TX/1FX SM ST	2989925	1

8 RJ45 ports
10/100 Mbps
RJ45 female connector, autonegotiation

-
-
-
-
-
-

6-pos. MINI DIN female connector (PS/2)

Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, Rapid Spanning Tree (RSTP)

Internet Explorer 5.5 or higher
Supported SNMP MIBs: Enterprise, MIB II, Bridge

Rapid Spanning Tree 802.1w, Fast Ring Detection

Per Ethernet 2 status LEDs: LINK and status activity, 100, full-duplex, supply voltage U_{S1} and U_{S2} (redundant supply voltage)

Network, line and star structure: any
100 m

24 V DC
3.6 V_{PP}
18.5 V DC ... 30.5 V DC
250 mA (at $U_S = 24$ V DC)

230 g
45 mm
99 mm
112 mm
IP20 in acc. with DIN 40050/IEC 60529
-40°C ... 70°C
30% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC
EN 61000-6-3/-4
EN 61000-6-2

4 RJ45 ports
10/100 Mbps
RJ45 female connector, autonegotiation

1 SC multimode
SC-DUPLEX
1300 nm
11000 m (glass fiber with F-G 62.5/125 0.7 dB/km F1000)
6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200)
3000 m (glass fiber with F-G 62.5/125 2.6 dB/km F600)
2800 m (glass fiber with F-G 50/125 1.6 dB/km F800)

RS-232-C, 6-pos. MINI-DIN female connector (PS/2)

Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, Rapid Spanning Tree (RSTP)

Internet Explorer 5.5 or higher
Supported SNMP-MIBs: Enterprise, MIB II, Bridge

Rapid Spanning Tree 802.1w, Fast Ring Detection

Per Ethernet 2 status LEDs: LINK and status activity, 100, full-duplex, supply voltage U_{S1} and U_{S2} (redundant supply voltage)

Network, line and star structure: any
100 m

24 V DC
3.6 V_{PP}
18.5 V DC ... 30.5 V DC
400 mA (at $U_S = 24$ V DC)

230 g
45 mm
99 mm
112 mm
IP20 in acc. with DIN 40050/IEC 60529
-40°C ... 70°C
30% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC
EN 61000-6-3/-4
EN 61000-6-2

4 RJ45 ports
10/100 Mbps
RJ45 female connector, autonegotiation

1 SC single-mode
SC-DUPLEX
1300 nm
36000 m (glass fiber with F-G 9/125 0.36 dB/km)
32000 m (glass fiber with F-G 9/125 0.4 dB/km)
26000 m (glass fiber with F-G 9/125 0.5 dB/km)
-

RS-232-C, 6-pos. MINI-DIN female connector (PS/2)

Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, Rapid Spanning Tree (RSTP)

Internet Explorer 5.5 or higher
Supported SNMP-MIBs: Enterprise, MIB II, Bridge

Rapid Spanning Tree 802.1w, Fast Ring Detection

Per Ethernet 2 status LEDs: LINK and status activity, 100, full-duplex, supply voltage U_{S1} and U_{S2} (redundant supply voltage)

Network, line and star structure: any
100 m

24 V DC
3.6 V_{PP}
18.5 V DC ... 30.5 V DC
400 mA (at $U_S = 24$ V DC)

230 g
45 mm
99 mm
112 mm
IP20 in acc. with DIN 40050/IEC 60529
-40°C ... 70°C
30% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC
EN 61000-6-3/-4
EN 61000-6-2

Lean Managed Switch

The Lean Managed Switches have the most important management functions that are required for automation in Ethernet networks:

- RSTP is the standard IT protocol for the resolution of redundant network structures (meshed, ring). Redundant data paths are manufacturer-independent and thus possible for higher level 19" switches of the IT level as well
- Some unintentionally plugged loops are automatically suppressed (increase in the network ruggedness)
- The fast redundancy switchover using the Fast Ring Detection function prevents interruption of the process or communication failure in the case of redundancy.
- Port Mirroring reflects the data on a freely selectable diagnostics port of the switch. Recording data traffic for service purposes is thus possible
- Flexible and easy configuration is possible via Web-based Management using the automator
- SNMP – Simple Network Management Protocol – the standard for network management in IT enables integration into seamless company-wide network diagnostics concepts
- A configurable alarm contact serves as an alarm output (integration into alarming strategy of the PLC via digital inputs)
- Expanded operating temperature range from -40°C to +70°C enables universal applications



FL SWITCH LM 4TX/2FX...

Lean Managed Switch with RJ45 ports and SC multimode ports



Applied for: UL-EX / CUL-EX

Description	Type	Order No.	Pcs. / Pkt.
Lean Managed Switch - 4 RJ45 ports, 2 SC fiber optics ports (multi-mode)	FL SWITCH LM 4TX/2FX	2832658	1
- 4 RJ45 ports, 2 SC fiber optics ports (multi-mode), preconfigured for Ethernet/IP	FL SWITCH LM 4TX/2FX-E	2891660	1
- 4 RJ45 ports, 2 SC fiber optics ports (single mode)			
- 4 RJ45 ports, 2 SC fiber optics ports (single mode), preconfigured for Ethernet/IP			
- 4 RJ45 ports, 2 ST fiber optics ports (multi-mode)			
- 4 RJ45 ports, 2 ST fiber optics ports (single mode)			
Technical data			
Ethernet interface			
Number of ports	4 RJ45 ports		
Transmission speed	10/100 Mbps		
Type of connection	RJ45 female connector, autonegotiation		
Fiber optic interface			
Number of ports	2 SC multimode		
Type of connection	SC-DUPLEX		
Wave length	1300 nm		
Transmission length	11000 m (glass fiber with F-G 62.5/125 0.7 dB/km F1000) 6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200) 3000 m (glass fiber with F-G 62.5/125 2.6 dB/km F600) 2800 m (glass fiber with F-G 50/125 1.6 dB/km F800)		
Other connections			
Serial (RS-232)	RS-232-C, 6-pos. MINI-DIN female connector (PS/2)		
Function			
Basic functionality	Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, Rapid Spanning Tree (RSTP)		
Supported browsers	Internet Explorer 5.5 or higher		
SNMP – Simple Network Management Protocol	Supported SNMP-MIBs: Enterprise, MIB II, Bridge		
Redundancy	Rapid Spanning Tree 802.1w, Fast Ring Detection		
Status and diagnostics displays	Per Ethernet 2 status LEDs: LINK and status activity, 100, full-duplex, supply voltage U _{S1} and U _{S2} (redundant supply voltage)		
Network extension parameters			
Cascading depth	Network, line and star structure: any		
Maximum conductor length ((twisted pair)	100 m		
Power supply			
Supply voltage	24 V DC		
Residual ripple	3.6 V _{pp}		
Range of supply voltages	18.5 V DC ... 30.5 V DC		
Typical current consumption	400 mA (at U _S = 24 V DC)		
General data			
Weight	230 g		
Width	45 mm		
Height	99 mm		
Depth	112 mm		
Degree of protection	IP20 in acc. with DIN 40050/IEC 60529		
Ambient temperature (operation)	-40°C ... 70°C		
Permissible humidity (operation)	30% ... 95% (non-condensing)		
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC		
Emitted interference	EN 61000-6-3/-4		
Immunity to interference	EN 61000-6-2		



FL SWITCH LM 4TX/2FX SM...

Lean Managed Switch with RJ45 ports and SC single mode ports



FL SWITCH LM 4TX/2FX ST

Lean Managed Switch with RJ45 ports and ST multi-mode ports



FL SWITCH LM 4TX/2FX SM ST

Lean Managed Switch with RJ45 ports and ST single mode ports

Applied for: UL-EX / CUL-EX

Type	Order No.	Pcs. / Pkt.
FL SWITCH LM 4TX/2FX SM	2891916	1
FL SWITCH LM 4TX/2FX SM-E	2891864	1

Type	Order No.	Pcs. / Pkt.
FL SWITCH LM 4TX/2FX ST	2989132	1

Type	Order No.	Pcs. / Pkt.
FL SWITCH LM 4TX/2FX SM ST	2989239	1

4 RJ45 ports
10/100 Mbps
RJ45 female connector, autonegotiation

2 SC single-mode
SC-DUPLEX
1300 nm
36000 m (glass fiber with F-G 9/125 0.36 dB/km)
32000 m (glass fiber with F-G 9/125 0.4 dB/km)
26000 m (glass fiber with F-G 9/125 0.5 dB/km)
-

RS-232-C, 6-pos. MINI-DIN female connector (PS/2)

Store-and-forward switch, complies with IEEE 802.3, two priority classes in acc. with IEEE 802.1 P TCP/IP protocol, BootP-capable, integrated web server function, Rapid Spanning Tree (RSTP)

Internet Explorer 5.5 or higher
Supported SNMP MIBs: Enterprise, MIB II, Bridge

Rapid Spanning Tree 802.1w, Fast Ring Detection

Per Ethernet 2 status LEDs: LINK and status activity, 100, full-duplex, supply voltage U_{S1} and U_{S2} (redundant supply voltage)

Network, line and star structure: any
100 m

24 V DC
3.6 V_{PP}
18.5 V DC ... 30.5 V DC
400 mA (at $U_S = 24$ V DC)

230 g
45 mm
99 mm
112 mm
IP20 in acc. with DIN 40050/IEC 60529
-40°C ... 70°C
30% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC
EN 61000-6-3/-4
EN 61000-6-2

4 RJ45 ports
10/100 Mbps
RJ45 female connector, autonegotiation

2 ST multi mode
ST Simplex
1300 nm
11000 m (glass fiber with F-G 62.5/125 0.7 dB/km F1000)
6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200)
3000 m (glass fiber with F-G 62.5/125 2.6 dB/km F600)
2800 m (glass fiber with F-G 50/125 1.6 dB/km F800)

RS-232-C, 6-pos. MINI-DIN female connector (PS/2)

Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, Rapid Spanning Tree (RSTP)

Internet Explorer 5.5 or higher
Supported SNMP-MIBs: Enterprise, MIB II, Bridge

Rapid Spanning Tree 802.1w, Fast Ring Detection

Per Ethernet 2 status LEDs: LINK and status activity, 100, full-duplex, supply voltage U_{S1} and U_{S2} (redundant supply voltage)

Network, line and star structure: any
100 m

24 V DC
3.6 V_{PP}
18.5 V DC ... 30.5 V DC
400 mA (at $U_S = 24$ V DC)

230 g
45 mm
99 mm
112 mm
IP20 in acc. with DIN 40050/IEC 60529
-40°C ... 70°C
30% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC
EN 61000-6-3/-4
EN 61000-6-2

4 RJ45 ports
10/100 Mbps
RJ45 female connector, autonegotiation

2 ST single mode
ST Simplex
-
36000 m (glass fiber with F-G 9/125 0.36 dB/km)
32000 m (glass fiber with F-G 9/125 0.4 dB/km)
26000 m (glass fiber with F-G 9/125 0.5 dB/km)
2800 m

RS-232-C, 6-pos. MINI-DIN female connector (PS/2)

Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, Rapid Spanning Tree (RSTP)

Internet Explorer 5.5 or higher
Supported SNMP-MIBs: Enterprise, MIB II, Bridge

Rapid Spanning Tree 802.1w, Fast Ring Detection

Per Ethernet 2 status LEDs: LINK and status activity, 100, full-duplex, supply voltage U_{S1} and U_{S2} (redundant supply voltage)

Network, line and star structure: any
100 m

24 V DC
3.6 V_{PP}
18.5 V DC ... 30.5 V DC
400 mA (at $U_S = 24$ V DC)

230 g
45 mm
99 mm
112 mm
IP20 in acc. with DIN 40050/IEC 60529
-40°C ... 70°C
30% ... 95% (non-condensing)
Conformance with EMC directive 89/336/EEC
EN 61000-6-3/-4
EN 61000-6-2

Smart Managed Compact Switch



Gigabit switches offer excellent realtime properties with high data throughput at the same time. Not only does the network backbone profit from this, but also the powerful termination devices, such as data servers or camera applications.

The Smart Managed Switches FL SWITCH SMCS 8GT and FL SWITCH SMCS 6GT/2SFP are the first industrial DIN switch switches that are supported on all Gigabit Ethernet ports. "Smart" stands for Switches with Management for Automation and Real-Time.

The switches offer the realtime properties required by PROFINET-RT and open up the bandwidth for integrating IT realtime services, such as video and voice-over-IP in automation networks, at the same time.

The two optical interfaces of the FL SWITCH SMCS 6.../2SFP enable flexible use of various glass fiber modules. Distances of up to 80 km can thus be bridged.

A user can switch between operating modes, e.g. from Ethernet to PROFINET or Ethernet/IP without using the WEB interfaces. Thus, the switch is also equipped with a "SMART Mode" from which the desired operating state can be selected using the Mode button.

A pluggable configuration memory with an industrial M12 connection method allows easy device exchange.

Ethernet



FL SWITCH SMCS 8...
 Smart Managed Compact Switch with RJ45 ports

Description	Type	Order No.	Pcs. / Pkt.
Smart Managed Compact Switch - 8 RJ45 ports	FL SWITCH SMCS 8TX	2989226	1
- 8 RJ45 ports, 1000 Mbps	FL SWITCH SMCS 8GT	2891123	1
Smart Managed Compact Switch - 6 RJ45 ports, 2 SFP fiber optics ports			
- 6 RJ45 ports, 2 SFP fiber optics ports, 1000 Mbps			
Pluggable input/output module for fiber optics - Wavelength 850 nm (short) - Wavelength 1300 nm (long) - Wavelength 1550 nm (longhaul)			
Configuration memory, replaceable - MRM function	FL MEM PLUG FL MEM PLUG/MRM	2891259 2891275	1 1
Technical data	FL SWITCH SMCS 8TX	FL SWITCH SMCS 8GT	
Ethernet interface			
Number of ports	8		
Transmission speed	10/100 Mbps	10/100/1000 Mbps	
Type of connection	RJ45		
Fiber optic interface			
Number of ports	-		
Type of connection	-		
Wave length	-		
Transmission length	-		
Other connections			
Serial (RS-232)	RS-232-C, 6-pos. MINI-DIN female connector (PS/2)		
Function			
Basic functionality	Store-and-forward switch complies with IEEE 802.3 2 priority classes as per IEEE 802.1 P TCP/IP protocol, BootP-capable, port-mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), Profinet IO Device, media redundancy protocol (MRP).		
Redundancy	Spanning Tree 802.1d, Rapid Spanning Tree 802.1w, Fast Ring Detection, Media Redundancy Protocol (MRP) as per IEC 62439		
Status and diagnostics displays	Per Ethernet 2 status LEDs: LINK and status activity with switch-over, 100, full-duplex, supply voltage Us1 and Us2 (redundant supply voltage) and FAIL		
Network extension parameters			
Cascading depth	Network, line and star structure: any		
Maximum conductor length ((twisted pair)	100 m		
Power supply			
Supply voltage	24 V DC		
Residual ripple	3.6 V _{pp}		
Range of supply voltages	18 V DC ... 32 V DC		
Typical current consumption	600 mA (at U _s = 24 V DC)		
General data			
Weight	650 g		
Width	128 mm		
Height	100 mm		
Depth	69 mm		
Degree of protection	IP20		
Ambient temperature (operation)	0°C ... 55°C		
Permissible humidity (operation)	5% ... 95% (non-condensing)		
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC		
Emitted interference	EN 61000-6-3/-4		
Immunity to interference	EN 61000-6-2		

Ethernet



FL SWITCH SMCS 6.../2SFP

Smart Managed Compact Switch with RJ45 ports and Gigabit glass fiber interfaces



FL SFP ...X

Pluggable input/output module for fiber optics

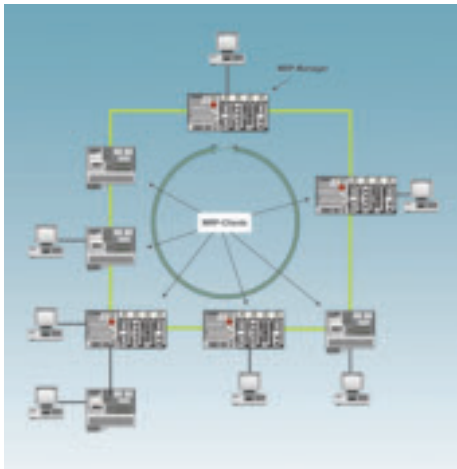


FL SFP LH

Pluggable input/output module for fiber optics

Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
FL SWITCH SMCS 6TX/2SFP	2989323	1						
FL SWITCH SMCS 6GT/2SFP	2891479	1						
FL MEM PLUG	2891259	1	FL SFP SX	2891754	1			
FL MEM PLUG/MRM	2891275	1	FL SFP LX	2891767	1	FL SFP LH	2989912	1
FL SWITCH SMCS 6TX/2SFP	FL SWITCH SMCS 6GT/2SFP		FL SFP SX	FL SFP LX				
6			1			1		
10/100 Mbps	10/100/1000 Mbps		1 LC female connector at the SFP module, 1000 mbps	1310 nm		1 LC female connector at the SFP module, 1000 mbps		
RJ45			850 nm	30 km (glass fiber 9/125)		1550 nm		
			550 m (glass fiber 50/125)	250 m (glass fiber 62.5/125)		80 km (glass fiber 9/125)		
2			300 m (glass fiber 62.5/125)					
SFP ports								
-								
Up to 80 km (depending on the fiber/SFP module used)								
RS-232-C, 6-pos. MINI-DIN female connector (PS/2)								
Store-and-forward switch complies with IEEE 802.3 2 priority classes as per IEEE 802.1 P TCP/IP protocol, BootP-capable, port-mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), Profinet IO Device, media redundancy protocol (MRP).			SFP module as FO port			SFP module as FO port		
Spanning Tree 802.1d, Rapid Spanning Tree 802.1w, Fast Ring Detection, MRP								
Per Ethernet 2 status LEDs: LINK and status activity with switch-over, 100, full-duplex, supply voltage Us1 and Us2 (redundant supply voltage) and FAIL			via a Factory-Line device			via a Factory-Line device		
Network, line and star structure: any								
100 m								
24 V DC								
3.6 V _{PP}								
18 V DC ... 32 V DC								
650 mA (at U _s = 24 V DC)								
650 g								
128 mm								
100 mm								
69 mm								
IP20								
0°C ... 55°C								
5% ... 95% (non-condensing)			-40°C ... 85°C (non-condensing)			-40°C ... 85°C (non-condensing)		
Conformance with EMC directive 89/336/EEC			30% ... 95% (non-condensing)			30% ... 95% (non-condensing)		
EN 61000-6-3/-4								
EN 61000-6-2								

**Managed Compact Switches and
 Modular Managed Switches**



Always the right solution: compact and modular managed Factory Line switches

The Factory Line switches solve every Ethernet installation tasks in the industrial environment: The Factory Line Modular Managed Switch is the first industrial switch that can be expanded from 8 ports to 24 ports all the way through.

For applications in automation requiring a compact block switch, the managed compact switches with 16 TX or 14 TX and 2 glass ports are the right choice.

The switches are ideal for PROFINET realtime and EtherNet/IP applications and support the management functions required for this. Powerful full wire speed switching fabric provides high data throughput and top time response.

A part of the PROFINET standard IEC 61158 is the Media Redundancy Protocol MRP, which is based on a ring topology and ensures switchover times of 200 ms. A switch is defined as an MRP manager and the remaining as an MRP client. The MRP manager logically opens a port so that the ring is interrupted only logically (physically it is still a ring). A mains error is identified by the MRP manager and the open line is switched as the data line.

The redundancy manager function can be integrated into MCS and SMCS with the help of the MRM MEM plug (Order No.: 2891275) into MMS with the help of MRM module (Order No.: 2891770).

The modular managed switches are also available as a maritime version with GL and LR rating.



FL SWITCH MCS 16TX

Managed switch, 16 twisted pair ports

Description	Type	Order No.	Pcs. / Pkt.
Managed switch - 16 RJ45 ports - 14 RJ45 ports, 2 SC fiber optics ports (multi-mode)	FL SWITCH MCS 16TX	2832700	1
Modular switch system , head station can be expanded to 24 Ethernet ports - GL rating Expansion , 8 Ethernet ports - GL rating Configuration memory , replaceable			
- MRM function Programming cable Labeling field	FL MEM PLUG FL MEM PLUG/MRM PRG CAB MINI DIN	2891259 2891275 2730611	1 1 1
Technical data Ethernet interface Number of ports Transmission speed Type of connection Fiber optic interface Number of ports Type of connection Wave length Transmission length Other connections Serial (RS-232) Function Basic functionality	16 10/100 Mbps RJ45 - - - - RS-232-C, 6-pos. MINI-DIN female connector (PS/2) Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE 802.1 P TCP/IP protocol, BootP-capable, port-mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), port security, PROFINET-IO-device, DHCP option 82 relay agent		
VLAN – Virtual Local Area Network Redundancy Status and diagnostics displays	32 port-based, dynamic via GVRP Spanning Tree 802.1d, Rapid Spanning Tree 802.1w, Fast Ring Detection, Media Redundancy Protocol (MRP) as per IEC 62439 Per Ethernet 2 status LEDs: LINK and status activity with switchover, 100, full-duplex, supply voltage Us1 and Us2 (redundant supply voltage) and FAIL		
Network extension parameters Cascading depth Maximum conductor length ((twisted pair)	Network, line and star structure: any 100 m		
Power supply Supply voltage Residual ripple Range of supply voltages Typical current consumption	24 V DC 3.6 V _{PP} 18.5 V DC ... 30.5 V DC 600 mA (at U _s = 24 V DC)		
General data Weight Width Height Depth Degree of protection Ambient temperature (operation) Permissible humidity (operation) Electromagnetic compatibility Emitted interference Immunity to interference	1000 g 214 mm 95 mm 69 mm IP20 0°C ... 55°C (non-condensing) 10% ... 95% (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-3/-4 EN 61000-6-2		



FL SWITCH MCS 14TX/2FX

Managed switch, 14 twisted pair ports, 2 glass fiber interfaces



FL SWITCH MM HS...

Modular managed switch, head station

Ethernet



FL MXT...

Expansion

Type	Order No.	Pcs. / Pkt.
FL SWITCH MCS 14TX/2FX	2832713	1
FL MEM PLUG	2891259	1
FL MEM PLUG/MRM	2891275	1
PRG CAB MINI DIN	2730611	1

Type	Order No.	Pcs. / Pkt.
FL SWITCH MM HS	2832328	1
FL SWITCH MM HS/M	2832522	1
FL IF MEM 2TX-D	2832483	1
PRG CAB MINI DIN	2730611	1
FL M LABEL	2891055	1

Type	Order No.	Pcs. / Pkt.
FL MXT	2832331	1
FL MXT/M	2832535	1
FL M LABEL	2891055	1

14 10/100 Mbps RJ45	8 can be expanded to a maximum of 24 ports 10/100 Mbps 8 ports via FL IF (interface) modules	- 10/100 Mbps 8 ports via FL IF (interface) modules
2 SC multimode SC-DUPLEX 1300 nm Up to 10000 m (depending on the fiber used)	8 can be expanded to a maximum of 24 ports Via interface modules	- Via interface modules
RS-232-C, 6-pos. MINI-DIN female connector (PS/2)	RS-232-C, 6-pos. MINI-DIN female connector (PS/2)	-
Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE 802.1 P TCP/IP protocol, BootP-capable, port-mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), port security, PROFINET-IO-device, DHCP option 82 relay agent	Store and forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE 802.1 P TCP/IP protocol, BootP-capable, port-mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), port security, PROFINET-IO-device, DHCP option 82 relay agent	Expansion module for modular managed switch
32 port-based, dynamic via GVRP Spanning Tree 802.1d, Rapid Spanning Tree 802.1w, Fast Ring Detection, Media Redundancy Protocol (MRP) as per IEC 62439	32 port-based, dynamic via GVRP Spanning Tree 802.1d, Rapid Spanning Tree 802.1w, Fast Ring Detection, Media Redundancy Protocol (MRP) as per IEC 62439	-
Per Ethernet 2 status LEDs: LINK and status activity with switch-over, 100, full-duplex, supply voltage U _{S1} and U _{S2} (redundant supply voltage) and FAIL	Per Ethernet 2 status LEDs: LINK and status activity with switch-over, 100, full-duplex, supply voltage U _{S1} and U _{S2} (redundant supply voltage) and FAIL, two-digit 7-segment display	LEDs for media modules
Network, line and star structure: any 100 m	Network, line and star structure: any 100 m	-
24 V DC 3.6 V _{PP} 18.5 V DC ... 30.5 V DC 800 mA (at U _S = 24 V DC)	24 V DC 3.6 V _{PP} 18.5 V DC ... 30.2 V DC 350 mA (Up to 3500 mA, depending on the configuration)	- - - (via head station)
1000 g 214 mm 95 mm 69 mm IP20 0°C ... 55°C (non-condensing) 10% ... 95% (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-3/-4 EN 61000-6-2	1350 g 214 mm 95 mm 115 mm IP20 0°C ... 55°C (non-condensing) 10% ... 95% (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-3/-4 EN 61000-6-2	550 g 127 mm 95 mm 115 mm IP20 0°C ... 55°C (non-condensing) 10% ... 95% (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-3/-4 EN 61000-6-2

Configuration memory and interface modules



Memory Plug – replaceable configuration memory

A Modular Managed Switch can guarantee switch-over times of 200 ms in a redundant network with medium redundancy protocol (MRP) and ring structure if the FL IF MEM 2TX-D/MRM has the MRP manager function integrated.

Once the module has been installed, the MRP redundancy mechanism must be configured in the web interfaces of the SWITCHES and the redundant ring with MRP is now at your disposal.

In addition to the MRP functionality, complete switch configurations including the management IP-address and all switch settings (port configuration, trap receiver, etc.) can also be saved (also refer to FL IF MEM 2TX-D, order no. 2892483).

The FL IF MEM 2TX-D/MRM has also been equipped with two RJ45 ports (TX) and thus guarantees a sufficient number of free ports for MMS SWITCH.

Ethernet



FL IF MEM 2TX-D...

Configuration memory, twisted pair

Applied for: BV

Description	Type	Order No.	Pcs. / Pkt.
Configuration memory , for saving the switch configuration			
- MRM function	FL IF MEM 2TX-D	2832483	1
Configuration memory , replaceable	FL IF MEM 2TX-D/MRM	2891770	1
- MRM function			
Interface module for Modular Managed Switch system			
- Exit to the front			
- Exit downward			
- Power-over-Ethernet, exit to the front			
Fiber optics media module for connecting 100Base FX multimode glass fiber (1300 nm)			
- Exit to the front			
- Exit downward			
- Exit downward			
Flat-ribbon labeling (see CLIPLINE catalog)	ZBF...		
Technical data			
Ethernet interface			
Number of ports	FL IF MEM 2TX-D	FL IF MEM 2TX-D/MRM	
Transmission speed			2
Type of connection			10/100 Mbps
Fiber optic interface			RJ45 female connector
Number of ports			-
Type of connection			-
Wave length			-
Transmission length			-
			-
			-
			-
Function			
Basic functionality	Configuration memory (plug-in)	Configuration memory and manager for the media redundancy protocol (MRP)	
Power supply			
Connection supply			From FL SWITCH MM HS or MXT
Supply voltage			(via head station)
Typical current consumption			10 mA
General data			
Weight			70 g
Width			31 mm
Height			78 mm
Depth			72.5 mm
Degree of protection			IP20
Ambient temperature (operation)			0°C ... 55°C (non-condensing)
Permissible humidity (operation)			10% ... 95% (non-condensing)
Electromagnetic compatibility			Conformance with EMC directive 89/336/EEC
Emitted interference			EN 61000-6-3/-4
Immunity to interference			EN 61000-6-2



FL MEM PLUG...

Replaceable configuration memory

Ethernet



FL IF 2TX VS-RJ-...

Interface module twisted pair

Ethernet



FL IF 2FX S...

Interface module, glass fiber

 Ex: // Applied for: BV			 Ex:					
Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
FL MEM PLUG	2891259	1						
FL MEM PLUG/MRM	2891275	1						
			FL IF 2TX VS-RJ-F	2832344	1			
			FL IF 2TX VS-RJ-D	2832357	1			
			FL IF 2PSE-F	2832904	1			
ZBF...			ZBF...			FL IF 2FX SC-F	2832412	1
						FL IF 2FX SC-D	2832425	1
						FL IF 2FX ST-D	2884033	1
FL MEM PLUG	FL MEM PLUG/MRM		FL IF 2TX VS-RJ-F	FL IF 2PSE-F		FL IF 2FX SC-F		FL IF 2FX ST-D
-	-		2	2 PoE ports		2	100 Mbps	-
-	-		10/100 Mbps (connection direction forwards)	RJ45 female connector		SC connector	-	-
-	-		-	-		2	ST BFOC	-
-	-		-	-		SC connector	1300 nm	-
-	-		-	-		2800 m (glass fiber with F-G 50/125 1.6 dB/km F800)	10000 m (glass fiber with F-G 62.5/125 0.7 dB/km F1000)	-
-	-		-	-		6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200)	6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200)	-
-	-		-	-		3000 m (glass fiber with F-G 62.5/125 2.6 dB/km F600)	3000 m (glass fiber with F-G 62.5/125 2.6 dB/km F600)	-
-	-		-	-		2800 m (glass fiber with F-G 50/125 1.6 dB/km F800)	2800 m (glass fiber with F-G 50/125 1.6 dB/km F800)	-
Configuration memory (plug-in)	Configuration memory and manager for the media redundancy protocol (MRP)		Media module for modular managed switch	Media module for Modular Managed Switch with Power over Ethernet IEEE802.3af, Power Source Equipment (PSE)		Media module for modular managed switch		
from FL SWITCH MCS/SMCS			From FL SWITCH MM HS or MXT	Via head station		From FL SWITCH MM HS or MXT		
-	-		(via head station)	(Internal / 48 V DC for PoE)		(via head station)		
-	-		10 mA	10 mA (Max. 900 mA)		200 mA		
25 g			70 g			80 g		
16 mm			31 mm			31 mm		
57 mm			75.7 mm	84.7 mm		75.7 mm	83 mm	
IP20			75.5 mm			72.5 mm		
0°C ... 55°C (non-condensing)			IP20			IP20		
10% ... 95% (non-condensing)			0°C ... 55°C (non-condensing)			0°C ... 55°C (non-condensing)		
Conformance with EMC directive 89/336/EEC			10% ... 95% (non-condensing)			10% ... 95% (non-condensing)		
EN 61000-6-3/-4			Conformance with EMC directive 89/336/EEC			Conformance with EMC directive 89/336/EEC		
EN 61000-6-2			EN 61000-6-3/-4			EN 61000-6-3/-4		
			EN 61000-6-2			EN 61000-6-2		

POF and HCS module for the modular managed switch

The Modular Managed Switch (MMS) adapts to the particular connection requirements via the 2-port interface modules.

The polymer fiber and HCS interface modules provide the favorable option of allowing Ethernet transmissions at 10 Mbps or alternatively 100 Mbps in environments with strong electromagnetic interference.

A simple electrical isolation of potentials can be attained with these modules, between two buildings or plants, for example.

In order to achieve maximum port scalability, interface modules with 2 polymer/HCS fiber interfaces or with a twisted pair and a polymer and HCS fiber interface are available.

The Factory Line modular managed switch adapts to the respective requirements. It can also be combined with other interface modules of different connection methods.

The 2-port glass fiber module for the modular managed switch offers maximum flexibility when it comes to connecting switches over long distances. Variants are available for multimode and single-mode fibers and can bridge over distances of up to 36 km. The multimode variants have either an SC or an ST connector for connection to all conventional conductors and testers.

Ethernet



FL IF 2FX SM SC-D

Interface module, glass fiber

Ex: // Applied for: NV / BV

Description	Type	Order No.	Pcs. / Pkt.
FO media module for connecting single-mode (mono-mode) glass fibers (1300 nm), downward exit			
Interface module for Modular Managed Switch system, exit downward - HCS fibers - POF fibers	FL IF 2FX SM SC-D	2832205	1
Combined Interface module , exit downward - 1 RJ45 port, 1 POF port - 1 RJ45 port, 1 HCS port			
Interface modules , 2 ports, SCRJ for POF/HCS, diagnosis-capable			
Flat-ribbon labeling (see CLIPLINE catalog)	ZBF...		

Technical data	
Ethernet interface	
Number of ports	2
Transmission speed	100 Mbps
Type of connection	SC connector
Fiber optic interface	
Number of ports	2
Type of connection	SC connector
Wave length	-
Transmission length	36000 m (glass fiber with F-G 9/125 0.36 dB/km)

Function	
Basic functionality	Media module for modular managed switch
Power supply	
Supply voltage	(via head station)
Typical current consumption	200 mA
General data	
Weight	80 g
Width	31 mm
Height	85 mm
Depth	72.5 mm
Degree of protection	IP20
Ambient temperature (operation)	0°C ... 55°C (non-condensing)
Permissible humidity (operation)	10% ... 95% (non-condensing)
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC
Emitted interference	EN 61000-6-3/-4
Immunity to interference	EN 61000-6-2

Ethernet



FL IF 2... 100-D

Interface module HCS fiber

Ethernet



FL IF TX/... 100-D

Interface module, combined TX/POF

Ethernet



FL IF 2POF SCRJ-D

Interface modules, SCRJ for POF/HCS, diagnosis-capable

Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
FL IF 2HCS 100-D FL IF 2POF 10/100-D	2832742 2832852	1 1						
ZBF...			FL IF TX/POF 10/100-D FL IF TX/HCS 100-D	2832807 2832739	1 1			
			ZBF...			FL IF 2POF SCRJ-D ZBF...	2891084	1
FL IF 2HCS 100-D	FL IF 2POF 10/100-D		FL IF TX/POF 10/100-D	FL IF TX/HCS 100-D				
2			1					
100 Mbps (connection direction downwards) FSMA connectors	10/100 Mbps (connection direction downwards) 2 ports, 10/100 Mbp/s, autonegotiation		10/100 Mbps	100 Mbps		-		
			RJ45 female connectors			-		
2			1			2		
F-SMA connector 650 nm			FSMA connector 650 nm			SCRJ 650 nm		
100 m (HCS fiber with F-S 200/230 10 dB/km)	50 m (including 3 dB system reserve, polymer fiber with 980/1000 230 dB/km)		50 m (including 3 dB system reserve, polymer fiber with F-K 980/1000 230 dB/km)	100 m (HCS fiber with F-S 200/230 10 dB/km)		50 m (including 3 dB system reserve, polymer fiber with F-K 980/1000 230 dB/km)		
Media module for modular managed switch			Media module for modular managed switch			Media module for Modular Managed Switch with FO diagnosis		
(via head station) 100 mA			(via head station) 60 mA			(via head station) 200 mA		
80 g 31 mm			70 g 31 mm			80 g 31 mm		
75.7 mm	80.3 mm		80.3 mm	75.7 mm		73.5 mm		
						72.5 mm		
						72.5 mm		
						IP20		
0°C ... 55°C (non-condensing) 10% ... 95% (non-condensing)			0°C ... 55°C (non-condensing) 10% ... 95% (non-condensing)			0°C ... 55°C (non-condensing) 10% ... 95% (non-condensing)		
Conformance with EMC directive 89/336/EEC EN 61000-6-3/-4 EN 61000-6-2			Conformance with EMC directive 89/336/EEC EN 61000-6-3/-4 EN 61000-6-2			Conformance with EMC directive 89/336/EEC EN 61000-6-3/-4 EN 61000-6-2		

SFN switch with gigabit support

The FL SWITCH SFN ... range of Factory Line switches with standard functions in their versions can be used for quick and cost-effective Ethernet network expansion. The switches have 8 ports, up to two of which are multimode/single-mode glass fiber ports.

The switches support transmission rates of 10/100/1000 Mbps at the twisted-pair ports, and 1000 Mbps at the glass fiber ports.

Ethernet



FL SWITCH SFN 8GT

Ethernet switch with RJ45 ports



Description	Type	Order No.	Pcs. / Pkt.
Ethernet switch , eight RJ45 ports - 8 RJ45 ports - 7 RJ45 ports, 1 SC FO port (multi-mode) - 6 RJ45 ports, 2 SC FO ports (multi-mode) - 6 RJ45 ports, 2 SC FO ports (single-mode) with high range - 6 RJ45 ports, 2 SC FO ports (single-mode) with especially high range	FL SWITCH SFN 8GT	2891673	1
Layer-1 security elements	FL PLUG GUARD...		
Technical data			
Ethernet interface			
Number of ports	8 RJ45 ports		
Transmission speed	10/100/1000 Mbps (RJ45)		
Type of connection	RJ45 female connector, autonegotiation and autocrossing		
Fiber optic interface			
Number of ports	-		
Type of connection	-		
Wave length	-		
Transmission length	-		
Other connections			
Potential-free signaling contact	Plug-in/screw connection via COMBICON		
Function			
Basic functionality	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode		
Status and diagnostics displays	LEDs: U _{S1} , U _{S2} (redundant voltage supply), link and activity per port		
Network extension parameters			
Cascading depth	Network, line and star structure: any		
Maximum conductor length ((twisted pair)	100 m		
Power supply			
Supply voltage	24 V DC (redundant)		
Residual ripple	3.6 V _{PP}		
Range of supply voltages	9 V DC ... 30.2 V DC		
Typical current consumption	Typ. 430 mA		
General data			
Weight	395 g		
Width	50 mm		
Height	120 mm		
Depth	70 mm		
Degree of protection	IP20 in acc. with DIN 40050/IEC 60529		
Ambient temperature (operation)	-25°C ... 60°C (75°C in preparation)		
Permissible humidity (operation)	10% ... 95% (non-condensing)		
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC		
Emitted interference	EN 61000-6-4		
Immunity to interference	EN 61000-6-2		

Ethernet



FL SWITCH SFN 7GT/SX

Ethernet switch with RJ45 and FO ports

Ethernet



FL SWITCH SFN 6GT/2SX

Ethernet switch with RJ45 and FO ports

Ethernet



FL SWITCH SFN 6GT/2LX...

Ethernet switch with RJ45 and FO ports

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 7GT/SX	2891518	1
FL PLUG GUARD...		

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 6GT/2SX	2891398	1
FL PLUG GUARD...		

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 6GT/2LX	2891987	1
FL SWITCH SFN 6GT/2LX-20	2891563	1
FL PLUG GUARD...		

7 RJ45 ports 10/100/1000 Mbps (RJ45) RJ45 female connector, autonegotiation and autocrossing
1 FO port SC duplex 850 nm 220 m (glass fiber 62.5/125)
Plug-in/screw connection via COMBICON
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode
LEDs: U _{S1} , U _{S2} (redundant voltage supply), link and activity per port
Network, line and star structure: any 100 m
24 V DC (redundant) 3.6 V _{PP} 9 V DC ... 30.2 V DC Typ. 320 mA
415 g 50 mm 120 mm 70 mm IP20 in acc. with DIN 40050/IEC 60529 -25°C ... 60°C (75°C in preparation) 10% ... 95% (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-4 EN 61000-6-2

6 RJ45 ports 10/100/1000 Mbps (RJ45) RJ45 female connector, autonegotiation and autocrossing
2 FO ports SC duplex 850 nm 220 m (glass fiber 62.5/125)
Plug-in/screw connection via COMBICON
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode
LEDs: U _{S1} , U _{S2} (redundant voltage supply), link and activity per port
Network, line and star structure: any 100 m
24 V DC (redundant) 3.6 V _{PP} 9 V DC ... 30.2 V DC Typ. 350 mA
425 g 50 mm 120 mm 70 mm IP20 in acc. with DIN 40050/IEC 60529 -25°C ... 60°C (75°C in preparation) 10% ... 95% (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-4 EN 61000-6-2

6 RJ45 ports 10/100/1000 Mbps (RJ45) RJ45 female connector, autonegotiation and autocrossing
2 FO ports SC duplex 1310 nm 10000 m (glass fiber 9/125)
Plug-in/screw connection via COMBICON
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode
LEDs: U _{S1} , U _{S2} (redundant voltage supply), link and activity per port
Network, line and star structure: any 100 m
24 V DC (redundant) 3.6 V _{PP} 9 V DC ... 30.2 V DC Typ. 360 mA
435 g 50 mm 120 mm 70 mm IP20 in acc. with DIN 40050/IEC 60529 -25°C ... 60°C (75°C in preparation) 10% ... 95% (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-4 EN 61000-6-2

SFN switch

Factory Line switches with standard functions in slim housing design

The FL SWITCH SFN ... range of Factory Line switches with standard functions in numerous versions can be used for quick and cost-effective Ethernet network expansion. The switches have 5 or 8 ports, up to two of which are designed in multimode/single-mode glass fiber ports in SC or ST format. The switches support transmission rates of 10 and 100 Mbps at the Twisted-Pair-Ports. The glass fiber ports exclusively support 100 Mbps.

The switches regenerate received data telegrams and send them to the port to which the device is connected with the corresponding target address.

Unassigned ports of the FL SWITCH SFN can be locked mechanically for protection against unauthorized use. Assigned ports meet the requirements of LAN security level 1, as they can be locked against unauthorized removal of the network connection.

Features and fields of application

- Increased network performance by filtering the data traffic.
 - Local data traffic remains local.
 - Amount of data in the network segments is reduced.
- Simple network extension without configuration of the switches.
- Coupling of copper network segments with different transmission rates with automatic detection of data transmission rate of 10 or 100 Mbps.
- Auto negotiation: Each copper port establishes a half or full duplex connection with 10 or 100 Mbps.
- Auto crossing: It is not necessary to make a distinction between 1:1 or crossover Ethernet copper cables.
- Electrical isolation of network segments using up to two fiber optic ports.
- Option to attach layer 1 security elements to the RJ45 ports.

Ethernet



FL SWITCH SFN ...TX

Ethernet switch with RJ45 ports



Description	Type	Order No.	Pcs. / Pkt.
Ethernet switch	FL SWITCH SFN 5TX	2891152	1
- 5 RJ45 ports	FL SWITCH SFN 8TX	2891929	1
- 8 RJ45 ports			
- 4 RJ45 ports, 1 SC FO port			
- 7 RJ45 ports, 1 SC FO port			
- 4 RJ45 ports, 1 ST FO port			
- 7 RJ45 ports, 1 ST FO port			
- 6 RJ45 ports, 2 SC FO ports			
- 6 RJ45 ports, 2 ST FO ports			
Layer-1 security elements	FL PLUG GUARD...		
Technical data	FL SWITCH SFN 5TX	FL SWITCH SFN 8TX	
Ethernet interface			
Number of ports	5 RJ45 ports	8 RJ45 ports	
Transmission speed	10/100 Mbps (RJ45)		
Type of connection	RJ45 female connector, autonegotiation and autocrossing		
Fiber optic interface			
Number of ports	-		
Type of connection	-		
Wave length	-		
Transmission length	-		
Function			
Basic functionality	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode		
Status and diagnostics displays	LEDs: U _S , link and activity per port	LEDs: U _{S1} , link and activity per port	
Network extension parameters			
Cascading depth	Network, line and star structure: any		
Maximum conductor length ((twisted pair)	100 m		
Power supply			
Supply voltage	24 V DC		
Residual ripple	3.6 V _{PP}		
Range of supply voltages	18.5 V DC ... 30.2 V DC		
Typical current consumption	Typ. 90 mA	Typ. 140 mA	
General data			
Weight	265 g	365 g	
Width	30 mm	50 mm	
Height	120 mm		
Depth	70 mm		
Degree of protection	IP20 in acc. with DIN 40050/IEC 60529		
Ambient temperature (operation)	0°C ... 60°C		
Permissible humidity (operation)	10% ... 95% (non-condensing)		
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC		
Emitted interference	EN 61000-6-4		
Immunity to interference	EN 61000-6-2		

Ethernet



FL SWITCH SFN ...TX/FX

Ethernet switch with RJ45 and FO ports

Ethernet



FL SWITCH SFN ...TX/FX ST

Ethernet switch with RJ45 and FO ports

Ethernet



FL SWITCH SFN 6TX/2FX...

Ethernet switch with RJ45 and FO ports

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 4TX/FX	2891851	1
FL SWITCH SFN 7TX/FX	2891097	1
FL PLUG GUARD...		
FL SWITCH SFN 4TX/FX	FL SWITCH SFN 7TX/FX	
4 RJ45 ports	7 RJ45 ports	
10/100 Mbps (RJ45)		
RJ45 female connector, autonegotiation and autocrossing		
1 FO port		
SC-DUPLEX		
1300 nm/1310 nm		
2000 m (glass fiber 50/125)		
2000 m (glass fiber 62.5/125)		
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode		
LEDs: U _S , link and activity per port		
Network, line and star structure: any		
100 m		
24 V DC		
3.6 V _{PP}		
18.5 V DC ... 30.2 V DC		
Typ. 140 mA	Typ. 190 mA	
265 g	365 g	
30 mm	50 mm	
120 mm		
70 mm		
IP20 in acc. with DIN 40050/IEC 60529		
0°C ... 60°C		
10% ... 95% (non-condensing)		
Conformance with EMC directive 89/336/EEC		
EN 61000-6-4		
EN 61000-6-2		

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 4TX/FX ST	2891453	1
FL SWITCH SFN 7TX/FX ST	2891110	1
FL PLUG GUARD...		
FL SWITCH SFN 4TX/FX ST	FL SWITCH SFN 7TX/FX ST	
4 RJ45 ports	7 RJ45 ports	
10/100 Mbps (RJ45)		
RJ45 female connector, autonegotiation and autocrossing		
1 FO port		
ST format		
1300 nm/1310 nm		
2000 m (glass fiber 50/125)		
2000 m (glass fiber 62.5/125)		
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode		
LEDs: U _S , link and activity per port		
Network, line and star structure: any		
100 m		
24 V DC		
3.6 V _{PP}		
18.5 V DC ... 30.2 V DC		
140 mA	Typ. 190 mA	
265 g	365 g	
30 mm	50 mm	
131 mm	120 mm	
70 mm		
IP20 in acc. with DIN 40050/IEC 60529		
0°C ... 60°C		
10% ... 95% (non-condensing)		
Conformance with EMC directive 89/336/EEC		
EN 61000-6-4		
EN 61000-6-2		

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 6TX/2FX	2891314	1
FL SWITCH SFN 6TX/2FX ST	2891411	1
FL PLUG GUARD...		
FL SWITCH SFN 6TX/2FX	FL SWITCH SFN 6TX/2FX ST	
6 RJ45 ports	6 RJ45 ports	
10/100 Mbps (RJ45)		
RJ45 female connector, autonegotiation and autocrossing		
2 FO ports		
SC-DUPLEX	ST format	
1300 nm		
2000 m (glass fiber 50/125)		
2000 m (glass fiber 62.5/125)		
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode		
LEDs: U _S , link and activity per port		
Network, line and star structure: any		
100 m		
24 V DC		
3.6 V _{PP}		
18.5 V DC ... 30.2 V DC		
Typ. 230 mA		
365 g		
50 mm		
120 mm		
70 mm		
IP20 in acc. with DIN 40050/IEC 60529		
0°C ... 60°C		
30% ... 95% (non-condensing)		
Conformance with EMC directive 89/336/EEC		
EN 61000-6-4		
EN 61000-6-2		

SFN switch

Factory Line switches with standard functions for basic and extreme environment 10/100 Mbps applications

The **FL SWITCH SFNB...** range of Factory Line switches extend the SFN range of switches for basic, entry level applications. They are ideal for applications that require only basic Ethernet switching functions such as small scale machines and monitoring applications. The FL SWITCH SFNB switches have 5 or 8 ports. While they provide low installed cost Ethernet connections, they are fully industrialized with rugged metal housings, a -10°C to +60°C temperature range and complete IEC 61000-4 electrical noise ratings.

FL SWITCH SFNT... standard function unmanaged switches extend the SFN range to meet the demands of extreme environment, wide temperature applications. The SFNT switches come in 5 and 8 port sizes, and optionally include a multimode glass fiber optic cable (SC connector) interface. The 8 port switch also has an ST connector option. The demanding requirements found in oil/gas, process, city infrastructure, marine and other outdoor related industry locations require constant operation in -40°C to +75°C temperature conditions.

In critical applications it is important to include diagnostics to maintain high network uptimes. The SFNT switches have an alarm contact that can be triggered if one or both of the redundant power supplies is lost, or if the communications link to a critical port is cut or powered down. Critical applications also require some measure of network access security. The optional plug-in security frames allow unassigned ports to be physically blocked, or existing cables locked in place, to reduce the possibility of unauthorized or accidental tampering.



FL SWITCH SFNB ...TX

Ethernet switch with RJ45 ports

Description	Type	Order No.	Pcs. / Pkt.
Ethernet switch - 5 RJ45 ports - 8 RJ45 ports	FL SWITCH SFNB 5TX FL SWITCH SFNB 8TX	2891001 2891002	1 1
Wide temperature Ethernet switch - 5 RJ45 ports - 8 RJ45 ports - 4 RJ45 ports, 1 SC FO port - 7 RJ45 ports, 1 SC FO port - 7 RJ45 ports, 1 ST FO port Layer-1 security elements			
Technical data	FL SWITCH SFNB 5TX	FL SWITCH SFNB 8TX	
Ethernet interface	5 RJ45 ports	8 RJ45 ports	
Number of ports		10/100 MbpsMbps (RJ45)	
Transmission speed		RJ45 female connector, autonegotiation and autocrossing	
Type of connection			
Fiber optic interface			
Number of ports	-		
Transmission speed	-		
Type of connection	-		
Transmission length	-		
Function	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode		
Basic functionality	LEDs: U _s , link and activity per port		
Status and diagnostics displays			
Network extension parameters	Network, line and star structure: any		
Cascading depth	100 m		
Maximum conductor length ((twisted pair)			
Power supply	24 V DC		
Supply voltage	3.6 V _{pp}		
Residual ripple	12 V DC ... 48 V DC	9 V DC ... 32 V DC	
Range of supply voltages	185 mA (@24 V DC)	140 mA (@24 V DC)	
Typical current consumption			
General data			
Weight	205 g	320 g	
Width	28 mm	50 mm	
Height		110 mm	
Depth		70 mm	
Degree of protection		IP20	
Ambient temperature (operation)		-10°C ... 60°C	
Permissible humidity (operation)		10% ... 95% (non-condensing)	
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC		
Emitted interference	EN 61000-6-4		
Immunity to interference	EN 61000-6-2		



FL SWITCH SFNT ...TX

Wide temperature Ethernet switch with RJ45 ports



FL SWITCH SFNT 4TX/FX

Wide temperature Ethernet switch with RJ45 ports and one FO port in SC format



FL SWITCH SFNT 7TX/FX...

Wide temperature Ethernet switch with RJ45 ports and one FO port in SC format

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFNT 5TX FL SWITCH SFNT 8TX	2891003 2891005	1 1
FL SWITCH SFNT 5TX	FL SWITCH SFNT 8TX	
5 RJ45 ports 10/100 MbpsMbps (RJ45) RJ45 female connector, autonegotiation and autocrossing	8 RJ45 ports 10/100 MbpsMbps (RJ45) RJ45 female connector, autonegotiation and autocrossing	
-	-	
-	-	
-	-	
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode, includes QoS and alarm contact	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode, includes QoS and alarm contact	
LEDs: U _{S1} , U _{S2} (redundant voltage supply), link and activity per port, alarm (power and link down)	LEDs: U _{S1} , U _{S2} (redundant voltage supply), link and activity per port, alarm (power and link down)	
Network, line and star structure: any 100 m	Network, line and star structure: any 100 m	
24 V DC 3.6 V _{PP} 9 V DC ... 32 V DC 125 mA (@24 V DC)	24 V DC 3.6 V _{PP} 9 V DC ... 32 V DC 155 mA (@24 V DC)	
275 g 30 mm	460 g 50 mm	
130 mm 100 mm IP20 -40°C ... 75°C 10% ... 95% (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-4 EN 61000-6-2		

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFNT 4TX/FX	2891004	1
FL SWITCH SFNT 4TX/FX		
4 RJ45 ports 10/100 Mbps (RJ45) RJ45 female connector, autonegotiation and autocrossing		
1 FO port 100 Mbps (SC-D, full duplex) SC-DUPLEX 2000 m (typ.)		
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode, includes QoS and alarm contact		
LEDs: U _{S1} , U _{S2} (redundant voltage supply), link and activity per port, alarm (power and link down)		
Network, line and star structure: any 100 m		
24 V DC 3.6 V _{PP} 9 V DC ... 32 V DC 180 mA (@24 V DC)		
280 g 30 mm		
130 mm 100 mm IP20 -40°C ... 75°C 10% ... 95% (non-condensing)		
-		
-		
-		

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFNT 7TX/FX FL SWITCH SFNT 7TX/FX ST FL PLUG GUARD...	2891006 2891007	1 1
FL SWITCH SFNT 7TX/FX	FL SWITCH SFNT 7TX/FX ST	
7 RJ45 ports 10/100 Mbps (RJ45) RJ45 female connector, autonegotiation and autocrossing		
1 FO port 100 Mbps (SC-D, full duplex) SC-DUPLEX 2000 m (typ.)	100 Mbps (ST, full duplex) ST format	
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode, includes QoS and alarm contact	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode, includes QoS and alarm contact	
LEDs: U _{S1} , U _{S2} (redundant voltage supply), link and activity per port, alarm (power and link down)	LEDs: U _{S1} , U _{S2} (redundant voltage supply), link and activity per port, alarm (power and link down)	
Network, line and star structure: any 100 m	Network, line and star structure: any 100 m	
24 V DC 3.6 V _{PP} 9 V DC ... 32 V DC 180 mA (@24 V DC)	24 V DC 3.6 V _{PP} 9 V DC ... 32 V DC 180 mA (@24 V DC)	
470 g 50 mm		
130 mm 100 mm IP20 -40°C ... 75°C 10% ... 95% (non-condensing)		
-		
-		
-		

SF switches

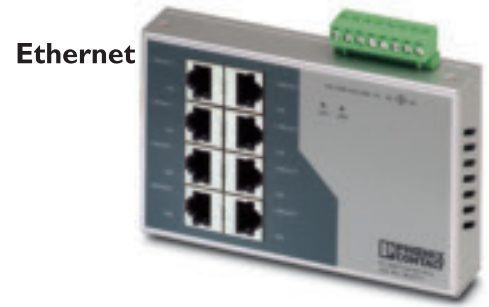
The Factory Line standard range of switches FL SWITCH SF makes it possible to expand networks quickly and inexpensively, in terminal boxes and on the plant floor level as well. Their low-profile housing design and high port densities means they can be used in universal, distributed applications in control cabinets and flat terminal boxes.

The FL SWITCH SF series supports the autonegotiation function for transmission rates of 10/100 Mbps in mixed mode. This takes care of the coupling of network segments or terminal devices with the same or different data transmission rates. It is no longer necessary to differentiate between the 1:1 or crossover cables due to the autocrossing function. The switches automatically detect whether Ethernet cables are occupied and set themselves accordingly. The segment length of the network can be increased to up to 10 km thanks to the FO ports, especially for bridging over rough surroundings.

The switches have redundant electrical power supply and an electrically isolated alarm contact. With full suitability for industrial applications, the FL SWITCH SF series with TX variants makes it extremely economical to set up Ethernet networks in the industrial environment.

Wide choice of connection options

Select the connection variant to exactly suit your applications from the SF switch range. While the copper cables are connected to the twisted pair ports with standard RJ45 connectors, the fiber optic cables are connected via SC or ST connectors.



FL SWITCH SF ...TX

Ethernet switch with RJ45 ports

Description	Type	Order No.	Pcs. / Pkt.
Ethernet switch	FL SWITCH SF 8TX	2832771	1
- 8 RJ45 ports	FL SWITCH SF 16TX	2832849	1
- 16 RJ45 ports			
- 7 RJ45 ports, 1 SC FO port			
- 15 RJ45 ports, 1 SC FO port			
- 6 RJ45 ports, 2 SC FO ports			
- 14 RJ45 ports, 2 SC FO ports			
- 6 RJ45 ports, 2 ST FO ports			
- 7 RJ45 ports, 1 ST FO port			
- 4 RJ45 ports, 3 ST FO ports			
Technical data	FL SWITCH SF 8TX	FL SWITCH SF 16TX	
Ethernet interface	8 RJ45 ports	16 RJ45 ports	
Number of ports	10/100 Mbps (RJ45)		
Transmission speed	RJ45 female connector, autonegotiation and autocrossing		
Type of connection			
Fiber optic interface			
Number of ports	-		
Type of connection	-		
Wave length	-		
Transmission length	-		
Other connections			
Potential-free signaling contact	Plug-in/screw connection via COMBICON		
Function			
Basic functionality	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode		
Status and diagnostics displays	LEDs: U _{S1} , U _{S2} (redundant voltage supply), link and activity per port		
Network extension parameters			
Cascading depth	Network, line and star structure: any		
Maximum conductor length ((twisted pair)	100 m		
Power supply			
Supply voltage	24 V DC		
Residual ripple	3.6 V _{pp}		
Range of supply voltages	18.5 V DC ... 30.2 V DC		
Typical current consumption	Typ. 200 mA	Typ. 300 mA	
General data			
Weight	260 g	380 g	
Width	135 mm	205 mm	
Height	94.3 mm		
Depth	30 mm		
Degree of protection	IP20 in acc. with DIN 40050/IEC 60529		
Ambient temperature (operation)	0°C ... 55°C		
Permissible humidity (operation)	30% ... 95% (non-condensing)		
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC		
Emitted interference	EN 61000-6-4		
Immunity to interference	EN 61000-6-2		

Ethernet



FL SWITCH SF ...TX/FX

Ethernet switch with RJ45 and FO ports

Ethernet



FL SWITCH SF ...TX/2FX

Ethernet switch with RJ45 and FO ports

Ethernet



FL SWITCH SF ...TX/...FX ST

Ethernet switch with RJ45 and FO ports

Type	Order No.	Pcs. / Pkt.
FL SWITCH SF 7TX/FX	2832726	1
FL SWITCH SF 15TX/FX	2832661	1
FL SWITCH SF 7TX/FX	FL SWITCH SF 15TX/FX	
7 RJ45 ports	15 RJ45 ports	
10/100 Mbps (RJ45)		
RJ45 female connector, autonegotiation and autocrossing		
1 FO port		
SC-DUPLEX		
1300 nm		
6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200)		
Plug-in/screw connection via COMBICON		
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode		
LEDs: U _{S1} , U _{S2} (redundant voltage supply), link and activity per port		
Network, line and star structure: any		
100 m		
24 V DC		
3.6 V _{pp}		
18.5 V DC ... 30.2 V DC		
Typ. 220 mA	Typ. 330 mA	
260 g	380 g	
135 mm	205 mm	
115.3 mm		
30 mm		
IP20 in acc. with DIN 40050/IEC 60529		
0°C ... 55°C		
30% ... 95% (non-condensing)		
Conformance with EMC directive 89/336/EEC		
EN 61000-6-4		
EN 61000-6-2		

Type	Order No.	Pcs. / Pkt.
FL SWITCH SF 6TX/2FX	2832933	1
FL SWITCH SF 14TX/2FX	2832593	1
FL SWITCH SF 6TX/2FX	FL SWITCH SF 14TX/2FX	
6 RJ45 ports	14 RJ45 ports	
10/100 Mbps (RJ45)		
RJ45 female connector, autonegotiation and autocrossing		
2 FO ports		
SC duplex		
1300 nm		
6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200)		
Plug-in/screw connection via COMBICON		
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode		
LEDs: U _{S1} , U _{S2} (redundant voltage supply), link and activity per port		
Network, line and star structure: any		
100 m		
24 V DC		
3.6 V _{pp}		
18.5 V DC ... 30.2 V DC		
Typ. 240 mA	Typ. 360 mA	
260 g	380 g	
135 mm	205 mm	
115.3 mm		
30 mm		
IP20 in acc. with DIN 40050/IEC 60529		
0°C ... 55°C		
30% ... 95% (non-condensing)		
Conformance with EMC directive 89/336/EEC		
EN 61000-6-4		
EN 61000-6-2		

Type	Order No.	Pcs. / Pkt.
FL SWITCH SF 6TX/2FX ST	2832674	1
FL SWITCH SF 7TX/FX ST	2832577	1
FL SWITCH SF 4TX/3FX ST	2832603	1
FL SWITCH SF 6TX/2FX ST	FL SWITCH SF 7TX/FX ST	
6 RJ45 ports	7 RJ45 ports	
10/100 Mbps (RJ45)		
RJ45 female connector, autonegotiation and autocrossing		
2 FO ports		
ST format		
1300 nm		
6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200)	2000 m (glass fiber 50/125)	
Plug-in/screw connection via COMBICON		
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode		
LEDs: U _{S1} , U _{S2} (redundant voltage supply), link and activity per port		
Network, line and star structure: any		
100 m		
24 V DC		
3.6 V _{pp}		
18.5 V DC ... 30.2 V DC		
Typ. 240 mA	Typ. 220 mA	
140 g		
135 mm		
115.3 mm		
30 mm		
IP20 in acc. with DIN 40050/IEC 60529		
0°C ... 55°C		
30% ... 95% (non-condensing)		
Conformance with EMC directive 89/336/EEC		
EN 61000-6-4		
EN 61000-6-2		



Unmanaged switch with 5/8 TP RJ45 ports

The FL SWITCH 5TX and FL SWITCH 8TX Ethernet switches allow the network to be expanded fast and cost-effectively.

They have a redundant power supply and a floating alarm contact. The devices are particularly suitable for distributed network solutions.

With a width of just 45 mm, and simple, configuration-free assembly, they are the Ethernet connections of choice for the control cabinet. Further net segments can be connected to the 5 or 8 ports.

The switch supports 10 Mbps and 100 Mbps even when operated together.

Ethernet hub with 8/16 RJ45 ports

The hub is used for quick and cost-effective Ethernet network expansion. It has eight/sixteen twisted pair ports, which can be connected to additional network segments or termination devices. It is especially suited for special automation protocols, such as the FL Net.

The FL HUB 8/16 TX-ZF supports both Ethernet with 10 Mbps and with 100 Mbps. The hub regenerates the received data telegrams and sends them to the remaining ports.

For port 5, a port assignment switch is located on the hub. The transmit and receive cables are exchanged at port 5 by actuating the switch, while polarity is maintained. Cross-over cables for connecting network nodes can thus be omitted.

Power over Ethernet solutions

For the first time, the Power Source Equipment FL PSE 2TX enables the common transmission of power and data in the industrial environment via an Ethernet connection (LAN).

The Power over Ethernet standard IEEE 802.3af is used. This means that end devices such as WLAN access points, Bluetooth access points, IP telephones and IP cameras, which are being increasingly used in industrial areas, can be connected quickly and economically.

In the case of installation in difficult-to-reach places such as walls or ceilings, a separate supply connection can be dispensed with – power and data are made available through the LAN connection. The investment costs for any power supply units and the associated installation costs for the power supply to termination devices can be eliminated entirely. Even the fault tolerance of the termination devices can be increased by using a central uninterrupted power supply (UPS).

The FL PSE 2TX allows existing Ethernet networks to be extended by 2 PoE ports. The FL PSE 2TX is also operated by the 24 V supply voltage here, so that other power supply units are not necessary.

Description
Ethernet switch - 5 RJ45 ports - 8 RJ45 ports
Ethernet hub - 8 RJ45 ports - 16 RJ45 ports
Power-over-Ethernet module (PSE)
Technical data
Ethernet interface
Number of ports
Transmission speed
Type of connection
Other connections
Potential-free signaling contact
Function
Basic functionality
Status and diagnostics displays
Network extension parameters
Cascading depth
Maximum conductor length ((twisted pair)
Power supply
Supply voltage
Residual ripple
Range of supply voltages
Typical current consumption
General data
Weight
Width
Height
Depth
Degree of protection
Ambient temperature (operation)
Permissible humidity (operation)
Electromagnetic compatibility
Emitted interference
Immunity to interference

Ethernet



FL SWITCH ...TX

Ethernet switch with RJ45 ports

Ethernet



FL HUB ...TX-ZF

Ethernet hub with RJ45 ports

Ethernet



FL PSE 2TX

Power-over-Ethernet modules (midspan)

Type	Order No.	Pcs. / Pkt.
FL SWITCH 5TX	2832085	1
FL SWITCH 8TX	2832218	1

FL SWITCH 5TX	FL SWITCH 8TX
5	8
10/100 Mbps RJ45	
Plug-in/screw connection via COMBICON	
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode	
LEDs: U _{S1} , U _{S2} (redundant voltage supply), link and activity per port	
Network, line and star structure: any 100 m	
24 V DC	
3.6 V _{PP} 18.5 V DC ... 30.2 V DC 125 mA (to US)	
225 g	
45 mm	
99 mm	
112 mm	
IP20	
0°C ... 55°C	
30% ... 95% (non-condensing)	
Conformance with EMC directive 89/336/EEC	
EN 61000-6-4	
EN 61000-6-2	

Type	Order No.	Pcs. / Pkt.
FL HUB 8TX-ZF	2832551	1
FL HUB 16TX-ZF	2832564	1

FL HUB 8TX-ZF	FL HUB 16TX-ZF
8	16
10/100 Mbps RJ45 female connector	
Hub/repeater, compliance with IEEE 802.3	
LEDs: UL (communications voltage), COL (collision) link and receive LED per port	
4 hubs 10 Mbps / 2 hubs 100 Mbps 100 m	
24 V DC (via COMBICON; max. conductor cross section 2.5 mm ²)	
3.6 V _{PP} 18.5 V DC ... 30.5 V DC Typ. 144 mA (to US)	
140 g	280 g
45 mm	90 mm
	99 mm
	112 mm
	IP20
0°C ... 60°C	0°C ... 55°C
30% ... 95% (non-condensing)	
Conformance with EMC directive 89/336/EEC	
EN 61000-6-4	
EN 61000-6-2	

Type	Order No.	Pcs. / Pkt.
FL PSE 2TX	2891013	1

FL PSE 2TX	
2 PoE ports 10/100 Mbps 8-pos. RJ45 female connector	
PSE/midspan, complies with IEEE 802.3af	
LEDs: US, PoE detection per port	
100 m	
24 V DC (via COMBICON; max. conductor cross section 2.5 mm ²)	
3.6 V _{PP} 18.5 V DC ... 30.5 V DC Typ. 100 mA (During no load; approx. 1800 mA at 24 V at the input with maximum load and 25°C ambient temperature)	
320 g	
45 mm	
99 mm	
112 mm	
IP20	
0°C ... 55°C	
30% ... 95% (non-condensing)	
Conformance with EMC directive 89/336/EEC	
EN 61000-6-4	
EN 61000-6-2	



The pre-assembled fiber optics patch cables have been specially developed for industrial use.

They are ideal for fast integration of Ethernet fiber optics components with LC connection (SFP modules) in the existing single mode or multimode fiber optics networks.

For the SC and ST connector formats that are practical for industrial use, patch cables are available in lengths of one and two meters as single mode and multimode variants.



FL MM PATCH ... LC-...

Fiber optics patch cable, pre-assembled

Description	Length of cable	Type	Order No.	Pcs. / Pkt.
Assembled fiber optics cable (multi-mode)				
- LC/IP20 on LC/IP20	1 m	FL MM PATCH 1,0 LC-LC	2989158	1
- LC/IP20 on LC/IP20	2 m	FL MM PATCH 2,0 LC-LC	2989255	1
Assembled fiber optics cable (multi-mode)				
- LC/IP20 on SC/IP20	1 m	FL MM PATCH 1,0 LC-SC	2989161	1
- LC/IP20 on SC/IP20	2 m	FL MM PATCH 2,0 LC-SC	2989268	1
Assembled fiber optics cable (multi-mode)				
- LC/IP20 on ST/IP20	1 m	FL MM PATCH 1,0 LC-ST	2989174	1
- LC/IP20 on ST/IP20	2 m	FL MM PATCH 2,0 LC-ST	2989271	1
Assembled fiber optics cable (single mode)				
- LC/IP20 on LC/IP20	1 m	FL SM PATCH 1,0 LC-LC	2989187	1
- LC/IP20 on LC/IP20	2 m	FL SM PATCH 2,0 LC-LC	2989284	1
Assembled fiber optics cable (single mode)				
- LC/IP20 on SC/IP20	1 m	FL SM PATCH 1,0 LC-SC	2989190	1
- LC/IP20 on SC/IP20	2 m	FL SM PATCH 2,0 LC-SC	2989297	1
Assembled fiber optics cable (single mode)				
- LC/IP20 on ST/IP20	1 m	FL SM PATCH 1,0 LC-ST	2989242	1
- LC/IP20 on ST/IP20	2 m	FL SM PATCH 2,0 LC-ST	2989349	1
Technical data				
Cable, properties				
Individual wire diameter		2.8 mm		
Outer sheath, material		LSZH		
External sheath, color		orange		
General data				
Ambient temperature (operation)		-5°C ... 70°C		

Patch cable

The preassembled patch cables have been specially developed for industrial use.

They are suitable for the quick installation of Ethernet components and patch fields or termination devices within a control cabinet. They form the link to a seamless high quality Ethernet system.

The patch cables are characterized by a new bend protection and are available in graded lengths from 0.3 to 20 m.

All patch cables are designed as 1:1 cable. They come with four pairs of conductors and are assembled with RJ45 male connectors as per IEC 603-7/class A. Each cable is tested separately for its transmission properties.

With their high, universal wiring quality across the active and passive infrastructure, the patch cables fulfill the requirements of the standards for CAT5/CAT6.



FL CAT... PATCH ...

Patch cable, CAT5/CAT6, pre-assembled

Description	Length of cable	Type	Order No.	Pcs. / Pkt.
Patch cable, CAT5, preassembled	0.3 m	FL CAT5 PATCH 0,3	2832250	10
	0.5 m	FL CAT5 PATCH 0,5	2832263	10
	1 m	FL CAT5 PATCH 1,0	2832276	10
	1.5 m	FL CAT5 PATCH 1,5	2832221	10
	2 m	FL CAT5 PATCH 2,0	2832289	10
	3 m	FL CAT5 PATCH 3,0	2832292	10
	5 m	FL CAT5 PATCH 5,0	2832580	10
	7.5 m	FL CAT5 PATCH 7,5	2832616	10
	10 m	FL CAT5 PATCH 10,0	2832629	10
	Patch cable, CAT6, preassembled	0.3 m	FL CAT6 PATCH 0,3	2891181
0.5 m		FL CAT6 PATCH 0,5	2891288	10
1 m		FL CAT6 PATCH 1,0	2891385	10
1.5 m		FL CAT6 PATCH 1,5	2891482	10
2 m		FL CAT6 PATCH 2,0	2891589	10
3 m		FL CAT6 PATCH 3,0	2891686	10
5 m		FL CAT6 PATCH 5,0	2891783	10
7.5 m		FL CAT6 PATCH 7,5	2891880	10
10 m		FL CAT6 PATCH 10	2891877	10
12.5 m		FL CAT6 PATCH 12,5	2891369	5
15 m		FL CAT6 PATCH 15,0	2891372	5
20 m		FL CAT6 PATCH 20,0	2891576	5
Technical data			FL CAT5 PATCH 0,3	FL CAT6 PATCH 0,3
Cable, properties				
External diameter		5,5 mm	5,5 mm	
Single wire, material		Cu litz wire	Cu litz wire	
Individual wires per module		8	8	
Single wire, cross section		0,14 mm ²	0,14 mm ²	
Outer sheath, material		LSFROH	LSFROH	
Smallest bending radius, fixed installation		30 mm	30 mm	
Shielding		SF/UTP	S/FTP	
Connector				
Volume resistance		≤ 0.003 Ω (IEC 60603-7)	≤ 0.003 Ω (IEC 60603-7)	
General data				
Ambient temperature (operation)		-10°C ... 60°C	-10°C ... 60°C	

Industrial network solutions

Factory Line Wired

Accessories for Factory Line patch cables

The unique and innovative accessories of the Factory Line patch cables are characterized by the fact that they can be installed later without tools and can be combined with each other.

Dust protection

The dust protection elements protect the unused connections from dust and mechanical damage at the connection points provided for them, such as SFN switches and patch fields. At the same time, they allow the ports to be color-coded.

Thanks to color-coding, the various network services can be better visualized, such as automation, voice-over-IP and video-over-IP, which makes it easy to see what's what in the control cabinet.

Color-coding

The optical color coding supports the correct connection of the patch cables for the respective application. The color coding is especially easy to apply to the connection cables. Installation can be done without tools and can be done at a later time, as well. Thanks to color-coding, the user does not have to keep the otherwise required cable color variety in stock.

IP54 accessories

The IP54 accessories provide protection against environmental influences, such as dust, steam/hot water and oils. Like the color-coding, it can be retrofitted later and achieves the IP54 degree of protection when both plugged in as well as unplugged. By combining with color codes, the visualization of the network services is also possible in rough conditions. Only a 3-pronged pair of pliers is required for installing the FL IP 54 SPOUT, such as the FL IP 54 ASSEMBLY TOOL.



FL DUST CVR ...

Dust protection elements

Description	Type	Order No.	Pcs. / Pkt.
Dust protection with color marking , for SFN switch and angled patch connector			
- Black	FL DUST CVR BK	2891107	10
- Blue	FL DUST CVR BU	2891204	10
- Brown	FL DUST CVR BN	2891301	10
- Yellow	FL DUST CVR YE	2891408	10
- Gray	FL DUST CVR GY	2891505	10
- Green	FL DUST CVR GN	2891602	10
- Red	FL DUST CVR RD	2891709	10
- Violet	FL DUST CVR VT	2891806	10
- White	FL DUST CVR WH	2891903	10
Color marking for FL CAT ...patch...			
- Black			
- Blue			
- Brown			
- Yellow			
- Gray			
- Green			
- Red			
- Violet			
IP54 protection with color marking , for SFN switch and angled patch connector			
- Blue			
- Yellow			
- Green			
- Red			
- White			
IP54 protection for patch cables , for use with FL IP 54 FLANGE ...			
Assembly tool for FL IP 54 SPOUT			





FL PATCH CCODE ...

Color marking for FL CAT ...patch...



FL IP 54 FLANGE ...

IP54 protection with color marking, for SFN switch and angled patch connector



FL IP 54 ...

IP54 accessories

Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
FL PATCH CCODE BK	2891194	20						
FL PATCH CCODE BU	2891291	20						
FL PATCH CCODE BN	2891495	20						
FL PATCH CCODE YE	2891592	20						
FL PATCH CCODE GY	2891699	20						
FL PATCH CCODE GN	2891796	20						
FL PATCH CCODE RD	2891893	20						
FL PATCH CCODE VT	2891990	20						
			FL IP 54 FLANGE BU	2891628	10			
			FL IP 54 FLANGE YE	2891725	10			
			FL IP 54 FLANGE GN	2891822	10			
			FL IP 54 FLANGE RD	2891932	10			
			FL IP 54 FLANGE WH	2891961	10			
						FL IP 54 SPOUT	2891440	10
						FL IP 54 ASSEMBLY TOOL	2891547	1



Reliability with Factory Line patch cables

The safety of networks is becoming more and more important and is a decisive factor for the future of entire companies. Independent studies show that over 70% of network errors and crashes are due to faulty cabling infrastructure and manipulation of the connection cables.

Starting with the choice of a passive cabling system, strict attention must be paid to ensuring that the reliability aspects are supported and implemented. With the new accessories for Factory Line patch cables, the different safety requirements in automation are fulfilled in detail.

Safe clip

The FL PATCH SAFE CLIP securing element can be mounted without tools and prevents Ethernet connections from being disconnected unintentionally. The protected connections can only be disconnected if conscious action is taken. By means of this simple and quick-to-install solution, unintentional disconnection is reliably prevented.

Plug guard

The FL PLUG GUARD... concept goes a step further. With these products, network connections will really be safe in the future. Connections can only be severed by authorized personnel.

If the FL PLUG GUARD... is used in conjunction with the Port Guard, it is even possible to authorize access to unused terminal points, since these ports can simply be sealed.

Patch guard

In connection with the Factory Line patch cables, the FL PATCH GUARD provides the only way to secure ports which cannot accept security frames. In this way, it is possible for the first time to secure ports on any Ethernet components, e.g. controllers.

Thanks to the slender design, it is even possible to connect patch guard elements directly to switches with high port densities, such as the FL SWITCH MCS...

As with the plug guard, it is only possible to release connections with a special key.



FL PATCH SAFE CLIP

Security element for FL CAT ...patch...

Description	Type	Order No.	Pcs. / Pkt.
Security element for FL CAT ...patch...	FL PATCH SAFE CLIP	2891246	20
Security frame for SFN switch and patch fields - Green - Red - White Locking element for security frame FL PLUG GUARD... - Locking element - Key Lockable security element for FL PATCH... - Security element - Key Color marking for FL PATCH GUARD - Black - Blue - Orange - Yellow - Turquoise - Green - Red - Violet			





FL PLUG GUARD ...

Security frame for SFN switch and patch fields



FL PATCH GUARD ...

Lockable security element for FL PATCH...



FL PATCH GUARD CCODE ...

Color marking for FL PATCH GUARD

Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
FL PLUG GUARD GN FL PLUG GUARD RD FL PLUG GUARD WH	2891615 2891712 2891819	20 20 20						
FL PORT GUARD FL PLUG GUARD KEY	2891220 2891327	20 1						
			FL PATCH GUARD FL PATCH GUARD KEY	2891424 2891521	20 1			
						FL PATCH GUARD CCODE BK FL PATCH GUARD CCODE BU FL PATCH GUARD CCODE OG FL PATCH GUARD CCODE YE FL PATCH GUARD CCODE TQ FL PATCH GUARD CCODE GN FL PATCH GUARD CCODE RD FL PATCH GUARD CCODE VT	2891136 2891233 2891330 2891437 2891534 2891631 2891738 2891835	12 12 12 12 12 12 12 12



Patch fields

The seamless installation solution for industrial networks

The Factory Line patch fields enable long-term, high-quality on-site assembling of networks in industrial automation with security and flexibility options.

The dimensions of the patch fields are optimized, with 8 connections for use with the Managed Switches from the Factory Line range.

Security

In order to be able to guarantee reliability in your data network, even at level 1, versatile accessories for securing and coding the data lines are available.

Flexibility

The completely modular approach makes it possible to fit the patch fields with connection elements for various types of transmission media. If needed, any ports can be converted to glass fiber or can be retrofitted with color-coded markers and security elements. All modifications can be installed during operation without affecting other ports. This means maximum flexibility due to the option of individual configuration.

Investment protection

The patch cables are available in CAT5 and CAT6 so that standardized installation is possible, which allows gigabit transmission today. This guarantees investment protection for the passive infrastructure.

Ethernet



FL PF...TX CAT...

Patch field with two RJ45 CAT5e network connections

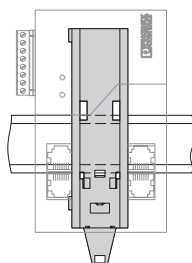
Description	Type	Order No.	Pcs. / Pkt.
Patch field, 2 RJ45 CAT5e network connections			
- CAT5e	FL PF 2TX CAT5E	2891165	1
- CAT6	FL PF 2TX CAT 6	2891068	1
- CAT5e	FL PF 8TX CAT5E	2891178	1
- CAT6	FL PF 8TX CAT 6	2891071	1
Technical data	FL PF 2TX CAT5E	FL PF 8TX CAT5E	
Ethernet interface	Ethernet (RJ45)		
Interface	Ethernet (RJ45)		
Number of ports	2	8	
Weight	125 g	260 g	
Width	38 mm	124 mm	
Height	112 mm	135 mm	
Depth	88 mm	140 mm	
Degree of protection	IP20		
Ambient temperature (operation)	0°C ... 55°C (non-condensing)		
Housing material	Metal		

Rail adapter

The Factory Line Rail Adapter makes it possible to place devices in narrow terminal boxes on a DIN rail rotated by 90° in order to save valuable installation space.

The design has been optimized for the assembly of SF switches with eight ports, so that these can be mounted using little space in control cabinets and terminal boxes where space is restricted.

Thanks to its useful width of 93 mm, the rail adapter offers universal application options to mount broad devices on a DIN rail within a minimum of space.



FL RA SF8

Description	Type	Order No.	Pcs. / Pkt.
Rail adapter for vertical mounting position	FL RA SF8	2832519	1
Technical data			
General data			
Width	37 mm		
Height	144 mm		
Depth	14 mm		
Material	Chrome-plated steel		
Mounting type	DIN rail 35 mm		

Protect Cap

Unused Ethernet ports in an industrial environment can be reliably protected against dangerous influences such as dust using the Factory Line Protect Cap.

The Protect Cap can be mounted on all RJ45 ports on infrastructure elements or on automation components and can again be removed without using any tool. It thus reliably protects the unused ports against dust or mechanical influences, so that they can be used for a long time.

The Factory Line Protect Cap is a practical supplement for every Ethernet device that has unoccupied RJ45 ports.



FL RJ45 PROTECT CAP

Description	Type	Order No.	Pcs. / Pkt.
Dust protection cap for RJ45 female connector	FL RJ45 PROTECT CAP	2832991	10
Technical data			
General data			
Color	black		
Material	-		
Mounting type	-		

Wireless MUX IO

Wireless transmission of control signals

The Wireless MUX is sold as a "Ready to use" package: Unpack – connect – switch on – and the wireless link is working.

Two packages are available:

- Standard package with OMNI antenna, an omnidirectional antenna. Ranges* of between 50 m and 100 m in the hall and over 200 m outdoors are thus possible.
- Package with PANEL antenna, a directional antenna. Outdoors, with no obstacles, distances* of over 400 m can be bridged.

The principle is simple. The signal connected at the input of the wireless MUX can be output at the corresponding output of the other Wireless MUX in a typical time of less than 10 ms.

Omni wireless set maritime

The Wireless MUX IO is also available with maritime approval: GL, LR and DNV.

Modular MUX

Two ILC 170 ETH 2TX are suitable for transmitting a greater number of digital and analog I/O signals. These are equipped with the required software via IL MODULAR MUX SD cards. The individual selection of Inline I/O terminals can be aligned with the ILC 170 ETH 2 TX.

The IO data is transmitted from one controller to another via the Ethernet interface. This can be done via an Ethernet cable or Wireless via Bluetooth or WLAN access points as well. Additional configuration software is not required.

The digital and analog Inline I/O terminals that can be used on the field multiplexer are marked in this catalog with the adjacent logo.



* The range can be considerably exceeded or fallen below and depends on the environment, antenna technology and the product used.

Please visit www.phoenixcontact.com for more information on the prevailing country-specific approvals for the relevant product.



ILB BT ADIO MUX-OMNI...

Wireless set with OMNI omnidirectional antenna

Description	Type	Order No.	Pcs. / Pkt.
Wireless MUX set , consisting of two modules with 16 digital inputs and outputs each and two analog inputs and outputs each, two OMNI antennas	ILB BT ADIO MUX-OMNI	2884208	1
- Transmission capacity 16 dBm, antenna gain 2 dBi			
- Transmission capacity 8 dBm, antenna gain 2 dBi	ILB BT ADIO MUX-OMNI 8	2884554	1
- Transmission capacity 4 dBm, antenna gain 2 dBi	ILB BT ADIO MUX-OMNI 4	2692270	1
Wireless MUX set , consisting of two modules with 16 digital inputs and outputs each and two analog inputs and outputs each, two PANEL antennas			
- Transmission capacity 12 dBm, antenna gain 8 dBi			
- Transmission capacity 0 dBm, antenna gain 8 dBi			
- Transmission capacity 8 dBm, antenna gain 8 dBi			
Modular MUX for ILC 170 ETH 2TX			

Technical data	
Wireless interface	
Wireless standard	Bluetooth 1.2
Frequency range	2.402 GHz ... 2.48 GHz (ISM bandwidth)
Transmission capacity	16 dBm (40 mW, controlled automatically)
Antenna connection method	MCX (female)
Antenna	
Assembly instructions	OMNI omnidirectional antenna, 2 dBi, Lambda/2, with fixing bracket, 1.5 m cable
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC (including ripple)
Supply current	< 100 mA
Digital inputs	
Connection method	1-wire
Number of inputs	16
Digital outputs	
Connection method	1-wire
Number of outputs	16
Maximum output current per channel	500 mA
Protective circuitry	Short circuit protection, overload protection, protected against reverse voltages
Analog inputs	
Number of inputs	2
Voltage input signal	0 V ... 10 V
Current input signal	0 mA ... 20 mA
Measured value resolution	12 bits
Analog outputs	
Number of outputs	2
Voltage output signal	0 V ... 10 V
Current output signal	0 mA ... 20 mA
DAC resolution	12 bits
General data	
Weight	1200 g
Width	95 mm
Degree of protection	IP20
Ambient temperature (operation)	-25°C ... 60°C
Shock as per IEC 60068-2-29	25g
Vibration (operation) in acc. with IEC 60068-2-6:1982	5g
Mounting type	DIN rail mounting



ILB BT ADIO MUX-PANEL ...

Wireless set with PANEL directional antenna



ILB BT ADIO MUX-OMNI/M

Wireless set with OMNI omnidirectional antenna and maritime approval



IL MODULAR MUX SD

SD memory card with MODULAR MUX software

Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
ILB BT ADIO MUX-PANEL	2884509	1	ILB BT ADIO MUX-PANEL 8	2884567	1			
			ILB BT ADIO MUX-OMNI 8/M	2693185	1			
						IL MODULAR MUX SD	2700047	1

Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Bluetooth 1.2 2.402 GHz ... 2.48 GHz (ISM bandwidth) 12 dBm (16 mW, controlled automatically) MCX (female)			Bluetooth 1.2 2.402 GHz ... 2.48 GHz (ISM bandwidth) 8 dBm (6.3 mW, controlled automatically) MCX (female)			-		
PANEL radio link antenna, 8 dBi, with fixing bracket, 1 m cable			OMNI omnidirectional antenna, 2 dBi, Lambda/2, with fixing bracket, 1.5 m cable			-		
24 V DC 19.2 V DC ... 30 V DC (including ripple)			24 V DC 19.2 V DC ... 30 V DC (including ripple)			-		
< 100 mA			< 100 mA			-		
1-wire 16			1-wire 16			-		
1-wire 16 500 mA Short circuit protection, overload protection, protected against reverse voltages			1-wire 16 500 mA Short circuit protection, overload protection, protected against reverse voltages			-		
2 0 V ... 10 V 0 mA ... 20 mA 12 bits			2 0 V ... 10 V 0 mA ... 20 mA 12 bits			-		
2 0 V ... 10 V 0 mA ... 20 mA 12 bits			2 0 V ... 10 V 0 mA ... 20 mA 12 bits			-		
1300 g 95 mm IP20 -25°C ... 60°C 25g 5g DIN rail mounting			1200 g 95 mm IP20 -25°C ... 60°C 25g 5g DIN rail mounting			-		

Wireless-IO

Factory Line Bluetooth for wireless signal transmission

The Fieldline installation system from Phoenix Contact can have up to three Fieldline Modular Wireless IO modules distributed in the field added to it via a Bluetooth-based local bus.

There is a choice of Inline Block modules with IP20 protection and Fieldline devices with IP65 as IO devices.

Configuration of the devices is a simple matter: The base station writes the connection data to an ID connector that is then plugged onto the wireless modules. The basic station can be integrated in all common fieldbus networks, such as INTERBUS and PROFIBUS, using the various Fieldline bus couplers.

Factory Line Modbus IO access point

The FL BT MOD IO AP allows automation sensors and actuators to be wirelessly integrated in an Ethernet network.

The communication with the controller takes place over the industrial Ethernet protocol Modbus/TCP. The sensors and actuators are connected to wireless IO modules which are available in IP65 or IP20 degree of protection.

The FL BT MOD IO AP can communicate with up to seven Wireless IO modules at the same time.

Factory Line Bluetooth

Factory Line Bluetooth is the industrial Bluetooth technology for transmission of control data in factory automation.

- Extremely rugged and reliable
- Simple and fast commissioning
- Can be operated together with WLAN without any interruptions due to the Black-Channel-Listing, Low Emission Mode and AFH
- Parallel operation of several Bluetooth systems
- Manipulation-proof and tap-proof



FLM BT BS 3...

Fieldline Modular Wireless IO base station for up to three Wireless IO devices

Description	Type	Order No.	Pcs. / Pkt.
Fieldline Modular Wireless IO base station for up to three Wireless IO devices			
- Adjustable transmission power	FLM BT BS 3	2736770	1
- 4 dBm transmission power	FLM BT BS-4	2692681	1
Bluetooth Modbus IO access point			
Fieldline Modular Wireless IO device			
- Adjustable transmission power			
- 4 dBm transmission power			
Inline Block Wireless IO device			
- Adjustable transmission power			
- 4 dBm transmission power			
Configuration connector ID-PLUG , necessary to configure the Wireless-IO devices (need for replacement)			
DIN rail adapter			
Technical data			
Wireless interface			
Wireless standard	Bluetooth 1.2		
Frequency range	2.402 GHz ... 2.48 GHz (ISM bandwidth)		
Transmission capacity	8 dBm (6.3 mW, controlled automatically)		
Wireless modules that can be connected	Up to 3		
Antenna connection method	SMA (female)		
Antenna			
Type of connection	SMA (male)		
Assembly instructions	OMNI antenna is included		
Fieldbus interface			
Name	Fieldline Modular local bus		
Transmission speed	500 kBaud / 2 MBaud (data rate can be changed via pin 5 (voltage supply ULS))		
Ethernet interfaces			
Type of connection	-		
Power supply for module electronics			
Supply voltage	24 V DC		
Range of supply voltages	19.2 V DC ... 30 V DC (including ripple)		
Digital inputs			
Connection method	-		
Number of inputs	-		
Digital outputs			
Connection method	-		
Number of outputs	-		
Maximum output current per channel	-		
Protective circuitry	-		
Analog inputs			
Number of inputs	-		
Voltage input signal	-		
Current input signal	-		
Measured value resolution	-		
Analog outputs			
Number of outputs	-		
Voltage output signal	-		
Current output signal	-		
DAC resolution	-		
General data			
Weight	255 g		
Width	70.5 mm		
Degree of protection	IP65		
Ambient temperature (operation)	-25°C ... 60°C		
Mounting type	Wall mounting, optionally on mounting plate		



FL BT MOD IO AP

Bluetooth Modbus IO access point,
as a wireless access point for Wireless IO devices



FLM BT DIO 8/8 M12...

Fieldline Modular Wireless IO device for connection with
FLM BT BS 3 and FL BT MOD IO AP



ILB BT ADIO 2/2/16/16...

Inline Block Wireless IO device for connection with FLM BT BS 3
and FL BT MOD IO AP

Type	Order No.	Pcs. / Pkt.
FL BT MOD IO AP	2884758	1
FL BT ADAPTER	2884949	1

Type	Order No.	Pcs. / Pkt.
FLM BT DIO 8/8 M12	2736767	1
FLM BT DIO 8/8-M12-4	2692694	1
FLM BT ID-PLUG M12	2736783	1

Type	Order No.	Pcs. / Pkt.
ILB BT ADIO 2/2/16/16	2884282	1
ILB BT ADIO 2/2/16/16-4	2692704	1
FLM BT ID-PLUG M12	2736783	1

Bluetooth 2.0
ISM 2.4 GHz
Max. 14 dBm (with automatic control)
7 (FLM BT DIO 8/8 M12, ILB BT ADIO 2/2/16/16)
SMA (female)

SMA (male)
External OMNI omnidirectional antenna, antennas can be exchanged

-
-

RJ45 female connector

24 V DC
9 V DC ... 30 V DC

-
-

-

-

-

-

-

-

-

-

95 g
80 mm
IP20
-25°C ... 55°C
Wall mounting, DIN rail mounting optional

Bluetooth 1.2
2.402 GHz ... 2.48 GHz (ISM bandwidth)
8 dBm (6.3 mW, controlled automatically)
1 (FLM BT BS 3, FL BT MOD IO AP)
SMA (female)

SMA (male)
OMNI antenna is included

-
-

-

24 V DC
19.2 V DC ... 30 V DC (including ripple)

2, 3-wire
8

2, 3-wire

8

500 mA

Short circuit protection, overload protection, protected against reverse voltages

-

-

-

-

310 g
70.5 mm
IP65
-25°C ... 60°C
Wall mounting, optionally on mounting plate

Bluetooth 1.2
2.402 GHz ... 2.48 GHz (ISM bandwidth)
8 dBm (6.3 mW, controlled automatically)
1 (FLM BT BS 3, FL BT MOD IO AP)
SMA (female)

SMA (male)
OMNI antenna is included

-
-

-

24 V DC
19.2 V DC ... 30 V DC (including ripple)

1-wire
16

1-wire

16

500 mA

Short circuit protection, overload protection, protected against reverse voltages

2

0 V ... 10 V

0 mA ... 20 mA

12 bits

305 g
117 mm
IP20
-25°C ... 60°C
DIN rail mounting

Factory Line Bluetooth

Factory Line Bluetooth for wireless transmission of control data

For wireless integration of Ethernet-compatible automation components in the network, the Factory Line module offer FL BLUETOOTH AP and FL BT EPA. The data is transferred transparently according to the protocol. This allows industrial Ethernet protocols, such as Modbus/TCP, Ethernet/IP and PROFINET to be reliably transmitted.

The FL BLUETOOTH AP can be used as an access point for up to seven devices, as an Ethernet client adapter and as a serial Bluetooth COM server.

The FL BT SPA is a Bluetooth serial adapter with which serial devices can be wirelessly integrated in an Ethernet network via the FL BLUETOOTH AP and its integrated COM server.

FL BT EPA

The new concept of "intelligent antenna" combines all functions in one extremely compact and rugged IP65 housing: an industrial Bluetooth wireless module, circular special antenna for reliable wireless connections in metallic environments and control electronics that provides the PLC with complete control over all functions.

Thanks to this concept, a better, more high-performance and considerably economically installation can be automatically attained.

With the new "Lean-Stacks", the FL BT EPA speed is more than double as compared to the previous solutions. The FL BT EPA fulfills the PROFINET requirements of Conformance Class A.

The FL BT EPA AIR SET is a "Ready to use" package: Unpack, connect, press the Mode button and the wireless path is ready to work in just a few seconds!

Factory Line Bluetooth

Factory Line Bluetooth is the industrial Bluetooth technology from Phoenix Contact for transmission of control data in factory automation.

- Extremely rugged and reliable
- Simple and fast commissioning
- Can be operated together with WLAN without any interruptions due to the Black-Channel-Listing, Low Emission Mode and AFH
- Parallel operation of several Bluetooth systems
- Manipulation-proof and tap-proof

* The range can be considerably exceeded or fallen below and depends on the environment, antenna technology and the product used.

Please visit www.phoenixcontact.com for more information on the prevailing country-specific approvals for the relevant product.



FL BLUETOOTH AP

Bluetooth access point, can be used as an access point or a client

Description	Type	Order No.	Pcs. / Pkt.
Bluetooth access point			
Bluetooth Ethernet client adapter	FL BLUETOOTH AP	2737999	1
Protocol-transparent Ethernet wireless path			
Bluetooth serial port adapter			
DIN rail adapter	FL BT ADAPTER	2884949	1

Technical data	
Wireless interface	
Wireless standard	Bluetooth 2.0
Frequency range	ISM 2.4 GHz
Transmission capacity	Max. 14 dBm (with automatic control)
Wireless modules that can be connected	7
Profiles supported	LAP, PAN, SPP
Antenna connection method	SMA (female)
Antenna	
Type of connection	SMA (male)
Assembly instructions	External OMNI omnidirectional antenna, antennas can be exchanged
Ethernet interfaces	
Type of connection	RJ45 female connector
Serial port	
Type of connection	D-SUB-9 connector
Protocols supported	RS-232
Power supply for module electronics	
Supply voltage	24 V DC
Type of connection	Via COMBICON
Range of supply voltages	9 V DC ... 30 V DC
Supply current	200 mA
Security	
	128 bit data encoding MAC filter Authentication PIN Non-discoverable
Function	
Operating modes	Access point / Ethernet client adapter / (COM server)
Function	
Configuration	Bridge, P2P, MP, COM server
General data	
Web-based management	Web-based management
Radio (wireless) certifications	
Europe, more countries in e-shop	Europe, more countries in e-shop
Weight	95 g
Width	80 mm
Height	65 mm
Depth	25 mm
Degree of protection	IP20
Class of protection	III
Ambient temperature (operation)	-30°C ... 65°C
Permissible humidity (operation)	5% ... 90% (non-condensing)
Air pressure (operation)	795 hPa ... 1080 hPa (up to 2000 m above mean sea level)
Mounting type	Wall mounting, DIN rail mounting optional

Bluetooth



FL BT EPA

Bluetooth Ethernet client adapter for wireless connection of Ethernet termination devices to an FL BLUETOOTH AP

Bluetooth



FL BT EPA AIR SET

Protocol-transparent Ethernet spark gap, e.g. for PROFINET, Modbus/TCP etc.

Bluetooth



FL BT SPA

Bluetooth serial port adapter, as a wireless connection for a serial interface to FL BLUETOOTH AP

Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
FL BT EPA	2692788	1						
			FL BT EPA AIR SET	2693091	1			
FL BT ADAPTER	2884949	1	FL BT ADAPTER	2884949	1	FL BT SPA	2884952	1
						FL BT ADAPTER	2884949	1

Bluetooth 2.0
ISM 2.4 GHz
Max. 20 dBm (with automatic control)
1
PAN
-

Permanently installed
Internal circularly polarized panel antenna

M 12 connectors (D-coded, female)

24 V DC
M12 connector (A-coded, male)
9 V DC ... 30 V DC
-

128 bit data encoding
Authentication
PIN
Non-discoverable

Ethernet client adapter

Client, bridge, P2P
Web-based management

Europe, more countries in e-shop
120 g
66 mm
91 mm
34 mm
IP65
III
-30°C ... 65°C
5% ... 90% (non-condensing)
795 hPa ... 1080 hPa (up to 2000 m above mean sea level)
Wall mounting

Bluetooth 2.0
ISM 2.4 GHz
Max. 20 dBm (with automatic control)
1
PAN
-

Permanently installed
Internal circularly polarized panel antenna

M 12 connectors (D-coded, female)

24 V DC
M12 connector (A-coded, male)
9 V DC ... 30 V DC
-

128 bit data encoding
Authentication
PIN
Non-discoverable

Ethernet client adapter

Client, bridge, P2P
Web-based management

Europe, more countries in e-shop
500 g
66 mm
91 mm
34 mm
IP65
III
-30°C ... 65°C
5% ... 90% (non-condensing)
795 hPa ... 1080 hPa (up to 2000 m above mean sea level)
Wall mounting

Bluetooth 2.0
ISM 2.4 GHz
Max. 14 dBm (with automatic control)
1
SPP
SMA (female)

SMA (male)
External OMNI omnidirectional antenna, antennas can be exchanged

D-SUB-9 connector
RS-232, RS-485, RS-422

24 V DC
Via COMBICON
9 V DC ... 30 V DC
200 mA

128 bit data encoding
MAC filter
Authentication
PIN
Non-discoverable

Serial client adapters

Serial port adapter
By means of AT commands

Europe, more countries in e-shop
95 g
80 mm
65 mm
25 mm
IP20
III
-25°C ... 55°C
5% ... 90% (non-condensing)
795 hPa ... 1080 hPa (up to 2000 m above mean sea level)
Wall mounting, DIN rail mounting optional

Factory Line WLAN

Reliable, rugged and safe. Factory Line WLAN access points have been specially designed for use in harsh industrial environments. By supporting the currently highest safety standard in acc. with IEEE 802.11i with AES encoding, the data are protected as best possible from unauthorized access or manipulation.

The Factory Line access points thus enable mobile applications to have reliable and safe wireless network access, or guarantee stable connections to outlying stations over several hundred meters.

The Factory Line access points fulfill the PROFINET requirements of Conformance Class A.

* The range can be considerably exceeded or fallen below and depends on the environment, antenna technology and the product used.

Please visit www.phoenixcontact.com for more information on the prevailing country-specific approvals for the relevant product.

WLAN



FL WLAN ... AP 802-11

Wireless LAN access point for the b, g, a and n wireless standards

Description	Type	Order No.	Pcs. / Pkt.
Wireless LAN access point	FL WLAN 24 AP 802-11	2884075	1
- One wireless interface, two antennas	FL WLAN 24 DAP 802-11	2884279	1
- Two wireless interfaces, four antennas	FL WLAN 230 AP 802-11	2884444	1
- Supply voltage 230 V AC			
Replaceable configuration memory for WLAN modules	FL WLAN SIM	2692539	1
Technical data	FL WLAN 24 AP 802-11	FL WLAN 230 AP 802-11	
Wireless interface	IEEE 802.11 b/g/a/n		
Wireless standard	ISM 2.4 GHz / 5 GHz		
Frequency band	20 dBm (EIRP)		
Transmission capacity	R-SMA (male)		
Antenna connection method	R-SMA (female)		
Antenna	External OMNI omnidirectional antenna, the antennas can be exchanged		
Ethernet interfaces	RJ45 female connector		
Power supply for module electronics	24 V DC (PoE) 230 V AC (PoE)		
Supply voltage	Via COMBICON		
Type of connection	18.5 V DC ... 30.5 V DC 110 V AC ... 230 V AC		
Range of supply voltages	400 mA (recommended protection 2AT)		
Security	WEP 64 bit/128 bit WEPplus WPA TKIP 802.11i WPA2 (RSN, AES) WPA PSK (pre-shared key) WPA group & master rekeying		
Function	Access point		
Operating modes	Multilingual web-based interface (German/English) under http or https, with password protection		
Configuration	Automatic channel selection Yes		
Automatic channel selection	Quality of service (QoS) Yes		
Quality of service (QoS)	Virtual LAN (VLAN) support 802.1Q Yes		
Virtual LAN (VLAN) support 802.1Q	General data		
Radio (wireless) certifications	Europe, more countries in e-shop		
Weight	1300 g		
Width	159 mm		
Height	250 mm		
Depth	65 mm		
Degree of protection	IP65		
Ambient temperature (operation)	-20°C ... 55°C		
Permissible humidity (operation)	10% ... 85% (non-condensing)		
Air pressure (operation)	795 hPa ... 1080 hPa (up to 2000 m above mean sea level)		
Shock in acc. with IEC 60068-2-27:1997	25g		
Vibration (operation) in acc. with IEC 60068-2-6:1982	5g		
Mounting type	Adapter plate		

Factory Line WLAN

The FL WLAN 24 AP 802-11 XDB is suitable for control cabinet assembly due to its compact design. It supports the Access Point, Multipoint Bridge and Client Adapter operating modes. A Repeater Mode for range expansion is also available.

Factory Line WLAN is the industrial WLAN technology from Phoenix Contact for high-performance infrastructure networks and for control of mobile transport systems

- High performance and reliability
- Long range
- Good integration in automation systems
- Manipulation-proof and tap-proof

WLAN



... 802-11 XDB

Wireless LAN access point
For the a, b and g wireless standards

Description	Type	Order No.	Pcs. / Pkt.
Wireless LAN access point - One wireless interface approved for Europe, antennas as accessories	FL WLAN 24 AP 802-11 XDB	2990037	1
Wireless LAN access point - One wireless interface approved for USA, antennas as accessories	RAD-80211-XDB	2990011	1
Technical data	FL WLAN 24 AP 802-11 XDB RAD-80211-XDB		
Wireless interface			
Wireless standard	IEEE 802.11 a/b/g		
Frequency band	ISM 2.4 GHz / 5 GHz		
Transmission capacity	20 dBm (EIRP)		
Antenna connection method	2x MCX (female)		
Antenna			
Assembly instructions	Antenna not included		
Ethernet interfaces			
Type of connection	RJ45 female connector		
Power supply for module electronics			
Supply voltage	24 V DC		
Type of connection	Via COMBICON		
Range of supply voltages	9 V DC ... 30 V DC		
Supply current	215 mA (24 V DC)		
Security			
	WEP 64 bit/128 bit WPA TKIP 802.11i WPA2 (AES) WPA PSK (preshared key)		
Function			
Operating modes	access point, client, bridge		
Configuration	Web-based management		
Automatic channel selection	Yes		
General data			
Radio (wireless) certifications	Europe, more countries in e-shop	Americas, more countries in e-shop	
Weight	250 g		
Width	45 mm		
Height	99 mm		
Depth	113 mm		
Degree of protection	IP20		
Ambient temperature (operation)	0°C ... 65°C		
Permissible humidity (operation)	5% ... 90% (non-condensing)		
Air pressure (operation)	795 hPa ... 1080 hPa (up to 2000 m above mean sea level)		
Shock in acc. with IEC 60068-2-27:1997	25g		
Vibration (operation) in acc. with IEC 60068-2-6:1982	5g		
Mounting type	DIN rail mounting		

Ex:

Wireless Ethernet

Factory Line WLAN client for network integration and fast roaming

Reliable, rugged and safe. The Factory Line Ethernet and Serial Port adapters have been specially designed for use in harsh industrial environments.

They allow integration of automation devices and PLCs to serial or Ethernet connection to a WLAN network. By supporting the currently highest safety standard in acc. with IEEE 802.11i with AES encoding, the data are protected as best possible from unauthorized access or manipulation.

Bridge mode and fast roaming in automation networks

With its high performance and fully transparent bridge operating mode, the WLAN client FL WLAN 24 EC 802-11 in combination with a suitable access point is ideal for a powerful and inexpensive connection of two networks (Layer 2 transparent) over several hundred meters.

Factory Line WLAN client FL WLAN 24 EC 802-11 implements various standard-compliant functions that enable extremely fast and reliable roaming.

- Standard roaming:
Fastest possible roaming through unlimited channel lists and configurable signal threshold values (RSSI)
- Table roaming:
Configurable fixed sequence of access points e.g. for linear vehicle systems and Modbus/TCP API for controlled access point change

The FL WLAN EPA/SPA module stands out with the following features:

- Protocol-transparent data transmission
- Brief delay time (Latent)
- Fast setting up of the connection
- Configuration, diagnostics and connection control via SNMP (only FL WLAN EPA) and AT commands
- DHCP server and client
- Operating modes: Infrastructure and Ad-hoc
- Ad-hoc networks with seven devices can be realized

The "intelligent antenna" concept

The new concept of "intelligent antenna" for FL WLAN EPA combines all functions in one extremely compact and rugged IP65 housing: industrial WLAN wireless module, circular special antenna for reliable wireless connections in metallic environments and control electronics that provides the PLC with complete control over all functions.

Thanks to this concept, a better, more high-performance and considerably economically installation can be automatically attained.

Factory Line WLAN is the industrial WLAN technology from Phoenix Contactor for high-performance infrastructure networks and for control of mobile transport systems

- High performance and reliability
- Long range
- Good integration in automation systems
- Manipulation-proof and tap-proof

Description

Wireless LAN Ethernet client

Wireless LAN Ethernet port adapter

Wireless LAN serial port adapter,

Replaceable configuration memory for WLAN modules

Technical data

Wireless interface

Wireless standard

Frequency band

Transmission capacity

Antenna connection method

Antenna

Type of connection

Assembly instructions

Ethernet interfaces

Type of connection

Serial port

Type of connection

Protocols supported

Power supply for module electronics

Supply voltage

Type of connection

Range of supply voltages

Supply current

Security

Function

Operating modes

Configuration

Automatic channel selection

Quality of service (QoS)

Virtual LAN (VLAN) support 802.1Q

General data

Radio (wireless) certifications

Weight

Width

Height

Depth

Degree of protection

Ambient temperature (operation)

Permissible humidity (operation)

Air pressure (operation)

Shock in acc. with IEC 60068-2-27:1997

Vibration (operation) in acc. with IEC 60068-2-6:1982

Mounting type

WLAN



FL WLAN 24 EC 802-11

Ethernet client adapter
for the b, g, a and n wireless standards



FL WLAN EPA

Wireless LAN Ethernet port adapter,
as a wireless connection for an Ethernet interface to a WLAN
access point

WLAN



FL WLAN SPA

Wireless LAN serial port adapter,
as a wireless connection for a serial interface to a WLAN access
point

Type	Order No.	Pcs. / Pkt.
FL WLAN 24 EC 802-11	2884130	1
FL WLAN SIM	2692539	1

Type	Order No.	Pcs. / Pkt.
FL WLAN EPA	2692791	1

Type	Order No.	Pcs. / Pkt.
FL WLAN SPA	2884761	1

IEEE 802.11 b/g/a/n ISM 2.4 GHz / 5 GHz 20 dBm (EIRP) R-SMA (male)	IEEE 802.11 b/g ISM 2.4 GHz Max. 20 dBm (EIRP) -	IEEE 802.11 b/g ISM 2.4 GHz 14 dBm (EIRP) SMA (male)
R-SMA (female) External OMNI omnidirectional antenna, the antennas can be exchanged	Permanently installed Internal circularly polarized panel antenna	SMA (female) Exchangeable
RJ45 female connector	M 12 connectors (D-coded, female)	-
-	-	D-SUB-9 connector RS-232, RS-485, RS-422
24 V DC (PoE) Via COMBICON 18.5 V DC ... 30.5 V DC 400 mA (recommended protection 2AT)	24 V DC M12 connector (A-coded, male) 9 V DC ... 30 V DC -	24 V DC Via COMBICON 9 V DC ... 30 V DC 200 mA
WEP 64 bit/128 bit WEPplus WPA TKIP 802.11i WPA2 (RSN, AES) WPA PSK (presared key) WPA group & master rekeying	802.11i WPA PSK (presared key) WPA2 PSK AES WEP 64 bit/128 bit TKIP	802.11i WPA PSK (presared key) WPA2 PSK AES WEP 64 bit/128 bit TKIP
Ethernet client adapter	Ethernet client adapter	Client adapters
Multilingual web-based interface (German/English) under http or https, with password protection	Web-based management	By means of AT commands
Yes Yes Yes	Yes - -	Yes - -
Europe, more countries in e-shop 1300 g 159 mm 250 mm 65 mm IP65 -20°C ... 55°C 10% ... 85% (non-condensing) 795 hPa ... 1080 hPa (up to 2000 m above mean sea level) 25g 5g Adapter plate	Europe, more countries in e-shop 120 g 66 mm 91 mm 34 mm IP65 -30°C ... 65°C 5% ... 90% (non-condensing) 795 hPa ... 1080 hPa (up to 2000 m above mean sea level) - - Wall mounting	Europe, more countries in e-shop 95 g 80 mm 65 mm 25 mm IP65 -25°C ... 55°C 5% ... 90% (non-condensing) 795 hPa ... 1080 hPa (up to 2000 m above mean sea level) 25g 5g Wall mounting, DIN rail mounting optional

IEEE 802.11 b/g ISM 2.4 GHz Max. 20 dBm (EIRP) -	IEEE 802.11 b/g ISM 2.4 GHz Max. 20 dBm (EIRP) -	IEEE 802.11 b/g ISM 2.4 GHz 14 dBm (EIRP) SMA (male)
Permanently installed Internal circularly polarized panel antenna	Permanently installed Internal circularly polarized panel antenna	SMA (female) Exchangeable
M 12 connectors (D-coded, female)	M 12 connectors (D-coded, female)	-
-	-	D-SUB-9 connector RS-232, RS-485, RS-422
24 V DC (PoE) Via COMBICON 18.5 V DC ... 30.5 V DC 400 mA (recommended protection 2AT)	24 V DC M12 connector (A-coded, male) 9 V DC ... 30 V DC -	24 V DC Via COMBICON 9 V DC ... 30 V DC 200 mA
WEP 64 bit/128 bit WEPplus WPA TKIP 802.11i WPA2 (RSN, AES) WPA PSK (presared key) WPA group & master rekeying	802.11i WPA PSK (presared key) WPA2 PSK AES WEP 64 bit/128 bit TKIP	802.11i WPA PSK (presared key) WPA2 PSK AES WEP 64 bit/128 bit TKIP
Ethernet client adapter	Ethernet client adapter	Client adapters
Multilingual web-based interface (German/English) under http or https, with password protection	Web-based management	By means of AT commands
Yes Yes Yes	Yes - -	Yes - -
Europe, more countries in e-shop 1300 g 159 mm 250 mm 65 mm IP65 -20°C ... 55°C 10% ... 85% (non-condensing) 795 hPa ... 1080 hPa (up to 2000 m above mean sea level) 25g 5g Adapter plate	Europe, more countries in e-shop 120 g 66 mm 91 mm 34 mm IP65 -30°C ... 65°C 5% ... 90% (non-condensing) 795 hPa ... 1080 hPa (up to 2000 m above mean sea level) - - Wall mounting	Europe, more countries in e-shop 95 g 80 mm 65 mm 25 mm IP65 -25°C ... 55°C 5% ... 90% (non-condensing) 795 hPa ... 1080 hPa (up to 2000 m above mean sea level) 25g 5g Wall mounting, DIN rail mounting optional

IEEE 802.11 b/g ISM 2.4 GHz Max. 20 dBm (EIRP) -	IEEE 802.11 b/g ISM 2.4 GHz Max. 20 dBm (EIRP) -	IEEE 802.11 b/g ISM 2.4 GHz 14 dBm (EIRP) SMA (male)
Permanently installed Internal circularly polarized panel antenna	Permanently installed Internal circularly polarized panel antenna	SMA (female) Exchangeable
M 12 connectors (D-coded, female)	M 12 connectors (D-coded, female)	-
-	-	D-SUB-9 connector RS-232, RS-485, RS-422
24 V DC (PoE) Via COMBICON 18.5 V DC ... 30.5 V DC 400 mA (recommended protection 2AT)	24 V DC M12 connector (A-coded, male) 9 V DC ... 30 V DC -	24 V DC Via COMBICON 9 V DC ... 30 V DC 200 mA
WEP 64 bit/128 bit WEPplus WPA TKIP 802.11i WPA2 (RSN, AES) WPA PSK (presared key) WPA group & master rekeying	802.11i WPA PSK (presared key) WPA2 PSK AES WEP 64 bit/128 bit TKIP	802.11i WPA PSK (presared key) WPA2 PSK AES WEP 64 bit/128 bit TKIP
Ethernet client adapter	Ethernet client adapter	Client adapters
Multilingual web-based interface (German/English) under http or https, with password protection	Web-based management	By means of AT commands
Yes Yes Yes	Yes - -	Yes - -
Europe, more countries in e-shop 1300 g 159 mm 250 mm 65 mm IP65 -20°C ... 55°C 10% ... 85% (non-condensing) 795 hPa ... 1080 hPa (up to 2000 m above mean sea level) 25g 5g Adapter plate	Europe, more countries in e-shop 120 g 66 mm 91 mm 34 mm IP65 -30°C ... 65°C 5% ... 90% (non-condensing) 795 hPa ... 1080 hPa (up to 2000 m above mean sea level) - - Wall mounting	Europe, more countries in e-shop 95 g 80 mm 65 mm 25 mm IP65 -25°C ... 55°C 5% ... 90% (non-condensing) 795 hPa ... 1080 hPa (up to 2000 m above mean sea level) 25g 5g Wall mounting, DIN rail mounting optional

2.4 GHz accessories

RAD-ISM-2400-ANT-PAN-8-0

Radio link antenna with high gain (+8 dBi) for transmitting over long distances.

RAD-ISM-2400-ANT-CIR-8-0

Circularly polarized panel directional antenna especially for use in industrial halls with a very high reflection component due to metal.



PANEL directional antenna



PANEL directional antenna, circular

Description
PANEL directional wireless antenna (without cable) 8 dBi, linearly polarized 8 dBi, circularly polarized, clockwise

Type	Order No.	Pcs. / Pkt.
RAD-ISM-2400-ANT-PAN- 8-0	2867610	1

Type	Order No.	Pcs. / Pkt.
RAD-ISM-2400-ANT-CIR-8-0	2884936	1

Technical data
Ambient temperature (operation)
Degree of protection
Gain
Impedance
Type of connection
Horizontal / vertical apex angle
Dimensions W / H
Frequency range
Scope of delivery

-40°C ... 75°C
IP55
8 dBi
50 Ω
SMA (female)
75 ° / 70 °
80 mm / 100 mm
2.3 GHz ... 2.8 GHz
Incl. mounting material

-40°C ... 80°C
IP55
8 dBi
50 Ω
SMA (female)
70 ° / 65 °
95 mm / 101 mm
2.4 GHz
Incl. mounting material

RAD-ISM-2400-ANT-OMNI-5-0

Omnidirectional antenna with high gain for use in buildings.

RAD-ISM-2400-ANT-OMNI-6-0

Omnidirectional antenna with high gain for outdoors.

RAD-ISM-2400-ANT-VAN-3-...

Robust omnidirectional antenna in an inconspicuous design with vandalism protection.



OMNI omnidirectional antenna



OMNI omnidirectional antenna

Description
OMNI omnidirectional antenna 2.4 GHz, 5 dBi gain 2.4 GHz, 6 dBi gain
OMNI omnidirectional antenna with vandal protection
With SMA connection (male)
With connection MCX (male)
Mounting material

Type	Order No.	Pcs. / Pkt.
RAD-ISM-2400-ANT-OMNI-5-0	2884923	1
RAD-ISM-2400-ANT-OMNI-6-0	2885919	1

Type	Order No.	Pcs. / Pkt.
RAD-ISM-2400-ANT-VAN- 3-0-SMA	2885867	1
RAD-ISM-2400-ANT-VAN- 3-1-MCX	2885702	1
RAD-ANT-VAN-MKT	2885870	1

Technical data
Ambient temperature (operation)
Degree of protection
Gain
Impedance
Type of connection
Horizontal / vertical apex angle
Dimensions W / H
Frequency range
Scope of delivery

RAD-ISM-2400-ANT-OMNI-5-0	RAD-ISM-2400-ANT-OMNI-6-0
-20°C ... 65°C	-40°C ... 75°C
IP55	IP55
5 dBi	6 dBi
50 Ω	50 Ω
SMA (male)	N (female)
360 ° / 45 °	360 ° / 30 °
13 mm / 187 mm	22 mm / 250 mm
2.4 GHz	2.4 GHz ... 2.5 GHz
-	Incl. mounting material

RAD-ISM-2400-ANT-VAN- 3-0-SMA	RAD-ISM-2400-ANT-VAN- 3-1-MCX
-40°C ... 80°C	-40°C ... 80°C
IP55	IP55
3 dBi	3 dBi
50 Ω	50 Ω
SMA (male) with cable (1.5 m)	MCX (male) with cable (1.5 m)
360 ° / 85 °	360 ° / 85 °
86 mm / 43 mm	86 mm / 43 mm
2.4 GHz	2.4 GHz
-	-

5 GHz accessories



RAD-ISM-5000-ANT-PAR-18-N
RAD-ISM-5000-ANT-PAR-22-N

Directional wireless antennas for WLAN 802.11a (5 GHz) with high profits for larger distances.



Parabolic antenna



Parabolic antenna

Description
Parabolic antenna
Gain 18 dBi
Gain 22 dBi

Type	Order No.	Pcs. / Pkt.
RAD-ISM-5000-ANT-PAR-18-N	5606613	1

Type	Order No.	Pcs. / Pkt.
RAD-ISM-5000-ANT-PAR-22-N	5606174	1

Technical data

Ambient temperature (operation)	-40°C ... 70°C
Degree of protection	IP55
Gain	18 dBi
Impedance	50 Ω
Type of connection	N (female)
Horizontal / vertical apex angle	18 ° / 18 °
Dimensions W / H	152.4 mm / 152.4 mm
Frequency range	5.25 GHz ... 5.85 GHz
Scope of delivery	Incl. mounting material

Ambient temperature (operation)	-40°C ... 70°C
Degree of protection	IP55
Gain	22 dBi
Impedance	50 Ω
Type of connection	N (female)
Horizontal / vertical apex angle	12 ° / 12 °
Dimensions W / H	- / -
Frequency range	5.25 GHz ... 5.85 GHz
Scope of delivery	Incl. mounting material

Omnidirectional antenna for 5 GHz for direct assembly on WLAN devices with R-SMA connection (replacement part).



OMNI omnidirectional antenna

Description
Omnidirectional antenna
5 GHz, 5 dBi gain

Type	Order No.	Pcs. / Pkt.
RAD-ISM-5200-ANT-OMNI-5-0	2692034	2

Technical data

Ambient temperature (operation)	-40°C ... 80°C
Degree of protection	IP65
Gain	5 dBi
Impedance	50 Ω
Type of connection	RSMA (female)
Horizontal / vertical apex angle	360 ° / 17 °
Dimensions W / H	- / 176 mm
Frequency range	5.2 GHz ... 5.8 GHz
Scope of delivery	-

Antenna cables, adapters and surge protection

RAD-CAB-EF142-...

Extension cable for positioning antennas at a distance: leading out of the control cabinet, connection to an antenna mounted somewhere else.

RAD-CAB-EF393-...

When using surge protection or for adapting an antenna with N connection



Antenna cable type EF 142

Antenna cable type EF 393

Description
Antenna extension cable , SMA connection at both ends (male)
3 m
5 m
Antenna extension cable
3 m
5 m
10 m
Technical data
Ambient temperature (operation)
Impedance
Cable, attenuation

Type	Order No.	Pcs. / Pkt.
RAD-CAB-EF142-3M	2884512	1
RAD-CAB-EF142-5M	2884525	1
Technical data		
Ambient temperature (operation)	-40°C ... 105°C	
Impedance	50 Ω	
Cable, attenuation	Approx. 0.93 dB/m	

Type	Order No.	Pcs. / Pkt.
RAD-CAB-EF393- 3M	2867649	1
RAD-CAB-EF393- 5M	2867652	1
RAD-CAB-EF393-10M	2867665	1
Technical data		
Ambient temperature (operation)	-40°C ... 105°C	
Impedance	50 Ω	
Cable, attenuation	approx. 0.45 dB/m	

RAD-PIG-EF316...

For converting connector standards or leading out from the control cabinet.

RAD-ADP-...

As an adapter between devices and cables.

CN-LAMBDA/4-...

Surge protection outdoors. For details, see the TRABTECH catalog.



Adapter cable, type EF 316

Adapter

Description
Adapter cables (pigtailes)
0.3 m, N (female) -> SMA (male)
0.5 m, SMA (male) -> SMA (male)
1 m, MCX (male) -> SMA (male)
Adapter
SMA (female) -> SMA (female)
RSMA (female) > SMA (female)
SMA (female) -> SMA (female), perpendicular
COAXTRAB , protective adapter for antenna connections
N (female) -> N (female)
N(male) -> N(female)
Female-female
Further information on surge protection can be found in the TRABTECH catalog.

Type	Order No.	Pcs. / Pkt.
RAD-PIG-EF316-N-SMA	2867694	1
RAD-PIG-EF316-SMA-SMA	2885618	1
RAD-PIG-EF316-MCX-SMA	2867678	1
Technical data		
Ambient temperature (operation)	-40°C ... 70°C	
Impedance	50 Ω	
Cable, attenuation	approx. 1.5 dB/m	
Attenuation	-	

Type	Order No.	Pcs. / Pkt.
RAD-ADP-SMA/F-SMA/F	2884541	1
RAD-ADP-RSMA/F-SMA/F	2884538	1
RAD-ADP-SMA/F-SMA/M-90	2917324	1
Technical data		
Ambient temperature (operation)	-65°C ... 165°C	
Impedance	50 Ω	
Cable, attenuation	-	
Attenuation	0.3 dB	
CN-LAMBDA/4-2.0-BB	2818863	1
CN-LAMBDA/4-2.0-SB	2818876	1
CN-LAMBDA/4-5.9-BB	2838490	1

Leaky waveguide and accessories

FL LCX CABLE METER

The leaky waveguide is a cable that acts as an antenna which constantly radiates over its length. It ensures a continuous wireless connection when using tracked systems, even in remote or difficult to access areas. The cable is individually configured during assembly and is provided with connectors.



Leaky wave conductors

Connectors

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Leaky wave conductors	FL LCX CABLE METER	2884774	1			
Connectors for leaky wave conductor				FL LCX CON-N/F	2884965	1
Termination resistors for leaky wave conductor				FL LCX 50-OHM	2884978	1
Technical data						
Ambient temperature (operation)	-40°C ... 85°C			-		
Degree of protection	-			-		
Impedance	50 Ω			50 Ω		
Type of connection	-			N (female)		
Frequency range	2.4 GHz ... 6 GHz			2.4 GHz ... 6 GHz		

Accessories for leaky waveguide

Cable fastenings are required for mounting the leaky waveguide and an alignment tool is required for mounting the connector for connecting the wireless unit.



Alignment tool



Cable tie

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Alignment tool for leaky wave conductor	FL LCX TOOL	2884981	1			
Cable tie for leaky wave conductor				FL LCX CLAMP	2884994	100