FL SWITCH SFN…24VAC

Five- and eight-port standard function Ethernet switch with narrow housings for 24 V AC power



Data Sheet
2686_en_E

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1 Description

The FL SWITCH SFN…-24VAC range of Factory Line switches can be used for quick and cost-effective Ethernet network expansion to the field level. Due to the narrow housing design, the switches are suitable for use in control cabinets and junction boxes.

The FL SWITCH SFN…-24VAC switches support the auto negotiation function on the RJ45 ports and offer transmission speeds of 10/100 Mbps. Mixed operation for the connection of segments with different data transmission speeds is also supported. The RJ45 ports offer an auto crossing function, which means it is not necessary to make a distinction between 1:1 and crossover cables. Unused RJ45 ports can be fitted with security caps to provide mechanical protection against unauthorized use.

2 Features and benefits

- Switched Ethernet networks reduce traffic and non-predictable timing
- Pretagged high priority messages are forwarded before lower priority messages during periods of high network traffic
- Auto-negotiation and autocross simplify cabling
- Couple copper network segments with different bit rates with automatic detection of the data transmission speed of 10 or 100 Mbps
- Individual LEDs at each port indicate communication activity and data rate
- -0 to 60°C operating range
- Removable power connector
- NS 35 DIN rail (EN 60715) compatible
- Industrial rated, rugged metal housing for industrial applications
- Low-cost, low-complexity security by connecting Layer 1 security elements at the RJ45 ports to restrict access and tampering (optional)
- Meets IEC 61000-6-2 electrical noise immunity
- Meets IEC 60068-2-6 vibration test standards
- Meets IEC 60068-2-27 shock test standards

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It can be downloaded at phoenixcontact.net/products.

This document is valid for all products listed in the “Ordering data” on page 2.

3 Ordering data

Products

Description	Type	Order No.	Pcs./Pkt.
Ethernet switch, with 5 RJ45 ports for 10/100 Mbps	FL SWITCH SFN 5TX-24VAC	2891021	1
Ethernet switch, with 8 RJ45 ports for 10/100 Mbps	FL SWITCH SFN 8TX-24VAC	2891020	1

Accessories

Description	Type	Order No.	Pcs./Pkt.
Universal end clamp	E/NS 35 N	0800886	50
PCB connector, nominal current: 12 A, rated voltage (III/2): 320 V, nominal cross section: 2.5 mm^2, number of positions: 4, pitch: 5 mm, connection method: Screw connection with tension sleeve, color: green, contact surface: Tin	MSTB 2,4/ 4-ST	1754481	1
Surge protection in accordance with Class EA (CAT6A), for Gigabit Ethernet (up to 10 Gbps), token ring, FDDI/CDDI, ISDN, and DS1. Suitable for Power over Ethernet (PoE+) “Mode A” and “Mode B”. RJ45 attachment plug with separate grounding cable and ground connection snap-on foot for NS 35 DIN rails.	DT-LAN-CAT.6+	2881007	1
Dust protection caps for RJ45 socket	FL RJ45 PROTECT CAP	2832991	10
Patch cable, CAT5, assembled, 0.5 m	FL CAT5 PATCH 0,5	2832263	1
Patch cable, CAT5, assembled, 1.0m	FL CAT5 PATCH 1,0	2832276	1
Patch cable, CAT5, assembled, 2.0 m	FL CAT5 PATCH 2,0	2832289	1
Patch cable, degree of protection: IP20, number of positions: 8, 10 Gbps, CAT6A, cable outlet: straight	NBC-R4AC-R4AC-IE8A/…/…	1411854	1
Patch cable, CAT6A, 4-pair, shielded, connection not crossed (line), assembled at both ends with RJ45/IP20 connectors, outer sheath material: PUR, length: 2.0 m	NBC-R4AC/10G-10G-R4A/10G-94F/2,0	1408360	1
Patch cable, CAT6A, 4-pair, shielded, connection not crossed (line), assembled at both ends with RJ45/IP20 connectors, outer sheath material: PUR, length: 3.0 m	NBC-R4AC/10G-10G-R4A/10G-94F/3,0	1408365	1
Layer 1 security elements for four RJ45 network connections for use with patch boxes and panels	FL SEC PAC 4TX	2832865	1
Adapter, DIN rail to 19-inch rack	FL DIN RA	2891053	1

4 Technical data

General data		
Function	Switch/repeater; conforms to standard IEEE 802.3	
Latency of the communication processor	8 µs plus frame time	
Housing dimensions (width x height x depth)		
5-port switch, without connectors	30 x 120 x 70 mm	
8-port switch, without connectors	50 x 120 x 70 mm	
Weight		
5-port switch, without connectors	277 g	
8-port switch, without connectors	340 g	
Operating temperature	0°C to 60°C	
Storage temperature	-20°C to 85°C	
Degree of protection	IP20, DIN 40050, IEC 60529	
Protection class	Class 3 VDE 0106; IEC 60536	
Humidity (operation and storage)	5% to 95%, no condensation	
Air pressure (operation)	86 kPa to 108 kPa, 1500 m above sea level	
Air pressure (storage)	86 kPa to 108 kPa, 3500 m above sea level	
Mounting rail	NS 35 (EN 60715)	
Preferred mounting position	Perpendicular to a standard rail	
Connection to protective earth ground	Snapped onto a grounded rail	

Supply voltage (US)		
Connection type	Removable, spring-cage connector	
Wire size (solid/stranded/AWG)	0.2 to 2.5 mm^2 / 0.2 to 2.5 mm^2 / 24 to 12 AWG	
Recommended PE wire size	2.5 mm^2	
Nominal power supply	24 V AC/24 V DC	
Permissible ripple	3.6 V_{pp} within the permissible voltage range	
Permissible voltage range	20 V AC to 28 V AC 12 V DC to 32 V DC	
Test voltage	500 V DC for one minute	
Protection against polarity reversal	Present	

Current consumption and inrush current		
Nominal current consumption		
FL SWITCH SFN 5TX-24VAC	114 mA @ 24 V AC	74 mA @ 24 V DC
FL SWITCH SFN 8TX-24VAC	189 mA @ 24 V AC	135 mA @ 24 V DC
Maximum, current consumption		
FL SWITCH SFN 5TX-24VAC	132 mA @ 20 V AC	139 mA @ 12 V DC
FL SWITCH SFN 8TX-24VAC	214 mA @ 20 V AC	287 mA @ 12 V DC
Inrush current		
FL SWITCH SFN 5TX-24VAC	3.83 A @ 24 V AC (750 µs)	5.01 A @ 24 V DC (750 µs)
FL SWITCH SFN 8TX-24VAC	3.92 A @ 24 V AC (750 µs)	4.15 A @ 24 V DC (750 µs)

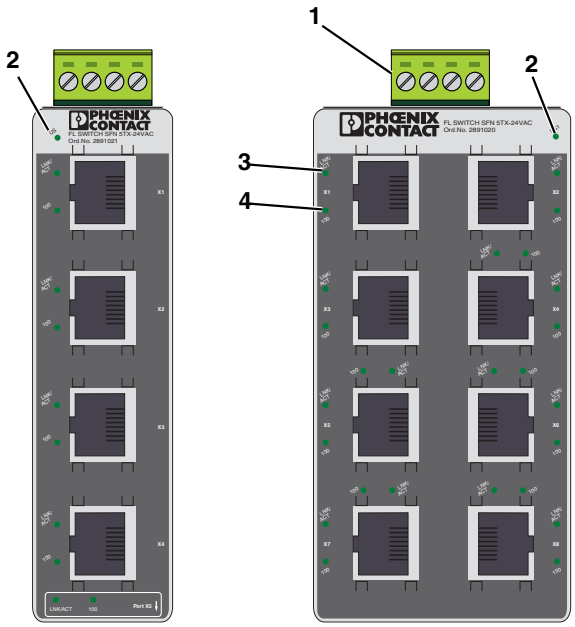
Interfaces	
Total number of RJ45 Ethernet interfaces	5/8
MAC address table size (Entries)	1 K
Properties of RJ45 ports	
Connection format	8-pos. RJ45 female connector on the switch
Connection medium	Twisted-pair cable with a conductor cross section of 0.14 mm^2 to 0.22 mm^2
Cable impedance	100 Ω
Transmission speed	10/100 Mbps
Maximum network segment length	100 m

Mechanical tests	
Shock test according to IEC 60068-2-27	Operation: 25g, 11 ms period, half-sine shock pulse Storage/transport: 50g, 11 ms period, half-sine shock pulse
Vibration resistance according to IEC 60068-2-6	Operation/storage/transport: 5g, 150 Hz, Criterion 3
Free fall according to IEC 60068-2-32	1 m

Conformance with EMC directives	
Developed according to IEC 61000-6-2	
IEC 61000-4-2 (ESD)	Criterion B
IEC 61000-4-3 (radiated-noise immunity)	Criterion A
IEC 61000-4-4 (burst)	Criterion A
IEC 61000-4-5 (surge)	Criterion B
IEC 61000-4-6 (conducted noise immunity)	Criterion A
IEC 61000-4-8 (noise immunity against magnetic fields)	Criterion A
EN 55022 (noise emission)	Class A

Approvals	
General	CE cULus ROHS EEE 2002/95/EC, WEEE 2002/96/EC, EAC
Hazardous location	cULus Class 1, Division 2, Groups A, B, C, D Temp Code T6 installed in minimum IP54 enclosure

5 Overview



1 Power connector
2 Power LED (US) - green
3 LNK/ACT LED
4 100 LED

Figure 1 Housing

5.1 Diagnostic and status indicators

Des.	Color	Status	Meaning
US1	green	ON	Supply voltage (US) in the tolerance range
		OFF	Supply voltage (US) too low

5.2 Data transmission speed LEDs (2 LEDs/Port)

	10 Mbps	100 Mbps
LNK/ACT	ON/blinking	ON/blinking
100	OFF	ON

LNK/ACT LED:
ON: indicates an electrical link
Flashing: indicates network traffic (at high data rates the blinking is in a constant rate)

6 Installation

CAUTION:
Only qualified personnel may start up and operate this device. Qualified personnel are persons authorized to start up, ground and mark devices, systems, and equipment according to the standards of safety technology.

NOTE:
The FL SWITCH SFN…24VAC module is designed for SELV and PELV operation according to IEC 61140/EN 61140.

Install the FL SWITCH SFN…24VAC on a clean mounting rail. To avoid contact resistance, use only clean, corrosion-free rails that meet the EN 60715 standard. End clamps can be mounted on both sides of the module to stop the modules from slipping on the rail.

NOTE:
Connect the mounting rail to protective earth ground using a grounding terminal block. The modules are grounded when they are snapped onto the rail. Connect protective earth ground with low impedance.

6.1 Assembly

1. Place the module onto the rail from above. The upper holding keyway must be hooked onto the top edge of the rail.
2. Push the module from the front towards the mounting surface.
3. Once the module has been snapped on properly, check that it is fixed securely on the rail.

6.2 Removal

1. Insert a suitable tool (e.g., needle-nose pliers) into the arresting latch and pull it down.
2. Pull the module slightly away from the mounting surface.
3. Lift the module from the rail.

6.3 Power Connection

The switch is designed for SELV and PELV operation at 24 V AC/DC according to IEC 61140/EN 61140. Only SELV and PELV according to the defined standards may be used for supply purposes.

Snapping the switch onto a grounded mounting rail connects it to the ground potential. In an environment particularly prone to EMI, noise immunity can be increased by an additional low-impedance connection to functional earth ground (see Figure 2).

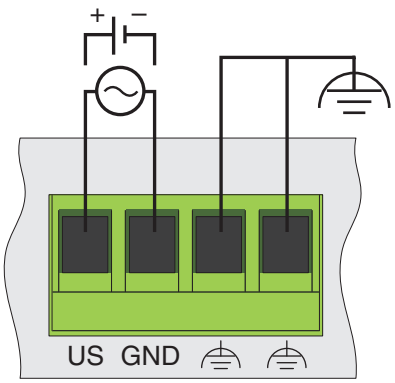


Figure 2 Power connections

Use power conductors between 0.2 - 2.5 mm² (24 - 12 AWG). Torque connection screws to 0.5 - 0.6 Nm (5 - 7 lb-in.).

6.4 Ethernet Interface

The FL SWITCH SFN…24VAC has five/eight Ethernet ports on the front in RJ45 format to which only twisted-pair cables with an impedance of 100 Ω can be connected. The data transmission speed is 10/100 Mbps. In addition, every port has an auto crossing function: it is not necessary to make a distinction between 1:1 or crossover Ethernet cables.

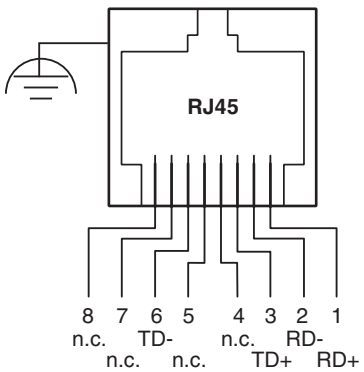


Figure 3 RJ45 pin assignment

7 Switching Characteristics

– **Store and Forward**

All data telegrams received by the switch are saved and their validity checked. Invalid or faulty data packets (> 1522 bytes or CRC errors) and fragments (< 64 bytes) are rejected. Valid data telegrams are forwarded by the switch. The switch always forwards the data using the data transmission speed that is used in the destination network segment.

– **Multi-Address Function**

The switch independently learns the addresses for termination devices, which are connected via a port, by evaluating the source addresses in the data telegrams. Only packets with unknown addresses, with a source address of this port or with a multicast/broadcast address in the destination address field are forwarded via the corresponding port. The switch can store addresses in its address table with an aging time of 5 minutes. This is important when more than one termination device is connected to one or more ports. In this way, several independent subnetworks can be connected to one switch.

A restart deletes the entire address table.

– **Quality of Service (QoS): IEEE 802.1P/Q**

The FL SWITCH SFN…-24VAC switches are capable of reading Ethernet packets that have already been assigned a priority level by a managed switch. In cases of heavy traffic, packets with a priority level between 4 and 7 are considered high priority and processed before packets with a priority level between 0 and 3. After prioritization the packets are forwarded without modification.

8 Dimensions

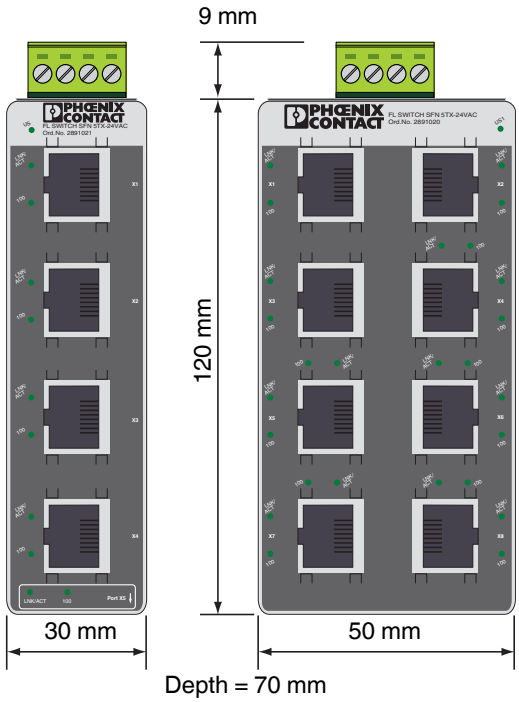


Figure 4 Housing dimensions