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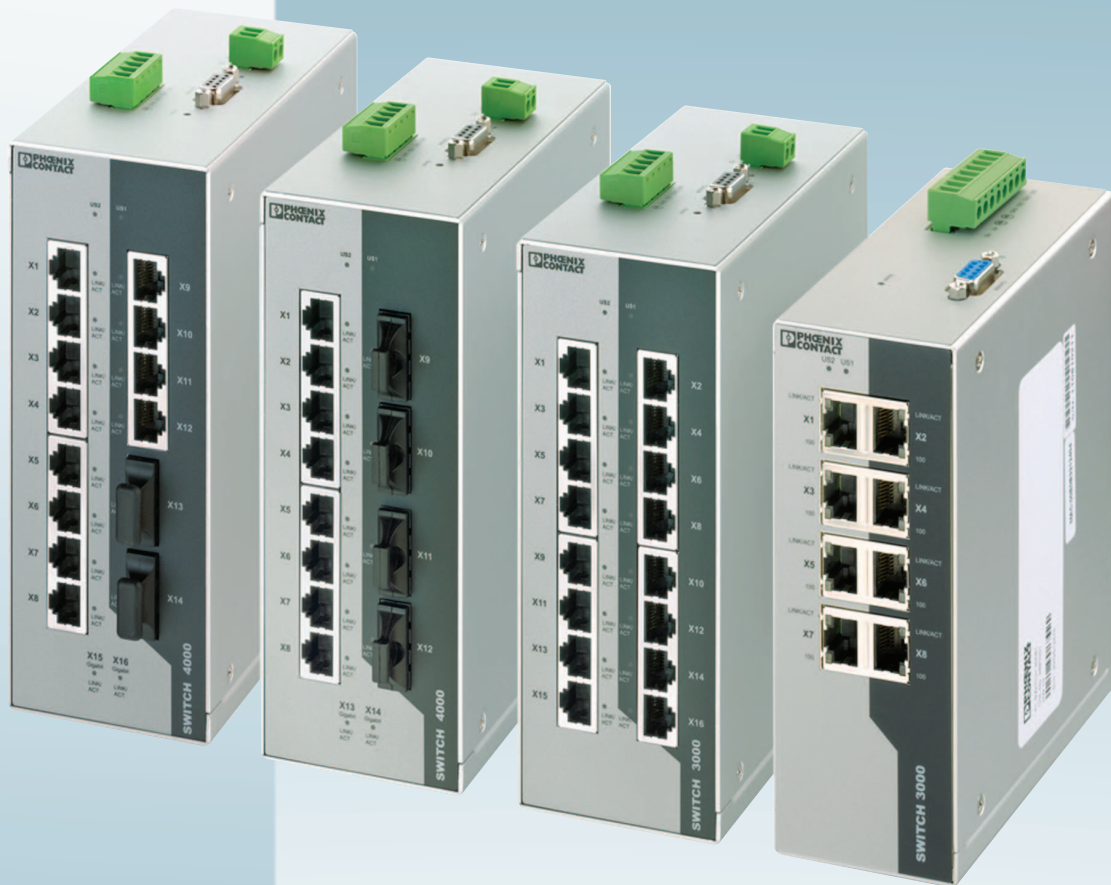
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User manual

**UM EN FL SWITCH 30..., 40... and 48...**

Managed industrial switch

# User manual

## Managed industrial switch

2016-09-12

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Designation: UM EN FL SWITCH 30..., 40... and 48...

Revision: L

This user manual is valid for:

Designation	Version	Order No.
FL SWITCH 3005		2891030
FL SWITCH 3008		2891031
FL SWITCH 3005T		2891032
FL SWITCH 3008T		2891035
FL SWITCH 3004T-FX		2891033
FL SWITCH 3004T-FX ST		2891034
FL SWITCH 3006T-2FX		2891036
FL SWITCH 3006T-2FX SM		2891060
FL SWITCH 3006T-2FX ST		2891037
FL SWITCH 3012E-2FX		2891120
FL SWITCH 3012E-2FX SM		2891119
FL SWITCH 3016		2891058
FL SWITCH 3016T		2891059
FL SWITCH 4008T-2GT-4FX SM		2891061

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Designation	Version	Order No.
FL SWITCH 4008T-2SFP		2891062
FL SWITCH 4012T-2GT-2FX		2891063
FL SWITCH 3012E-2SFX		2891067
FL SWITCH 3016E		2891066
FL SWITCH 4824E-4GC		2891072
FL SWITCH 4808E-16FX LC-4GC		2891073
FL SWITCH 4808E-16FX SM LC-4GC		2891074
FL SWITCH 4808E-16FX-4GC		2891079
FL SWITCH 4808E-16FX SM-4GC		2891080
FL SWITCH 4012T-2GT-2FX ST		2891161
FL SWITCH 4008T-2GT-3FX SM		2891160
FL SWITCH 4808E-16FX ST-4GC		2891085
FL SWITCH 4808E-16FX SM ST-4GC		2891086
FL SWITCH 4800E-24FX-4GC		2891102
FL SWITCH 4800E-24FX SM-4GC		2891104





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### User group of this manual

The use of products described in this manual is oriented exclusively to:

- Qualified electricians or persons instructed by them, who are familiar with applicable standards and other regulations regarding electrical engineering and, in particular, the relevant safety concepts.
- Qualified application programmers and software engineers, who are familiar with the safety concepts of automation technology and applicable standards.

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This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety measures that follow this symbol to avoid possible injury or death.

There are three different categories of personal injury that are indicated with a signal word.

**DANGER** This indicates a hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING** This indicates a hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION** This indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



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# 1 Overview

The FL SWITCH 30..., 40... and 48... managed switches provide scalable power for application flexibility and ease of use. The switches are industrially hardened and offer a complete range of 10/100 connections and IEEE functions.

The FL SWITCH 30... range consists of managed switches with up to 16 ports that provide maximum redundancy, message filtering and security functions with both wide and normal industrial temperature ranges. The large IEEE function set meets application and IT department requirements, while retaining the ease of use needed by supporting plant floor personnel. Versions with 10/100 TX and TX/Fiber port combinations are available.

The FL SWITCH 30...E... range consists of managed switches with up to 16 ports that provide maximum redundancy, message filtering and security functions with wide industrial temperature ranges and IEC 61850 extended electrical noise immunity.

The FL SWITCH 40... range consists of managed switches with up to 16 ports and various combinations of RJ45 and fiber optic connections. FL SWITCH 40... switches contain the same large IEEE function set as the FL SWITCH 30... switches. The unique mix of 1000 Mbps, 10/100 Mbps and fiber optic ports allows a wide range of distributed and supervisory applications.

The FL SWITCH 48...E... range consists of rack-mounted managed switches with up to 28 ports with different port formats:

- Switches with 24 TX ports with 4 SFP/TX combo ports (“combo – means, “combination port”, where the user may use one of two interfaces – either a copper RJ45 or fiber media module.
- Switches with eight TX RJ45 ports with 16 FX-MM or SM fiber optic ports as well as the 4 SFP/TX combo ports that provide maximum redundancy, message filtering and security functions with wide, industrial temperature ranges and IEC 61850-3/IEEE 1613 substation hardened extended electrical noise immunity. The switch is compatible with DNP3 protocol-based devices.

The unique web simplification approach allows users to choose from extensive redundancy, message filtering and security functions, while reducing overall system complexity. It allows maintenance personnel complete access to read diagnostic information without login requirements.

Maximum network availability is ensured through redundant power supply, rapid spanning tree (RST) and extended ring protocols. Browser-based configuration pages make configuration simple. For further simplification, unused configuration pages can be hidden from less experienced personnel, such as those on the plant floor.

## 1.1 Models

The FL SWITCH 30... switch is available with five or eight ports and fiber optic ports in either SC or ST format. The FL SWITCH 40... provides 10, 14 or 16 ports and SC or LC (SFP) fiber optic ports. Each switch has two 1000 Mbps uplink ports. The FL SWITCH 48...E... provides 28 ports with different port formats, such as RJ45, LC and SFP.

The available models are:

Table 1-1 Models

	No. of RJ45 ports: 10/100	No. of RJ45 ports: 10/100/1000	No. of fiber optic ports	No. of GC ports <sup>1</sup>
FL SWITCH 3005	5	-	-	
FL SWITCH 3005T	5	-	-	
FL SWITCH 3008	8	-	-	
FL SWITCH 3008T	8	-	-	
FL SWITCH 3016	16	-	-	
FL SWITCH 3016T	16	-	-	
FL SWITCH 3004T-FX	4	-	1 (SC, Multimode, 100 Mbps)	
FL SWITCH 3004T-FX ST	4	-	1 (ST, Multimode, 100 Mbps)	
FL SWITCH 3006T-2FX	6	-	2 (SC, Multimode, 100 Mbps)	
FL SWITCH 3006T-2FX ST	6	-	2 (ST, Multimode, 100 Mbps)	
FL SWITCH 3006T-2FX SM	6	-	2 (SC, Single mode, 100 Mbps)	
FL SWITCH 3012E-2SFX	12	-	2 (SFP slots - LC, 100 Mbps)	
FL SWITCH 3012E-2FX	12	-	2 (SC, Multimode, 100 Mbps)	
FL SWITCH 3012E-2FX SM	12	-	2 (SC, Single mode, 100 Mbps)	
FL SWITCH 3016E	16	-	-	
FL SWITCH 4008T-2SFP <sup>3</sup>	8	-	2 (SFP slots - LC, 1000 Mbps)	
FL SWITCH 4012T-2GT-2FX	12	2	2 (SC, Multimode, 100 Mbps)	
FL SWITCH 4012T-2GT-2FX ST	12	2	2 (ST, Multimode, 100 Mbps)	
FL SWITCH 4008T-2GT-3FX SM	8	2	3 (SC, Single mode, 100 Mbps)	
FL SWITCH 4008T-2GT-4FX SM	8	2	4 (SC, Single mode, 100 Mbps)	

Table 1-1 Models

	No. of RJ45 ports: 10/100	No. of RJ45 ports: 10/100/1000	No. of fiber optic ports	No. of GC ports <sup>1</sup>
FL SWITCH 4824E-4GC <sup>3</sup>	24			4
FL SWITCH 4808E-16FX LC-4GC <sup>3</sup>	8		16 (LC, Multimode, 100 Mbps)	4
FL SWITCH 4808E-16FX SM LC-4GC <sup>3</sup>	8		16 (LC, Single mode, 100 Mbps)	4
FL SWITCH 4808E-16FX LC-4GC <sup>3</sup>	8		16 (SC, Multimode, 100 Mbps)	4
FL SWITCH 4808E-16FX LC-4GC <sup>3</sup>	8		16 (SC, Single mode, 100 Mbps)	4
FL SWITCH 4808E-16FX ST-4GC <sup>3</sup>	8		16 (ST, Multimode, 100 Mbps)	4
FL SWITCH 4808E-16FX SM ST-4GC <sup>3</sup>	8		16 (ST, Single mode, 100 Mbps)	4
FL SWITCH 4800E-24FX-4GC <sup>3</sup>			24 (SC, Multimode, 100 Mbps)	4
FL SWITCH 4800E-24FX SM-4GC <sup>3</sup>			24 (SC, Single mode, 100 Mbps)	4

<sup>1</sup> GC ports are combination ports that allow connection through either RJ45 or fiber optic connection. The RJ45 ports connect at 10/100/1000 Mbps and the fiber optic ports connect at 1000 Mbps via an SFP module. The RJ45 and fiber optic connection for a single port cannot be used at the same time.

<sup>3</sup> SFP slots accept only 1000 Mbps modules



## 1.2 Structure

### 1.2.1 FL SWITCH 3006T-2FX

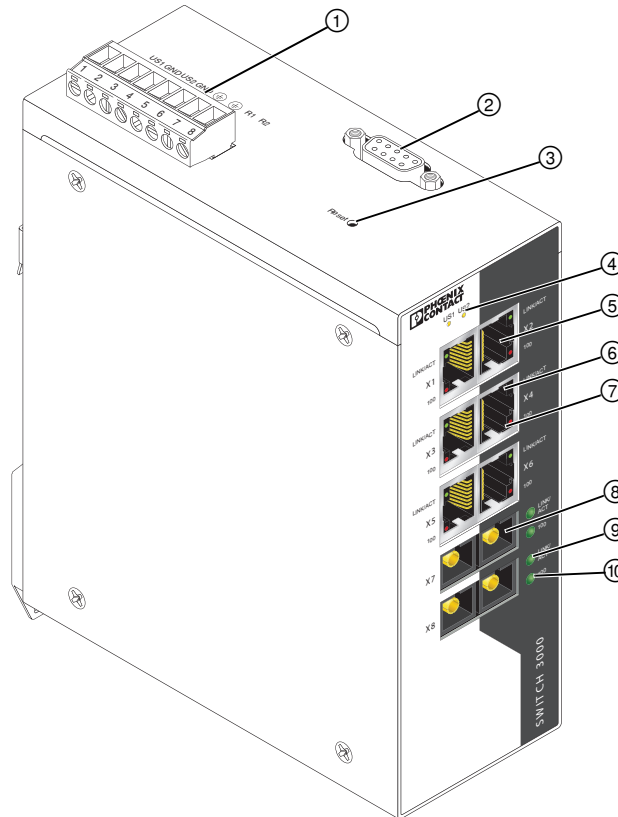


Figure 1-1 Structure of the FL SWITCH 3006T-2FX

Table 1-2 Structure of the FL SWITCH 3006T-2FX

1	Power supply/remote alarm connector	
2	RS-232 serial port (9-pos. D-SUB)	
3	Reset button	<p>Press and hold for less than 10 seconds to reboot with the saved configuration. The IP address is retained.</p> <p>Press and hold until all LEDs flash (approximately 30 seconds) to reboot using the factory defaults. The saved configuration and IP address will be lost.</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p><b>i</b> The reset button may be disabled for security purposes (see “Services” on page 63).</p> </div>
4	Power indicator LEDs (US1/US2)	<p>Green indicates voltage supply is within range.</p> <p>Off indicates a voltage supply is below 18 V.</p>

Table 1-2 Structure of the FL SWITCH 3006T-2FX (continued)

5	RJ45 ports	
6	RJ45 port LNK/ACT LED	Green indicates link is active. Off indicates link is not active. Flashing indicates data transfer.
7	RJ45 port 100 LED	Orange indicates 100 Mbps. Off indicates 10 Mbps.
8	Fiber optic port	
9	Fiber optic LNK/ACT LED	Green indicates link is active. Off indicates link is not active. Flashing indicates data transfer.
10	Fiber optic 100 LED	Orange indicates 100 Mbps. Off indicates link is not active.

### 1.2.2 16-port FL SWITCH 30... switches

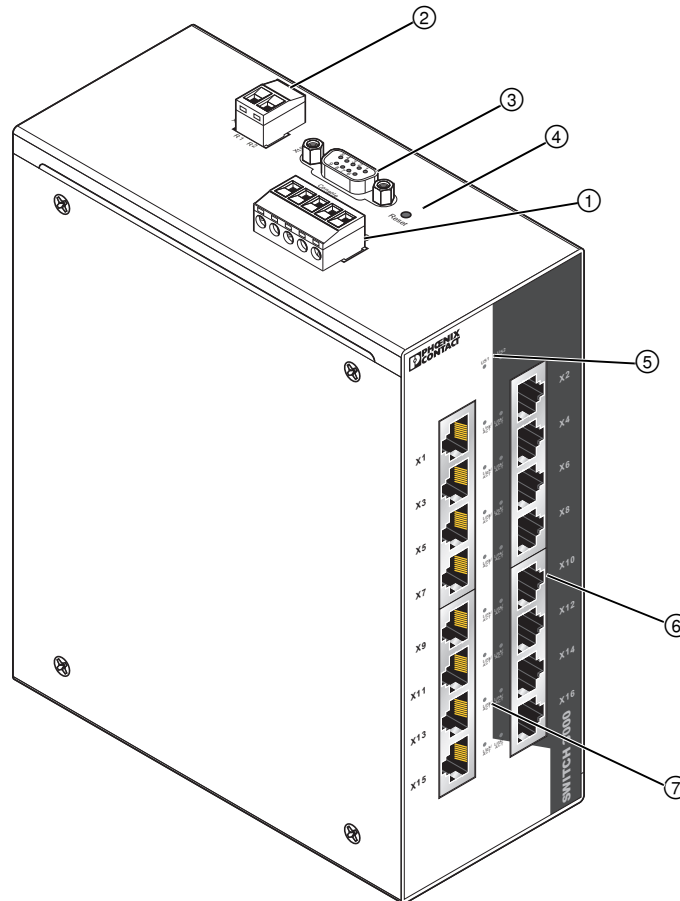



Figure 1-2 Structure of the FL SWITCH 3016

## FL SWITCH 30..., 40... and 48...

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Table 1-3 Structure of the FL SWITCH 3016

1	Power supply	
2	Remote alarm connector	
3	RS-232 serial port (9-pos. D-SUB)	
4	Reset button	<p>Press and hold for less than 10 seconds to reboot with the saved configuration. The IP address is retained. Press and hold until all LEDs flash (approximately 30 seconds) to reboot using the factory defaults. The saved configuration and IP address will be lost.</p> <div data-bbox="722 617 1200 716" style="border: 1px solid black; padding: 5px;"> The reset button may be disabled for security purposes (see "Services" on page 63).</div>
5	Power indicator LEDs (US1/US2)	<p>Green indicates voltage supply is within range. Off indicates a voltage supply is below 18 V.</p>
6	RJ45 ports	
7	RJ45 port LED (LNK/ACT)	<p>Green indicates link is active. Off indicates link is not active. Flashing indicates data transfer.</p>

1.2.3 14- and 16-port FL SWITCH 40... switches

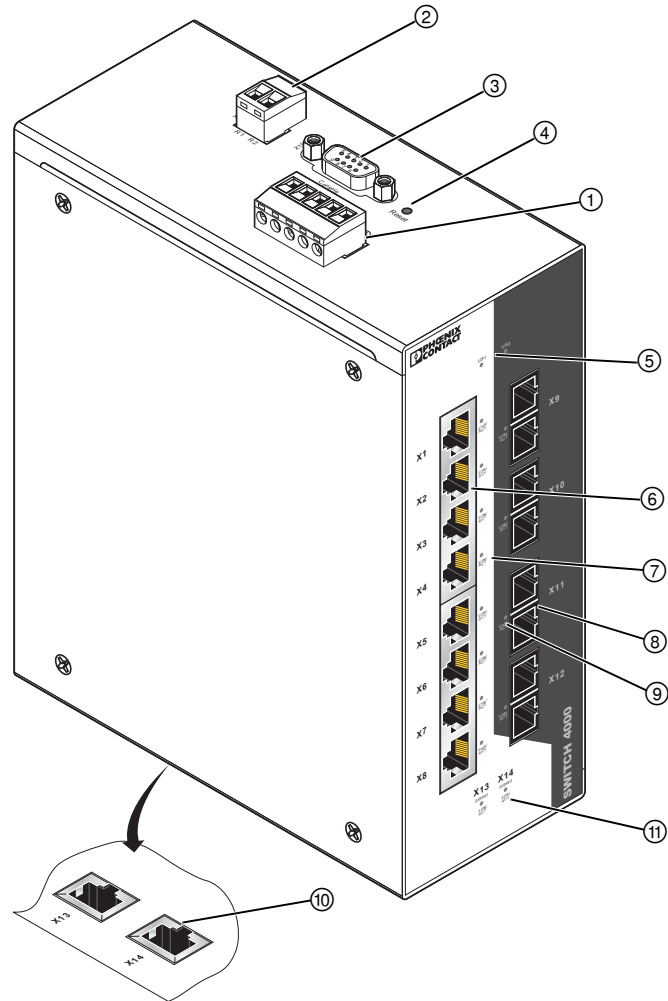



Figure 1-3 Structure of the FL SWITCH 4008T-2GT

## FL SWITCH 30..., 40... and 48...

Table 1-4 Structure of the FL SWITCH 4008T-2GT

1	Power supply	
2	Remote alarm connector	
3	RS-232 serial port (9-pos. D-SUB)	
4	Reset button	<p>Press and hold for less than 10 seconds to reboot with the saved configuration. The IP address is retained.</p> <p>Press and hold until all LEDs flash (approximately 30 seconds) to reboot using the factory defaults. The saved configuration and IP address will be lost.</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;">  <p>The reset button may be disabled for security purposes (see “Services” on page 63).</p> </div>
5	Power indicator LEDs (US1/US2)	<p>Green indicates voltage supply is within range.</p> <p>Off indicates a voltage supply is below 18 V.</p>
6	RJ45 ports	
7	RJ45 port LEDs (LNK/ACT)	<p>Green indicates link is active.</p> <p>Off indicates link is not active.</p> <p>Flashing indicates data transfer.</p>
8	Fiber optic ports	
9	Fiber optic LNK/ACT LED	<p>Green indicates link is active.</p> <p>Off indicates link is not active.</p> <p>Flashing indicates data transfer.</p>
10	RJ45 1000 Mbps ports	
11	RJ45 1000 Mbps port LEDs (LNK/ACT)	<p>Orange indicates 1000 Mbps.</p> <p>Off indicates link is not active.</p>

### 1.2.4 FL SWITCH 4824E-4GC switch

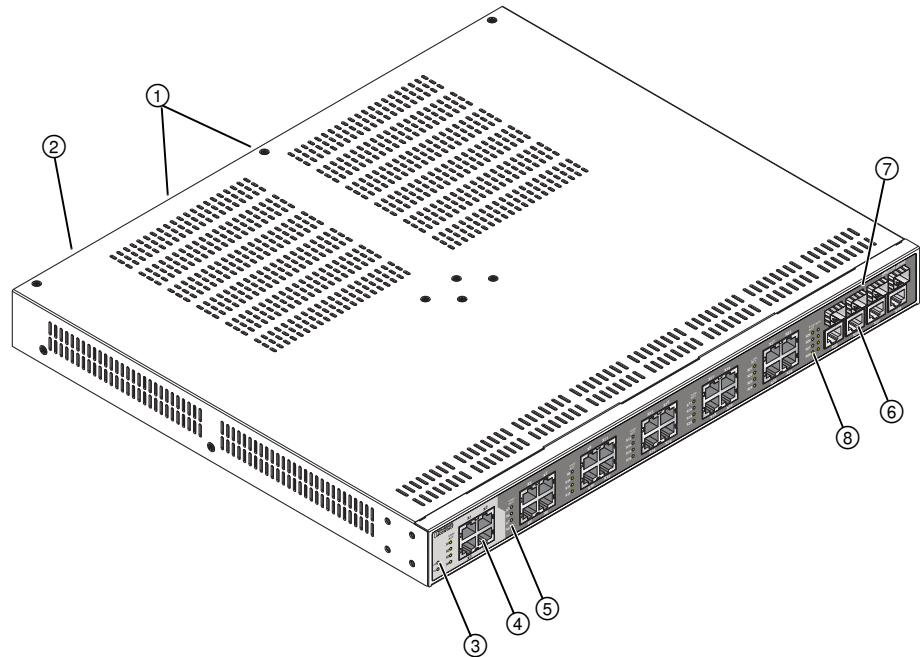


Figure 1-4 Structure of the FL SWITCH 4824E-4GC

Table 1-5 Structure of the FL SWITCH 4824E-4GC

1	Power supply slots	
2	RS-232 serial port (9-pos. D-SUB)	
3	Power indicator LEDs (US1/US2)	Green indicates voltage supply is within range. Off indicates a voltage supply is below 18 V.
4	RJ45 ports (10/100 Mbps)	
5	RJ45 port LEDs (LNK/ACT)	Green indicates link is active. Off indicates link is not active. Flashing indicates data transfer.
6	Gigabit combination ports - RJ45 connection	
7	Gigabit combination ports - Fiber optic connection (1000 Mbps)	
8	Gigabit combination port LEDs	Green indicates link is active. Off indicates link is not active. Flashing indicates data transfer.



1.2.5 FL SWITCH 4808E-16FX...4GC switch

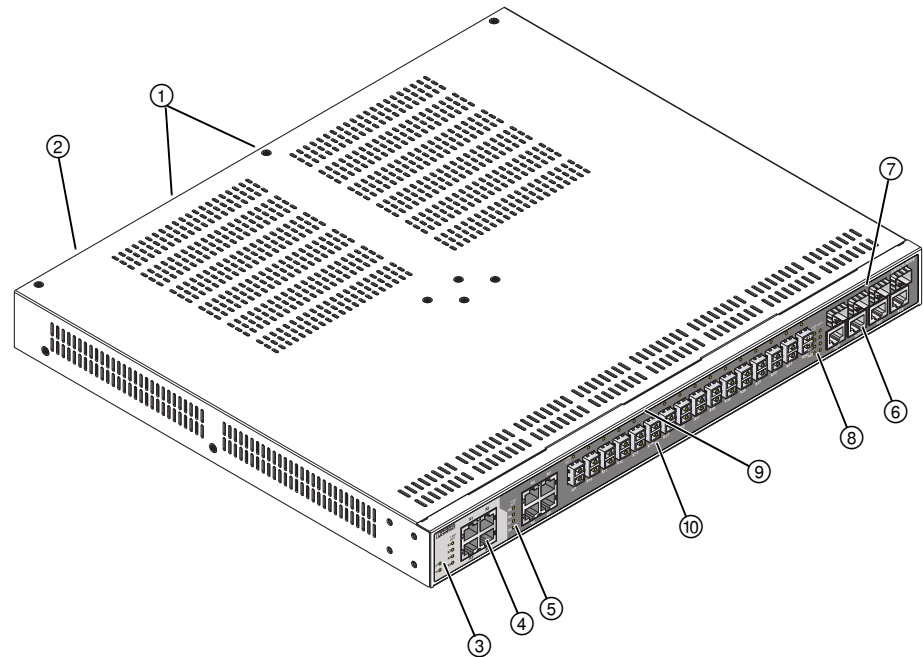


Figure 1-5 Structure of the FL SWITCH 4808E-16FX...4GC

Table 1-6 Structure of the FL SWITCH 4808E-16FX...4GC

1	Power supply slots	
2	RS-232 serial port (9-pos. D-SUB)	
3	Power indicator LEDs (US1/US2)	Green indicates voltage supply is within range. Off indicates a voltage supply is below 18 V.
4	RJ45 ports	
5	RJ45 port LEDs (LNK/ACT)	Green indicates link is active. Off indicates link is not active. Flashing indicates data transfer.
6	Gigabit combination ports - RJ45 connection	
7	Gigabit combination ports - Fiber optic connection	
8	Gigabit combination port LEDs	Green indicates link is active. Off indicates link is not active. Flashing indicates data transfer.
9	Fiber optic ports (100 Mbps)	
10	Fiber optic LNK/ACT LED	Green indicates link is active. Off indicates link is not active. Flashing indicates data transfer.

## 1.3 Installation notes

**WARNING:**

Do not look directly into the fiber optic ports when operational. The laser lightst can cause blindness or damage vision.

The user shall be responsible for ensuring the integrity of any protective conductor connections before carrying out any other actions. The protective earth connections should not be removed when the equipment is energized.

The user shall be responsible for checking equipment ratings, operating instructions, and installation instructions before commissioning or maintenance. It is the responsibility of the user to ensure that the equipment is installed, operated, and used for it's intended function in a manner specified by the manufacturer. Failure to do to this may impair safety protection mechanisms of the equipment.

The equipment conforms to pollution degree 2 when installed according to the normal position of use.

The FL SWITCH 4800E-P... power supplies contain factory-soldered (not user replaceable) fuses with the values: 400 V, 5 A, T (10 s).



## 2 Installation

### 2.1 Mounting

#### 2.1.1 FL SWITCH 30... and FL SWITCH 40...

Mount the FL SWITCH 30... and FL SWITCH 40... on a clean DIN rail according to EN 50022. To avoid contact resistance, only use clean, corrosion-free DIN rails.

Before mounting the modules, an end clamp (E/NS 35N, Order No. 0800886) should be placed on the left-hand side next to the switch to stop the module from slipping on the DIN rail. After the switch is mounted, install an end clamp on the right-hand side of the switch.

1. Place the module onto the DIN rail from above (1). The upper holding keyway must be hooked onto the top edge of the DIN rail. Push the module from the front toward the mounting surface (2).

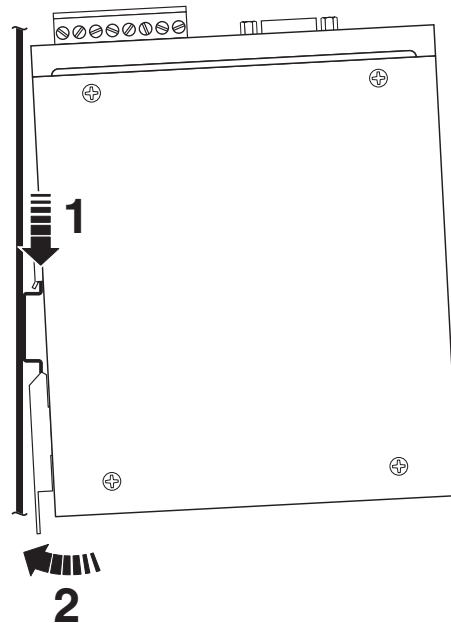


Figure 2-1 DIN rail installation

2. Once the module is snapped on properly, check that it is fixed securely on the DIN rail.
3. To prevent slipping along the DIN rail, install end clamps (E/NS 35N, Order No. 0800886) on each side of the module.

### 2.1.2 FL SWITCH 48...E...

The FL SWITCH 48...E... switch is for installation in a standard 19-inch rack. The optional FL RMB 4800E (Order No. 2891054) can be purchased separately for high-vibration and shock environments that require a more rugged installation.



It is recommended that 1U (rack unit) of space be kept free above each FL SWITCH 48...E... to allow additional air flow for heat dissipation. While not a requirement, the space will allow the switch to operate at a reduced temperature.



Because of tight spaces in most rack assemblies, connect the cord to the back of the switch before installing. See “Power (FL SWITCH 30... and FL SWITCH 40... )” on page 21 for additional information.

#### Standard mounting bracket installation

1. Attach the two mounting brackets (1) to the switch using the one M3 screw (2) and three M4 screws (3) provided.

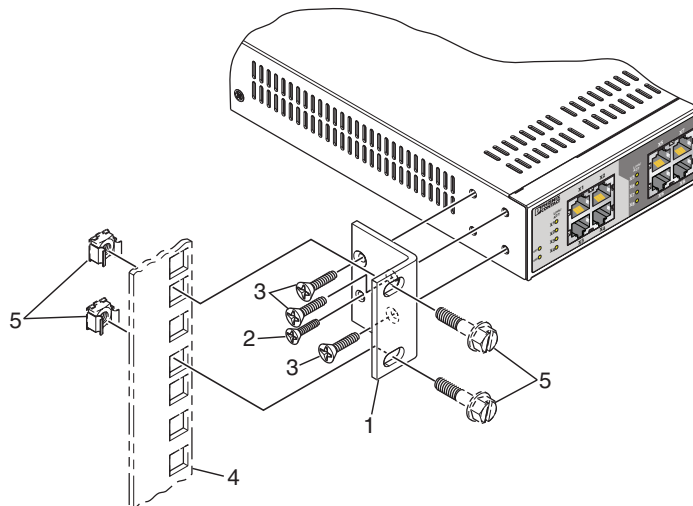


Figure 2-2 19-inch rack mounting with standard mounting brackets

2. Connect the user-supplied power cord into the rear of the switch.
3. Place the switch in the desired location on the rack (4). Use the rack hardware (5) to secure the switch in place on the rack.

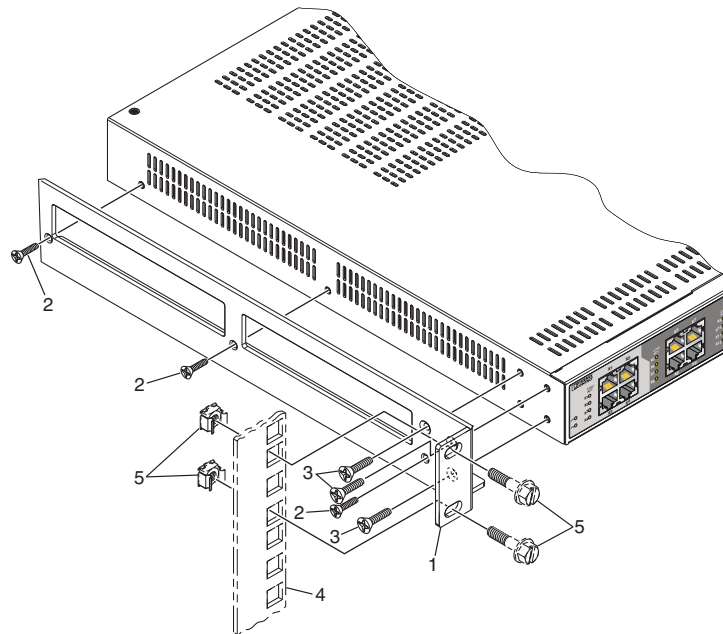
**Optional FL RMB 4800E mounting bracket installation**

Figure 2-3 19-inch rack mounting with optional FL RMB 4800E mounting brackets

1. Attach one mounting bracket (1) to the side of the switch using the three M3 screws (2) and three M4 screws (3) provided.
2. Repeat for the other side.
3. Place the switch in the desired location on the mounting rack (4). Use the mounting hardware (5) provided with the mounting rack to secure the switch.