

# Industrial Ethernet Switch - FL SWITCH 2316 - 2702909

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Managed Switch 2000, 16 RJ45 ports 10/100/1000 Mbps, degree of protection: IP20, PROFINET Conformance-Class B

The figure shows a version of the product

## Your advantages

- ✓ Suitable for PROFINET and EtherNet/IP™ networks
- ✓ Easy and fast startup and commissioning with the FL NETWORK MANAGER software
- ✓ Configuration memory
- ✓ RSTP
- ✓ DHCP client, DHCP server (pool-based and port-based), DHCP option 82
- ✓ VLANs
- ✓ MRP (client and master)
- ✓ Web-based management, SNMP
- ✓ -40°C ... +70°C ambient temperature



## Key Commercial Data

|                                      |               |
|--------------------------------------|---------------|
| Packing unit                         | 1 pc          |
| GTIN                                 |               |
| GTIN                                 | 4055626398723 |
| Weight per Piece (excluding packing) | 445.000 g     |
| Custom tariff number                 | 85176200      |
| Country of origin                    | Germany       |
| Sales Key                            | DNN121        |

## Technical data

### Note

|                         |   |
|-------------------------|---|
| Utilization restriction | EMC: class A product, see manufacturer's declaration in the download area |
|-------------------------|---|

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## Technical data

### Note

|  |   |
|--|---|
|  | Use in potentially explosive areas is not permitted in China. |
|--|---|

### Dimensions

|        |        |
|--------|--------|
| Width  | 85 mm  |
| Height | 130 mm |
| Depth  | 115 mm |

### Ambient conditions

|  |   |
|--|---|
| Degree of protection                     | IP20  |
| Ambient temperature (operation)          | -40 °C ... 70 °C  |
| Ambient temperature (storage/transport)  | -40 °C ... 85 °C  |
| Permissible humidity (operation)         | 10 % ... 95 % (non-condensing)  |
| Permissible humidity (storage/transport) | 10 % ... 95 % (non-condensing)  |
| Air pressure (operation)                 | 79 kPa ... 108 kPa up to 2000 m above mean sea level (Without derating) |
| Air pressure (storage/transport)         | 79 kPa ... 108 kPa up to 2000 m above mean sea level (Without derating) |
| Degree of pollution                      | 2   |

### Interfaces

|                               |                                   |
|-------------------------------|-----------------------------------|
| Interface                     | Ethernet (RJ45)                   |
| No. of ports                  | 16 (RJ45 ports)                   |
| Note on the connection method | Auto negotiation and autocrossing |
| Transmission physics          | Copper                            |
| Transmission speed            | 10/100/1000 Mbps                  |
| Transmission length           | 100 m (per segment)               |
| Signal LEDs                   | Data receive, link status         |

### Function

|                      |  |
|----------------------|--|
| Basic functions      | Store-and-forward switch, complies with IEEE 802.3 |
| Configuration memory | max. 8 GByte (SD card)                             |
| Management           | Web-based management (HTTP/HTTPS)                  |
|                      | Role-based user management                         |
|                      | SNMPv1/v2/v3                                       |
|                      | Command-line interface (Telnet, SSH)               |
| Diagnostic functions | RMON History                                       |
|                      | LLDP (Link Layer Discovery Protocol)               |
|                      | SNMP-Traps   |
|                      | N:1-Portmirroring                                  |
|                      | ACD (Address Conflict Detection)                   |
|                      | SysLog   |
|                      | CRC-Surveillance                                   |
| Filter functions     | Quality of Service (8 priority classes)            |
|                      | Class of Service                                   |

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### Function

|                                  |   |
|----------------------------------|---|
|                                  | DiffServ/DSCP   |
|                                  | Port-Priorisierung  |
|                                  | VLAN (up to 32 VLANs)   |
|                                  | IGMP Snooping/Querier (v1/v2)   |
|                                  | Auto-Query-Port   |
|                                  | Extended Multicast Filtering  |
| Redundancy                       | MRP (Media Redundancy Protocol)   |
|                                  | RSTP (Rapid Spanning Tree Protocol)   |
|                                  | FRD (Fast Ring Detection)   |
|                                  | Large Tree Support  |
|                                  | LACP (Link Aggregation Control Protocol)  |
| Additional functions             | Jumbo frames (Max. 9,600 bytes)   |
|                                  | Transmission of MMS and GOOSE (IEC 61850-8-1)   |
| MAC address table                | 8k  |
| IP parameterization              | DHCP-Client   |
|                                  | DHCP Option 82 (Relay Agent)  |
|                                  | DHCP server (pool-based, port-based)  |
|                                  | BootP   |
|                                  | DCP (Discovery and Configuration Protocol)  |
| PROFINET device function         | PROFINET device   |
|                                  | Fast Startup  |
| PROFINET conformance class       | Conformance-Class B   |
| Time synchronization             | SNTP (Simple Network Time Protocol)   |
| Status and diagnostic indicators | LEDs: US1, US2 (power supply), Fail (alarm contact), 2 LEDs per Ethernet port (Link/Activity and Speed) |
| Signal contact control voltage   | typ. 24 V DC  |

### Security functions

|               |                                 |
|---------------|---------------------------------|
| Port security | MAC-based, RADIUS (IEEE 802.1X) |
|---------------|---------------------------------|

### Network expansion parameters

|   |  |
|---|--|
| Cascading depth                         | Network, linear, and star structure: any |
| Maximum conductor length (twisted pair) | 100 m                                    |

### Supply voltage

|                             |   |
|-----------------------------|---|
| Supply voltage              | 24 V DC (redundant)   |
| Residual ripple             | 3.6 V <sub>PP</sub> (within the permitted voltage range)                    |
| Supply voltage range        | 12 V DC ... 57 V DC   |
| Typical current consumption | 455 mA (at U <sub>S</sub> = 24 V DC and 25 °C ambient temperature)          |
| Max. current consumption    | 1.8 A (U <sub>S</sub> = Min, T <sub>amb</sub> = Max, DO <sub>1</sub> = Max) |
| Current consumption         | 455 mA  |

### General

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## Technical data

### General

|                  |  |
|------------------|--|
| Mounting type    | DIN rail   |
| Type AX          | Book type  |
| Net weight       | 445 g  |
| Housing material | Polycarbonate fiber reinforced   |
| Note             | Support by phone or on-site (fee is charged)                               |
| MTTF             | 379.84 Years (SN 29500 standard, temperature 25°C, operating cycle 21%)    |
|                  | 199.41 Years (SN 29500 standard, temperature 40°C, operating cycle 34.25%) |
|                  | 27.52 Years (SN 29500 standard, temperature 55°C, operating cycle 100%)    |

### Connection data

|                                       |                           |
|---------------------------------------|---------------------------|
| Connection method                     | Push-in spring connection |
| Conductor cross section solid min.    | 0.25 mm <sup>2</sup>      |
| Conductor cross section solid max.    | 1.5 mm <sup>2</sup>       |
| Conductor cross section flexible min. | 0.25 mm <sup>2</sup>      |
| Conductor cross section flexible max. | 1.5 mm <sup>2</sup>       |
| Conductor cross section AWG min.      | 24                        |
| Conductor cross section AWG max.      | 16                        |
| Stripping length                      | 9 mm                      |

### Standards and Regulations

|   |  |
|---|--|
| Electromagnetic compatibility                                     | Conformance with EMC Directive 2014/30/EU                      |
| Interference emission   | EN 61000-6-2 EN 61000-6-3 (noise emission) Class B             |
| Conducted noise emission  | EN 61000-6-2 EN 61000-6-3 (conducted emissions) Class B        |
| Immunity to surge   | EN 61000-6-2 EN 61000-4-5 (surge) Criterion A                  |
| Immunity to burst   | EN 61000-6-2 EN 61000-4-4 (EFT burst) Criterion A              |
| Immunity to EF  | EN 61000-6-2 EN 61000-4-3 (electromagnetic fields) Criterion A |
| Immunity to ESD   | EN 61000-6-2 EN 61000-4-2 (ESD) Criterion B                    |
| Immunity to conducted interference                                | EN 61000-6-2 EN 61000-4-6 (line noise immunity) Criterion A    |
| Type of test  | Free fall in accordance with EN 61131-2                        |
| Noise emission  | EN 61000-6-4   |
| Noise immunity  | EN 61000-6-2   |
| Vibration (storage/transport)                                     | 5g, 150 Hz, in acc. with IEC 60068-2-6                         |
| Free from substances that could impair the application of coating | Yes  |
| Shipbuilding approval   | Tested in accordance with IEC 60945 and IACS E10               |
| Vibration (operation)   | in acc. with IEC 60068-2-6: 5g, 150 Hz                         |
| Shock (operation)   | 30g (EN 60068-2-27)  |
| ATEX  | # II 3 G Ex ec IIC T4 Gc                                       |
| IECEX   | Ex ec IIC T4 Gc  |
| UL, USA   | UL 60079-0, Ed.6 / UL 60079-7, Ed.5                            |
| UL, USA/Canada  | Class I, Div. 2, Groups A, B, C, D T4                          |

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## Technical data

### Standards and Regulations

|                  |  |
|------------------|--|
|                  | Class I, Zone 2, IIC T4                              |
| UL, Canada       | CSA C22.2 NO.60079-0, Ed.3 / CSA C22.2 NO.60079-7:16 |
| Noxious gas test | ISA S71.04.2013 G3 Harsh Group A                     |

### Environmental Product Compliance

|            |   |
|------------|---|
| REACH SVHC | Lead 7439-92-1  |
| China RoHS | Environmentally Friendly Use Period = 50 years  |
|            | For details about hazardous substances go to tab "Downloads", Category "Manufacturer's declaration" |

## Classifications

### eCl@ss

|               |          |
|---------------|----------|
| eCl@ss 10.0.1 | 19170401 |
| eCl@ss 11.0   | 19170401 |
| eCl@ss 4.0    | 27250501 |
| eCl@ss 4.1    | 27250501 |
| eCl@ss 5.0    | 19030100 |
| eCl@ss 5.1    | 19030100 |
| eCl@ss 6.0    | 19170100 |
| eCl@ss 7.0    | 19170106 |
| eCl@ss 8.0    | 19170106 |
| eCl@ss 9.0    | 19170106 |

### ETIM

|          |          |
|----------|----------|
| ETIM 3.0 | EC000734 |
| ETIM 4.0 | EC000734 |
| ETIM 5.0 | EC000734 |
| ETIM 6.0 | EC000734 |
| ETIM 7.0 | EC000734 |

### UNSPSC

|               |          |
|---------------|----------|
| UNSPSC 6.01   | 43172015 |
| UNSPSC 7.0901 | 43201404 |
| UNSPSC 11     | 43172015 |
| UNSPSC 12.01  | 43201410 |
| UNSPSC 13.2   | 43201410 |
| UNSPSC 18.0   | 43222612 |
| UNSPSC 19.0   | 43222612 |
| UNSPSC 20.0   | 43222612 |
| UNSPSC 21.0   | 43222612 |

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## Approvals

### Approvals








#### Approvals

UL Listed / cUL Listed / EAC / DNV GL / LR / RINA / ABS / NK / CC-Link IE Field / BV / cULus Listed

#### Ex Approvals

IECEX / ATEX / UL Listed / cUL Listed / cULus Listed

### Approval details

|            |   |   |                         |
|------------|---|---|-------------------------|
| UL Listed  |    | <a href="http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm">http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm</a> | FILE E 238705           |
| cUL Listed |  | <a href="http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm">http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm</a> | FILE E 238705           |
| EAC        |  |   | RU*-<br>DE.*.B.00741/19 |
| DNV GL     |  | <a href="https://approvalfinder.dnvgl.com/">https://approvalfinder.dnvgl.com/</a>   | TAA00000YV              |
| LR         |  | <a href="http://www.lr.org/en">http://www.lr.org/en</a>   | 17/20056                |
| RINA       |  | <a href="http://www.rina.org/en">http://www.rina.org/en</a>   | ELE130419XG             |
| ABS        |   | <a href="http://www.eagle.org/eagleExternalPortalWEB/">http://www.eagle.org/eagleExternalPortalWEB/</a>   | 17-<br>HG1592765-1-PDA  |
| NK         |  | <a href="http://www.classnk.or.jp/hp/en/">http://www.classnk.or.jp/hp/en/</a>   | TA19464M                |

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## Approvals

|                  |  |              |
|------------------|--|--------------|
| CC-Link IE Field |  | Ref. No. 184 |
|------------------|--|--------------|

|    |  |   |             |
|----|--|---|-------------|
| BV |  | <a href="http://www.veristar.com/portal/veristarinfo/generalinfo/approved/approvedProducts/equipmentAndMaterials">http://www.veristar.com/portal/veristarinfo/generalinfo/approved/approvedProducts/equipmentAndMaterials</a> | 48146/A1 BV |
|----|--|---|-------------|

|              |  |  |
|--------------|--|--|
| cULus Listed |  |  |
|--------------|--|--|

## Accessories

### Accessories

#### Configuration memory

Program / configuration memory - FL SD FLASH/MRM - 2700270



Parameterization memory, plug-in, with MRM functionality

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#### Data cable preassembled

Patch cable - NBC-R4AC-R4AC-IE8A/.../... - 1411854



Patch cable, degree of protection: IP20, number of positions: 8, 10 Gbps, CAT6<sub>A</sub>, cable outlet: straight

Patch cable - NBC-R4AC/10G-R4AC/10G-94F/2,0 - 1408360



Patch cable, CAT6<sub>A</sub>, 4-pair, shielded, connection not crossed (line), assembled at both ends with RJ45/IP20 connectors, outer sheath material: PUR, length: 2.0 m

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### Accessories

Patch cable - NBC-R4AC/10G-R4AC/10G-94F/3,0 - 1408365



Patch cable, CAT6<sub>A</sub>, 4-pair, shielded, connection not crossed (line), assembled at both ends with RJ45/IP20 connectors, outer sheath material: PUR, length: 3.0 m

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Patch cable - NBC-R4AC/1,0-93B/R4AC - 1408968



Patch cable, Ethernet (100 Mbps), PROFINET (100 Mbps), EtherCAT<sup>®</sup> (100 Mbps), shielded, star quad, AWG 22 flexible (7-wire), green, RJ45 connector/IP20, straight, to RJ45 connector/IP20, straight, length: 1 m

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Patch cable - NBC-R4AC/2,0-93B/R4AC - 1408969



Patch cable, Ethernet (100 Mbps), PROFINET (100 Mbps), EtherCAT<sup>®</sup> (100 Mbps), shielded, star quad, AWG 22 flexible (7-wire), green, RJ45 connector/IP20, straight, to RJ45 connector/IP20, straight, length: 1 m

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Patch cable - NBC-R4AC/5,0-93B/R4AC - 1408970



Patch cable, Ethernet (100 Mbps), PROFINET (100 Mbps), EtherCAT<sup>®</sup> (100 Mbps), shielded, star quad, AWG 22 flexible (7-wire), green, RJ45 connector/IP20, straight, to RJ45 connector/IP20, straight, length: 1 m

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### Drivers and interfaces

Software - FL SNMP OPC SERVER V3 - 2701139



SNMP-OPC server, German and English, for monitoring and configuration of SNMP-capable equipment in HMI and SCADA systems

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### End block



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### Accessories

End clamp - E/NS 35 N - 0800886



End clamp, width: 9.5 mm, color: gray

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### Mounting rail adapter

DIN rail adapter - FL DIN RA - 2891053



The FL DIN RA is installed in a standard, 19-inch rack (EIA-310-D, IEC 60297-3-100) to allow DIN rail mounted equipment to be rack mounted.

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### Network management software

Software - FL NETWORK MANAGER BASIC - 2702889



FL Network Manager, SNMP-based configuration and firmware update software, for easy startup of Managed Switches

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### Parameterization memory

Memory - SD FLASH 512MB - 2988146



Program and configuration memory, plug-in, 512 Mbyte.

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Program / configuration memory - SD FLASH 2GB - 2988162



Program and configuration memory, for extending the internal flash memory, pluggable, 2 GB.

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### Patch cable

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### Accessories

Patch cable - FL CAT5 PATCH 0,5 - 2832263



Patch cable, CAT5, assembled, 0.5 m

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Patch cable - FL CAT5 PATCH 1,0 - 2832276



Patch cable, CAT5, assembled, 1 m

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Patch cable - FL CAT5 PATCH 2,0 - 2832289



Patch cable, CAT5, assembled, 2 m

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### PCB plug

Printed-circuit board connector - FK-MCP 1,5/ 5-ST-3,81GY35BD1-5 - 1015782



PCB connector, nominal cross section: 1.5 mm<sup>2</sup>, color: light gray, nominal current: 8 A, rated voltage (III/2): 160 V, contact surface: Tin, type of contact: Female connector, Number of potentials: 5, Number of rows: 1, Number of positions per row: 5, number of connections: 5, product range: FK-MCP 1,5/...-ST, pitch: 3.81 mm, connection method: Push-in spring connection, conductor/PCB connection direction: 0 °, Stecksystem: MINI COMBICON, Locking: without, type of packaging: packed in cardboard

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PCB connector - MCVW 1,5/ 5-ST-3,81GY7035BD2DO - 1034096



PCB connector, nominal cross section: 1.5 mm<sup>2</sup>, color: light gray, nominal current: 8 A, rated voltage (III/2): 160 V, contact surface: Tin, type of contact: Female connector, Number of potentials: 5, Number of rows: 1, Number of positions per row: 5, number of connections: 5, product range: MCVW 1,5/...-ST, pitch: 3.81 mm, connection method: Screw connection with tension sleeve, conductor/PCB connection direction: -90 °, Stecksystem: MINI COMBICON, Locking: without, type of packaging: packed in cardboard

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### Protective cap

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### Accessories

Dust protection - FL RJ45 PROTECT CAP - 2832991



Dust protection caps for RJ45 socket