

FL MC EF 1300 SM SC - FO converters



2902856
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FO converter with SC duplex fiber optic connection (1300 nm), for converting 10/100Base-T(X) to single mode fiberglass (9/125 μm). Auto negotiation and auto MDI(X) function. Comprehensive link diagnostics. DIN-rail mountable, 18 ... 30 V DC supply.

Product description

Optical transmission with FO technology provides superior immunity to interference at maximum transmission ranges without restricting the transmission bandwidth.

Your advantages

- Transmission ranges up to 36 km
- Auto negotiation
- Auto MDI/MDI-X switch-over
- Link fault pass through (LFPT) and far end fault (FEF) functions for easy connection monitoring
- 10/100 Mbps
- Shipbuilding approval in accordance with DNV GL

Commercial data

Item number	2902856
Packing unit	1 pc
Minimum order quantity	1 pc
Sales key	DNC311
Product key	DNC311
Catalog page	Page 351 (C-6-2019)
GTIN	4046356689212
Weight per piece (including packing)	170.9 g
Weight per piece (excluding packing)	117 g
Customs tariff number	85176200
Country of origin	DE

Technical data

Notes

Utilization restriction

CCCex note	Use in potentially explosive areas is not permitted in China.
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Product properties

Product type	Media converter
MTTF	1400 Years (SN 29500 standard, temperature 25°C, operating cycle 21%)
	599 Years (SN 29500 standard, temperature 40°C, operating cycle 34.25%)
	101 Years (SN 29500 standard, temperature 40°C, operating cycle 100%)
MTBF	284 Years (Telcordia standard, 25°C temperature, 21% operating cycle (5 days a week, 8 hours a day))
	74 Years (Telcordia standard, 40°C temperature, 34.25% operating cycle (5 days a week, 12 hours a day))
Signal delay	± 1.3 µs (Store and Forward mode, 10/100 Mbps, depending on the frame size)

System properties

Functionality

Basic functions	Store-and-forward media converter
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Electrical properties

Electrical isolation	according to IEEE 802.3
	VCC // FE // Ethernet
Maximum power dissipation for nominal condition	2.4 W
Test voltage data interface/power supply	0.5 kV _{rms} (50 Hz, 1 min.)

Supply

Supply voltage range	18 V DC ... 30 V DC (Screw connection)
	18 V DC ... 30 V DC (as an alternative or redundant, via backplane bus contact and system current supply)
Nominal supply voltage	24 V DC
Typical current consumption	100 mA (24 V DC)
Protective circuit	Reverse polarity protection

Connection data

Supply

Connection method	Plug-in screw terminal block (COMBICON), redundancy possible
Single conductor/terminal point, rigid	0.2 mm² ... 2.5 mm²
Single-wire/terminal point, flexible	0.2 mm² ... 2.5 mm²
Conductor cross section, flexible [AWG]	24 ... 14

FL MC EF 1300 SM SC - FO converters



2902856

<https://www.phoenixcontact.com/au/products/2902856>

Stripping length	7.00 mm
Tightening torque	0.56 Nm ... 0.79 Nm

Interfaces

Signal	Ethernet
Basic functions	Store-and-forward media converter

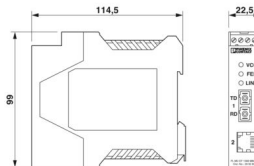
Data: optical FO

Transmit capacity, minimum	≥ -15 dBm ((9/125 μ m) dynamic in link mode (average))
Transmit capacity, maximum	≤ -8 dBm ((9/125 μ m) dynamic in link mode (average))
Transmission length incl. 3 dB system reserve	36 km (F-E 9/125 0.36 dB/km)
	32 km (F-E 9/125 0.4 dB/km)
	26 km (F-E 9/125 0.5 dB/km)
Connection method	SC duplex
Wavelength	1300 nm
Minimum receiver sensitivity	-31 dBm (dynamic in link mode (average))
Maximum receiver sensitivity	-7 dBm (dynamic in link mode (average))
Transmission medium	Single-mode fiberglass

Data: Ethernet interface, 10/100Base-T(X) in accordance with IEEE 802.3

Transmission speed	10/100 Mbps
Connection method	RJ45 jack, shielded
No. of channels	1
Transmission length	100 m (shielded twisted pair)
Transmission medium	Copper
Signal LEDs	Activity, link status, 10/100 Mbps
Auto-negotiation modes	Auto
Link through	Link fault pass through
MDI-/MDI-X switchover	Auto-MDI(X)

Dimensions

Dimensional drawing	
Width	22.5 mm
Height	99 mm
Depth	114.5 mm

Material specifications

Color (Housing)	green (RAL 6021)
Material (Housing)	PA 6.6-FR

Cable/line

FO cable

Fiber types	50/125 µm
	62.5/125 µm
	Fiberglass

Mechanical tests

Free fall in accordance with IEC 60068-2-32	: 1 m
Vibration resistance in accordance with EN 60068-2-6/IEC 60068-2-6	: 5g, 10...150 Hz, 2.5 h, in XYZ direction
Shock in accordance with EN 60068-2-27/IEC 60068-2-27	: 25g, 11 ms period, half-sine shock pulse

Environmental and real-life conditions

Ambient conditions

Degree of protection	IP20
Ambient temperature (operation)	-40 °C ... 65 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Altitude	≤ 5000 m (For restrictions, see the manufacturer's declaration for altitude operation)
	≤ 2000 m (in acc. with UL)
Permissible humidity (operation)	5 % ... 95 % (non-condensing)
Permissible humidity (storage/transport)	5 % ... 95 % (non-condensing)

Approvals

CE

Certificate	CE-compliant
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ATEX

Identification	Ⓔ II 3 G Ex nA IIC T4 Gc X
Note	Please follow the special installation instructions in the documentation!

UL, USA/Canada

Identification	508 Listed
	Class I, Zone 2, AEx nA IIC T4
	Class I, Zone 2, Ex nA IIC T4 Gc X
	Class I, Div. 2, Groups A, B, C, D

Corrosive gas test

Identification	ISA-S71.04-1985 G3 Harsh Group A
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Shipbuilding

Identification	DNV GL
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Shipbuilding data

FL MC EF 1300 SM SC - FO converters



2902856

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Temperature	B
Humidity	A
Vibration	A
EMC	B
Enclosure	Required protection according to the Rules shall be provided upon installation on board

EMC data

Electromagnetic compatibility	Conformance with EMC Directive 2014/30/EU
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Electrostatic discharge

Standards/regulations	EN 61000-4-2
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Electrostatic discharge

Contact discharge	± 6 kV (Test Level 3)
Discharge in air	± 8 kV (Test Level 3)
Indirect discharge	± 6 kV
Comments	Criterion B

Electromagnetic HF field

Standards/regulations	EN 61000-4-3
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Electromagnetic HF field

Frequency range	80 MHz ... 3 GHz (Test Level 3)
Field intensity	10 V/m
Comments	Criterion A

Fast transients (burst)

Standards/regulations	EN 61000-4-4
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Fast transients (burst)

Input	± 2 kV (Test Level 3)
Signal	± 2 kV (Test Level 3)
Comments	Criterion B

Surge current load (surge)

Standards/regulations	EN 61000-4-5
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Surge current load (surge)

Input	± 0.5 kV (DC supply)
Signal	± 1 kV (Data line, asymmetrical)
Comments	Criterion B

Conducted interference

Standards/regulations	EN 61000-4-6
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Conducted interference

Frequency range	0.15 MHz ... 80 MHz
Comments	Criterion A

FL MC EF 1300 SM SC - FO converters



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Voltage	10 V
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Emitted interference

Standards/regulations	EN 55032
Comments	Class A, industrial applications

Criteria

Criterion A	Normal operating behavior within the specified limits.
Criterion B	Temporary impairment to operational behavior that is corrected by the device itself.

Standards and regulations

Free from substances that could impair the application of coating	VDMA 24364:2018-05
Electrical isolation	according to IEEE 802.3

Mounting

Mounting type	DIN rail mounting
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FL MC EF 1300 SM SC - FO converters

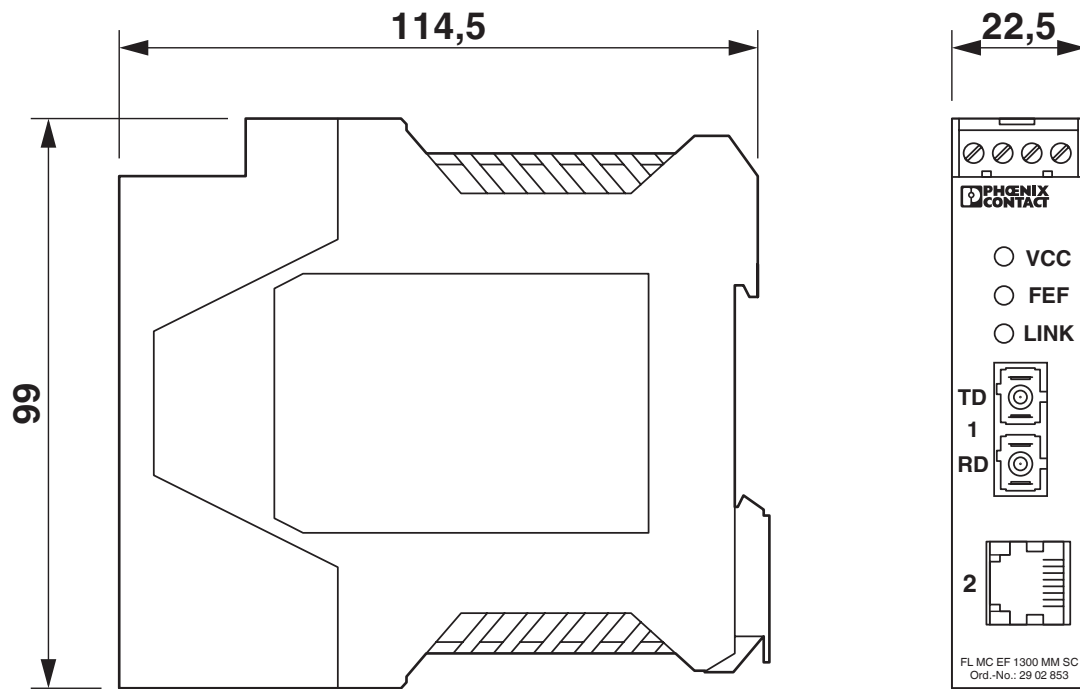
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Drawings

Dimensional drawing



Slim design

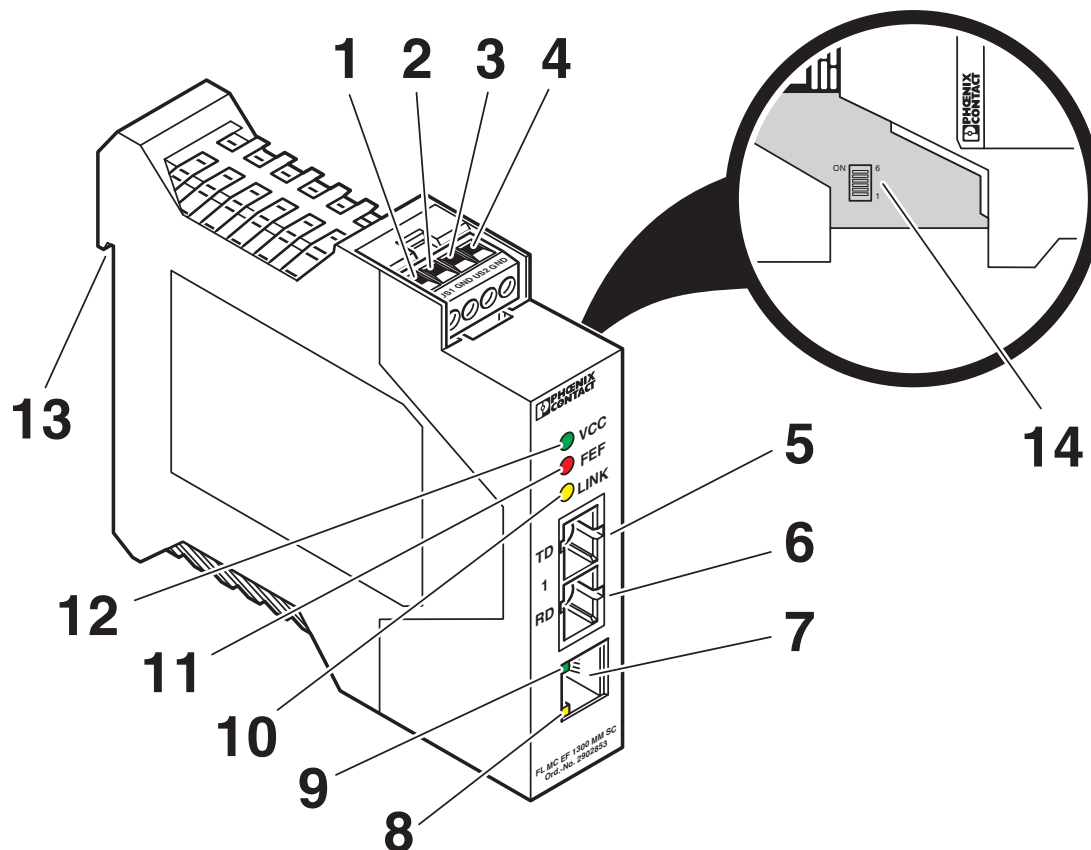
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Schematic diagram



Function elements

FL MC EF 1320

LED	permanent	flashing
GN - VCC	Device ON	
RD - FEF	Far End Fault	
YE - LINK	Link FO	Activity FO
GN - RJ45	Full Duplex	Activity CU
GN/YE - RJ45	100/10 Mbit/s	

ON	OFF (DEFAULT)
Local Link	Link Pass Through
not used	not used
Pass Pause Frame	Drop Pause Frame
Half Duplex	Full Duplex
10 Mbit/s	100 Mbit/s
Fixed Data Rate	

ON ←

6

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Block diagram

The block diagram illustrates the T-Bus system architecture. A central microcontroller (µC 10/100 MBit/s) is connected to a T-Bus. The T-Bus is connected to a DC-DC converter and a 10/100 BASE-T(X) Ethernet port. The DC-DC converter is powered by US2+ and US1+ pins, with GND connections. The Ethernet port has pins TD+(1), TD-(2), RD+(3), and RD-(6). The microcontroller has pins TD, FO, and RD. The T-Bus is represented by a dashed line with arrows indicating data flow.

May 23, 2025, 2:57 AM Page 9 (12)

FL MC EF 1300 SM SC - FO converters



2902856

<https://www.phoenixcontact.com/au/products/2902856>

Approvals

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	DNV GL Approval ID: TAA00001KR
	UL Listed Approval ID: E238705
	cUL Listed Approval ID: E238705
	cUL Listed Approval ID: E199827
	UL Listed Approval ID: E199827

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Classifications

ECLASS

ECLASS-13.0	19170411
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ETIM

ETIM 9.0	EC001467
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UNSPSC

UNSPSC 21.0	43201500
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Environmental product compliance

EU RoHS

Fulfills EU RoHS substance requirements	Yes
Exemption	7(a), 7(c)-I

China RoHS

Environment friendly use period (EFUP)	EFUP-50
	An article-related China RoHS declaration table can be found in the download area for the respective article under "Manufacturer declaration". For all articles with EFUP-E, no China RoHS declaration table issued and required.

EU REACH SVHC

REACH candidate substance (CAS No.)	Lead(CAS: 7439-92-1)
SCIP	440a3d4c-ab01-466b-9d3b-4e4f7baac025