Media converters – Universal devices

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

General features

– Auto negotiation and auto MDI/MDIx
– Connection monitoring with LFPT (link fault pass through)
– Signal LEDs for activity, link status, 10/100 Mbps
– Backplane bus contact, enabling alternative or redundant 24 V power supply

Devices with 1300 nm wavelength

The **FL MC EF 1300...** media converters support universal use.

Features:

– 1300 nm wavelength
– Multimode or single mode fiberglass cable
– B-FOC (ST®) or SC duplex

Devices with WDM technology

The **FL MC EF WDM...** media converters enable full duplex communication via a single glass fiber thanks to WDM (wavelength division multiplex) technology.

Features:

– 1310 nm and 1550 nm wavelengths for transmitting and receiving
– Multimode or single mode fiberglass cable
– SC simplex connection

Devices with 660 nm wavelength

The **FL MC EF 660 SCRJ** media converter is designed for use in networks covering short distances.

Features:

– 660 nm wavelength
– Polymer and PCF fibers
– SC-RJ connection
– Easy connection of the FO connector
– LED bar graph for signaling the optical receiving capacity

WDM technology
Single-fiber transmission

Ex:

Technical data

Supply		
Supply voltage range		18 V DC ... 30 V DC (screw connection)
Supply voltage range		18 V DC ... 30 V DC (as an alternative or redundant, via backplane bus contact and system power supply)
Nominal current consumption		< 110 mA (24 V DC)
FO interface		
Wavelength		1550 nm (send) / 1310 nm (receive)
Transmission distance incl. 3 dB system reserve		38 km (with F-E 9/125 0.36 dB/km) 34 km (with F-E 9/125 0.4 dB/km) 28 km (with F-E 9/125 0.5 dB/km) 21 km (with F-G 62.5/125 0.7 dB/km F 1000) 5.5 km (with F-G 62.5/125 2.6 dB/km F 600) 21 km (with F-G 50/125 0.7 dB/km F 1200) 9 km (with F-G 50/125 1.6 dB/km F 800)
Signal LEDs		Far end fault (red LED), link status (yellow LED)
Ethernet interface		
Connection method		RJ45 socket, shielded
Transmission speed		10/100 Mbps
Auto negotiation modes		Auto
Transmission distance		100 m (shielded twisted pair)
Link through		Link fault pass through
MDI-/MDI-X switchover		Auto-MDI(X)
Signal LEDs		Activity, link status, 10/100 Mbps
General data		
Dimensions	W / H / D	22.5 mm / 99 mm / 114.5 mm
Ambient temperature (operation)		-40°C ... 65°C
Electrical isolation		VCC // FE // Ethernet
Test voltage		1.5 kV_{rms} (50 Hz, 1 min.)
Conformance/approvals		
ATEX		II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada		cULus listed UL 508 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
EMC note		Class A product, see page 527

Ordering data

Description	Type	Order No.	Pcs./Pkt.
FO converter, for converting 10/100Base-TX to a single mode optical fiber, WDM technology			
WDM set with devices A and B, SC simplex connection	**FL MC EF WDM-SET SC**	2902660	1
WDM device A, SC simplex connection	**FL MC EF WDM-A SC**	2902658	1
WDM device B, SC simplex connection	**FL MC EF WDM-B SC**	2902659	1
FO converter, for converting 10/100Base-TX to multimode fiberglass (1300 nm) - Connection: SC duplex - Connection: B-FOC (ST®)			
FO converter, for converting 10/100Base-TX to single mode fiberglass (1300 nm) - Connection: SC duplex			
FO converter, for converting 100Base-T to polymer or PCF fiber (660 nm) - Connection: SC-RJ			

Universal devices with 1300 nm for multimode fiberglass

Ex:

Technical data	
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 power supply)	
< 100 mA (24 V DC)	
1300 nm 6.4 km (with F-G 50/125 0.7 dB/km F 1000) 2.8 km (with F-G 50/125 1.6 dB/km F 800) 10 km (with F-G 62.5/125 0.7 dB/km F 1000) 3 km (with F-G 62.5/125 2.6 dB/km F 600)	
Far end fault (red LED), link status (yellow LED)	
RJ45 socket, shielded 10/100 Mbps Auto 100 m (shielded twisted pair) Link fault pass through Auto-MDI(X) Activity, link status, 10/100 Mbps	
22.5 mm / 99 mm / 114.5 mm -40°C ... 65°C VCC // FE // Ethernet 1.5 kV_{rms} (50 Hz, 1 min.)	
II 3 G Ex nA IIC T4 Gc X II (2) D [Ex op is Db] IIIC (PTB 06 ATEX 2042 U) II (2) G [Ex op is Gb] IIC (PTB 06 ATEX 2042 U) cULus listed UL 508 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	
Class A product, see page 527	

Ordering data

Type	Order No.	Pcs./Pkt.
FL MC EF 1300 MM SC	2902853	1
FL MC EF 1300 MM ST	2902854	1

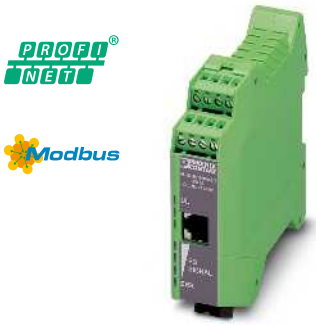
Universal device with 1300 nm for single mode fiberglass

Ex:

Technical data	
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 power supply)	
< 100 mA (24 V DC)	
1300 nm 36 km (with F-E 9/125 0.36 dB/km) 32 km (with F-E 9/125 0.4 dB/km) 26 km (with F-E 9/125 0.5 dB/km)	
Far end fault (red LED), link status (yellow LED)	
RJ45 socket, shielded 10/100 Mbps Auto 100 m (shielded twisted pair) Link fault pass through Auto-MDI(X) Activity, link status, 10/100 Mbps	
22.5 mm / 99 mm / 114.5 mm -40°C ... 65°C VCC // FE // Ethernet 1.5 kV_{rms} (50 Hz, 1 min.)	
II 3 G Ex nA IIC T4 Gc X cULus listed UL 508 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	
Class A product, see page 527	

Ordering data

Type	Order No.	Pcs./Pkt.
FL MC EF 1300 SM SC	2902856	1



Universal device with 660 nm for polymer and PCF fibers

Technical data	
18 V DC ... 32 V DC (via COMBICON plug-in screw terminal block)	
18 V DC ... 32 V DC (as an alternative or redundant, via backplane bus contact and system power supply)	
≤ 85 mA (24 V DC)	
660 nm 50 m (Polymer fiber with F-P 980/1000 230 dB/km) 100 m (PCF fiber with F-K 200/230 8 dB/km)	
Optical receiver power: Very good (green), good (green), critical (yellow), fault (red)	
RJ45 socket, shielded 100 Mbps - 100 m (shielded twisted pair) Link fault pass through - -	
22.5 mm / 99 mm / 114.5 mm -40°C ... 60°C VCC // Ethernet 1.5 kV_{rms} (50 Hz, 1 min.)	
- -	
Class A product, see page 527	

Ordering data

Type	Order No.	Pcs./Pkt.
FL MC EF 660 SCRJ	2702944	1

Media converters

The class 1000 and 2000 media converters offer a robust design in metal housing. From the basic version to use in energy applications, they meet a wide range of different requirements.

General features

– 1300 nm wavelength
– Connection monitoring with LFPT (link fault pass through)
– Signal LEDs for activity, link status, 10/100 Mbps
– Robust design in metal housing for high EMC requirements

Devices for basic requirements

The **FL MC 1000...** media converters offer an easy and inexpensive entry-level solution for converting to FO technology.

Features:

– Multimode fiberglass cables
– B-FOC (ST®) or SC duplex
– Auto negotiation and auto MDI/MDIx

Devices for real-time applications

Thanks to their short delay times (latency), the **FL MC 2000T...** media converters are suitable for applications with real-time Ethernet protocols.

Features:

– Store-and-forward or pass-through mode can be selected via DIP switch (low latency, 835 ns)
– Multimode or single mode fiberglass cable
– B-FOC (ST®) or SC duplex
– Extended temperature range (-40°C ... +75°C)

Devices for harsh requirements

The **FL MC 2000E...** media converters are designed for use in energy technology. Thanks to their robust design, they are used in environments subject to high levels of EMI around switchgear.

Features:

– Multimode or single mode fiberglass cable
– LC duplex connection
– IEC 61850 and IEEE 1613
– Extended temperature range (-40°C ... +75°C)
– Redundant power supply with a wide range from 12 ... 57 V DC (24, 36, 48 V DC)

Basic requirements, multimode fiberglass

Ex:

Technical data

Supply		
Supply voltage range		12 V DC ... 48 V DC
Nominal current consumption		73 mA (24 V DC)
FO interface		
Wavelength		1310 nm
Transmission distance incl. 3 dB system reserve		8 km (fiberglass with F-G 62.5/125 0.7 dB/km F1000) 3.3 km (fiberglass with F-G 62.5/125 2.6 dB/km F600) 9.6 km (fiberglass with F-G 50/125 0.7 dB/km F1200) 5.3 km (fiberglass with F-G 50/125 1.6 dB/km F800)
Signal LEDs		LNK/ACT
Ethernet interface		
Connection method		RJ45 socket, shielded
Transmission speed		10/100 Mbps
Auto negotiation modes		Auto
Link through		Link fault pass through
MDI-/MDI-X switchover		Auto-MDI(X)
Signal LEDs		LNK/ACT, 100
Switching output		
Contact type		-
Max. switching voltage		-
General data		
Dimensions	W / H / D	28 mm / 110 mm / 70 mm
Ambient temperature (operation)		0°C ... 60°C
Electrical isolation		VCC // FE // Ethernet
Test voltage		1500 V AC (500 V AC, 1 minute)
EMC note		Class A product, see page 527

Ordering data

Description	Type	Order No.	Pcs./Pkt.
FO converter, for converting 10/100Base-TX to multimode fiberglass (1300 nm) - Connection: SC duplex - Connection: B-FOC (ST®) - Connection: LC duplex	**FL MC 1000 SC** **FL MC 1000 ST**	2891320 2891321	1 1
FO converter, for converting 10/100Base-TX to single mode fiberglass (1300 nm) - Connection: SC duplex - Connection: SC duplex - Connection: LC duplex			

Real-time protocols, multimode fiberglass

Ex:

Technical data

12 V DC ... 48 V DC	
110 mA (24 V DC)	
1310 nm	
8 km (fiberglass with F-G 62.5/125 0.7 dB/km F1000)	
3.3 km (fiberglass with F-G 62.5/125 2.6 dB/km F600)	
9.6 km (fiberglass with F-G 50/125 0.7 dB/km F1200)	
5.3 km (fiberglass with F-G 50/125 1.6 dB/km F800)	
LNK/ACT	
RJ45 socket, shielded	
10/100 Mbps	
Auto	
Link fault pass through	
Auto-MDI(X)	
LNK/ACT, 100	
1 x N/C contact	
≤ 250 V AC	
28 mm / 110 mm / 70 mm	
-40°C ... 75°C	
VCC // FE // Ethernet	
1500 V AC (500 V AC, 1 minute)	
Class A product, see page 527	

Ordering data

Type	Order No.	Pcs./Pkt.
FL MC 2000T SC	2891315	1
FL MC 2000T ST	2891316	1

Real-time protocols, single mode fiberglass

Ex:

Technical data

	FL MC 2000T SM20 SC	FL MC 2000T SM40 SC
12 V DC ... 48 V DC		
110 mA (24 V DC)		
1310 nm		
	20 km (fiberglass with F-G 9/125 0.36 dB/km)	40 km (fiberglass with F-G 9/125 0.36 dB/km) 36 km (fiberglass with F-G 9/125 0.4 dB/km) 29 km (fiberglass with F-G 9/125 0.5 dB/km)
LNK/ACT		
RJ45 socket, shielded		
10/100 Mbps		
Auto		
Link fault pass through		
Auto-MDI(X)		
LNK/ACT, 100		
1 x N/C contact		
≤ 250 V AC		
28 mm / 110 mm / 70 mm		
-40°C ... 75°C		
VCC // FE // Ethernet		
1500 V AC (500 V AC, 1 minute)		
Class A product, see page 527		

Ordering data

Type	Order No.	Pcs./Pkt.
FL MC 2000T SM20 SC	2891317	1
FL MC 2000T SM40 SC	2891318	1

IEC 61850-3

Harsh ambient conditions, IEC 61850

Ex:

Technical data

	FL MC 2000E LC	FL MC 2000E SM40 LC
12 V DC ... 57 V DC		
110 mA (24 V DC)		
1310 nm		
	8 km (fiberglass with F-G 62.5/125 0.7 dB/km F1000) 3.3 km (fiberglass with F-G 62.5/125 2.6 dB/km F600) 9.6 km (fiberglass with F-G 50/125 0.7 dB/km F1200) 5.3 km (fiberglass with F-G 50/125 1.6 dB/km F800)	40 km (fiberglass with F-G 9/125 0.36 dB/km) 36 km (fiberglass with F-G 9/125 0.4 dB/km) 29 km (fiberglass with F-G 9/125 0.5 dB/km)
LNK/ACT		
RJ45 socket, shielded		
100 Mbps		
Link fault pass through		
Auto-MDI(X)		
LNK/ACT, 100		
1 x N/C contact		
≤ 250 V AC		
30 mm / 130 mm / 100 mm		
-40°C ... 75°C		
VCC // FE // Ethernet		
1500 V AC (500 V AC, 1 minute)		
Class A product, see page 527		

Ordering data

Type	Order No.	Pcs./Pkt.
FL MC 2000E LC	2891056	1
FL MC 2000E SM40 LC	2891156	1