

tML[®] Xtended - FO Module 2x MPO/MTP[®] without Pins/12x LC Duplex w. shutter 50/125 μ OM4



tML[®] - tde Modular Link

tML[®] is a patented, modular cabling system consisting of the three key components module, trunk cable and rack mount enclosure. The system components are 100 percent manufactured, pre-assembled and tested in Germany. They enable plug-and-play installation on site - especially in data centres, but also in industrial environments - within the shortest possible time. The system is characterized by highest packing density and highest flexibility during migration to higher transmission rates. Fibre optic and TP modules can be combined in one rack mount enclosure. 96x fibre optics LC Duplex or 96x MPO connectors can be used modularly on a 19-inch height unit. Thanks to its patented polarity and dark fibre modules, the tML system offers the simplest migration options to 100G and more.

The utility patent protected tML[®] Xtended - module will be installed in the link on one side rotated 180 degrees. The associated tML[®] Xtended trunk cable has a type B pin out. The complete link corresponds to EIA / TIA "Method B". The advantage is that before and after migration uniformly configured patch cables and modules are used.

The tML[®] Xtended - FO Module MPO/MTP[®] is intended for the installation in the tML[®] Rack Mount Enclosure 1U (for 8 x Modules).



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Technical Data

The end faces of the connectors are optimized by means of Lasercleaving and machine polish. The MPO/MTP[®]plug has a defined fiber height of 1 - 3.5 μ . The max. adjacent fiber height difference is 0.2 μ m and for all fibers 0.3 μ m. All system components (modules, trunk cables and patch cords) are co-ordinated for the reaching of the performance particularly. The module is marked with sequential serial number and article number. The modules are ROHS compliant.

Entry	2 x MPO/MTP [®] Female Adapter (magenta) back
Exit	12 x LC Duplex Adapter with self-closing shutter (magenta) front
Tests	Interferometer, Insertion Loss, Return Loss and Visual Final Inspection; all measured values are electronically archived
	QS-Managementsystem ISO 9001, ISO 14001 and TL 9000

Box	Galvanized steel sheet
Front Panel	Stainless steel
Dimensions	110 x 108 x 20 mm

FO Adapters

Type	MPO/MTP [®]
Application	Multimode OM4
Design	without Flange
Connector style	SC Simplex
Key Orientation	Type A, Key up/down
Color	Magenta
Material	Plastic
Sleeve	--
Shutter	--
Standards	IEC 61754-7 TIA 604-5
Manufacturer	US Conec

FO Adapters

When the connector is inserted into the adapter it compress the springs, opening the internal shutter. The internal shutter opens, and due to the special design of the shutter, it will not touch the ferrule end face. As the connector is removed from the adapter, the shutter spring automatically returns the internal shutter to the closed position.

Type	LC Duplex
Application	Multimode OM4
Design	One-Piece without flange
Connector style	SC simplex
Color	Magenta

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Housing material	Plastic
Sleeve	Zirkonia Staight Split
Self-closing shutter material	Metal
Self-closing shutter protection	Dust an laser light
Manufacturer	tde

FO Connectors

The end faces of the connectors are optimized by means of Lasercleaving and machine polish. The MPO/MTP[®] plug has a defined fiber height of 1 - 3.5 μ . The max. adjacent fiber height difference is 0.2 μ m and for all fibers 0.3 μ m.

Connector

Type	MPO/MTP [®] Female Push Pull Locking (Magenta)
Ferrule	12 Fiber MM Elite [®] ferrule, PPS
Boot colour	Black
Manufacturer	tde/US Conec

Optical Performance

Fiber	Type	Wavelength	Insertion loss typ.	Insertion loss max.	Return loss min.
50/125 μ OM4	MPO/MTP [®]	850 /1300 nm	\leq 0.16 dB	0.30 dB	30 dB

FO Connectors

Connector Type	LC Unibody Simplex
Housing	Plastic, Magenta
Ferrule	Zirkonia Staight Split, Spring-loaded Axially
Ferrule Hole	126 μ
Mating Cycles	1.000
Operating Temperature	-40°C up to +75°C
Strain Relief to	100 N
Manufacturer	tde

Optical performance

Fiber	Type	Wavelength	Insertion loss typ.	Insertion loss max.	Return loss min.
50/125 μ OM4	LC	850 / 1300 nm	\leq 0.10 dB	0.30 dB	35 dB

FO Fiber

Type	Draka OM4 50/125 μ m bend-insensitive multimode fiber (C32)
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Standards and Norms	IEC 60793-2-10: type A1a.3	ITU G.651.1	TIA/EIA-492 AAAD
	ISO/IEC 11801 category OM4	EN 60793-2-10: type A1a.3	ANSI/TIA/EIA-568.C
	ISO/IEC 24764	EN 50173-1 category OM4	IEEE 802.3

Optical properties

Maximum attenuation value of cable at 850 nm	IEC 60793-1-40	≤ 3.0 dB/km
Maximum attenuation value of cable at 1300 nm	IEC 60793-1-40	≤ 1.0 dB/km
Attenuation limit according to IEC 60793-2-10, 850 nm	IEC 60793-1-40	≤ 2.5 dB/km
Attenuation limit according to IEC 60793-2-10, 1300 nm	IEC 60793-1-40	≤ 0.8 dB/km
Inhomogeneity of OTDR trace for any two 1000 metre fiber lengths	IEC 60793-1-40	Max. 0.1 dB/km
Fiber bending loss R=7.5 mm 850/1300 nm	IEC 60793-1-40	≤ 0.2 dB / ≤ 0.5 dB
Fiber bending loss R=15 mm 850/1300 nm	IEC 60793-1-40	≤ 0.1 dB / ≤ 0.3 dB

Bandwidth

Overfilled (OFL) modal bandwidth at 850 nm	IEC 60793-1-41	≥ 3500 MHz*km
Overfilled (OFL) modal bandwidth at 1300 nm	IEC 60793-1-41	≥ 500 MHz*km
Effective Modal Bandwidth (EMB) at 850 nm	IEC 60793-1-49	≥ 4700 MHz*km
Group index of refraction at 850 nm	IEC 60793-1-22	1.482
Group index of refraction at 1300 nm	IEC 60793-1-22	1.477

Geometrical / mechanical properties

Core diameter	IEC/EN 60793-1-20	50 ± 2 μ m
Cladding diameter	IEC/EN 60793-1-20	125.0 ± 1.0 μ m
Cladding non-circularity	IEC/EN 60793-1-20	$\leq 0.7\%$
Core non-circularity	IEC/EN 60793-1-20	$\leq 5\%$
Core -cladding concentricity error	IEC/EN 60793-1-20	≤ 1 μ m
Primary coating diameter - uncoloured	IEC/EN 60793-1-21	242 ± 5 μ m
Primary coating diameter - coloured	IEC/EN 60793-1-21	250 ± 15 μ m
Primary coating non-circularity	IEC/EN 60793-1-21	$\leq 5\%$
Primary coating-cladding concentricity error	IEC/EN 60793-1-21	≤ 6 μ m
Proof stress level	IEC/EN 60793-1-30	≥ 0.7 ($\approx 1\%$) GPa
Typical average strip force	IEC/EN 60793-1-32	1.7 N
Strip force (peak)	IEC/EN 60793-1-32	1.3 N $\leq F_{\text{peak.strip}} \leq 8.9$ N
Numerical aperture	IEC/EN 60793-1-43	0.200 ± 0.015

Product variants & accessories

Art.-No.	Description
TML-M12LCADS/MP09E-X	tML [®] Xtended - FO Module 2x MPO/MTP [®] without Pins/12x LC APC Duplex w. shutter 9/125 μ OS2

tML[®] Xtended - FO Module 2x MPO/MTP[®] without Pins/12x LC Duplex w. shutter 50/125 μ OM4

Art.-No.	Description
TML-M12LCDS/MP09E-X	tML [®] Xtended - FO Module 2x MPO/MTP [®] without Pins/12x LC Duplex w. shutter 9/125 μ OS2
TML-M12LCDS/MP50G4X	tML [®] Xtended - FO Module 2x MPO/MTP [®] without Pins/12x LC Duplex w. shutter 50/125 μ OM4
TML-M12LCDS/MP50G5X	tML [®] Xtended - FO Module 2x MPO/MTP [®] without Pins/12x LC Duplex w. shutter 50/125 μ OM5