

tML<sup>®</sup> 24- FO Dark Fiber Module 4x 24F MPO without Pins/12x 12F MPO with Pins 50/125μ OM5, SR4



## tML<sup>®</sup> 24

tML<sup>®</sup> 24 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. Heart of the system are the rear MPO/MTP<sup>®</sup> 24 fiber and Telco connectors, which can be used to connect at least six or twelve ports at a time. Depending on the module configuration, transfer rates of up to 400G are currently possible with SR4. The fibre optic and TP modules can be used together in a module carrier with a very high port density. The tde offers its tML<sup>®</sup> cabling system as a proven tML<sup>®</sup> standard system and in the highly innovative variants tML<sup>®</sup>Xtended and now tML<sup>®</sup> 32 for extreme scalability and very easy migration to higher transmission rates such as 40G, 100G, 200G and 400G.

The tML<sup>®</sup> - FO Dark Fiber Module MPO/MTP<sup>®</sup> uses all the fibers of the back room cabling and is intended for the installation in the tML<sup>®</sup> 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 - 3.5µ. The max. adjacent fiber height difference is 0.2µm and for all fibers 0.3µm. 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	4 x MPO/MTP®(24 Fibers) Female Adapter (red) back
Exit	12 x MPO/MTP®(12 Fibers) Male Adapter (limegreen) 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	Singlemode / Multimode
Design	without Flange
Connector style	SC Simplex
Key Orientation	Type A, Key up/down
Color	Red
Material	Plastic
Sleeve	--
Shutter	--
Standards	IEC 61754-7 TIA 604-5
Manufacturer	US Conec

## FO Adapters

Type	MPO/MTP®
Application	Multimode OM5
Design	without Flange
Connector style	SC Simplex
Key Orientation	Type A, Key up/down
Color	Limegreen
Material	Plastic
Sleeve	--
Shutter	--

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Standards	IEC 61754-7 TIA 604-5
Manufacturer	US Conec

### 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 - 3.5µ. The max. adjacent fiber height difference is 0.2µm and for all fibers 0.3µm.

#### Connector

Type	MPO/MTP® Female Push Pull Locking
Ferrule	24 Fiber MM Elite® ferrule, PPS
Boot colour	Red
Temperature range	-40°C to +75°C
Manufacturer	tde/US Conec

#### Optical Performance

Fiber	Type	Wavelength	Insertion loss typ.	Insertion loss max.	Return loss min.
50/125µ OM5	MPO/MTP®	850 nm	≤ 0.11 dB	0.25 dB	35 dB

### 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 - 3.5µ. The max. adjacent fiber height difference is 0.2µm and for all fibers 0.3µm.

#### Connector

Type	MPO/MTP® Male Push Pull Locking with Elite Pins
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.
50/125µ OM5	MPO/MTP®	850 nm	≤ 0.11 dB	0.25 dB	35 dB

### FO Fiber

Type	Corning ClearCurve® 50/125µ OM5 multimode fiber
Design	Optical fibre G50/125 µm (conform to IEC 60793-2-10 type A1a.4b) with optical core 50 µm +/- 2.5 µm diameter and optical cladding 125 µm +/- 1 µm diameter

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### Geometrical properties

Core concentricity error	< 5 %
Coating concentricity error	< 1 %
Core coating eccentricity	< 1.5 µm
Eccentricity of coating	< 12 µm
Screen test	≥ 0.7 GPa (100 kpsi)

### Transmission characteristics

Attenuation, maximum values 850 nm (cabled fibre)	2.5 dB/km
Attenuation, maximum values 953 nm (cabled fibre)	1.8 dB/km
Attenuation, maximum values 1300 nm (cabled fibre)	0.7 dB/km
Attenuation, maximum values 850 nm (uncabled fibre)	2.34 dB/km
Attenuation, maximum values 953 nm (uncabled fibre)	1.7 dB/km
Attenuation, maximum values 1300 nm (uncabled fibre)	0.64 dB/km
Macrobending, induced attenuation 100 turns, 37.5 mm	≤ 0.5 dB (at 850 nm)
Macrobending, induced attenuation 100 turns, 37.5 mm	≤ 0.5 dB (at 1300 nm)
Macrobending, induced attenuation 2 turns, 15 mm	≤ 0.1 dB (at 850 nm)
Macrobending, induced attenuation 2 turns, 15 mm	≤ 0.3 dB (at 1300 nm)
Macrobending, induced attenuation 2 turns, 7.5 mm	≤ 0.3 dB (at 850 nm)
Macrobending, induced attenuation 2 turns, 7.5 mm	≤ 0.5 dB (at 1300 nm)
Bandwidth (OFL), minimum values 850 nm	3500 MHz x km
Bandwidth (OFL), minimum values 953 nm	1850 MHz x km
Bandwidth (OFL), minimum values 1300 nm	500 MHz x km
Effective modal Bandwidth-length product min. 850 nm	4700 MHz x km
Effective modal Bandwidth-length product min. 953 nm	2470 MHz x km
Numerical aperture	0.200 +/- 0.015
Effective group of refraction 850 nm	1.482
Effective group of refraction 1300 nm	1.477

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## Product variants & accessories

Art.-No.	Description
TML-M12MPP/04M2-09E	tML® 24- FO Dark Fiber Module 4x 24F MPO without Pins/12x 12F MPO with Pins 9/125µ OS2, LR4
TML-M12MPP/04M2-50G3	tML® 24- FO Dark Fiber Module 4x 24F MPO without Pins/12x 12F MPO with Pins 50/125µ OM3, SR4
TML-M12MPP/04M2-50G4	tML® 24- FO Dark Fiber Module 4x 24F MPO without Pins/12x 12F MPO with Pins 50/125µ OM4, SR4
TML-M12MPP/04M2-50G5	tML® 24- FO Dark Fiber Module 4x 24F MPO without Pins/12x 12F MPO with Pins 50/125µ OM5, SR4