

tML<sup>®</sup> 24 - FO Micro Distribution Trunk Cable both sides 1x 24F MPO w. Pins 24G50/125µ OM5 LSHF,  
Type A, Length: xx in m



## tML<sup>®</sup> - tde Modular Link

tML<sup>®</sup> 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> 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 200G 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, tML<sup>®</sup> 24 System and now tML<sup>®</sup> 32 System for extreme scalability and very easy migration to higher transmission rates such as 40G, 100G, 200G and 400G.

The tML<sup>®</sup> - FO Micro Distribution trunk cable is intended for the connection of two tML<sup>®</sup> 24 - FO 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<sup>®</sup> 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.

Cable	Round cable 3.6 mm, loose tube, LSOH
Connectors	MPO/MTP <sup>®</sup> Push Pull
Pin out	Type A
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

## FO Connectors

The end faces of the connectors are optimized by means of Lasercleaving and machine polish. The MPO/MTP<sup>®</sup> 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 <sup>®</sup> Male Push Pull Locking with Elite Pins
Ferrule	24 Fiber MM Elite <sup>®</sup> 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 <sup>®</sup>	850 nm	≤ 0.11 dB	0.25 dB	35 dB

## FO Cables

### Loose tube

Loose tube	unfilled (FRNC)
Wall thickness PVC-tube	0.35 mm – 0.40 mm
Outer diameter	2.6 mm with 24 optical fibres
Tube colour	green
Colour code fibres (1-12)	red, green, blue, yellow, white, grey, brown, violet, turquoise, black, orange, pink
Colour code fibres (13-24)	red, green, blue, yellow, white, grey, brown, violet, turquoise, transparent, orange, pink (always with black ring marking, except transparent)

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## Strain relief elements

Strain relief elements	Aramid
Strength members	Fiberglass-reinforced plastic (FRP)

## Outer jacket

Outer jacket	Halogen-free and flame-retardant material (FRNC)
Wall thickness	approx. 0.4 mm
Outer diameter	approx. 3.8 mm
Colour	lime green
Inkjet - marking (black)	t d e – IVH24G50–MPO-OM5 LSZH (F.RoHS)

## Mechanical characteristics

Min. bending radius fixed (static) acc. IEC 60794-1-2 E11A	10 x outside diameter
Min. bending radius during assembly (dynamic), with additional tensile strain acc. IEC 60794-1-2 E6	15 x outside diameter
Max. tensile force acc. IEC 60794-1-2 E1, short term	300 N
Max. crush resistance acc. IEC 60794-1-2 E3, long term	150 N/dm
Max. crush resistance acc. IEC 60794-1-2 E3, short term	1500 N/dm
Cable weight	20.0 kg/km

## Thermal characteristics

Transport and storage	-40°C to +80°C
Verlegung	-20°C to +50°C
In use acc. IEC 60794-1-2 F1	-40°C to +80°C

## Fire performance

Cable is flame-retardant	acc. to IEC 60332-1-2
Smoke density	acc. to IEC 61034
Halogen-free	acc. to IEC 60754-1
Acidity of the combustion gases	acc. to IEC 60754-2
Fire load	0.26 MJ/m

Chemical characteristics	No resistance to oil, petrol, acid and leach
Standardisation	IEC 60794-2

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## 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

## 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

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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

## Product variants & accessories

Art.-No.	Description
TML-M2P/M2P09I24E-Axx	tML® 24 - FO Micro Distribution Trunk Cable both sides 1x 24F MPO w. Pins 24E9/125µ OS2 LSHF, Type A, Length: xx in m
TML-M2P/M2P50I24G3Axx	tML® 24 - FO Micro Distribution Trunk Cable both sides 1x 24F MPO w. Pins 24G50/125µ OM3 LSHF, Type A, Length: xx in m
TML-M2P/M2P50I24G4Axx	tML® 24 - FO Micro Distribution Trunk Cable both sides 1x 24F MPO w. Pins 24G50/125µ OM4 LSHF, Type A, Length: xx in m
TML-M2P/M2P50I24G5Axx	tML® 24 - FO Micro Distribution Trunk Cable both sides 1x 24F MPO w. Pins 24G50/125µ OM5 LSHF, Type A, Length: xx in m