

tML<sup>®</sup> Xtended - FO Micro Distribution trunk cable both sides 1xMPO/MTP<sup>®</sup> w. Pins 12G50/125 $\mu$  OM5  
LSHF, Type B, 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> Xtended - module will be installed in the link on one side rotated 180 degrees. The associated tML<sup>®</sup> 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.



**tde<sup>®</sup> trans data elektronik GmbH**

**Headquarter address:**

Lingener Str. 2  
D-49626 Bippen/Ohrte  
Tel.: +49 5435 9511 0  
Fax.: +49 5435 9511 32

**Sales office address:**

Prinz-Friedrich-Karl-Str. 46  
D-44135 Dortmund  
Tel.: +49 231 914 36 99  
Fax.: +49 231 914 31 29

info@tde.de | www.tde.de

tML<sup>®</sup> Xtended - FO Micro Distribution trunk cable both sides 1xMPO/MTP<sup>®</sup> w. Pins 12G50/125 $\mu$  OM5  
LSHF, Type B, Length: xx in m

## Technical Data

The tML<sup>®</sup>- FOMicro Distribution trunk cable is preterminated with MPO/MTP<sup>®</sup>connectors on both ends. 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 - 3.5 $\mu$ . The max. adjacent fiber height difference is 0.2 $\mu$ m and for all fibers 0.3 $\mu$ m. All system components (modules, trunk cables and patch cords) are co-ordinated for the reaching of the performance particularly. The fan-out unit is optimized for tML<sup>®</sup> - Cable Mounting Bracket for Fan-out Units. The module is marked with sequential serial number and article number.

## 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 - 3.5 $\mu$ . The max. adjacent fiber height difference is 0.2 $\mu$ m and for all fibers 0.3 $\mu$ m.

### Connector

Type	MPO/MTP <sup>®</sup> Male Push Pull Locking with Elite Pins
Ferrule	12 Fiber MM Elite <sup>®</sup> 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 $\mu$ 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	0.20 mm – 0.25 mm
Outer diameter	1.8 mm with 12 optical fibres
Tube colour	green
Colour code fibres (1-12)	red, green, blue, yellow, white, grey, brown, violet, turquoise, black, orange, pink

### Strain relief elements

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

tML<sup>®</sup> Xtended - FO Micro Distribution trunk cable both sides 1xMPO/MTP<sup>®</sup> w. Pins 12G50/125 $\mu$  OM5  
LSHF, Type B, Length: xx in m

## Outer jacket

Outer jacket	Halogen-free and flame-retardant material (FRNC)
Wall thickness	approx. 0.4 mm
Outer diameter	approx. 3.0 mm
Colour	lime green
Inkjet - marking (black)	t d e – IVH12G50–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	15.0 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	0.17 MJ/m
Reaction to fire (Euroclasses)	Dca

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

## FO Fiber

tML<sup>®</sup> Xtended - FO Micro Distribution trunk cable both sides 1xMPO/MTP<sup>®</sup> w. Pins 12G50/125 $\mu$  OM5  
LSHF, Type B, Length: xx in m

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

## Geometrical properties

Core concentricity error	< 5 %
Coating concentricity error	< 1 %
Core coating eccentricity	< 1.5 $\mu$ m
Eccentricity of coating	< 12 $\mu$ m
Screen test	$\geq$ 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	$\leq$ 0.5 dB (at 850 nm)
Macrobending, induced attenuation 100 turns, 37.5 mm	$\leq$ 0.5 dB (at 1300 nm)
Macrobending, induced attenuation 2 turns, 15 mm	$\leq$ 0.1 dB (at 850 nm)
Macrobending, induced attenuation 2 turns, 15 mm	$\leq$ 0.3 dB (at 1300 nm)
Macrobending, induced attenuation 2 turns, 7.5 mm	$\leq$ 0.3 dB (at 850 nm)
Macrobending, induced attenuation 2 turns, 7.5 mm	$\leq$ 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

tML<sup>®</sup> Xtended - FO Micro Distribution trunk cable both sides 1xMPO/MTP<sup>®</sup> w. Pins 12G50/125 $\mu$  OM5  
LSHF, Type B, Length: xx in m

Effective group of refraction 850 nm	1.482
Effective group of refraction 1300 nm	1.477

## Product variants & accessories

Art.-No.	Description
TML-MPP/MPP09I12E-Bxx	tML <sup>®</sup> Xtended - FO Micro Distribution trunk cable both sides 1xMPO/MTP <sup>®</sup> with Pins 12E9/125 $\mu$ OS2 LSHF, Type B, Length: xx in m
TML-MPP/MPP50I12G4Bxx	tML <sup>®</sup> Xtended - FO Micro Distribution trunk cable both sides 1xMPO/MTP <sup>®</sup> w. Pins 12G50/125 $\mu$ OM4 LSHF, Type B, Length: xx in m
TML-MPP/MPP50I12G5Bxx	tML <sup>®</sup> Xtended - FO Micro Distribution trunk cable both sides 1xMPO/MTP <sup>®</sup> w. Pins 12G50/125 $\mu$ OM5 LSHF, Type B, Length: xx in m