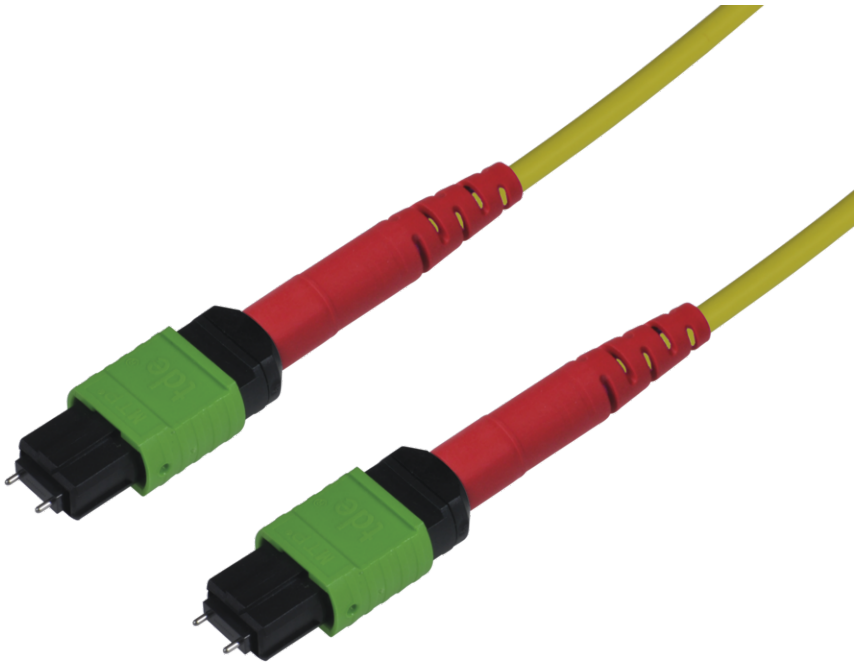
tML® 24 - FO Micro Distribution Trunk Cable both sides 1x 24F MPO w. Pins 24E9/125µ OS2 LSHF, Type A, Length: xx in m



tML® - 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. Heart of the system are the rear MPO/MTP® 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® cabling system as a proven tML® standard system and in the highly innovative variants tML® Xtended, tML® 24 System and now tML® 32 System for extreme scalability and very easy migration to higher transmission rates such as 40G, 100G, 200G and 400G.

The tML® - FO Micro Distribution cable is intended for the connection of two tML® 24 - FO Modules.

tde® 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 8805 61 13
Fax.: +49 231 8805 61 15

info@tde.de | www.tde.de

tML® 24 - FO Micro Distribution Trunk Cable both sides 1x 24F MPO w. Pins 24E9/125µ OS2 LSHF, Type A, Length: xx in m

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.

Cable	Round cable 3.6 mm, loose tube, LSOH, yellow
Connectors	MPO/MTP®Push Pull (yellow)
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® 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® APC Male Push Pull Locking with Elite Pins (green)
Ferrule	24 Fiber SM 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.
9/125µ OS2	MPO/MTP®APC	1550 nm	≤ 0.10 dB	0.25 dB	75 dB

FO Cables

Standards	EN 50173-5
	IEC 60794-2-20
	ISO/IEC 24764

Construction

Type	IVH24E09
Fiber	24 primary coated fibres nominally 242 µm, arranged in 2 groups of 12 fibres, Group 1: Red id tread Group 2: Green id tread

tML® 24 - FO Micro Distribution Trunk Cable both sides 1x 24F MPO w. Pins 24E9/125µ OS2 LSHF, Type A, Length: xx in m

Fiber colors	According to TIA/EIA 598-C also in agreement with IEC 60304: 1-12: Blue, orange, green, brown, grey, white, red, black, yellow, violet, pink and aqua
	13-24: Blue, orange, green, brown, grey, white, red, transparent, yellow, violet, pink and aqua (with add. ring mark)
Strength member	Ultra high modulus Aramid yarns
Sheath	Halogen free, flame resistant thermoplastic sheathing compound acc. to EN 50290-2-27, UV stabilised
Sheath colors	Yellow, RAL 1021

Fire rating

IEC 60332-1-2	Pass
IEC 60332-2-2	Pass
IEC 60754-1	No halogens
IEC 60754-2	No acid matters
IEC 61034-2	No dense smoke

Heat of combustion

200 MJ/km	0.5 KWh/m

Physical properties IEC60974-1-2

Outer diameter cable	ø3.6 mm +0.1 mm -0.3 mm
Diameter PVC-core tube	2.0 ± 0.1 mm
Wall thickness PVC-core tube	0.35 mm – 0.40 mm
Weight	11 kg/km
Tensile strength (dynamic)	220 N
Tensile strength (permanent)	110 N
Compressive strength (crush)	400 N
Impact	4 Nm, R= 12.5 mm
Kink	No Kink
Min. Bending radius	R = 20 mm
Temperature range	Operation and installation: -0°C to 50°C. Storage: -20°C to 50°C

FO Fiber

Type	Corning Ultra SMF-28® 09/125µ OS2 singlemode fiber
Maximum Attenuation	At 1310 nm max. 0.32 dB/km At 1383 nm max. 0.32 dB/km At 1490 nm max. 0.21 dB/km At 1550 nm max. 0.18 dB/km At 1625 nm max. 0.20 dB/km
Attenuation vs. Wavelength	Range: 1285 - 1330 mm; Ref. λ: 1310 nm; Max. Difference: 0.03 dB/km Range: 1525 - 1575 mm; Ref. λ: 1550 nm; Max. Difference: 0.02 dB/km

tML® 24 - FO Micro Distribution Trunk Cable both sides 1x 24F MPO w. Pins 24E9/125µ OS2 LSHF, Type A, Length: xx in m

Macrobend Loss	Mandrel Radius: 10mm; Number of Turns: 1; Wavelength: 1550nm; Induced Attenuation: ≤ 0.50 dB Mandrel Radius: 10mm; Number of Turns: 1; Wavelength: 1625nm; Induced Attenuation: ≤ 1.5 dB Mandrel Radius: 15mm; Number of Turns: 10; Wavelength: 1550nm; Induced Attenuation: ≤ 0.05 dB Mandrel Radius: 15mm; Number of Turns: 10; Wavelength: 1625nm; Induced Attenuation: ≤ 0.30 dB Mandrel Radius: 25mm; Number of Turns: 100; Wavelength: 1310nm, 1550nm, 1625nm; Induced Attenuation: ≤ 0.01 dB
Point Discontinuity	Wavelength: 1310 nm; Point Discontinuity: ≤ 0.05 dB Wavelength: 1550 nm; Point Discontinuity: ≤ 0.05 dB
Cable Cutoff Wavelength (λccf)	λccf ≤ 1260 nm
Mode-Field Diameter	At 1310 nm = 9.2 ± 0.4 µm At 1550 nm = 10.4 ± 0.5 µm
Dispersion	At 1550 nm = ≤ 18.0 [ps/(nm*km)] At 1625 nm = ≤ 22.0 [ps/(nm*km)]
	Zero Dispersion Wavelength (λ_0): 1304 nm ≤λ_0≤ 1324 nm Zero Dispersion Slope (S_0): ≤ 0.092 ps/(nm² *km)
Polarization Mode Dispersion (PMD)	PMD Link Design Value = ≤ 0.04 ps/√km Maximum Individual Fiber = ≤ 0.1 ps/√km

Dimensional Specifications

Fiber Curl	≥ 4.0 m radius of curvature
Cladding Diameter	125.0 ± 0.7 µm
Core-Clad Concentricity	≤ 0.5 µm
Cladding Non-Circularity	≤ 0.7%
Coating Diameter	242 ± 5 µm
Coating-Cladding Concentricity	< 12 µm

Environmental Specifications

Environmental Test	Test Condition	Induced Attenuation 1310 nm, 1550 nm & 1625 nm
Temperature Dependence	-60°C to +85°C	≤ 0.05
Temperature Humidity Cycling	-10°C to +85°C up to 98% RH	≤ 0.05
Water Immersion	23°C ± 2°C	≤ 0.05
Heat Aging	85°C ± 2°C	≤ 0.05
Operating Temperature Range	-60°C to +85°C	

Mechanical Specifications

Proof Test	The entire fiber length is subjected to a tensile stress ≥ 100 kpsi (0.69 GPa).
Length	Fiber lengths available up to 63.0 km/spool.

Performance Characterizations

Core Diameter	8.2 µm
Numerical Aperture	0.14

tML® 24 - FO Micro Distribution Trunk Cable both sides 1x 24F MPO w. Pins 24E9/125µ OS2 LSHF, Type A, Length: xx in m

Effective Group Index of Refraction	1310 nm: 1.4676 1550 nm: 1.4682
Fatigue Resistance Parameter (nd)	20
Coating Strip Force	Dry: 0.6 lbs (3N) Wet: 14 days room temperature: 0.6 lbs (3N)
Rayleigh Backscatter Coefficient (for 1 ns Pulse Width)	1310 nm: -77 dB 1550 nm: -82 dB

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