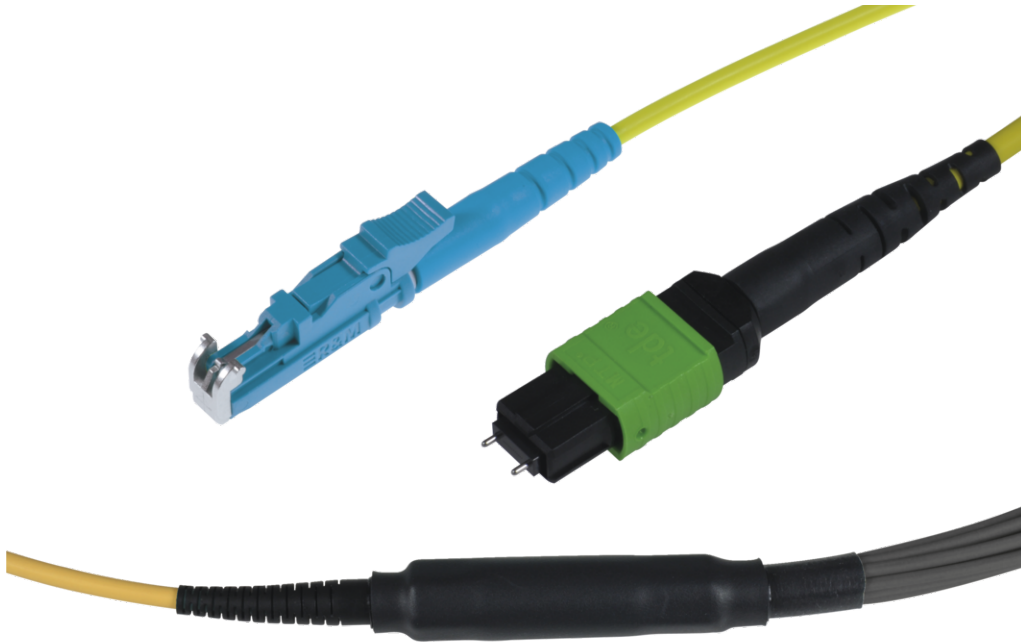


tML[®] - FO Fan-out Cable MPO/MTP[®] w. Pins/12x E2000 UPC 12E9/125µ LSOH, Length: xx



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 tML[®] - FO Fan-out Cable MPO/MTP[®] is for the use with tML[®]- FO Trunk Cables.



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tML[®] - FO Fan-out Cable MPO/MTP[®] w. Pins/12x E2000 UPC 12E9/125 μ LSOH, Length: xx

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 (fan-out cables or modules, trunk cables and patch cords) are co-ordinated for the reaching of the performance particularly. The fanout cable is marked with sequential serial number and article number.

Cable	Round cable, loose tube, LSOH, yellow
Fan-out unit	Metal
Entry	1 x MPO/MTP [®] Male Push Pull (green)
Exit	12 x E2000 UPC (blue)
Pin-out	Crossover (TIA/EIA-568-B.1 Methode C)
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

Type	E2000 UPC
Ferrule	Ceramic
Ferrule Hole	125.5 μ
Ferrule Concentricity	$\leq 0.6 \mu$
Connector colour	Blue
Lever Colour	Blue
Boot colour	Blue
Manufacturer	RDM

Optical performance

Fiber	Type	Wavelength	Insertion loss typ.	Insertion loss max.	Return loss min.
9/125 μ	E2000 UPC	1550 nm	≤ 0.10 dB	0.25 dB	55 dB

FO Connectors

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Connector

Type	MPO/MTP [®] APC Male Push Pull Locking with Elite Pins (green)
Ferrule	12 Fiber SM Elite [®] ferrule, PPS
Boot colour	Black
Temperature range	-40°C bis +75°C
Manufacturer	tde/US Conec

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Optical Performance

Fiber	Type	Wavelength	Insertion loss typ.	Insertion loss max.	Return loss min.
9/125 μ OS2	MPO/MTP [®] APC	1310 / 1550 nm	\leq 0.10 dB	0.20 dB	75 dB

FO Fan-Out

Length Fan-Out	40 mm
Max. \varnothing Fan-Out	10 mm
Parallel connectors	12

FO Cables

Standards	EN 50173-5
	IEC 60794-2-20
	ISO/IEC 24764
Flame resistance	IEC 60332-1-2
	IEC 60332-2-2
	IEC 60754-1
	IEC 60754-2
	IEC 61034

Cable construction

Type	IVH12E09
Loose tube	12 coated fibers within PVC-core tube
Fiber type	SM-G652D, 9/125 μ , Corning SMF-28e+, OS2
Strength members	Aramid yarn
Outer jacket	LSZH (Halogen free, low smoke, flame retardant thermoplastic compound)
Jacket color	Yellow, RAL 1021
Identification	"t d e – IVH12E09–MPO LSZH" and sequential meter marking + Lot number

Physical properties

Outer diameter cable	3.0 \pm 0.1 mm
Diameter PVC-core tube	1.8 \pm 0.1 mm
Wall thickness PVC-core tube	0.35 mm – 0.40 mm
Max. tensile load	300 N
Min. bending radius	30 mm
Temperature range (storage, installation, operation)	-20°C to +70°C

FO Fiber

tML[®] - FO Fan-out Cable MPO/MTP[®] w. Pins/12x E2000 UPC 12E9/125 μ LSOH, Length: xx

Type	Corning SMF-28e+ [®] 09/125 μ OS2 G.652.D singlemode fiber
Maximum Attenuation	At 1310 nm max. 0.33 - 0.35 dB/km At 1383 \pm 3 nm max. 0.31 - 0.35 dB/km At 1490 nm max. 0.21 - 0.24 dB/km At 1550 nm max. 0.19 - 0.20 dB/km At 1625 nm max. 0.20 - 0.23 dB/km
Attenuation vs. Wavelength	Range: 1285 - 1330 nm; Ref. λ : 1310 nm; Max. Difference: 0.03 dB/km Range: 1525 - 1575 nm; Ref. λ : 1550 nm; Max. Difference: 0.02 dB/km
Macrobend Loss	Mandrel Diameter:32mm; Number of Turns: 1; Wavelength: 1550nm; Induced Attenuation: \leq 0.03 dB Mandrel Diameter:50mm; Number of Turns: 100; Wavelength: 1310nm; Induced Attenuation: \leq 0.03 dB Mandrel Diameter:50mm; Number of Turns: 100; Wavelength: 1550nm; Induced Attenuation: \leq 0.03 dB Mandrel Diameter:60mm; Number of Turns: 100; Wavelength: 1625nm; Induced Attenuation: \leq 0.03 dB
Point Discontinuity	Wavelength: 1310 nm; Point Discontinuity: \leq 0.05 dB Wavelength: 1550 nm; Point Discontinuity: \leq 0.05 dB
Cable Cutoff Wavelength (λ_{ccf})	$\lambda_{ccf} \leq 1260$ nm
Mode-Field Diameter	At 1310 nm = 9.2 \pm 0.4 μ m At 1550 nm = 10.4 \pm 0.5 μ m
Dispersion	At 1550 nm = \leq 18.0 [ps/(nm*km)] At 1625 nm = \leq 22.0 [ps/(nm*km)]
	Zero Dispersion Wavelength (λ_0): 1310 nm $\leq \lambda_0 \leq$ 1324 nm Zero Dispersion Slope (S_0): \leq 0.092 ps/(nm ² *km)
Polarization Mode Dispersion (PMD)	PMD Link Design Value = \leq 0.06 ps/ \sqrt km Maximum Individual Fiber = \leq 0.1 ps/ \sqrt km
Norm	ITU-T Recommendation G.652 (Tables A, B, C, and D) IEC Specifications 60793-2-50 Type B1.3 TIA/EIA 492-CAAB Telcordia Generic Requirements GR-20-CORE ISO 11801 OS2

Dimensional Specifications

Fiber Curl	\geq 4.0 m radius of curvature
Cladding Diameter	125.0 \pm 0.7 μ m
Core-Clad Concentricity	\leq 0.5 μ m
Cladding Non-Circularity	\leq 0.7%
Coating Diameter	242 \pm 5 μ m
Coating-Cladding Concentricity	$<$ 12 μ m

Environmental Specifications

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

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Mechanical Specifications

Proof Test	The entire fiber length is subjected to a tensile stress \geq 100 kpsi (0.7 GPa).
Length	Fiber lengths available up to 63.0 km/spool.

Performance Characterizations

Core Diameter	8.2 μ m
Numerical Aperture	0.14
Zero Dispersion Wavelength (λ_0)	1317 nm
Zero Dispersion Slope (S_0)	0.088 ps/(nm ² *km)
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-E2A/MPP09112Exx	tML [®] - FO Fan-out Cable MPO/MTP [®] w. Pins/12x E2000 APC 12E9/125 μ LSOH, Length: xx
TML-E2/MPP09112Exx	tML [®] - FO Fan-out Cable MPO/MTP [®] w. Pins/12x E2000 UPC 12E9/125 μ LSOH, Length: xx
TML-E2/MPP50112G3-xx	tML [®] - FO Fan-out Cable MPO/MTP [®] w. Pins/12x E2000 12G50/125 μ OM3 LSOH, Length: xx
TML-E2/MPP50112G4-xx	tML [®] - FO Fan-out Cable MPO/MTP [®] w. Pins/12x E2000 12G50/125 μ OM4 LSOH, Length: xx
TML-E2/MPP50112Gxx	tML [®] - FO Fan-out Cable MPO/MTP [®] w. Pins/12x E2000 12G50/125 μ OM2 LSOH, Length: xx
TML-E2/MPP62112Gxx	tML [®] - FO Fan-out Cable MPO/MTP [®] w. Pins/12x E2000 12G62,5/125 μ OM1 LSOH, Length: xx