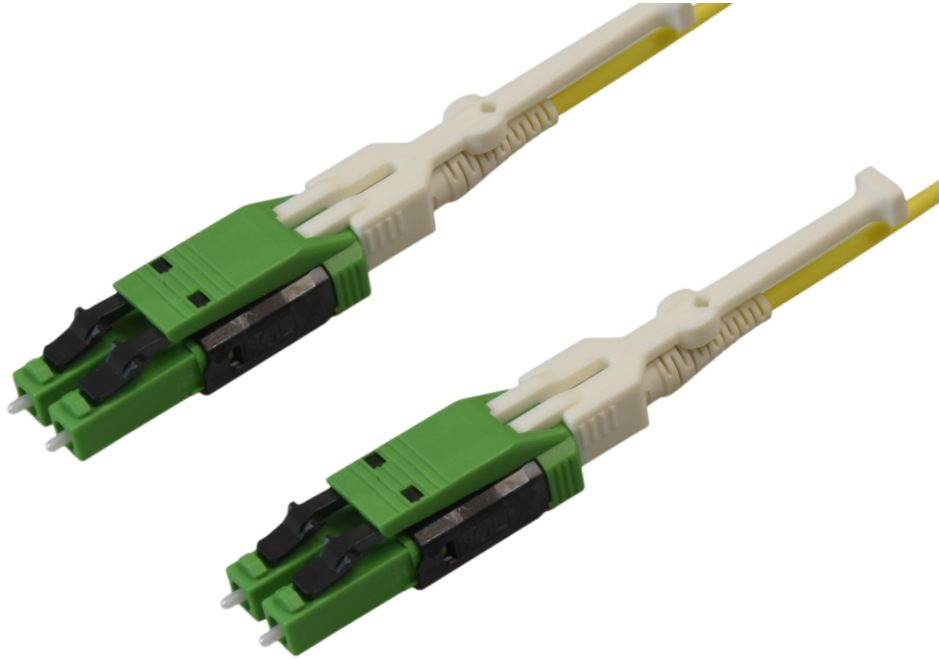


tML[®] HD - FO Patch cord switchable LC APC HD / LC APC HD Duplex Mini 9/125 μ , FRNC, OS2,
Crossover, Length: xxx in m



tML[®] Xtended

tML[®] Xtended 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[®] 12 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 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[®] 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.



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Technical Data

FO Connectors

Connector type	LC HD duplex Uniboot
Housing	Plastic, integrated locking of unlocking aid
Polarity	Tool-less
Ferrule	Zirconia Straight Split, Spring-loaded Axially
Ferrule hole	125 μ m
Mating cycles	1000
Operating temperature	-40°C to 75°C
Strain relief to	100 N
Manufacturer	tde
Simplex/Duplex clip	Uniboot Duplex Housing

Optical performance

Fiber	Type	Wavelength	Insertion loss typ.	Insertion loss max.	Return loss min.
9/125 μ	LC Uniboot HD APC	1550 nm	< 0.10 dB	0.25 dB	75 dB

FO Cables

Flame resistance	IEC 60332-3
	IEC 60754
	IEC 61034-1
	IEC 61034-2

Cable construction

Type	DVH02E09-2.0
Tight buffer	2x 600 μ coated fibers (free movable in the compound)
Fiber type	SM-G652D, 9/125 μ , Corning SMF-28e+, OS2
Strength members	Aramid yarn (free movable in the compound)
Outer jacket	LSZH (Halogen free, low smoke, flame retardant thermoplastic compound)
Jacket color	Yellow, RAL 1021
Identification	"t d e – DVH02E09-2.0mm LSZH" and sequential meter marking + Lot number

Physical properties

Outer diameter cable	2.0 \pm 0.1 mm
Maximum tensile load, short term	500 N
Maximum tensile load, long term	300 N
Min. Bending radius, unloaded	20 mm

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Min. Bending radius, loaded	40 mm
Temperature range (operation)	-5°C to +60°C

FO Fiber

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 ± 0.4 μ m At 1550 nm = 10.4 ± 0.5 μ m
Dispersion	At 1550 nm = ≤ 18.0 [ps/(nm*km)] At 1625 nm = ≤ 22.0 [ps/(nm*km)]
	Zero Dispersion Wavelength (λ_0): 1310 nm $\leq \lambda_0 \leq 1324$ nm Zero Dispersion Slope (S_0): ≤ 0.092 ps/(nm ² *km)
Polarization Mode Dispersion (PMD)	PMD Link Design Value = ≤ 0.06 ps/ \sqrt km Maximum Individual Fiber = ≤ 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	≥ 4.0 m radius of curvature
Cladding Diameter	125.0 ± 0.7 μ m
Core-Clad Concentricity	≤ 0.5 μ m
Cladding Non-Circularity	$\leq 0.7\%$
Coating Diameter	242 ± 5 μ m
Coating-Cladding Concentricity	< 12 μ m

Environmental Specifications

Environmental Test	Test Condition	Induced Attenuation 1310 nm, 1550 nm & 1625 nm
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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 \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
TMLHLCA/HLCA09DRMxxx	tML [®] HD - FO Patch cord switchable LC APC HD / LC APC HD Duplex Mini 9/125 μ , FRNC, OS2, Crossover, Length: xxx in m
TML-HLC/HLC09DRMxxx	tML [®] HD - FO Patch cord switchable LC HD / LC HD Duplex Mini 9/125 μ , FRNC, OS2, Crossover, Length: xxx in m
TML-HLC/HLC50D4RMxxx	tML [®] HD - FO Patch cord switchable LC HD / LC HD Duplex Mini 50/125 μ , FRNC, OM4, Crossover, Length: xxx in m
TML-HLC/HLC50D5RMxxx	tML [®] HD - FO Patch cord switchable LC HD / LC HD Duplex Mini 50/125 μ , FRNC, OM5, Crossover, Length: xxx in m