

tML[®] - Mini Fanout 1x 24F MPO Female/2x 12F MPO Male 24G50/125µ OM4 100GbE, Type C, 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.



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.: +49 231 914 36 99
Fax.: +49 231 914 31 29

info@tde.de | www.tde.de

tML[®] - Mini Fanout 1x 24F MPO Female/2x 12F MPO Male 24G50/125 μ OM4 100GbE, Type C, 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 - 3.5 μ . The max. adjacent fiber height difference is 0.2 μ m and for all fibers 0.3 μ m. All system components (modules, trunk cables and patch cords) are co-ordinated for the reaching of the performance particularly. The module is marked with sequential serial number and article number.

Cable	Round cable, loose tube, LSOH, magenta
Connectors	MPO/MTP [®] Push Pull (magenta)
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

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.

Connector

Type	MPO/MTP [®] Female Push Pull Locking (magenta)
Ferrule	24 Fiber MM 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.
50/125 μ OM4	MPO/MTP [®]	850 nm	≤ 0.12 dB	0.25 dB	35 dB

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 - 3.5 μ . The max. adjacent fiber height difference is 0.2 μ m and for all fibers 0.3 μ m.

Connector

Type	MPO/MTP [®] Male Push Pull Locking with Elite Pins (magenta)
Ferrule	12 Fiber MM Elite [®] ferrule, PPS
Boot colour	Black

tML[®] - Mini Fanout 1x 24F MPO Female/2x 12F MPO Male 24G50/125 μ OM4 100GbE, Type C, Length:
xx in m

Manufacturer	tde/US Conec
--------------	--------------

Optical Performance

Fiber	Type	Wavelength	Insertion loss typ.	Insertion loss max.	Return loss min.
50/125 μ OM4	MPO/MTP [®]	850 /1300 nm	≤ 0.12 dB	0.25 dB	35 dB

FO Fan-Out

Length Fan-Out	40 mm
Max. \varnothing Fan-Out	10 mm
Parallel connectors	2

FO Cables

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

Construction

Type	IVH24G50-OM4
Fiber	24 primary coated fibres nominally 242 μ m, arranged in 2 groups of 12 fibres, Group 1: Red id tread Group 2: Green id tread
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	Magenta, RAL 4003

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

tML[®] - Mini Fanout 1x 24F MPO Female/2x 12F MPO Male 24G50/125 μ OM4 100GbE, Type C, Length:
xx in m

Heat of combustion

200 MJ/km	0.5 KWh/m
-----------	-----------

Physical properties IEC60974-1-2

Outer diameter cable	$\varnothing 3.6 \text{ mm } +0.1 \text{ mm } -0.3 \text{ mm}$
Diameter PVC-core tube	$2.0 \pm 0.1 \text{ mm}$
Wall thickness PVC-core tube	$0.35 \text{ mm} - 0.40 \text{ mm}$
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 ClearCurve [®] 50/125 μ OM4 multimode fiber
Optimized Data Rate over Distance	40/100 Gb over 170 m* 10 Gb/s over 550 m 1 Gb/s over 1100 m
Standard Compliance	ISO/IEC 11801: type OM4 fiber** IEC 60793-2-10: type A1a.3 fiber** TIA/EIA: 492AAAD ITU: ITU G651.1
*	Distances specified in the 40G/100G per IEEE 802.3ba standard are 150m on OM4 and 100m on OM3; Corning fibers are manufactured to tighter dispersion specifications and thereby support the extended distances shown in the table (assuming cable attenuation $\leq 3.0 \text{ dB/km}$ and same 1.0 dB of connector loss for OM3 that the standard requires for OM4)
**	Assumes IEC draft standard is harmonized with 492AAAD which was approved by TIA

Optical Specifications

Bandwidth	High Performance EMB* (MHz.km): 4700 at 850 nm only Legacy Performance EMB** (MHz.km): 3500 at 850 nm / 500 at 1300 nm
Attenuation	At 850 nm max. $\leq 2.3 \text{ dB/km}$ At 1300 nm max. $\leq 0.6 \text{ dB/km}$
Macrobend Loss	Mandrel Radius (mm): 37.2 / 15 / 7.5 Number of Turns: 100 / 2 / 2 Induced Attenuation (dB) at 850 nm: $\leq 0.05 / \leq 0.1 / 0.2$ Induced Attenuation (dB) at 1300 nm: $\leq 0.15 / \leq 0.3 / \leq 0.5$
Numerical Aperture	0.200 ± 0.015
*	Ensured via miniEMBc, per TIA/EIA 455-220A and IEC 60793-1-49, for high performance laser-based systems (up to 10Gb/s)

tML[®] - Mini Fanout 1x 24F MPO Female/2x 12F MPO Male 24G50/125 μ OM4 100GbE, Type C, Length:
xx in m

**	OFL BW, per TIA/EIA 455-204 and IEC 60793-1-41, for legacy and LED-based systems (typically up to 100 Mb/s)
----	---

Dimensional Specifications

Core Diameter	50.0 \pm 2.5 μ m
Cladding Diameter	125.0 \pm 1.0 μ m
Core-Clad Concentricity	\leq 1.5 μ m
Cladding Non-Circularity	\leq 1.0%
Core Non-Circularity	\leq 5.0%
Coating Diameter	242 \pm 5 μ m
Coating-Cladding Concentricity	$<$ 12 μ m

Environmental

Environmental Test	Test Condition	Induced Attenuation 850 nm & 1300 nm (dB/km)
Temperature Dependence	-60°C to +85°C	\leq 0.10
Temperature Humidity Cycling	-10°C to +85°C and 4% to 98% RH	\leq 0.10
Water Immersion	23°C \pm 2°C	\leq 0.20
Heat Aging	85°C \pm 2°C	\leq 0.20
Damp Heat	85°C at 85% RH	\leq 0.20
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 GN/m ²).
Length	Fiber lengths available up to 17.6 km/spool.

Performance Characterizations

Refractive Index Difference	1%
Effective Group Index of Refraction	850 nm: 1.480 1300 nm: 1.479
Fatigue Resistance Parameter (nd)	20
Coating Strip Force	Dry: 0.6 lbs (2.7N) Wet: 14 days in 23°C water soak: 0.6 lbs (2.7N)
Chromatic Dispersion	Zero Dispersion Wavelength (λ_0): 1295 nm $\leq \lambda_0 \leq$ 1315 nm Zero Dispersion Slope (S_0): \leq 0.101 ps/(nm ² *km)

Product variants & accessories

tML[®] - Mini Fanout 1x 24F MPO Female/2x 12F MPO Male 24G50/125 μ OM4 100GbE, Type C, Length:
xx in m

Art.-No.	Description
TML-M2/MPP50I24G3Cxx	tML [®] - Mini Fanout 1x 24F MPO Female/2x 12F MPO Male 24G50/125 μ OM3 100GbE, Type C, Length: xx in m
TML-M2/MPP50I24G4Cxx	tML [®] - Mini Fanout 1x 24F MPO Female/2x 12F MPO Male 24G50/125 μ OM4 100GbE, Type C, Length: xx in m