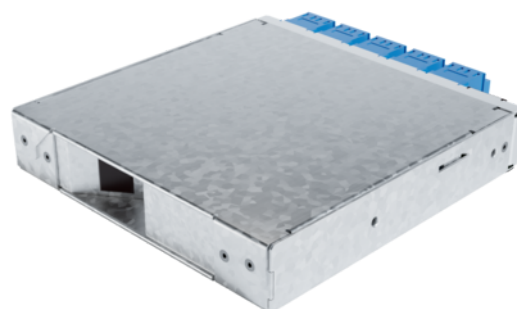


tML[®] 24 - HD FO Breakout Module 1x 24F MPO/MTP[®] with Pins/10x LC Duplex 9/125μ OS2



tML[®] 24

tML[®] 24 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[®] 24 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 400G 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 and now tML[®] 32 for extreme scalability and very easy migration to higher transmission rates such as 40G, 100G, 200G and 400G.

The tML[®] HD Breakout Module is intended for the installation in the tML[®] Rack Mount Enclosure 1U (for 8 x Modules). The tML[®] HD Breakout Module can be used only in combination with the tML[®] HD patch cord.



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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. 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. The modules are ROHS compliant.

Entry	1 x MPO/MTP [®] Male Adapter (red) front
Exit	10 x LC Duplex Adapter (blue) front
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

Box	Galvanized steel sheet
Front Panel	Stainless steel
Dimensions	110 x 108 x 20 mm

FO Adapters

Type	LC Duplex
Application	Singlemode OS2 PC
Design	One-Piece without flange
Connector style	SC simplex
Color	Blue
Material	Plastik
Sleeve	Zirkonia Straight Split
Shutter	--
Manufacturer	tde

FO Connectors

Connector Type	LC UPC Unibody Simplex
Housing	Plastic, Blue
Ferrule	Zirconia Straight Split, Spring-loaded Axially
Ferrul Hole	125.5 μ
Ferrule Concentricity	≤ 0.6 μ
Mating Cycles	500
Operating temperature	-40°C up to +75°C
Strain Relief to	100 N
Manufacturer	tde

tML[®] 24 - HD FO Breakout Module 1x 24F MPO/MTP[®] with Pins/10x LC Duplex 9/125 μ OS2

Optical performance

Fiber	Type	Wavelength	Insertion loss typ.	Insertion loss max.	Return loss min.
9/125 μ	LC UPC	1310 / 1550 nm	≤ 0.10 dB	0.25 dB	55 dB

FO Adapters

Type	MPO/MTP [®]
Application	Singlemode / Multimode
Design	without Flange
Connector style	SC Simplex
Key Orientation	Type A, Key up/down
Color	Red
Material	Plastic
Sleeve	--
Shutter	--
Standards	IEC 61754-7 TIA 604-5
Manufacturer	US Conec

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 [®] 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.
9/125 μ OS2	MPO/MTP [®] APC	1550 nm	≤ 0.10 dB	0.25 dB	75 dB

FO Fiber

Type	Draka OS2 9/125 μ m singlemode fiber (C03e)
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Standards and Norms	IEC 60793-2-50 Category B.1.3	ISO/IEC 11801:2002, cat. OS1
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tML[®] 24 - HD FO Breakout Module 1x 24F MPO/MTP[®] with Pins/10x LC Duplex 9/125 μ OS2

	EN 60793-2-50: Class B1.3	ISO/IEC 24702: 2006, cat. OS2; also OS1 requirements are fulfilled
	ITU Recommendation G.652.D – the older ITU designations A, B and C are also fulfilled	IEEE 802.3 – 2002 incl. 802.3ae
	EN 50173-1:2007, cat. OS2; also OS1 requirements are fulfilled	

Attenuation (of cable with fibers) according to IEC 60793-1-40

1310 nm – 1625 nm	≤ 0.39 dB/km
1550 nm	≤ 0.25 dB/km
Inhomogeneity of OTDR trace for any two 1000 metre fiber lengths	Max. 0.1 dB/km

Group index of refraction according to IEC 60793-1-22

Group index of refraction at 1310 nm	1.467
Group index of refraction at 1550 nm	1.468
Group index of refraction at 1625 nm	1.468

Other properties according to IEC 60793-1-xx

Attribute	Measurement method	Limits
Cladding diameter	IEC/EN 60793-1-20	125.0 ± 0.7 μ m
Cladding non-circularity	IEC/EN 60793-1-20	$\leq 0.7\%$
Core (MFD) non-circularity	IEC/EN 60793-1-20	$\leq 6\%$
Core (MDF) -cladding concentricity error	IEC/EN 60793-1-20	≤ 0.5 μ m
Primary coating diameter - uncoloured	IEC/EN 60793-1-21	242 ± 7 μ m
Primary coating diameter - coloured	IEC/EN 60793-1-21	250 ± 15 μ m
Primary coating non-circularity	IEC/EN 60793-1-21	$\leq 5\%$
Primary coating-cladding concentricity error	IEC/EN 60793-1-21	≤ 12.0 μ m
Proof stress level	IEC/EN 60793-1-30	≥ 0.7 GPa ($\approx 1\%$)
Strip force (peak)	IEC/EN 60793-1-32	$1.0\text{ N} \leq F_{\text{peak.strip}} \leq 8.9\text{ N}$
Chromatic dispersion coefficient In the interval 1285 nm – 1330 nm At 1550 nm At 1625 nm	IEC/EN 60793-1-42	≤ 3 ps/km*nm ≤ 18.0 ps/km*nm ≤ 22.0 ps/km*nm
Zero dispersion wavelength, λ_0		1311 ± 11 nm
Zero dispersion slope		≤ 0.090 ps/(nm ² *km)
Cut-off wavelength	IEC/EN 60793-1-44	$1034 - 1330$ λ_c nm ≤ 1260 λ_c nm
Mode field diameter at 1310 nm Mode field diameter at 1550 nm	IEC/EN 60793-1-45	9.0 ± 0.4 μ m 10.1 ± 0.5 μ m
Macrobending loss at 1550 nm, 100 turns on a $\varnothing$ 60 mm mandrel.	IEC/EN 60793-1-47	≤ 0.05 dB

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Polarisation mode dispersion (PMD) coefficient, IEC/EN 60793-1-48
cabled

≤ 0.5 ps/√km

PMDQ Link Design Value:

IEC/EN 60794-3

≤ 0.2 ps/√km

Product variants & accessories

Art.-No.	Description
TML-M10LCAD/M2P09E	tML [®] 24 - HD FO Breakout Module 1x 24F MPO/MTP [®] with Pins/10x LC APC Duplex 9/125µ OS2
TML-M10LCD/M2P09E	tML [®] 24 - HD FO Breakout Module 1x 24F MPO/MTP [®] with Pins/10x LC Duplex 9/125µ OS2
TML-M10LCD/M2P50G3	tML [®] 24 - HD FO Breakout Module 1x 24F MPO/MTP [®] with Pins/10x LC Duplex 50/125µ OM3
TML-M10LCD/M2P50G4	tML [®] 24 - HD FO Breakout Module 1x 24F MPO/MTP [®] with Pins/10x LC Duplex 50/125µ OM4
TML-M10LCDS/M2P50G5	tML [®] 24 - HD FO Breakout Module 1x 24F MPO/MTP [®] with Pins/10x LC Duplex 50/125µ OM5