

## Description

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 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® 12, tML® 24, tML® 32 and now tML® 24+ System for extreme scalability and very easy migration to higher transmission rates such as 40G, 100G, 200G, 400G and 800G and more.

The tML® - FO Module 5HP MPO/MTP® is intended for the installation in the tML® Rack Mount Enclosure 3U (for 17 x Modules).



## 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 (beige) back
Exit	6 x E2000 Compact Adapter (beige/orange) 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	black

### FO Adapters

Type	MPO/MTP®
Application	Multimode OM1/OM2
Design	without Flange
Connector style	SC Simplex
Key Orientation	Type A, Key up/down
Color	Beige
Material	Plastic
Sleeve	--
Shutter	--
Standards	IEC 61754-7 TIA 604-5
Manufacturer	US Conec

### FO Adapters

Standardisation	acc. to IEC61754-15, DIN EN 186270
Mating cycles	min. 1000
Pull-out force	min. 70 N
Number of connectors (A)	1
Connector type (A)	E2000™ Compact
Protection class (IP) connector (A)	20
Polishing connector (A)	PC
Attenuation grade IL - connector (A)	≤ 0.2 dB, testing method acc. to IEC 61300-3-4
Connector color (A)	beige
Lever- frame-coding connector (A)	color
Frame color connector (A)	orange-orange
Sleeve material	Zirkonia Straight Split
Holder for connector / module	support plate
Fiber type	Multimode (MM)

# tML® - FO Module 5HP black MPO/MTP® with Pins/6x E2000 Compact 50/125µ OM2

Dimensions	74.7 / 42 x 14.7 / 22.95 x 13 / 16.6 mm
Material	steel: X10CrNi18-8 (1.4310) / plastic: PBT, fiber-glass reinforced (halogen-free)
Manufacturer	R&M

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.

## FO Connectors

Type	MPO/MTP® Male Push Pull Locking with Elite Pins (beige)
Ferrule	12 Fiber MM Elite® ferrule, PPS
Boot colour	Black
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.
50/125µ OM2	MPO/MTP®	850 nm	≤ 0.25 dB	0.45 dB	20 dB
62.5/125µ OM1	MPO/MTP®	850 nm	≤ 0.25 dB	0.45 dB	

## FO Connectors

Type	E2000
Ferrule	Ceramic
Ferrule Hole	126 µ
Connector colour	Beige
Lever colour	Black
Boot colour	Black
Manufacturer	RDM

## Optical performance

Fiber	Type	Wavelength	Insertion loss typ.	Insertion loss max.	Return loss min.
50/125µ OM2	E2000	850 nm	≤ 0.25 dB	0.45 dB	30 dB
62.5/125µ OM1	E2000	850 nm	≤ 0.25 dB	0.45 dB	

### FO Fiber

Type	Corning 50/125µ OM2 multimode fiber
Manufacturer	Corning

### Optical Specifications

Bandwidth	500 at 850 nm / 500 at 1300 nm
Attenuation	At 850 nm max. ≤ 2.5 dB/km At 1300 nm max. ≤ 0.8 dB/km
Numerical Aperture	0.200 ± 0.015

### Dimensional Specifications

Core Diameter	50.0 ± 3.0 µm
Cladding Diameter	125.0 ± 2.0 µm
Core-Clad Concentricity	≤ 3.0 µm
Cladding Non-Circularity	< 2.0%
Core Non-Circularity	≤ 5.0%
Coating Diameter	245 ± 5 µm
Coating-Cladding Concentricity	< 12 µm

### Environmental Specifications

Environmental Test	Test Condition	Induced Attenuation 850 nm and 1300 nm (dB/km)
Temperature Dependence	-60°C to +85°C	≤ 0.20
Temperature Humidity Cycling	-10°C to +85°C and 4% to 98% RH	≤ 0.20
Operating Temperature Range	-60°C to +85°C	

### Mechanical Specifications

Proof Test	The entire fiber length is subjected to a tensile stress ≥ 100 kpsi (0.7 GN/m <sup>2</sup> ).
Length	Fiber lengths available up to 8.8 km/spool.

### Performance Characterizations

Refractive Index Difference	2%
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# tML® - FO Module 5HP black MPO/MTP® with Pins/6x E2000 Compact 50/125µ OM2

Effective Group Index of Refraction	850 nm: 1.490 1300 nm: 1.486
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 ( $\lambda_0$ ): 1300 nm $\leq \lambda_0 \leq$ 1320 nm Zero Dispersion Slope (S0): $\leq 0.101$ ps/(nm <sup>2</sup> *km)

Art.-No.	Description
TML-T06E2AC/MPP09ES	tML® - FO Module 5HP black MPO/MTP® with Pins/6x E2000 APC Compact 9/125µ OS2
TML-T06E2C/MPP09ES	tML® - FO Module 5HP black MPO/MTP® with Pins/6x E2000 Compact 9/125µ OS2
TML-T06E2C/MPP50G3S	tML® - FO Module 5HP black MPO/MTP® with Pins/6x E2000 Compact 50/125µ OM3
TML-T06E2C/MPP50G4S	tML® - FO Module 5HP black MPO/MTP® with Pins/6x E2000 Compact 50/125µ OM3
TML-T06E2C/MPP50GS	tML® - FO Module 5HP black MPO/MTP® with Pins/6x E2000 Compact 50/125µ OM2
TML-T06E2C/MPP62GS	tML® - FO Module 5HP black MPO/MTP® with Pins/6x E2000 Compact 62,5/125µ OM1