tML® HD - FO Breakout Module 2x MPO/MTP® with Pins/8x LC Duplex 50/125µ OM4, SR4

\*\*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.

\*\*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.

\*\*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.

\*\*tML® Breakout - LWL Module MPO/MTP®

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.

\*\*TECHNISCHE\_DATEN

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 | 2 x MPO/MTP®Male Adapter (magenta) front |
| Exit | 8 x LC Duplex Adapter (magenta) 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 | Multimode OM4 |
| Design | One-Piece without flange |
| Connector style | SC simplex |
| Color | Magenta |
| Material | Plastic |
| Sleeve | Zirkonia Staight Split |
| Shutter | -- |
| Manufacturer | tde |

\*\*\*FO Connectors

|  |  |
| --- | --- |
| Connector Type | LC Unibody Simplex |
| Housing | Plastic, Magenta |
| Ferrule | Zirkonia Staight Split, Spring-loaded Axially |
| Ferrule Hole | 126 µ |
| Mating Cycles | 1.000 |
| Operating Temperature | -40°C up to +75°C |
| Strain Relief to | 100 N |
| Manufacturer | tde |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Fiber | Type | Wavelength | Insertion loss typ. | Insertion loss max. | Return loss min. |
| 50/125µ OM4 | LC | 850 / 1300 nm | ≤ 0.07 dB | 0.15 dB | 35 dB |

\*\*\*FO Adapters

|  |  |
| --- | --- |
| Type | MPO/MTP® |
| Application | Multimode OM4 |
| Design | without Flange |
| Connector style | SC Simplex |
| Key Orientation | Type A, Key up/down |
| Color | Magenta |
| 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 - 3.5µ. The max. adjacent fiber height difference is 0.2µm and for all fibers 0.3µm.

|  |  |
| --- | --- |
| Type | MPO/MTP® Male Push Pull Locking with Elite Pins (magenta) |
| Ferrule | 12 Fiber MM Elite® ferrule, PPS |
| Boot colour | Black |
| Manufacturer | tde/US Conec |

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

\*\*\*FO Fiber

|  |  |
| --- | --- |
| Type | Corning ClearCurve® 50/125µ 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 ≤3.0 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 |

|  |  |
| --- | --- |
| 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. ≤ 2.3 dB/km At 1300 nm max. ≤ 0.6 dB/km |
| Macrobend Loss | Mandrel Radius (mm): 37.2 / 15 / 7.5 Number of Turns: 100 / 2 / 2 Induced Attenuation (dB) at 850 nm: ≤ 0.05 / ≤ 0.1 /  0.2  Induced Attenuation (dB) at 1300 nm: ≤ 0.15 / ≤ 0.3 / ≤ 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) |
| \*\* | OFL BW, per TIA/EIA 455-204 and IEC 60793-1-41, for legacy and LED-based systems (typically up to 100 Mb/s) |

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| --- | --- |
| Core Diameter | 50.0 ± 2.5 µm |
| Cladding Diameter | 125.0 ± 1.0 µm |
| Core-Clad Concentricity | ≤ 1.5 µm |
| Cladding Non-Circularity | ≤ 1.0% |
| Core Non-Circularity | ≤ 5.0% |
| Coating Diameter | 242 ± 5 µm |
| Coating-Cladding Concentricity | < 12 µm |

|  |  |  |
| --- | --- | --- |
| Enviromental Test | Test Condition | Induced Attenuation 850 nm & 1300 nm (dB/km) |
| Temperature Dependence | -60°C to +85°C | ≤ 0.10 |
| Temperature Humidity Cycling | -10°C to +85°C and 4% to 98% RH | ≤ 0.10 |
| Water Immersion | 23°C ± 2°C | ≤ 0.20 |
| Heat Aging | 85°C ± 2°C | ≤ 0.20 |
| Damp Heat | 85°C at 85% RH | ≤ 0.20 |
| Operating Temperature Range | -60°C to +85°C  |   |

|  |  |
| --- | --- |
| Proof Test | The entire fiber length is subjected to a tensile stress ≥ 100 kpsi (0.7 GN/m²). |
| Length | Fiber lengths available up to 17.6 km/spool. |

|  |  |
| --- | --- |
| 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) |
| Cromatic Dispersion | Zero Dispersion Wavelength (λ0): 1295 nm ≤λ0≤ 1315 nm Zero Dispersion Slope (S0): ≤ 0.101 ps/(nm²\*km) |