tML® HD - FO Breakout Module 2x MPO/MTP® with Pins/8x LC Duplex w. shutter 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. A special cleaning tool is required to clean the adapters with shutter.

\*\*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 with self-closing shutter (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

When the connector is inserted into the adapter it compress the springs, opening the internal shutter. The internal shutter opens, and due to the special design of the shutter, it will not touch the ferrule end face. As the connector is removed from the adapter, the shutter spring automatically returns the internal shutter to the closed position.

|  |  |
| --- | --- |
| Type | LC Duplex |
| Application | Multimode OM4 |
| Design | One-Piece without flange |
| Connector style | SC simplex |
| Color | Magenta |
| Housing material | Plastic |
| Sleeve | Zirkonia Staight Split |
| Self-closing shutter material | Metal |
| Self-closing shutter protection | Dust an laser light |
| 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 | Draka OM4 50/125µm bend-insensitive multimode fiber (C32) |

|  |  |  |  |
| --- | --- | --- | --- |
| Standards and Norms | IEC 60793-2-10: type A1a.3 | ITU G.651.1 | TIA/EIA-492 AAAD |
|   | ISO/IEC 11801 category OM4 | EN 60793-2-10: type A1a.3 | ANSI/TIA/EIA-568.C |
|   | ISO/IEC 24764 | EN 50173-1 category OM4 | IEEE 802.3 |

|  |  |  |
| --- | --- | --- |
| Maximum attenuation value of cable at 850 nm | IEC 60793-1-40 | ≤ 3.0 dB/km |
| Maximum attenuation value of cable at 1300 nm | IEC 60793-1-40 | ≤ 1.0 dB/km |
| Attenuation limit according to IEC 60793-2-10, 850 nm | IEC 60793-1-40 | ≤ 2.5 dB/km |
| Attenuation limit according to IEC 60793-2-10, 1300 nm | IEC 60793-1-40 | ≤ 0.8 dB/km |
| Inhomogeneity of OTDR trace for any two 1000 metre fiber lengths | IEC 60793-1-40 | Max. 0.1 dB/km |
| Fiber bending loss R=7.5 mm 850/1300 nm | IEC 60793-1-40 | ≤ 0.2 dB / ≤ 0.5 dB |
| Fiber bending loss R=15 mm 850/1300 nm | IEC 60793-1-40 | ≤ 0.1 dB / ≤ 0.3 dB |

|  |  |  |
| --- | --- | --- |
| Overfilled (OFL) modal bandwidth at 850 nm | IEC 60793-1-41 | ≥ 3500 MHz\*km |
| Overfilled (OFL) modal bandwidth at 1300 nm | IEC 60793-1-41 | ≥ 500 MHz\*km |
| Effective Modal Bandwidth (EMB) at 850 nm | IEC 60793-1-49 | ≥ 4700 MHz\*km |
| Group index of refraction at 850 nm | IEC 60793-1-22 | 1.482 |
| Group index of refraction at 1300 nm | IEC 60793-1-22 | 1.477 |

|  |  |  |
| --- | --- | --- |
| Core diameter | IEC/EN 60793-1-20 | 50 ± 2 µm |
| Cladding diameter | IEC/EN 60793-1-20 | 125.0 ± 1.0 µm |
| Cladding non-circularity | IEC/EN 60793-1-20 | ≤ 0.7% |
| Core non-circularity | IEC/EN 60793-1-20 | ≤ 5% |
| Core -cladding concentricity error | IEC/EN 60793-1-20 | ≤ 1 µm |
| Primary coating diameter - uncoloured | IEC/EN 60793-1-21 | 242 ± 5 µm |
| Primary coating diameter - coloured | IEC/EN 60793-1-21 | 250 ± 15 µm |
| Primary coating non-circularity | IEC/EN 60793-1-21 | ≤ 5% |
| Primary coating-cladding concentricity error | IEC/EN 60793-1-21 | ≤ 6 µm |
| Proof stress level | IEC/EN 60793-1-30 | ≥ 0.7 (≈ 1 %) GPa |
| Typical average strip force | IEC/EN 60793-1-32 | 1.7 N |
| Strip force (peak) | IEC/EN 60793-1-32 | 1.3 N ≤ Fpeak.strip ≤ 8.9 N |
| Numerical aperture | IEC/EN 60793-1-43 | 0.200 ± 0.015 |