

# Interpretation of Terminology & Differences – MPO and MTP®

White paper

## Introduction

MPO and MTP connectors become well-commonly applied in the high-density, high-bandwidth fibre optical networks. The appearance of two connectors look alike. To some degrees, they are compatible in their application.

To provide high-density termination capability, our solutions utilise a standards-compliant multi-fibre connector. The connector is called an MPO (Multi-fibre Push On) connector by the standards. In many cases, multi-fibre connector products are referred to as MTP connectors. The MPO's rise in popularity stems from its unique ability to mate multiple fibres (2-72 fibres) within a single connector body housing therefore significantly reducing a lot of space.

This white paper is intended to clarify the terminology and differences of the two terms – MPO and MTP.

## MPO connectors

MPO (multi-fibre push on) connector is the first generation of clip clamping multi-core optic fibre connector, which developed by the Japan NTT (Nippon Telegraph and Telephone Corporation). Now many companies can design and produce this kind of connector, but there's some differences in capacities and costs among these brands, the compatibility as well.

MPO is an industry term to describe a multi-fibre Push On style connector. By definition, the MPO is a multi-fibre connector (a single connector that houses multiple fibre terminations) that is defined by IEC-61754-7, "Fibre optic interconnecting devices and passive components – Fibre optic connector interfaces - Part 7: Type MPO connector family"; and TIA-604-5-D, "Fibre Optic Connector Intermateability Standard, Type MPO".

MPOs come as 12 or 24 fibre variants in Multimode and Single-mode and are available from numerous vendors in one format or another. MPO is a 12-fibre connector for ribbon cable. Its main use is for pre-terminated cable assemblies and cabling systems. This connector is sometimes called a MTP which is a commercial name. It is covered in the TIA connector intermateability standard FOCIS-5 (TIA-604-5). These connectors have more than 1 fibre in a single ferrule and snap into place by a mechanical mechanism. There are many designs of MPO on the market from the various manufacturers.

The ever-increasing demand for bandwidth in data centres prompted the development of MPO (multi-fibre push-on connectors) - compact, pre-terminated links able to handle bandwidth all the way up to 100 Gbps - and to date, the only type of connector that is standards recognised to do so.

## MTP connectors

The term MTP is a registered trademark of US Conec Ltd. This is the term used by US Conec to describe their connector. The US Conec MTP product is fully compliant with the MPO standards. As such, the MTP connector is an MPO connector. MTP connectors are high performance MPO connectors with many innovative designs. Compared with the MPO connectors, it strengthens the mechanical and the optical performance.

As the MTP connectors compliance with all standards of the MPO connectors, the MTP connectors can replace the MPO connectors in the application to get better performance.

The core of connector is the MT socket. It's the core part of mechanical butt transmission. The socket consists of two pilot holes and several fibre holes (max 12 fibres). Because the capacity of connector is determined by the fibre alignment accuracy and lasting stability after fibre alignment, the importance of MT socket performance is self-evident.

The parts of the MPO connector can be disassembled into one pair of MT sockets, 2 pieces of pilot pins, 2 enclosures and an adaptor.



MPO and MTP are the MT series. Small size, multi-channel is the most prominent feature, which greatly facilitates the high-density wiring. The MT series connectors have been widely applied to the CATV, Multimedia, Gigabit Ethernet, active device interface, data processing networks, and telecommunication networks. The MPO can be 4 to 24 fibres. The MPO patch cord cable can be ribbon fibre or breakout fibre.

The MT series patch cord have low insertion loss and high precision guide pins exact alignment.



MTP 12 Fibre Connector

The MTP® connector is a high performance MPO connector with multiple engineered product enhancements to improve optical and mechanical performance when compared to generic MPO connectors.

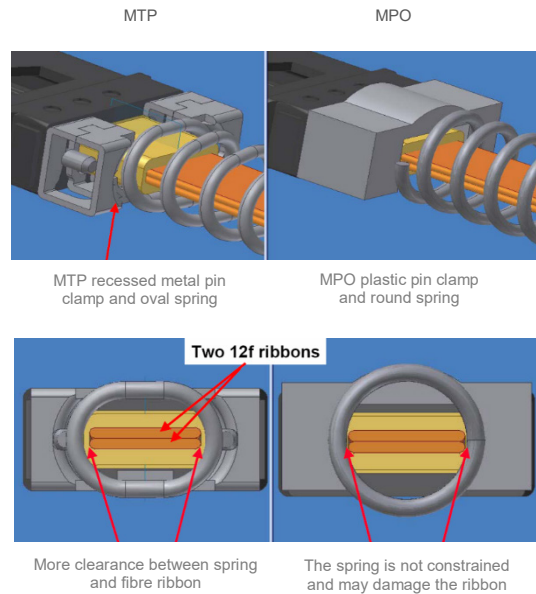
The MTP connector is used by many of the leading manufacturers and is the only multi-fibre connector used by OptronicsPlus.

## Internal Components of MTP and MPO connectors

The outside frame components of the MTP connector are more easier to disassemble. The floating ferrule of MTP connector improves the transmission performance in the mechanical butt joint.

The oval pin of MTP connector is composed of stainless steel material. It can improve the accuracy of butt joint and reduce the attrition to the pilot holes. There is a metal clip in MTP connector used to fix the drive ring. In MTP connector, the design of oval spring maximises the gap between fibre ribbon and spring, this can protect the fibre ribbon from damages during inserting. The design of MTP fibre optic connector spring, is to maximize the 12-core and multi-core ribbon application of the band gap to prevent fibre damage.

The MTP design includes a recessed pin clamp and oval spring which ensures a secure spring seat, and greater clearance between the spring and the ribbon cable, reducing the risk of damage to the cable.

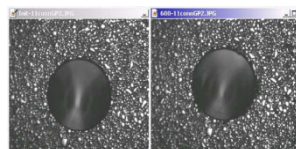
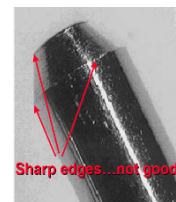


## Connector Guide Pins - Durability Results Comparison

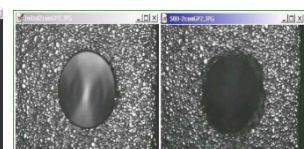
MTP Guide Pin (Elliptical)



MPO Guide Pin (Sharp Chamfer)



MTP guide hole damage after 600 matings



Typical MPO guide hole damage after 500 matings

\*MTP® is a registered trademark of US Conec Ltd

The MTP design also includes a removable housing, allowing easy gender changes, geometry verification and re-measuring when required.

The MTP also has elliptically shaped guide pins for precision alignment and improved durability. Superior mechanical and optical performance can be achieved.

## What makes the MTP connector superior to generic MPO connectors?

The MTP connector has features and benefits that are not available on generic MPO connectors. Some of the key distinctions include:

1. The MTP connector housing is removable. This feature allows the customer to:
  - Re-work and re-polish the MT ferrule
  - Change the gender after assembly or even in the field
  - Scan the ferrule interferometrically after assembly

2. The MTP connector offers ferrule float to improve mechanical performance. This allows two mated ferrules to maintain physical contact while under an applied load.
3. The MTP connector uses tightly held tolerance stainless steel guide pin tips with an elliptical shape. The elliptical shaped guide pin tips improve guidance reducing guide hole wear.
4. The MTP connector has a metal pin clamp with features for centring the push spring. This feature:
  - Eliminates lost pins
  - Centers spring force
  - Eliminates fibre damage from spring
5. The MTP connector spring design maximises ribbon clearance for twelve fibre and multifibre ribbon applications to prevent fibre damage.
6. The MTP connector is offered with four standard variations of strain relief boots to meet a wide array of applications.
  - Round, Loose Fibre Cable Constructions
  - Oval Jacketed Cable
  - Bare Ribbon Fibre
  - Short boot which reduces the footprint by 45%. Ideal for use in space limited applications.

## Conclusion

The MTP® connector (an improved MPO connector) was developed to increase fibre density even more. Because of the high number of fibre strands available in a small connection, MTP® assemblies are used for backbone, cross-connect, and breakout applications.

Used by all the leading high density fibre manufacturers the MTP® Connector is at the heart of the Complete Connect solution. The 12 fibre connector has been designed to provide enhanced “overlife” performance and is key to maintaining a robust network. With the development of information technology, there is a big market of connectors for high-speed/high-bandwidth/high-density network. The MPO and MTP connectors, MPO and MTP patch cords will be highly needed. As a real manufacturer of fibre optic cables, patch cords and pigtails, we can provide you supreme service and high quality products with competitive price.

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