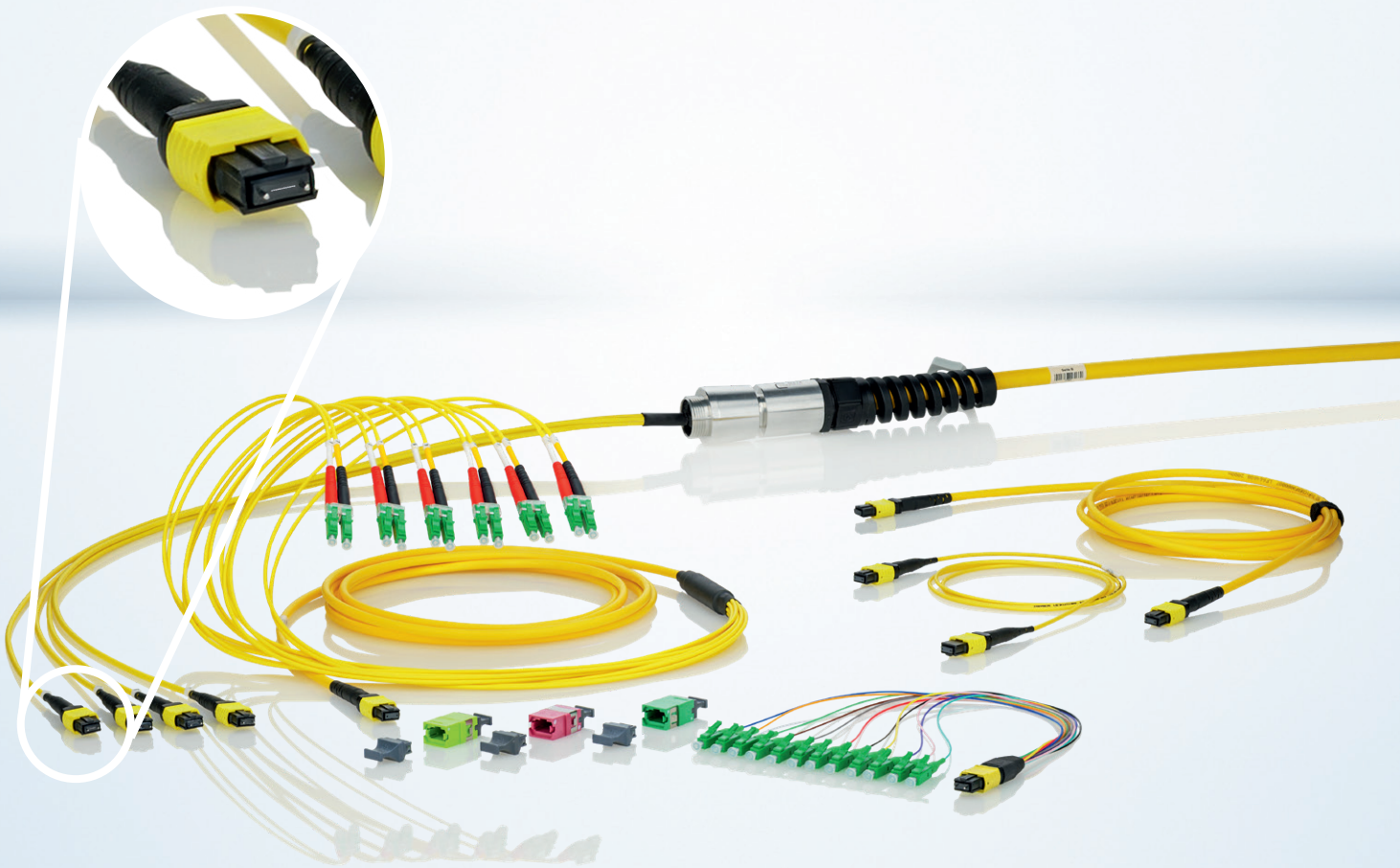


# OpDAT MTP® Cable assemblies

High transmission rates with low space requirements



MTP® is a registered trademark of US Conec Ltd., USA

## OpDAT MTP® cable assemblies

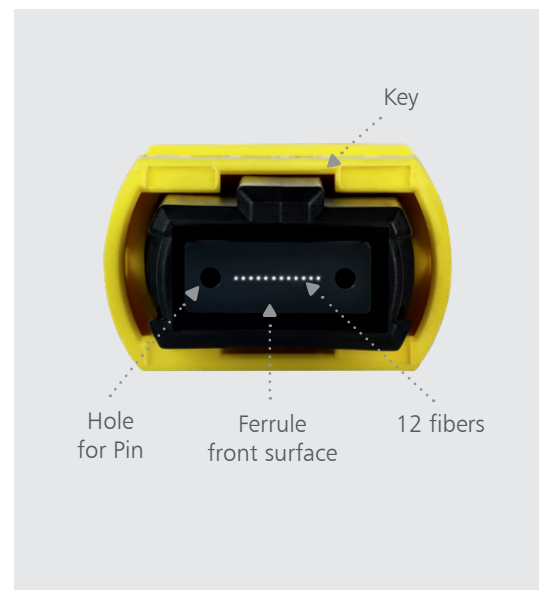
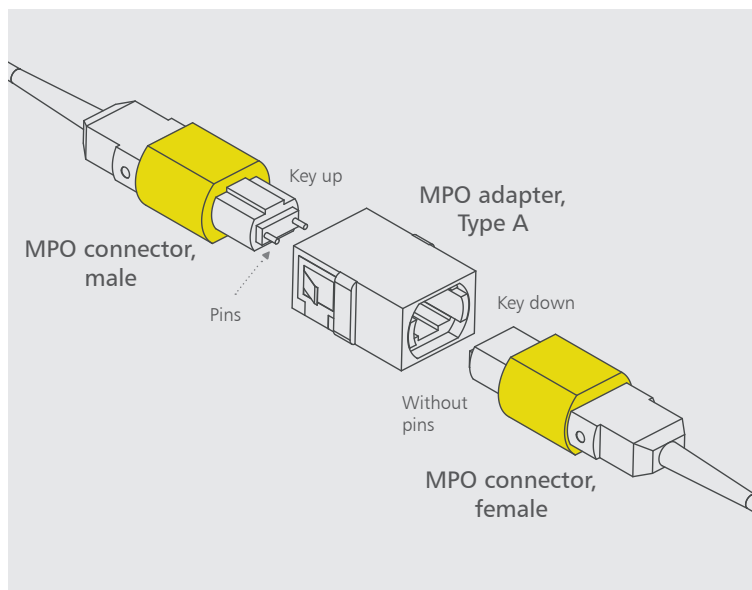
Data centers are at the heart of every network, no matter what tasks it performs. The demands on performance and capacity are increasing rapidly. The huge volumes of data that need to be processed and archived quickly, push today's networks to their limits meaning that expansions become inevitable. The result is that compact, cost-effective, fast and, above all, user-friendly solutions are needed to make optimal use of the available space and keep downtime to a minimum.

Multi-fiber connectors have become the transmission method of choice in many data centers and telecommunication centers, supporting transmission of 10, 40 and 100 Gbit/s and more. MPO/MTP®-cable assemblies for fast and reliable fiber optic links provide an effective means for high and sustainable transmission rates and ensure a powerful and fast network.

### How does an MPO connector work?

The MPO fiber optic connector type is a multifiber connector in accordance with IEC 61754-7, in which several fibers are arranged in parallel in a rectangular ferrule ("parallel optics"). The number of fibers is usually 8, 12 or 24 fibers. MPO connectors always use an adapter in which a connector with two pins (= "Male") is joined to a connector with two holes (= "Female").

The pins are designed for highly accurate frontal positioning of the fibers. The adapter has the function of mechanical fixation in e.g. 19-inch distributors and it assists with the alignment of the two connectors in relation to each other due to its keys on both sides, which also each have a key. The locking of the connectors in an adapter is realized using a push-pull mechanism.



### Where are MPO connectors used?

MPO cable assemblies are predominantly used in data centers with transmission rates of 10 up to 400 Gbit/s. They are used to connect the distribution technology, e.g. 19" panels, and the active components such as servers or switches.

Another field of use is in industrial cabling, where the high packing densities associated with MPO/MTP® are an advantage when running cables.





## MPO or MTP®?

The MPO (Multipath Push On) connector type is defined in the following standards:

- > DIN EN 61754-7: MPO connector family
- > TIA-604-5: Fiber Optic Connector Intermateability Standard-Type MPO

US Conec modified this connector with respect to mechanical and optical properties and it is produced under the trade name MTP® (Multiple Termination Push-Pull). METZ CONNECT exclusively uses MTP®-connectors and adapters from US Conec. Only connectors with Elite® ferrules are used from this product line. These have excellent properties with respect to insertion and return loss. All multimode MTP® connectors are always straight polished, while all single-mode MTP® connectors are angled polished (APC).

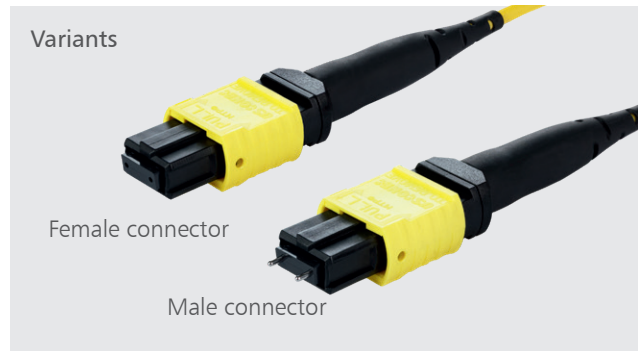
SM MTP® with angled polishing (APC)



## Male or Female?

MPO/MTP® connectors always use a combination of one connector with two pins (= "Male") and one connector with two holes (= "Female"). The pins are designed for highly accurate frontal positioning of the fibers in the two connectors. In MTP® systems the necessary patch cords are equipped with female connectors on both sides, while trunk cables, distributors or active components are equipped with male connectors.

Variants



## LC and/or MTP®?

LC duplex and MPO connectors are standardized for structured cabling according to ISO 11801-5 and EN 50173-5 standards for data center applications. They are both characterized by high packing density and ease of operation when joining. Often, a combination of both connectors is used in a cabling system to utilize the following advantages: For LC duplex, there is currently a wide range of cost-effective transceivers that are supplied in the so-called SFP design with LC connection. This

allows duplex applications to be constructed with 10, 25 or 50 GBit/s. Bundling these duplex lines onto 12-fiber MTP® trunk cabling provides easy management. In addition, the MTP® cabling is a sustainable investment for higher transmission rates, since the active components can continue to be used when they are replaced by QSFP transceivers with connectors. Transmission rates of 40 to 400 GBit/s are then made possible, depending on the type of transceiver.

## 40GBASE-LR4

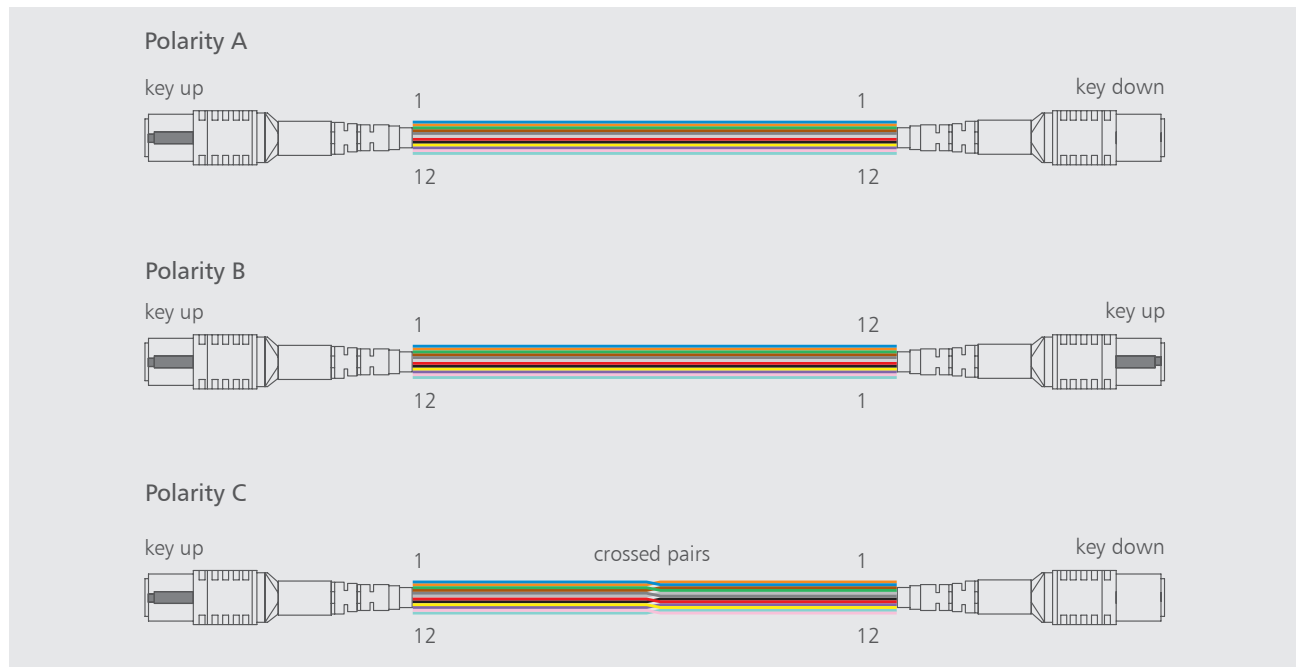




## Polarity A, B or C?

In the case of multi-fiber systems, care must be taken to ensure the wiring and direction is correct: To properly connect two transceivers, an odd number of intersections within the cabling is always necessary to ensure continuity of the light cable throughout the entire system and to connect the transmitter to the receiver.

These intersections are established based on the type of assignment or polarity. The specifications for the polarity are therefore urgently required when ordering MTP® cable assemblies. Depending on the cabling structure and the components used, a mixture of different polarities may also be possible.



## 8 or 12 fibers?

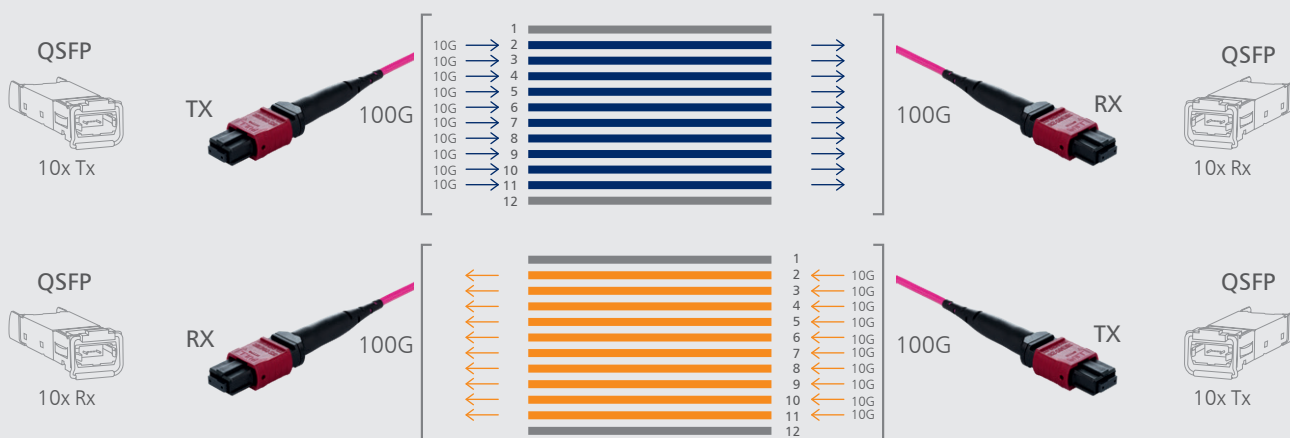
MTP® connector with 12 fibers are frequently used in combination with SFP transceivers and LC duplex connectors. In this case, all 12 fibers are used as 6x duplex cables.

MTP® connectors with 8 fibers are used in combination with QSFP transceivers. 4 fibers are used in each direction. Here, a plain MTP® cable routing is possible, but there is also a splitting

into duplex lines with a suitably interconnected fanout cable. MTP®8 connectors can also be connected with MTP®12 cables. In this case, the 4 middle fibers are not used.

Application scenarios are shown on Page 20 and 21.

## 100GBASE-SR10



## Production in Blumberg



METZ CONNECT has been manufacturing high-quality fiber optic cable assemblies at its Blumberg site for many years now. The well thought-out production equipment ensures a complete description of each processing step in the manufacturing structures, which results in excellent quality. The employees working here receive ongoing and targeted training, with a very strong focus on the quality of workmanship of each product. The processing quality provides the basis for the stable long-term performance of the fiber optic connectors and thus, for the reliability that METZ CONNECT is known for.

Each product is fully tested with two wavelengths. All materials used were quality tested in an extensive internal approval process. In addition, all cable types contain bend-resistant fibers – both for single-mode (OS2) and for all multimode fiber types (OM3, OM4, OM5).

Because the products are manufactured in Blumberg, deliveries can be made on short notice, also in accordance with special customer requirements.

## Configurator

Due to the very high number of variants of MTP® cable assemblies, METZ CONNECT has developed another customer-friendly configurator that you will find on our homepage at

[www.metz-connect.com/configurator](http://www.metz-connect.com/configurator). In it you will find all available variants including specifications and price.

## Certified by GHMT PREMIUM Verification Program

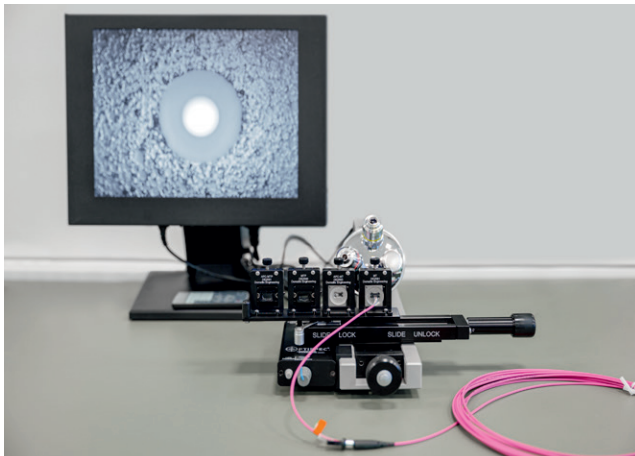
METZ CONNECT has been offering high-quality products for copper cabling for many years, and these products are certified annually by GHMT, thus, providing long-term and transparent proof of their high quality.

Also, all MTP® cable assemblies are tested according to the GHMT PVP test plan LWL MPO/MTP® Ed evaluation standard 1.0 (2020.-03) has been tested and corresponds to PVP Level 2.

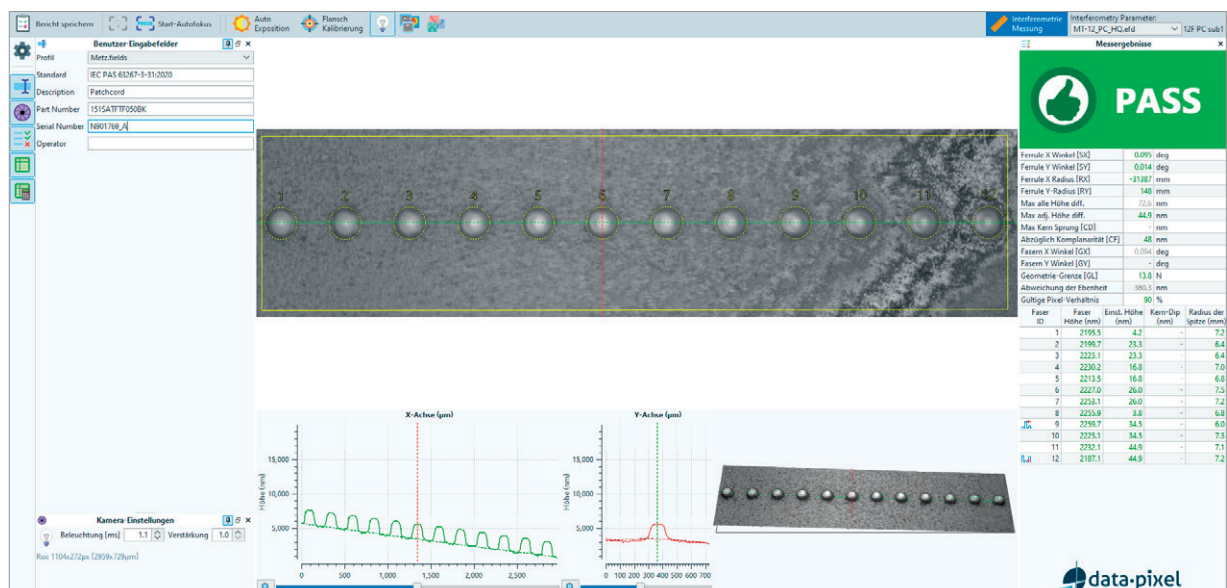
## Measurement technology

All cable assemblies are 100% tested for insertion loss and return loss with two wavelengths (SM: 1310 and 1550 nm, MM: 850 and 1300 nm) checked. All data is archived, records are kept of measurement protocols and are enclosed with the product. In addition, an interferometer measurement is performed for each

connector. After the measurement, a final visual inspection of the connectors is carried out in accordance with IEC 61300-3-35. The different types of cables are marked with serial numbers and bar-codes that guarantee traceability at all times.



## Interferometer measurement





## Transmission technology

ETHERNET PROTOCOLS (IEEE 802.E)		FIBER NUMBER (PER DIRECTION/ PER CONNECTION)	TRANSCEIVER	CONNECTOR TYPE	FIBER TYPE	WAVE LENGTHS	RANGE (DEPENDENT ON TRANSCEIVER)
10 GBit Ethernet	10GBASE-LR	1/2	SFP	LC duplex	OS2	1310 nm	10 km
	10GBASE-SR	1/2	SFP	LC duplex	OM3	850 nm	100 m
					OM4		125 m
40 GBit Ethernet	40GBASE-LR4	1/2	SFP	LC duplex	OS2	WDM: 1270, 1290, 1310, 1330 nm	10 km
	40GBASE-SR4	4/8	QSFP	MPO8	OM3	850 nm	100 m
					OM4		150 m
100 GBit Ethernet	100GBASE-LR4	1/2	SFP	LC duplex	OS2	WDM: 1295, 1300, 1305, 1310 nm	10 km
	100GBASE-SR4	4/8	QSFP	MPO8	OM3	850 nm	100 m
					OM4		125 m
					OM3		100 m
	100GBASE-SR10	10/10	QSFP	2 x MPO12	OM4	850 nm	125 m
400 GBit Ethernet	400GBASE-DR4	4/8	QSFP-DD	MPO8	OS2	1310 nm	500 m
	400GBASE-SR8	8/16	QSFP-DD	MPO16	OM3	850 nm	70 m
					OM4		100 m

## Fiber type

		MULTIMODE			SINGLE MODE
	IEC 11801	OM3	OM4	OM5	OS2
Standard	IEC	60793-2-10 A1a.2	60793-2-10 A1a.3	60793-2-10 A1a.4	60793-2-50 B.6_a2
	ITU-T			G.651.1	G.657.A2 and G.652.D
Fiber structure				50/125 μm	9/125 μm
Cable sheath color		aqua	violet	lime green	yellow

## Properties



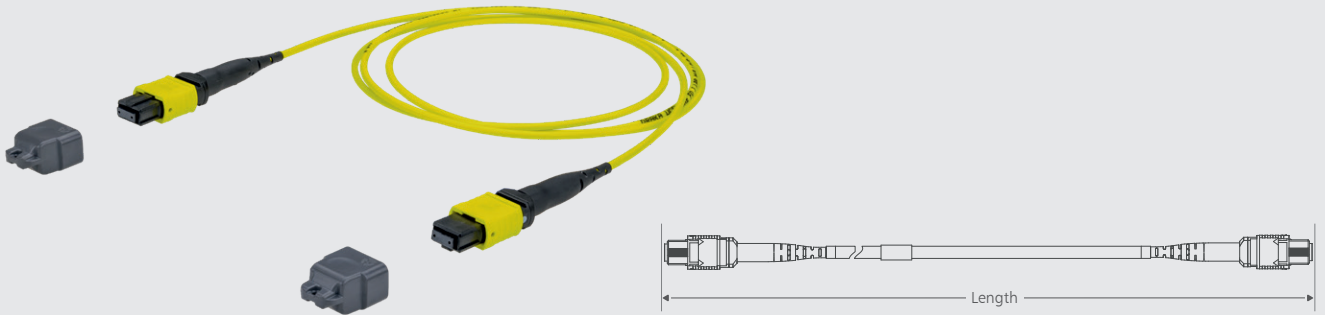
OPTICAL PROPERTIES			MTP ELITE®	MTP ELITE® PVP LEVEL 2
MM	Insertion loss (compared to master) <sup>1)</sup>	max.	0.35 dB	0.25 dB
	Return damping	PC polish	> 35 dB	> 35 dB
SM	Insertion loss (compared to master) <sup>1)</sup>	max.	0.35 dB	0.25 dB
	Return damping	APC polish	> 60 dB	> 70 dB

<sup>1)</sup> IEC61300-3-4 Method B, measured value applies to the individual connector

MECHANICAL PROPERTIES			MTP ELITE®
Standard		IEC	61754-7
		TIA/EIA	604-5
Color connector	OM3	PC polish	aqua
	OM4	PC polish	violet
	OM5	PC polish	lime green
	SM	APC polish	yellow
Tensile strength		min.	70 N

## Product variants

### OpDAT patch cord



## Description

- Patch cord with 8 or 12 fibers, pre-assembled on both sides with MTP® connectors
- Cable with aramid yarn, suitable for indoor applications. Available in Ø 2mm and Ø 3mm diameters, UV stabilized, flame retardant and halogen free
- Female connectors (without pins) by default. Variants with male connectors (with pins) are available as well
- For the assignment variants polarity A, B or C are available

## Assignment variants

### Polarity A



### Polarity B



### Polarity C





## Ordering information

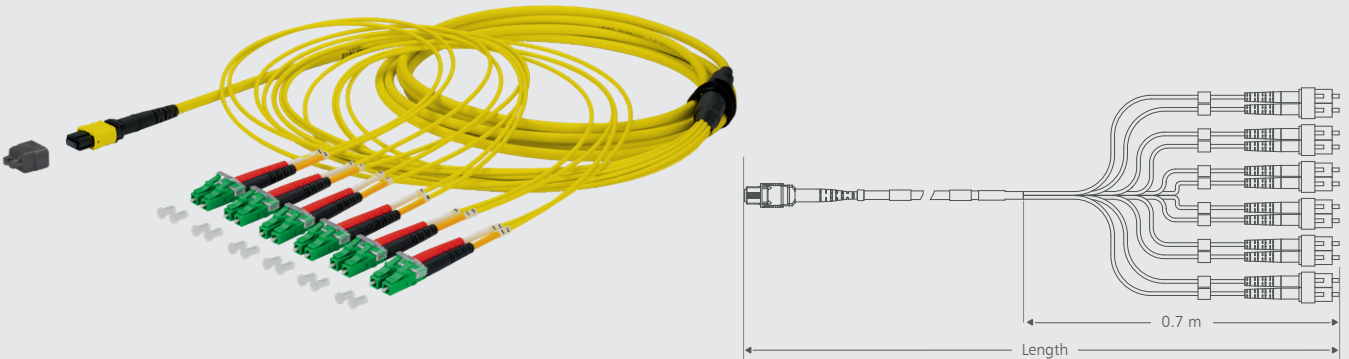
FIBER TYPE	FIBER NUMBER	CONNECTOR A	CONNECTOR B	CABLE	LENGTH	P/N POLARITY A	P/N POLARITY B
OS2	12	MTP12-F	MTP12-F	Ø 2.0 mm	1 m	151PATFTF010A	151PATFTF010B
					2 m	151PATFTF020A	151PATFTF020B
					3 m	151PATFTF030A	151PATFTF030B
					5 m	151PATFTF050A	151PATFTF050B
					10 m	151PATFTF0A0A	151PATFTF0A0B
OM5	12	MTP12-F	MTP12-F	Ø 2.0 mm	1 m	151RATFTF010A	151RATFTF010B
					2 m	151RATFTF020A	151RATFTF020B
					3 m	151RATFTF030A	151RATFTF030B
					5 m	151RATFTF050A	151RATFTF050B
					10 m	151RATFTF0A0A	151RATFTF0A0B
OM4	12	MTP12-F	MTP12-F	Ø 2.0 mm	1 m	151SATFTF010A	151SATFTF010B
					2 m	151SATFTF020A	151SATFTF020B
					3 m	151SATFTF030A	151SATFTF030B
					5 m	151SATFTF050A	151SATFTF050B
					10 m	151SATFTF0A0A	151SATFTF0A0B
OS2	8	MTP8-F	MTP8-F	Ø 2.0 mm	1 m	151PD8F8F010A	151PD8F8F010B
					2 m	151PD8F8F020A	151PD8F8F020B
					3 m	151PD8F8F030A	151PD8F8F030B
					5 m	151PD8F8F050A	151PD8F8F050B
					10 m	151PD8F8F0A0A	151PD8F8F0A0B
OM5	8	MTP8-F	MTP8-F	Ø 2.0 mm	1 m	151RD8F8F010A	151RD8F8F010B
					2 m	151RD8F8F020A	151RD8F8F020B
					3 m	151RD8F8F030A	151RD8F8F030B
					5 m	151RD8F8F050A	151RD8F8F050B
					10 m	151RD8F8F0A0A	151RD8F8F0A0B
OM4	8	MTP8-F	MTP8-F	Ø 2.0 mm	1 m	151SD8F8F010A	151SD8F8F010B
					2 m	151SD8F8F020A	151SD8F8F020B
					3 m	151SD8F8F030A	151SD8F8F030B
					5 m	151SD8F8F050A	151SD8F8F050B
					10 m	151SD8F8F0A0A	151SD8F8F0A0B

You will find all available variants in our configurator on our homepage [www.metz-connect.com](http://www.metz-connect.com). You can configure the cable according to your individual needs and order it directly.



## Product variants

### OpDAT fanout cables



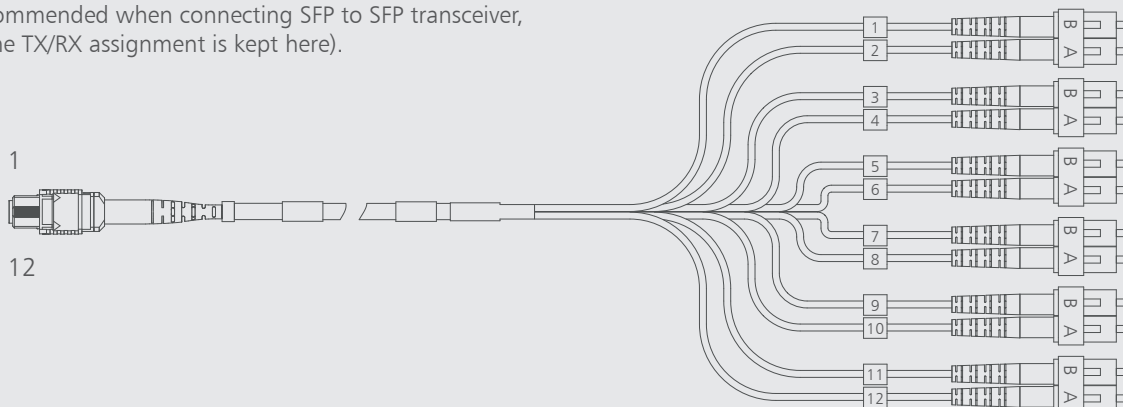
## Description

- › Fanout cables with 8 or 12 fibers, pre-assembled with an MTP®-connector and 4 or 6 duplex connectors (LC, SC, E2000)
- › Cable with aramid yarn, suitable for indoor applications. Available diameters include Ø 3.0 mm and Ø 4.5 mm. UV-stabilized, flame retardant and halogen-free
- › Plastic divider as interface to fanout, consisting of single cables with Ø 2 mm, length 0.7 m
- › Polarity A or B is available for the assignment variants
- › for patching we recommend using the 3.0 mm cable together with a female connector (without pins)
- › for a trunk cable we recommend using the 4.5 mm cable together with a male connector (without pins). A pulling aid incl. fixing set is an available option on the MTP side

## Assignment variants

### Polarity A

(recommended when connecting SFP to SFP transceiver, as the TX/RX assignment is kept here).



# Ordering information

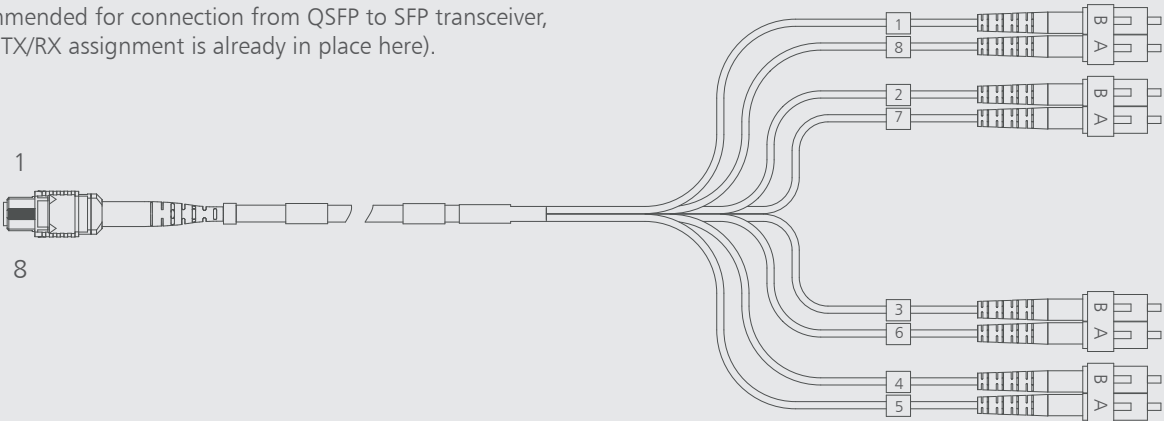
FIBER TYPE	FIBER NUMBER	CONNECTOR A	CONNECTOR B	CABLE	LENGTH	P/N POLARITY A	P/N POLARITY B
OS2	12	MTP12-F	LC-D APC	Ø 3.0 mm	2 m	152PBTfJA220EA	152PBTfJA220EB
			LC-D UPC			152PBTfJO220EA	152PBTfJO220EB
			E2000-D APC			152PBTfMA220EA	152PBTfMA220EB
			E2000-D UPC			152PBTfMO220EA	152PBTfMO220EB
OM5	12	MTP12-F	LC duplex	Ø 3.0 mm	2 m	152RBTfJO220EA	152RBTfJO220EB
			E2000 duplex			152RBTfMO220EA	152RBTfMO220EB
OM4	12	MTP12-F	LC duplex	Ø 3.0 mm	2 m	152SBTfJO220EA	152SBTfJO220EB
			E2000 duplex			152SBTfMO220EA	152SBTfMO220EB
OS2	8	MTP8-F	LC-D APC	Ø 3.0 mm	2 m	152PC8fJA220EA	152PC8fJA220EB
			LC-D UPC			152PC8fJO220EA	152PC8fJO220EB
			E2000-D APC			152PC8fMA220EA	152PC8fMA220EB
			E2000-D UPC			152PC8fMO220EA	152PC8fMO220EB
OM5	8	MTP8-F	LC duplex	Ø 3.0 mm	2 m	152RC8fJO220EA	152RC8fJO220EB
			E2000 duplex			152RC8fMO220EA	152RC8fMO220EB
OM4	8	MTP8-F	LC duplex	Ø 3.0 mm	2 m	152SC8fJO220EA	152SC8fJO220EB
			E2000 duplex			152SC8fMO220EA	152SC8fMO220EB

You will find all available variants in our configurator on our homepage [www.metz-connect.com](http://www.metz-connect.com). You can configure the cable according to your individual needs and order it directly.



## Polarity B

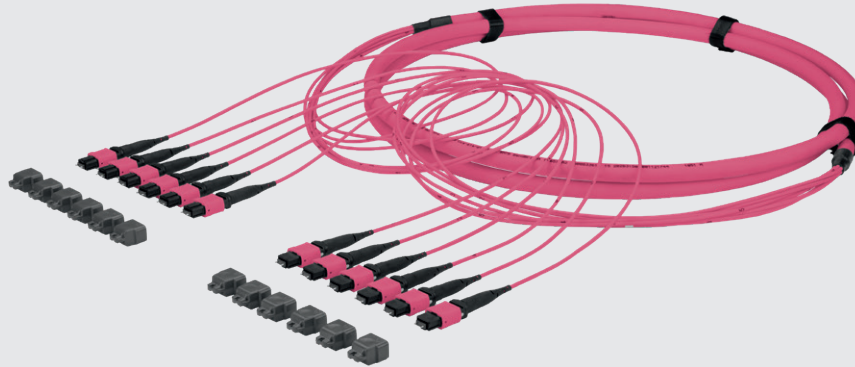
(recommended for connection from QSFP to SFP transceiver, as the TX/RX assignment is already in place here).





## Product variants

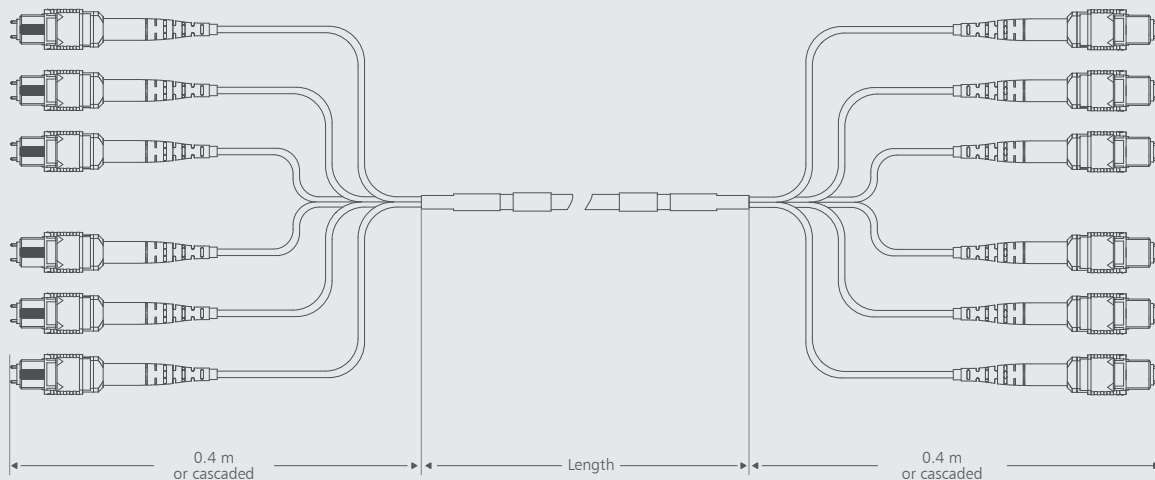
### OpDAT trunk cable – with breakout cable



## Description

- Trunk cable with 8 to 72 fibers, pre-assembled on both sides with MTP® connectors
- Breakout cable with aramid yarn, suitable for indoor applications. Diameters of Ø 4.5 mm to 9.6 mm available. UV-stabilized, flame retardant and halogen-free
- Fanout cable, consisting of single cables with Ø 2 mm. Length of 0.4 m or cascaded when using a pulling aid
- Fanout protection variants are an option on one or both sides
- Polarity A or B is available for the assignment variants

## Cable design



## Product variants

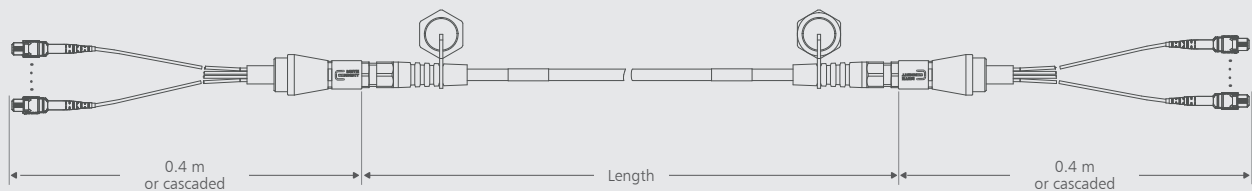
### OpDAT trunk cable – with universal cable



## Description

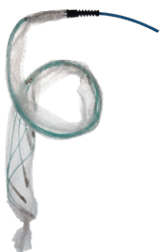
- Trunk cable with 8 to 96 fibers, pre assembled on both sides with MTP® connectors
- Universal cable with loose tube design, suitable for outdoor and indoor applications. Diameter from Ø 7.3 mm to 12.8 mm available. UV-stabilized, metal-free, rodent-proof, longitudinally watertight, flame resistant and halogen-free
- robust aluminum cable divider as interface to the fanout cables. Can be fixed with screws or snapped into place
- Fanout cable, consisting of single cables of Ø 3 mm. Length of 0.4 m or cascaded when using a pulling aid
- Polarity A or B is available for the assignment variants
- Fanout protection variants are an option on one or both sides

## Cable design



## Fanout protection variants

Bubble wrap



Protection net



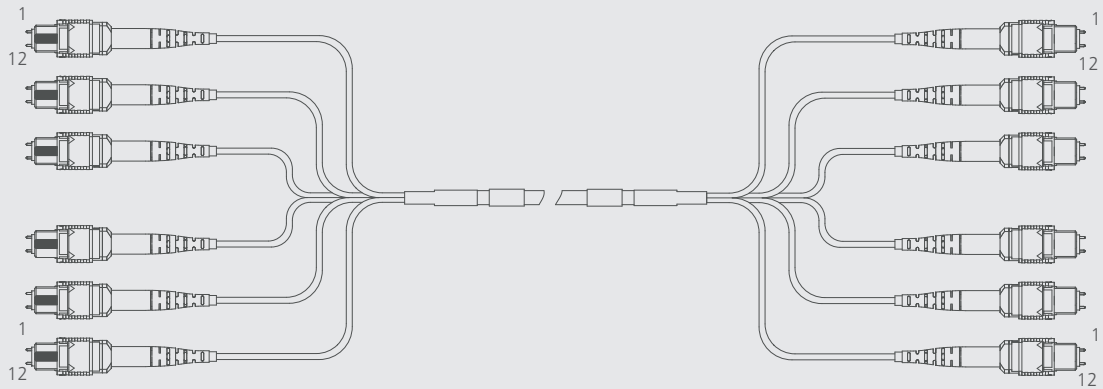
Pulling aid



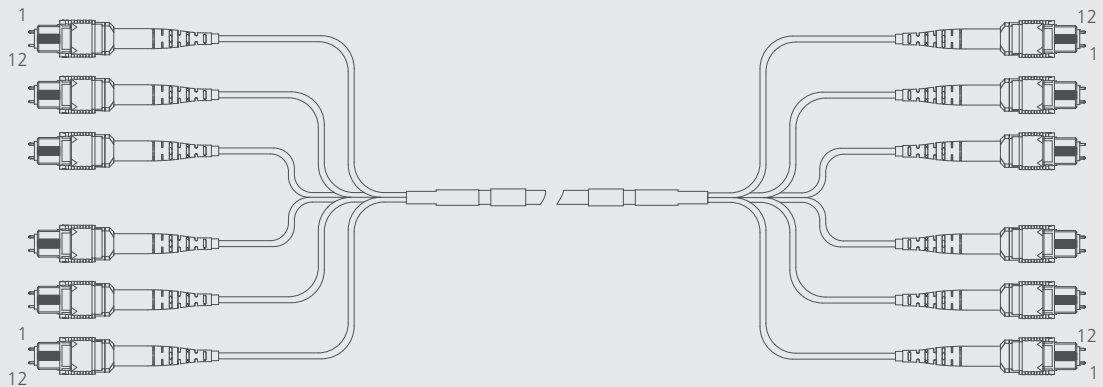
## OpDAT trunk cable

### Assignment variants

Polarity A



Polarity B



All MTP® trunk cable variants can be found in our configurator.  
You will find them on our homepage [www.metz-connect.com](http://www.metz-connect.com).

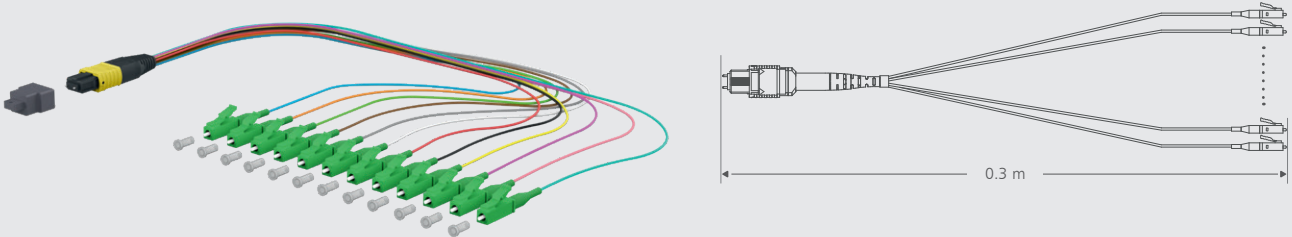






## Product variants

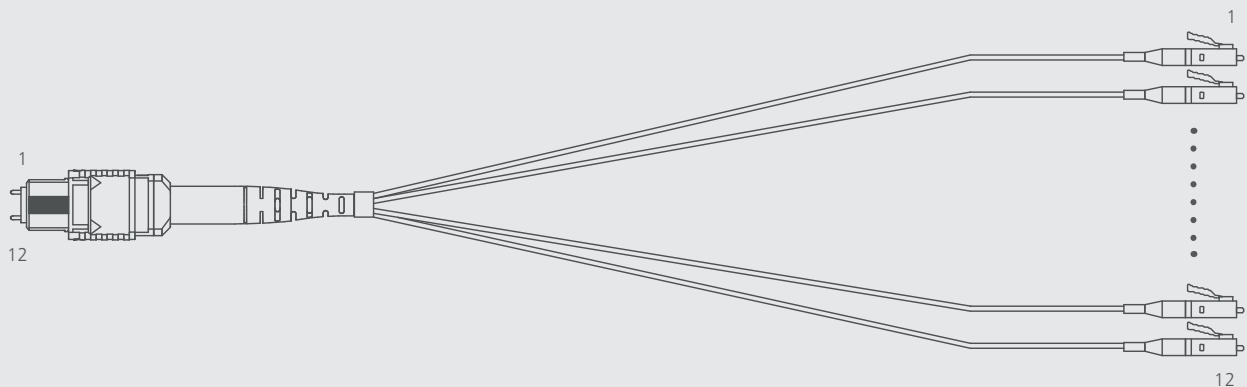
### OpDAT buffer fanouts



## Description

- > Buffer fanout with 8 or 12 fibers, assembled with an MTP® connector and 8 or 12 Simplex connectors
- > Core diameter Ø 0,9 mm, color-coded according to TIA/EIA 598
- > for direct installation in distribution housing
- > As default with male connector (with pins) and a length of 0.3 m
- > Polarity A is available for the assignment variants

## Assignment variants



Color sequence according to TIA/EIA 598

for 12 fibers



for 8 fibers

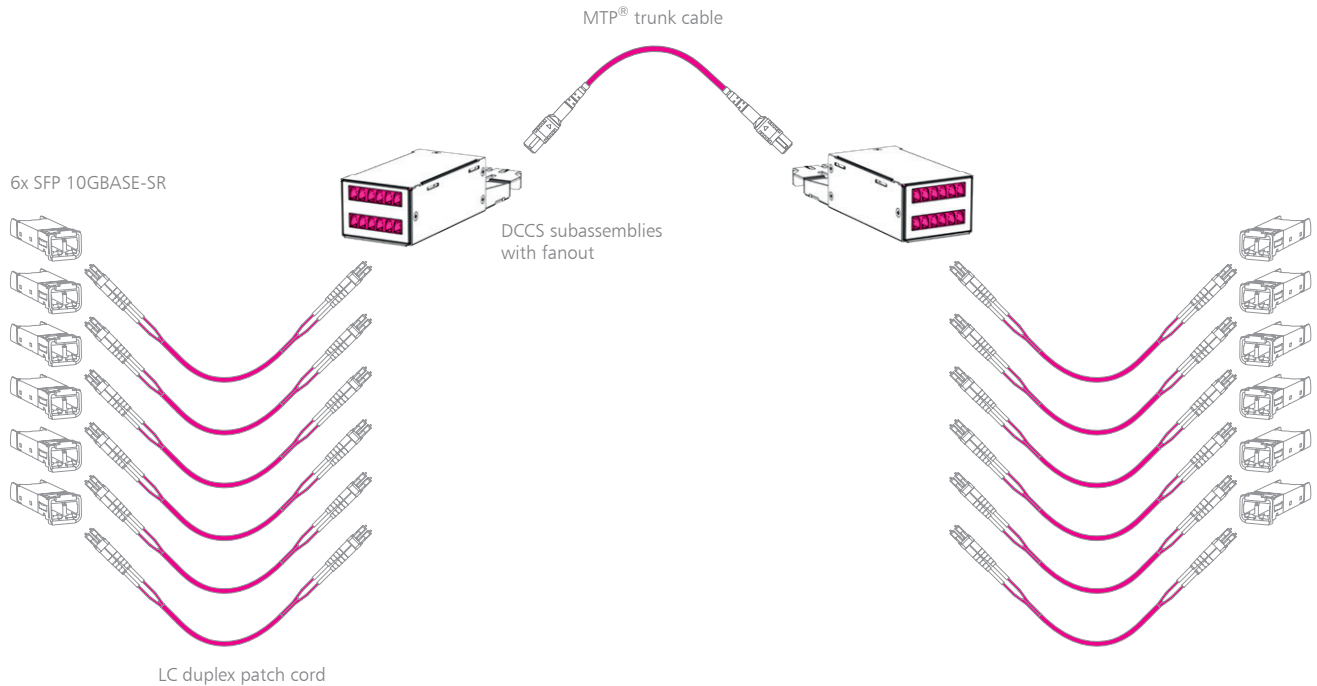


## Ordering information

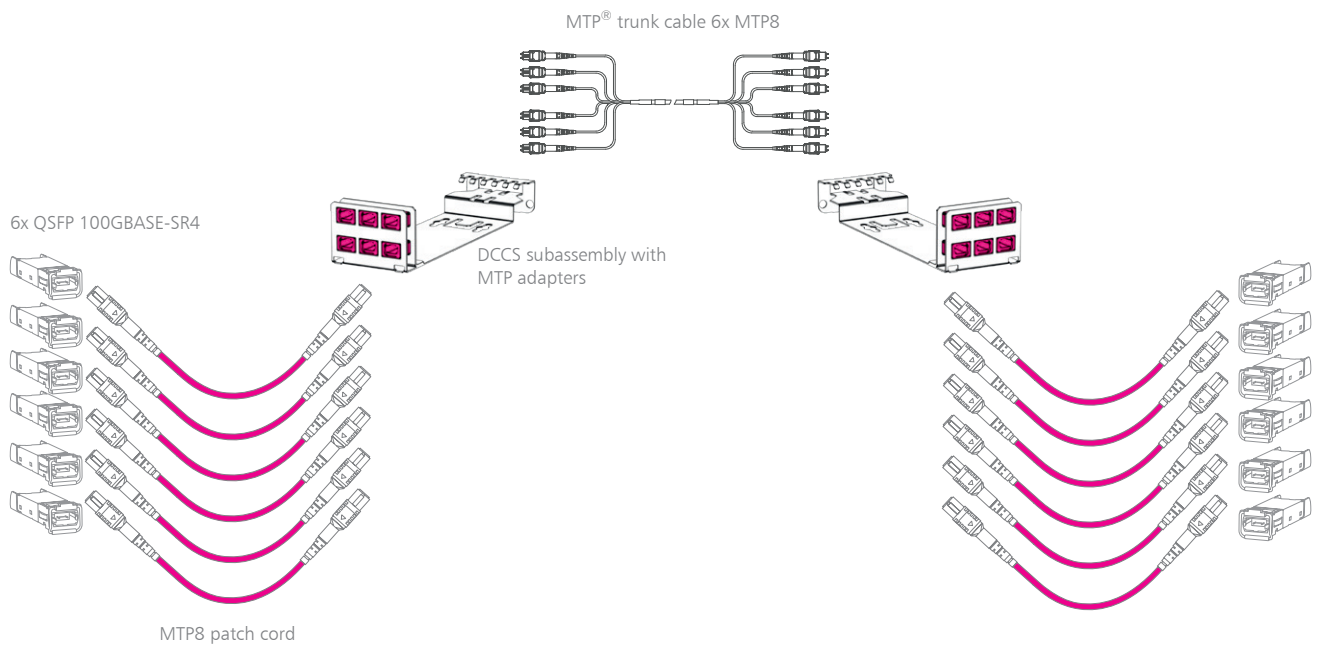
FIBER TYPE	FIBER NUMBER	CONNECTOR A	CONNECTOR B	CABLE	LENGTH	P/N POLARITY A
OS2	12	MTP12-M	LC APC	Ø 0.9 mm	0.3 m	151P5TMJA003A
			LC UPC			151P5TMJO003A
			E2000 APC			151P5TMMA003A
			E2000 UPC			151P5TMMO003A
OM5	12	MTP12-M	LC	Ø 0.9 mm	0.3 m	151R5TMJO003A
			E2000			151R5TMMO003A
OM4	12	MTP12-M	LC	Ø 0.9 mm	0.3 m	151S5TMJO003A
			E2000			151S5TMMO003A
OS2	8	MTP8-M	LC APC	Ø 0.9 mm	0.3 m	151P48MJA003A
			LC UPC			151P48MJO003A
			E2000 APC			151P48MMA003A
			E2000 UPC			151P48MMO003A
OM5	8	MTP8-M	LC	Ø 0.9 mm	0.3 m	151R48MJO003A
			E2000			151R48MMO003A
OM4	8	MTP8-M	LC	Ø 0.9 mm	0.3 m	151S48MJO003A
			E2000			151S48MMO003A

## Application scenarios with the DCCS system

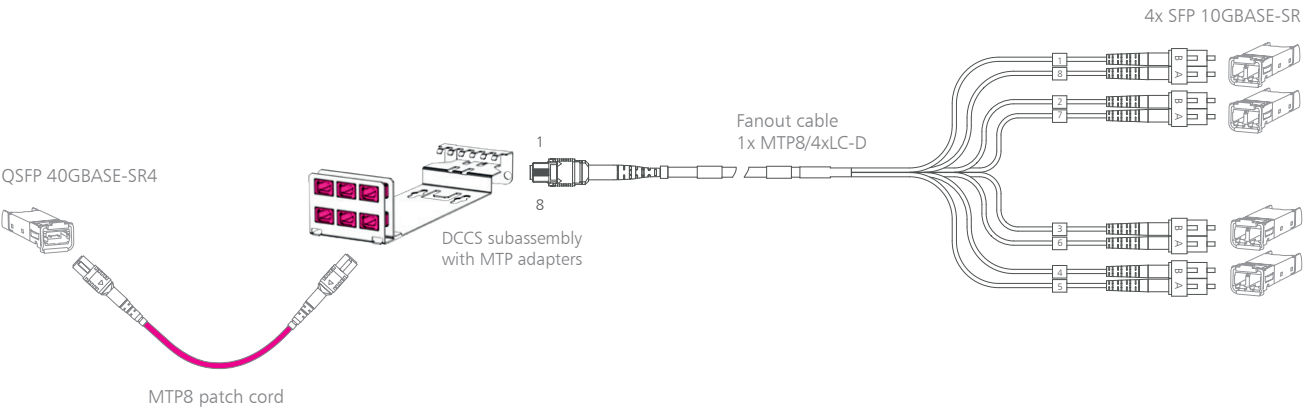
### 10GBASE-SR



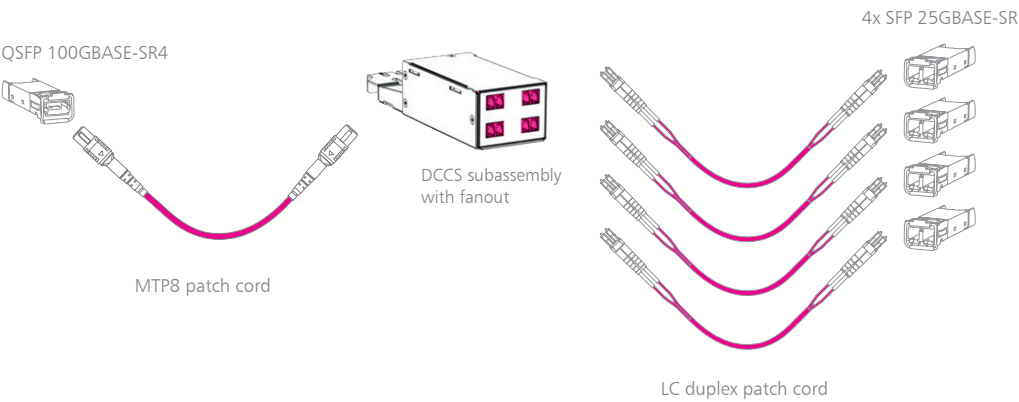
### 100GBASE-SR4



40GBASE-SR4






100GBASE-SR4








## Accessories

Separable cable glands, suitable for mounting afterwards on trunk cables:

	PRODUCT NAME	P/N
	Cable gland M20, separable	150811TM20-E
	Cable gland M25, separable	150811TM25-E
	Cable gland M32, separable	150811TM32-E

## Cleaning tool

	PRODUCT NAME	P/N
	CLETOP-MPO cleaning cassette	150800113-E
	CLETOP-MPO replacement rollers	150800114-E
	Ferrule cleaner MPO Fujikura	150800120-E

OpDAT adapters

FIBER TYPE	COLOR	P/N KEY UP /KEY DOWN (TYPE A)	P/N KEY UP/KEY UP (TYPE B)
			
OS2	green	1509009MA-I	-
OM5	lime green	1509008MA-I	1509008MB-I
OM4	violet	1509007MA-I	1509007MB-I
OM3	aqua	1509005MA-I	1509005MB-I

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