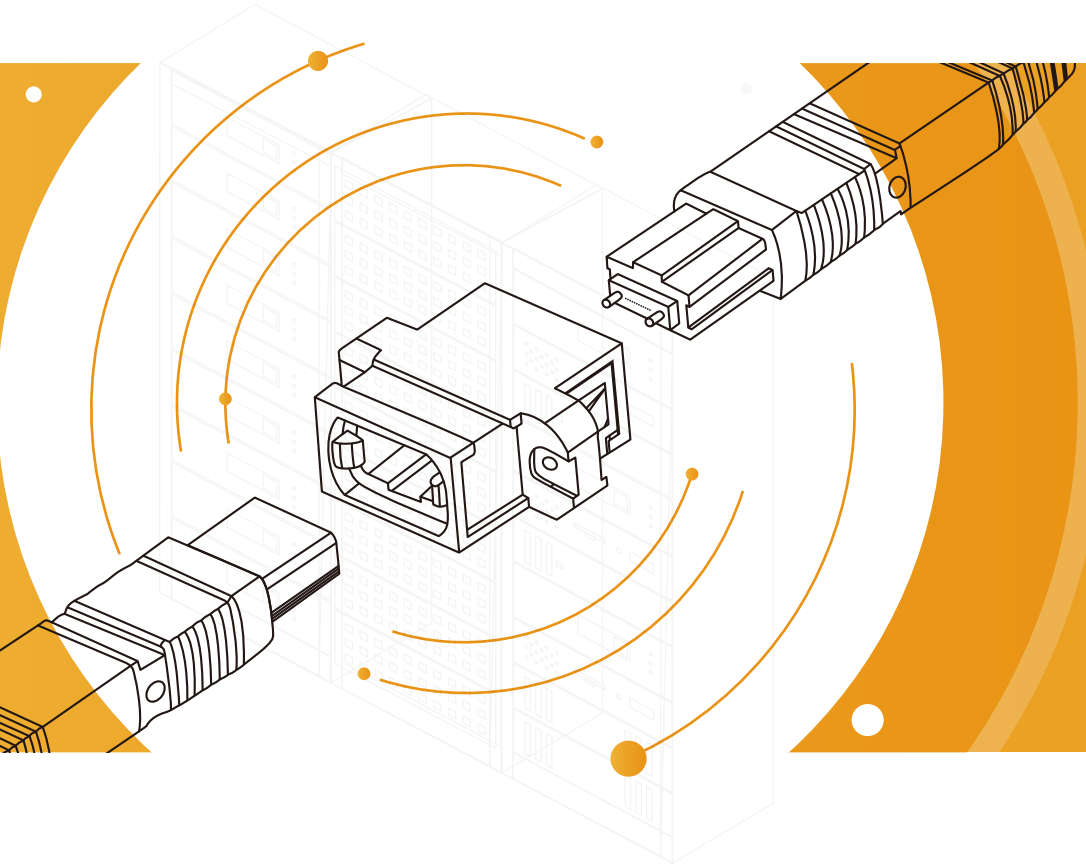
SINDA



HIGH-DENSITY

MPO / MTP

CABLING SYSTEM PRODUCT MANUAL

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03

MPO CONNECTORS & ADAPTERS

MPO Introduction：

MPO (Multi-fiber Push On) fiber optic connector is a type of multi-core fiber optic connector. MPO is the abbreviation of English Multi Push On, which is adopted by IEEE standard as a type of connector for 40 G/100G transmission.

MPO connectors usually have 12-core fibers in a row, which can support one or more columns of fibers in the same MPO connector. The standard is IEC 61754-7 and is divided into one column according to the number of cores discharged in the connector (12 cores).), multiple columns (24 cores).

The MPO connector type is distinguished by several factors according to IEC 61754-7: number of cores (Array Number), male-Female, polarity, polishing type (PC or APC), Applicable wire diameter type (bund le or ribbon cable).

MPO Advantage：

Small size, smaller than SC fiber connector

High precision,precision MT guiding pins and guiding holes ensu re precise fiber alignment

High density, is able to support 12 ~ 96 core fiber connection.

MPO Application range：

MPO high-density optical fiber pre-connection system is currently used in three major areas: high-density environment applications in data centers, fiber-to-building applications, and connection applications with in optical transceivers such as optical splitters, 40G, 100G, a nd QSFP+.

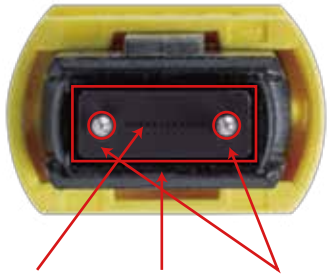
MPO High performance sealed circuit breaker

- Circuit for testing the transmit capability and receive sensitivity of network devices
- Meets Telcordia GR-1435-CORE and RoHS requirements

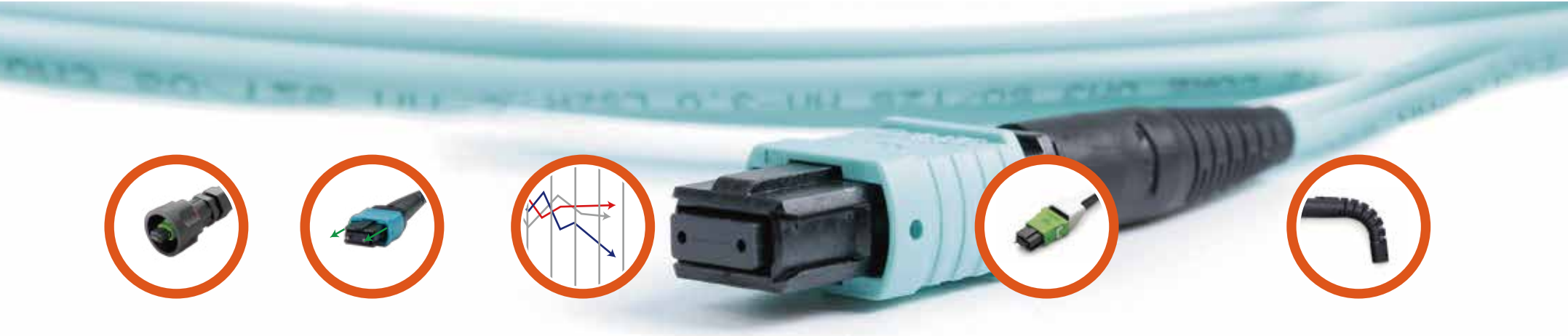
MT is an abbreviation of Mechanical Transfer, mechanical alignment transmis sion. He is a multi-core ferrule (conventional fiber is a single-core ferrule), the alignment accuracy of the MT ferrule directly affects the performance of the multi-core connector, and the alignment accuracy of the ferrule is determined by the eccentricity and spacing of the fiber.

The guiding pin (Pin needle) and the fiber matching accuracy are determined. Therefore, the MT ferrule and the MT ferrule forming process must have very high precision, and the shape and tolerance of the PIN pin are also critical.

(MT Ferrule)



(Ribbon Fiber) (MT Ferrule) Guide pins (holes)



Outdoor MPO

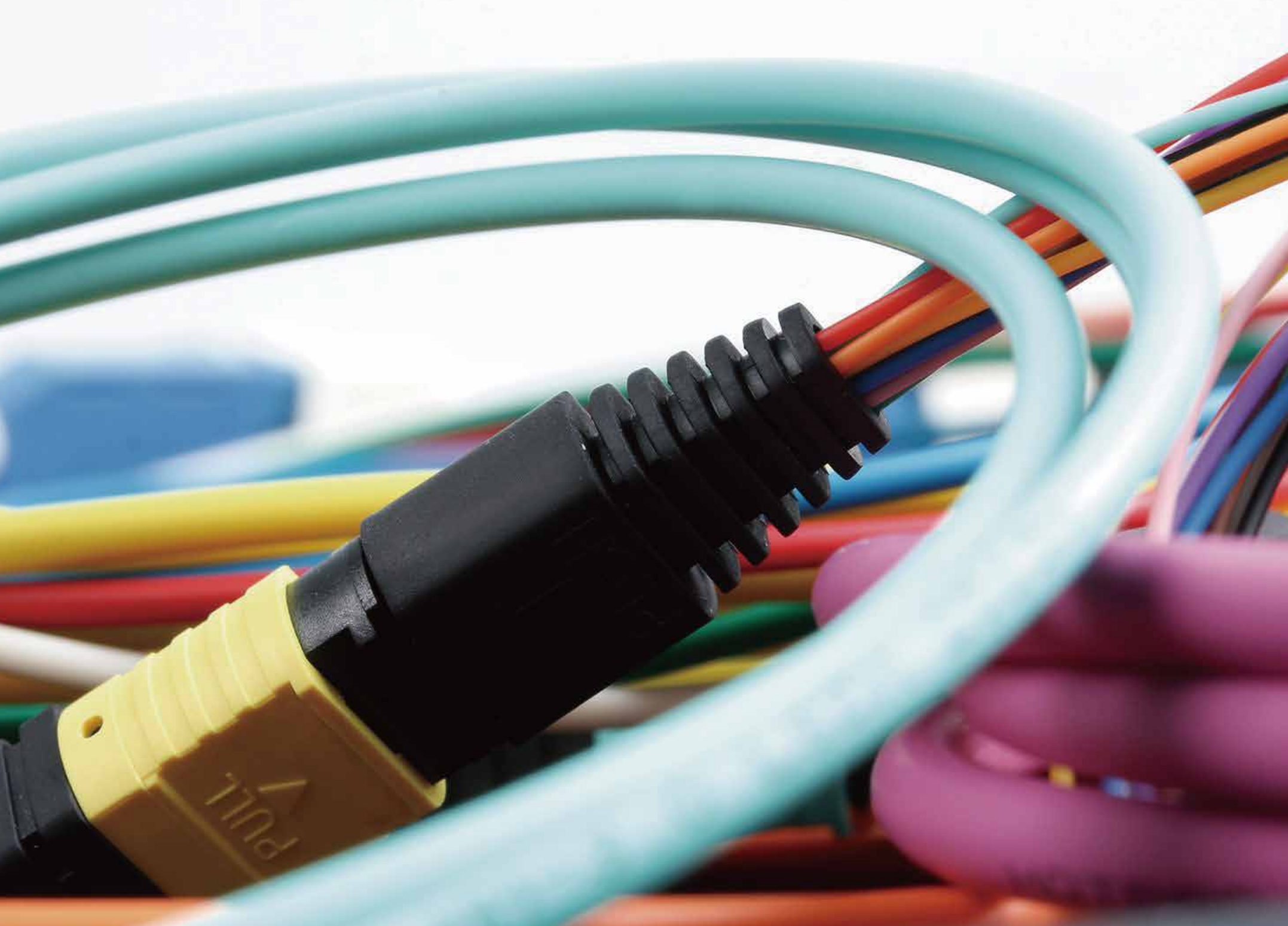
Detachable housing

Lower insertion loss

High density panel application

Multiple optional tail sleeves

Table of MPO ferrules				
Name	Aperture of ferrule (mm)	Aperture of pins (mm)	Concentricity error (mm)	Material
4MT (MM)	0.127±0.001	0.7±0.001	< 0.0025	PPS
8MT(MM)	0.127±0.001	0.7±0.001	< 0.0025	PPS
8MT(MM Low loss)	0.126+0.001/-0	0.7+0/-0.001	< 0.0014	PPS
8MT(SM)	0.125+0.001/-0	0.7+0/-0.001	< 0.0014	PPS
8MT(SM Low loss)	0.125+0.005/-0	0.6990	< 0.0007	PPS
12MT (MM)	0.127±0.001	0.7±0.001	< 0.0025	PPS
12MT (MM Low loss)	0.126+0.001/-0	0.7+0/-0.001	< 0.0014	PPS
12MT(SM)	0.125+0.001/-0	0.7+0/-0.001	< 0.0014	PPS
12MT(SM Low loss)	0.125+0.005/-0	0.6990	< 0.0007	PPS
24MT(MM)	0.127±0.001	0.7±0.001	< 0.0025	PPS
24MT(MM Low loss)	0.126+0.001/-0	0.7+0/-0.001	< 0.0014	PPS
24MT(SM)	0.125+0.001/-0	0.7+0/-0.001	< 0.0014	PPS
24MT(SM Low loss)	0.125+0.005/-0	0.6990	< 0.0007	PPS
48MT（MM）	0.127±0.001	0.7±0.001	< 0.0025	PPS
48MT (SM)	0.125+0.001/-0	0.7+0/-0.001	< 0.001	PPS


PULL

04

MPO/MTP PARTS CUSTOMIZATION

MPO connector of flat ribbon cable

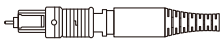
MPO connector of round bundle cable

MPO connector of round bundle cable

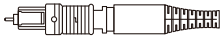
Such MPO connector is for round bundle cable only, and there're boots which are suitable for cables with different diameters: φ 2.0mm, φ3.0mm, φ3.6mm, φ4.5mm, φ5.0mm, φ5.5mm.

2.0mm Round Boots

2.0mm Boot with Crimp

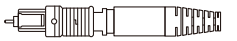


2.0mm Boot without Crimp

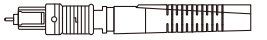


3.0mm Round Boots

3.0mm Boot

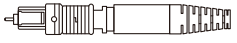


3.0mm Flex Angle

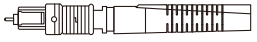


3.6mm Round Boots

3.6mm Boot

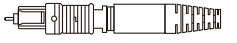


3.6mm Flex Angle



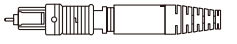
4.5/5.0/5.5 mm Round

4.5mm Boot



5.0mm Boot

5.5mm Boot

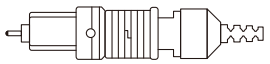


MPO connector of flat ribbon cable

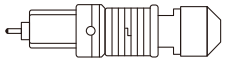
Such MPO connector is for flat ribbon cable only, and there type s: normal connector for flat ribbon cables, bare ribbon type, an d bare ribbon short type.

Ribbon Boots

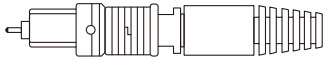
Bare Ribbon



Bare Ribbon Short



Flat Ribbon Cable



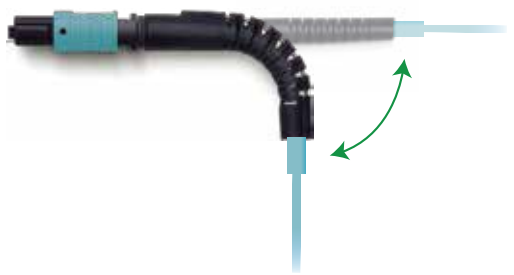
Ordinary panel

High density panel

- The density is increased 30%!
- The connector can be pulled out easily
- The push pull tap greatly sim - plify connectivity in the HD racks, then same spaces can hold more adapters and con - nectors.

As difference on boot and housing, there're these types for MPO connectors: Normal type, MPO-MINI Connector, High Density Push Pull Tab, and MPO Flex Angled Boot

MPO Flex Angled Boot



It's flexible at any direction of 0-90°.

MPO-MINI Connector

The total length is 37mm—shorter than normal connector.

High Density Push Pull Tab

The push pull tab allows high density rack applications

01
Fiber counts

02
Single mode or Multi mode

03
Round bundle cable or flat ribbon cable

04
With or without PIN (Male or Female)

05
Or special connectors, like types of HD,flex angled boot, and MINI connector.

06
A B C
Three polar methods: Type A (positive polarity), Type B (flip pair to correct polarity) and type C (cross polarity)

05

MPO ORDERING GUIDE

MPO branch fiber patch cord customization service

Male (with pin) Female head (without pins)

12 cores 8 cores

FC & ST FC & ST

OFNP LSZH

Male (with pin) Female head (without pins)

Round cable Flat cable

Connector specification

Usconec® MPO Connector		MM Elite® MT Ferrule	MM Standard MT Ferrule	SM Elite® MT Ferrule	SM Standard MT Ferrule
Insertion Loss (dB)	Typical	0.25 (All Fibers)	0.2 (All Fibers)	0.1 (All Fibers)	0.25 (All Fibers)
	Maximum	0.35 (Single Fiber)	0.60 (Single Fiber)	0.35 (Single Fiber)	0.75 (Single Fiber)
Return Loss(dB)		> 20	> 20	> 60 (8°Angle Polish)	> 60 (8°Angle Polish)
Exchangeability(dB)		≤0.3			
Durability(dB)		＜0.2（500Matings,per EIA-455-21A)			
Tensile Strength(dB)		≤0.3（Max 66N)			
Operating Temperature (℃)		-20~+60			
Storage Temperature (℃)		-40~+80			
Polarity		TIA-568-C.3 A, B, C			
Fiber Count		8,12, 24, 48, 72, 96 and 144			

Cable specification

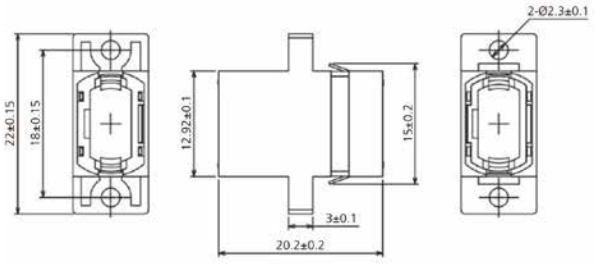
FIBER TYPE (ISO/IEC 11801 Nomendature)	OS2 (ITU 652.Dcompliant)	OM1	OM2	OM3	OM4
Core /Cladding Size (μm)	9/125	62.5/125	50/125	50/125	50/125
Wavelength (nm)	1310/1383/1550	850/1300	850/1300	850/1300	850/1300
Typical Attenuation (dB/km)	0.34/0.34/0.20	2.7/0.6	2.2/0.6	2.2/0.6	2.2/0.6
Minimum Over Field Launch (OFL) Bandwidth (MHz-km)	-- / -- / --	200/500	700/500	1500/500	3500/500
Laser Bandwidth/EMB (MHz-km)	-- / -- / --	-- / --	950/500	2000/ 500	4700/500
1 Gigabit Ethernet Distance (m)	5000 / -- / --	300/500	750/500	1000/600	1040/600
10 Gigabit Ethernet Distance (m)	10000 / -- / 40000	33 / --	150 / --	300 / --	550 / --
40 Gigabit Ethernet Distance (m)	-- / -- / --	-- / --	-- / --	140 / --	190 / --
100 Gigabit Ethernet Distance (m)	-- / -- / --	-- / --	-- / --	140 / --	190 / --

MPO adapter is used to connect MPO connectors.

There are these types: MPO simplex adapter with flange , MPO Sim plex adapter without flange ,

MPO 45° stackable adapter, and MPO normal stackable adapter.

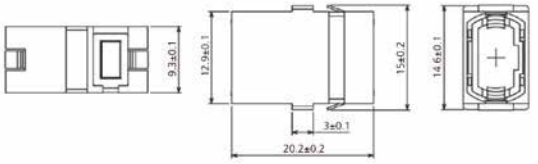
MPO Simplex adapter with flange



MPO 45° stackable adapter

This design makes it easier to have high-density installation, it also avoids harm of light to installers.

MPO Simplex adapter without flange



MPO normal stackable adapter

Stackable adapters for standard MPO panels and better meet the needs of increasingly encrypted system designs.

According to different materials, there're two types:MPO plastic adapter& MPO metal adapter.

Metal housing with flange

Metal housing without flange

MPO plastic adapter

MPO single port fiber optic adapter

MTP/MPO Fiber Adapter

According to difference of the Key, there're: MPO adapter with keys on same direction& MPO with keys on opposite direction, and MPO adapter with keys Interchangeable

MPO adapter with keys on same direction

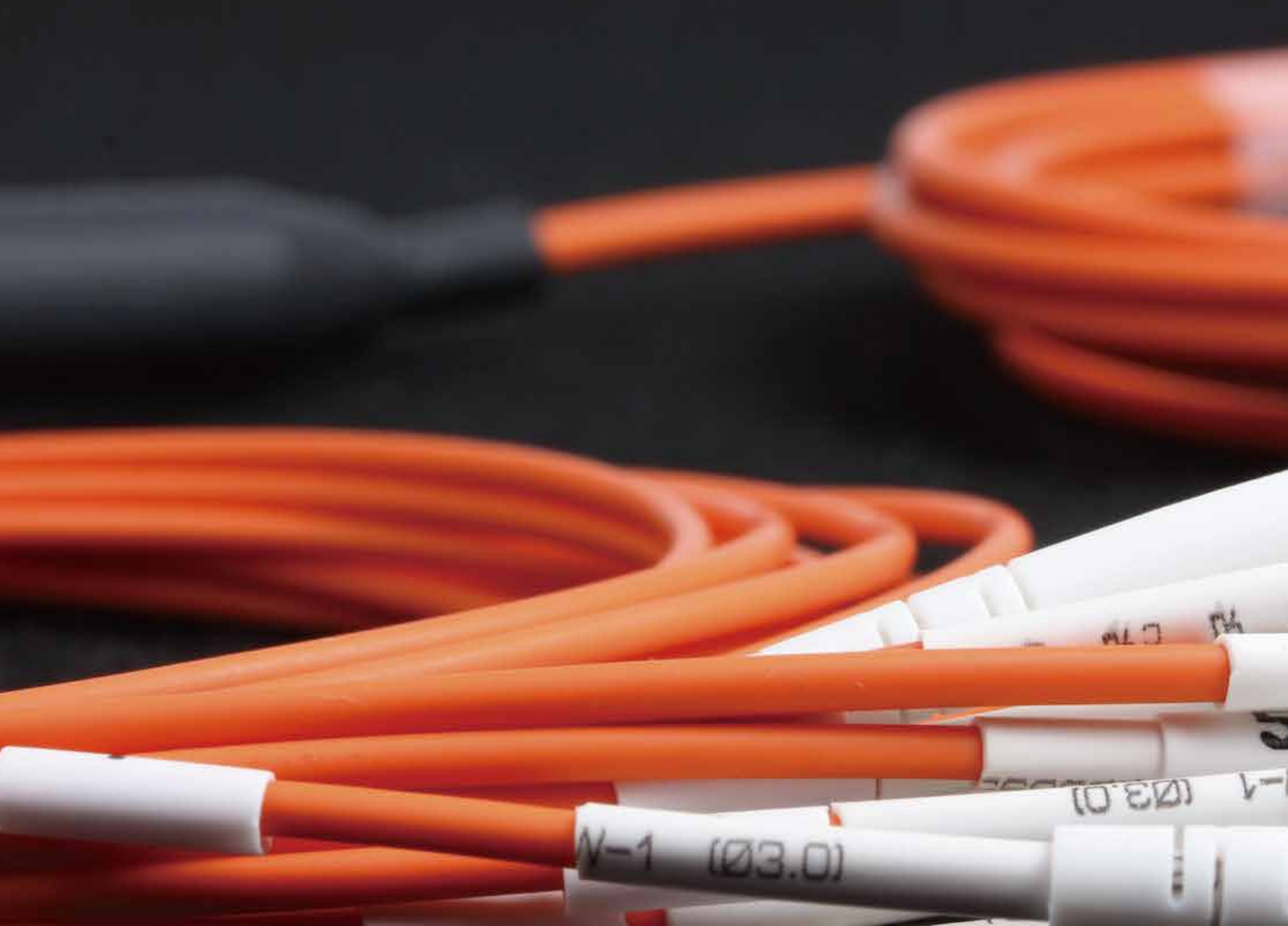
The keys are on the same direction

MPO with keys on opposite direction

The keys are on opposite direction

MPO adapter with keys Interchangeable

Polarities can be changed.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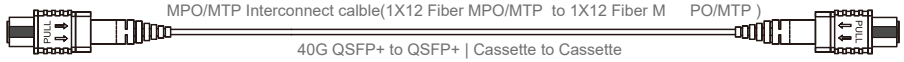
06

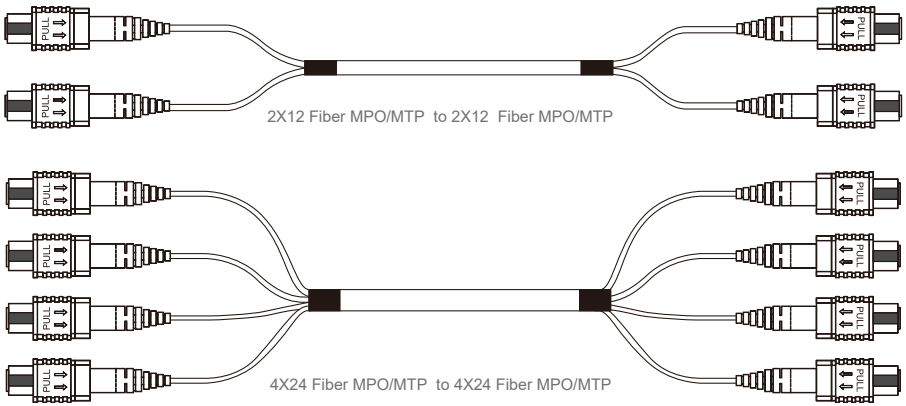
MPO TRUNK PATCH CORDS

MPO trunk patch cord is used for signal transmission, both sides are MPO connectors. Common cables are round type, and fiber counts are 12/24/36/48/72/144cores.

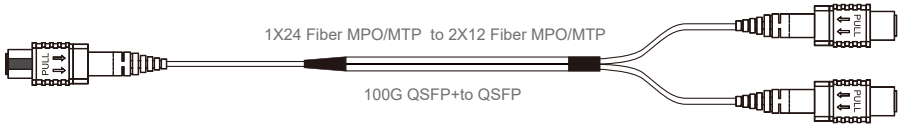
8/12/24cores-1*1 single tube



24/48/72/96/144cores-N*N multi- tubes



12/24/36 cores-1*N fanout multi-tubes



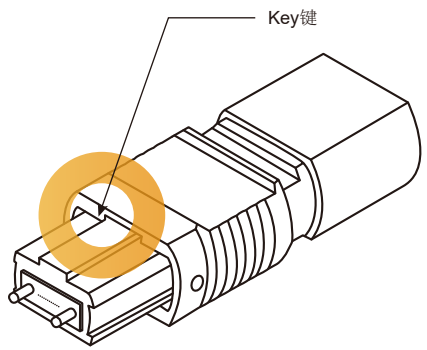
MPO STRUCTURE AND POLARITY INTRODUCTION

MPO Fanout Hybrid Patch cord is mainly used to connect QSFP and SFP modules, or MPO and the LC connectors. Normally OD of the fanout cables is 2.0mm.

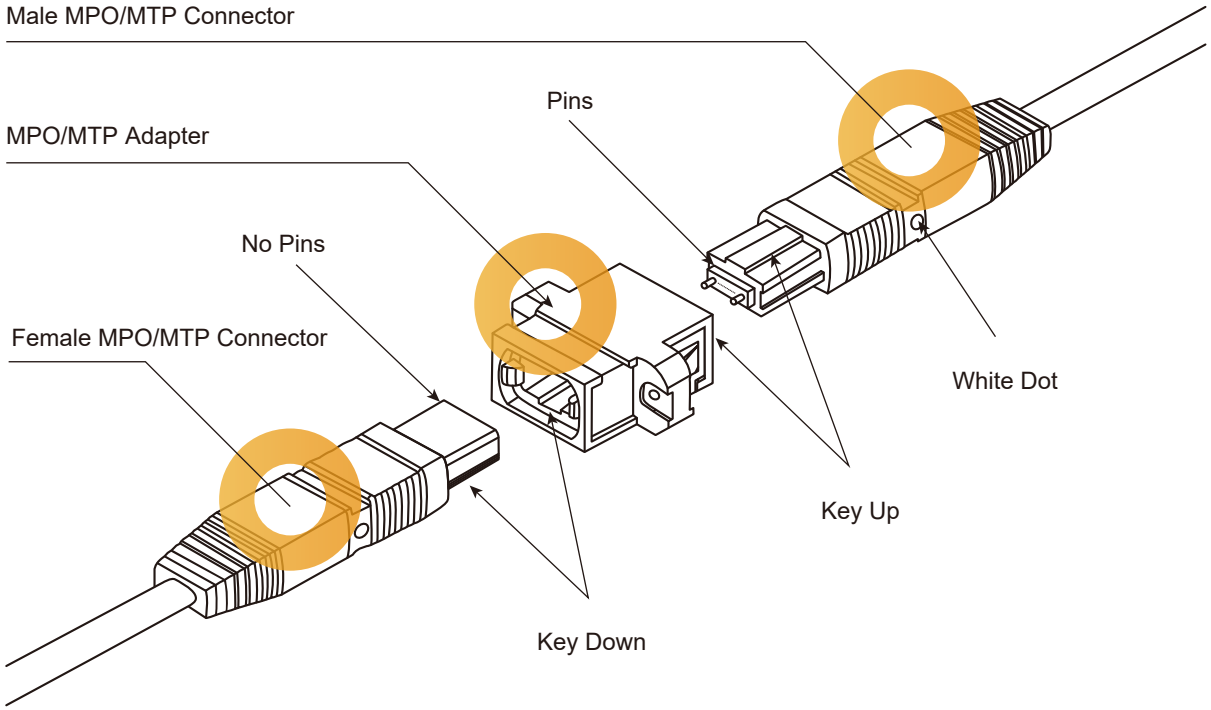
Connectors like LC and SC are frequently used in traditional cabling system, because such connectors do not have matter with polarity. But polarity of connecting systems like MTP/MPO is necessary, and we must be aware of this during installation.

Firstly, we must know keys' directions of the MPO connectors and adapters.

The MPO connector can be used for 2-12 core side-by-side fiber connections for up to two rows of 24-core fibers. the MPO/MTP fiber connector includes fiber, sheath, coupling assembly, metal ring, pin, dust cap, etc., and the pin portion is divided into male and female.



So direction of the keys is a standard to check polarity of the MPO-MPO patch cords.

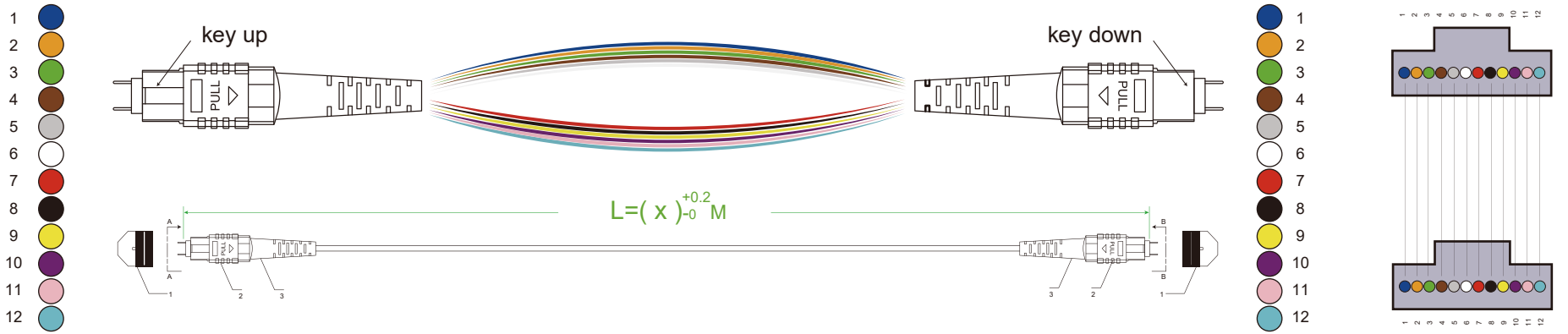


Like above picture- it's diagram for view of keys when MPO connector comes through MPO adapter, it's clear that there's a key on front of MPO connector, and there's a key groove inside the MPO adapter to match the
key of the MPO connector.

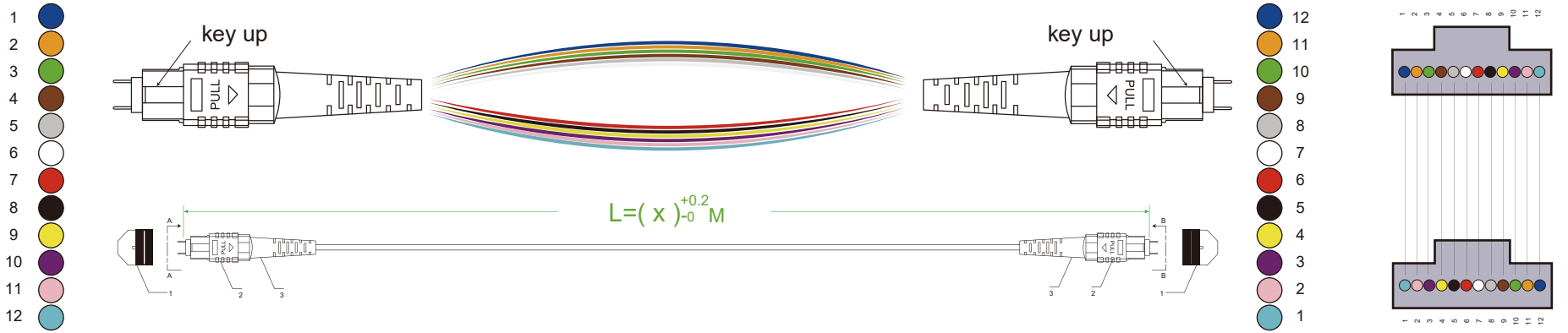
Keys on both sides of normal MPO adapter are on opposite positions, so when we connect the adapter with two MPO connectors, key of one of the MPO connectors is up, the other one is down.

There are three types of polarity: Type A (key up- key down), T ype B (key up - keyup/ key down- key down), and Type C (key up- key down in pairs).

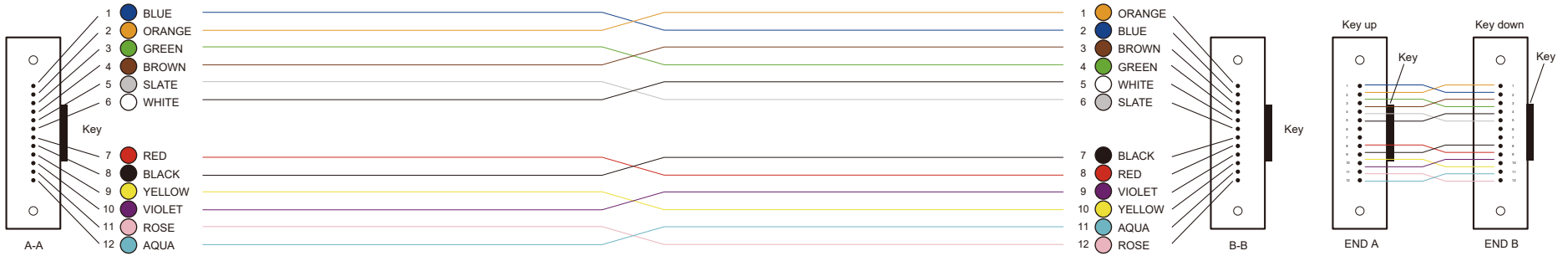
Type A (key up- key down)

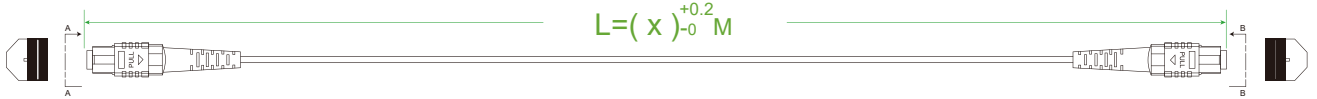


Type B (key up - key up/ key down- key down)



Type C (key up- key down in pairs)





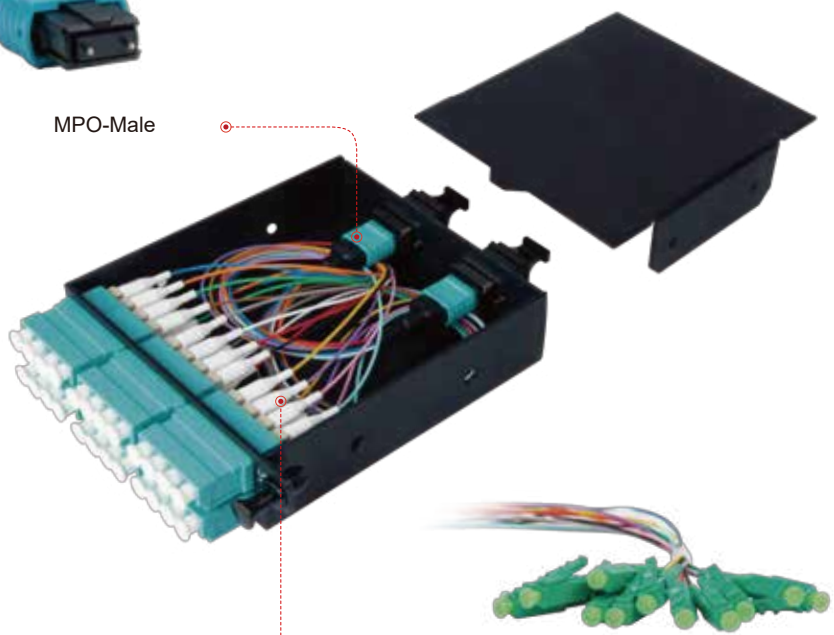
Ordering Information

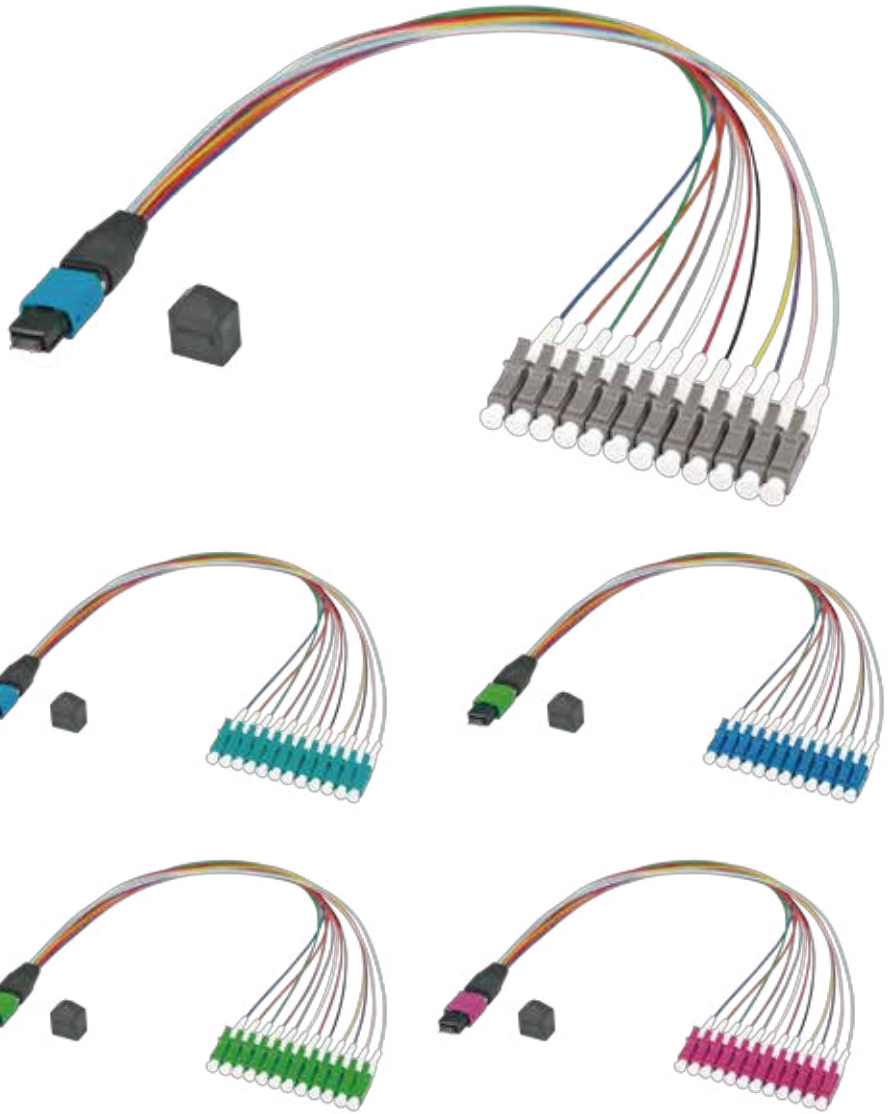
Fiber Counts	Connector A	Connector B	Loss Level	Polarity	Cable	Fiber Type	Cable Jacket
8	SM/UPC 12C 母	SM/UPC 12C 母	Standard loss	A Polarity	Mini bundle cable	SM-9/125-G652D	OFNP
12	SM/APC 12C 母	SM/APC 12C 母	Standard Loss	TIA-568-C.3A	Ribbon cable	SM-9/125-G657A1	OFNR
24	SM/UPC 24C 母	SM/UPC 24C 母	≤0.7dB	B Polarity	Bare ribbon cable	SM-9/125-G657A2	LSZH
36	SM/APC 24C 母	SM/APC 24C 母	Low loss	TIA-568-C.3B		MM-62.5/125-OM1	
48	MM/UPC 12C 母	MM/UPC 12C 母	Low Loss	C Polarity		MM-50/125-OM3-150	
72	MM/UPC 24C 母	MM/UPC 24C 母	≤0.35dB	TIA-568-C.3C		MM-50/125-OM3-300	
96	SM/UPC 12C 公	SM/UPC 12C 公				MM-50/125-OM4-550	
144	SM/APC 12C 公	SM/APC 12C 公					
	SM/UPC 24C 公	SM/UPC 24C 公					
	SM/APC 24C 公	SM/APC 24C 公					
	MM/UPC 12C 公	MM/UPC 12C 公					
	MM/UPC 24C 公	MM/UPC 24C 公					

07

MPO HARNESS MODULE HYBRID PATCH CORDS

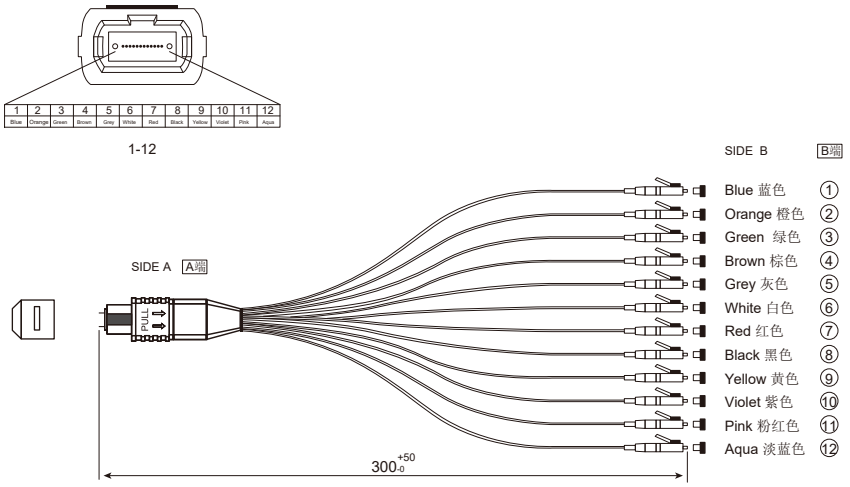
MPO Harness module Hybrid Patch cords are used in MPO cassette only. Such patch cords are short, and OD of the fan-out cables are sm all. Normally it's φ0.9mm, and the MPO connector is male.



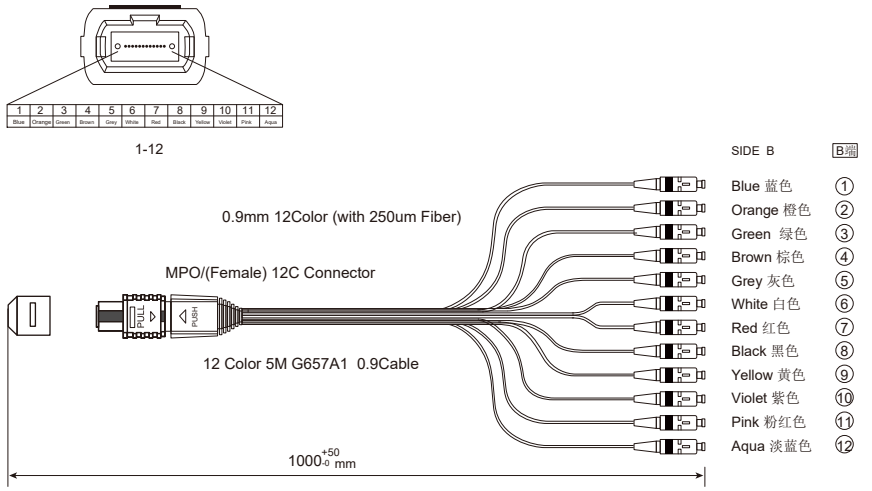


MPO Harness module Hybrid Patch cords

Drawing for MPO Harness 12cores module Hybrid Patch cords(To LC)



Drawing for MPO Harness 12cores module Hybrid Patch cords(To LC)



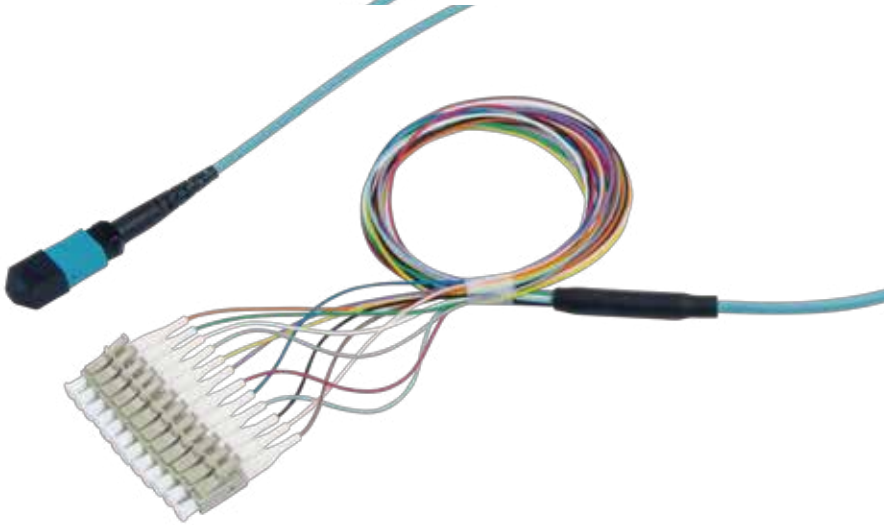
Ordering Information

Fiber Counts	Connector A	Connector B	Loss Level	Polarity	Cable	Fiber Type	Cable Jacket
8	SM/UPC 12C 公	LC/UPC SM	Standard loss	IH-MPO-A	Mini bundle cable	SM-9/125-G652D	OFNP
12	SM/APC 12C 公	LC/UPC MM	Standard Loss	Fixed plug-in module box	Ribbon cable	SM-9/125-G657A1	OFNR
24	SM/UPC 24C 公	LC/APC SM	≤0.7dB	IH-MPO-B	Bare ribbon cable	SM-9/125-G657A2	LSZH
	SM/APC 24C 公	SC/UPC SM	Low loss	Fixed plug-in module box		MM-62.5/125-OM1	
	MM/UPC 12C 公	SC/APC SM	Low Loss	IH-MPO-C		MM-50/125-OM2	
	MM/UPC 24C 公	SC/UPC MM	≤0.35dB	Fixed plug-in module box		MM-50/125-OM3-150	
						MM-50/125-OM3-300	
						MM-50/125-OM4-550	

08

MPO Fanout Hybrid Patch cord

MPO Fanout Hybrid Patch cord is mainly used to connect QSFP and SFP modules, or MPO and the LC connectors. Normally OD of the fanout cables is 2.0mm.



MPO single tube jumper

MPO branch multi-tube jumper

MPO Fanout Transfer Jumper

MPO Fanout Transfer multi-tube jumper

09

MPO OUTDOOR WATERPROOF CABLING SYSTEM

For special high density multi-core cabling system, like FTTA base station, RRU-BBU, emer - gent telecommunication repair and temporary multi-core wiring,We develops two types of MPO outdoor waterproof connector.

RMC-MPO(metal)

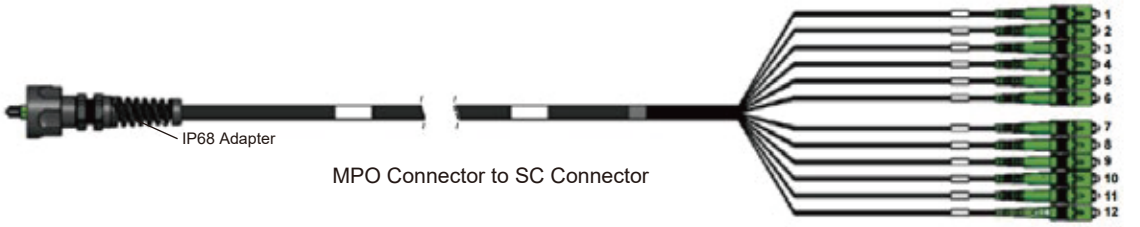
Fiber Cable for ODVA-MPO

Fiber Cable for ODVA-MPO

ODVA-MPO Fanout Patch Cord- Indoor

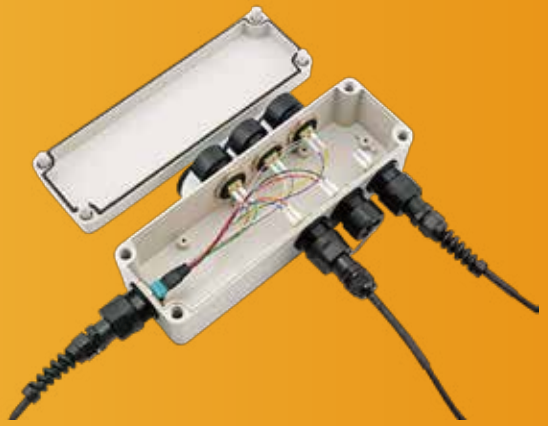
ODVA-MPO Fanout Patch Cord- Outdoor

MPO Connector to MPO Connector



MPO Connector to SC Connector

ODVA-MPO Waterproof Box



ODVA-MPO Waterproof Box

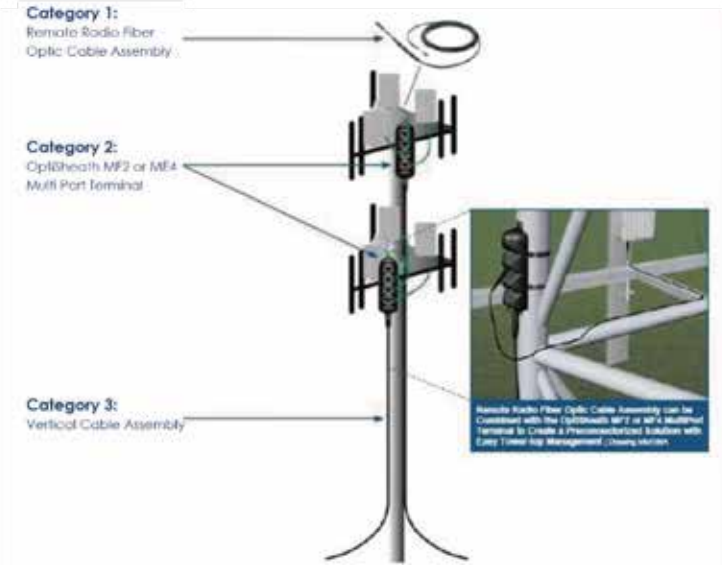
ODVA-MPO Waterproof Box

RMC-MPO Waterproof Connector

RMC-MPO Plug

RMC-MPO Socket

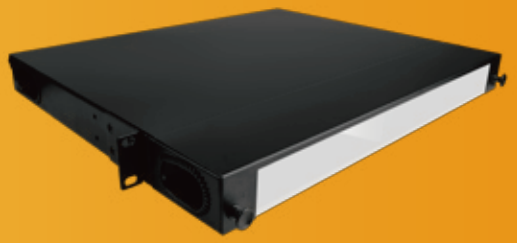
ODVA-MPO，RMC-MPO Applications



汉维通信

HW-MPO-A

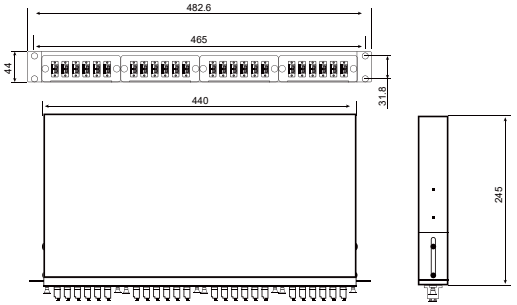
Both panel and cassette are made with cold rolled sheet, and the cassette is fixed on panel with clasps.



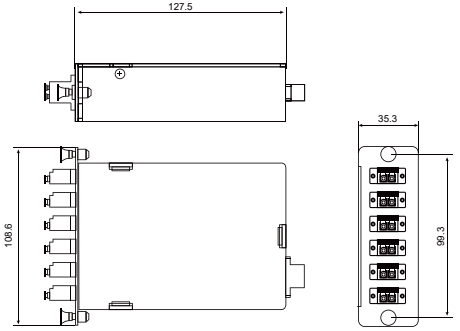
1C

MPO HIGH DENSITY PATCH PANEL

Drawing for panel A



Drawing for cassette A

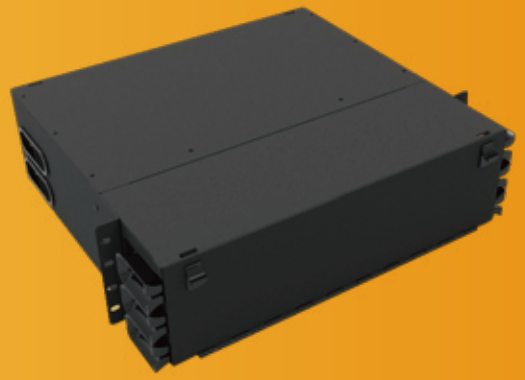


Cassette

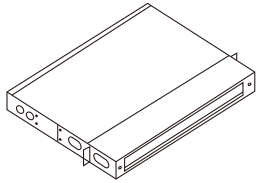
Packing Information				
Height	Dimension	Capacity of cassettes	Capacity/ Cores	Weight
1U	482.6*245*44mm	4	12-96	4.0kg
2U	482.6*245*85mm	8	96-192	7.0kg
3U	482.6*245*133mm	12	192-288	10.0kg
Capacity of each cassette is 12-24cores(LC ports)				Empty cassette + panel

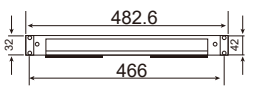
HW-MPO-B

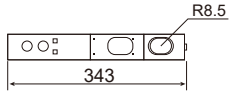
The panel is made with cold rolled sheet and frosted painting; cassette is made with aluminum, and adapter plate is made with plastic. The cassette is fixed on the panel with pressing valve



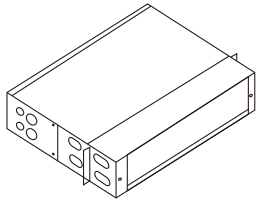
Picture of 1U

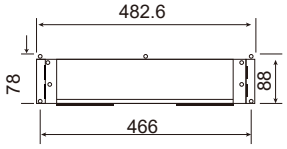


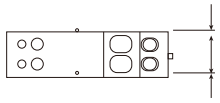




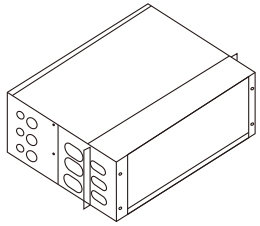
Picture of 2U

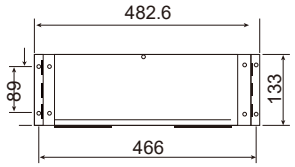


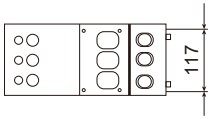




Picture of 3U







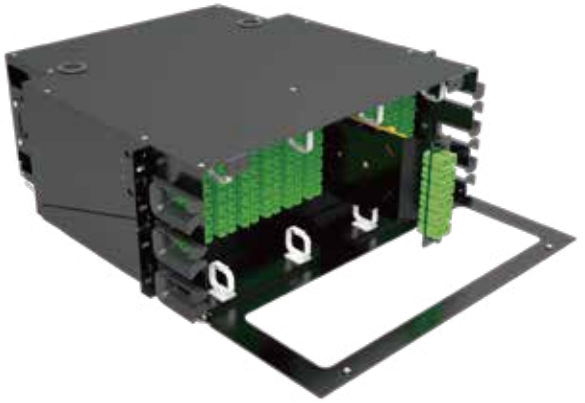
Packing Information

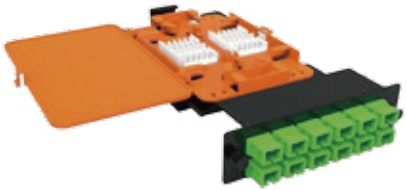
Height	Dimension	Capacity of cassettes	Capacity / Cores	Weight
1U	482.6*245*44mm	4	12-96	4.0kg
2U	482.6*245*85mm	8	96-192	7.0kg
3U	482.6*245*133mm	12	192-288	10.0kg
Capacity of each cassette is 12-24cores(LC ports)				Empty cassette + panel

HW-MPO-C

This panel is made with stainless steel, unlike box structure of normal panels, this one is assembled with separated parts, such struc - ture simplifies the installation. Aluminum and the simple structure make the panel lighter and more protective for environment. The cassette is also improved, it's fixed on the panel with clasps too, but the two clasps are on different positions, then more cassettes can be installed at the same space`

Picture of 4U



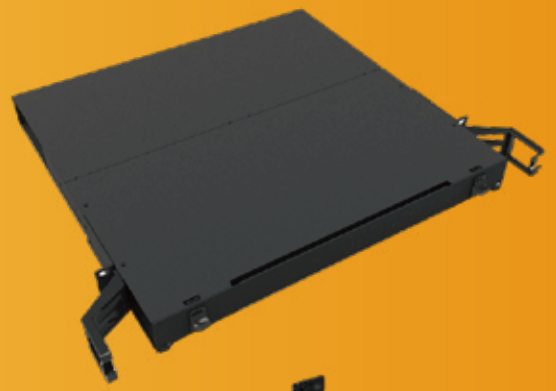


Packing Information

Height	Dimension	Capacity of cassettes	Capacity/ Cores	Weight
4U	482.6*452.5*133mm	12	12-288	10.0kg
Capacity of each cassette is 12-24cores(LC ports)				Empty cassette + panel

HW-MPO-D

This panel is made with stainless steel, unlike box structure of normal panels, this one is assembled with separated parts, such structure simplifies the installation. Aluminum and the simple structure make the panel lighter and more protective for environment. The cassette is also improved, it's fixed on the panel with clasps too, but the two clasps are on different positions, then more cassettes can be installed at the same space



Picture of the Pane

Before assembly

1U 5ports- Fully assembled

45°fan shaped HD- fully assembled

Before assembly

2U 12ports- Fully assembled

45°fan shaped HD- fully assembled

Packing Information

Height	Dimension	Capacity of cassettes	apacity/ Cores	Weight
1U	482.6*255*42mm	4-5	12-96	4.0kg
2U	482.6*255*88mm	8	192-288	5.0kg
Capacity of each cassette is 12-24cores(LC ports)				Empty cassette + panel

11

MPO/MPT HIGH-DENSITY CABLING SYSTEM

With the popularity of 40G and 100G networks, more and more dat a centers, telecom centers, enterprises and even campuses are beginning to use MTP/MPO cabling systems. These cabling systems use MTP/MPO fiber patch cords and MTP/MPO fiber optic distribution. Wire box, MTP/MPO adapter and MTP/MPO adapter panel are built, and it offers unlimited possibilities for high-density cabling while saving network deployment time.

The MTP/MPO cabling system not only saves wiring space, but also simplifies the cabling process and facilitates cable management.

1

Data center switch

Meet more business needs and upgrade your data center

2

Fiber terminal box

Mainly used for connection and storage between external fiber optic cable and equipment pigtail

3

Fiber distribution box

Meet more business needs and upgrade your data center

4

MTP/MPO-LC fiber distribution box

Flexible expansion of services to meet high-density cabling management

5

Fiber optic adapter panel

Connect to an electrical interface module or switch to transmit faster electrical signals

6

Optical module

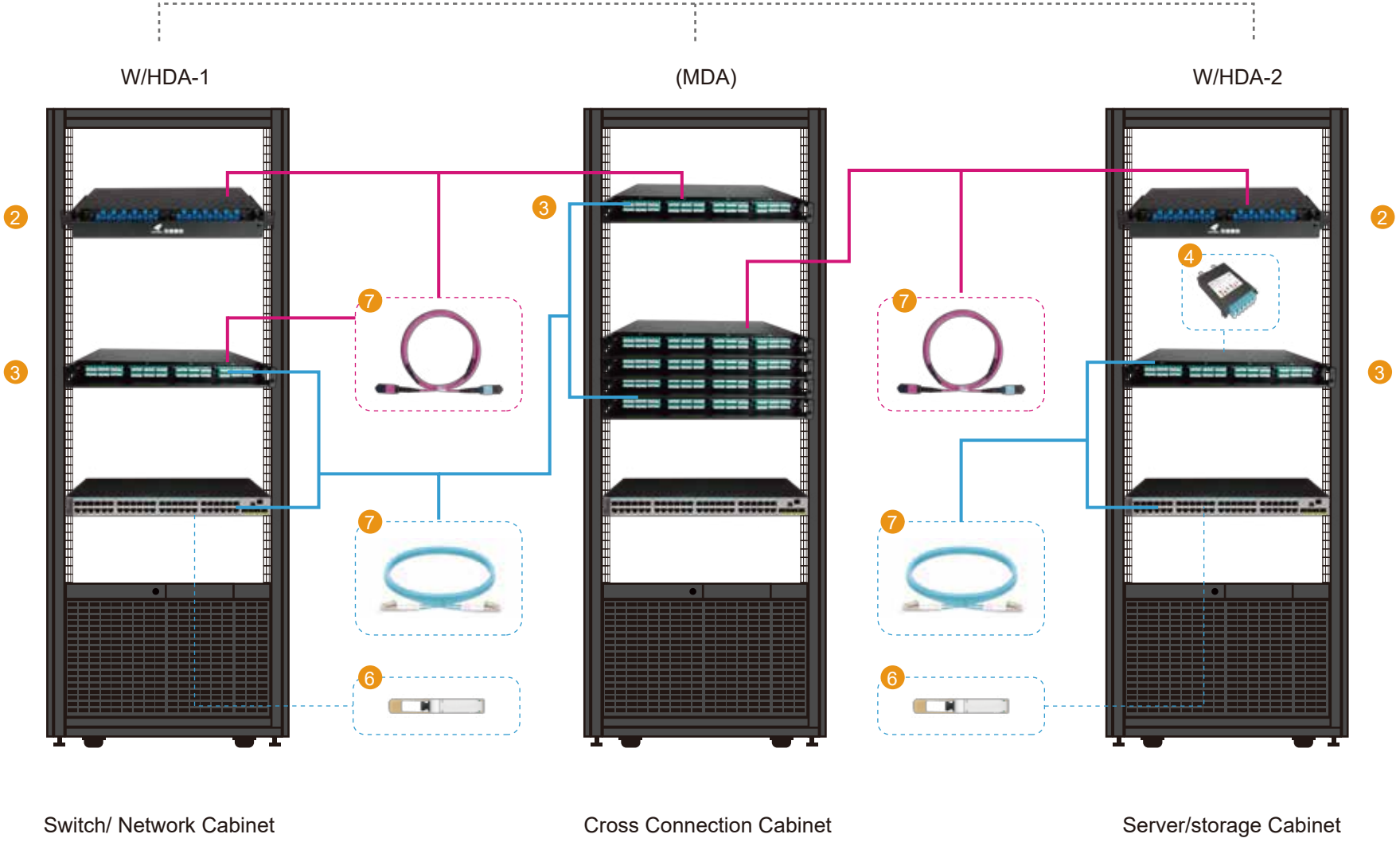
Meet more business needs and upgrade your data center

7

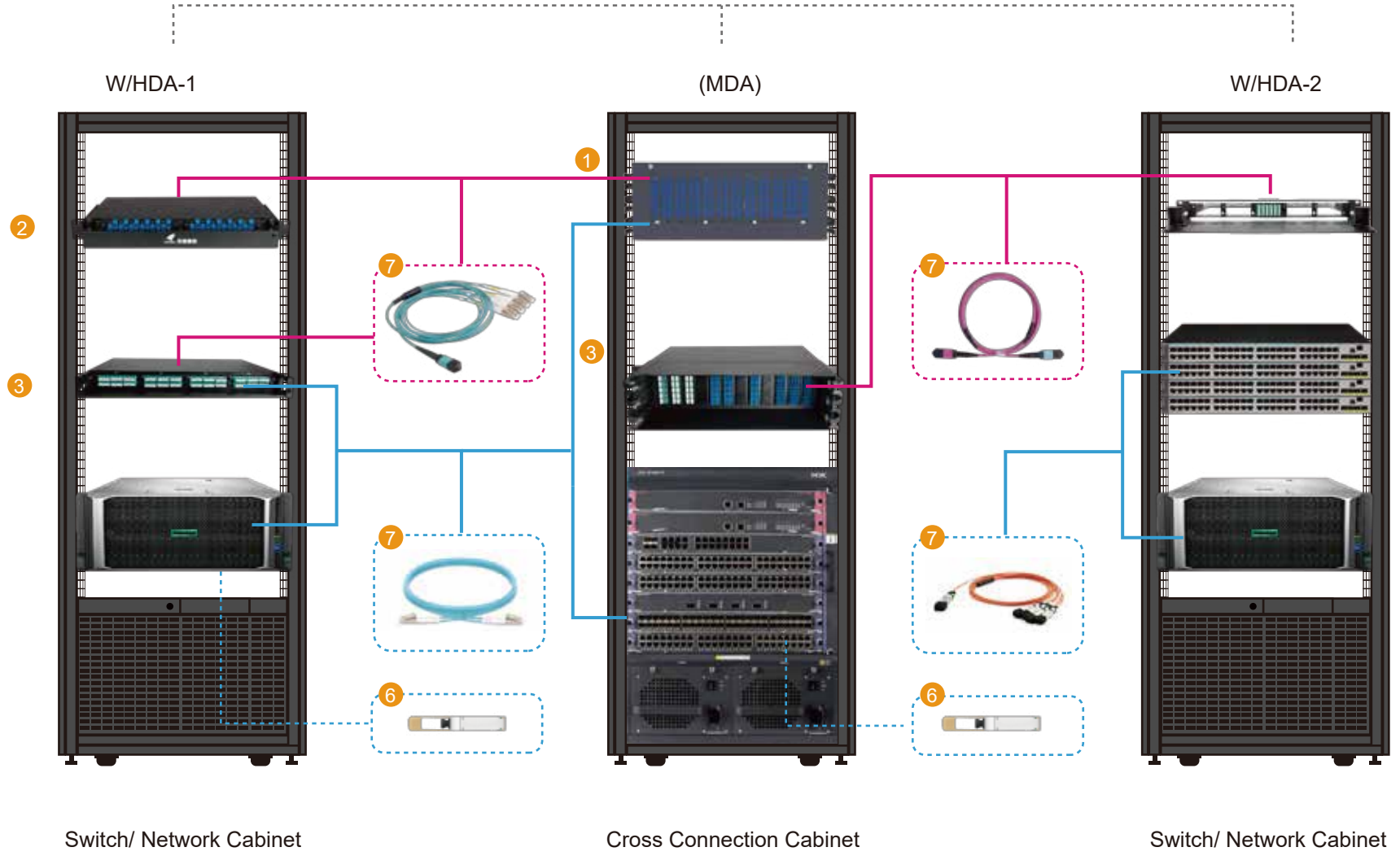
MTP/MPO fiber patch cord

Comply with international telecommunication standards. Low loss, stable transmission signal

MPO high-density solutions in data center



MPO high-density solutions in data center



10 Gbps Interconnector solutions

10G-SFP MM 850nm SFP | LC-LC Duplex OM3 Patch cord | MPO patch panel | MPO trunk patch cord | MPO distribution box | MPO to LC-OM3 patch cord | 10G-SFP MM 850nm SFP

40 Gbps Interconnector solutions

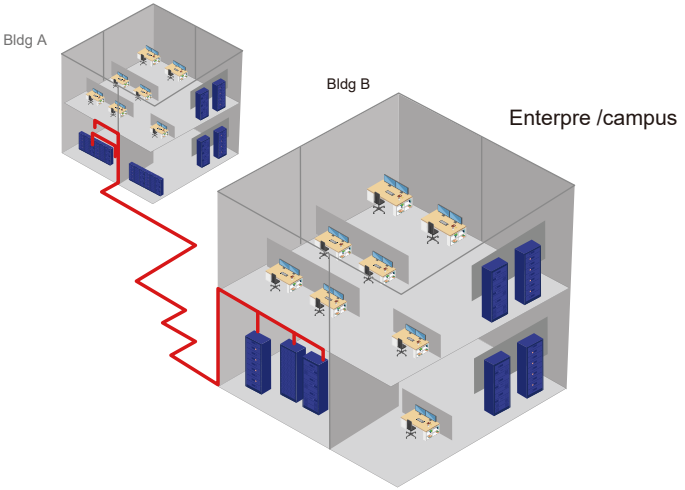
10G-SFP MM 850nm SFP | MPO to LC-OM3 patch cord | MPO patch panel | Optical adapter panel | MPO to LC-OM3 patch cord | 40G-QSFP MM 850nm SFP

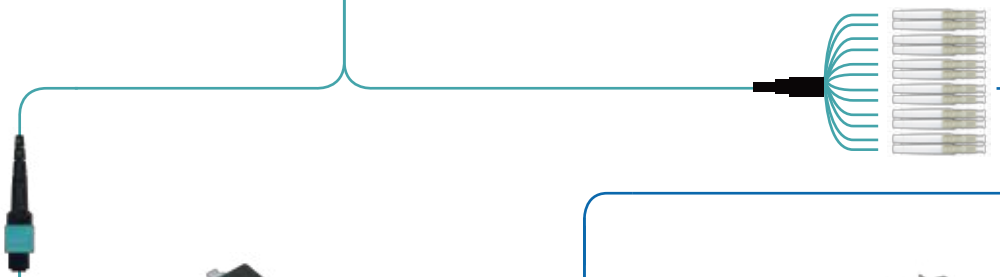
100 Gbps Interconnector solutions

100G-QSFP MM 850nm SFP | MPO patch cord | 100G-QSFP MM 850nm SFP

Enterprise /Campus wiring solution

Pre-connetion fiber panels





MTP /MPO cassette

Optical adapter panel

Connecting inside the panels

Pre-connetion fiber panels

Optical adapter panel

Connect outside to the panels