Ruijie Fiber Optics

Installation and Reference Guide

Document version: V1.5
Date: September 11, 2024

Copyright

Disclaimer

The products, services, or features that you purchase are subject to commercial contracts and terms. It is possible that some or all of the products, services, or features described in this document may not be available for purchase or use. Unless agreed upon otherwise in the contract, Ruijie Networks does not provide any explicit or implicit statements or warranties regarding the content of this document.

The names, links, descriptions, screenshots, and any other information regarding third-party software mentioned in this document are provided for your reference only. Ruijie Networks does not explicitly or implicitly endorse or recommend the use of any third-party software and does not make any assurances or guarantees concerning the applicability, security, or legality of such software. You should choose and use third-party software based on your business requirements and obtain proper authorization. Ruijie Networks assumes no liability for any risks or damages arising from your use of third-party software.

The content of this document is subject to constant change due to product version upgrades or other reasons. Thus, Ruijie Networks reserves the right to modify the content of the document without prior notice or prompt.

This manual serves solely as a user guide. While Ruijie Networks endeavors to ensure the accuracy and reliability of the content when compiling this manual, it does not guarantee that the content of the manual is free of errors or omissions. All information contained in this manual does not constitute any explicit or implicit warranties.

Preface

Intended Audience

This document is intended for:

- Network engineers
- Technical support and servicing engineers
- Network administrators

Technical Support

- Ruijie Networks website: https://www.ruijienetworks.com/
- Online support center: https://ruijienetworks.com/support
- Case portal: https://caseportal.ruijienetworks.com
- Community: https://community.ruijienetworks.com
- Email support: service_rj@ruijienetworks.com
- Live chat: https://www.ruijienetworks.com/rita
- Documentation feedback: doc@ruijie.com.cn

Conventions

1. Signs

The signs used in this document are described as follows:

Danger

An alert that contains important safety instructions. Before you work on any equipment, be aware of the hazards involved and be familiar with standard practices in case of accidents.

Warning

An alert that calls attention to important rules and information that if not understood or followed can result in data loss or equipment damage.

Caution

An alert that calls attention to essential information that if not understood or followed can result in function failure or performance degradation.

Note

An alert that contains additional or supplementary information that if not understood or followed will not lead to serious consequences.

Specification

An alert that contains a description of product or version support.

2. Note

The manual provides configuration information, including models, port types, and command line interfaces, for reference purposes only. In the event of any discrepancy or inconsistency between the manual and the actual version, the actual version shall take precedence.

Contents

1 Naming Rules

Table 1-1 Naming Rules

Type	Digit Position	Parameter	Parameter Description
Connector at end A	1	MPO16/MPO8/MPO/QSFP-MPO8/LC2	● MPO16: 16-fiber multi-fiber push on (MPO) connector ● MPO8/MPO/QSFP-MPO8: 8-fiber MPO connector ● LC2: Duplex lucent connector (LC) connector
Connector at end B	2	N/A x	● Blank: No breakout ● x: Number of breakouts, for example, 3
	3	MPO16/MPO8/MPO4/MPO/LC2	● MPO16: 16-fiber MPO connector ● MPO/MPO8: 8-fiber MPO connector ● MPO4: 4-fiber MPO connector ● LC2: Duplex LC connector
Optical fiber mode	4	OM4/MM/OM3/SM	● SM: Single-mode ● MM: Multimode ● OM: A standard for multimode fibers to indicate the level of fibers. The bandwidth and maximum distance for different levels of transmission are different. OM4 fibers can transmit more information over the same distance. The maximum transmission distance of a transceiver over two types of optical fibers is different. Take the 25G-SR transceiver as an example. Its maximum transmission distance is 70 m over OM3 fibers or 100 m over OM4 fibers.
Optical fiber length	5	xxM	-
(Remarks)	6	APC/UPC/B	● Angled physical contact (APC): Features an angled end face (8 degrees). ● Ultra physical contact (UPC): Has a flat end face. ● B: The breakout point is closer to end B.

The following example uses the MPO16-2MPO8-MM-10M module to illustrate the naming convention:

- MPO16: 16-fiber MPO connector.
- 2: There are two breakouts.
- MPO8: 8-fiber MPO connector.
- MM: Multimode.
- 10M: The length of the optical fiber is 10 m.

2 MPO16-MPO16 Series MMF Optics

The MPO16/APC-MPO16/APC series MMF optics feature the 16-fiber MPO connector. The 16-fiber MPO trunk jumper is designed for direct connection to the 400G-QDD-SR8-MM850 module, supporting 400G transmission in ultra-large data centers.

2.1 Appearance

Figure 2-1 shows the structure of the MPO16/APC-MPO16/APC series MMF optics. It features MPO connectors (female connectors with APC end face), B-type cabling, 16-fiber MMF, and 16 channels (tx1–tx8 and rx1–rx8). Figure 2-2 shows the actual appearance.

Figure 2-1 Structure of 16-Fiber MPO Fiber Jumpers

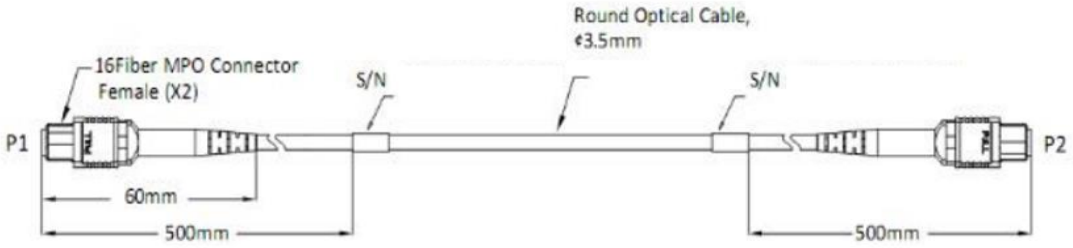


Figure 2-2 Appearance of MPO16-MPO16 Series MMF Optics

Based on the return loss, there are four types of MPO end face finishes: physical contact (PC), super physical contact (SPC), UPC, and APC. According to industry standards, the return loss of the PC, SPC, UPC, and APC connectors is –35 dB, –40 dB, –50 dB, and –60 dB, respectively. The fiber end faces of the PC, SPC, and UPC connectors are flat, but differ in the polishing level, which affects the return loss. The end face of an APC connector is polished to an 8-degree angle to reduce the return loss. The APC end face is specifically designed for connection with an APC connector, and its end face tilt is visible to the naked eye, as shown in Figure 2-3. The guide pin of an MPO16 connector is deviated to one side and the fiber boot is yellow, as shown in Figure 2-4. The 16-fiber mechanical transfer (MT) channels are shown in Figure 2-5.

Figure 2-3 APC Connector

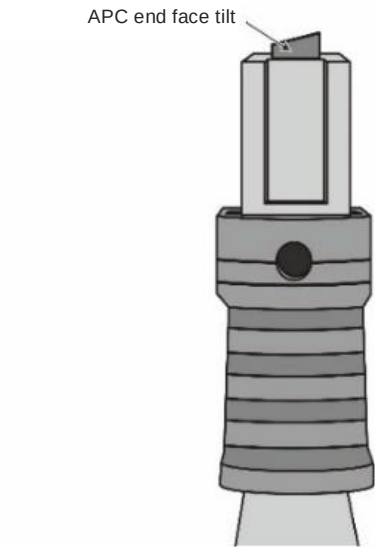
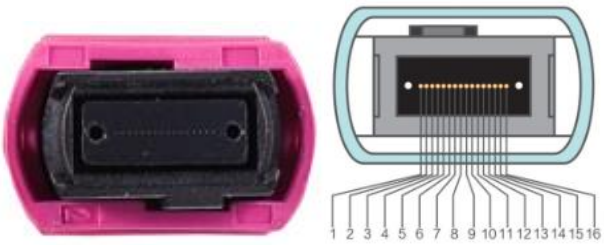


Figure 2-4 MPO16-APC OM4 Connector

Figure 2-5 Physical Diagram (Left) and Schematic Diagram (Right) of 16-Fiber MT Channels



Note

The appearance diagram is for reference only. The actual appearance of fibers in different lengths may vary.

2.2 Hardware Specifications

Table 2-1 Temperature and Humidity Requirements

Operating Temperature	–10ºC to +60ºC (14ºF to 140ºF)
Storage Temperature	–20ºC to +75ºC (–4ºF to +167ºF)
Operating Humidity	≤ 85% RH
Storage Humidity	≤ 95% RH

Table 2-2 MPO16-MPO16 Specifications

Fiber Type	MMF 50/125	**Wavelength**	850 nm
Maximum Transmission Distance for a 400G transceiver	100 m	**Ferrule Type**	APC-APC
Minimum Bend Radius	7 mm	**Attenuation**	≤ 3.5 dB/km
Outer Diameter	3.4 mm to 3.6 mm	**Outer Sheath Material**	Low Smoke Zero Halogen (LSZH)
Connector Pull-Off Force	50 N	**Flame Retardant Standard Compliance**	IEC60332-1
Return Loss	≥ 40 dB	**Insertion Loss**	≤ 0.5 dB

2.3 Product Description

Table 2-3 MPO16-MPO16 Fiber Jumpers

Model	Connector Type	Cable Type	Length
MPO16-MPO16-OM4-xxM	MPO16/APC- MPO16/APC	OM4	100 m
MPO16-MPO16-OM3-xxM	MPO16/APC- MPO16/APC	OM3	70 m

Table 2-4 Models of Paired Optical Transceivers

Ruijie Optical Transceiver Model	Center Wavelength	Connector Type	Fiber Type	Modular Bandwidth (MHz·km)	Maximum Cabling Distance
400G-QDD-SR8-MM850	850 nm	MPO-16/APC	Multimode	2000	70 m (OM3)
				4700	100 m (OM4)

2.3.1 MPO16-MPO16-OM4-xxM

The MPO16-MPO16-OM4-xxM is an OM4 MMF with MPO16 connectors at both ends and supports direct connection to the 400G-QDD-SR8-MM850 module for data transmission over a distance of up to 100 m.

Table 2-5 MPO16-MPO16-OM4-xxM Fiber Jumpers

Model	Cable Length	Fiber Type	Cable Color	Sheath Color	Boot Color
MPO16-MPO16-OM4-1M	1 m	OM4	Heather violet	Purple	Yellow/Red
MPO16-MPO16-OM4-2M	2 m	OM4	Heather violet	Purple	Yellow/Red
MPO16-MPO16-OM4-3M	3 m	OM4	Heather violet	Purple	Yellow/Red
MPO16-MPO16-OM4-5M	5 m	OM4	Heather violet	Purple	Yellow/Red
MPO16-MPO16-OM4-8M	8 m	OM4	Heather violet	Purple	Yellow/Red
MPO16-MPO16-OM4-10M	10 m	OM4	Heather violet	Purple	Yellow/Red
MPO16-MPO16-OM4-15M	15 m	OM4	Heather violet	Purple	Yellow/Red
MPO16-MPO16-OM4-20M	20 m	OM4	Heather violet	Purple	Yellow/Red
MPO16-MPO16-OM4-30M	30 m	OM4	Heather violet	Purple	Yellow/Red
MPO16-MPO16-OM4-50M	50 m	OM4	Heather violet	Purple	Yellow/Red
MPO16-MPO16-OM4-60M	60 m	OM4	Heather violet	Purple	Yellow/Red
MPO16-MPO16-OM4-70M	70 m	OM4	Heather violet	Purple	Yellow/Red
MPO16-MPO16-OM4-80M	80 m	OM4	Heather violet	Purple	Yellow/Red
MPO16-MPO16-OM4-100M	100 m	OM4	Heather violet	Purple	Yellow/Red

2.3.2 MPO16-MPO16-OM3-xxM

The MPO16-MPO16-OM3-xxM is an OM3 MMF with MPO16 connectors at both ends and supports direct connection to the 400G-QDD-SR8-MM850 module for data transmission over a distance of up to 70 m.

Table 2-6 MPO16-MPO16-OM3-xxM Fiber Jumpers

Model	Cable Length	Fiber Type	Cable Color	Sheath Color	Boot Color
MPO16-MPO16-OM3-1M	1 m	OM3	Water blue	Purple	Red
MPO16-MPO16-OM3-2M	2 m	OM3	Water blue	Purple	Red
MPO16-MPO16-OM3-3M	3 m	OM3	Water blue	Purple	Red
MPO16-MPO16-OM3-5M	5 m	OM3	Water blue	Purple	Red
MPO16-MPO16-OM3-8M	8 m	OM3	Water blue	Purple	Red
MPO16-MPO16-OM3-10M	10 m	OM3	Water blue	Purple	Red
MPO16-MPO16-OM3-15M	15 m	OM3	Water blue	Purple	Red
MPO16-MPO16-OM3-20M	20 m	OM3	Water blue	Purple	Red
MPO16-MPO16-OM3-30M	30 m	OM3	Water blue	Purple	Red
MPO16-MPO16-OM3-50M	50 m	OM3	Water blue	Purple	Red
MPO16-MPO16-OM3-60M	60 m	OM3	Water blue	Purple	Red

3 MPO16-2MPO8 Series MMF Optics

The MPO16/APC-2MPO8/APC breakout optics feature a 16-fiber MPO connector at end A, connected to a 400G-QDD-SR8-MM850 module through a 16-fiber MPO trunk cable, and 8-fiber MPO connectors at ends B1 and B2, connected to 200G-Q56-SR4-MM850 or 200G-Q56-SR4-MM850(D) modules.

3.1 Appearance

Figure 3-1 shows the structure of the MPO16-2MPO8 series MMF optics. It features MPO connectors with APC end face at both ends, a 16-fiber trunk cable with a diameter of 3.5 mm, and two 8-fiber breakout cables. Figure 3-2 shows the actual appearance. Figure 3-3 shows the connectors at ends A and B. Figure 3-4 shows the mappings between channels.

Figure 3-1 Structure of MPO16-2MPO8 Series MMF Optics

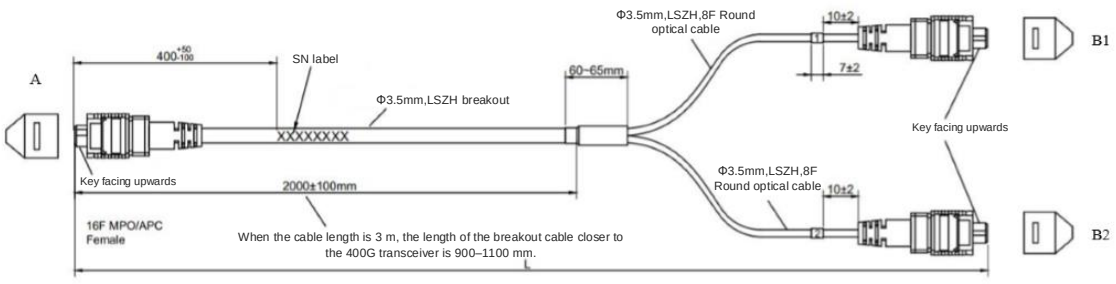
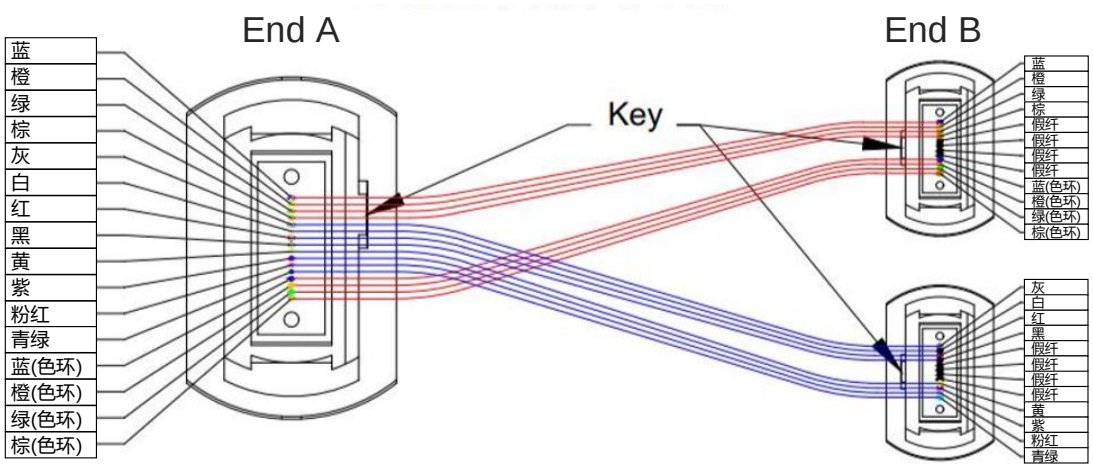


Figure 3-2 Appearance of MPO16-2MPO8 Series MMF Optics

Figure 3-3 16-Fiber MPO Connector at End A (Left) and 8-Fiber MPO Connector at End B (Right)

Figure 3-4 16-Fiber MT Channels (Left) and 8-Fiber MT Channels (Right)



Note

The appearance diagram is for reference only. The actual appearance of fibers in different lengths may vary.

3.2 Hardware Specifications

Table 3-1 Temperature and Humidity Requirements

Operating Temperature	–10ºC to +60ºC (14ºF to 140ºF)
Storage Temperature	–20ºC to +75ºC (–4ºF to +167ºF)
Operating Humidity	≤ 85% RH
Storage Humidity	≤ 95% RH

Table 3-2 Specifications of the MPO16 Connector at End A

Fiber Type	MMF 50/125	**Wavelength**	850 nm
Minimum Bend Radius	7 mm	**Ferrule Type**	APC-APC
Outer Diameter	3.4 mm to 3.6 mm	**Repeatability**	< 0.3 dB
Return Loss	≥ 35 dB	**Insertion Loss**	≤ 0.5 dB
Allowable Tensile Force	130 N	**Crushing Force**	200 N/100 mm

Table 3-3 Specifications of the MPO8 Connector at End B

Fiber Type	MMF 50/125	**Wavelength**	850 nm
Minimum Bend Radius	7 mm	**Ferrule Type**	APC-APC
Outer Diameter	3.4 mm to 3.6 mm	**Repeatability**	< 0.3 dB
Return Loss	≥ 35 dB	**Insertion Loss**	≤ 0.5 dB
Allowable Tensile Force	130 N	**Crushing Force**	200 N/100 mm

3.3 Product Description

Table 3-4 MPO16-2MPO8 Fiber Jumpers

Model	Breakout Point	Trunk Cable Length	Breakout Cable Length	Cable Type	Reach
MPO16-2MPO8-MM-xxM	Closer to the MPO16 connector at end A (400G)	2 m	(x-2) m	OM4	100 m

Model	Breakout Point	Trunk Cable Length	Breakout Cable Length	Cable Type	Reach
MPO16-2MPO8-OM3-MM-xxM	Closer to the MPO16 connector at end A (400G)	2 m	(x-2) m	OM3	70 m
MPO16-2MPO8-MM-xxM(B)	Closer to the MPO8 connector at end B (200G)	(x-3) m	3 m	OM4	100 m
MPO16-2MPO8-OM3-MM-xxM(B)	Closer to the MPO8 connector at end B (200G)	(x-3) m	3 m	OM3	70 m

Table 3-5 Models of Paired Optical Transceivers

End	Ruijie Optical Transceiver Model	Center Wavelength	Connector Type	Fiber Type	Modular Bandwidth (MHz·km)	Maximum Cabling Distance
A	400G-QDD-SR8-MM850	850 nm	MPO-16/APC	Multimode	2000	70 m (OM3)
					4700	100 m (OM4)
B	200G-Q56-SR4-MM850 200G-Q56-SR4-MM850(D)	850 nm	MPO-8/APC	Multimode	2000	70 m (OM3)
					4700	100 m (OM4)

3.3.2 MPO16-2MPO8-MM-xxM

The MPO16-2MPO8-MM-xxM is an OM4 MMF with a 2-meter trunk and a breakout point closer to the MPO16 connector at end A (400G transceiver). It can be used to pair a 400G-QDD-SR8-MM850 module with two 200G-Q56-SR4-MM850 or 200G-Q56-SR4-MM850(D) modules for data transmission over a distance of up to 100 m.

Table 3-6 MPO16-2MPO8-MM-xxM Fiber Jumpers

Model	Cable Length	Trunk Cable Length (Distance from the Breakout Point to the 400G Transceiver)	Breakout Cable Length (Distance from the Breakout Point to the 200G Transceiver)	Cable Color	Sheath Color	Boot Color of End A	Boot Color of End B
MPO16-2MPO8-MM-3M	3 m	1 m	2 m	Heather violet	Purple	Yellow/ Red	Black
MPO16-2MPO8-MM-5M	5 m	2 m	3 m	Heather violet	Purple	Yellow/ Red	Black
MPO16-2MPO8-MM-7M	7 m	2 m	5 m	Heather violet	Purple	Yellow/ Red	Black
MPO16-2MPO8-MM-10M	10 m	2 m	8 m	Heather violet	Purple	Yellow/ Red	Black
MPO16-2MPO8-MM-15M	15 m	2 m	13 m	Heather violet	Purple	Yellow/ Red	Black
MPO16-2MPO8-MM-20M	20 m	2 m	18 m	Heather violet	Purple	Yellow/ Red	Black
MPO16-2MPO8-MM-30M	30 m	2 m	28 m	Heather violet	Purple	Yellow/ Red	Black
MPO16-2MPO8-MM-40M	40 m	2 m	38 m	Heather violet	Purple	Yellow/ Red	Black
MPO16-2MPO8-MM-50M	50 m	2 m	48 m	Heather violet	Purple	Yellow/ Red	Black
MPO16-2MPO8-MM-60M	60 m	2 m	58 m	Heather violet	Purple	Yellow/ Red	Black
MPO16-2MPO8-MM-70M	70 m	2 m	68 m	Heather violet	Purple	Yellow/ Red	Black
MPO16-2MPO8-MM-100M	100 m	2 m	98 m	Heather violet	Purple	Yellow/ Red	Black

3.3.3 MPO16-2MPO8-OM3-MM-xxM

The MPO16-2MPO8-OM3-MM-xxM is an OM3 MMF with a 2-meter trunk and a breakout point closer to the MPO16 connector at end A (400G transceiver). It can be used to pair a 400G-QDD-SR8-MM850 module with

two 200G-Q56-SR4-MM850 or 200G-Q56-SR4-MM850(D) modules for data transmission over a distance of up to 70 m.

Table 3-7 MPO16-2MPO8-OM3-MM-xxM Fiber Jumpers

Model	Cable Length	Trunk Cable Length (Distance from the Breakout Point to the 400G Transceiver)	Breakout Cable Length (Distance from the Breakout Point to the 200G Transceiver)	Cable Color	Sheath Color	Boot Color of End A	Boot Color of End B
MPO16-2MPO8-OM3-MM-3M	3 m	1 m	2 m	Water blue	Purple	Red	Black
MPO16-2MPO8-OM3-MM-5M	5 m	2 m	3 m	Water blue	Purple	Red	Black
MPO16-2MPO8-OM3-MM-7M	7 m	2 m	5 m	Water blue	Purple	Red	Black
MPO16-2MPO8-OM3-MM-10M	10 m	2 m	8 m	Water blue	Purple	Red	Black
MPO16-2MPO8-OM3-MM-15M	15 m	2 m	13 m	Water blue	Purple	Red	Black
MPO16-2MPO8-OM3-MM-20M	20 m	2 m	18 m	Water blue	Purple	Red	Black
MPO16-2MPO8-OM3-MM-30M	30 m	2 m	28 m	Water blue	Purple	Red	Black
MPO16-2MPO8-OM3-MM-40M	40 m	2 m	38 m	Water blue	Purple	Red	Black
MPO16-2MPO8-OM3-MM-50M	50 m	2 m	48 m	Water blue	Purple	Red	Black
MPO16-2MPO8-OM3-MM-60M	60 m	2 m	58 m	Water blue	Purple	Red	Black

3.3.4 MPO16-2MPO8-MM-xxM(B)

The MPO16-2MPO8-MM-xxM(B) is an OM4 MMF with a 3-meter trunk and a breakout point closer to the MPO8 connector at end B (200G transceiver). It can be used to pair a 400G-QDD-SR8-MM850 module with two 200G-Q56-SR4-MM850 or 200G-Q56-SR4-MM850(D) modules for data transmission over a distance of up to 100 m.

Table 3-8 MPO16-2MPO8-MM-xxM(B) Fiber Jumpers

Model	Cable Length	Trunk Cable Length (Distance from the Breakout Point to the 400G Transceiver)	Breakout Cable Length (Distance from the Breakout Point to the 200G Transceiver)	Cable Color	Sheath Color	Boot Color of End A	Boot Color of End B
MPO16-2MPO8-MM-10M(B)	10 m	7 m	3 m	Heather violet	Purple	Yellow/ Red	Black
MPO16-2MPO8-MM-15M(B)	15 m	12 m	3 m	Heather violet	Purple	Yellow/ Red	Black
MPO16-2MPO8-MM-20M(B)	20 m	17 m	3 m	Heather violet	Purple	Yellow/ Red	Black
MPO16-2MPO8-MM-30M(B)	30 m	27 m	3 m	Heather violet	Purple	Yellow/ Red	Black
MPO16-2MPO8-MM-40M(B)	40 m	37 m	3 m	Heather violet	Purple	Yellow/ Red	Black
MPO16-2MPO8-MM-50M(B)	50 m	47 m	3 m	Heather violet	Purple	Yellow/ Red	Black
MPO16-2MPO8-MM-60M(B)	60 m	57 m	3 m	Heather violet	Purple	Yellow/ Red	Black
MPO16-2MPO8-MM-70M(B)	70 m	67 m	3 m	Heather violet	Purple	Yellow/ Red	Black
MPO16-2MPO8-MM-100M(B)	100 m	97 m	3 m	Heather violet	Purple	Yellow/ Red	Black

3.3.5 MPO16-2MPO8-OM3-MM-xxM(B)

The MPO16-2MPO8-OM3-MM-xxM(B) is an OM3 MMF with a 3-meter trunk and a breakout point closer to the MPO8 connector at end B (200G transceiver). It can be used to pair a 400G-QDD-SR8-MM850 module with two 200G-Q56-SR4-MM850 or 200G-Q56-SR4-MM850(D) modules for data transmission over a distance of up to 70 m.

Table 3-9 MPO16-2MPO8-OM3-MM-xxM(B) Fiber Jumpers

Model	Cable Length	Trunk Cable Length (Distance from the Breakout Point to the 400G Transceiver)	Breakout Cable Length (Distance from the Breakout Point to the 200G Transceiver)	Cable Color	Sheath Color	Boot Color of End A	Boot Color of End B
MPO16-2MPO8-OM3-MM-10M(B)	10 m	7 m	3 m	Water blue	Purple	Red	Black
MPO16-2MPO8-OM3-MM-15M(B)	15 m	12 m	3 m	Water blue	Purple	Red	Black
MPO16-2MPO8-OM3-MM-20M(B)	20 m	17 m	3 m	Water blue	Purple	Red	Black
MPO16-2MPO8-OM3-MM-30M(B)	30 m	27 m	3 m	Water blue	Purple	Red	Black
MPO16-2MPO8-OM3-MM-40M(B)	40 m	37 m	3 m	Water blue	Purple	Red	Black
MPO16-2MPO8-OM3-MM-50M(B)	50 m	47 m	3 m	Water blue	Purple	Red	Black
MPO16-2MPO8-OM3-MM-60M(B)	60 m	57 m	3 m	Water blue	Purple	Red	Black

3.4 1-to-2 Breakout Cable Configuration

Taking interface 49 of the switch as an example, perform the following 1-to-2 breakout configuration:

```
Ruijie#configure terminal
Ruijie(config)# split interface FHGigabitEthernet 0/49 split-type 2*200G
Ruijie(config)# interface range FHGigabitEthernet 0/49:1-2
Ruijie(config-if-range)# no shutdown
Ruijie(config-if-range)# end
Ruijie#write
```

Caution

Remember to configure all of the three ports.

If you want to remove the configuration, run the following commands:

```
Ruijie#configure terminal
```

```
Ruijie(config)# no split interface FHGigabitEthernet 0/49
Ruijie(config)# end
Ruijie#write
```

4 MPO-MPO(APC) Series MMF Optics

The MPO-MPO(APC) series MMF optics feature the 8-fiber MPO/APC connector. The 8-fiber MPO/APC trunk jumper is designed for direct connection to the 200G transceiver and interconnection with the 400G transceiver, supporting 200G and 400G transmission in ultra-large data centers.

4.1 Appearance

Figure 4-1 shows the structure of the MPO-MPO(APC) series MMF optics. It features MPO connectors (female connectors with APC end face), B-type cabling, and 8-fiber MMF. Figure 4-2 shows the actual appearance, and Figure 4-3 shows connectors. Figure 4-4 shows the mappings between channels.

Figure 4-1 Structure of MPO-MPO(APC) Series MMF Optics

.

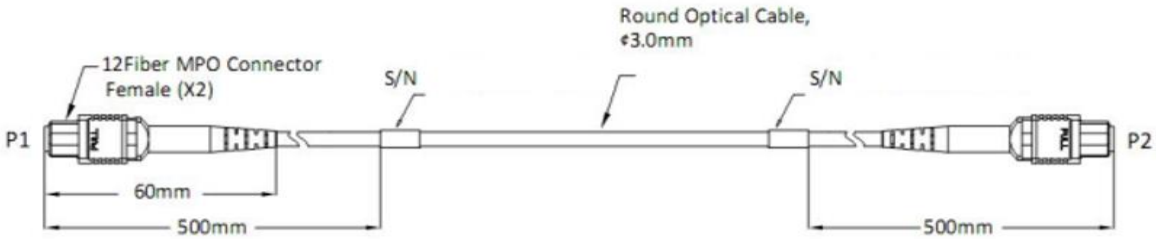


Figure 4-2 Appearance of MPO-MPO(APC) Series MMF Optics

Figure 4-3 8-Fiber MPO-APC Connectors

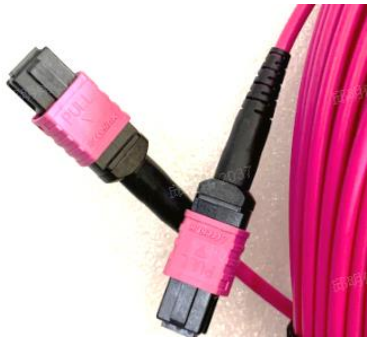
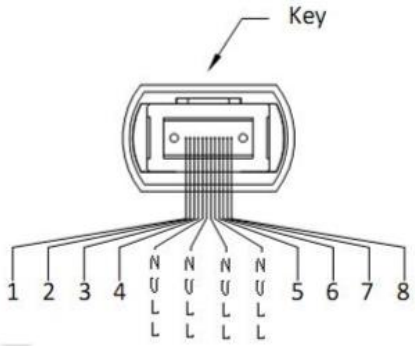


Figure 4-4 8-Fiber MPO Jumper

P1 Fiber Number	CABLE Buffer Color	P2 Fiber Number
Fiber 1	Blue	Fiber 8
Fiber 2	Orange	Fiber 7
Fiber 3	Green	Fiber 6
Fiber 4	Brown	Fiber 5
NULL		NULL
NULL		NULL
NULL		NULL
NULL		NULL
Fiber 5	Gray	Fiber 4
Fiber 6	White	Fiber 3
Fiber 7	Red	Fiber 2
Fiber 8	Black	Fiber 1



Note

The appearance diagram is for reference only. The actual appearance of fibers in different lengths may vary.

4.2 Hardware Specifications

Table 4-1 Temperature and Humidity Requirements

Operating Temperature	–20ºC to +60ºC (–4ºF to +140ºF)
Storage Temperature	–20ºC to +60ºC (–4ºF to +140ºF)
Operating Humidity	≤ 85% RH
Storage Humidity	≤ 95% RH

Table 4-2 MPO-MPO(APC) Specifications

Fiber Type	MMF 50/125	**Wavelength**	850 nm
Minimum Bend Radius	6 mm	**Ferrule Type**	APC-APC
Outer Diameter	2.9 mm to 3.1 mm	**Repeatability**	< 0.3 dB
Return Loss	≥ 35 dB	**Insertion Loss**	≤ 0.35 dB
Allowable Tensile Force	130 N	**Crushing Force**	200 N/100 mm

4.3 Product Description

Table 4-3 MPO-MPO(APC) Fiber Jumpers

Model	Connector Type	Cable Type
MPO-MPO-OM4-xxM(APC)	MPO8/APC- MPO8/APC	OM4
MPO-MPO-OM3-xxM(APC)	MPO8/APC- MPO8/APC	OM3

Table 4-4 Models of Paired Optical Transceivers

Ruijie Optical Transceiver Model	Form Factor	Center Wavelength	Connector Type	Fiber Type	Maximum Cabling Distance
200G-Q56-SR4-MM850	QSFP56	850 nm	MPO/APC	Multimode	70 m (OM3) 100 m (OM4)
200G-Q56-SR4-MM850(D)	QSFP56	850 nm	MPO/APC	Multimode	70 m (OM3) 100 m (OM4)
200G-Q112-VR2-MM850	QSFP112	850 nm	MPO/APC	Multimode	30 m (OM3) 50 m (OM4)
400G-Q112-VR4-MM850	QSFP112	850 nm	MPO/APC	Multimode	30 m (OM3)

					50 m (OM4)
400G-OSFP-VR4-MM850	OSFP	850 nm	MPO/APC	Multimode	30 m (OM3)
					50 m (OM4)
400G-QDD-SR4-MM850	QSFP-DD	850 nm	MPO/APC	Multimode	60 m (OM3)
					100 m (OM4)

4.3.1 MPO-MPO-OM4-xxM(APC)

The MPO-MPO-OM4-xxM(APC) is an OM4 MMF with 8-fiber MPO/APC connectors at both ends. It supports direct connections to the 200G-Q56-SR4-MM850, 200G-Q56-SR4-MM850(D), or 400G-QDD-SR4-MM850 modules for data transmission over a distance of up to 100 meters, the 200G-Q112-VR2-MM850 module for up to 50 meters, and interconnections with the 400G-Q112-VR4-MM850, 400G-OSFP-VR4-MM850, or 400G-QDD-SR4-MM850 modules for up to 50 meters.

Table 4-5 MPO-MPO-OM4-xxM(APC) Fiber Jumpers

Model	Cable Length	Fiber Type	Cable Color	Sheath Color	Boot Color
MPO-MPO-OM4-1M(APC)	1 m	OM4	Heather violet	Purple	Black
MPO-MPO-OM4-3M(APC)	3 m	OM4	Heather violet	Purple	Black
MPO-MPO-OM4-5M(APC)	5 m	OM4	Heather violet	Purple	Black
MPO-MPO-OM4-10M(APC)	10 m	OM4	Heather violet	Purple	Black
MPO-MPO-OM4-15M(APC)	15 m	OM4	Heather violet	Purple	Black
MPO-MPO-OM4-20M(APC)	20 m	OM4	Heather violet	Purple	Black
MPO-MPO-OM4-30M(APC)	30 m	OM4	Heather violet	Purple	Black

Model	Cable Length	Fiber Type	Cable Color	Sheath Color	Boot Color
MPO-MPO-OM4-50M(APC)	50 m	OM4	Heather violet	Purple	Black
MPO-MPO-OM4-60M(APC)	60 m	OM4	Heather violet	Purple	Black
MPO-MPO-OM4-70M(APC)	70 m	OM4	Heather violet	Purple	Black
MPO-MPO-OM4-80M(APC)	80 m	OM4	Heather violet	Purple	Black
MPO-MPO-OM4-100M(APC)	100 m	OM4	Heather violet	Purple	Black

4.3.2 MPO-MPO-OM3-xxM(APC)

The MPO-MPO-OM3-xxM(APC) is an OM3 MMF with 8-fiber MPO/APC connectors at both ends. It supports direct connections to the 200G-Q56-SR4-MM850 or 200G-Q56-SR4-MM850(D) modules for data transmission over a distance of up to 70 meters, the 400G-QDD-SR4-MM850 module for up to 60 meters, the 200G-Q112-VR2-MM850 module for up to 30 meters, and interconnections with the 400G-Q112-VR4-MM850, 400G-OSFP-VR4-MM850, or 400G-QDD-SR4-MM850 modules for up to 30 meters.

Table 4-6 MPO-MPO-OM3-xxM(APC) Fiber Jumpers

Model	Cable Length	Fiber Type	Cable Color	Sheath Color	Boot Color
MPO-MPO-OM3-1M(APC)	1 m	OM3	Water blue	Purple	Black
MPO-MPO-OM3-3M(APC)	3 m	OM3	Water blue	Purple	Black
MPO-MPO-OM3-5M(APC)	5 m	OM3	Water blue	Purple	Black
MPO-MPO-OM3-10M(APC)	10 m	OM3	Water blue	Purple	Black
MPO-MPO-OM3-15M(APC)	15 m	OM3	Water blue	Purple	Black
MPO-MPO-OM3-20M(APC)	20 m	OM3	Water blue	Purple	Black
MPO-MPO-OM3-30M(APC)	30 m	OM3	Water blue	Purple	Black
MPO-MPO-OM3-50M(APC)	50 m	OM3	Water blue	Purple	Black
MPO-MPO-OM3-60M(APC)	60 m	OM3	Water blue	Purple	Black

5 MPO-MPO(UPC) Series MMF Optics

The MPO-MPO(UPC) series MMF optics feature the 8-fiber MPO/APC connector. The 8-fiber MPO/APC trunk jumper is designed for direct connections to the 40G-QSFP-SR-MM850, 40G-QSFP-LSR-MM850, 100G-QSFP-SR-MM850, or 200G-Q56-SR4-MM850(B) modules.

5.1 Appearance

Figure 5-1 shows the structure of the MPO-MPO(UPC) series MMF optics. It features MPO connectors (female connectors with UPC end face), B-type cabling, and 8-fiber MMF. Figure 5-2 shows the actual appearance, and Figure 5-3 shows connectors. Figure 5-4 shows the mappings between channels.

Figure 5-1 Structure of MPO-MPO(UPC) Series MMF Optics

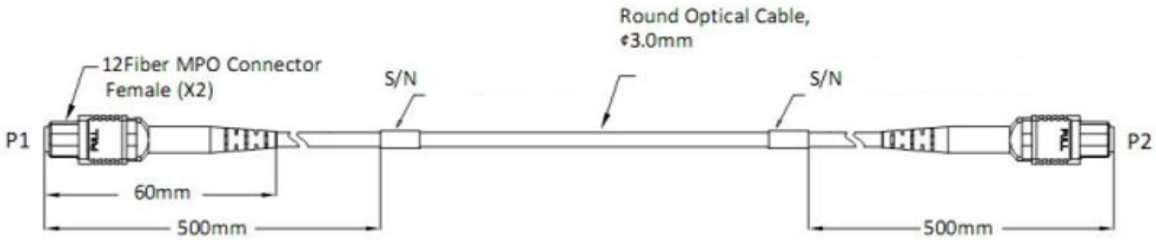
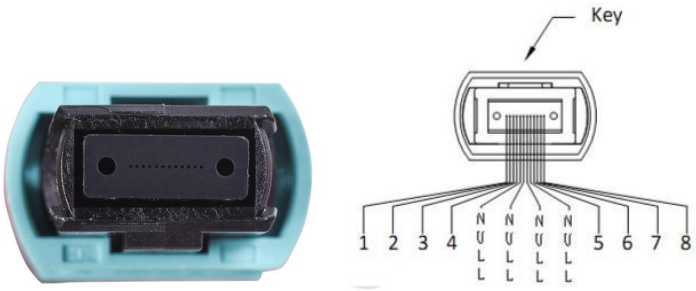


Figure 5-2 Appearance of MPO-MPO(UPC) Series MMF Optics

Figure 5-3 12-Fiber MPO-UPC Connectors

Figure 5-4 12-Fiber MPO Jumper Channels



Note

The appearance diagram is for reference only. The actual appearance of fibers in different lengths may vary.

5.2 Hardware Specifications

Table 5-1 Temperature and Humidity Requirements

Operating Temperature	–20ºC to +60ºC (–4ºF to +140ºF)
Storage Temperature	–20ºC to +60ºC (–4ºF to +140ºF)
Operating Humidity	≤ 85% RH
Storage Humidity	≤ 95% RH

Table 5-2 MPO-MPO(UPC) Specifications

Connector Type	MPO/UPC-MPO/UPC	**Fiber Grade**	OM4/OM3
Fiber Type	MMF 50/125	**Wavelength**	850 nm
Minimum Bend Radius	6 mm	**Number of Strands**	8
Outer Diameter	2.9 mm to 3.1 mm	**Repeatability**	< 0.3 dB
Return Loss	≥ 20 dB	**Insertion Loss**	≤ 0.35 dB

5.3 Product Description

Table 5-3 MPO-MPO(UPC) Fiber Jumpers

Model	Connector Type	Cable Type
MPO-MPO-OM4-xxM	MPO8/UPC- MPO8/UPC	OM4
MPO-MPO-OM3-xx	MPO8/UPC-MPO8/UPC	OM3

Table 5-4 Models of Paired Optical Transceivers

Ruijie Optical Transceiver Model	Form Factor	Center Wavelength	Connector Type	Fiber Type	Maximum Cabling Distance
40G-QSFP-SR-MM850	QSFP+	850 nm	MPO/UPC	Multimode	100 m (OM3)
					150 m (OM4)
40G-QSFP-LSR-MM850	QSFP+	850 nm	MPO/UPC	Multimode	300 m (OM3)
					400 m (OM4)
100G-QSFP-SR-MM850	QSFP28	850 nm	MPO/UPC	Multimode	70 m (OM3)
					100 m (OM4)
200G-Q56-SR4-MM850(B)	QSFP56	850 nm	MPO/UPC	Multimode	70 m (OM3)
					100 m (OM4)

5.3.1 MPO-MPO-OM4-xxM

The MPO-MPO-OM4-xxM is an OM4 MMF with 8-fiber MPO/UPC connectors at both ends. It supports direct connections to the 40G-QSFP-SR-MM850 module for data transmission over a distance of up to 150 meters, the 40G-QSFP-LSR-MM850 module for up to 400 meters, and 100G-QSFP-SR-MM850 or 200G-Q56-SR4-MM850(B) modules for up to 100 meters.

Table 5-5 MPO-MPO-OM4-xxM Fiber Jumpers

Model	Cable Length	Fiber Type	Cable Color	Sheath Color	Boot Color
MPO-MPO-OM4-1M	1 m	OM4	Heather violet	Green	Black
MPO-MPO-OM4-2M	2 m	OM4	Heather violet	Green	Black
MPO-MPO-OM4-3M	3 m	OM4	Heather violet	Green	Black
MPO-MPO-OM4-5M	5 m	OM4	Heather violet	Green	Black
MPO-MPO-OM4-8M	8 m	OM4	Heather violet	Green	Black
MPO-MPO-OM4-10M	10 m	OM4	Heather violet	Green	Black
MPO-MPO-OM4-15M	15 m	OM4	Heather violet	Green	Black
MPO-MPO-OM4-20M	20 m	OM4	Heather violet	Green	Black
MPO-MPO-OM4-30M	30 m	OM4	Heather violet	Green	Black
MPO-MPO-OM4-50M	50 m	OM4	Heather violet	Green	Black

5.3.2 MPO-MPO-OM3-xx

The MPO-MPO-OM3-xx is an OM3 MMF with 8-fiber MPO/UPC connectors at both ends. It supports direct connections to the 40G-QSFP-SR-MM850 module for data transmission over a distance of up to 100 meters, the 40G-QSFP-LSR-MM850 module for up to 300 meters, and 100G-QSFP-SR-MM850 or 200G-Q56-SR4-MM850(B) modules for up to 70 meters.

Table 5-6 MPO-MPO-OM3-xxM Fiber Jumpers

Model	Cable Length	Fiber Type	Cable Color	Sheath Color	Boot Color
MPO-MPO-OM3-1	1 m	OM3	Water blue	Green	Black
MPO-MPO-OM3-2	2 m	OM3	Water blue	Green	Black
MPO-MPO-OM3-3	3 m	OM3	Water blue	Green	Black

Model	Cable Length	Fiber Type	Cable Color	Sheath Color	Boot Color
MPO-MPO-OM3-5	5 m	OM3	Water blue	Green	Black
MPO-MPO-OM3-8	8 m	OM3	Water blue	Green	Black
MPO-MPO-OM3-10	10 m	OM3	Water blue	Green	Black
MPO-MPO-OM3-15	15 m	OM3	Water blue	Green	Black
MPO-MPO-OM3-20	20 m	OM3	Water blue	Green	Black
MPO-MPO-OM3-30	30 m	OM3	Water blue	Green	Black
MPO-MPO-OM4-50	50 m	OM3	Water blue	Green	Black
MPO-MPO-OM3-60	50 m	OM3	Water blue	Green	Black

6 MP8-2MPO4 Series MMF Optics

The MPO8/APC-2MPO4/APC breakout optics feature an 8-fiber MPO connector at end A, connected to a 400G-QDD-SR4-MM850 or 400G-Q112-VR4-MM850 module through an 8-fiber MPO trunk cable, and 4-fiber MPO connectors at ends B1 and B2, connected to 200G-Q112-VR2-MM850 or 200G-Q56-VR2-MM850 modules.

6.1 Appearance

Figure 6-1 shows the structure of the MP8-2MPO4 series MMF optics. It features MPO connectors (female connectors with UPC end face), B-type cabling, and 8-fiber MMF. Figure 6-2 shows connectors. Figure 6-3 shows the mappings between channels.

Figure 6-1 Structure of MPO8-2MPO4 Series MMF Optics

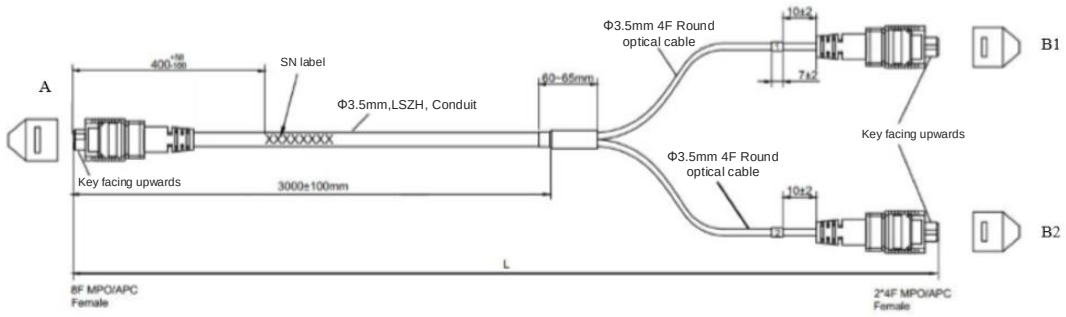


Figure 6-2 8-Fiber MPO Connector at End A (Left) and 4-Fiber MPO Connector at End B (Right)

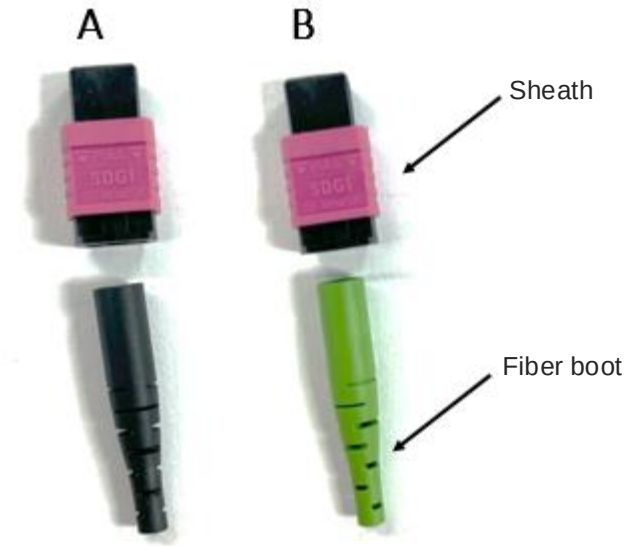
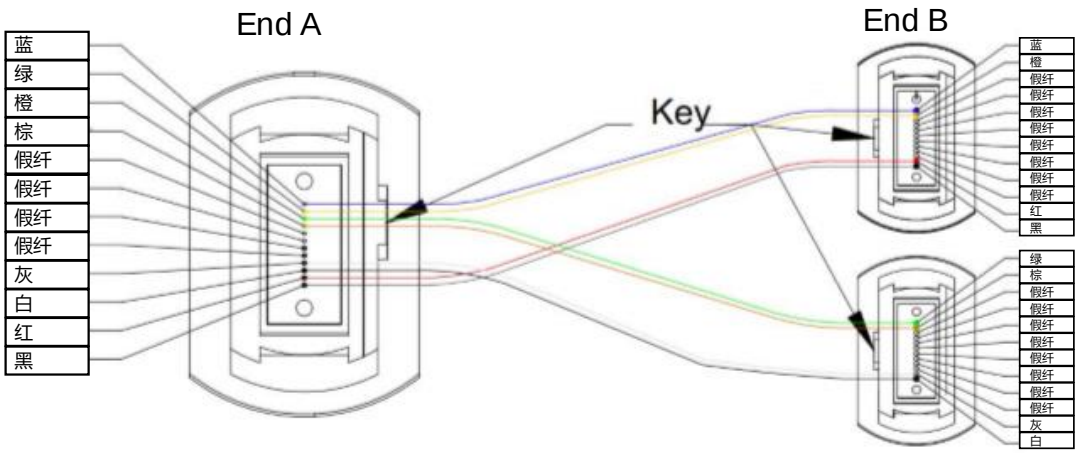


Figure 6-3 8-Fiber MT Channels (Left) and 4-Fiber MT Channels (Right)



Note

The appearance diagram is for reference only. The actual appearance of fibers in different lengths may vary.

6.2 Hardware Specifications

Table 6-1 Temperature and Humidity Requirements

Operating Temperature	–20ºC to +60ºC (–4ºF to +140ºF)
Storage Temperature	–20ºC to +60ºC (–4ºF to +140ºF)
Operating Humidity	≤ 85% RH
Storage Humidity	≤ 95% RH

Table 6-2 Specifications of the MPO8 Connector at End A

Fiber Type	MMF 50/125	**Wavelength**	850 nm
Minimum Bend Radius	7 mm	**Ferrule Type**	APC-APC
Outer Diameter	3.4 mm to 3.6 mm	**Repeatability**	< 0.3 dB
Return Loss	≥ 40 dB	**Insertion Loss**	≤ 0.5 dB
Allowable Tensile Force	130 N	**Crushing Force**	200 N/100 mm

Table 6-3 Specifications of the MPO4 Connector at End B

Fiber Type	MMF 50/125	**Wavelength**	850 nm
Minimum Bend Radius	7 mm	**Ferrule Type**	APC-APC
Outer Diameter	3.4 mm to 3.6 mm	**Repeatability**	< 0.3 dB
Return Loss	≥ 40 dB	**Insertion Loss**	≤ 0.5 dB
Allowable Tensile Force	130 N	**Crushing Force**	200 N/100 mm

6.3 Product Description

Table 6-4 MP8-2MPO4 Fiber Jumpers

Model	Breakout Point	Trunk Cable Length	Breakout Cable Length	Cable Type	Length
MPO8-2MPO4-OM4-xxM	Closer to the MPO8 connector at end A (400G)	3 m	(x-3) m	OM4	50 m
MPO8-2MPO4-OM4-xxM(B)	Closer to the MPO4 connector at end B (200G)	(x-3) m	3 m	OM4	50 m

Table 6-5 Models of Paired Optical Transceivers

End	Ruijie Optical Transceiver Model	Center Wavelength	Connector Type	Fiber Type	Modular Bandwidth (MHz·km)	Maximum Cabling Distance
A	400G-QDD-SR4-MM850 400G-Q112-VR4-MM850	850 nm	MPO-8/APC	Multimode	2000	30 m (OM3)
					4700	50 m (OM4)
B	200G-Q112-VR2-MM850 200G-Q56-VR2-MM850	850 nm	MPO-4/APC	Multimode	2000	30 m (OM3)
					4700	50 m (OM4)

6.3.1 MPO8-2MPO4-OM4-xxM

The MPO8-2MPO4-OM4-xxM is an OM4 MMF with a 3-meter trunk and a breakout point closer to the MPO8 connector at end A (400G transceiver). It can be used to pair a 400G-QDD-SR4-MM850 or 400G-Q112-VR4-MM850 module with two 200G-Q112-VR2-MM850 or 200G-Q56-VR2-MM850 modules for data transmission over a distance of up to 50 m.

Table 6-6 MPO8-2MPO4-OM4-xxM Fiber Jumpers

Model	Cable Length	Trunk Cable Length (Distance from the Breakout Point to the 400G Transceiver)	Breakout Cable Length (Distance from the Breakout Point to the 200G Transceiver)	Cable Color	Sheath Color	Boot Color of End A	Boot Color of End B
MPO8-2MPO4-OM4-5M	5 m	3 m	2 m	Heather violet	Purple	Black	Green
MPO8-2MPO4-OM4-7M	7 m	3 m	4 m	Heather violet	Purple	Black	Green
MPO8-2MPO4-OM4-10M	10 m	3 m	7 m	Heather violet	Purple	Black	Green
MPO8-2MPO4-OM4-15M	15 m	3 m	12 m	Heather violet	Purple	Black	Green
MPO8-2MPO4-OM4-20M	20 m	3 m	17 m	Heather violet	Purple	Black	Green
MPO8-2MPO4-OM4-30M	30 m	3 m	27 m	Heather violet	Purple	Black	Green

6.3.2 MPO8-2MPO4-OM4-xxM(B)

The MPO8-2MPO4-OM4-xxM(B) is an OM4 MMF with a 3-meter breakout and a breakout point closer to the MPO4 connector at end B (200G transceiver). It can be used to pair a 400G-QDD-SR4-MM850 or 400G-Q112-VR4-MM850 module with two 200G-Q112-VR2-MM850 or 200G-Q56-VR2-MM850 modules for data transmission over a distance of up to 50 m.

Table 6-7 MPO8-2MPO4-OM4-xxM(B) Fiber Jumpers

Model	Cable Length	Trunk Cable Length (Distance from the Breakout Point to the 400G Transceiver)	Breakout Cable Length (Distance from the Breakout Point to the 200G Transceiver)	Cable Color	Sheath Color	Boot Color of End A	Boot Color of End B
MPO8-2MPO4-OM4-10M(B)	10 m	7 m	3 m	Heather violet	Purple	Black	Green

MPO8-2MPO4-OM4-15M(B)	15 m	12 m	3 m	Heather violet	Purple	Black	Green
MPO8-2MPO4-OM4-20M(B)	20 m	17 m	3 m	Heather violet	Purple	Black	Green

7 MPO-MPO(APC) Series SMF Optics

The MPO-MPO(APC) series SMF optics feature the 8-fiber MPO connector. The 8-fiber MPO trunk jumper is designed for direct connections to the 400G-QDD-DR4-SM1310, 400G-Q112-DR4-SM1310, or 400G-OSFP-DR4-SM1310 modules, supporting 400G transmission in ultra-large data centers.

7.1 Appearance

Figure 7-1 shows the structure of the MPO-MPO(APC) SMF optics. It features MPO connectors (female connectors with APC end face), B-type cabling, and 8-fiber SMF. Figure 7-2 shows the actual appearance, and Figure 7-3 shows connectors. Figure 7-4 shows the mappings between channels.

Figure 7-1 Structure of MPO-MPO(APC) Series SMF Optics

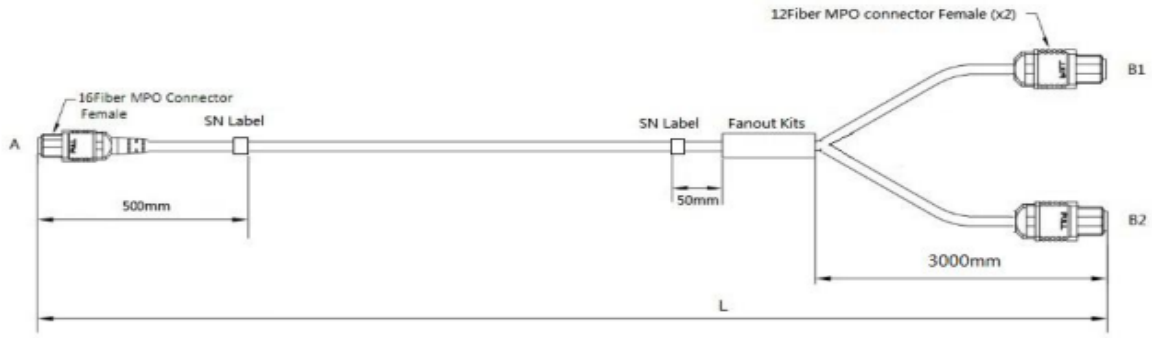
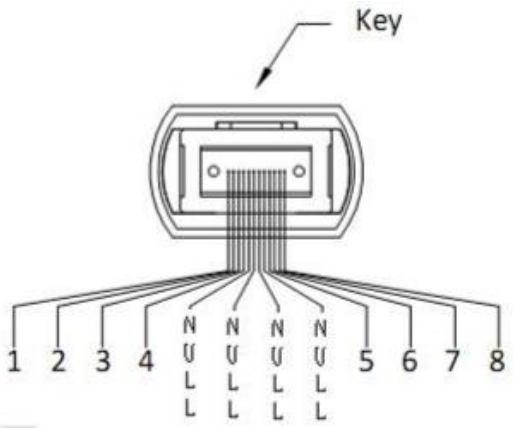


Figure 7-2 Appearance of MPO-MPO(APC) Series SMF Optics

Figure 7-3 8-Fiber MPO-APC Connectors

Figure 7-4 8-Fiber MPO Jumper Channels

P1 Fiber Number	CABLE Buffer Color	P2 Fiber Number
Fiber 1	Blue	Fiber 8
Fiber 2	Orange	Fiber 7
Fiber 3	Green	Fiber 6
Fiber 4	Brown	Fiber 5
NULL		NULL
NULL		NULL
NULL		NULL
NULL		NULL
Fiber 5	Gray	Fiber 4
Fiber 6	White	Fiber 3
Fiber 7	Red	Fiber 2
Fiber 8	Black	Fiber 1



Note

The appearance diagram is for reference only. The actual appearance of fibers in different lengths may vary.

7.2 Hardware Specifications

Table 7-1 Temperature and Humidity Requirements

Operating Temperature	–20ºC to +60ºC (–4ºF to +140ºF)
Storage Temperature	–20ºC to +60ºC (–4ºF to +140ºF)
Operating Humidity	≤ 85% RH
Storage Humidity	≤ 95% RH

Table 7-2 MPO-MPO(APC) SMF Specifications

Connector Type	MPO/APC-MPO/APC	**Fiber Grade**	G.657 A2
Fiber Type	OS2 9/125 μm	**Wavelength**	1310 nm
Minimum Bend Radius	10 mm	**Number of Strands**	8
Outer Diameter	2.9 mm to 3.1 mm	**Repeatability**	< 0.3 dB
Return Loss	≥ 60 dB	**Insertion Loss**	≤ 0.7 dB

7.3 Product Description

Table 7-3 MPO-MPO(APC) Single-Mode Fiber Jumpers

Model	Connector Type	Cable Type
MPO-MPO-SM-xxM(APC)	MPO8/UPC- MPO8/UPC	Single-mode

Table 7-4 Models of Paired Optical Transceivers

Ruijie Optical Transceiver Model	Form Factor	Center Wavelength	Connector Type	Fiber Type	Maximum Cabling Distance
400G-QDD-DR4-SM1310	QSFP-DD	1310 nm	MPO-8/APC	Single-mode	500 m
400G-Q112-DR4-SM1310	QSFP112	1310 nm	MPO-8/APC	Single-mode	500 m
400G-OSFP-DR4-SM1310	OSFP	1310 nm	MPO-8/APC	Single-mode	500 m

7.3.1 MPO-MPO-SM-xxM(APC)

The MPO-MPO-SM-xx(APC) is an OS2 SMF with 8-fiber MPO/APC connectors at both ends. It supports direct connections to the 400G-QDD-DR4-SM1310, 400G-Q112-DR4-SM1310, or 400G-OSFP-DR4-SM1310 modules for data transmission over a distance of up to 500 m.

Table 7-5 MPO-MPO-SM-xx(APC) Fiber Jumpers

Model	Cable Length	Fiber Type	Cable Color	Sheath Color	Boot Color
MPO-MPO-SM-1M(APC)	1 m	OS2	Yellow	Green	Black
MPO-MPO-SM-3M(APC)	3 m	OS2	Yellow	Green	Black
MPO-MPO-SM-5M(APC)	5 m	OS2	Yellow	Green	Black
MPO-MPO-SM-10M(APC)	10 m	OS2	Yellow	Green	Black
MPO-MPO-SM-15M(APC)	15 m	OS2	Yellow	Green	Black
MPO-MPO-SM-20M(APC)	20 m	OS2	Yellow	Green	Black
MPO-MPO-SM-30M(APC)	30 m	OS2	Yellow	Green	Black
MPO-MPO-SM-50M(APC)	50 m	OS2	Yellow	Green	Black

Model	Cable Length	Fiber Type	Cable Color	Sheath Color	Boot Color
MPO-MPO-SM-60M(APC)	60 m	OS2	Yellow	Green	Black
MPO-MPO-SM-70M(APC)	70 m	OS2	Yellow	Green	Black
MPO-MPO-SM-80M(APC)	80 m	OS2	Yellow	Green	Black
MPO-MPO-SM-100M(APC)	100 m	OS2	Yellow	Green	Black

8 LC2-LC2(UPC) Series SMF Optics

The LC-LC(UPC) series SMF optics feature 9/125 μm OS2 SMFs, which exhibit reduced attenuation when bent or twisted, thereby enhancing the efficiency of jumper installation and maintenance. The LC-LC(UPC) SMF optics save more space in high-density cabling environments such as data centers, enterprise networks, telecom equipment rooms, server farms, cloud storage networks, and any location requiring fiber patch jumpers. They are ideal for 1G, 10G, 25G, 40G, 100G, 200G, and 400G Ethernet connections.

8.1 Appearance

Figure 8-1 shows the structure of the LC2-LC2(UPC) series SMF optics. It features the duplex LC SMF and dual-fiber cable. Figure 8-2 shows the actual appearance, and Figure 8-3 shows connectors.

Figure 8-1 Structure of LC2-LC2-SM-xxM(UPC) Series SMF Optics

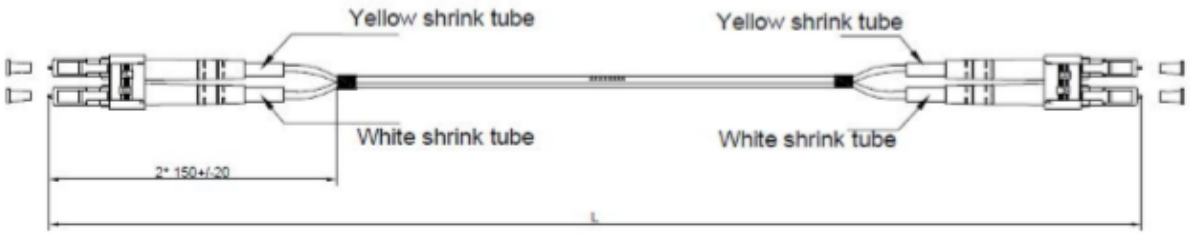


Figure 8-2 Appearance of LC2-LC2-SM-xxM(UPC) Series SMF Optics

Figure 8-3 LC2-LC2 Connectors

Note

The appearance diagram is for reference only. The actual appearance of fibers in different lengths may vary.

8.2 Hardware Specifications

Table 8-1 Temperature and Humidity Requirements

Operating Temperature	0ºC to 60ºC (32ºF to 140ºF)
Storage Temperature	–20ºC to +60ºC (–4ºF to +140ºF)
Operating Humidity	≤ 85% RH
Storage Humidity	≤ 95% RH

Table 8-2 LC2-LC2(UPC) SMF Specifications

Connector Type	LC/UPC-LC/UPC	**Fiber Grade**	G.657 A2
Fiber Type	OS2 9/125 μm	**Wavelength**	1310/1550 nm
Minimum Bend Radius (Core)	10 mm	**Minimum Bend Radius (Cable)**	10 mm/5D (dynamic/static)
Outer Diameter	1.9 mm to 2.1 mm	**Number of Strands**	Duplex
Return Loss	≥ 50 dB	**Insertion Loss**	≤ 0.3 dB

8.3 Product Description

Table 8-3 LC2-LC2 (UPC) Single-Mode Fiber Jumpers

Model	Connector Type	Cable Type
LC2-LC2-SM-xxM(UPC)	LC2/UPC- LC2/UPC	Single-mode

Table 8-4 Models of Paired Optical Transceivers

Ruijie Optical Transceiver Model	Data Rate	Center Wavelength	Connector Type	Fiber Type	Maximum Cabling Distance
GE-LX-SM1310	1.25 Gbps	1310 nm	Duplex LC	Single-mode	10 km
MINI-GBIC-LX-SM1310	1.25 Gbps	1310 nm	Duplex LC	Single-mode	10 km
MINI-GBIC-LH40-SM1310	1.25 Gbps	1310 nm	Duplex LC	Single-mode	40 km
MINI-GBIC-ZX80-SM1550	1.25 Gbps	1550 nm	Duplex LC	Single-mode	80 km
XG-SFP-iLR-SM1310-I	10.3125 Gbps	1310 nm	Duplex LC	Single-mode	1.4 km
XG-SFP-LR-SM1310	10.3125 Gbps	1310 nm	Duplex LC	Single-mode	10 km
SFP-S1-R1000P1	10.3125 Gbps	1310 nm	Duplex LC	Single-mode	10 km
XG-SFP-ER-SM1550	10.3125 Gbps	1550 nm	Duplex LC	Single-mode	40 km
XG-SFP-ZR-SM1550	10.3125 Gbps	1550 nm	Duplex LC	Single-mode	80 km
VG-SFP-LR-SM1310	25.78125 Gbps	1310 nm	Duplex LC	Single-mode	10 km
40G-QSFP-LR4-SM1310	41.25 Gbps	1310 nm	Duplex LC	Single-mode	10 km
40G-QSFP-iLR4-SM1310	41.25 Gbps	1310 nm	Duplex LC	Single-mode	2 km
100G-QSFP-DR1-SM1310	103.125 Gbps	1310 nm	Duplex LC	Single-mode	500 m
100G-QSFP-LR4-SM1310	103.125 Gbps	1310 nm	Duplex LC	Single-mode	10 km
100G-QSFP-iLR4-SM1310	103.125 Gbps	1310 nm	Duplex LC	Single-mode	2 km
100G-QSFP-ER4-SM1310	103.125 Gbps	1310 nm	Duplex LC	Single-mode	40 km

Ruijie Optical Transceiver Model	Data Rate	Center Wavelength	Connector Type	Fiber Type	Maximum Cabling Distance
200G-QSFP-FR4-SM1310	212.5 Gbps	1310 nm	Duplex LC	Single-mode	2 km
400G-QDD-FR4-SM1310	425 Gbps	1310 nm	Duplex LC	Single-mode	2 km

8.3.1 LC2-LC2-SM-xxM(UPC)

The LC2-LC2-SM-xxM(UPC) is an OS2 SMF with duplex LC/UPC connectors. It supports direct connection to the single-mode optical transceiver with duplex LC connectors.

Table 8-5 LC2-LC2-SM-xxM(UPC) Fiber Jumpers

Model	Cable Length	Fiber Type	Cable Color	Boot Color
LC2-LC2-SM-1M(UPC)	1 m	OS2	Yellow	White
LC2-LC2-SM-3M(UPC)	3 m	OS2	Yellow	White
LC2-LC2-SM-5M(UPC)	5 m	OS2	Yellow	White
LC2-LC2-SM-10M(UPC)	10 m	OS2	Yellow	White
LC2-LC2-SM-15M(UPC)	15 m	OS2	Yellow	White
LC2-LC2-SM-20M(UPC)	20 m	OS2	Yellow	White
LC2-LC2-SM-30M(UPC)	30 m	OS2	Yellow	White
LC2-LC2-SM-50M(UPC)	50 m	OS2	Yellow	White
LC2-LC2-SM-60M(UPC)	60 m	OS2	Yellow	White
LC2-LC2-SM-70M(UPC)	70 m	OS2	Yellow	White
LC2-LC2-SM-80M(UPC)	80 m	OS2	Yellow	White
LC2-LC2-SM-100M(UPC)	100 m	OS2	Yellow	White

9 MPO8-4LC 1-to-4 Breakout Optics

The MPO8/APC-4LC/UPC breakout optics feature an 8-fiber MPO connector at end A, connected to a 400G-QDD-DR4-SM1310 or 400G-Q112-DR4-SM1310 module through an 8-fiber MPO trunk cable, and duplex LC connectors at ends B1 to B4, connected to 100G-QSFP-DR1-SM1310 modules.

9.1 Appearance

Figure 9-1 shows the structure of the MPO8-4LC breakout optics. It features the 8-fiber MPO connector (female connectors with UPC end face) at end A, B-type cabling, and four duplex LC or UPC connectors at end B, as shown in Figure 9-2. Figure 9-3 shows the mappings between channels.

Figure 9-1 Structure of MPO8-4LC Series Breakout Optics

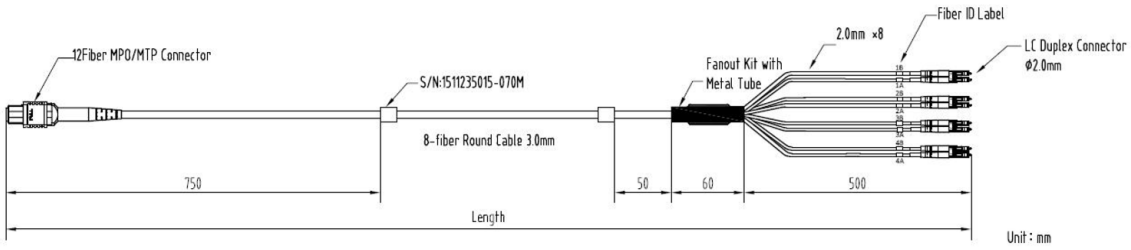


Figure 9-2 8-Fiber MPO Connector at End A (Left) and LC Connector at End B (Right)

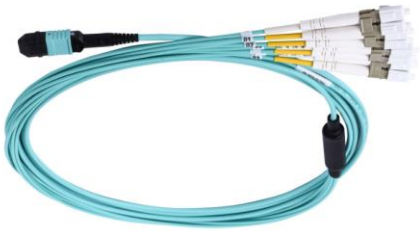


Figure 9-3 MT Channels

MPO Connector	Cable buffer color	LC Connector
1	Blue	1B
2	Orange	2B
3	Green	3B
4	Brown	4B
5	Null	×
6	Null	×
7	Null	×
8	Null	×
9	Grey	4A
10	White	3A
11	Red	2A
12	Black	1A

Note

The appearance diagram is for reference only. The actual appearance of fibers in different lengths may vary.

9.2 Hardware Specifications

Table 9-1 Temperature and Humidity Requirements

Operating Temperature	–10ºC to +60ºC (14ºF to 140ºF)
Storage Temperature	–20ºC to +60ºC (–4ºF to +140ºF)
Operating Humidity	≤ 85% RH
Storage Humidity	≤ 95% RH

Table 9-2 Specifications of the MPO8 Connector at End A

Connector Type	MPO8	**Ferrule Type**	APC (SM) or UPC (MM)
Minimum Bend Radius	7 mm	**Outer Sheath Material**	LSZH
Outer Diameter	2.9 mm to 3.1 mm	**Repeatability**	< 0.3 dB
Return Loss	≥ 40 dB	**Insertion Loss**	≤ 0.5 dB
Allowable Tensile Force	130 N	**Crushing Force**	200 N/100 mm

Table 9-3 LC2-LC2(UPC) SMF Specifications

Connector Type	LC/UPC-LC/UPC	**Outer Sheath Material**	LSZH
Minimum Bend Radius (Core)	10 mm	**Minimum Bend Radius (Cable)**	10 mm/5D (dynamic/static)
Outer Diameter	1.9 mm to 2.1 mm	**Number of Strands**	Duplex
Return Loss	≥ 50 dB	**Insertion Loss**	≤ 0.3 dB

9.3 Product Description

Table 9-4 MP8-2MPO4 Fiber Jumpers

Model	Breakout Point	Fiber Type	Length
QSFP-MPO8-4LC-SM-30M	Closer to the LC connector at end B	Single-mode	30 m
QSFP-MPO8-4LC-MM-3M	Closer to the LC connector at end B	Multimode	3 m
QSFP-MPO8-4LC-MM-10M	Closer to the LC connector at end B	Multimode	10 m

9.3.1 QSFP-MPO8-4LC-SM-xxM

The QSFP-MPO8-4LC-SM-xxM is an OS2 SMF with a breakout point closer to the LC connector at end B. It can be used to pair a 400G-QDD-DR4-SM1310 or 400G-Q112-DR4-SM1310 module with four 100G-QSFP-DR1-SM1310 modules for data transmission over a distance of up to 50 m.

Table 9-5 Models of Paired Optical Transceivers

End	Ruijie Optical Transceiver Model	Center Wavelength	Connector Type	Fiber Type	Maximum Cabling Distance
A	400G-QDD-DR4-SM1310 400G-Q112-DR4-SM1310	1310 nm	MPO8/APC	Single-mode	500 m
B	100G-QSFP-DR1-SM1310	1310 nm	LC/UPC	Multimode	500 m

Table 9-6 QSFP-MPO8-4LC-SM-xxM Fiber Jumpers

Model	Cable Length	Fiber Type	Cable Color
QSFP-MPO8-4LC-SM-30M	30 m	OS2	Yellow

9.3.2 QSFP-MPO8-4LC-MM-xxM

The QSFP-MPO8-4LC-SM-xxM is an OM3 MMF with a breakout point closer to the LC connector at end B. It can be used to pair a 100G-QSFP-SR-MM850 module with four VG-SFP-SR-MM850 modules, or pair a 40G-QSFP-SR-MM850 module with four XG-SFP-SR-MM850 modules.

Table 9-7 Models of Paired Optical Transceivers

End	Ruijie Optical Transceiver Model	Center Wavelength	Connector Type	Fiber Type	Maximum Cabling Distance
A	100G-QSFP-SR-MM850	850 nm	MPO8/UPC	OM3	70 m
B	VG-SFP-SR-MM850	850 nm	LC/UPC	OM3	
End	**Ruijie Optical Transceiver Model**	**Center Wavelength**	**Connector Type**	**Fiber Type**	**Maximum Cabling Distance**
A	40G-QSFP-SR-MM850	850 nm	MPO8/UPC	OM3	100 m
B	XG-SFP-SR-MM850	850 nm	LC/UPC	OM3	

Table 9-8 QSFP-MPO8-4LC-MM-xxM Fiber Jumpers

Model	Cable Length	Fiber Type	Cable Color
QSFP-MPO8-4LC-MM-3M	3 m	OM3	Water blue
QSFP-MPO8-4LC-MM-10M	10 m	OM3	Water blue

10 Installation and Precautions

10.1 Precautions

- Before connecting optical fibers, do not remove dust caps. If an optical fiber is connected to an adapter panel interface but not yet plugged into an optical transceiver, keep the dust cap in place.
- Do not touch or scratch the connector's end face when it is not connected to an optical transceiver.
- If the end face is contaminated, use the MPO cleaner or box cleaner to clean the MPO connector, as shown in Figure 10-1. Figure 10-2 shows the inspection criteria for the end face of the MPO connector.

Figure 10-1 Cleaning the Connector

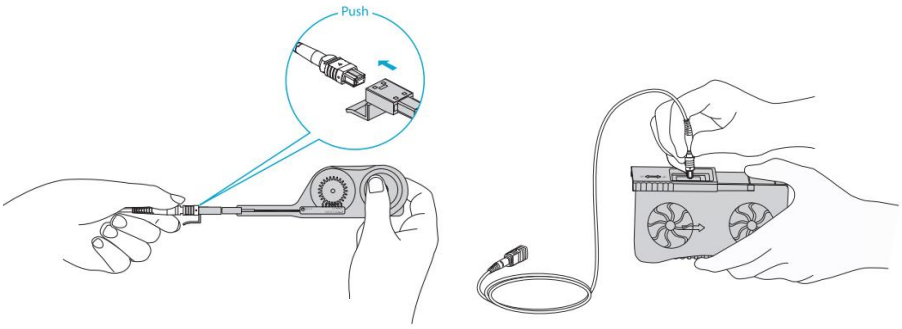
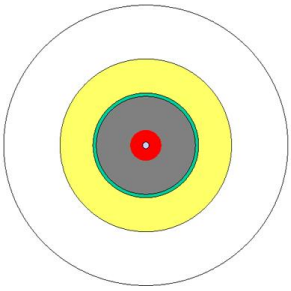


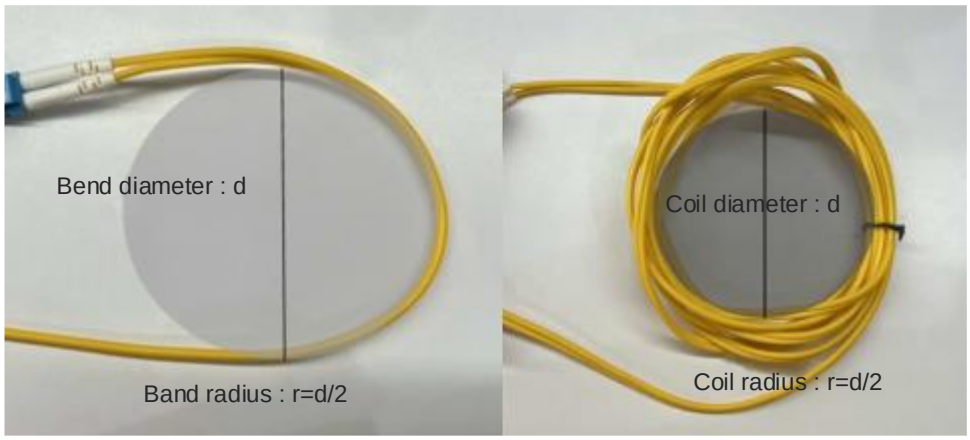
Figure 10-2 MPO Connector End Face Inspection Criteria



Area	Area Range	Defect Determination Criteria		
		Scratches (Width)	Dents (Diameter)	Contamination (Diameter)
A	SMF: 0–25 μm	Zero defects	Zero defects	Invisible
	MMF: 0–65 μm	Scratches with a width of 1 μm or less can be ignored. Up to two scratches with a width of 2 μm or less are acceptable.	Dents with a diameter of 1 μm or less can be ignored. Up to two dents with a diameter of 2μm or less are acceptable.	
B	SMF: 25–120 μm	Up to three scratches with a width of 4 μm or less are acceptable.	Up to three dents with a diameter of 4 μm or less are acceptable.	Invisible
	MMF: 65–120 μm			
C	120–130 um	No requirements	No requirements	Invisible
D	130–250 um	No requirements	No requirements	No requirements

- Hold the connector boot when inserting the MPO connector into an adapter, and hold the connector shell when removing the MPO connector from the adapter.
- When bending a cable, ensure that the bend radius is at least 20 times the cable diameter. Do not overbend the cable (a minimum bend radius of 30 mm is required, with 50 mm recommended.), as shown in Figure 10-3. If the bend radius is too small, the tensile force on the inner core of the optical fiber may be too large, causing damage to the optical fiber.

Figure 10-3 Bend Radius Measurement



- Bundle optical fibers with appropriate tightness and limit the number of cables in a bundle—no more than 100 for 2 mm fibers and no more than 60 for 3 mm fibers—to prevent significant deformation of the outer sheath.
- When routing optical fibers through holes or pipes, use a gentle push-pull method. Avoid forcefully dragging

or pushing the optical fibers to prevent scratches that may damage the optical fibers.

- The label contents should be clear and easy to read.

10.2 Site Requirements

- The installation site should be clean, free from dust, dirt, and other contaminants. To ensure optimal signal transmission, keep optical bores and interfaces clean.
- Temperature and humidity: Optical fibers have specific requirements for temperature and humidity. For details, see product specifications. Extreme conditions can impact the performance and lifespan of the product.
- Electromagnetic interference (EMI): Optical fibers are sensitive to EMI. Avoid strong electromagnetic sources such as motors and power cords at the installation site to prevent interference with optical signals.

10.3 Tools and Materials

- Optical fibers
- Cleaning tools
- Label and identifier
- Brackets and fixture

10.4 Installation Procedure

(1) Plan an optical fiber route.

Determine the start and end points of an optical fiber route, plan and print labels for the optical fiber based on these positions.

(2) Mark both ends of the optical fiber with the same number.

After removing the shell, mark both ends of the optical fiber with the same number to help identify the corresponding fiber connectors during installation.

(3) Designate a working area.

Designate a secure working area and restrict access to authorized personnel only. This will help prevent damage to optical fibers and keep dust, dirt, and contaminants out of the area.

(4) Prepare optical fibers.

In the working area, lay out optical fibers, determine the number of optical fibers (you are advised to reserve an additional 3%), and attach labels to the optical fibers.

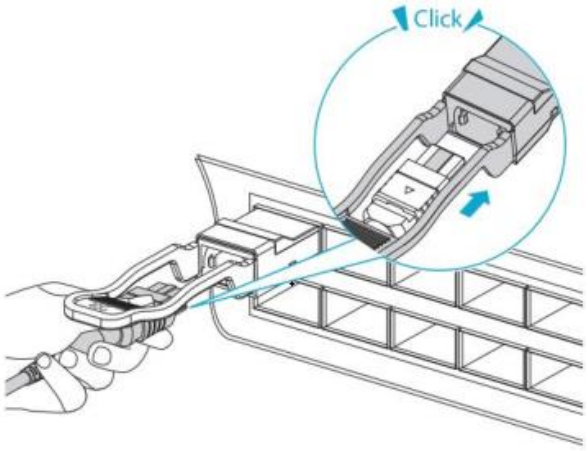
(5) Route optical fibers.

Lay out optical fibers along the planned route, and use brackets and fixture to secure the optical fibers.

(6) Connect optical fibers to endpoint devices.

Remove fiber connector caps and insert optical fibers into endpoint devices. Confirm the orientation of the alignment key and then insert the connector axially into the adapter or socket panel, as shown in Figure 10-4. Avoid repeatedly plugging and unplugging the connector when the end face is not visible.

Figure 10-4 Installing an MPO Fiber Jumper



(7) Test the optical fiber.

Use an optical fiber tester to test the connection quality and signal strength of optical fibers. If the optical fiber is connected to a Ruijie switch, run the **show interfaces transceiver diagnosis** command to query the attenuation after powering on the switch. If the optical power falls within the standard range, the device passes the test.

```
========Interface TenGigabitEthernet 1/11========
Current channel     :  SFX 1/2(Lane3)
Transceiver Type    :  10GBASE-LR8-SFX
Connector Type      :  LC
Mode                :  Single mode
Wavelength(nm)      :
  Lane1: 1271, Lane2: 1291, Lane3: 1311, Lane4: 1331
  Lane5: 1351, Lane6: 1371, Lane7: 1391, Lane8: 1411
Transfer Distance   :
    SMF fiber
        -- 10km
Digital Diagnostic Monitoring  : YES
Vendor Serial Number           : G1SU6UD001579

Current diagnostic parameters[L1-L8:Lane1 - Lane8 AP:Average Power]:
Temp(Celsius)   Voltage(V)      Bias(mA)            RX power(dBm)              TX power(dBm)
38(OK)          3.26(OK)        41.88(OK)[L1]       -7.55(OK)[L1/AP]           5.60(OK)[L1]
                                42.13(OK)[L2]       -6.47(OK)[L2/AP]           4.09(OK)[L2]
                                42.86(OK)[L3]       -7.05(OK)[L3/AP]           5.34(OK)[L3]
                                41.24(OK)[L4]       -6.82(OK)[L4/AP]           4.15(OK)[L4]
                                42.52(OK)[L5]       -8.63(OK)[L5/AP]           5.39(OK)[L5]
                                41.99(OK)[L6]       -6.60(OK)[L6/AP]           4.43(OK)[L6]
                                42.16(OK)[L7]       -5.50(OK)[L7/AP]           5.24(OK)[L7]
                                43.44(OK)[L8]       -6.55(OK)[L8/AP]           5.63(OK)[L8]
```

10.5 Maintenance and Troubleshooting

(1) Check the optical fiber connection regularly.

Check whether the optical fiber connection is loose or damaged.

(2) Clean optical fiber connectors.

Use tools to clean optical fiber connectors to secure connection.

(3) Handle the damaged optical fiber.

If the optical fiber is damaged, discontinue use immediately and contact a professional for repair or replacement.