QUANTIFI PHOTONICS®
A Teradyne Company

PASSIVE

Series

Passive Component Integration

MATRIQ User Manual

quantifiphotonics.com

Trademarks

Quantifi Photonics' trademarks have been identified as such. However, the presence or absence of such identification does not affect the legal status of any trademark. All third party product and company names are trademarks™ or registered® trademarks of their respective holders. Neither Quantifi Photonics nor any software programs or other goods or services offered by Quantifi Photonics are affiliated with, endorsed by, or sponsored by the third parties listed below.

LabVIEW™ is a trademark of National Instruments. MATLAB® is a trademark of The MathWorks Inc. Python® is a trademark of the Python Software Foundation. Microsoft Edge®, and Microsoft Windows® are trademarks of the Microsoft Corporation. Google Chrome™ is a trademark of Google LLC.

Units of Measurement

Units of measurement in this publication conform to SI standards and practices.

CE mark related enquiries

EU Authorized Representative
Certification Company
Veluwezoom 42
1327 AH ALMERE
The Netherlands
+31 (0)36 202 40 37
info@certification-company.com

Manufacturer information

Quantifi Photonics Limited
12-14 Parkway Drive
Rosedale, Auckland 0632
New Zealand

User manual version: 2.08

Table of contents

1 Conventions

Please make yourself familiar with these conventions; we use them throughout this user manual:

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in **death or serious injury**.

Do not proceed unless the required conditions are met and understood.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in **minor or moderate injury** or **component damage**.

Do not proceed unless the required conditions are met and understood.

NOTE

Indicates relevant information that requires your attention.

2 Safety information

Carefully read all safety information before using your Quantifi Photonics product.

2.1 Optical laser radiation precautions

WARNING

To protect yourself from harm caused by optical radiation:

- Do not install or terminate fibers while the light source is active.
- Turn the Quantifi Photonics product OFF before inspecting the end face(s) of the product, or any optical patch cords connected to it.
- Never look directly into a live fiber; ensure that your eyes are protected at all times.

CAUTION

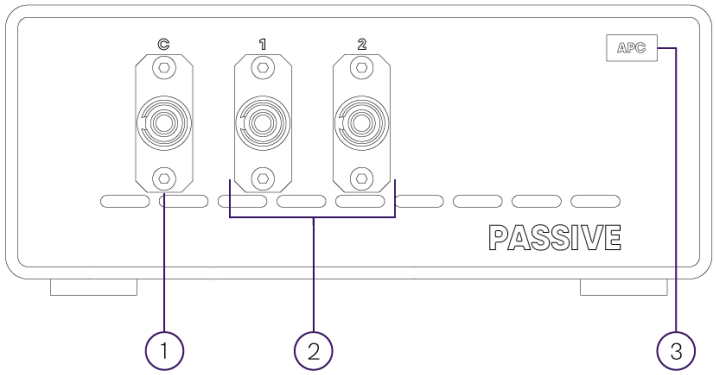
The use of controls, adjustments, and procedures other than those specified in this document may result in exposure to hazardous situations involving optical radiation.

3 Introducing the PASSIVE Series

The PASSIVE Series product are highly customizable products that can integrate the passive components of your choice.

The PASSIVE Series can be customized to a wide range of passive components: WDM couplers, splitters, circulators, band-pass filters, PM beam splitters, MUX, DeMUX and more.

Front:



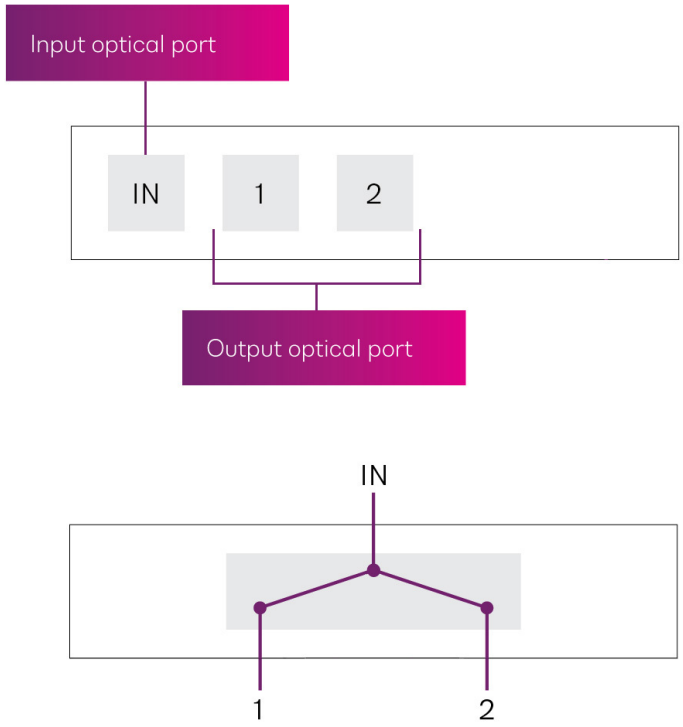
Rear:

1	Input optical port	3	Optical connector type
2	Optical optical port		

3.1 Port mappings

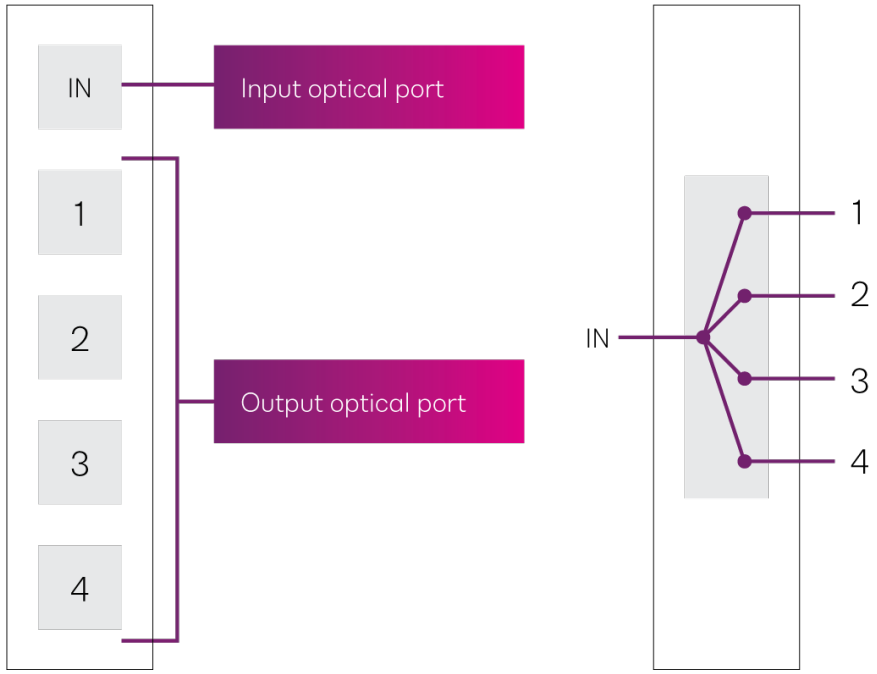
3.1.1 PASSIVE-1001

The PASSIVE-1001 is a 1310 ± 80 nm, 1×2 (50/50) splitter, that equally splits the optical power of the input port into two output ports.



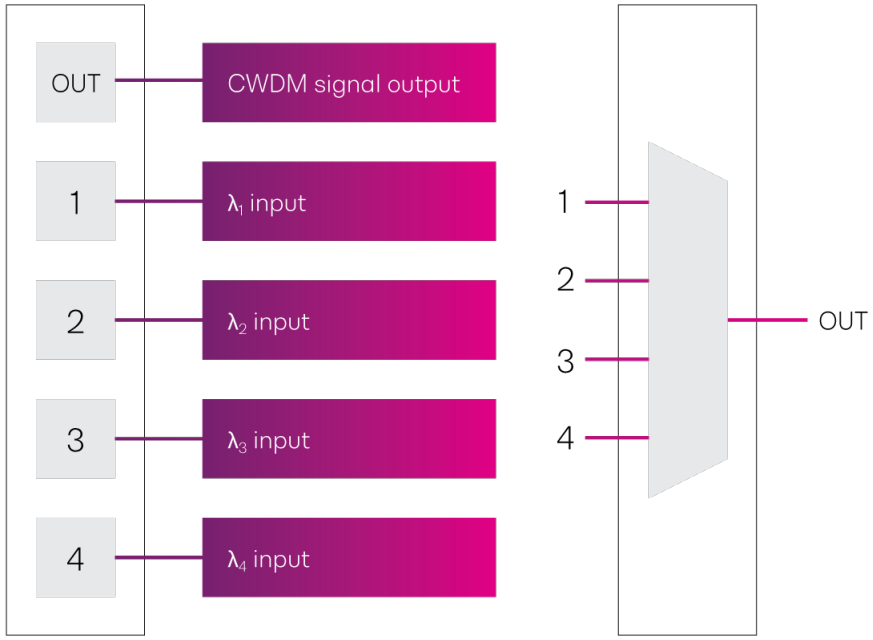
3.1.2 PASSIVE-1002

The PASSIVE-1002 is a 1-slot, 1260 to 1650 nm, 1×4 (25/25/25/25) splitter module, that equally splits the optical power of the input port into four output ports.



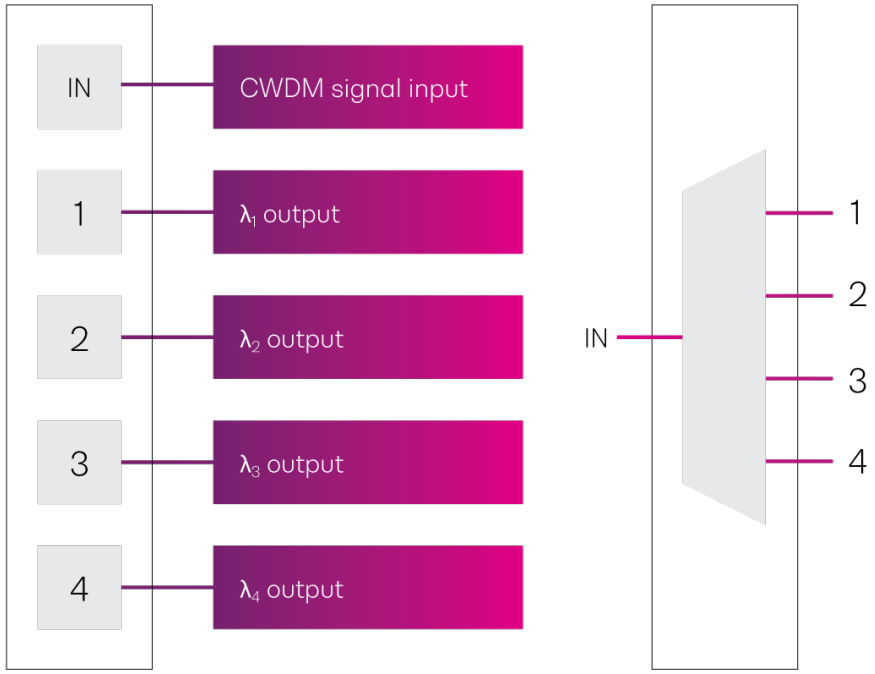
3.1.3 PASSIVE-1006

The PASSIVE-1006 is a 1-slot, CWDM4 MUX module, which combines 4 different fibers each carrying a different wavelength into a single fiber.



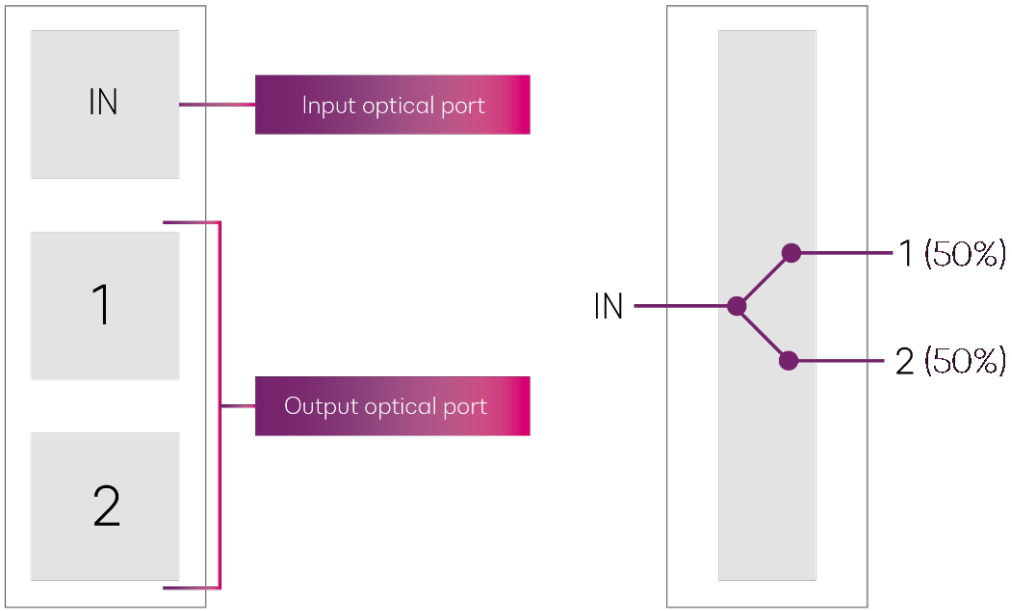
3.1.4 PASSIVE-1007

The PASSIVE-1007 is a 1-slot, CWDM4 DeMUX module, which separates one optical fiber carrying 4 WDM channels into 4 different fibers each carrying a different wavelength.



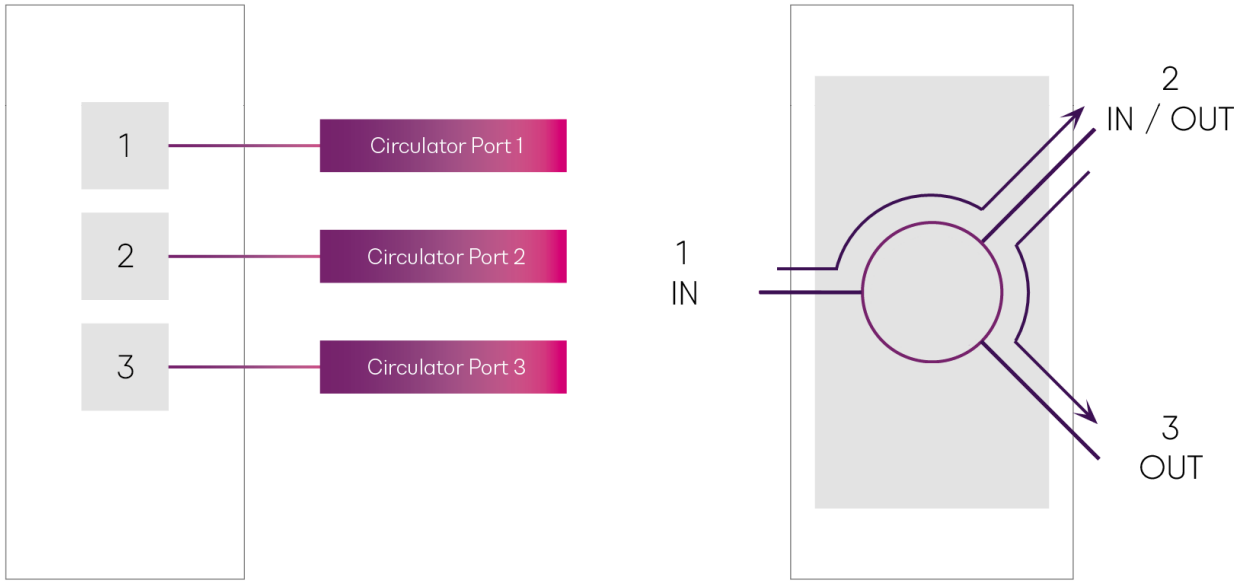
3.1.5 PASSIVE-1008

The PASSIVE-1008 is a 1-slot, single-mode, 1550 ± 80 nm, 1×2 (50/50) splitter module, that equally splits the optical power of the input port into two output ports.



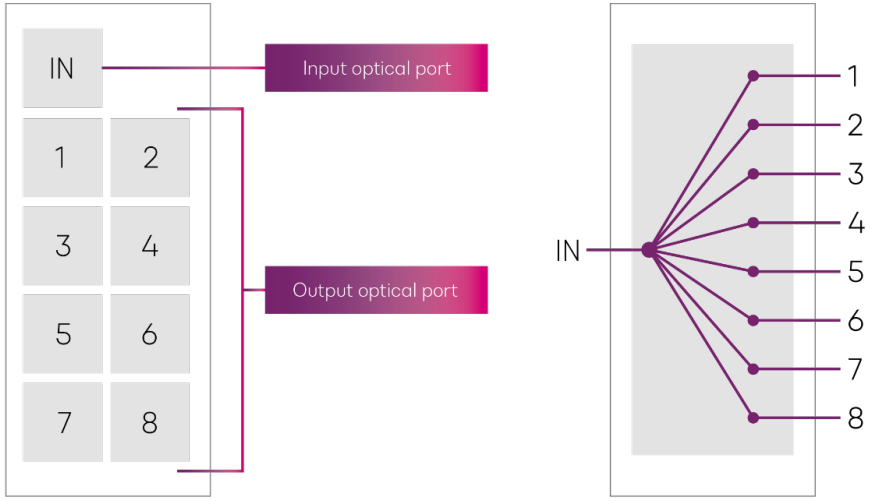
3.1.6 PASSIVE-1009

The PASSIVE-1009 is a 1-slot, 1550 nm optical circulator that transmits the incoming signal as follows:



3.1.7 PASSIVE-1010

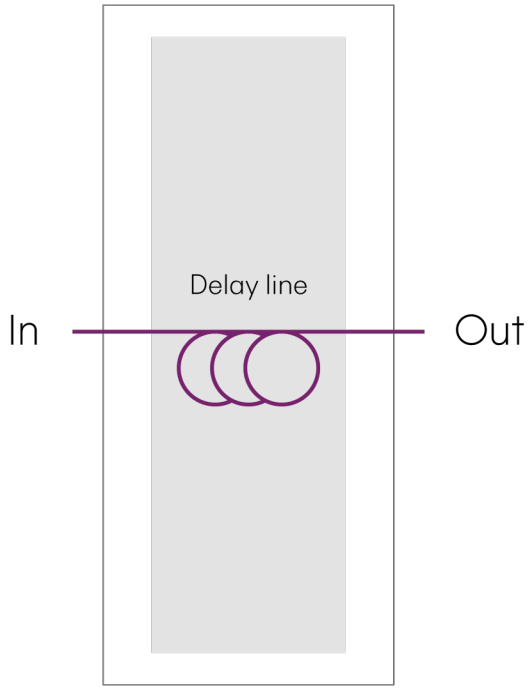
The PASSIVE-1010 is a 2-slot, 1310nm, 1×8 splitter module, that equally splits the optical power of the input port into eight output ports.



3.1.8 PASSIVE-1014

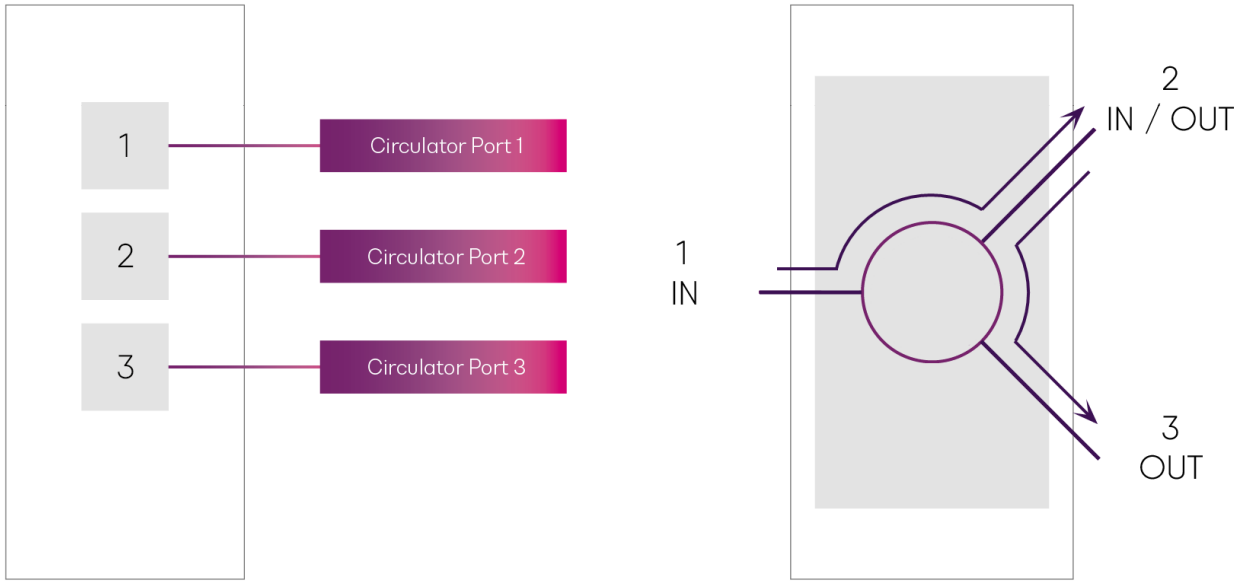
The PASSIVE-1014 is a 2-slot, fixed 1000m fiber delay element.

Delay 4.890µs @ 1310nm, 4.893µs @ 1550nm. SMF-28e fiber.



3.1.9 PASSIVE-1015

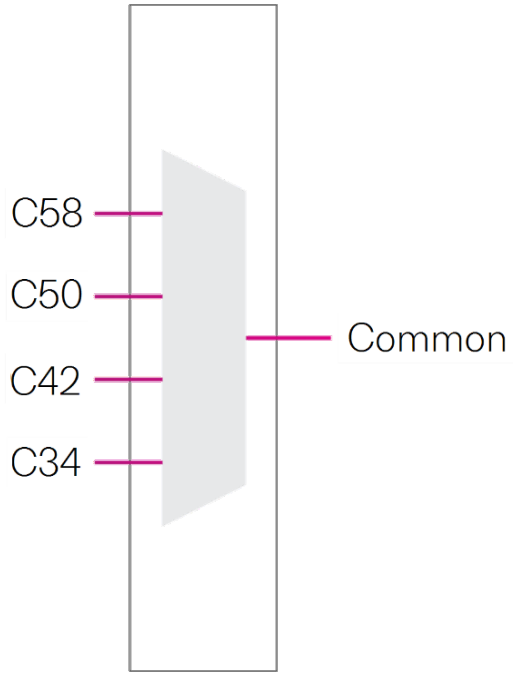
The PASSIVE-1015 is a 1-slot, 1230 to 1390 nm optical circulator that transmits the incoming signal as follows:



3.1.10 PASSIVE-1016

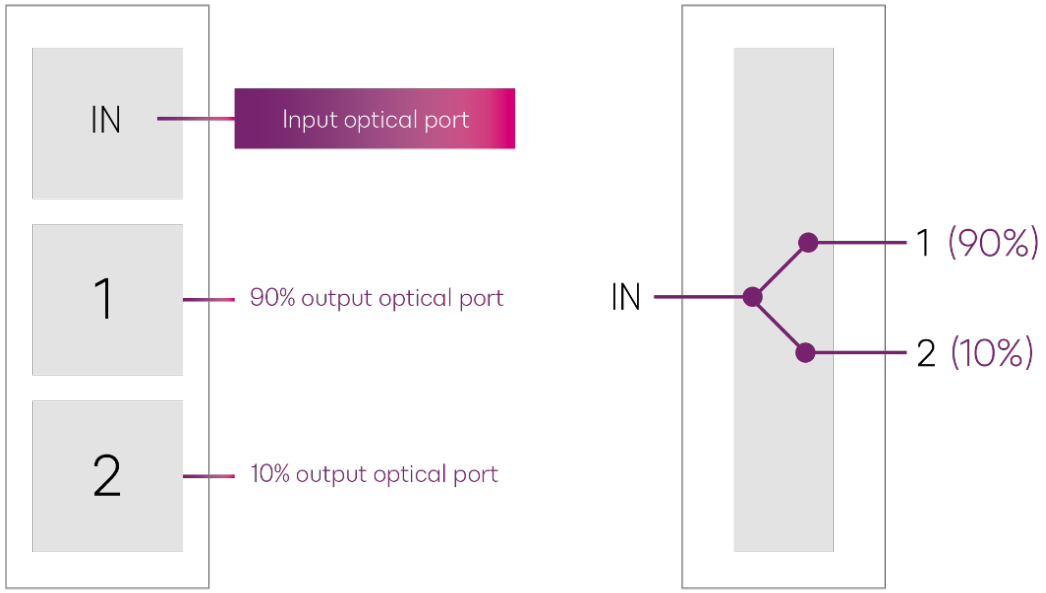
The PASSIVE-1016 is a 1-slot, WDM bi-directional MUX/DEMUX device, which combines 4 different fibers each carrying a different wavelength into a single fiber.

Port 1	Common	
Port 2	C58	1531.116 nm
Port 3	C50	1537.397 nm
Port 4	C42	1543.730 nm
Port 5	C34	1550.116 nm



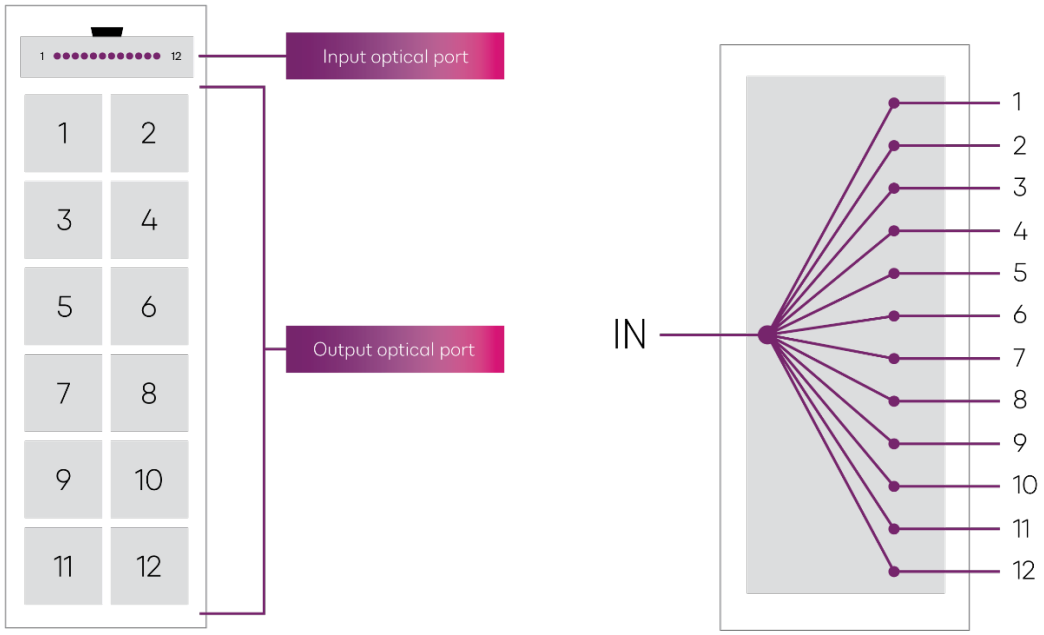
3.1.11 PASSIVE-1017

The PASSIVE-1017 is a 1-slot, single-mode, 1550 nm, 1×2 (90/10) splitter module, that splits the optical power of the input port into two output ports; one containing 90% of the input signal power, the other containing 10% of the input signal power.



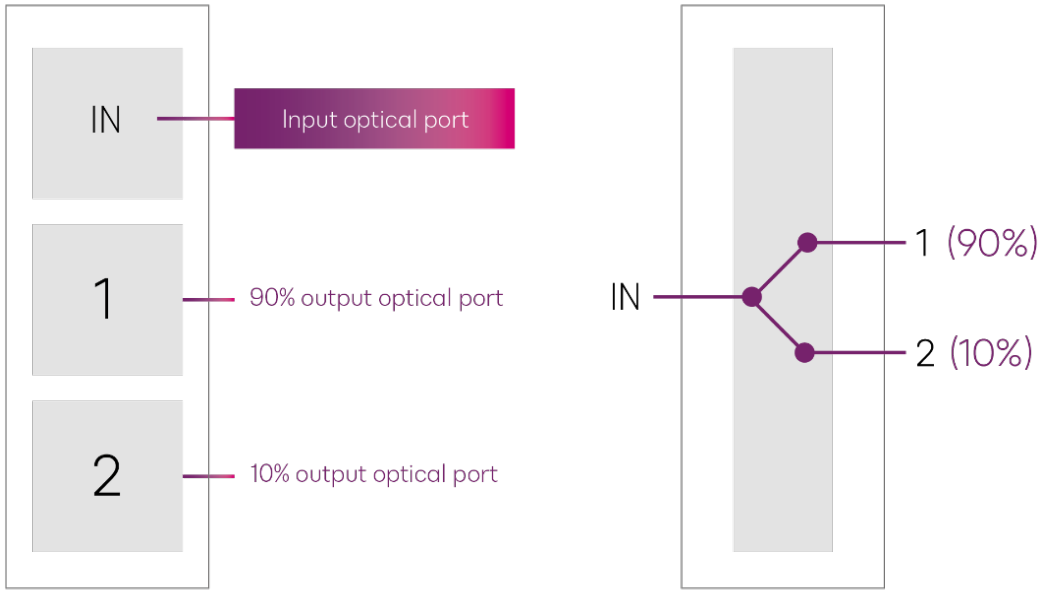
3.1.12 PASSIVE-1018

The PASSIVE-1018 is a 2-slot, passive 12-way breakout module. It enables breaking out a high-density MTP-12 connector (Elite Male, Key up) into 12 SC/APC connectors in single-mode fiber.



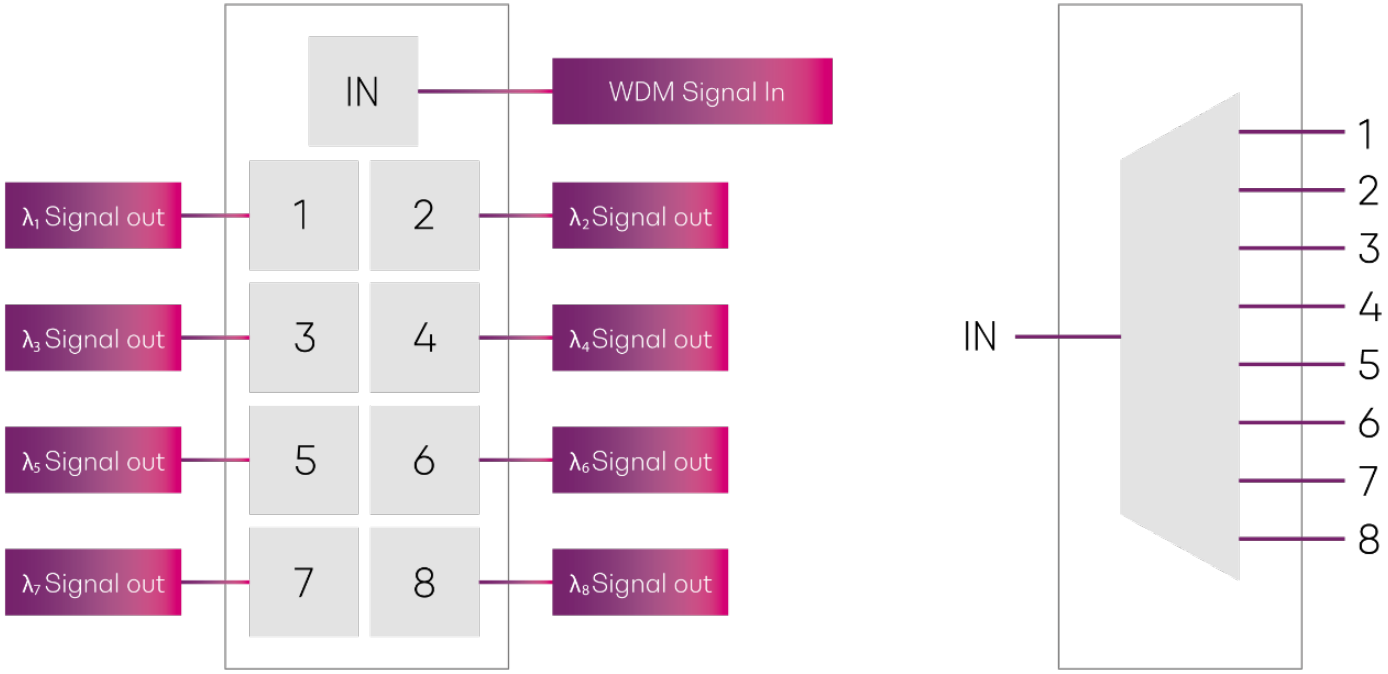
3.1.13 PASSIVE-1019

The PASSIVE-1019 is a 1-slot, 1310 nm, 1×2 (90/10) splitter module, that splits the optical power of the input port into two output ports; one containing 90% of the input signal power, the other containing 10% of the input signal power.



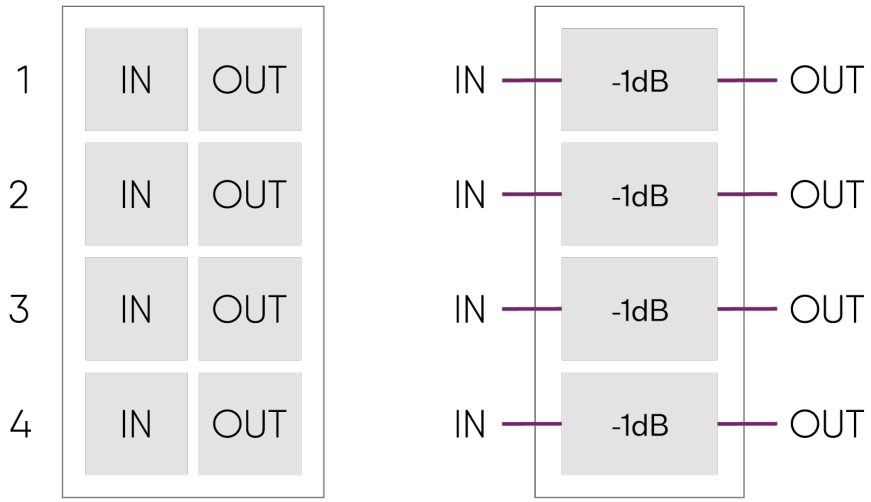
3.1.14 PASSIVE-1020

The PASSIVE-1020 is a 1-slot, bi-directional 1x8 WDM MUX/DEMUX module, which separates one optical fiber carrying 8 WDM channels into 8 different fibers each carrying a different wavelength.



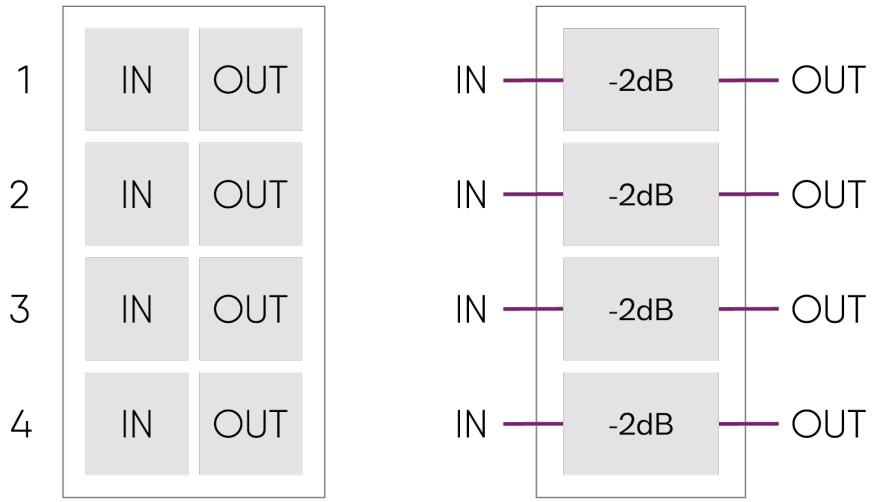
3.1.15 PASSIVE-1021

The PASSIVE-1021 is a 2-slot 4-channel attenuator with a fixed attenuation level of 1dB.



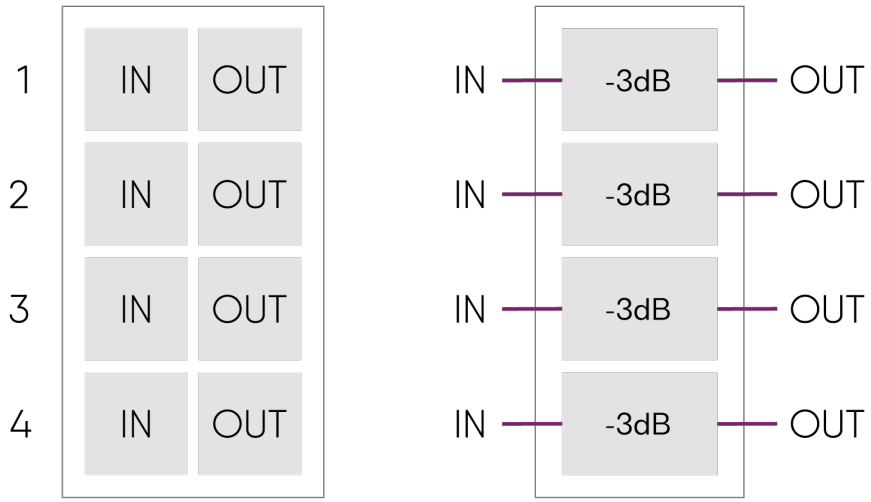
3.1.16 PASSIVE-1022

The PASSIVE-1022 is a 2-slot 4-channel attenuator with a fixed attenuation level of 2dB.



3.1.17 PASSIVE-1023

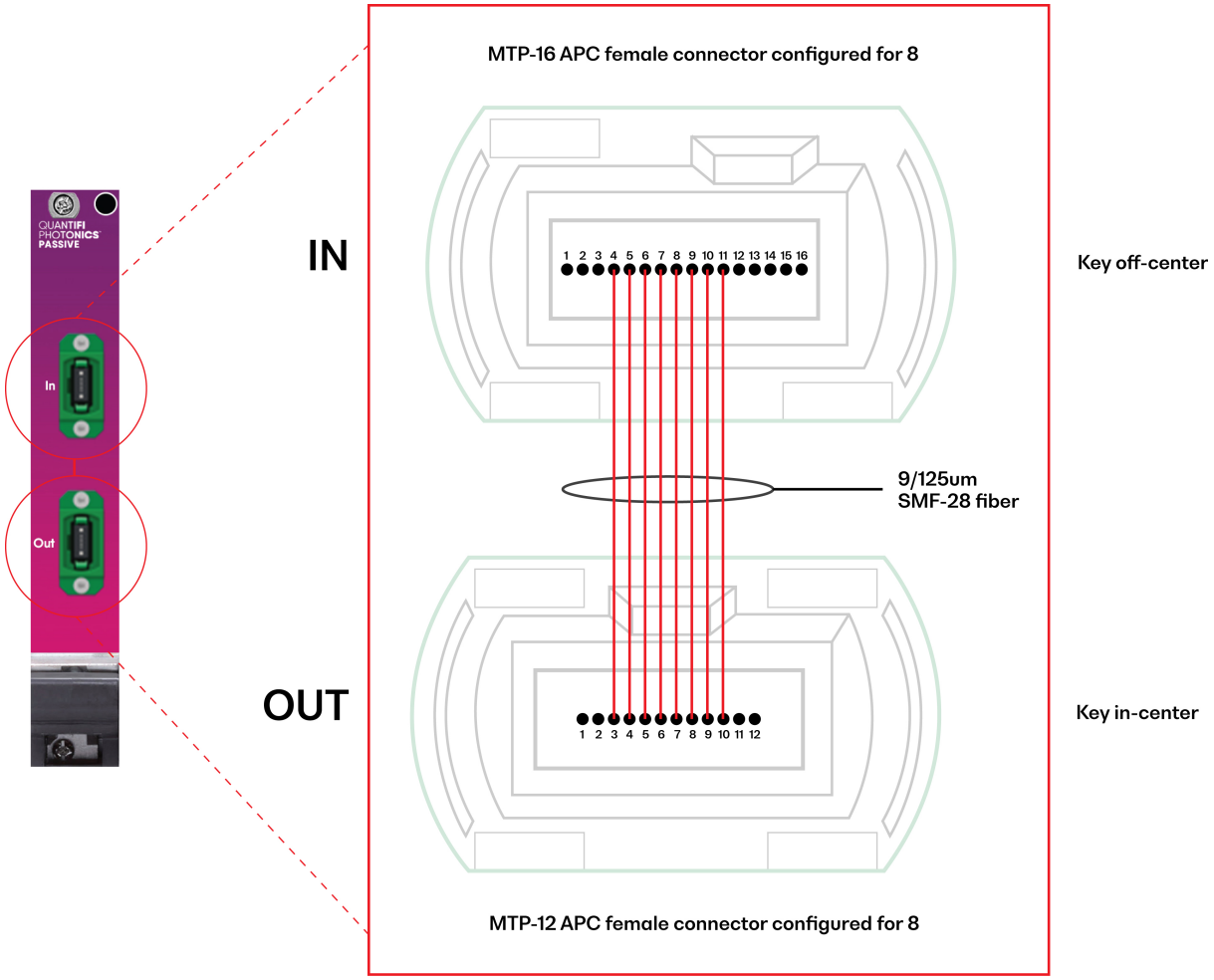
The PASSIVE-1023 Is a 2-slot 4-channel attenuator with a fixed attenuation level of 3dB.



3.1.18 PASSIVE-1026

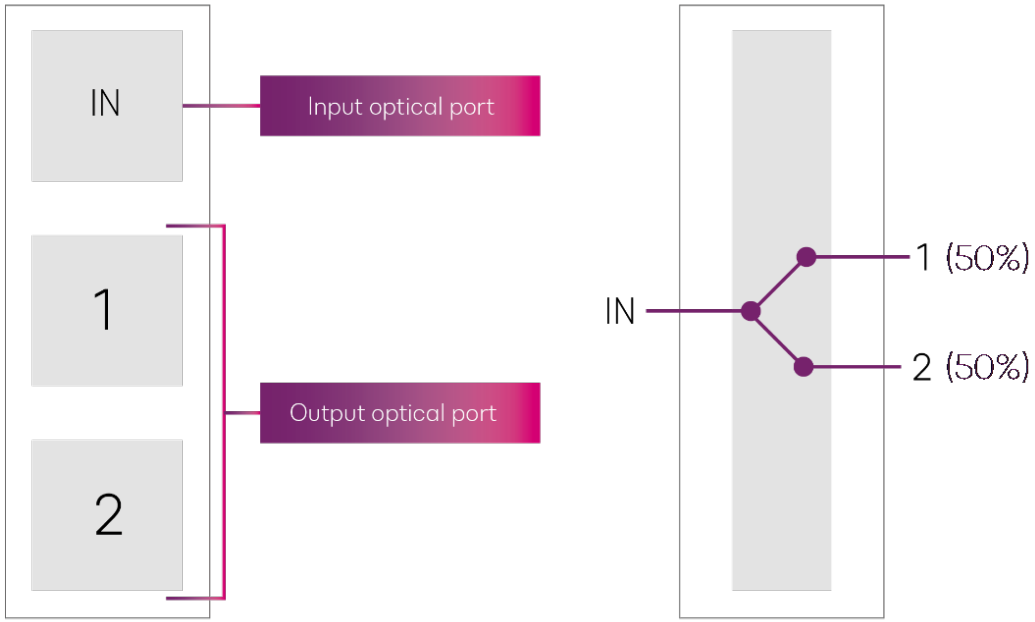
The PASSIVE-1026 is a 1-slot module with an MTP-16 APC input connector and an MTP-12 APC output connector.

9/125um SMF-28 fiber.



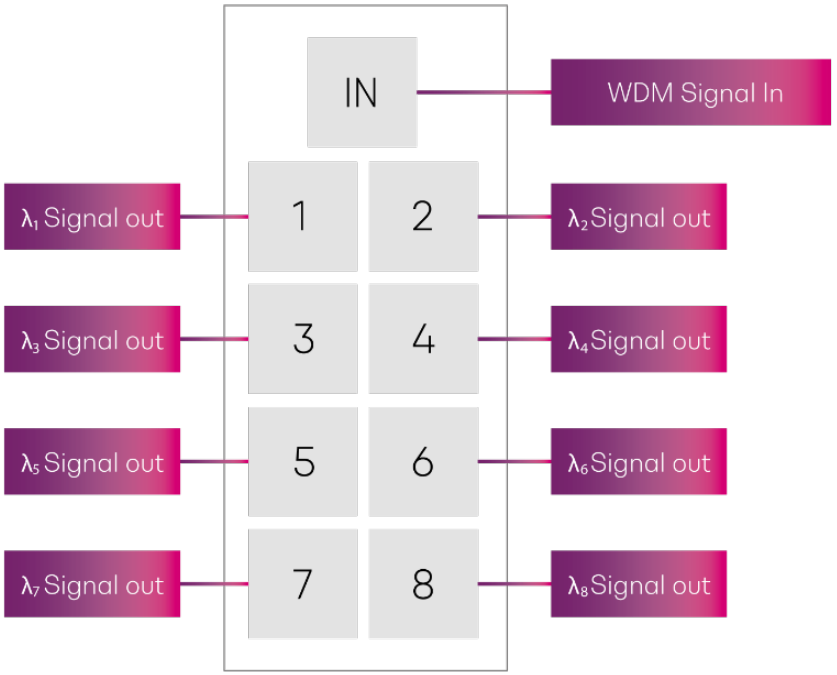
3.1.19 PASSIVE-1301

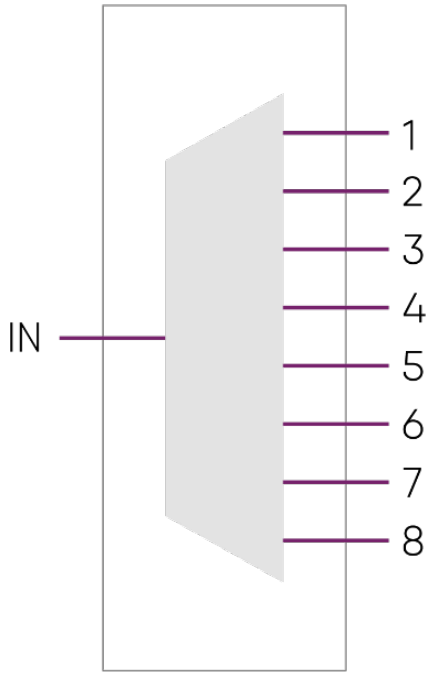
The PASSIVE-1301 is a 1-slot, 1310 nm, 1×2 (50/50) splitter module, that equally splits the optical power of the input port into two output ports.



3.1.20 PASSIVE-1303

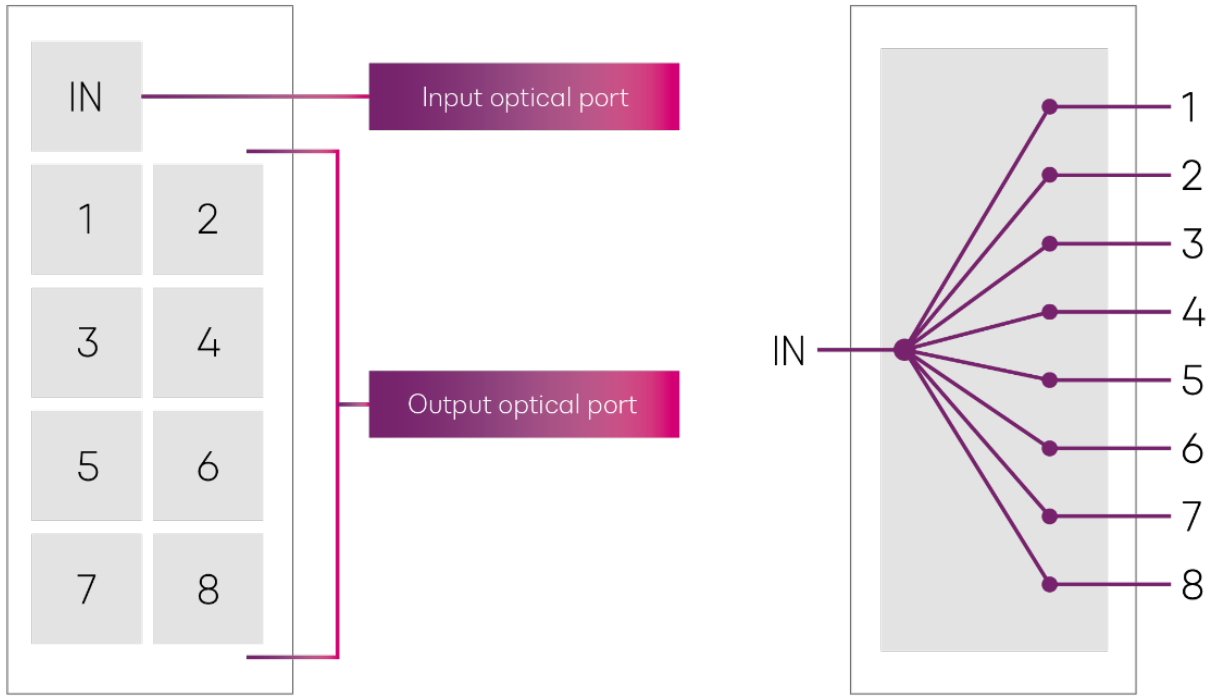
The PASSIVE-1303 is a 1-slot, bi-directional 1x8 polarization maintaining WDM MUX/DEMUX module, which separates one optical fiber carrying 8 WDM channels into 8 different fibers each carrying a different wavelength.





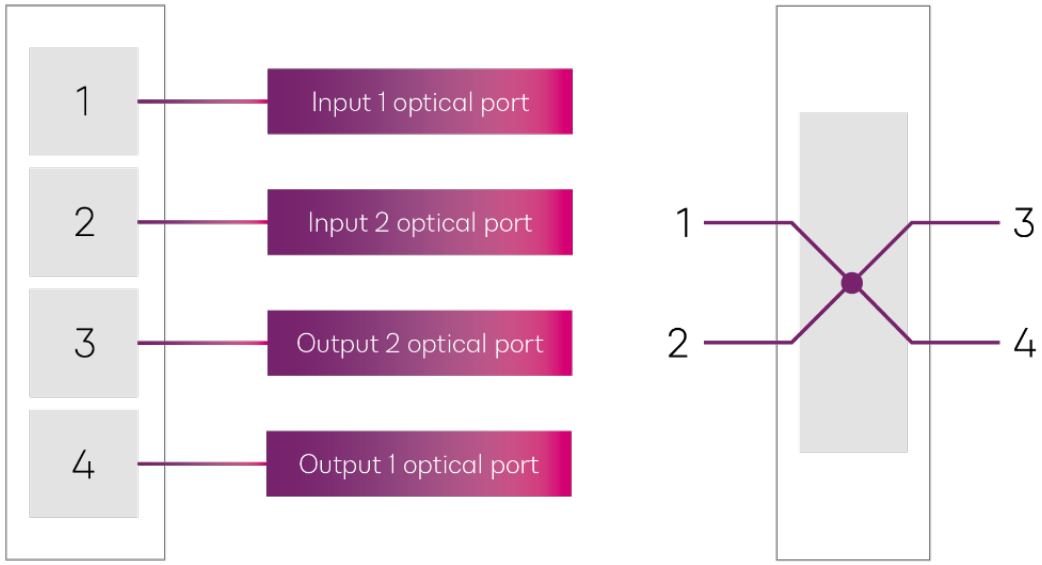
3.1.21 PASSIVE-1304

The PASSIVE-1304 is a 1-slot, 1310 nm, 1×8 polarization maintaining splitter module, that equally splits the optical power of the input port into eight output ports.



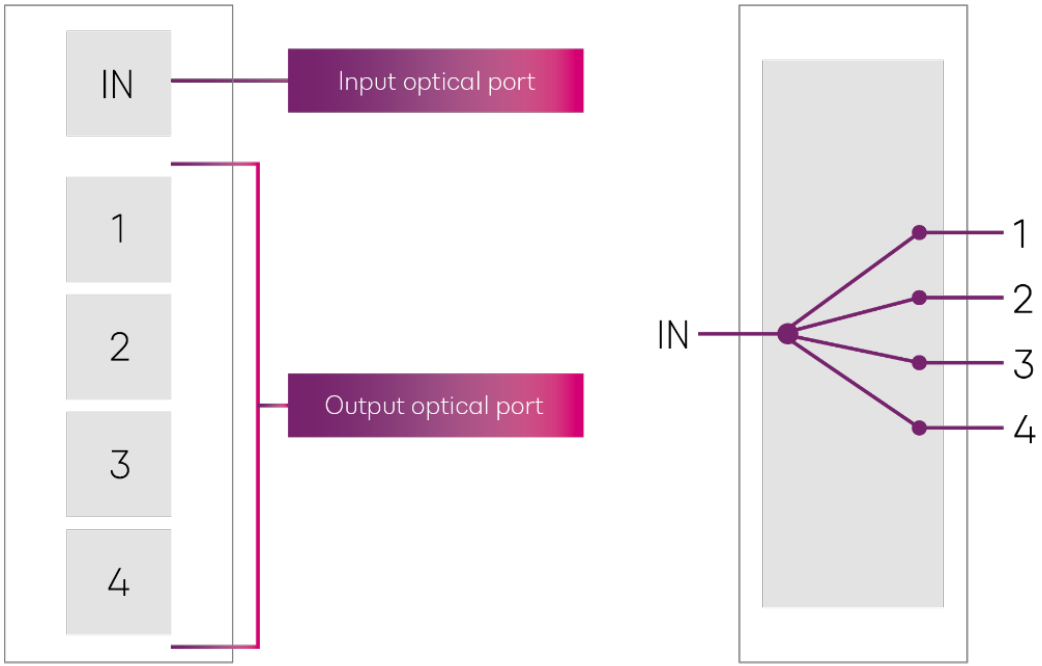
3.1.22 PASSIVE-1305

The PASSIVE-1305 is a 1-slot, 1310 nm polarization maintaining 2×2 fused fiber optic coupler module, that evenly splits the optical power of two input ports into two output ports.



3.1.23 PASSIVE-1306

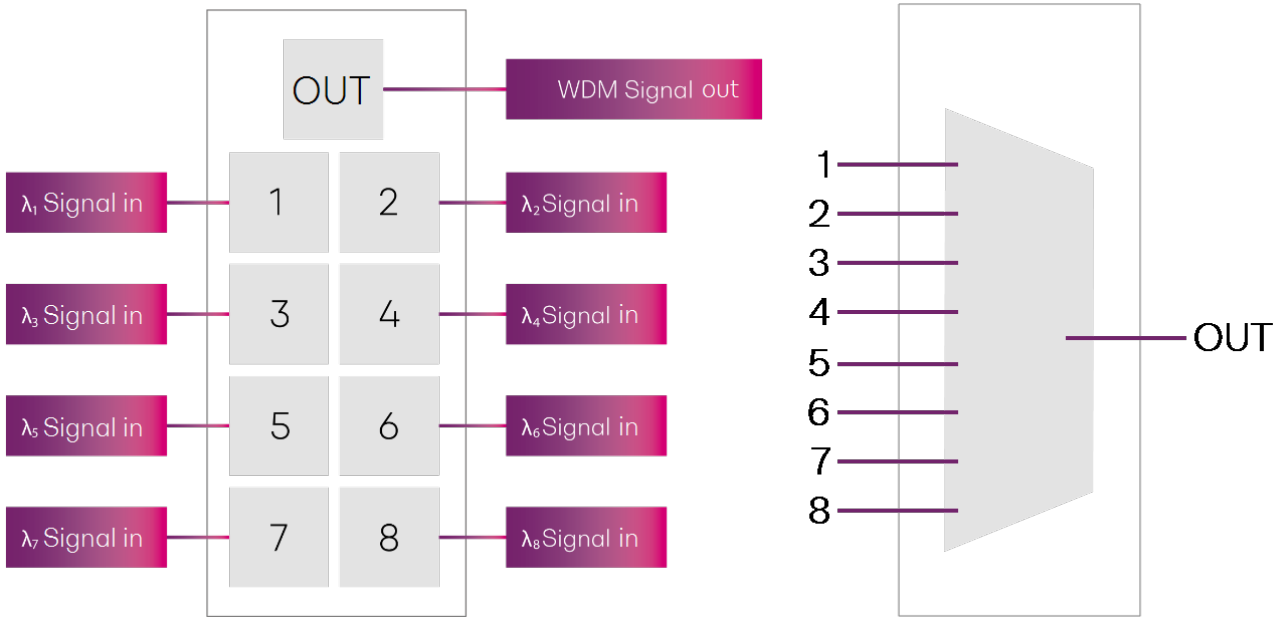
The PASSIVE-1306 is a 1-slot, 1310 nm polarization maintaining 1×4 splitter module, that equally splits the optical power of the input port into four output ports.



3.1.24 PASSIVE-1307

The PASSIVE-1307 is a 2-slot 1x8 polarization maintaining WDM MUX module, which combines 8 different fibers each carrying a different wavelength into one single optical fiber carrying 8 WDM channels.

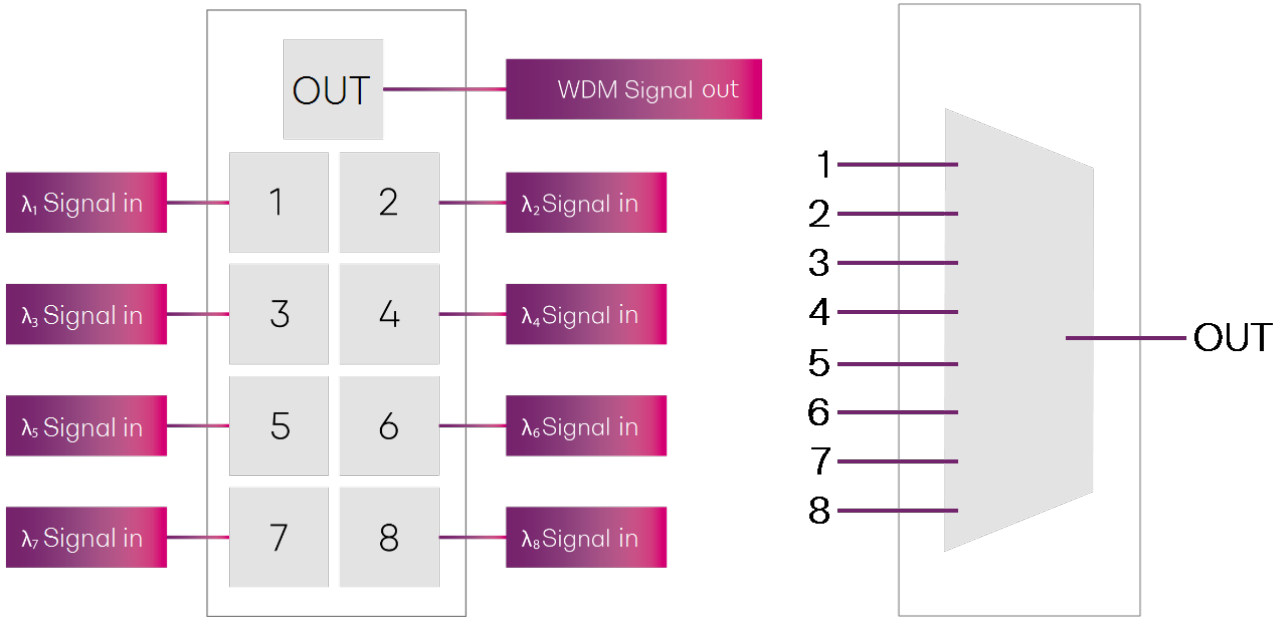
λ_1	1301.47 nm
λ_2	1303.73 nm
λ_3	1306.01 nm
λ_4	1308.28 nm
λ_5	1310.57 nm
λ_6	1312.87 nm
λ_7	1315.17 nm
λ_8	1317.48 nm



3.1.25 PASSIVE-1308

The PASSIVE-1308 is a 2-slot 1x8 polarization maintaining WDM MUX module, which combines 8 different fibers each carrying a different wavelength into one single optical fiber carrying 8 WDM channels.

λ_1	1302.60 nm
λ_2	1304.87 nm
λ_3	1307.14 nm
λ_4	1309.43 nm
λ_5	1311.72 nm
λ_6	1314.02 nm
λ_7	1316.33 nm
λ_8	1318.64 nm



4 Working with optical fibers

Quantifi Photonics products are equipped with high quality optical connectors in compliance with EIA-455-21A standards.

CAUTION

Keep connectors clean and in good condition to ensure maximum power and to avoid erroneous readings. Quantifi Photonics is not responsible for damage or errors caused by bad fiber cleaning or handling.

- Always inspect fiber end faces for cleanliness using a fiber inspection probe before inserting them into a port..
- If required, clean fibers and faces as detailed below.

NOTE

- To avoid damaging ferrules or fiber faces due to mismatched connectors, always check ports and connector type information before inserting a connector. All Quantifi Photonics units are labeled with connector type information.
- Failing to align and/or connect fiber-optic cables properly will result in significant signal loss and reflection.

▶ When connecting a fiber-optic cable to a port:

1. Visually inspect the fiber end face using a fiber inspection microscope.
2. If a **connector end face** is dirty:
    - Wipe the connector end face using a reel-type cleaner and inspect again.
    - For stubborn hard to clean connectors:
        - Use lint-free fiber-cleaning wipes soaked in a fiber optic cleaning solution.
        - Wipe the connector on the soaked part.
        - Dry the connector by wiping on the dry part of the wipe, or by using a reel-type cleaner.
    - Repeat the process until connector inspection shows a clean fiber face.
3. If a **bulkhead inner connector face** is dirty:
    - Use a pen-type dry cleaner, align the cleaning tip with the port and push the cleaner until you hear the characteristic click. Inspect again.
    - For stubborn hard to clean bulkhead connectors:
        - Use a stick-type cleaner dipped in a fiber optic cleaning solution.
        - Carefully align and insert the stick into the connector and gently rotate the stick for several seconds applying light pressure.
        - Use a pen-type cleaner to dry the connector.
    - Repeat the process until connector inspection shows a clean fiber face.
4. If the fiber end face is clean:
    - Carefully align the connector and port to prevent the fiber end from touching the outside of the port or other surfaces. If the connector features a key, mate it correctly into the corresponding notch of the port bulkhead.

- Push the connector in so that the fiber-optic cable is firmly in place with adequate contact. If your connector features a screw sleeve, tighten the connector to firmly maintain the fiber in place. Do not over-tighten, as this will dam-age the fiber and the port bulkhead.

5 System requirements

Quantifi Photonics PXIe modules

Supported browsers for working with CohesionUI	Google Chrome™ Microsoft Edge®
Chassis	PXIe-compatible chassis that • supports PXIe, or • contains PXI hybrid compatible slots
Recommended PXIe controller operating system	Microsoft Windows® 10 (64-bit)

Quantifi Photonics MATRIQ / EPIQ instruments

Supported browsers for working with CohesionUI	Google Chrome™ Microsoft Edge®
Recommended client computer operating system	Microsoft Windows® 10 (64-bit)

6 Maintenance

To help ensure long, trouble-free operation:

- Always inspect fiber-optic connectors before using them and clean them if necessary.
- Keep the unit free of dust.
- Store the unit at room temperature in a clean and dry area. Keep the unit out of direct sunlight.
- Avoid high humidity or significant temperature fluctuations.
- Avoid unnecessary shocks and vibrations.
- If any liquids are spilled on or into the unit, power off the chassis immediately. Remove the unit and allow to dry completely.
- To allow for sufficient air flow and avoid thermal issues, set up your instrument with a minimum clearance of 2 inches (50.8mm) around it and do not block any ventilation fans.

WARNING

The use of controls, adjustments, and procedures other than those specified herein may result in exposure to hazardous situations or impair the protection provided by this unit.

6.1 Annual calibration schedule

To ensure that the unit is performing within specification, we recommend it is re-calibrated every 12 months.

All Quantifi Photonics products are calibrated during manufacture, and each product is shipped to the customer with a Calibration Certificate. On this certificate, the calibration date, as well as the next calibration due date are mentioned.

We recommend your product is returned for re-calibration before the listed due date, to ensure continued performance of the product. For re-calibration service information, or to send in a product for re-calibration service, email support@quantifiphotonics.com.

If the Calibration Certificate has been misplaced, or the calibration due date is not known, email support@quantifiphotonics.com.

7 Technical Support

7.1 Contacting the Technical Support Group

To obtain after-sales service or technical support for this product, contact Quantifi Photonics:

support@quantifiphotonics.com

To accelerate the process, please provide information such as the name and the serial number of the product (see the product identification label), as well as a description of your problem.

7.2 Transportation

Maintain a temperature range within specifications when transporting the unit.

Transportation damage can occur from improper handling.

The following steps are recommended to minimize the possibility of damage:

- Pack the product in its original packing material when shipping. If the original packaging is unavailable, use appropriate foam packaging to provide shock absorption and avoid displacement of the product inside the shipping box. Please keep all input connectors covered with the supplied anti-static plastic covers during transport and avoid any shipping material making contact with the sensitive connectors of the product.
- Avoid high humidity or large temperature fluctuations.
- Keep the product out of direct sunlight.
- Avoid unnecessary shocks and vibrations.

8 Warranty Information

8.1 General information

Quantifi Photonics Ltd (Quantifi Photonics) warrants from the date of the original shipment (the Warranty Period) that this product will conform to specifications and will be free from defects in material and workmanship for the applicable Warranty Period. Quantifi Photonics also warrants that the equipment will meet applicable specifications under normal use.

NOTE

The warranty can become null and void if:

- The unit has been tampered with, repaired, or worked upon by unauthorized individuals or non-Quantifi Photonics personnel.
- The warranty sticker has been removed.
- The unit has been opened, other than as explained in this guide.
- The unit serial number has been altered, erased, or removed.
- The unit has been misused, neglected, or damaged by accident.
- The unit has been used with an external power supply not supplied by Quantifi Photonics with the unit.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL QUANTIFI PHOTONICS BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

For full warranty terms and conditions, please visit quantifiphotonics.com.

8.2 Liability

Quantifi Photonics shall not be liable for damages resulting from the use of the product, nor shall be responsible for any failure in the performance of other items to which the product is connected or the operation of any system of which the product may be a part.

Quantifi Photonics shall not be liable for damages resulting from improper usage, transportation or unauthorized modification of the product, its accompanying accessories and software.

The external power supply that has been supplied by Quantifi Photonics with the unit can only be used with that unit, do not use it with any other product.

8.3 Exclusions

Quantifi Photonics reserves the right to make changes in the design or construction of any of its products at any time without incurring obligation to make any changes whatsoever on units purchased. Accessories, including but not limited to fuses, pilot lamps, batteries and universal interfaces (EUI) used with Quantifi Photonics products are not covered by this warranty.

This warranty excludes failure resulting from: Improper use or installation, normal wear and tear, accident, abuse, neglect, fire, water, lightning or other acts of nature, causes external to the product or other factors beyond the control of Quantifi Photonics.

8.4 Certification

Quantifi Photonics certifies that this equipment met its published specifications at the time of shipment from the factory.

8.5 Service and repairs

To send any equipment for service, repair or calibration please contact the Technical Support Group: support@quantifiphotonics.com.

QUANTIFI PHOTONICS®
A Teradyne Company

Test. Measure. Solve.™

Quantifi Photonics is transforming the world of photonics test and measurement. Our portfolio of optical and electrical test instruments is rapidly expanding to meet the needs of engineers and scientists around the globe. From enabling ground-breaking experiments to driving highly efficient production testing, you'll find us working with customers to solve complex problems with optimal solutions.

To find out more, get in touch with us today.

General Enquiries	sales@quantifiphotonics.com
Technical Support	support@quantifiphotonics.com
Phone	+64 9 478 4849
North America	+1-800-803-8872

quantifiphotonics.com