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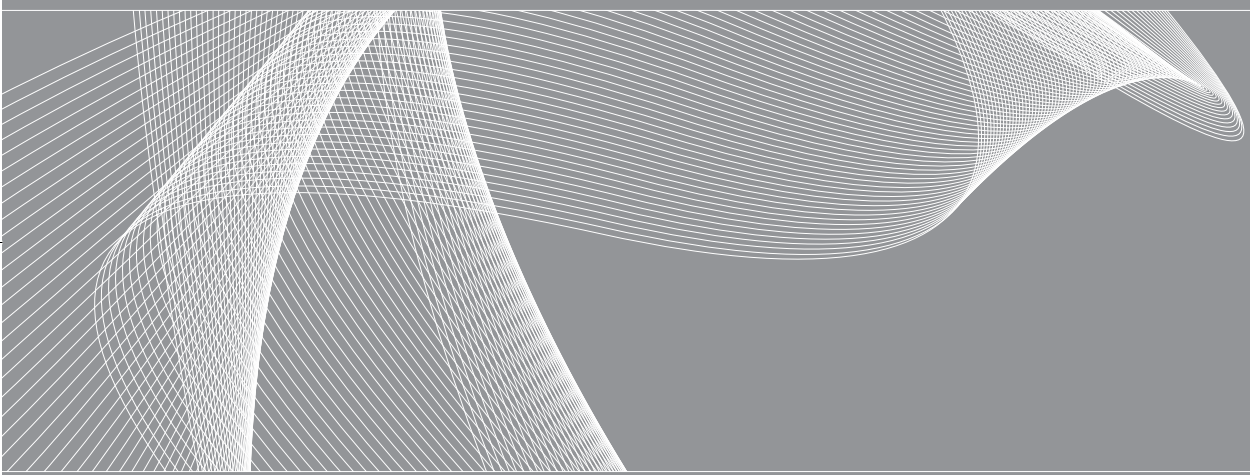
# PASSIVE DEVICES
## *CATALOGUE*

**EDITION 2.0**



As a global partner of optical components, SENKO provides both standard and customized passive device products to the market. Our commitment to the stringent management of our supply chain and manufacturing partners enables us to consistently deliver the highest quality, lowest cost products to our customers.

SENKO offers an extensive range of product lines, including Fused Coupler, Filter-based WDM, Outside Plant use WDM, Polarization Maintaining Components, Switching and Routing, and other customized products are also available upon request.

SENKO works closely with the industry to constantly develop new products and techniques and makes customer satisfaction their top priority.

Senko's quality system is certified to ISO 9001:2000 and all passive components are RoHS compliant.

# Passive Device index

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# FUSED PRODUCTS — SINGLE MODE FIBER COUPLER 1X2

(50/50)


## APPLICATIONS

- Telecommunications
- Network Monitoring
- FTTX

## FEATURES

- High Stable & Reliable
- Perfect Performance
- Compact Package
- RoHS Compliant

SENKO's Single Mode Fiber Couplers are highly stable for multi-port optical signal splitting with low insertion loss. All devices are qualified according to industry standard test procedures .

| PARAMETERS | VALUES | UNIT |
|---|---|---|
| Type | 1x2 | |
| Coupling Ratio | 50/50 | |
| Insertion loss Max.[1,2] | See below Table | |
| Uniformity Max. | See below Table | |
| Return loss Min.[2] | 55 | dB |
| Directivity Min. | 55 | dB |
| PDL Max. | See below Table | |
| WDL Max.[3] | See below Table | |
| TDL at -5~70c Max. | 0.15 | dB |
| Housing dimension | 250μm fiber 3.0 (Φ) x 54 (L)<br>900μm tube 3.0 (Φ) x 54 (L)<br>2mm/3mm tube, ABS Box: 90(L)x20(W)x10(H) | mm |
| Fiber Type | SMF-28e 250μm bare fiber | |
| Operating temperature | -40 ~ +85 | ℃ |
| Storage temperature | -40 ~+85 | ℃ |

*Note:*

1. *The performance are not including the Connectors.*
2. *IL are worst case including PDL, TDL, and WDL.*
3. *WDL means IL change over Single wavelength band. Only for each window band, not including water peak band.*

| | IL (dB) TYP. / MAX. | PDL (dB) MAX. | UNIFORMITY (dB) MAX. | WDL(dB) MAX. |
|---|---|---|---|---|
| Full Wavelength Band (1260~1620 nm) | 3.8 / 4.5 | 0.3 | 1.2 | NA |
| 3 Wavelength Band (1310/ 1550 ±40 and 1490 ±10 nm) | 3.4 / 3.7 | 0.2 | 0.8 | 0.5 |
| Dual Wavelength Band (1310/1550 ± 40 nm) | 3.3 / 3.6 | 0.15 | 0.7 | 0.3 |
| Single Wavelength Band (1310±40 or 1550 ±40 nm) | 3.2 / 3.4 | 0.15 | 0.6 | 0.2 |

| CODE | PORT | | WAVELENGTH | | COUPLING RATIO | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD-FC-SM | 1 | 1X2 | 31 | 1310 | 50 | 50/50 | b | 250μm | 0 | None | 10 | 1.0m |
| | 2 | 2X2 | 55 | 1550 | | | 9 | 900μm | 1 | SC/UPC | 15 | 1.5m |
| | | | DU | 1310/1550 | | | 2 | 2mm | 2 | SC/APC | | |
| | | | TR | 1310/1490/1550 | | | 3 | 3mm | 3 | FC/UPC | | |
| | | | FU | full | | | | | 4 | FC/APC | | |
| | | | | | | | | | 5 | LC/UPC | | |
| | | | | | | | | | 6 | LC/APC | | |
| | | | | | | | | | 7 | MU/UPC | | |

**ORDER CODE** example: **PD-FC-SM-1-31-50-9-1-10**

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# FUSED PRODUCTS — SINGLE MODE FIBER COUPLER 1X2

## (ALL COUPLING RATIO)


### APPLICATIONS

- Telecommunications
- Network Monitoring
- FTTX

### FEATURES

- High Stable & Reliable
- Perfect Performance
- Compact Package
- RoHS Compliant

SENKO's Single Mode Fiber Couplers are highly stable for multi-port optical signal splitting with low insertion loss. All devices are qualified according to industry standard test procedures .

| PARAMETERS | VALUES | UNIT |
|---|---|---|
| Type | 1x2 | |
| Operating Wavelength band 1 | Single Window—1310 or 1550±40 | nm |
| Operating Wavelength band 2 | Dual Windows—1310 and 1550±40 | nm |
| Operating Wavelength band 3 | Triple Windows—1310 and 1550±40 and 1490±10 | nm |
| Insertion loss Max.[1,2] | See below Table | |
| Return loss Min.[1] | 55 | dB |
| Directivity Min. | 55 | dB |
| PDL Max. | See below Table | |
| TDL at -5~70c Max. | 0.15 | dB |
| Housing dimension | 250μm fiber 3.0 (Φ) x 54 (L)<br>900μm tube 3.0 (Φ) x 54 (L)<br>2mm/3mm tube, ABS Box: 90(L)x20(W)x10(H) | mm |
| Fiber Type | SMF-28e 250μm bare fiber | |
| Operating temperature | -40~ +85 | ℃ |
| Storage temperature | -40 ~+85 | ℃ |

*Note:*
1. *The performance are not including the Connectors.*
2. *IL are worst case including PDL, TDL, and WDL.*

| COUPLING RATIO | SINGLE WINDOW | | DUAL WINDOW | | TRIPLE WINDOW | |
|---|---|---|---|---|---|---|
| | IL (dB) | PDL (dB) | IL (dB) | PDL (dB) | IL (dB) | PDL (dB) |
| 1/99 | ≤21.8/0.20 | ≤0.20/≤0.05 | ≤23.0/0.25 | ≤0.20/≤0.05 | ≤23.5/0.25 | ≤0.20/≤0.05 |
| 2/98 | ≤19.0/0.25 | ≤0.20/≤0.05 | ≤19.0/0.30 | ≤0.20/≤0.05 | ≤19.2/0.35 | ≤0.20/≤0.05 |
| 3/97 | ≤16.7/0.30 | ≤0.20/≤0.05 | ≤18.2/0.35 | ≤0.20/≤0.05 | ≤18.4/0.40 | ≤0.20/≤0.05 |
| 5/95 | ≤14.5/0.45 | ≤0.20/≤0.10 | ≤15.0/0.45 | ≤0.20/≤0.10 | ≤15.2/0.50 | ≤0.20/≤0.10 |
| 10/90 | ≤11.2/0.65 | ≤0.15/≤0.10 | ≤11.3/0.65 | ≤0.15/≤0.10 | ≤11.5/0.75 | ≤0.15/≤0.10 |
| 20/80 | ≤7.80/1.25 | ≤0.15/≤0.15 | ≤7.85/1.25 | ≤0.15/≤0.15 | ≤7.95/1.50 | ≤0.15/≤0.15 |
| 30/70 | ≤5.80/1.9 | ≤0.15/≤0.15 | ≤6.00/2.00 | ≤0.15/≤0.15 | ≤6.20/2.10 | ≤0.15/≤0.15 |
| 40/60 | ≤4.50/2.60 | ≤0.15/≤0.15 | ≤4.70/2.70 | ≤0.15/≤0.15 | ≤4.90/2.80 | ≤0.15/≤0.15 |

| CODE | PORT | | WAVELENGTH | | COUPLING RATIO | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD-FC-SM | 1 | 1X2 | 31 | 1310 | 1 | 1/99 | b | 250μm | 0 | None | 10 | 1.0m |
| | 2 | 2X2 | 55 | 1550 | 2 | 2/98 | 9 | 900μm | 1 | SC/UPC | 15 | 1.5m |
| | | | DU | 1310/1550 | 3 | 3/97 | 2 | 2mm | 2 | SC/APC | | |
| | | | TR | 1310/1490/1550 | 5 | 5/95 | 3 | 3mm | 3 | FC/UPC | | |
| | | | | | 10 | 10/90 | | | 4 | FC/APC | | |
| | | | | | 20 | 20/80 | | | 5 | LC/UPC | | |
| | | | | | 30 | 30/70 | | | 6 | LC/APC | | |
| | | | | | 40 | 40/60 | | | 7 | MU/UPC | | |

**ORDER CODE** example: **PD-FC-SM-1-55-1-2-1-15**

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# FUSED PRODUCTS — SINGLE MODE FIBER COUPLER 1X3


## APPLICATIONS

- Telecommunications
- Network Monitoring
- FTTX

## FEATURES

- Single Fusion
- High Stable & Reliable
- Perfect Performance
- Compact Package
- RoHS Compliant

SENKO's Single Mode Fiber Couplers are highly stable for multi-port optical signal splitting with low insertion loss. All devices are qualified according to industry standard test procedures .

| PARAMETERS | VALUES | UNIT |
|---|---|---|
| Type | 1x3 | |
| Coupling Ratio | 33.3/ 33.3/ 33.3 | |
| Insertion loss Max.[1,2] | See below Table | |
| Uniformity Max. | See below Table | |
| Return loss Min.[1] | 55 | dB |
| Directivity Min. | 55 | dB |
| PDL Max. | See below Table | |
| WDL Max.[3] | See below Table | |
| TDL at -5~70c Max. | 0.3 | dB |
| Housing dimension | 250μm fiber:3.0(Φ)x54(L) 900μm fiber:4.0(Φ)x60(L)<br>2mm/3mm tube , ABS box: 100(L)x80(W)x10(H) | mm |
| Fiber Type | SMF-28e 250μm bare fiber | |
| Operating temperature | -40~+85 | ℃ |
| Storage temperature | -40~+85 | ℃ |

*Note:*
1. *The performance are not including the Connectors.*
2. *IL are worst case including PDL, TDL, and WDL.*
3. *WDL means IL change over Single wavelength band, only for each window band, not including water peak band.*

| | IL (dB) TYP. / MAX. | PDL (dB) MAX. | UNIFORMITY (dB) MAX. | WDL(dB) MAX. |
|---|---|---|---|---|
| 3 Wavelength Band (1310/ 1550 ±40 and 1490 ±10 nm) | 6 / 6.6 | 0.3 | 1.4 | 0.5 |
| Dual Wavelength Band (1310/1550 ±40 nm) | 5.8 / 6.2 | 0.25 | 1.2 | 0.3 |
| Single Wavelength Band (1310 ±40 or 1550 ±40 nm) | 5.3 / 5.7 | 0.2 | 1.0 | 0.25 |

| CODE | PORT | | WAVELENGTH | | COUPLING RATIO | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD-FC-SM | 3 | 1X3 | 31 | 1310 | 33 | 33/33/33 | b | 250μm | 0 | None | 10 | 1.0m |
| | | | 55 | 1550 | | | 9 | 900μm | 1 | SC/UPC | 15 | 1.5m |
| | | | DU | 1310/1550 | | | 2 | 2mm | 2 | SC/APC | | |
| | | | TR | 1310/1490/1550 | | | 3 | 3mm | 3 | FC/UPC | | |
| | | | | | | | | | 4 | FC/APC | | |
| | | | | | | | | | 5 | LC/UPC | | |
| | | | | | | | | | 6 | LC/APC | | |
| | | | | | | | | | 7 | MU/UPC | | |

**ORDER CODE** example: **PD-FC-SM-3-31-33-9-1-15**

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# FUSED PRODUCTS — SINGLE MODE FIBER COUPLER 1X4


## APPLICATIONS

- Telecommunications
- Network Monitoring
- FTTX

## FEATURES

- Single Fusion Compact Package
- High Stable & Reliable
- Perfect Performance
- RoHS Compliant

SENKO's Single Mode Fiber Couplers are highly stable for multi-port optical signal splitting with low insertion loss. All devices are qualified according to industry standard test procedures .

| PARAMETERS | VALUES | UNIT |
|---|---|---|
| Type | 1x4 | |
| Coupling Ratio | 25/25/25/25 | |
| Insertion loss Max.[1,2] | See below Table | |
| Uniformity Max. | See below Table | |
| Return loss Min.[1] | 55 | dB |
| Directivity Min. | 55 | dB |
| PDL Max. | See below Table | |
| WDL Max.[3] | See below Table | |
| TDL at -5~70c Max. | 0.3 | dB |
| Housing dimension | 250μm fiber:3.0(Φ)x54(L) 900μm fiber:4.0(Φ)x65(L)<br>2mm/3mm tube , ABS box: 100(L)x80(W)x10(H) | mm |
| Fiber Type | SMF-28e 250μm bare fiber or with 900μm loose tube or with 2/3mm cable | |
| Operating temperature | -40~+85 | ℃ |
| Storage temperature | -40~+85 | ℃ |

*Note:*
1. *The performance are not including the Connectors.*
2. *IL are worst case including PDL, TDL, and WDL.*
3. *WDL means IL change over Single wavelength band, only for each window band, not including water peak band.*

| | IL (dB) TYP. / MAX. | PDL (dB) MAX. | UNIFORMITY (dB) MAX. | WDL(dB) MAX. |
|---|---|---|---|---|
| 3 Wavelength Band (1310/ 1550 ±40 and 1490 ±10 nm) | 6.8 / 7.5 | 0.30 | 1.7 | 0.6 |
| Dual Wavelength Band (1310/1550 ±40 nm) | 6.6 / 7.4 | 0.25 | 1.6 | 0.4 |
| Single Wavelength Band (1310 ±40 or 1550 ±40 nm) | 6.5 / 7.2 | 0.2 | 1.4 | 0.3 |

| CODE | PORT | | WAVELENGTH | | COUPLING RATIO | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD-FC-SM | 4 | 1X4 | 31 | 1310 | 25 | 25/25/25/25 | b | 250μm | 0 | None | 10 | 1.0m |
| | | | 55 | 1550 | | | 9 | 900μm | 1 | SC/UPC | 15 | 1.5m |
| | | | DU | 1310/1550 | | | 2 | 2mm | 2 | SC/APC | | |
| | | | TR | 1310/1490/1550 | | | 3 | 3mm | 3 | FC/UPC | | |
| | | | | | | | | | 4 | FC/APC | | |
| | | | | | | | | | 5 | LC/UPC | | |
| | | | | | | | | | 6 | LC/APC | | |
| | | | | | | | | | 7 | MU/UPC | | |

**ORDER CODE** example: **PD-FC-SM-4-DU-25-3-1-15**

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# FUSED PRODUCTS — FUSED WDM - 1310/1550


SENKO's 1310/1550nm fused single-mode wavelength division multiplexers are manufactured using the proven fused biconical taper technology, this device is ideal for combining or separating optical signals in the 1310 and 1550nm bands.

| PARAMETERS | VALUES | UNIT |
|---|---|---|
| Type | 1x2 | |
| Operating Wavelength | 1295~1325 / 1535~1565 | nm |
| Insertion loss Max. [1,2] | 0.3 | dB |
| Isolation Min. | 17 | dB |
| Return loss Min, [1] | 55 | dB |
| Directivity Min, | 55 | dB |
| PDL Max. | 0.1 | dB |
| WDL Max. | 0.15 | dB |
| TDL at -5~70c Max. | 0.15 | dB |
| Housing dimension | 250μm fiber 3.0 (Φ) x 54 (L)<br>900μm tube 3.0 (Φ) x 54 (L)<br>2mm/3mm tube, ABS Box: 90(L)x14(W)x8.5(H) | mm |
| Fiber Type | SMF-28e 250μm bare fiber | |
| Operating temperature | -40~ +85 | ℃ |
| Storage temperature | -40~ +85 | ℃ |
| Maximum Power Handling | 500 | mW |


| CODE | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | |
|---|---|---|---|---|---|---|
| PD SWDM-35 | B | 250μm | 0 | None | 10 | 1.0m |
| | 9 | 900μm | 1 | SC/UPC | 15 | 1.5m |
| | 2 | 2mm | 2 | SC/APC | | |
| | 3 | 3mm | 3 | FC/UPC | | |
| | | | 4 | FC/APC | | |
| | | | 5 | LC/UPC | | |
| | | | 6 | LC/APC | | |
| | | | 7 | MU/UPC | | |

**ORDER CODE** example: **PD-SWDM-35-B-1-10**

## APPLICATIONS

- Telecommunications
- Local Area Networls

## FEATURES

- High Isolation
- Low Loss
- High Reliability
- RoHS Compliant

*Note:*

1. *The performance are not including the Connectors.*
2. *IL are worst case including PDL, TDL, and WDL.*

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# FUSED PRODUCTS

## FUSED WDM - 980/1550


SENKO's 980/1550nm fused single-mode wavelength division multiplexers are manufactured using proven fused biconical taper technology, this device is ideal for combining or separating optical signals in the 980 and 1550nm bands in optical fiber amplifiers.

### APPLICATIONS

- Telecommunications
- Amplification
- Local Area Networks

### FEATURES

- High Isolation
- Low Loss
- High Reliable
- RoHS Compliant

| PARAMETERS | VALUES | UNTI |
|---|---|---|
| Operating Wavelength | 970 ~990 / 1535 ~1565 | nm |
| Insertion loss Max. [1,2] | 0.25 | dB |
| Isolation Min. | 20 | dB |
| Return loss Min, [1] | 55 | dB |
| Directivity Min, | 55 | dB |
| PDL Max. | 0.1 | dB |
| Housing dimension | 250μm fiber 3.0 (Φ) x 54 (L)<br>900μm tube 3.0 (Φ) x 54 (L)<br>2mm/3mm tube, ABS Box: 90(L)x14(W)x8.5(H) | mm |
| Fiber Type | Corning Hi 1060 Flex, or OFS BF05635-02 bare fiber | |
| Operating temperature | -40~ +85 | ℃ |
| Storage temperature | -40~ +85 | ℃ |
| Maximum Power Handling | 500 | mW |

*Note:*
1. *The performance are not including the Connectors.*
2. *IL are worst case including PDL, TDL, and WDL.*

| CODE | JUMPER TYPE | | FIBER CORE NAME | | CONNECTOR | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|
| PD SWDM-59 | B | 250μm | 1 | HI 1060 Flex | 0 | None | 10 | 1.0m |
| | 9 | 900μm | 2 | OFS BF05635-02fiBer | 1 | SC/UPC | 15 | 1.5m |
| | 2 | 2mm | | | 2 | SC/APC | | |
| | 3 | 3mm | | | 3 | FC/UPC | | |
| | | | | | 4 | FC/APC | | |
| | | | | | 5 | LC/UPC | | |
| | | | | | 6 | LC/APC | | |
| | | | | | 7 | MU/UPC | | |

**ORDER CODE** example: **PD-SWDM-59-B-1-1-10**

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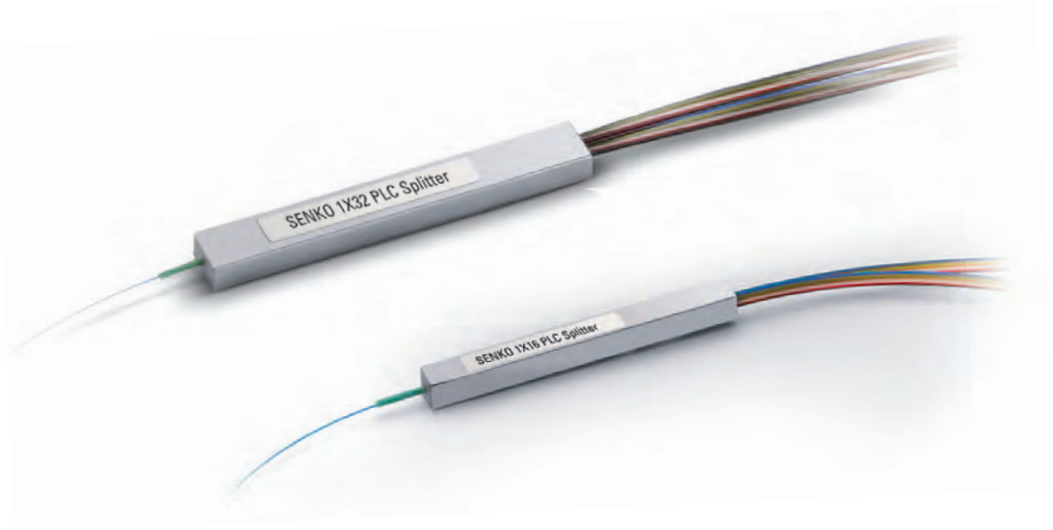
# PLC GROUP — 1xN PLC SPLITTER




SENKO's 1x N Planar Light wave Circuit (PLC) Splitters are based on the Plasma Chemical Vapor Deposition (P-CVD) technology and its patented fabrication process for providing stable optical performance.
SENKO's 1 x N PLC Splitter features guaranteed performance specifications and high reliability that surpass Telcordia requirements and is tailored for different applications and markets.

| PARAMETERS[1] | 1X2 | 1X4 | 1X8 | 1X16 | 1X32 | 1X 64 | UNIT |
|---|---|---|---|---|---|---|---|
| Operating Wavelength | 1260 ~1650 | | | | | | nm |
| Insertion Loss, Max. | 4.0 | 7.4 | 10.7 | 13.7 | 16.9 | 21 | dB |
| Uniformity | 0.4 | 0.6 | 0.8 | 1.2 | 1.5 | 2.5 | dB |
| PDL, Max. | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 | dB |
| WDL | 0.3 | 0.3 | 0.3 | 0.5 | 0.5 | 0.5 | dB |
| Return Loss, Min. | 55 | | | | | | dB |
| Directivity Min | 55 | | | | | | dB |
| Operating Temp. | -40 ~ +85 | | | | | | ℃ |
| Dimensions | 4 (W)x4 (H)x40(L) | | | 7 (W)x4 (H)x50(L) | | 12(W)x4(H) x60 (L) | mm |

| CODE | PORT | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|
| PD-SAC | 102 | 1X2 | F | 250μm individual bare fiber | 0 | None | 10 | 1.0m |
| | 104 | 1X4 | B | 250μm bare ribbon | | | 12 | 1.2m |
| | 108 | 1X8 | | | | | 15 | 1.5m |
| | 116 | 1X16 | | | | | | |
| | 132 | 1X32 | | | | | | |
| | 164 | 1X64 | | | | | | |

**ORDER CODE** example: **PD-SAC-116-B-0-10**

## APPLICATIONS

- Telecom, datacom
- Local Area Networks (LANs)
- Cable TV (CATV)
- Local Convergence points (LCP)
- FTTX

## FEATURES

- Low insertion loss;
- High maximum power tolerance;
- Excellent splitting uniformity;
- Broadband Operating wavelength;
- Compact design;
- Low polarization dependency

## OPTIONS

- They are available in 1x4, 8, 16, 32 and 64 configurations, with various connector options.
- Custom packaging is also available

*Note:*
1. *Values taken at room temperature, 1310 and 1550nm, without connectors.*
2. *Custom specification is also available.*
3. *All types of SM fibre are available.*

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# PLC GROUP

# 2xN PLC SPLITTER


SENKO's 2x N Planar Light wave Circuit (PLC) Splitters are based on the Plasma Chemical Vapor Deposition (P-CVD) technology and its patented fabrication process for providing stable optical performance.
SENKO's 1 x N PLC Splitter features guaranteed performance specifications and high reliability that surpass Telcordia requirements and is tailored for different applications and markets.

| PARAMETERS[1] | 2X2 | 2X4 | 2X8 | 2X16 | 2X32 | UNIT |
|---|---|---|---|---|---|---|
| Operating Wavelength | 1260~1650 | | | | | nm |
| Insertion Loss, Max. | 4.2 | 7.8 | 11.5 | 14.5 | 17.7 | dB |
| Uniformity | 0.6 | 1.2 | 1.5 | 1.8 | 2.0 | dB |
| PDL, Max. | 0.2 | 0.2 | 0.4 | 0.4 | 0.4 | dB |
| WDL | 0.4 | 0.4 | 0.5 | 0.6 | 0.8 | dB |
| Return Loss, Min. | 55 | | | | | dB |
| Directivity Min | 55 | | | | | dB |
| Operating Temp. | -40~ +85 | | | | | ℃ |
| Dimensions | 4 (W)x4 (H)x50 (L) | | | 7 (W)x4 (H)x60 (L) | | mm |

| CODE | PORT | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|
| PD-SAC | 202 | 2X2 | F | 250μm individual bare fiber | 0 | None | 10 | 1.0m |
| | 204 | 2X4 | B | 250μm bare ribbon | | | 12 | 1.2m |
| | 208 | 2X8 | | | | | 15 | 1.5m |
| | 216 | 2X16 | | | | | | |
| | 232 | 2X32 | | | | | | |

**ORDER CODE** example: **PD-SAC-216-B-0-10**

## APPLICATIONS

- Telecom, datacom
- Local Area Networks (LANs)
- Cable TV (CATV)
- Local Convergence points (LCP)
- FTTX

## FEATURES

- Low insertion loss;
- High maximum power tolerance;
- Excellent splitting uniformity;
- Broadband Operating wavelength
- Compact design;
- Low polarization dependency

## OPTIONS

They are available in 2x4, 8, 16, and 32 configurations, with various connector options.
Custom packaging is also available

*Note:*
1. *Values taken at room temperature, 1310 and 1550nm, without connectors.*
2. *Custom specification is also available.*
3. *All types of SM fibre are available.*

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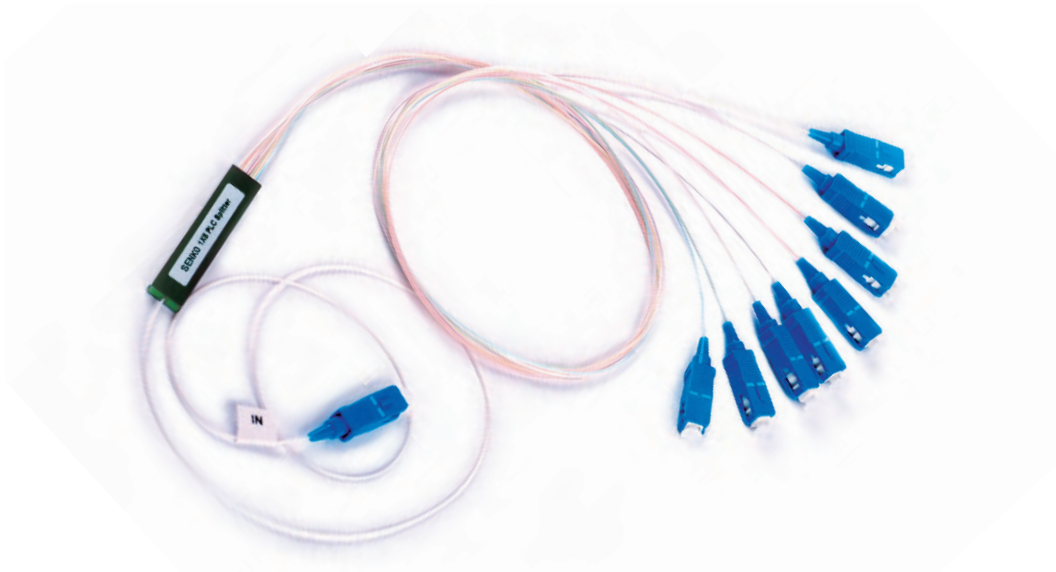
# PLC Group — Pre-connectorized PLC Splitter




SENKO's 1x N, 2x N Pre-connectorized Planar Light wave Circuit (PLC) Splitters are based on the Plasma Chemical Vapor Deposition (P-CVD) technology and its patented fabrication process for providing stable optical performance.

SENKO's 1 x N, 2x N Pre-connectorized PLC Splitter features guaranteed performance specifications and high reliability that surpass Telcordia requirements and is tailored for different applications and markets.

| PARAMETERS[1] | 1X2 | 2X2 | 1X4 | 2X4 | 1X8 | 2X8 | 1X16 | 2X16 | 1X32 | 2X32 | 1X64 | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Operating Wavelength | 1260 ~1650 | | | | | | | | | | | nm |
| Insertion Loss, Max. | 4.6 | 4.8 | 8.0 | 8.4 | 11.3 | 12.1 | 14.3 | 15.1 | 17.5 | 18.3 | 21.6 | dB |
| Uniformity | 0.7 | 1.2 | 0.9 | 1.8 | 1.1 | 2.1 | 1.5 | 2.4 | 1.8 | 2.6 | 3.1 | dB |
| PDL, Max. | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.3 | 0.4 | 0.3 | 0.4 | 0.4 | dB |
| WDL | 0.3 | 0.4 | 0.3 | 0.4 | 0.3 | 0.5 | 0.5 | 0.6 | 0.5 | 0.8 | 0.5 | dB |
| Return Loss, Min. | UPC:50,APC:55 | | | | | | | | | | | dB |
| Directivity Min | 55 | | | | | | | | | | | dB |
| Operating Temp. | -30 ~ +70 | | | | | | | | | | | ℃ |
| Dimensions | 7(W)x4(H)x60(L) | | | | | 12(W) x5(H) x80(L) | 12(W) x5(H) x60(L) | 12(W) x5(H) x80(L) | 20(W) x6(H) x80(L) | 20(W) x6(H) x100(L) | 40(W) x6(H) x100(L) | mm |

| CODE | PORT | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|
| PD-BLS | 102 | 1X2 | 9 | 900μm loose tube | 0 | None | 10 | 1.0m |
| | 104 | 1X4 | | | 1 | SC/UPC | 15 | 1.5m |
| | 108 | 1X8 | | | 2 | SC/APC | | |
| | 116 | 1X16 | | | 3 | FC/UPC | | |
| | 132 | 1X32 | | | 4 | FC/APC | | |
| | 164 | 1X64 | | | 5 | LC/UPC | | |
| | 202 | 2X2 | | | 6 | LC/APC | | |
| | 204 | 2X4 | | | 7 | MU/UPC | | |
| | 208 | 2X8 | | | | | | |
| | 216 | 2X16 | | | | | | |
| | 232 | 2X32 | | | | | | |

**ORDER CODE** example: **PD-BLS-102-9-1-10**

## APPLICATIONS

- Telecom, datacom
- Local Area Networks (LANs)
- Cable TV (CATV)
- Local Convergence points (LCP)
- FTTX

## FEATURES

- Low insertion loss;
- High maximum power tolerance;
- Excellent splitting uniformity;
- Broadband Operating wavelength;
- Compact design;
- Low polarization dependency

## OPTIONS

- They are available in 1x4, 8, 16, 32and64 configurations, with various connector options.
- Custom packaging is also available

*Note:*

1. *Value of parameters shows at room temperature, 1310 and 1550 nm ,with connector.*
2. *Custom specification is also available.*
3. *All types of SM fibre are available.*

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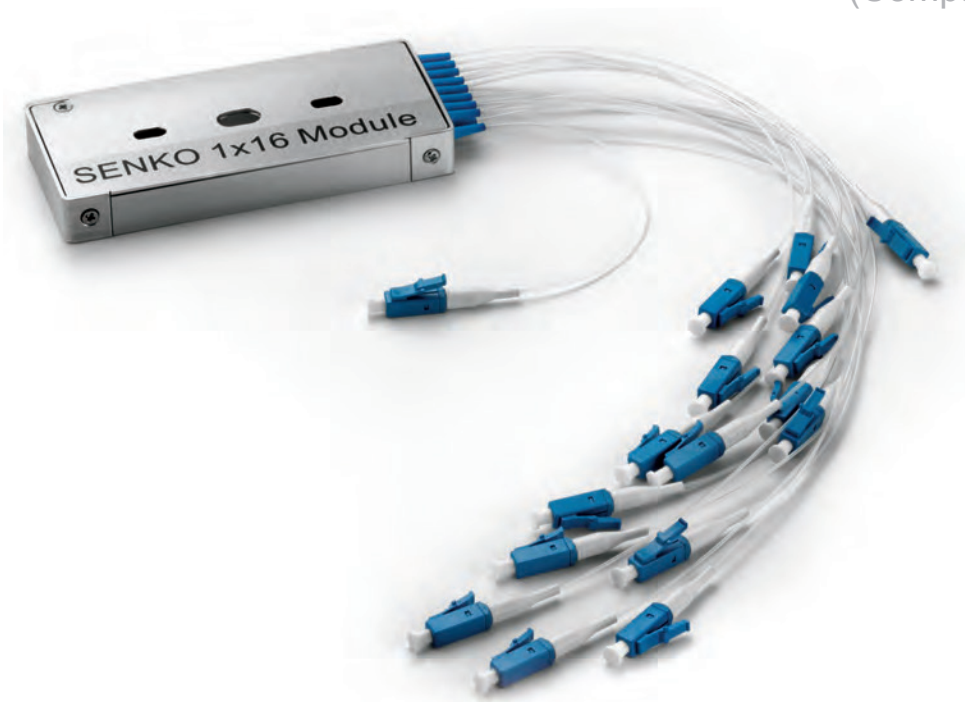
# PLC GROUP

## PLC SPLITTER MODULE 900μM TYPE (Compact)




SENKO's Planar Light wave Circuit (PLC) Splitter Modules allows system equipment manufacturers to reduce costs and shorten time to market.
High quality, reliable components are assembled at a dedicated custom module manufacturing facility.

| PARAMETERS [2,3] | 1X2 | 1X4 | 1X8 | 1X16 | 1X32 | 1X64 | 2X2 | 2X4 | 2X8 | 2X16 | 2X32 | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Operating Wavelength | 1260 ~1650 | | | | | | | | | | | nm |
| Insertion Loss, Max.[1] | 4.6 | 8.0 | 11.3 | 14.3 | 17.5 | 21.6 | 4.8 | 8.4 | 12.1 | 15.1 | 18.3 | dB |
| Uniformity, Max. | 0.7 | 0.9 | 1.1 | 1.5 | 1.8 | 2.8 | 0.9 | 1.5 | 1.8 | 2.1 | 2.3 | dB |
| PDL, Max. | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 | 0.2 | 0.2 | 0.4 | 0.4 | 0.4 | dB |
| WDL | 0.3 | 0.3 | 0.3 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.5 | 0.6 | 0.8 | dB |
| Return Loss, Min.[1] | UPC:50, APC: 55 | | | | | | | | | | | dB |
| Directivity Min | 55 | | | | | | | | | | | dB |
| Fiber Type | Input/output: 900μm loose tube | | | | | | | | | | | |
| Operating Temp.[4] | -40~+85 | | | | | | | | | | | ℃ |
| Dimensions | 90mm (L) x 40mm (W) x 14mm (H) | | | | | 110mm (L) x 60mm (W) x 16mm (H) | 90mm (L) x 40mm (W) x 14mm (H) | | | 100mm (L) x 40mm (W) x 14mm (H) | | mm |

| CODE | PORT | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|
| PD-SAC | 102 | 1X2 | 9 | 900μm loose tube | 0 | None | 10 | 1.0m |
| | 104 | 1X4 | | | 1 | SC/UPC | 15 | 1.5m |
| | 108 | 1X8 | | | 2 | SC/APC | | |
| | 116 | 1X16 | | | 3 | FC/UPC | | |
| | 132 | 1X32 | | | 4 | FC/APC | | |
| | 164 | 1X64 | | | 5 | LC/UPC | | |
| | 202 | 2X2 | | | 6 | LC/APC | | |
| | 204 | 2X4 | | | 7 | MU/UPC | | |
| | 208 | 2X8 | | | | | | |
| | 216 | 2X16 | | | | | | |
| | 232 | 2X32 | | | | | | |

**ORDER CODE** example: **PD-SAC-132-9-1-10**

### APPLICATIONS

- Telecom, datacom
- Local Area Networks (LANs)
- Cable TV (CATV)
- Local Convergence points (LCP)
- FTTX

### FEATURES

- Compact package
- Stable optical character
- Broadband operating wavelength
- Low insertion loss
- Low back reflection
- Excellent output uniformity

### OPTIONS

They are available in 1x4, 8, 16, and 32 configurations, with various connector options.
2 x N series is available upon request.
Custom packaging is also available

*Note:*
1. *IL and RL are included connector's performance.*
2. *Value of specification shows at room temperature, 1310 and 1550nm.*
3. *All types of SM fibre are available.*
4. *Operating temperature is guaranteed up to 1m tube/cable length and excludes connectors.*

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# PLC Group

## PLC Splitter Module 2mm Type (Compact)


SENKO's Planar Light wave Circuit (PLC) Splitter Modules allows system equipment manufacturers to reduce costs and shorten time to market.
High quality, reliable components are assembled at a dedicated custom module manufacturing facility.

| PARAMETERS [2,3] | 1X2 | 1X4 | 1X8 | 1X16 | 1X32 | 1X64 | 2X2 | 2X4 | 2X8 | 2X16 | 2X32 | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Operating Wave-length | 1260 nm ~1650 | | | | | | | | | | | nm |
| Insertion Loss, Max.[1] | 4.6 | 8.0 | 11.3 | 14.3 | 17.5 | 21.6 | 4.8 | 8.4 | 12.1 | 15.1 | 18.3 | dB |
| Uniformity, Max. | 0.7 | 0.9 | 1.1 | 1.5 | 1.8 | 2.8 | 0.9 | 1.5 | 1.8 | 2.1 | 2.3 | dB |
| PDL, Max. | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 | 0.2 | 0.2 | 0.4 | 0.4 | 0.4 | dB |
| WDL | 0.3 | 0.3 | 0.3 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.5 | 0.6 | 0.8 | dB |
| Return Loss, Min.[1] | UPC: 50, APC:55 | | | | | | | | | | | dB |
| Directivity Min | 55 | | | | | | | | | | | dB |
| Cable Type | Input/output:2mm/3mm Cable | | | | | | | | | | | |
| Operating Temp.[4] | -40~+85 | | | | | | | | | | | ℃ |
| Dimensions | 100mm (L) x 80mm (W) x 10mm (H) | | | | | 120mm (L) x 90mm (W) x 15mm (H) | 100mm (L) x 80mm (W) x 10mm (H) | | | 120mm (L) x 80mm (W) x 10mm (H) | | |

| CODE | PORT | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|
| PD-SAC | 102 | 1X2 | 2 | 2mm cable | 0 | None | 10 | 1.0m |
| | 104 | 1X4 | | | 1 | SC/UPC | 15 | 1.5m |
| | 108 | 1X8 | | | 2 | SC/APC | | |
| | 116 | 1X16 | | | 3 | FC/UPC | | |
| | 132 | 1X32 | | | 4 | FC/APC | | |
| | 164 | 1X64 | | | 5 | LC/UPC | | |
| | 202 | 2X2 | | | 6 | LC/APC | | |
| | 204 | 2X4 | | | 7 | MU/UPC | | |
| | 208 | 2X8 | | | | | | |
| | 216 | 2X16 | | | | | | |
| | 232 | 2X32 | | | | | | |

**ORDER CODE** example: **PD-SAC-132-2-2-15**

### APPLICATIONS

- Telecom, datacom
- Local Area Networks (LANs)
- Cable TV (CATV)
- Local Convergence points (LCP)
- FTTX

### FEATURES

- Compact package
- Stable optical character
- Broadband operating wavelength
- Low insertion loss
- Low back reflection
- Excellent output uniformity

### OPTIONS

- They are available in 1x4 , 8.16 and 32 configurations with various connector options
- 2xN Series is available upon request
- Custom packaging is also available Broadband operating wavelength
- Low insertion loss
- Low back reflection
- Excellent output uniformity

*Note:*

1. *IL and RL are included connector's performance.*
2. *Value of specification shows at room temperature, 1310 and 1550nm.*
3. *All types of SM fibre are available.*
4. *Operating temperature is guaranteed up to 1m tube/cable length and excludes connectors.*

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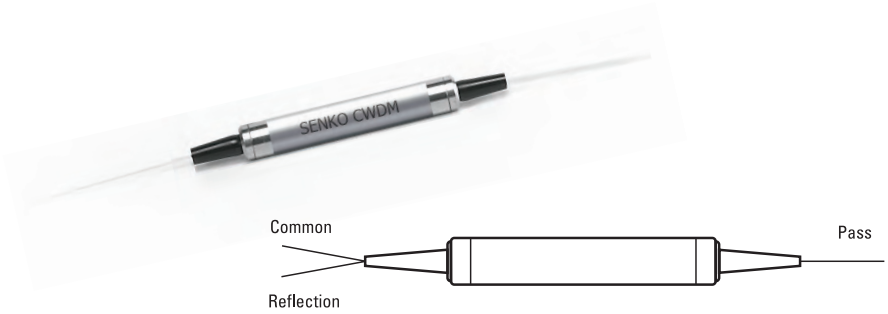
# WDM PRODUCTS — CWDM SINGLE DEVICE




## APPLICATIONS

- WDM system
- Metro Network
- Local Network

## FEATURES

- High Isolation
- Low Loss
- High Reliability
- RoHS Compliant

SENKO's Coarse Wavelength Division Multiplexer Device (CWDM) is based on Thin-Film-Filter and Micro-Optics to achieve wide passband, low insertion loss, high channel isolation and excellent environmental stability.

| PARAMETERS | | VALUE | UNIT |
|---|---|---|---|
| Operating Wavelength [1] | | 1260 ~1620 | nm |
| Signal CWDM Center Wavelength, λc | | Ch1: 1470; Ch2: 1490;<br>Ch3: 1510; Ch4: 1530;<br>Ch5: 1550; Ch6: 1570;<br>Ch7: 1590; Ch8: 1610;<br>Channel number can be decided when ordering | nm |
| Channel Spacing for CWDM | | 20 | nm |
| Channel Bandwidth | @ −0.5 dB | λc±6.5 | nm |
| Insertion Loss [2] | @ Pass Port | 0.6 | dB |
| | @ Reflection Port | 0.5 | dB |
| Isolation | Adjacent Channel | 30 | dB |
| | Non-adjacent Channel | 40 | dB |
| | Reflection Port @λc±6.5 | 13 | dB |
| PDL | | 0.2 | dB |
| Ripple in channel passband | | 0.4 | dB |
| PMD | | 0.1 | ps |
| Optical Power | | 500 | mW |
| Directivity | | 50 | dB |
| Return Loss | | 45 | dB |
| Operating Temperature | | -5~+70 | ℃ |
| Storage Temperature | | -40~+85 | ℃ |
| Fiber Type | | SMF-28e, 250 μm Bare fiber | |
| Dimensions | | 5.5(Φ)X34(L) for Bare fiber<br>5.5(Φ)X40(L) for 900 μm Loose tube | mm |

*Note:*

1. *Reflection wavelength involves OSC-1310 channel, also it can be upgraded to 16ch.*
2. *For device with connectors, IL will be 0.3 dB higher, RL will be 5dB Lower.*

| CODE | CHANNEL NUMBERS | | START WAVELENGTH | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|---|---|
| PD-CWDM | 1 | 1ch | 47 | 1470 | B | 250um bare fiber | 0 | None | 10 | 1.0m |
| | | | 49 | 1490 | 9 | 900μm | 1 | SC/UPC | 15 | 1.5m |
| | | | 51 | 1510 | | | 2 | SC/APC | | |
| | | | 53 | 1530 | | | 3 | FC/UPC | | |
| | | | 55 | 1550 | | | 4 | FC/APC | | |
| | | | 57 | 1570 | | | 5 | LC/UPC | | |
| | | | 59 | 1590 | | | 6 | LC/APC | | |
| | | | | | | | 7 | MU/UPC | | |

**ORDER CODE** example: **PD-CWDM-1-47-B-1-10**

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# WDM PRODUCT

# CWDM 2CH/4CH/8CH/16CH MODULE


SENKO's Coarse Wavelength Division Multiplexer (CWDM) Module is based on Thin-Film-Filter and Micro-Optics, this product features wide passband, low insertion loss and high channel isolation, high stability and reliability.

## APPLICATIONS

- WDM system
- Metro Network
- Local Network

## FEATURES

- High Isolation
- Low Loss
- High Reliability
- RoHS Compliant

| PARAMETERS [1] | | VALUE | UNIT |
|---|---|---|---|
| Operation Wavelength | | 1260 ~1620 | nm |
| Center Wavelength, λc | | 1270, 1290... 1470, 1490... 1570, 1590, 1610 or specified channel | nm |
| Channel Numbers | | 2, 4 or 8, 16 or specified | |
| Channel Spacing | | 20 | nm |
| Passband Bandwidth @-0.5dB | | λc ± 6.5 | nm |
| IL @ Pass Band [1,2] | 2CH | ≤1.0 | dB |
| | 4CH | ≤1.5 | dB |
| | 8CH | ≤2.7 | dB |
| | 16CH | ≤4.8 | dB |
| Pass Band Ripple | | ≤0.5 | dB |
| Isolation(Demux) | Adjacent Channel | ≥30 | dB |
| | Non-Adjacent Channel | ≥40 | dB |
| Return Loss | | ≥45 | dB |
| Directivity | | ≥50 | dB |
| PMD | | ≤0.2 | ps |
| PDL | | ≤0.2 | dB |
| Fiber Type | | SMF 28e 250μm fiber | |
| Package Dimension | | Metal Box:60 (W)× 12(H) × 80 (L)<br>ABS Plastic Box[1]:80 (W)× 10(H) × 100(L)<br>LGX Box[2]: 129(W)× 29(H) × 155.5(L) | mm |
| Operating Temperature | | 0~+ 70 | ℃ |
| Storage Temperature | | -40~+85 | ℃ |

*Note:*
1. *The tested performances do no include connectors.*
2. *For module with connectors, IL will be 0.3 dB higher, RL will be 5dB Lower.*

| CODE | CHANNEL NUMBERS | | START WAVELENGTH | | END WAVELENGTH | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | | BOX | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD-CWDM | 2 | 2ch | 27 | 1270 | 29 | 1290 | 9 | 900μm | 0 | None | 10 | 1.0m | 1 | Metal Box |
| | 4 | 4ch | ... | ... | ... | ... | 2 | 2mm | 1 | SC/UPC | 15 | 1.5m | 2 | ABS box[1] |
| | 8 | 8ch | 51 | 1510 | 53 | 1530 | 3 | 3mm | 2 | SC/APC | | | 3 | LGX box[2] |
| | 16 | 16ch | 53 | 1530 | 55 | 1550 | | | 3 | FC/UPC | | | | |
| | | | 55 | 1550 | 57 | 1570 | | | 4 | FC/APC | | | | |
| | | | 57 | 1570 | 59 | 1590 | | | 5 | LC/UPC | | | | |
| | | | 59 | 1590 | 61 | 1610 | | | 6 | LC/APC | | | | |
| | | | | | | | | | 7 | MU/UPC | | | | |

**ORDER CODE** example: **PD-CWDM-4-47-53-9-1-10-2**

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# WDM PRODUCTS

## CWDM 2CH/4CH/8CH + 1310CH MODULE


SENKO's Coarse Wavelength Division Multiplexer Module (CWDM) with 1310ch(OSC) is based on Thin-Film-Filter and Micro-Optics, this product features wide passband, low insertion loss and high channel isolation, high stability and reliability.

### APPLICATIONS

- WDM system
- Metro Network
- Local Network

### FEATURES

- High Isolation
- Low Loss
- High Reliability
- RoHS Compliant

| PARAMETERS [1] | | VALUE | UNIT |
|---|---|---|---|
| Operation Wavelength | | 1260 ~1620 | nm |
| Center Wavelength, λc | | 1470, 1490, 1510, 1530, 1550,1570, 1590, 1610 or specified channel | nm |
| Osc channel | | 1260~1360 | nm |
| Channel Numbers | | 2, 4 or 8 or specified | |
| Channel Spacing | | 20 | nm |
| Passband Bandwidth @-0.5dB | | λc ± 6.5 | nm |
| IL (Com-1310ch) | | ≤0.8 | dB |
| IL (Com- CWDM@ Pass Band) [1,4] | 2CH | ≤1.3 | dB |
| | 4CH | ≤1.8 | dB |
| | 8CH | ≤3.1 | dB |
| Pass Band Ripple | | ≤0.5 | dB |
| Isolation(Demux) | Adjacent Channel | ≥30 | dB |
| | Non-Adjacent Channel | ≥40 | dB |
| Return Loss | | ≥45 | dB |
| Directivity | | ≥50 | dB |
| PMD | | ≤0.2 | ps |
| PDL | | ≤0.2 | dB |
| Fiber Type | | SMF 28e 250μm fiber | |
| Package Dimension [2] | | Metal Box:60 (W)× 12(H) × 80 (L)<br>ABS Plastic Box[1]:80 (W)× 10(H) × 100(L)<br>LGX Box[2]: 129 (W)× 29(H) × 155.5(L) | mm |
| Operating Temperature [3] | | 0~+70 | °C |
| Storage Temperature | | -40~+85 | °C |

*Note:*

1. *The tested performances do no include connectors.*
2. *Customized Smaller packaging box is available to use bend insensitive fiber.*
3. *For module with connectors, IL will be 0.3 dB higher, RL will be 5dB Lower.*

| CODE | CHANNEL NUMBERS | | START WAVELENGTH | | END WAVELENGTH | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | | BOX | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD-CWDM3 | 2 | 2ch | 47 | 1470 | 49 | 1490 | 9 | 900μm | 0 | None | 10 | 1.0m | 1 | Metal Box |
| | 4 | 4ch | 49 | 1490 | 51 | 1510 | 2 | 2mm | 1 | SC/UPC | 15 | 1.5m | 2 | ABS box [1] |
| | 8 | 8ch | 51 | 1510 | 53 | 1530 | 3 | 3mm | 2 | SC/APC | | | 3 | LGX box [2] |
| | | | 53 | 1530 | 55 | 1550 | | | 3 | FC/UPC | | | | |
| | | | 55 | 1550 | 57 | 1570 | | | 4 | FC/APC | | | | |
| | | | 57 | 1570 | 59 | 1590 | | | 5 | LC/UPC | | | | |
| | | | 59 | 1590 | 61 | 1610 | | | 6 | LC/APC | | | | |
| | | | | | | | | | 7 | MU/UPC | | | | |

**ORDER CODE** example: **PD-CWDM3-4-47-53-9-1-15-1**

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# WDM PRODUCTS — MINI LOW LOSS 4CH/8CH CWDM


SENKO's Mini Low Loss Coarse Wavelength Division Multiplexer (CWDM) is based on Thin-Film-Filter and Micro-Optics, this product features small form, ultra low loss and high channel isolation. This technology is a lead-free packaging platform with high reliability.

## APPLICATIONS

- WDM system
- Metro Network
- Local Network

## FEATURES

- Small Form
- Ultra Low Loss
- High Reliability
- RoHS Compliant

| PARAMETERS | | VALUE | UNIT |
|---|---|---|---|
| Operation Wavelength | | 1260 ~1620 | nm |
| Center Wavelength, λc | | 1470, 1490, 1510, 1530, 1550,1570, 1590, 1610 | nm |
| Channel Numbers | | 4 or 8 | |
| Channel Spacing | | 20 | nm |
| Passband Bandwidth @-0.5dB | | λc ± 6.5 | nm |
| 1310ch Bandwidth | | 1310 ± 50 | nm |
| IL @ Pass Band [1,3] | 4CH CWDM | ≤1.0 | dB |
| | 8CH CWDM | ≤1.5 | dB |
| | 1310CH [2] | ≤1.0 | dB |
| Pass Band Ripple | | ≤0.5 | dB |
| Isolation | Adjacent Channel | ≥30 | dB |
| | Non-Adjacent Channel | ≥40 | dB |
| | Com-1310 @ CWDM CH | ≥30 | dB |
| Return Loss | | ≥45 | dB |
| Directivity | | ≥50 | dB |
| PMD | | ≤0.2 | ps |
| PDL | | ≤0.2 | dB |
| Fiber Type | | SMF 28e 250μm fiber | |
| Package Dimension | | 55(L)× 30(W) × 8(H) | mm |
| Operating Temperature | | 0~+70 | ℃ |
| Storage Temperature | | -40~+85 | ℃ |

*Note:*

1. *The tested performances do no include connectors.*
2. *1310ch is also available packaged into the module.*
3. *For module with connectors, IL will be 0.3 dB higher, RL will be 5dB Lower.*

| CODE | | CHANNEL | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH |
|---|---|---|---|---|---|---|---|---|
| PD-MLLC | 4 | 4ch | B | 250μm Bare fiber | 0 | None | 10 | 1.0m |
| | 8 | 8ch | 9 | 900μm | 1 | SC/UPC | 15 | 1.5m |
| | 5 | 4ch CWDM+1310ch | | | 2 | SC/APC | | |
| | 9 | 8ch CWDM+1310ch | | | 3 | FC/UPC | | |
| | | | | | 4 | FC/APC | | |
| | | | | | 5 | LC/UPC | | |
| | | | | | 6 | LC/APC | | |
| | | | | | 7 | MU/UPC | | |

**ORDER CODE** example: **PD-MLLC-8-B-1-10**

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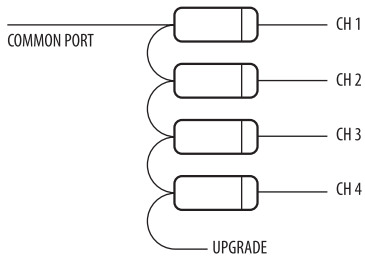
# WDM PRODUCTS

## DWDM 100G/200G 4CH/8CH MODULE




SENKO's 4/8CH Dense Wavelength Division Multiplexer (DWDM) is based on Thin-Film-Filter and Micro-Optics, this product features wide passband, low insertion loss and high channel isolation, high stability and reliability.

| PARAMETERS [1] | | VALUE | UNIT |
|---|---|---|---|
| Type | | 100G/200G DWDM | |
| Operating Wavelength | | 1520~1570 | nm |
| Center Wavelength, λc | | 4ch ITU Options in C band:<br>CH20: 1561.42<br>CH21: 1560.61<br>…<br>CH59: 1530.33<br>CH60: 1529.55<br>Ch number will be specified when ordering | nm |
| Passband Bandwidth @-0.5dB (100G) | | λc ± 0.11 | nm |
| Passband Bandwidth @-0.5dB (200G) | | λc ± 0.25 | nm |
| Insertion Loss (4CH) | Com – Channels | ≤2.0 | dB |
| | Com – Upgrade | ≤2.0 | dB |
| Insertion Loss (8CH) | Com – Channels | ≤3.0 | dB |
| | Com – Upgrade | ≤3.0 | dB |
| Isolation | Adjacent Channel | ≥25 | dB |
| | Non-Adjacent Channel | ≥40 | dB |
| | Com – Upgrade | ≥12 | dB |
| Passband Ripple | | ≤0.5 | dB |
| PDL | | ≤0.2 | dB |
| Return Loss | | ≥45 | dB |
| Directivity | | ≥50 | dB |
| Operating Temperature | | 0~+70 | ℃ |
| Storage Temperature | | -40~+85 | ℃ |
| Fiber Type | | Corning SMF-28e 250um bare fiber | |
| Package Dimension [2] | | Metal box: (L)80 × (W)60 × (H)12<br>ABS box: (L)100 × (W)80 × (H)10<br>LGX box: (L)155.5 × (W)129 × (H)29 | mm |

| CODE | CHANNEL SPACING | | CHANNEL NUMBERS | | START WAVELENGTH | | END WAVELENGTH | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | | BOX | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD-DWDM | 1 | 100G | 2 | 2ch | C21 | ITU C21 | H21 | ITU H21 | 9 | 900um | 0 | None | 10 | 1.0m | 1 | Metal Box |
| | 2 | 200G | 4 | 4ch | H21 | ITU H21 | C22 | ITU C22 | 2 | 2mm | 1 | SC/UPC | 15 | 1.5m | 2 | ABS Box |
| | | | 8 | 8ch | C22 | ITU C22 | H22 | ITU H22 | 3 | 3mm | 2 | SC/APC | | | 3 | LGX Box |
| | | | 16 | 16ch | … | … | … | … | | | 3 | FC/UPC | | | | |
| | | | | | | | | | | | 4 | FC/APC | | | | |
| | | | | | | | | | | | 5 | LC/UPC | | | | |
| | | | | | | | | | | | 6 | LC/APC | | | | |
| | | | | | | | | | | | 7 | MU/UPC | | | | |

**ORDER CODE** example: PD-DWDM-1-8-C21-C28-9-1-10-1

### APPLICATIONS

- WDM system
- Metro Network
- Local Network

### FEATURES

- High Isolation
- Low Loss
- High Reliability
- RoHS Compliant

*Note:*

1. *The parameters are not including connector performance.*
2. *Customized Smaller packaging box is available to use bend insensitive fiber.*
3. *For module with connectors, IL will be 0.3 dB higher, RL will be 5dB Lower.*

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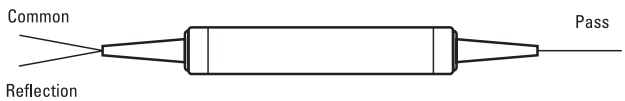
Advanced Components

# WDM PRODUCTS FTTX FWDM -1310~1490/1550


SENKO's 1310/1490/1550 FTTX MWDM is based on filter based platform for optical device. This multiplexer features ultra low loss, high isolation, and high reliability.




| PARAMETERS | | VALUE | UNIT |
|---|---|---|---|
| Pass Channel Wavelength Range, λP | | 1540 ~1560 | nm |
| Reflection Channel Wavelength Range, λR | | 1260 ~1360 and 1480 ~1500 | nm |
| Insertion Loss | Com-Pass | ≤0.7 | dB |
| | Com-Reflection | ≤0.5 | dB |
| Isolation | Com-Pass @λR | ≥25 | dB |
| | Com-Reflection @λP | ≥15 | dB |
| Return Loss | | ≥45 | dB |
| Directivity | | ≥50 | dB |
| PDL | | ≤0.1 | dB |
| Fiber Type | | SMF-28e, 250μm bare fiber | |
| Fiber Color | | Com port: Black; Pass port: Nature ; Ref. port: Nature | |
| Package Dimension | | 5.5mm(φ) x 34(L) for bare fiber<br>5.5mm(Φ) x 40(L) for 900μm Loose tube | mm |
| Operating Temperature | | 0~+70 | ℃ |
| Storage Temperature | | -40~+85 | ℃ |

| CODE | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | |
|---|---|---|---|---|---|---|
| PD-FWDM-FTTX | B | 250μm | 0 | None | 10 | 1.0m |
| | 9 | 900μm | 1 | SC/UPC | 15 | 1.5m |
| | | | 2 | SC/APC | | |
| | | | 3 | FC/UPC | | |
| | | | 4 | FC/APC | | |
| | | | 5 | LC/UPC | | |
| | | | 6 | LC/APC | | |
| | | | 7 | MU/UPC | | |

**ORDER CODE** example: **PD-FWDM-FTTX-B-1-10**

## APPLICATIONS

- WDM system
- For Metro Market
- FTTX

## FEATURES

- Low Insertion Loss
- High Channel Iso Lation
- Highly Stable & Reliate
- Rohs Compliant

*Note:*

1. *The tested performances do not include connectors.*
2. *For device with connectors, IL will be 0.3 dB higher, RL will be 5dB Lower.*

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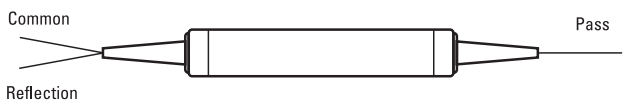
# WDM PRODUCTS FILTER BASED FWDM 1310/1550


SENKO's Wavelength Division Multiplexer (WDM) is based on thin-film filter technology, and has two types of standard isolation and high isolation. This component us used to combine or separate 1310 and 1550nm band signal. This product is ideal for high-power Optical Amplification Systems and WDM Network applications.




| PARAMETERS | | VALUE | UNIT |
|---|---|---|---|
| Pass Channel Wavelength Range, λP | | 1460~1620 | nm |
| Reflection Channel Wavelength Range, λR | | 1260~1360 | nm |
| Insertion Loss | Com-Pass | ≤0.6 | dB |
| | Com-Reflection | ≤0.4 | dB |
| Isolation (STD) | Com-Pass @λR | ≥30 | dB |
| | Com-Reflection @λP | ≥15 | dB |
| Isolation (High Isolation) | Com-Pass @λR | ≥45 | dB |
| | Com-Reflection @λP | ≥25 | dB |
| Return Loss | | ≥45 | dB |
| Directivity | | ≥50 | dB |
| PDL | | ≤0.1 | dB |
| Pass band Ripple | | ≤0.3 | dB |
| Fiber Type | | SMF-28e, 250μm bare fiber | |
| Package Dimension | | 5.5mm(φ) x 34(L) for bare fiber<br>5.5mm(Φ) x 40(L) for 900μm Loose tube | mm |
| Operating Temperature | | 0~+70 | ℃ |
| Storage Temperature | | -40~+85 | ℃ |

| CODE | ISOLATION LEVEL | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|
| PD-FWDM-35 | S | standard | B | 250um bare fire | 0 | None | 10 | 1.0m |
| | H | High Isolation | 9 | 900μm | 1 | SC/UPC | 15 | 1.5m |
| | | | | | 2 | SC/APC | | |
| | | | | | 3 | FC/UPC | | |
| | | | | | 4 | FC/APC | | |
| | | | | | 5 | LC/UPC | | |
| | | | | | 6 | LC/APC | | |
| | | | | | 7 | MU/UPC | | |

**ORDER CODE** example: **PD-FWDM-35-H-B-1-10**

## APPLICATIONS

- Bi-Directional WDM system
- Metro Network
- CATV
- FTTX

## FEATURES

- Wide Operating Wavelength Range
- Low Insertion Loss
- High Channel Isolation
- Highly Stable & Reliable
- RoHS Compliant

*Note:*

1. *The tested performances do not include connectors.*
2. *For device with connectors, IL will be 0.3 dB higher, RL will be 5dB Lower.*

# WDM PRODUCTS — GRATING DWDM MODULE


## APPLICATIONS

- MSO/CATV
- DWDM systems

## FEATURES

- Athermal/Passive
- Low Insertion Loss
- Good Temperature Stability

SENKO's Grating Multi-channel DWDM features low insertion loss, flat filter profile, good channel uniformity, and wide temperature stability(-40~85°C).

| PARAMETERS [1] | | VALUE | UNIT |
|---|---|---|---|
| Type | | 100G/200G DWDM | |
| Operating Wavelength | | 1520~1570 | nm |
| Center Wavelength, λc | | ITU Options in C band:<br>CH20: 1561.42<br>CH21: 1560.61<br>…<br>CH59: 1530.33<br>CH60: 1529.55<br>Ch number will be specified when ordering | nm |
| Passband Bandwidth @-0.5dB (100G) | | λc ± 0.11 | nm |
| Passband Bandwidth @-0.5dB (200G) | | λc ± 0.25 | nm |
| Insertion Loss (20CH) | Typical | 3.0 | dB |
| | max | 4.0 | dB |
| Insertion Loss (40CH) | Typical | 3.0 | dB |
| | max | 4.0 | dB |
| Isolation (Demux) | Adjacent Channel | 25 | dB |
| | Non-Adjacent Channel | 35 | dB |
| Channel IL Uniformity | | 1.0 | dB |
| PDL | | 0.4 | dB |
| Return Loss | | 40 | dB |
| Directivity | | 50 | dB |
| Operating Temperature | | -40~+85 | °C |
| Storage Temperature | | -40~+85 | °C |
| Fiber Type | | Corning SMF-28e 250um bare fiber | |
| | 100G | 200.32(L)X106.7(W)X20.4(H) | |
| | 200G | 200.32(L)X96.52(W)X43.18(H) | |

*Note:*
1. *The parameters are not including connector performance.*
2. *For module with connectors, IL will be 0.3 dB higher, RL will be 5dB Lower.*

| CODE | CHANNEL SPACING | | CHANNEL NUMBERS | | START WAVELENGTH | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD-DWDM-G | 1 | 100G | 8 | 8ch | C21 | ITU C21 | 9 | 900μm | 0 | None | 10 | 1.0m |
| | 2 | 200G | 16 | 16ch | H21 | ITU H21 | 2 | 2mm | 1 | SC/UPC | 15 | 1.5m |
| | | | 40 | 40ch | C22 | ITU C22 | 3 | 3mm | 2 | SC/APC | | |
| | | | | | … | … | | | 3 | FC/UPC | | |
| | | | | | | | | | 4 | FC/APC | | |
| | | | | | | | | | 5 | LC/UPC | | |
| | | | | | | | | | 6 | LC/APC | | |
| | | | | | | | | | 7 | MU/UPC | | |

**ORDER CODE** example: **PD-DWDM-G-1-8-C21-9-1-10**

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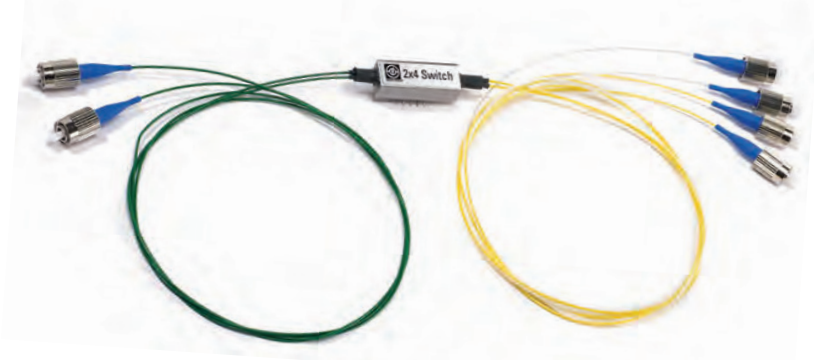
# SWITCH/ROUTING AND ATTENUATOR 1xN/2xN/4xN SERIES




Senko's Optical Switch 1xN/2xN/4xN series are based on Opto-mechanical technology with high reliable quality. These switches are designed for optical Multiplexers, cross-connect and network switching for fault/protection applications.

| PARAMETERS [1] | VALUE | | | UNIT |
|---|---|---|---|---|
| Types | 1x1 / 1x2 / 2x2 /2x4(Dual 1x2)/4x8(Quad 1x2)/4x4 bypass | | | |
| Wavelength | 1260~1360 and 1500~1600 | | | nm |
| Switch type | 1x1 / 1x2 / 2x2 /2x4(Dual 1x2) | 4x8(Quad 1x2) | 4x4 bypass | |
| Insertion Loss Typical | 0.5 | 1.0 | 2.0 | dB |
| Insertion Loss Max. | 1.0 | 1.4 | | dB |
| Wavelength Dependent Loss | 0.3 | | | dB |
| Temperature Dependent Loss | 0.5 | | | dB |
| PDL | 0.1 | | | dB |
| Repeatability | ±0.1 | | | dB |
| Cross Talk | -60 | | | dB |
| Return Loss | -50 | | | dB |
| Switch type | 1x1 / 1x2 / 2x2 /2x4(Dual 1x2) | 4x8(Quad 1x2) | 4x4 bypass | |
| Switching Time | 3.5 | 3.5 | 5 | ms |
| Optical Power Handing | 500 | | | mW |
| Durability (Cycles) | $3x10^7$ | | | |
| Operating Voltage range | 4.5~5.5 | | | V |
| Power Consumption Typ. | Latching:200±10% / Non-Latching:140±10% | | | mW |
| Dimension (H x W x L) | 1x1, 1x2—8.8x11x30<br>Mini 1x1, 1x2—7.6x11x22.6<br>2x2—9x18x39.5<br>2x4—8.2x11x30 | 7.6x11x22.6 | 7.6x11x22.6 | mm |
| Weight | Normal:16 / Mini:10 | 10 | 10 | g |
| Fiber Type | SMF-28e 250μm fiber or 0.9mm loose tube<br>MM fiber is also optional | | | |
| Operating temperature | -20~+70 | | | ℃ |

| CODE | FIBER MODE | | TYPE | | LATCHING | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD-FOSW | S | SM | 11 | 1x1 | L | latching | B | 250μm Bare fiber | 0 | None | 10 | 1.0m |
| | M | MM | 12 | 1x2 | N | Non-latching | 9 | 900μm | 1 | SC/UPC | 15 | 1.5m |
| | | | M1 | Mini 1x2 | | | | | 2 | SC/APC | | |
| | | | M2 | Mini 1x2 | | | | | 3 | FC/UPC | | |
| | | | 22 | 2x2 | | | | | 4 | FC/APC | | |
| | | | 24 | 2x4 | | | | | 5 | LC/UPC | | |
| | | | 44 | 4X4 bypass | | | | | 6 | LC/APC | | |
| | | | 48 | 4X8 | | | | | 7 | MU/UPC | | |

**ORDER CODE** example: **PD-FOSW-S-11-5-N-9-1-10**

## APPLICATIONS

- Optical Network Protection and Storage
- Network Switching
- Reconfigurable Add/ Drop Multiplexers
- Instrumentation and Testing, Measurement

## FEATURES

- Compact Size
- Low Insertion Loss
- Fully compliant with Telcordia GR-1221 and GR-1073
- RoHs Compliance

*Note:*

1. *The specification shows for SM type only but MM type(850/1300nm) available*
2. *The parameters are not including connector performance.*

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# SWITCH/ROUTING AND ATTENUATOR 1x4/1x8/1x16


## APPLICATIONS

- Optical Network Protection and Storage
- Network Switching
- Instrumentation and Testing, Measurement

## FEATURES

- Low Insertion Loss
- Fully compliant with Telcordia GR-1221 and GR-1073
- RoHs Compliance

Senko's 1X4/1x8/1x16 Optical Switch series are based on Opto-mechanical technology with high reliable quality. These switches are designed for optical Multiplexers, cross-connect and network switching for fault/protection applications.

| PARAMETERS [1] | VALUE | | | UNIT |
|---|---|---|---|---|
| Types | 1X4/1x8/1x16 | | | |
| Wavelength | 1X4 | 1X8 | 1X16 | nm |
| | 1260~1360 and 1500~1600 | | | |
| Insertion Loss Typical | 0.8 | 1.2 | 1.5 | |
| Insertion Loss Max. | 1.2 | 1.8 | 2.0 | dB |
| Wavelength Dependent Loss | 0.3 | | | dB |
| Temperature Dependent Loss | 0.5 | | | dB |
| PDL | 0.1 | | | dB |
| Repeatability | ±0.1 | | | dB |
| Cross Talk | 80 | | | dB |
| Return Loss | -55 | | | dB |
| Switching Time | 5 | | | ms |
| Optical Power Handing | 500 | | | mW |
| Durability (Cycles) | $3x10^7$ | | | |
| Dimension (H x W x L) | Normal:18x76x76 / Mini:15x44x55 | 18x100x100 | 18x130x140 | mm |
| Weight | Normal:135/Mini:100 | 270 | 510 | g |
| Fiber Type | SMF-28e 250μm fiber or 0.9mm loose tube MM fiber is also optional | | | |
| Operating temperature | -20~+70 | | | ℃ |

*Note:*

1. *The specification shows for SM type only but MM type(850/1300nm) available*
2. *The parameters are not including connector performance.*

| CODE | FIBER MODE | | TYPE | | LATCHING | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD-FOSW | S | SM | 14 | 1x4 | L | latching | B | 250μm bare fiber | 0 | None | 10 | 1.0M |
| | M | MM | 18 | 1x8 | | | 9 | 900μm | 1 | SC/UPC | 15 | 1.5M |
| | | | 16 | 1x16 | | | | | 2 | SC/APC | | |
| | | | | | | | | | 3 | FC/UPC | | |
| | | | | | | | | | 4 | FC/APC | | |
| | | | | | | | | | 5 | LC/UPC | | |
| | | | | | | | | | 6 | LC/APC | | |
| | | | | | | | | | 7 | MU/UPC | | |

**ORDER CODE** example: **PD-FOSW-S-18-3-L-9-1-15**

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# SWITCH/ROUTING AND ATTENUATOR — CIRCULATOR


Senko's Mini Fiber Optical Circulator features compact size, high performance over wide wavelength band, which the component can transmits the incoming signal from port1 to port2, and another incoming signal from port2 to port3. It's widely used in combination with fiber gratings and other reflective components in DWDM systems, and bi-directional communication systems.

## APPLICATIONS

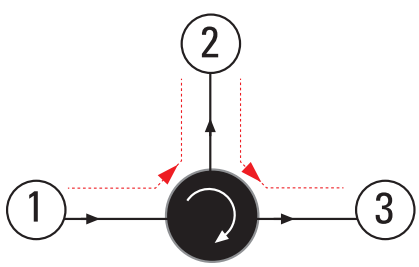
- Optical Amplifiers
- FBG Applications
- Dispersion Compensation
- Fiber Sensors

## FEATURES

- Low Insertion Loss & PDL
- High Channel Isolation
- Optical Path Epoxy Free
- Telcordia Compliant

| PARAMETERS | VALUE | UNIT |
|---|---|---|
| Operating Wavelength | 1310 band: 1290~1330 or<br>C-band: 1525~1565 or<br>C+L band: 1525~1610 | nm |
| Insertion Loss (1310, or C-band) [1] | ≤0.7 | dB |
| Insertion Loss (C+L band) [1] | ≤0.9 | dB |
| Isolation (2➞1,3➞2) - for (1310, or C-band) | ≥38 | dB |
| Isolation (2➞1,3➞2) - for (C+L band) | ≥32 | dB |
| Directivity (1➞3) | ≥50 | dB |
| Return Loss | ≥0.1 | dB |
| PDL (1310, or C-band) | ≤0.2 | dB |
| PDL (C+L band) | ≤0.15 | dB |
| Operating Temperature | 0~+70 | ℃ |
| Storage Temperature | -40~+85 | ℃ |
| Fiber Type | Corning SMF-28e 250μm bare fiber | |
| Package Dimension | 5.5(Φ) x 38(L) | mm |

*Note:*
1. *Insertion loss values include WDL, TDL.*
2. *For device with connectors, IL will be 0.3 dB higher, RL will be 5dB Lower.*




| CODE | WAVELENGTH | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|
| PD-FOCI | 3 | 1310 | B | 250μm Bare fiber | 0 | None | 10 | 1.0M |
| | 5 | 1550 | 9 | 900μm | 1 | SC/UPC | 15 | 1.5M |
| | | | | | 2 | SC/APC | | |
| | | | | | 3 | FC/UPC | | |
| | | | | | 4 | FC/APC | | |
| | | | | | 5 | LC/UPC | | |
| | | | | | 6 | LC/APC | | |
| | | | | | 7 | MU/UPC | | |

**ORDER CODE** example: **PD-FOCI-3-B-1-15**

# SWITCH/ROUTING AND ATTENUATOR — ISOLATOR


## APPLICATIONS

- Fiber Optic Lasers
- Optical Transmitters & Transceivers
- Fiber Amplifiers
- Fiber Sensors

## FEATURES

- High Isolation
- Low Insertion Loss
- Large Aperture Features

Senko 's Isolator is a compact, high performance component with low insertion, high isolation. It's ideal for amplifiers, fiber laser, and other fiber optic communication equipments to suppress back reflection and back scattering.

| PARAMETERS [1] | VALUE | | UNIT |
|---|---|---|---|
| Stage | Single Stage | Dual Stage | |
| Center Wavelength (λc) | 1310, 1480 or 1550 | | nm |
| Operating Wavelength Range | 1310±15, 1480±10 or 1550±20 | | nm |
| Min. Isolation at 23°C | 32 | 55 | dB |
| Max. Insertion Loss at -5°C -70°C | 0.55 | 0.65 | dB |
| Min. Return Loss (Input/Output) | 55/55 | 55/55 | dB |
| Max. PDL | 0.05 | 0.1 | dB |
| Max. Optical Power (CW) | 300 | | mW |
| Max. Tensile Load | 5 | | N |
| Fiber Type | SMF-28e, 250μm bare fiber | | |
| Operating Temperature | -5 ~+70 | | °C |
| Storage Temperature | -40 ~ +85 | | °C |
| Package Pimenion | 5.5(Φ)x34(L) for bare fiber<br>5.5(Φ)x40(L) for 900μm Loose tube | | mm |

*Note:*
1. *Above specifications are for device without connector. For devices with connectors, IL will be 0.3dB higher, RL will be 5dB lower .*

| CODE | WAVELENGTH | | STAGE | | CONNECTOR TYPE ON PORT 1 & 2 | | FIBER JACKET ON PORT 1 & 2 | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|---|---|
| PD-FOIS | 31 | 1310 | S | Single Stage | 0 | None | B | 250μm Fiber | Q | 0.75m |
| | 48 | 1480 | D | Dual Stage | 1 | SC/UPC | L | 900μm Loose Tube | | |
| | 55 | 1550 | | | 2 | SC/APC | | | | |
| | | | | | 3 | FC/UPC | | | | |
| | | | | | 4 | FC/APC | | | | |
| | | | | | 5 | LC/UPC | | | | |
| | | | | | 6 | LC/APC | | | | |
| | | | | | 7 | MU/UPC | | | | |

**ORDER CODE** example: **PD-FOIS-31-S-I-L-Q**

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# SWITCH/ROUTING AND ATTENUATOR — MANUAL VOA


Senko's Manual Variable Optical Attenuator features high resolution, and wide dynamic range with very convenient adjustment, also it has low insertion loss, low wavelength dependent loss, and low polarization dependent loss.

| PARAMETERS | VALUE | UNIT |
|---|---|---|
| Operating Wavelength | 1310±40, 1490±10 and 1550±40 | nm |
| Excess Insertion Loss [1] | ≤1.0 | dB |
| Attenuation Range | 1.0~30 | dB |
| Return Loss | ≥50 | dB |
| Resolution | ≤0.1 | dB |
| PDL | ≤0.15 | dB |
| Operating Temperature | 0~70 | °C |
| Storage Temperature | -40~+85 | °C |
| Fiber Type | Corning SMF-28e 250um bare fiber | |
| Package Dimension | 60 (L) x 16(W) x 8(H) | mm |

*Note:*
1. *Insertion loss values include WDL, TDL, PDL.*
2. *For device with connectors, RL will be 5dB lower.*

| CODE | WAVELENGTH | | JUMPER TYPE | | CONNECTOR | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|
| PD-MVOA | 3 | 1310 | B | 250μm Bare fiber | 0 | None | 10 | 1.0M |
| | 5 | 1550 | 9 | 900μm | 1 | SC/UPC | 15 | 1.5M |
| | T | Three Windows | 2 | 2mm | 2 | SC/APC | | |
| | | | 3 | 3mm | 3 | FC/UPC | | |
| | | | | | 4 | FC/APC | | |
| | | | | | 5 | LC/UPC | | |
| | | | | | 6 | LC/APC | | |
| | | | | | 7 | MU/UPC | | |

**ORDER CODE** example: **PD-MVOA-5-2-1-10**

## APPLICATIONS

- In-line Power Control
- Transmitter Power Equalization

## FEATURES

- Low Insertion Loss
- Wide Attenuation Range
- High Resolution

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# PM PRODUCTS

## PM POLARIZATION COMBINER/SPLITTER


Senko's Polarization Beam Combiner/Splitter is a high performance component that combines two orthogonal polarization signals into one output fiber, The typical configuration uses two PM fibers for the input and the SM fiber for the output. The device can also be used as a beam splitter.

| PARAMETER [1,2] | VALUES | | UNIT |
|---|---|---|---|
| Grade | Grade P | Grade A | |
| Center Wavelength | 1310,1480 or 1550 | | nm |
| Operating Wavelength Range | ±40 | | nm |
| Typ. Insertion loss | 0.4 | 0.5 | dB |
| Max. Insertion loss | 0.6 | 0.7 | dB |
| Min. Return Loss | 50 | | dB |
| Min. Extinction Ratio (for Splitter only) | 22 | 20 | dB |
| Min. Directivity | 50 | | dB |
| Max. Optical Power (CW) | 300 | | mW |
| Max. Tensile Load | 5 | | N |
| Fiber Type [3] | PM Panda Fiber on Port 1 & 2 | | |
| Operating Temperature | -5 to +70 | | °C |
| Storage Temperature | -40 to +85 | | °C |
| Packaging Dimenfion | 5.5(Φ)x35 (L) | | mm |

### APPLICATIONS

- Polarization Mode Dispersion Compensator
- EDFA & Raman Amplifier
- Coherent Telecommunication Systems
- Fiber Optic Sensor

### COMPACT HIGH PERFORMANCE

- Compact High Performance
- High Extinction Ratio
- Low Insertion Loss
- High Directivity

*Note:*

1. *Above specifications are for device without connector.*
2. *For devices with connectors, IL will be 0.3dB higher, RL will be 5dB lower and ER will be 2dB lower.*
3. *The PM fiber and the connector key are aligned to the slow axis.*

| CODE | WAVELENGTH | | GRADE | | CONNECTOR TYPE ON PORT 1, 2 & 3 | | FIBER JACKET ON PORT 1, 2 & 3 | | FIBER TYPE ON PORT3 | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD-PMBC PD-PMBS | 31 | 1310 | P | Premium | 0 | None | B | 250μm Fiber | 1 | SMF-28e FIBER | Q | 0,75m |
| | 48 | 1480 | A | A Grade | 1 | SC/UPC | D | 400μm Fiber only for PM Fiber | 2 | PM Panda Fiber, Slow Axis align 45°to Port 1 | | |
| | 55 | 1550 | | | 2 | SC/APC | L | 900μm Loose Tube | 3 | PM Panda Fiber, Slow Axis align to Port 1 | | |
| | | | | | 3 | FC/UPC | | | | | | |
| | | | | | 4 | FC/APC | | | | | | |
| | | | | | 5 | LC/UPC | | | | | | |
| | | | | | 6 | LC/APC | | | | | | |
| | | | | | 7 | MU/UPC | | | | | | |

**ORDER CODE** example: **PD-PMBC-31-P-2-D-2-Q**

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# PM PRODUCTS

## PM ISOLATOR


### APPLICATIONS

- Fiber Optic Lasers
- Optical Transmitters & Transceivers
- Fiber Amplifiers
- Fiber Sensors

### FEATURES

- High Isolation
- Low Insertion Loss
- Large Aperture Features

Senko Polarization Maintaining Isolator is characterized with low insertion, high isolation, and high extinction ratio. It's ideal for PM fiber amplifier, fiber laser, high speed communication systems and instrumentation applications.

| PARAMETER [1,2] | VALUES | | | | UNIT |
|---|---|---|---|---|---|
| Stage | Single Stage | | Dual Stage | | |
| Grade | Grade P | Grade A | Grade P | Grade A | |
| Center Wavelength (λc) | 1310, 1480 or 1550 | | | | nm |
| Operating Wavelength Range | ±20 | | | | nm |
| Typ. Peak Isolation | 42 | 40 | 58 | 55 | dB |
| Min. Isolation at 23°C, λc ±10 nm | 30 | 28 | 46 | 45 | dB |
| Typ. Insertion Loss at 23°C | 0.4 | 0.5 | 0.5 | 0.7 | dB |
| Max. Insertion Loss at -5°C-70°C | 0.6 | 0.7 | 0.7 | 0.9 | dB |
| Min. Return Loss (Input/Output) | 55 | 55 | 55 | 55 | dB |
| Min. Extinction Ratio(only for B tyep) | 20 | 18 | 20 | 18 | dB |
| Min. Extinction Ratio(only for F type) | 25 | 23 | 25 | 23 | dB |
| Max. Optical Power (CW) | 300 | | | | mW |
| Max. Tensile Load | 5 | | | | N |
| Fiber Type [3] | PM Panda Fiber | | | | |
| Operating Temperature | -5 to +70 | | | | °C |
| Storage Temperature | -40 to +85 | | | | °C |
| Package Dimension | 5.5(Φ)x35 (L) | | | | mm |

*Note:*

1. *Above specifications are for device without connector.*
2. *For devices with connectors, IL will be 0.3dB higher, RL will be 5dB lower and ER will be 2dB lower.*
3. *The PM fiber and the connector key are aligned to the slow axis.*

| CODE | WAVE-LENGTH | | GRADE | | STAGE | | AXIS ALIGNMENT | | CONNECTOR TYPE ON PORT 1 & 2 | | FIBER JACKET ON PORT 1 & 2 | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD-PMI | 31 | 1310 | P | Premium Grade | S | Single Stage | F | Fast Axis Blocked | 0 | None | B | 250μm Panda Bare Fiber | Q | 0.75m |
| | 48 | 1480 | A | A Grade | D | Dual Stage | B | Both Axis Working | 1 | SC/UPC | D | 400μm Panda Bare Fiber | | |
| | 55 | 1550 | | | | | | | 2 | SC/APC | L | 900μm Loose Tube with 400μm Panda fiber | | |
| | | | | | | | | | 3 | FC/UPC | T | 900μm Loose Tube with 250μm Panda fiber | | |
| | | | | | | | | | 4 | FC/APC | | | | |
| | | | | | | | | | 5 | LC/UPC | | | | |
| | | | | | | | | | 6 | LC/APC | | | | |
| | | | | | | | | | 7 | MU/UPC | | | | |

**ORDER CODE** example: **PD-PMI-55-P-D-F-1-B-S**

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# PM PRODUCTS — PM FILTER COUPLER

## APPLICATIONS

- Fiber Optic Instruments
- Fiber Amplifiers
- Fiber Lasers
- Fiber Sensors

## FEATURES

- Low Insertion Loss
- High Return Loss


Senko Polarization Maintaining Filter Coupler series is manufactured using advanced technology to allow the input signal to be splitted into various ratio with high extinction ratio.

| PARAMETER [1,2] | VALUES | | UNIT |
|---|---|---|---|
| Port Type | 1X2 | 2X2 | |
| Center Wavelength | 1310 or 1550 | | nm |
| Operating Wavelength Range | ±40 | | nm |
| Type | 1x2 | 2x2 | |
| Max. Excess Loss | 0.7 | 1.0 | dB |
| Max. Uniformity (only for 50/50) | 0.5 | 0.7 | dB |
| Tap Ratio (Port 2/4) | 1±0.2%, 2±0.4%, 5±1.0%, 10%, and 50% | | % |
| Min. Return Loss | 50 | | dB |
| Min. Extinction Ratio (only for F type) | 22 | 22 | dB |
| Min. Extinction Ratio (only for B type) | 20 | 18 | dB |
| Max. Optical Power (CW) | 300 (only for Splitter) | | mW |
| Max. Tensile Load | 5 | | N |
| Fiber Type [3] | SMF-28e or PM Panda Fiber on Tap Port | | |
| | PM Panda Fiber on Input & Output Port | | |
| Operating Temperature | -5 to +70 | | ℃ |
| Storage Temperature | -40 to +85 | | ℃ |
| Package Pimension | 5.5(Φ)x35(L) | | mm |

*Note:*

1. *Above specifications are for devices without the connectors.*
2. *For devices with connectors, IL will be 0.3dB higher, RL will be 5dB lower, and ER will be 2dB lower.*
3. *The PM fiber and the connector key are aligned to the slow axis. And for F type, fast axis is blocked.*

| CODE | WAVE-LENGTH | | PORT | | COUPLING RATIO | | AXIS ALIGNMENT | | CONNECTOR TYPE ON PORT 1, 2, 3 & 4 | | FIBER JACKET ON PORT 1, 2, 3 & 4 | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD-PMFC | 31 | 1310 | 1 | 1x2 | 01 | 1/99 | F | Fast Axis Blocked | 0 | None | B | 250μm Panda Bare Fiber | Q | 0.75m |
| | 55 | 1550 | 2 | 2x2 | 02 | 2/98 | B | Both Axis Working | 1 | SC/UPC | D | 400μm Panda Bare Fiber | | |
| | | | | | 05 | 5/95 | | | 2 | SC/APC | L | 900μm Loose Tube with 400μm Panda fiber | | |
| | | | | | 10 | 10/90 | | | 3 | FC/UPC | T | 900μm Loose Tube with 250μm Panda fiber | | |
| | | | | | 50 | 50/50 | | | 4 | FC/APC | | | | |
| | | | | | | | | | 5 | LC/UPC | | | | |
| | | | | | | | | | 6 | LC/APC | | | | |
| | | | | | | | | | 7 | MU/UPC | | | | |

**ORDER CODE** example: **PD-PMFC-31-2-50-F-2-B-Q**

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# PM PRODUCTS

# PM OPTICAL CIRCULATOR


## APPLICATIONS

- Fiber Optic Instruments
- Fiber Sensors
- Coherent Detecting
- Research

## FEATURES

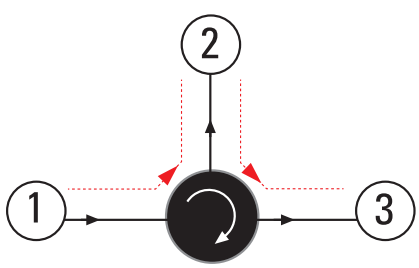
- Low Insertion Loss
- High Return Loss

Senko Polarization Maintaining Optical Circulator is a compact high performance component transmits the incoming signal from port1 to port2.while transmitting another incoming signal from port2 to port3.

| PARAMETER [1,2] | VALUES | | UNIT |
|---|---|---|---|
| Type | Type A | Type B | |
| Center Wavelength | 1310 or 1550 | | nm |
| Operating Wavelength Range | ± 30 | ± 20 | nm |
| Min. Isolation | 40 | 20 | dB |
| Typ. Isolation | 46 | 30 | dB |
| Peak Isolation | 52 | 40 | dB |
| Typ. Insertion Loss | 0.7 | 0.6 | dB |
| Max. Insertion Loss | 0.9 | 0.8 | dB |
| Min. Return Loss | 50 | | dB |
| Min. Extinction Ratio | 22 | 20 | dB |
| Min. Cross Talk | 50 | | dB |
| Max. Optical Power (CW) | 300 | | mW |
| Max. Tensile Load | 5 | | N |
| Fiber Type [3] | PM Panda Fiber | | |
| Operating Temperature | -5 to +70 | | ℃ |
| Storage Temperature | -40 to +85 | | ℃ |
| Package Dimension | 5.5(Φ)x35(L) | | mm |

*NOTE:*

1. *Above specifications are for device without connector.*
2. *For devices with connectors, IL will be 0.3dB higher, RL will be 5dB lower and ER will be 2dB lower.*
3. *The PM fiber and the connector key are aligned to the slow axis.*




| CODE | WAVELENGTH | | TYPE | | CONNECTOR TYPE ON PORT 1, 2 & 3 | | FIBER JACKET ON PORT 1, 2 & 3 | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|---|---|
| PD-PMCIR | 31 | 1310 | A | Type A | 0 | None | B | 250μm Panda Bare Fiber | Q | 0.75m |
| | 55 | 1550 | B | Type B | 1 | SC/UPC | D | 400μm Panda Bare Fiber | | |
| | | | | | 2 | SC/APC | L | 900μm Loose Tube with 400μm Panda fiber | | |
| | | | | | 3 | FC/UPC | T | 900μm Loose Tube with 250μm Panda fiber | | |
| | | | | | 4 | FC/APC | | | | |
| | | | | | 5 | LC/UPC | | | | |
| | | | | | 6 | LC/APC | | | | |
| | | | | | 7 | MU/UPC | | | | |

**ORDER CODE** example: **PD-PMCIR-31-B-1-B-S**

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# PM PRODUCTS

## PM FILTER WAVELENGTH DIVISION MULTIPLEXERS


### APPLICATIONS

- Fiber Optic Instruments
- Raman Amplifiers
- EDFAs
- Fiber Sensors

### FEATURES

- Low Insertion Loss
- High Return Loss
- High Isolation

Senko PM filter WDM series provide wavelength division multiplexing while maintaining signal polarization, which is ideal for high speed WDM network systems.

| PARAMETERS [1,2] | | VALUES | | | UNIT |
|---|---|---|---|---|---|
| Pass Band | Wavelength Range | 1270-1350(1530-1600) | 1450-1490(1530-1600) | 1500-1520(1530-1570) | nm |
| | Typ. Insertion Loss | 0.4 | 0.4 | 0.5 | dB |
| | Max. Insertion Loss | 0.6 | 0.6 | 0.7 | dB |
| | Typ. Isolation | 30 | 30 | 30 | dB |
| | Min. Isolation | 25 | 25 | 25 | dB |
| Reflection Band | Wavelength Range | 1530-1600(1270-1350) | 1530-1600(1450-1490) | 1530-1570(1500-1520) | nm |
| | Typ. Insertion Loss | 0.3 | | | dB |
| | Max. Insertion Loss | 0.5 | | | dB |
| | Typ. Isolation | 15 | | | dB |
| | Min. Isolation | 12 | | | dB |
| Min. Extinction Ratio | | 20 | | | dB |
| Min. Return Loss | | 50 | | | dB |
| Thermal Stability | | ≤0.005 | | | dB/°C |
| Max. Optical Power (CW) | | 300 | | | mW |
| Max. Tensile Load | | 5 | | | N |
| Fiber Type [3] | | PM Panda Fiber | | | |
| Operating Temperature | | -5 to +70 | | | °C |
| Storage Temperature | | -40 to +85 | | | °C |
| Package Dimension | | 5.5 (Φ)x35(L) | | | mm |

*Note:*

1. *Above specifications are for device without connector.*
2. *For devices with connectors, IL will be 0.3dB higher, RL will be 5dB lower and ER will be 2dB lower.*
3. *The PM fiber and the key are aligned to the slow axis.*

| CODE | | WAVELENGTH | | CONNECTOR TYPE ON PORT 1, 2 & 3 | | FIBER JACKET ON PORT 1, 2 & 3 | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|---|
| PD-PMFWDM | 3155 | 1310nm Pass/1550nm Reflect | 0 | None | B | 250μm Panda Bare Fiber | Q | 0.75m | |
| | 5531 | 1550nm Pass / 1310nm Reflect | 1 | SC/UPC | D | 400μm Panda Bare Fiber | | | |
| | 4855 | 1480nm Pass / 1550nm Reflect | 2 | SC/APC | L | 900μm Loose Tube with 400μm Panda fiber | | | |
| | 5548 | 1550nm Pass / 1480nm Reflect | 3 | FC/UPC | T | 900μmLoose Tube with 250μm Panda fiber | | | |
| | 5155 | 1510nm Pass / 1550nm Reflect | 4 | FC/APC | | | | | |
| | 5551 | 1550nm Pass / 1510nm Reflect | 5 | LC/UPC | | | | | |
| | | | 6 | LC/APC | | | | | |
| | | | 7 | MU/UPC | | | | | |

**ORDER CODE** example: **PD-PMFWDM-4855-1-B-S**

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# PM PRODUCTS — IN-LINE POLARIZER


## APPLICATIONS

- Communication Systems
- Fiber Sensors
- Test Instrumentations
- Research

## FEATURES

- High Extinction Ratio
- Low Insertion Loss
- High Return Loss

The In-line Polarizer is designed to pass light with one specific polarization while blocking the other polarization with high extinction ratio. It can also be used to enhance the extinction ratio of signals with its excellent polarization properties.

| PARAMETER [1,2] | VALUES | UNIT |
|---|---|---|
| Center Wavelength | 1310, 1480 or 1550 | nm |
| Operating Wavelength Range | ±50 | nm |
| Typ. Insertion Loss at 23°C | 0.3 | dB |
| Max. Insertion Loss at 23°C | 0.5 | dB |
| Min. Return loss | 50 | dB |
| Typ. Extinction ratio at 23°C | 30 | dB |
| Min. Extinction ratio at 23°C | 28 | dB |
| Max. Optical Power (CW) | 300 | mW |
| Max. Tensile Load | 5 | N |
| Fiber Type [3] | PM Panda Fiber or SMF-28e | |
| Operating Temperature | -5 to +70 | °C |
| Storage Temperature | -40 to +85 | °C |
| Package Imension | 5.5(Φ)x35(L) | mm |

*Note:*

1. *Above specifications are for devices without connectors.*
2. *For devices with connectors, IL will be 0.3dB higher, RL will be 5dB lower and ER will be 2dB lower.*
3. *The PM fiber and the connector key are aligned to the slow axis.*

| CODE | WAVELENGTH | | CONNECTOR TYPE ON PORT 1 & 2 | | FIBER JACKET ON PORT 1 & 2 | | FIBER TYPE ON PORT 1 & 2 | | FIBER LENGTH | |
|---|---|---|---|---|---|---|---|---|---|---|
| PD-ILP | 31 | 1310nm | 0 | None | B | 250μm Bare Fiber | 1 | PM / PM | Q | 0.75m |
| | 48 | 1480nm | 1 | SC/UPC | D | 400μm Panda Bare Fiber | 2 | SMF / PM | | |
| | 55 | 1550nm | 2 | SC/APC | L | 900μm Loose Tube with 400μm Panda fiber | 3 | SMF / SMF | | |
| | | | 3 | FC/UPC | T | 900μm Loose Tube with 250μm fiber | | | | |
| | | | 4 | FC/APC | | | | | | |
| | | | 5 | LC/UPC | | | | | | |
| | | | 6 | LC/APC | | | | | | |
| | | | 7 | MU/UPC | | | | | | |

**ORDER CODE** example: **PD-ILP-48-2-B-2-Q**

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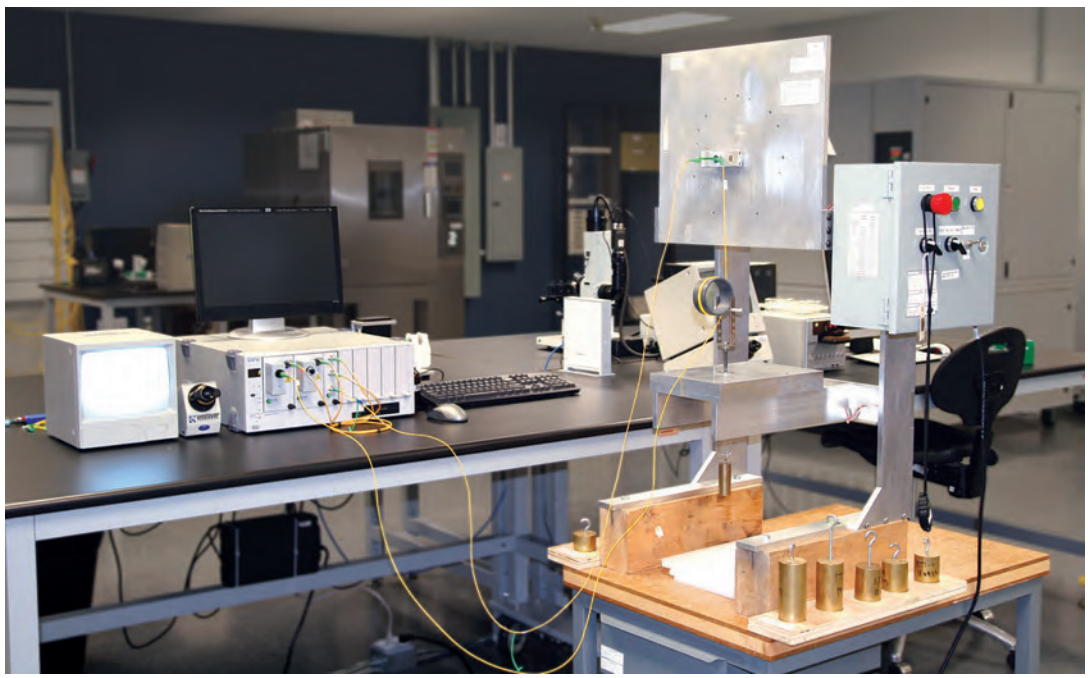
# ENGINEERING SERVICES



## PRODUCT TECHNICAL SUPPORT

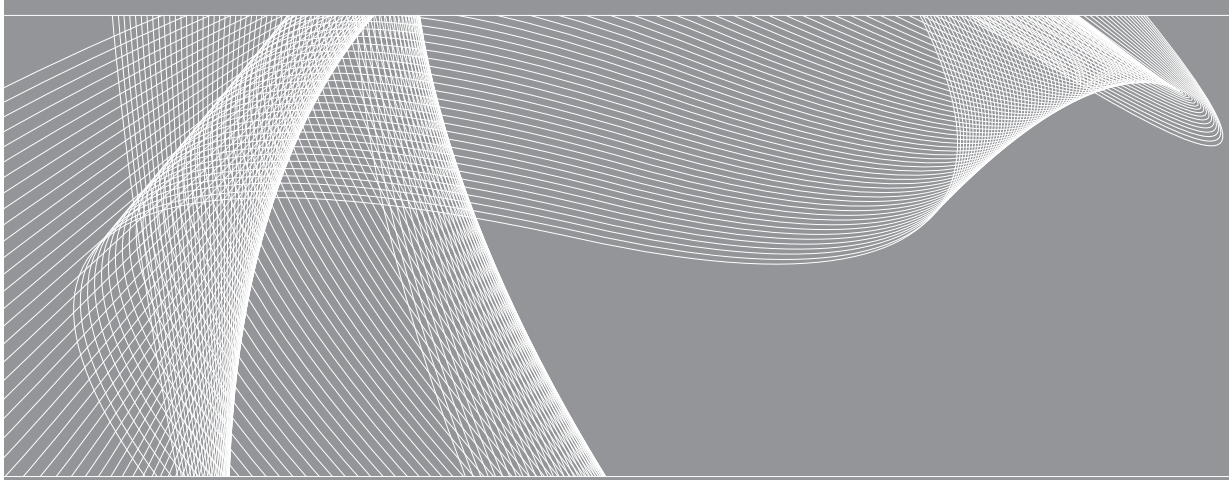
Senko's regional engineering departments provide local technical support to our sales teams throughout the world. Product specialists are available to ensure that customers' technical specifications are met. Senko's engineers also directly support customers on specific projects, such as PLC splitter, components, and associated customized products for FTTX operators. They also work closely with the manufacturing sites to ensure that high standards of quality and reliability are maintained.

## QUALIFICATION TESTING

Senko has a dedicated reliability test facility which is accredited to ISO-17025:2005. An extensive range of environmental and mechanical reliability test equipment is used to qualify passive components, along with our connector based products. All our products are qualified to internationally recognized industry standards, specifically Telcordia GR-1209, GR-1221, GR-326 and IEC 61300. Optical measurements may be taken automatically during testing to observe any degradation in performance.

## DEVELOPMENT PEOJECTS

We believe in innovation. Our policy of continuous improvement means that Senko's engineers are always looking for better engineering solutions, such as smaller form factor packaging. We are also developing completely new products to address diverse applications and markets and are open to customers' specific needs-if a solution doesn't already exist, we will aim to develop one.



SENKO Advanced Components, Incorporated is a recognized global leader in the design, production, sales, marketing and distribution of over 1000 fiber optic products. It is headquartered in Boston, Massachusetts, USA and is the fiber optic division of the Japan based SENKO Group.

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