

Hirundo

Polarization Maintaining (PM)

Fiber Optic PM Series



- Develop
- Solution Design
- Manufacture

Passive Optical Solutions >

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Polarization Maintaining (PM) Fiber Optic Series

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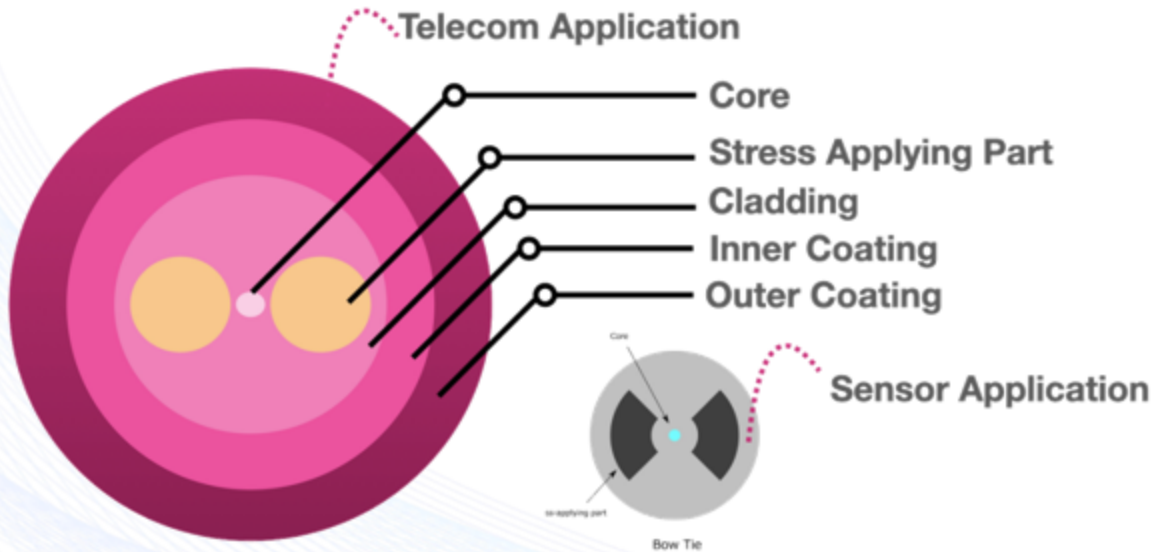
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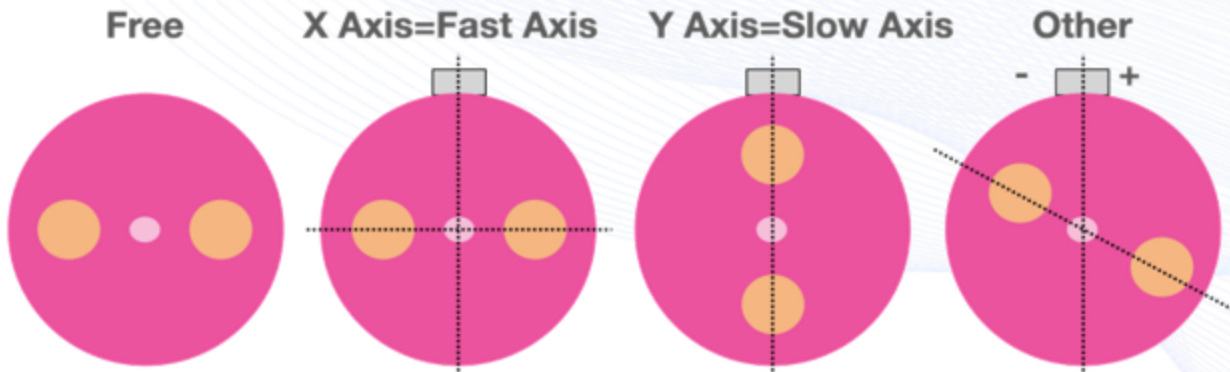
What's Polarization Maintaining (PM) Fiber ?

PM fiber is designed to propagate only one polarization of the input light. In polarization maintaining fiber, the polarization of linearly-polarized light waves launched into the fiber is maintained during propagation, with little or no cross-coupling of optical power between the polarization modes

Panda PM Optic Fiber



Polarization Modes





PM Fiber Patchcords



LC/UPC



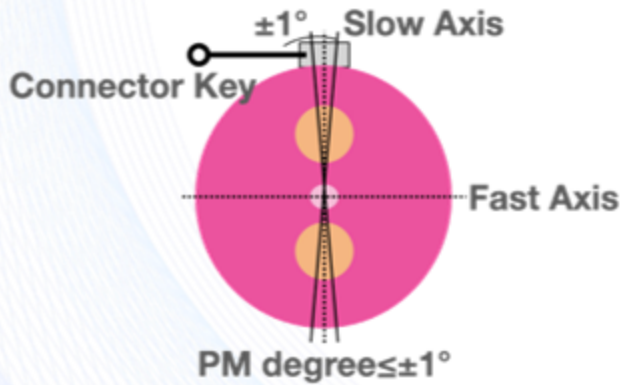
LC/APC



SC



FC



- Feature**
- Low Insertion Loss
 - High Return Loss & ER
 - High Stability and reliability

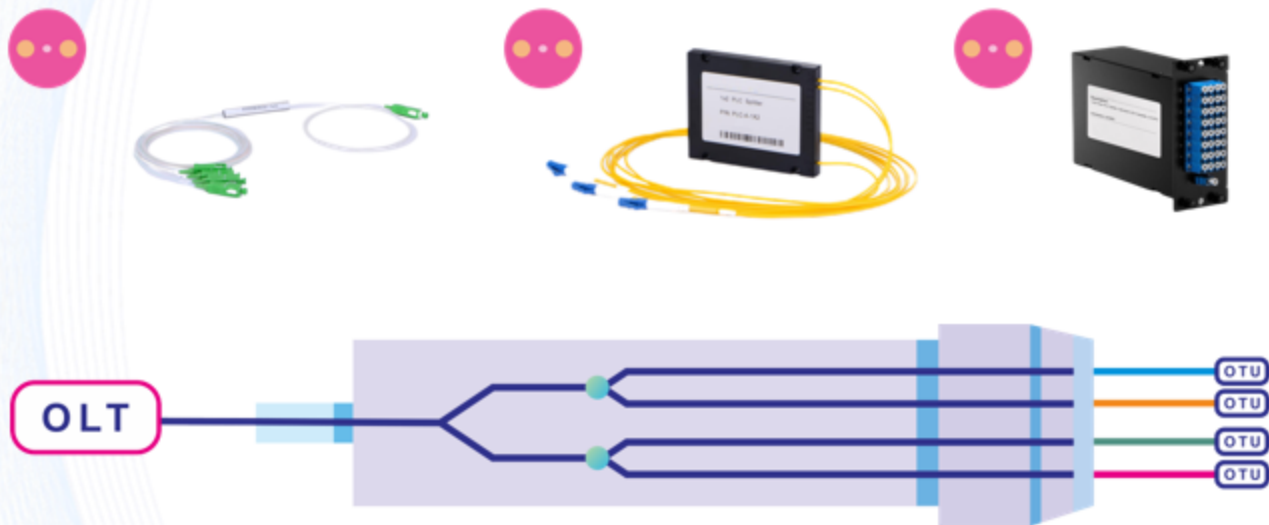
- Applications**
- Fiber Amplifier
 - DWDM system
 - Testing Instrument
 - Fiber Lasers

Performance Specification ▼

| Parameter | Specifications | | | | Unit |
|--------------------------|--|-----------|-------|-------|------|
| Connector Type | FC/UPC, SC/UPC, LC/UPC, FC/APC, SC/APC, LC/APC | | | | / |
| Wavelength | 1310, 1550 | 980, 1060 | 850 | 780 | nm |
| Insertion Loss | ≤0.3 | ≤0.5 | ≤0.8 | ≤0.8 | dB |
| Return Loss(UPC) | ≥50 | | | | dB |
| Return Loss(APC) | ≥60 | | | | dB |
| Extinction Ratio at 23°C | ≥23 | ≥23 | ≥23 | ≥23 | dB |
| Fiber Type | PM1310, PM1550 | PM980 | PM850 | PM780 | / |
| Key Orientation | Slow Axis | | | | / |
| Axis Alignment | ±1 | | | | deg |
| Operating temperature | -20~+70 | | | | °C |



PM PLC Splitter



- Feature**
- High Extinction Ratio
 - Small size
 - Good channel-to-channel uniformity
 - High reliability

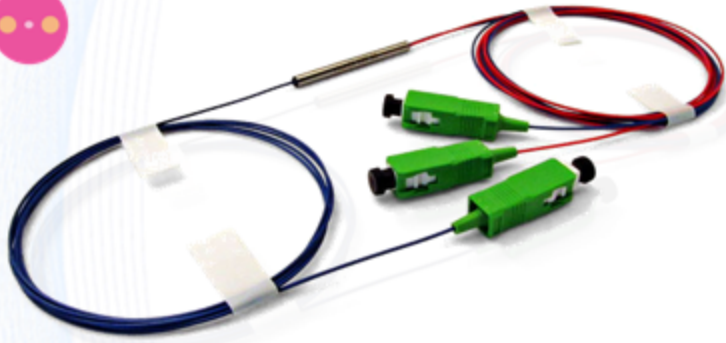
- Applications**
- PON Systems
 - Optical Networks
 - FTTH Access Networks
 - WDM Systems

Performance Specification ▼

| Parameters | Specifications | | | |
|-----------------------------|----------------------------------|-------|-------|-------|
| Operating wavelength(nm) | 980,1060,1310 or 1550 | | | |
| Channel Type | 1x4 | 1x8 | 1x16 | 1x32 |
| Insertion Loss (dB) | <7.5 | <10.5 | <13.7 | <16.9 |
| Uniformity (dB) | <0.6 | <0.8 | <1.2 | <1.5 |
| Extinction Ratio (dB) | >20 | >20 | >18 | >18 |
| Directivity (dB) | ≥50 | | | |
| Return Loss (dB) | ≥50 | | | |
| Fiber Type | PM Panda Fiber | | | |
| Maximum Power Handling (mW) | 500 | | | |
| Operating Temperaturey (°C) | -5 ~ +70 | | | |
| Storage temperature (°C) | -40 ~ +85 | | | |
| Package Types | Mini Module/ABS box/LGX Cassette | | | |



1x2 PM Filter Device



Feature

- High Extinction Ratio
- Small size
- Low Insertion Loss
- High reliability

Applications

- EDFA
- Fiber Optical Instrument
- Power Monitoring
- Fiber Sensor

Fast Axis Blocked
Both Axis Working



Performance Specification ▼

| Parameters | | Specifications |
|----------------------------|-------|---|
| Configuration Choice | | 1X2 |
| Operating wavelength(nm) | | 780, 980, 1064, 1310, 1550 or others on request |
| Split Ratio (%) | | 1/99, 2/98.....50/50 |
| Fiber type (um) | | 900um loose tube, PM1550 Panda fiber |
| Insertion loss (dB) | 50/50 | ≤ 3.7/3.7 |
| | 40/60 | ≤ 4.7/2.7 |
| | 30/70 | ≤ 6.0/2.1 |
| | 20/80 | ≤ 7.8/1.4 |
| | 10/90 | ≤ 11.2/0.9 |
| Extinction Ratio (dB) | | ≥ 18 |
| Operating temperature (°C) | | -40 ~ +85 |



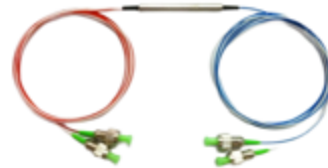
1x2(2x2) PM Coupler



PM 1X2



PM 1X2



PM 2X2

Feature

- High Extinction Ratio
- Small size
- Low Insertion Loss
- High reliability

Applications

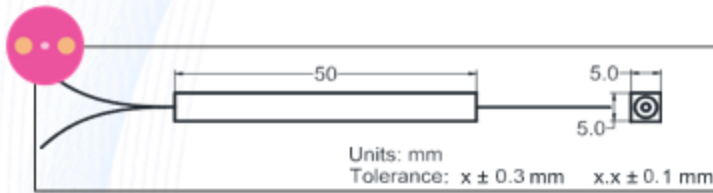
- EDFA
- Fiber Optical Instrument
- Power Monitoring
- Fiber Sensor

Performance Specification ▼

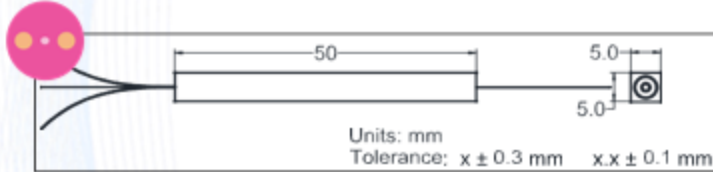
| Parameters | Grade P | Grade A | Grade P | Grade A | Grade P | Grade A |
|-------------------------------|---------------------------|---------|--------------------|---------|----------------------|---------|
| Operating Wavelength(nm) | 1310,1550 | | 980,1030,1040,1060 | | 780,850 | |
| Operating Bandwidth(nm) | +/-15 | | | | | |
| Typical Excess Loss(dB) | ≤0.3 | ≤0.4 | ≤0.4 | ≤0.6 | ≤0.6 | ≤0.8 |
| Polarization Extinction Ratio | ≥20 | ≥18 | ≥20 | ≥18 | ≥20 | ≥18 |
| Return Loss(dB) | ≥50 | | | | | |
| Directivity(dB) | ≥50 | | | | | |
| Max Optical Power(mW) | ≤500 | | | | | |
| Configuration | 1x2 or 2x2 | | | | | |
| Fiber Length | 1m , or others on request | | | | | |
| Fiber Type | Panda PM fiber | | | | | |
| Pigtail Type | 250um bare fiber | | 900um loose tube | | 2.0/3.0mm loose tube | |
| Dimensions(mm) | Ø3xL32 | | Ø3xL54 | | L90xW20xH10 | |



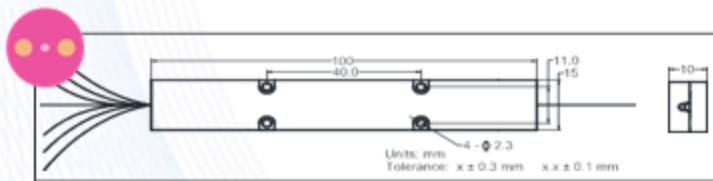
PM Pump & Signal Combiner



PM(1+1)x1



PM(2+1)x1



PM(6+1)x1

Feature

- High Power Coupling Efficiency
- Preservation of Mode Content
- Wavelength Insensitive
- Custom Configurations Available

Applications

- Fiber Laser
- Fiber Laser Seed Amplifiers
- Fiber Laser Power Amplifiers
- Industrial, Telecom & Research

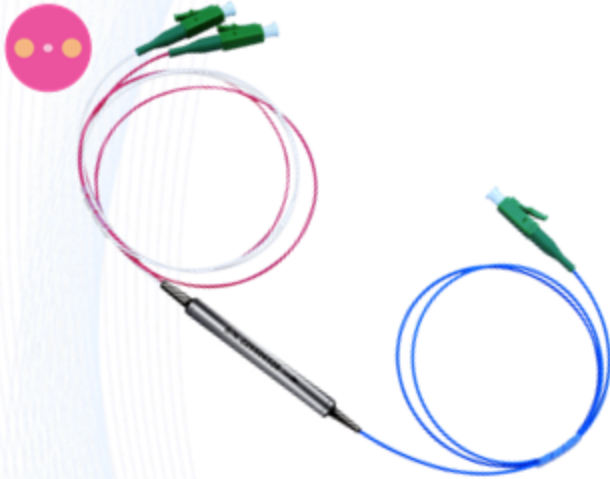


Performance Specification ▼

| Parameter | Unit | Value | | |
|--------------------------------------|------|---|----------------|------------|
| Product Type | / | PM(1+1)x1 | PM(2+1)x1 | PM(6+1)x1 |
| Pump Wavelength Range | nm | 800 - 1000 | 800 - 1000 | 900 - 1000 |
| Signal Wavelength Range | nm | 1064, 1550 | | |
| Fiber Type for Input(Pump Channel) | μm | Nufern 105/125(0.15 NA or 0.22 NA) | | |
| Fiber Type for Input(Signal Channel) | μm | PM980, PM1550, PM-6/125 DC or PM-8/125 DC | | |
| Fiber Type for Output | μm | PM-6/125 DC or PM-8/125 DC | | |
| Max. Signal Channel Insertion Loss | dB | 0.4 | 0.4 | 0.5 |
| Min. PER | dB | 18 | 18 | 18 |
| Min. Pump Efficiency | % | 90 | 90 | 98 |
| Max. Input Pump Power | W | 1 x 10 & 1 x 30 | 2 x 5 & 2 x 30 | 6 x 100 |
| Package Dimensions | mm | 50(L) x 5(W) x 5(H), 70(L) x 12(W) x 8(H), 100(L) x 15(W) x 10(H) | | |
| Operating Temperature | °C | -5 to +65 | | |



3Port PM Optical Circulator



Feature

- Optical path epoxy free
- High Extinction Ratio
- High Stability and Reliability

Applications

- Fiber Amplifier
- DWDM system
- Fiber Sensing
- Fiber Lasers

Performance Specification ▼

| Parameters | Specifications |
|--|-----------------------|
| Center Wavelength(nm) | 780,850, 808, 905,940 |
| Operating Wavelength Range(nm) | ± 10 |
| Typ. Peak Isolation(dB) | 23 |
| Min. Isolation at 23°C(dB) | 20 |
| Typ. Insertion Loss at 23°C(dB) | 1.3 |
| Max. Insertion Loss at 23°C(dB) | 1.5 |
| Min. Extinction Ratio at 23°C, only for PM(dB) | 20 |
| Min. Return Loss(Input/ Output)(dB) | 40 |
| Min. Cross Talk(dB) | 40 |
| Fiber Type | PM780 or Specified |
| Max. Average Optical Power(mW) | 500 or Specified |
| Max. Tensile Load(N) | 5 |
| Package Dimension(mm) | 70x28x26 |
| Operating Temperature(°C) | -5~+70 |



PM Isolator



Feature

- High Isolation and Return Loss
- High Extinction Ratio
- High Stability and Reliability

Applications

- Testing Instruments
- PM Fiber Sensing
- Fiber Lasers

- 1064nm (300mW)
- 1030nm (80mW)
- 1310/1480/1550nm (300mW)
- 1W/3W/5W/10W high power



Performance Specification ▼

| Parameters | Specifications | Unit |
|---|--------------------------|------|
| Operating Wavelength | 1310 or 1550 | nm |
| Isolation(Typical) | ≥42 | dB |
| Min Isolation* ^{@23°C} | ≥28 | dB |
| Insertion Loss(Typical)* ^{@23°C} | 0.4 | dB |
| Insertion Loss ^{@-5~70°C} | ≤0.55(without connector) | dB |
| | ≤0.85(Include connector) | |
| Extinction Ratio | ≥18 | dB |
| Optical Average Power | 500 | mW |
| Operating Temperature | -5~+70 | °C |
| Fiber Type | Panda Fiber | / |
| Package size | φ5.5 × L35 | mm |



PM AWG Module



PM 50/100GHz types are available

Feature

- Optical path epoxy free
- High Extinction Ratio
- High Stability and Reliability

Applications

- Fiber Amplifier
- DWDM system
- Fiber Sensing
- Fiber Lasers

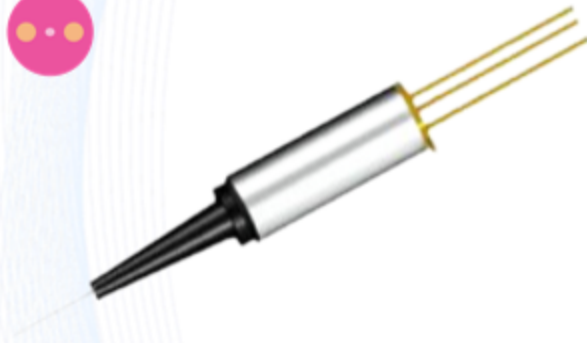
Performance Specification ▼

| Parameters | Specifications | | Units |
|--------------------------------|-------------------|-----------|-------|
| | 4ch/8ch/16ch/32ch | 40ch/48ch | |
| Channels | 4ch/8ch/16ch/32ch | 40ch/48ch | Ch |
| Channel Spacing | 50/100 | | GHz |
| Reference Pass-band | ± 0.05 | | nm |
| Wavelength Range | C Band | | THz |
| Center Wavelength | ITU Grid | | nm |
| Center Frequency Accuracy | ±0.04 +0.04 | | nm |
| Insertion Loss | ≤ 5.5 | | dB |
| Insertion Loss Uniformity | ≤ 1.5 | | dB |
| Ripple | ≤ 0.5 | | dB |
| Extinction Ratio | ≥ 18 | | dB |
| 1 dB Bandwidth | ≥ 0.4 | | nm |
| 3dB Bandwidth | ≥ 0.6 | | nm |
| 20 dB bandwidth | ≤ 1.2 | | nm |
| Adjacent Channel Isolation | ≥ 25 | | dB |
| Non-Adjacent Channel Isolation | ≥ 30 | | dB |
| Total Crosstalk | ≥ 22 | | dB |
| Return Loss | ≥ 40 | | dB |
| Polarization Mode Delay (PMD) | ≤ 1.0 | | ps |
| Chromatic Dispersion | ± 15 | | nm |
| Fiber Type | PM 1550 | | / |



PM MEMS VOA

Micro Electro-Mechanical Systems
Variable Optical Attenuator



Feature

- High Attenuation
- Low Power Consumption
- Insensitive to Shock and Vibration

Applications

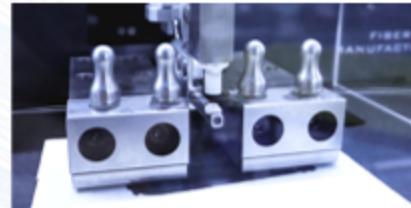
- Power Control and Equalization
- Receiver Protection
- Fiber Optic Sensor
- Test and Measurement

Performance Specification ▼

| Parameters | Specifications | Unit |
|-----------------------------|------------------------|------|
| Operating wavelength | 1550±20 | nm |
| Attenuation type | Bright | - |
| Attenuation range | ≥30 | dB |
| Insertion Loss | ≤1.0 | dB |
| Extinction Ratio | ≥20 | dB |
| Attenuation resolution | Continuous | - |
| Return Loss | ≥45 | dB |
| Response time | ≤2 | ms |
| Repeatability@20dB 1550nm | ≤±0.1 | dB |
| Stability @20dB 1550nm 2Hrs | ≤±0.1 | dB |
| Operation Temperature | -5~+70 | °C |
| Optical Average Power | ≤500 | mW |
| Power Consumption | ≤10 | uW |
| Drive Voltage | ≤15 or 6.5 DC | V |
| Fiber Type | 1550PM panda Fiber | / |
| Fiber Length | 1±0.1 | m |
| Fiber Jacket | 250um/900um/customized | / |
| Connector Type | FC/UPC | / |
| Key Alignment | Slow Axis | / |



Production Workshop



Industry Standard





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