Fiber Optic Attenuators

OZ Optics Limited

August 2024



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- **OZ Optics China**



Company Background



- Founded in 1985
- **Corporate Headquarter Located in Ottawa, Canada**
- Manufacturing Facility in Ottawa / Canada, Izmir / Türkiye and Jiaxing / China

Ten Product Groups:

- Laser-to-Fiber Delivery Systems
- High Power Fiber Optic Components
- Polarization Maintaining Products
- Attenuators
- Opto-Electronic Packaging
- Fiber Optic Test Equipment
- Fiber Optic Sensor Systems
- Fiber Optics Components for Gyroscope
- OCT
- BioPhotonics
- Quantum



Ottawa, Canada



Izmir, Türkiye



Jiaxing, China



Corporate Statements and Quality Policy





Our Vision

Capture and expand market share
 Be the preferred supplier of choice
 Maximize shareholder value

Our Mission

To become the leading provider of innovative optical products to telecom and non-telecom sectors

Our Core Values

- ✓ Leadership
- ✓ Teamwork
- ✓ Boldness
- ✓ Commitments
- ✓ Innovation
- ✓ Rewards

Our Quality Policy

Provide our Customers with a competitive advantage, leveraging performance, price and delivery, through a continuous process of Quality advancement in all areas of our Company.

Communicate effectively to our Customers, Suppliers and Shareholders our commitment to Quality, continuous improvement and to abide by any applicable requirements.

Promote opportunities of professional development for all members of our company through education, training and personal challenge.

Over 467 employees worldwide

OZ Canada

OZ China



OZ Türkiye







243+ Employees

87+ Employees 137+ Employees







Advanced Proprietary Processing Technology



Canada Certificate: FM 63463

China Certificate: FM 577647

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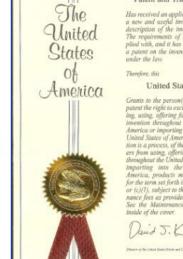
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Certificate of Registration

ISO9001:2015 Certified



Turkey Certificate: FM 601414



The Director of the United States Patent and Trademark Office

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude ob-ers from using, offering for sale or selling throughout the United States of America, or importing into the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(h). See the Maintenance Fee Notice on the



Broad Patent Portfolio

OZ Optics is Lead by an Experienced Team:

- Ömür Sezerman, Chairman, President & CEO Founder and CEO since inception (40 years) Zahide Sezerman, VP of Human Resources With OZ Optics since inception (40 years) **Garland Best, VP of Components Division** 33 years at OZ Optics **Gordon Youle, VP of Test Equipment Division** 26 years at OZ Optics **Saeed Pilevar, Senior VP of Business Development** 3 months at OZ Optics
- Onur Koca, General Manager of OZ Türkiye
 - 3 year at OZ Optics
- Bing Li, General Manager of OZ Optics China
 21 years at OZ Optics







Experienced and Well-Trained Staff in Following Fields: Optical, Mechanical, Electronics & Software

CNC Machine Shop



Clean Room



Femto-Second Laser Lab



Laser Conditioning / Cleaving



AR Coating



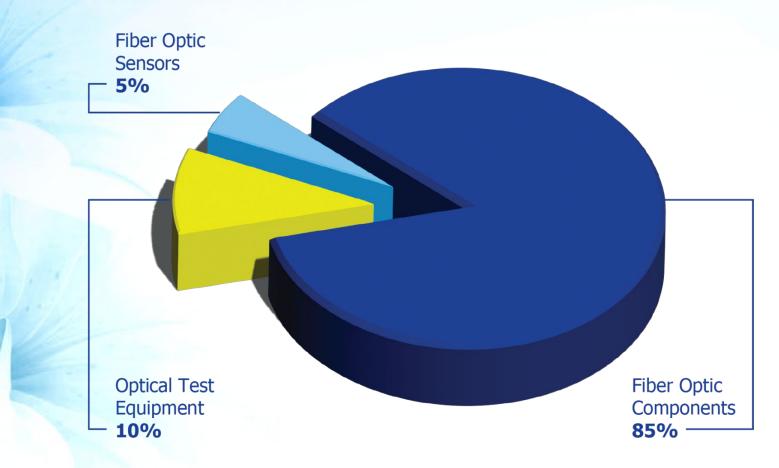
Core Competencies



- Pioneer in Polarization Maintaining (PM) Components & Custom Test Equipment, Including Polarization Test Equipment and FTTH Equipment
- Leader in Wavelength Flattened, High Power & Low PDL Components
- Leader in High Power Fiber Optic Delivery Systems
- Widest Range in Attenuator Product Offering
- Fiber Optic Distributed Strain and Temperature Sensors
- Complete product line for OCT, Gyroscope & BioPhotonics applications & 2 Micron
- Now available: Spectrometers and Quantum Light Sources



Three Product Groups > Over 1,000 Products > Leading Edge R&D



Leading Technology Featured Products

OL OPTICS UMITED

World's Largest Online Fiber Optic Catalog Most Products are in Stock



Polarization Maintaining Fiber Optic Components Patent Numbers: USA 7058275 7095931, 7295731, China 1672073





Fiber Optic Components Patent Numbers: Canada 2494133, USA 7058275, 7095931, 7295731, China 1672073 High Power, High Temperature Connectors and Patchcords OZPEN™ GO₂ Fiber Optics Cleaning Unit for High Power Components High Power Laser to Fiber **High Power Mode Field Adapters** Couplers, Collimators and Focusers High Power Optical Taps and **High Power Isolators Power Monitors High Power Splitters and** Shutters, Receptacies and Sieeve Thru Adapters with Sensors Wavelength Division Multiplexers (WDMs)

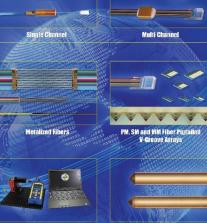
High Power

Leading Technology Featured Products



Fiber Optic Attenuators Polarization Maintaining, Single Mode and Multi-Mode Fibers Variable Attenuators Electrically Controlled **Digital Variable MEMS Variable** Attenuators PM, SM and MM Fibers Single and Multi Channel Miniature **Reflective Style** Pigtailed Inline Variable Attenuators Variable Attenuators Variable Attenuators -Attenuating Filter Air Gap Plug Type Patchcords Variable Attenuators **Fixed Attenuators**

Fiber Optic Components for Optoelectronic Packaging Hermetically Sealable Patchcords with Glass or Metal Solder



Polarization Measurement Tapered, Lensed Fiber, System for V-Grooves Polished and Laser Shaped





Fiber Optic Components for 2 Micron Wavelengths



Featured Products



Fiber Optic Products for Gyroscopes



Isolators

Quantum Entangled Photons Sources 1 1 4 - 11.1 🥗 🛄 🤅 🔊 🗞 🚺

Hyper-Entangled Photon Source Broadband Telecom Polarization-Entangled Photon Source Broadband Telecom



Bright Polarization-Entangled Photon Source Broadband Telecon Bright Polarization-Entangled Photon Source Narrowband Telecom



Correlated Photon Pair Sources Polarization-Entangled Photon Source Narrowband at 810 nm

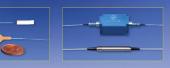


Polarization Entanglement Tomography Analyzer





SM and PM Fiber **Pintailed Circulators**





Featured Products

High-Resolution

High and Low Power

Patchcords

Pigtail, Receptacle Style Collimators and Focusers

Wavelength Division Multiplexers

and Beam Splitters

Fiber Optic Products for Biophotonics Applications



Universal Optical DNA Rapid Detection Systems for Pathogens





Fiber to Photodiode Couplers with Removable Filters



High Power Laser to Fiber Couplers





Fiber Optic U-Bracket



Assemblies



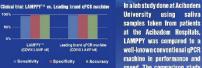
Turnkey, Ultra Stable Laser Modules

Universal Optical DNA Rapid Detection System For Pathogens Including: COVID-19, SARS, EBOLA, CHOLERA, SALMONELLA, ETC.



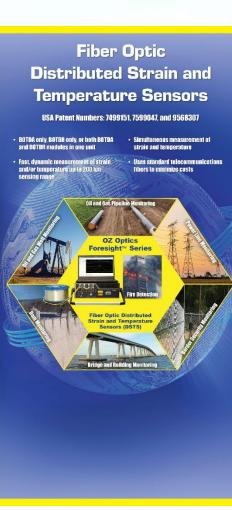
Features Use to detect viral, fungal, and bacterial DNA/RNA Rapid DNA/RNA detection (as little as 20 minutes) Highly sensitive and specific detection of low viral levels Intuitive software displays real time data during testing Melt analysis available with the included software Lid heater prevents evaporation and condensation Compact modular design allows for easy cleaning and maintenance Pair with an external battery for a portable and field-deployable system Test up to 8 samples simultaneously (higher throughout systems with up to 96 samples available upon request)

 Wireless communication with dual-band Wi-Fi and Bluetooth connectivity • A fraction of the cost of gPCR based systems OZ Optics also offers private labelling for volume OEM applications



LAMPPY was compared to a well-known conventional gPCR machine in performance and speed. The comparison study

was carried out with a sample size of 262 using the COVIX LAMP-based kill on both Instruments and then verified with the KrosQuanT SARS-COV-2 (2019 nCOV) Real Time PCR Diagnostic Kit on a leading brand conventional qPCR machine



Fiber Optic Sensors for

Pipeline Monitoring

USA Patent Numbers: 7499151, 7599047, and 9568307

 Pipeline leakage detection BOTDA only, BOTDR only, or both BOTDA and BOTDR modules in one unit Fast, dynamic measurement of strain and/or temperature up to 200 km sensing range

 Sensitive detection of corrosion / erosion, cracks and buckling Simultaneous measurement of strain and temperature

Uses standard telecommunication fiber to minimize costs



Corrosion and Erosion Monitorin



Fire Detection



Featured Products

Fiber Optic Sensors for **Fire Detection**

USA Patent Numbers: 7499151, 7599047, and 9568307

BOTDA only, BOTDB only, or both BOTDA
 Simultaneous measurement of
 and BOTDR modules in one unit
 strain and temperature

 Fast, dynamic measurement of strain and/or temperature up to 200 km Uses standard telecommunications liber to minimize costs







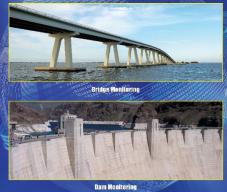
Fiber Optic Sensors for Bridges, **Dams and Buildings**

USA Patent Numbers: 7499151, 7599047, and 9568307

BOTDA only, BOTDR only, or both BOTDA Simultaneous measurement of and BOTDR modules in one unit strain and temperature

sensing ran

 Fast, dynamic measurement of strain and/or temperature up to 200 km Uses standard telecommunication fibers to minimize costs





Fiber Optic Sensors for Power Line and Smart Power **Generator Monitoring**

USA Patent Numbers: 7499151, 7599047, and 9568307

BOTDA only, BOTDR only, or both BOTDA Simultaneous measurement of and BOTDR modules in one unit strain and temperature Fast, dynamic measurement of strain and/or temperature up to 200 km

sensing ra

 Uses standard telecommunication fiber to minimize costs



lerground Power Line Monitoring **Power Line Monitoring**



Optical Ground Wire (OPGW)



Gas Generator Monitorin



USA Patent Numbers: 7499151, 7599047, and 9568307

BOTDA only, BOTDR only, or both BOTDA and BOTDR modules in one unit

 Simultaneous measurement of strain and temperature

Fast, dynamic measurement of strain and/or temperature up to 200 km sensing rang

Uses standard telecommunication fiber to minimize costs



Border Security Monitoring



Highway Health Monitoring



Industry Standards

All Products Manufactured are in Strict Accordance with International Industry Standards:

- ISO 9001:2015 Certified (Canada, China and Türkiye)
- **REACH Compliance**
- RoHS Compliance
- CE Compliance
- Telecordia Compliance
- Controlled Goods Directorate Registered
- Critical Supplier for F35 and F18 Project
- TSCA (Toxic Substance Control Act) Compliance
- CHEMSHERPA Compliance
- IEC 61010 Compliance



Marketing Strategy Application Market



Using our strong direct sales and distributors, we address the following markets:

- Energy Oil and Gas
- Military and Homeland Security
- **Educational**
- Industrial
- Telecom / Datacom
- Medical & Pharmaceutical



Marketing Strategy Application Market

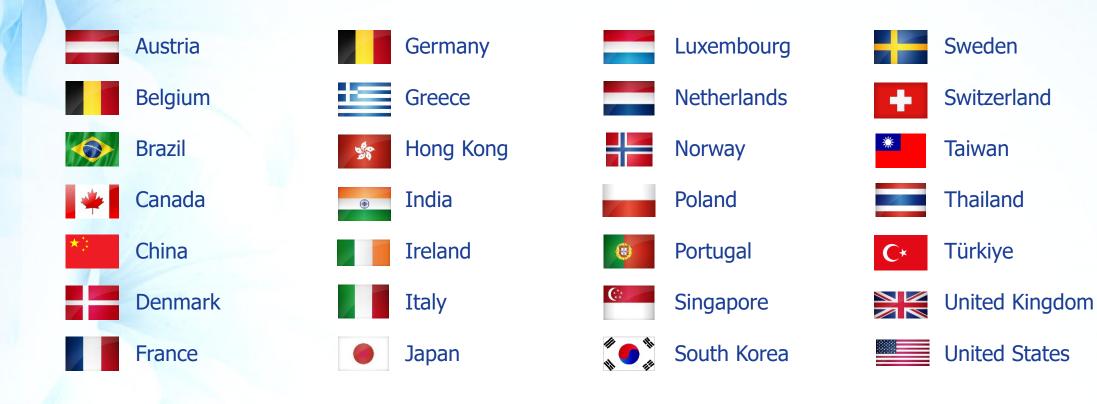
By leveraging the technology and expertise gained since its inception, OZ Optics has attracted a broad range of customers in the telecom / datacom, medical, military, security, industrial, construction, aerospace, power utilities, petrochemical and educational sectors.

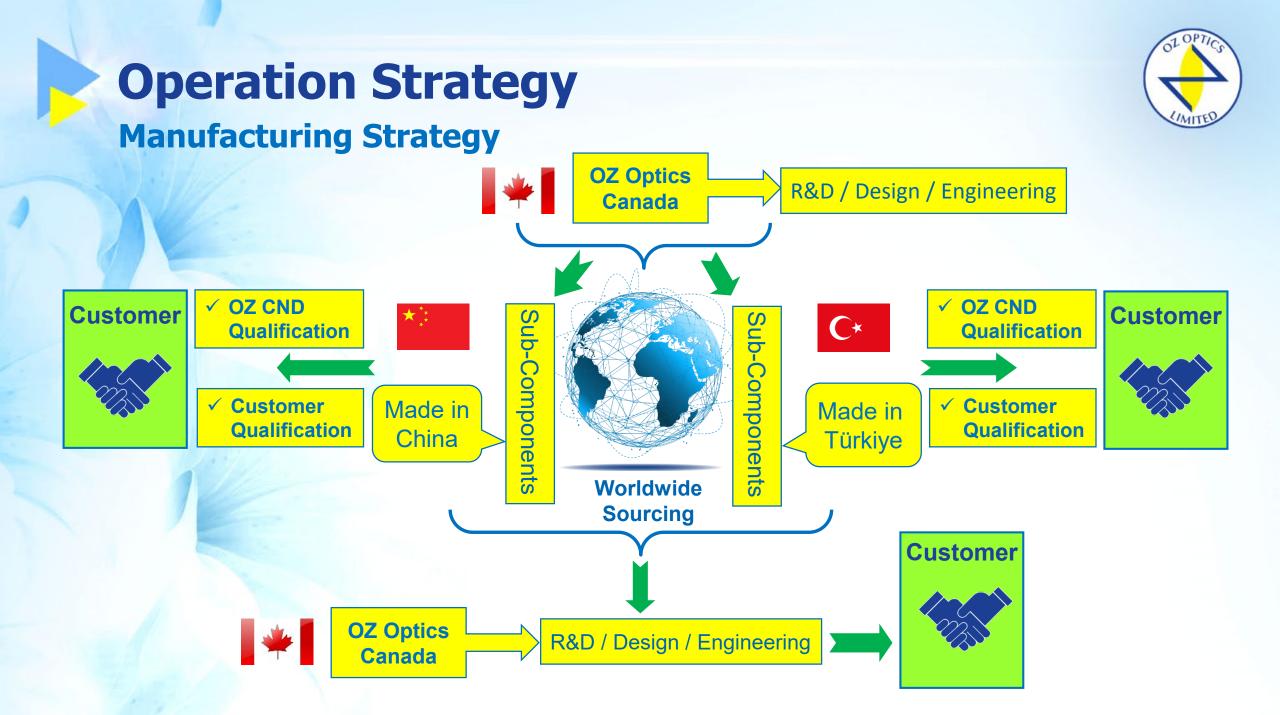


Marketing Strategy Global Sales Network



OZ Optics has resellers and distributors in over 30 Countries and Regions with over 10,000 customers worldwide:







Presence

Marketing & Operation Strategy

Competitive Advantage

- **Superior Technology Innovative Engineering**
- **Competitive Pricing**
- **Global Presence**
- **Extensive Experience In Fiber Optics Manufacturing**
- **Exceptional Quality and Service**





OZ OPTICS CANADA (Headquarters)



OZ OPTICS TÜRKIYE (Türkiye Factory)



Facility - Ottawa Headquarters

60,000 sq ft. - Manufacturing and R&D Facilities 15,000 sq ft. - Admin, Sales and Marketing 15,000 sq ft. - Training and Fitness Facilities







Facility - Ottawa Headquarters



Production Area











OL OPTICS

Facility - Türkiye Factory (Izmir, Türkiye)

- **Operational Since 2000**
- **33,000 sq ft. Manufacturing Facility**
- Located in Free Trade Zone
- Low Tax Rates
- Sub Component Parts Manufacturing
- High Quality Labor
- AR Coating Machine & Clean Room onsite



Facility - China Factory (Jiaxing, China)

- **Operational Since June 2010**
- Wholly Foreign Owned Enterprise
- Cost Effective Manufacturing
- High Quality Labor
- Supply Chain Integration









Branch Network Facility - China Factory (Jiaxing, China)

- Located in Economic Development Zone
- 4000+ sq meters Total Area
- 500 sq meters Administration, Sales and Marketing
- 3500 sq meters Manufacturing Area
- √ 500 sq meter Class 10,000 Clean Room
- √ 300 sq meter ESD Working Area





OZ Optics China

Zhejiang OZ Optics Technologies Co., Ltd

- **Operational since June 2010**
- Wholly Foreign Owned Enterprise
- NPI & Production Line Setup
- On-site Training by OZ CND
- Began Mass Production in September 2010
- Completed Main Facility Expansion in 2019











Fiber Optic Attenuators



OZ Optics Offers the Broadest Range of Attenuator Products on the Market.

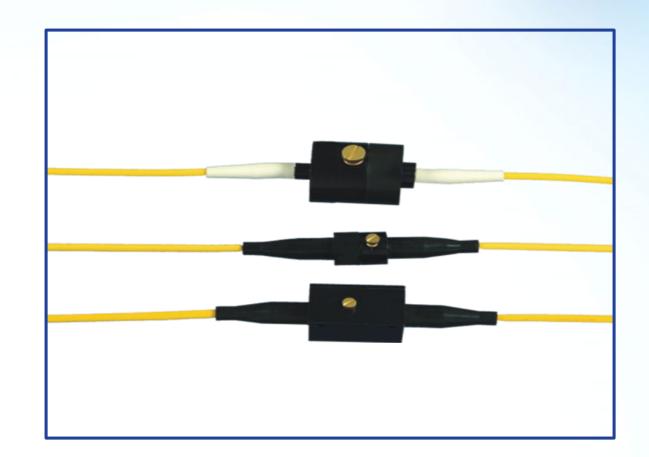
Competitive Advantages:

- High Power Handling Capability: Up to 10 Watts CW at 1550 nm
- Wavelength Flattened Response Over the S, C & L Bands (1470-1620 nm)
- Available from 350 nm 2000 nm wavelengths
- Very Low Polarization Dependent Loss (PDL): As low loss 0.01 dB
- High Volume Manufacturing Capability
- Exceptional Quality
- Superior Service
- Low Cost

Inline Variable Attenuators



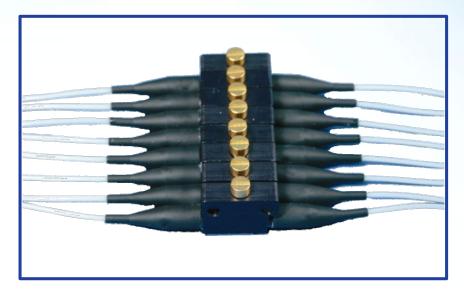
- 0.6 dB to 80 dB Attenuation Range SMF, PMF & MMF
- Available from 350 nm – 2000 nm wavelengths
- Up to 10 W Power, Flat Wavelength Response
- As low as 0.01 dB PDL
- High Power Version up to 10 Watts at 1550 nm
- Meets Telcordia Specifications



Miniature Inline Variable Attenuators



- 0.6 dB to 80 dB Attenuation Range SMF, PMF & MMF
- Available from 350 nm – 2000 nm wavelengths
- Up to 2 W Power, Flat Wavelength Response
- As low as 0.01 dB PDL, Meets Telcordia Specifications
- Ideal for patch panels, DWDM Systems

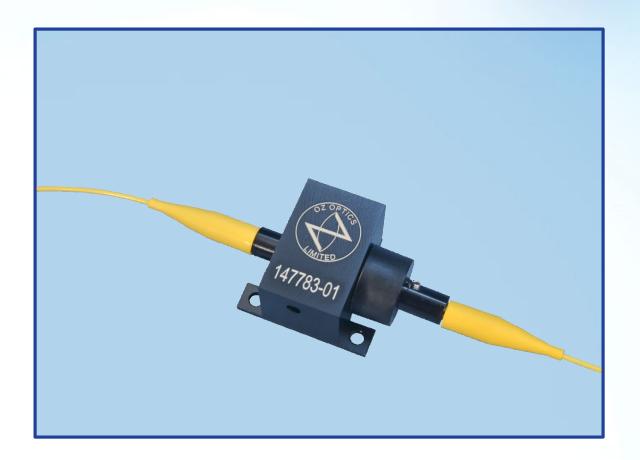




Inline Neutral Density Variable Attenuators



- Mode Independent Attenuation (Ideal for MMF)
- 0.6 dB to >40 dB Attenuation Range
- SMF, PMF & MMF Versions



Reflective Style Variable Attenuators



- 0.8 dB to 60 dB Attenuation Range
- Available from 350 nm – 2000 nm wavelengths
- 0.01 dB Resolution, SMF & MMF Versions
- -40 dB, -50 dB, -60 dB Backreflection



Receptacle Style Variable Attenuators



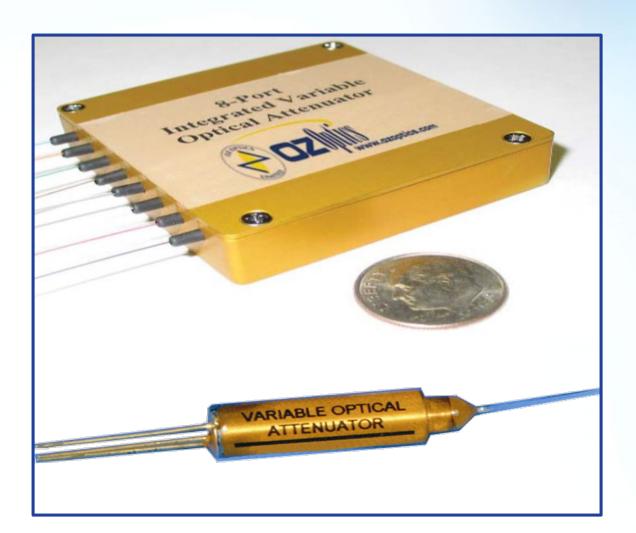
- 2 dB to 80 dB Attenuation Range
- Available from 350 nm – 2000 nm wavelengths
- 0.01dB Resolution, SMF & MMF Versions
- Wide Variety of Receptacles Available



MEMS Based Variable Attenuators



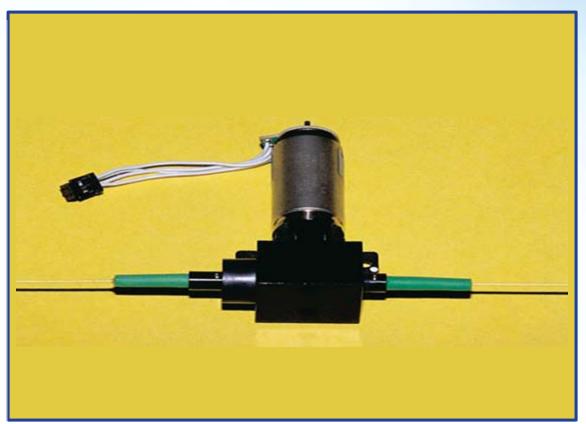
- 0.8 dB 40 dB Attenuation Range, Low Cost
- Available from 488 nm – 2000 nm wavelengths
- Up to 24 Multi Channel Version is available
- Power Monitors at Input and/or Output End
- SM and PM fiber versions.



OEM Motor Driven Variable Attenuators



- 0.6 dB to 60 dB Attenuation Range SMF, PMF & MMF
- Available from 350 nm – 2000 nm wavelengths
- Maintains Attenuation with Power Off, Up to 2 W
- Low Cost, High Speed, Rugged & Compact Size



Electrically Controlled Attenuators



- 0.6 dB to 60 dB Attenuation Range SMF, PMF & MMF
- Available from 350 nm – 2000 nm wavelengths
- Maintains Attenuation with Power Off, Up to 2 W Power
- Low Cost, High Speed, Rugged & Compact Size



Reflective Style Motor Driven Attenuators



- 0.8 dB 60 dB Attenuation Range
- Available from 350 nm – 2000 nm wavelengths
- Up to 2 W Power Handling SMF, PMF & MMF
- High Speed, Rugged & Compact Size



Digital Variable Attenuators



- 0.01 dB Resolution, Fast Response Time
- 0.6 dB to 60 dB Attenuation Range
- Available from 350 nm – 2000 nm wavelengths for SM, PM and MM fibers.
- USB Interface
- Up to four calibrated wavelengths



Benchtop Digital Multichannel Attenuator



- Your choice of up to 4 individual types of attenuators per unit
- **USB Interface**
- 0.6 dB to 60 dB Attenuation Range
- Can be calibrated for up to four individual wavelengths
- Optional integrated power monitoring for precise output power control
- Available from 350 nm 2000 nm wavelengths for SM, PM and MM fibers
- Maintains Attenuation with Power Off



Multichannel Electrically Controlled Variable Attenuator (Rack Mount)



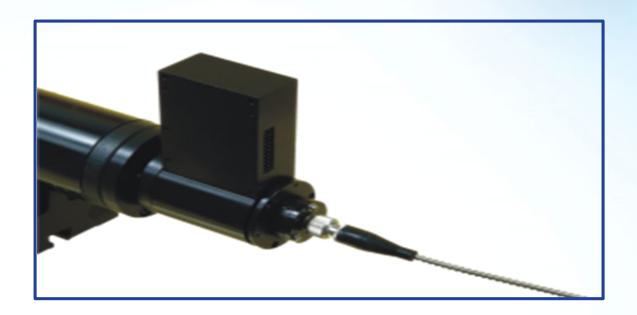
- Your choice of up to 32 individual attenuators per unit
- **USB Interface**
- Optional integrated power monitoring for precise output power control
- 0.6 dB to 60 dB Attenuation Range
- Available from 350 nm 2000 nm wavelengths for SM, PM and MM fibers.
- Calibrated for dual wavelengths
- Maintains Attenuation with Power Off



Source to Fiber Couplers - with Electrically Controlled Attenuators



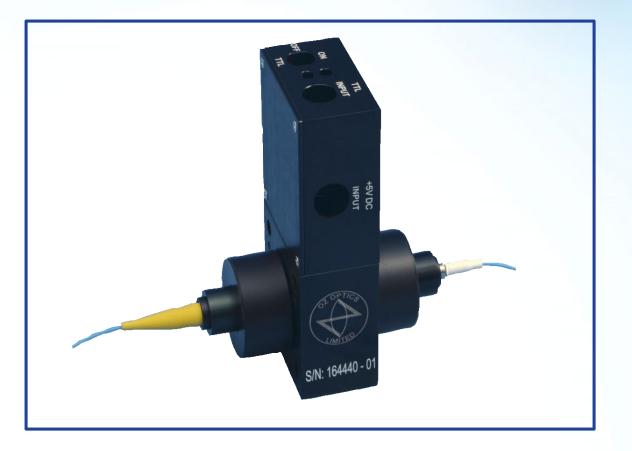
- > 60% Coupling Efficiency for SM & PM Fiber
- 60 dB Attenuation Range
- Available from 350 nm – 2000 nm wavelengths
- 0.5 dB Accuracy. 0.01 dB Resolution



Fiber Optic Shutters



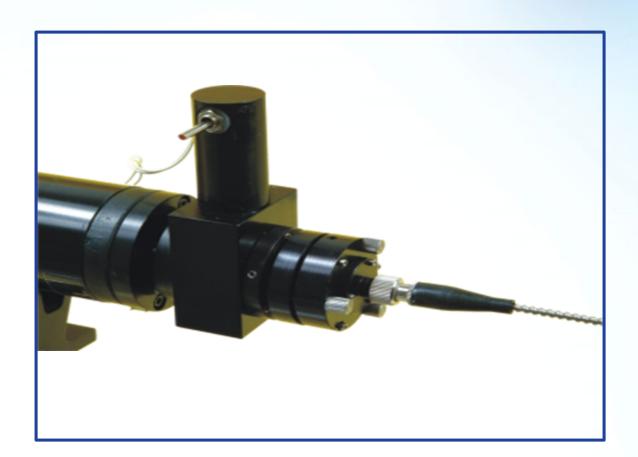
- Up to 100 W Optical Power SMF, PMF & MMF
- Fast Response Time
- Ideal for Safety Interlocks
- Available from 350 nm – 2000 nm wavelengths



Source to Fiber Couplers with Shutters



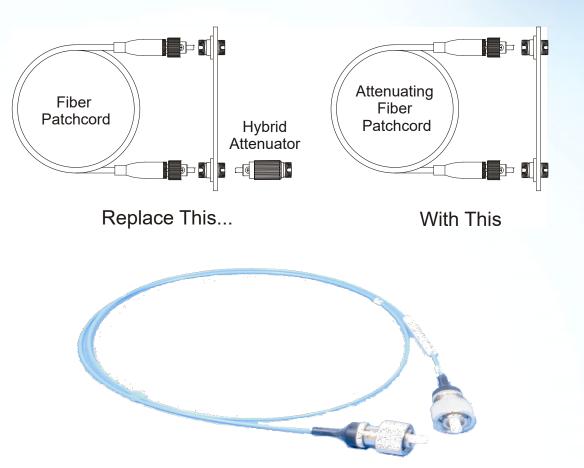
- > 60 % Coupling Efficiency for SM & PM Fiber
- **Up to 3 Watts Optical Power**
- Ideal for Safety Interlocks, Remote Control
- Available from 350 nm – 2000 nm wavelengths



Attenuating Fiber Patchcord



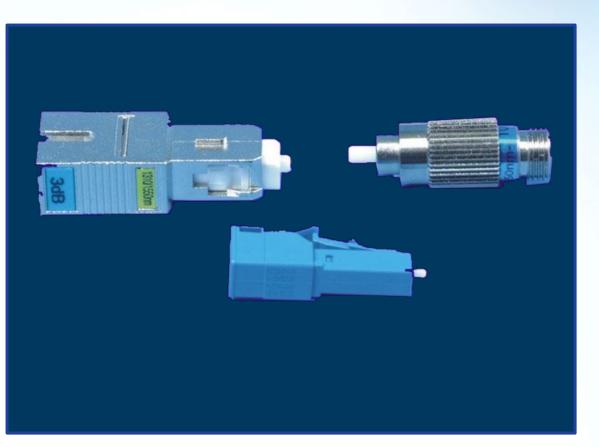
- **Simplifies Your Layout**
- 0.1 dB to 20 dB Attenuation in 0.1 dB Increments
- Capable of Handling up to 2 Watts of Optical Power
- Available from 350 nm – 2000 nm wavelengths
- For SM and PM fibers only



Plug Type Fixed Attenuators



- Low Cost, Rugged & Compact Size for SMF & MMF
- < -50 dB Backreflection (for SMF)
- -1 dB to -25 dB Attenuation Levels
- 1300 & 1550 nm for SMF,
 850, 1300 & 1550nm for MMF



Loopback Style Fixed Attenuators



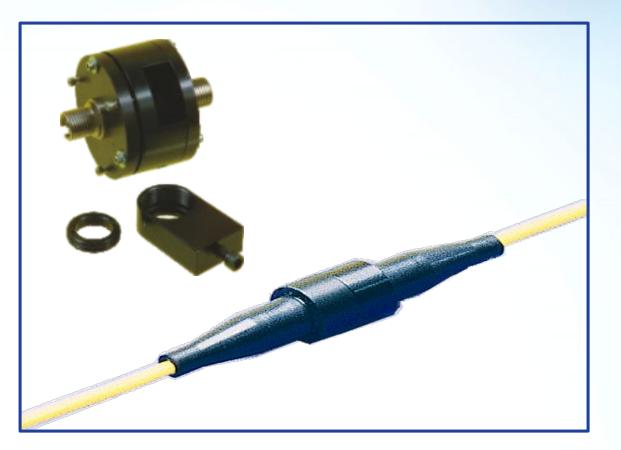
- Mode Independent Attenuation
- Rugged, Compact Housing
- SMF & MMF Versions



Fixed and Removable Neutral Density Attenuators



- Mode Independent Attenuation
- **Pigtail & Receptacle Styles**
- SMF, MMF & PMF Versions



Air Gap Variable Attenuators



- Very Compact Size
- Patch Panel Mountable
- FC/PC, SC & ST Connector Styles



Fiber Optic Terminators



- Designed to Kill Backreflection in Unused Ends
- 50 dB Return Loss, 1300/1550 SM Fiber Only
- Ultra, FC/PC, LC/PC & SC Connectors



Hybrid Patchcords



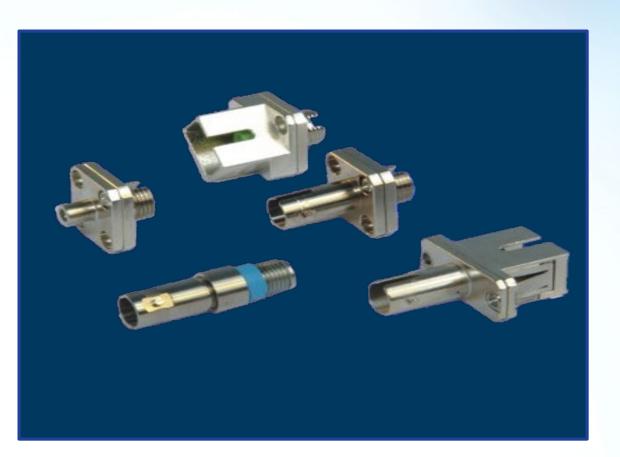
- Angled, Super, Ultra, FC/PC, ST, SC Connectors
- Male to Male, Male to Female Versions
- Low Cost, Rugged & Compact Size



Universal Connectors



- Less than 0.5 dB Insertion Loss
- Ultra, Super, Angled FC/PC, LC, SC, ST & SMA
- Low Cost, Rugged & Compact Size



Thank You for Choosing OZ Optics

Please Contact Our Sales Department: Tel: 613-831-0981 ext. 3370 Toll Free: 1-800-361-5415 Email: sales@ozoptics.com

