

# OZ Optics Limited

## HIGH POWER FIBER OPTIC COMPONENTS

June 2016

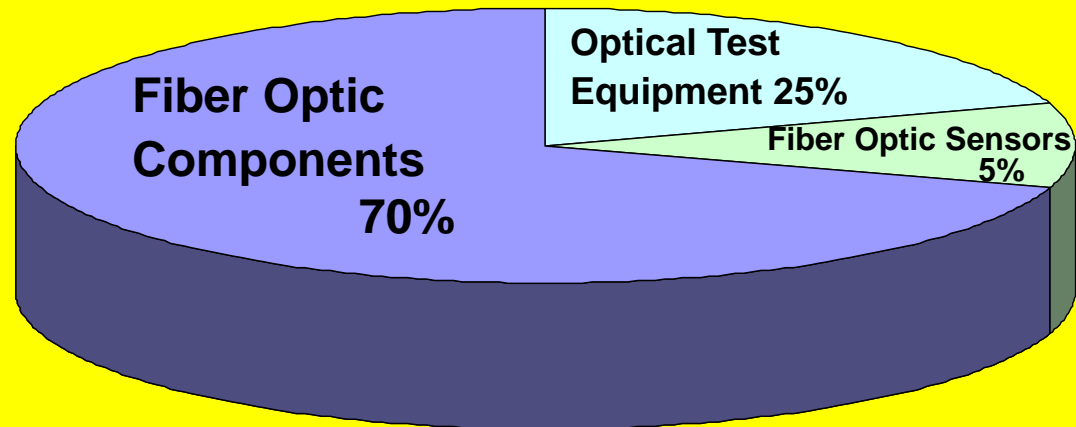
# Company Profile

- Company founded in 1985;
- Corporate headquarters located in Ottawa, Canada;
- Manufacturing facility in Ottawa/Canada, Izmir/Turkey, and Jiaxing/China
- Seven Product Groups: **Laser-to-Fiber Delivery Systems, High Power Fiber Optic Components, Polarization Maintaining Products, Attenuators, Opto-Electronic Packaging, Test Equipment, Fiber Optic Sensor Systems**
- Sales offices in Canada, USA, Turkey and China



# Company Profile

## ➤ Three Product Groups:



➤ Over 1,000 products

➤ Leading Edge R&D

# OZ Optics Products



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Global Leader in Fiber Optic Products since 1985

## Polarization Maintaining Fiber Optic Components

Patent Numbers: USA 7058275, 7095931, 7295731, China 1672073



Polarization Maintaining Connectors / Patchcords



Polarization Maintaining and Polarizing Splitters / Combiners / Fused Couplers / Switches



All Fiber Manual and Electrically Driven Polarization Controllers / Scramblers



PM Fiber Directional Taps / Power Monitors



Manual / Electrically Controlled PM Fiber Pigtailed Variable Attenuators



Fiber Pigtailed Polarizers



PLC Splitters



PM Fiber Pigtailed Circulators

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## High Power Fiber Optic Components

Patent Numbers: Canada 2494133, USA 7058275, 7095931, 7295731, China 1672073



High Power/Temperature Connectors & Patchcords



High Power Isolators



High Power Laser to Fiber Couplers / Collimators / Focusers



High Power Mode Field Adapters



High Power Optical Taps / Power Monitors



CO<sub>2</sub> Cleaning for High Power Components



High Power Splitters / WDM's



Shutters / Receptacles / Sleeve Thru Adapters with Sensors

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### Fiber Optic Attenuators for SM, PM, and MM Fibers

<p><b>Digital Variable Attenuators</b></p>  <ul style="list-style-type: none"> <li>• 0.008 Resolution, Fast Response</li> <li>• 0.008 to 1000 Extinction Range</li> <li>• 100 Wattage</li> </ul>	<p><b>Electrically Controlled Variable Attenuators</b></p>  <ul style="list-style-type: none"> <li>• 0.008 to 100dB Attenuation Range</li> <li>• Up to 2 Watts Power Handling</li> <li>• PC Based, Analog and Digital Control</li> </ul>	<p><b>MEMS Variable Attenuators</b></p>  <ul style="list-style-type: none"> <li>• 0.008 to 40dB Attenuation Range</li> <li>• Small Size, Low Cost, Low Power Consumption</li> <li>• Low Wavelength Response, Low Crosstalk</li> </ul>
<p><b>SM / PM / MM Fiber Pigtailed Inline Variable Attenuators</b></p>  <ul style="list-style-type: none"> <li>• 0.008 to 100dB Attenuation Range</li> <li>• 0.008 to 1000 Extinction Range</li> <li>• 0.008 POC, Novel Termination Specifications</li> </ul>	<p><b>Single/Multi Channel Miniature Variable Attenuators</b></p>  <ul style="list-style-type: none"> <li>• Compact, Less Than 5mm Spacing Between Fibers</li> <li>• Designed for Multiple Fiber Arrays</li> <li>• PC Based Monitors</li> </ul>	<p><b>Reflective Style Variable Attenuators</b></p>  <ul style="list-style-type: none"> <li>• 0.008 to 60 dB Attenuation Range</li> <li>• 0.01 dB Resolution</li> <li>• 40dB - 60dB, 0.008 - 0.009 Backreflection</li> </ul>
<p><b>Air Gap Variable Attenuators</b></p>  <ul style="list-style-type: none"> <li>• 0.008 to 100dB</li> <li>• Fast Power Response</li> <li>• Fiber, PC and ST Connector Styles</li> </ul>	<p><b>Plug Type Fixed Attenuators</b></p>  <ul style="list-style-type: none"> <li>• Low Insertion Loss</li> <li>• High Reliability</li> <li>• Available in Various Fiber Types</li> <li>• Available in Various Power Levels</li> </ul>	<p><b>Attenuating Fiber Patchcords</b></p>  <ul style="list-style-type: none"> <li>• Available in Various Fiber Types</li> <li>• Available in Various Power Levels</li> <li>• Available in Various Connector Styles</li> <li>• After 30 days and 1000 hours of use</li> </ul>

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### Laser & Laser Diode to Fiber Delivery Systems

<p><b>Laser to Fiber Couplers</b></p> 	<p><b>Bare Fiber Adaptors with Magnetic Clips</b></p> 	<p><b>Bulkhead Receptacles</b></p> 
<p><b>Pigtail/Receptacle Style High/Low Power Collimators/Focusers</b></p> 	<p><b>High/Low Power Patchcords</b></p> 	<p><b>WDM/RGB Combiners</b></p> 
<p><b>OCT Modules and 2 micron Components</b></p> 	<p><b>OEM Laser Diode to Fiber Couplers</b></p> 	<p><b>Turnkey, Ultra Stable Laser Modules</b></p> 

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### Fiber Optic Components for Optoelectronic Packaging


Hermetically Sealable Patchcords with Glass or Metal Solder



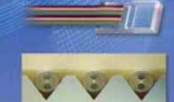
Single Channel



Multi Channel




Metalized Fibers



PM/SM/MM Fiber Pigtailed V-Groove Arrays



Polarization Measurement System for V-Grooves




Tapered / Lensed Fiber Polished / Laser Shaped




Glass Solder Preforms



Fiber Optic Ferrules



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### Fiber Optic Test Equipment



Polarization Extinction Ratio Measurement Systems



Power Meters with Smart Detector Heads



Broadband Digital Variable Attenuators



Optical Fiber Length Meters



High Power Visual Fault Locators Fiber Optic Stable Sources



Inline Optical Power Monitors/Meters



Laser Diode Sources Single/Multiwavelength



Fiber Optic Smart Patchcords



Fiber Optic Fault Finders



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# Product Innovation



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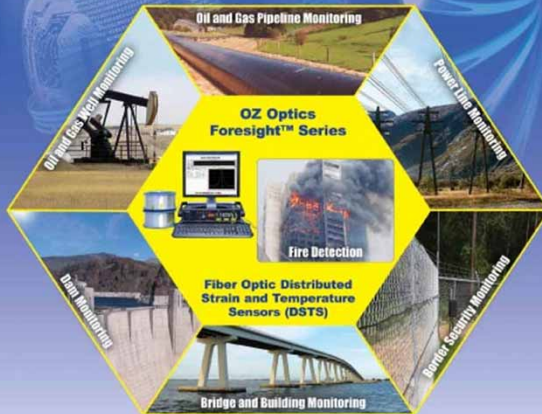


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## Fiber Optic Distributed Strain and Temperature Sensors

USA Patent Numbers: 7499151, 7599047

- 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 100 km sensing range
- Uses standard telecommunication fiber to minimize costs



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## Fiber Optic Fault Finder for Optical Network Safeguard™

- Monitors and reports network health status in real time, 24 hours/day, 365 days/year
- Lowers network operating and maintenance expenses
- Reduces revenue loss due to fiber plant outages
- User friendly interface via various wireless interfaces (Wi-Fi, GPRS), USB, or RS-232
- Reports fault location, giving GPS coordinates with time stamp
- Early alert and outage reports via cellular phone, email, IM, SMS, or text messaging



OZ Guard Automated Test Solution



Remote Monitoring a WDM Network



Remotely Accessible/Wireless Fault Finders



GPS Locator



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# Product Innovation



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## 2 micron Fiber Optic Components for PM and SM Fibers



Fiber Optic Patchcords



Fused Couplers / Taps / Beam Splitters / Combiners



Fiber Pigtailed Laser Diode Sources



Pigtail / Receptacle Style Collimators / Focusers



Polarizers



Manual / Electrically Controlled Variable Attenuators



Isolators

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## Fiber Optic Products for OCT Applications



OCT Modules



Manual / Electrically Controlled Broadband Variable Attenuators



Manual / Electrically Controlled Fiber Optic Delay Lines



Manual / Electrically Controlled Polarization Controllers



Fiber Pigtailed Broadband SLED Sources



Fiber Collimators / Focusers



Broadband Fused Couplers

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# Company Profile

Over 470 employees worldwide:

- 260 in Ottawa and US
- 50 in Turkey
- 160 in China

OZ Canada



OZ China



OZ Turkey

# Company Profile

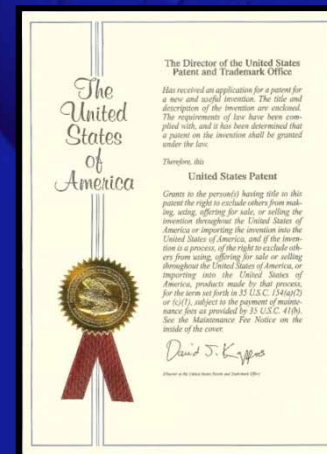
*OZ Optics is lead by an experienced team:*

- **Ömür Sezerman, Chairman, President & CEO**
  - Founder and CEO since inception (31 years)
- **Zahide Sezerman, VP of Human Resources**
  - With OZ Optics since inception (31 years)
- **Garland Best, VP of Components Division**
  - 24 years at OZ Optics
- **Gordon Youle, VP of Test Equipment Division**
  - 17 years at OZ Optics
- **Martin Powell, Operation Manager**
  - 12 years at OZ Optics
- **Sarah Miller, Controller**
  - 3 years at OZ Optics
- **Metin Sezerman, General Manager of OZ Turkey**
  - 15 years at OZ Optics
- **Bing Li, General Manager of OZ Optics China**
  - 12 years at OZ Optics

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# Company Profile

- ISO9001:2008 certified
- Broad patent portfolio
- Advanced proprietary processing technology



# Company Profile

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



# Company Profile

➤ *OZ Optics has resellers and distributors in over 30 Countries & Regions and over 10,000 customers globally:*



Australia



France



Japan



Spain



Austria



Germany



Netherlands



Switzerland



Belgium



Greece



Luxembourg



Sweden



Brazil



Hong Kong



Norway



Taiwan



Canada



India



Poland



Thailand



China



Ireland



Portugal



Turkey



Czech Rep.



Israel



Singapore



United Kingdom



Denmark



Italy



South Korea



United States

# In-House Production Capabilities

- Experienced and well-trained staff in following fields:
  - optical, mechanical, electronics & software

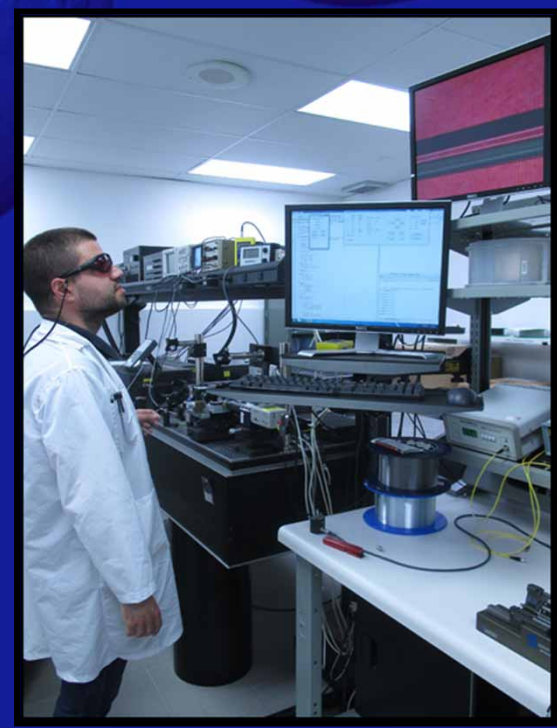
CNC Machine Shop



AR Coating



Femtosecond Laser Lab



Clean Room



Laser Conditioning/Cleaving



# Branch Network



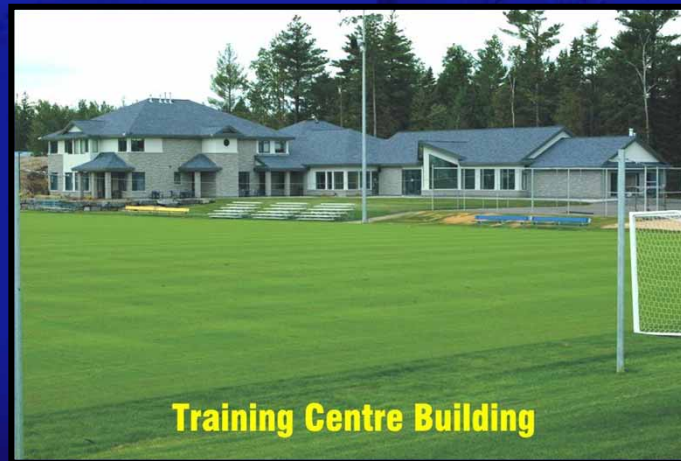
# Facility – Ottawa Headquarters

- 60,000 sq ft. – Manufacturing and R&D Facilities
- 15,000 sq ft. – Admin, Sales and Marketing
- 15,000 sq ft. – Training and Fitness Facility
- R&D, Product Design, Engineering, Final Assembly & QA





# Facility – Ottawa Headquarters



# OZ Optics – Turkey Factory

- Operational since 2000
- 33,000 sq ft. Manufacturing Facility
- Located in Free Trade Zone
- Low Tax Rates
- Sub Component Parts Manufacturing
- Cost Effective Manufacturing
- High Quality Labor



# OZ Optics China

- Operational since 2009
- Wholly Foreign Owned Enterprise
- Subcomponent Parts Manufacturing
- Cost Effective Manufacturing
- High Quality Labor
- Extensive Training  
( 3-6 months in OZ Canada)



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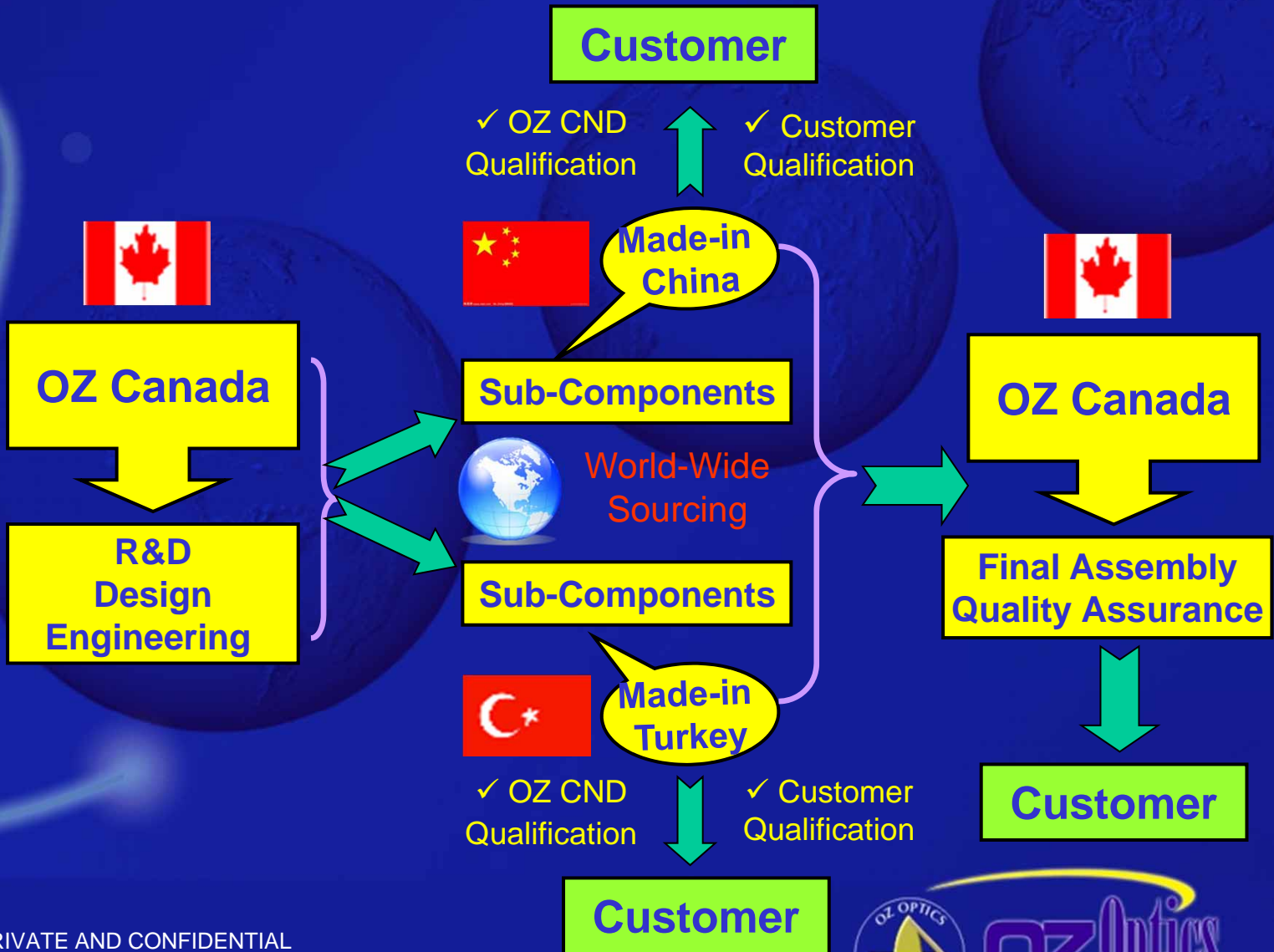
# OZ China Facility

## Jiaxing, China

- Located in Economic Development Zone
- 500 sq meters – Admin, Sales and Marketing
- 1500 sq meters – Manufacturing Area
  - 100 sq meters – Class 10,000 Clean Room
  - 100 sq meters – ESD Working Area



# Manufacturing Strategy



# Industry Standards

All products manufactured are in strict accordance with international industry standards:

➤ *Telecordia Compliance*



➤ *CE Compliance*



➤ *RoHS Compliance*



➤ *ISO 9001:2008 Certified (China, Turkey and Canada)*

➤ *Controlled Goods Directorate Registered*

# Core Competencies

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

# Leading Technology

- **High Power Isolators**
  - power handling > 50W
  - low loss, low cost turnkey solution



High Power Free Space and Pigtailed Isolators

- **Pioneer in Polarization Maintaining (PM) Components**
  - wavelength flattened
  - high power & low PDL
  - PM test equipment



Polarization Maintaining Patchcords

Distributed Strain and Temperature Sensors



- **Fiber Optic Sensor**
  - fast and simultaneous measurement of strain & temp
  - large structure health monitoring

High Power Collimators/Focusers



- **Leader in High Power Fiber Optic Delivery Systems**
  - specializes in custom design





## OUR VISION

- Be the preferred Supplier of choice
- Capture and expand market share
- 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
- Commitment
- 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 and continuous improvement
- Promote opportunities of professional development for all members of our Company through education, training and personal challenge

Ömür Sezerman  
President

# Clean Room for High Power Manufacturing Components



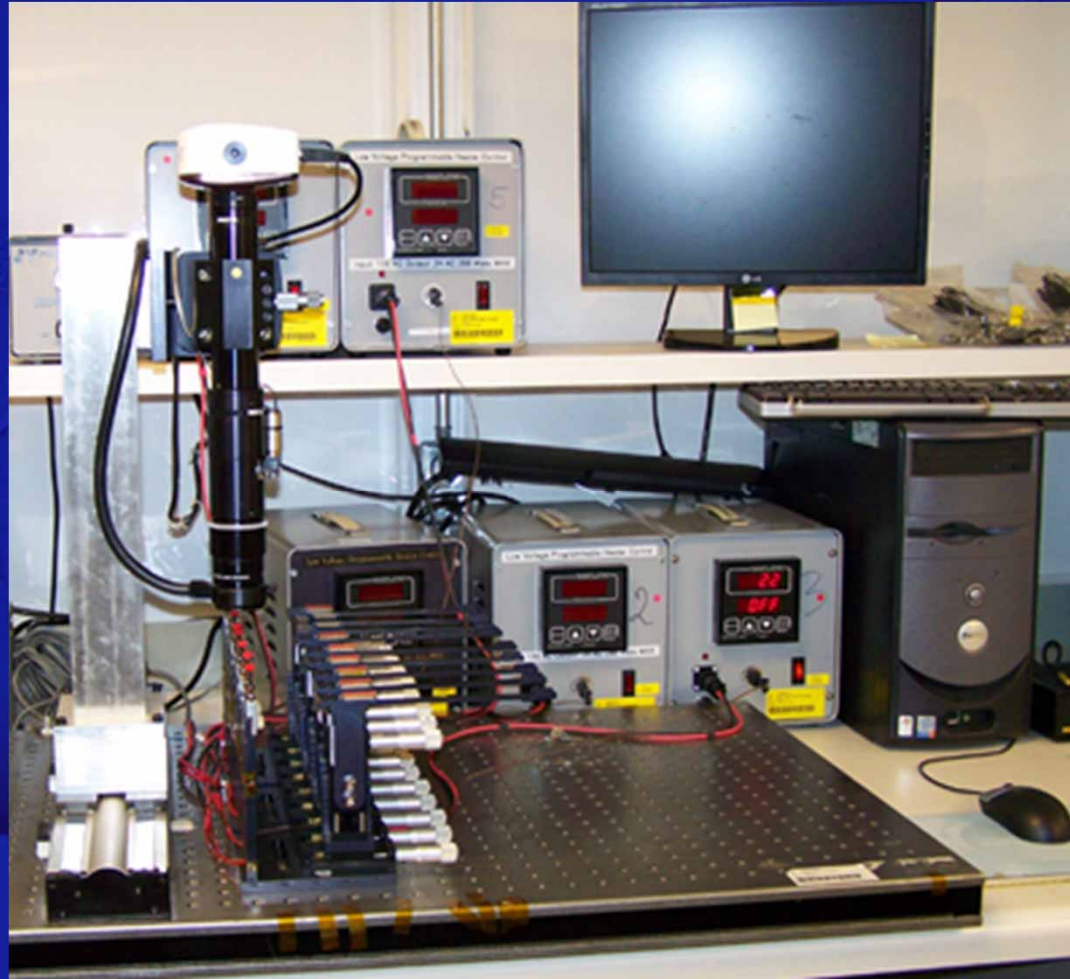
# Fusion Splicer for End Capping



# High Power Inspection Station



# High Power Gluing Station for Patchcords



# Fusion Splicer, Cleaver and Glass Processing System with PM Rotation

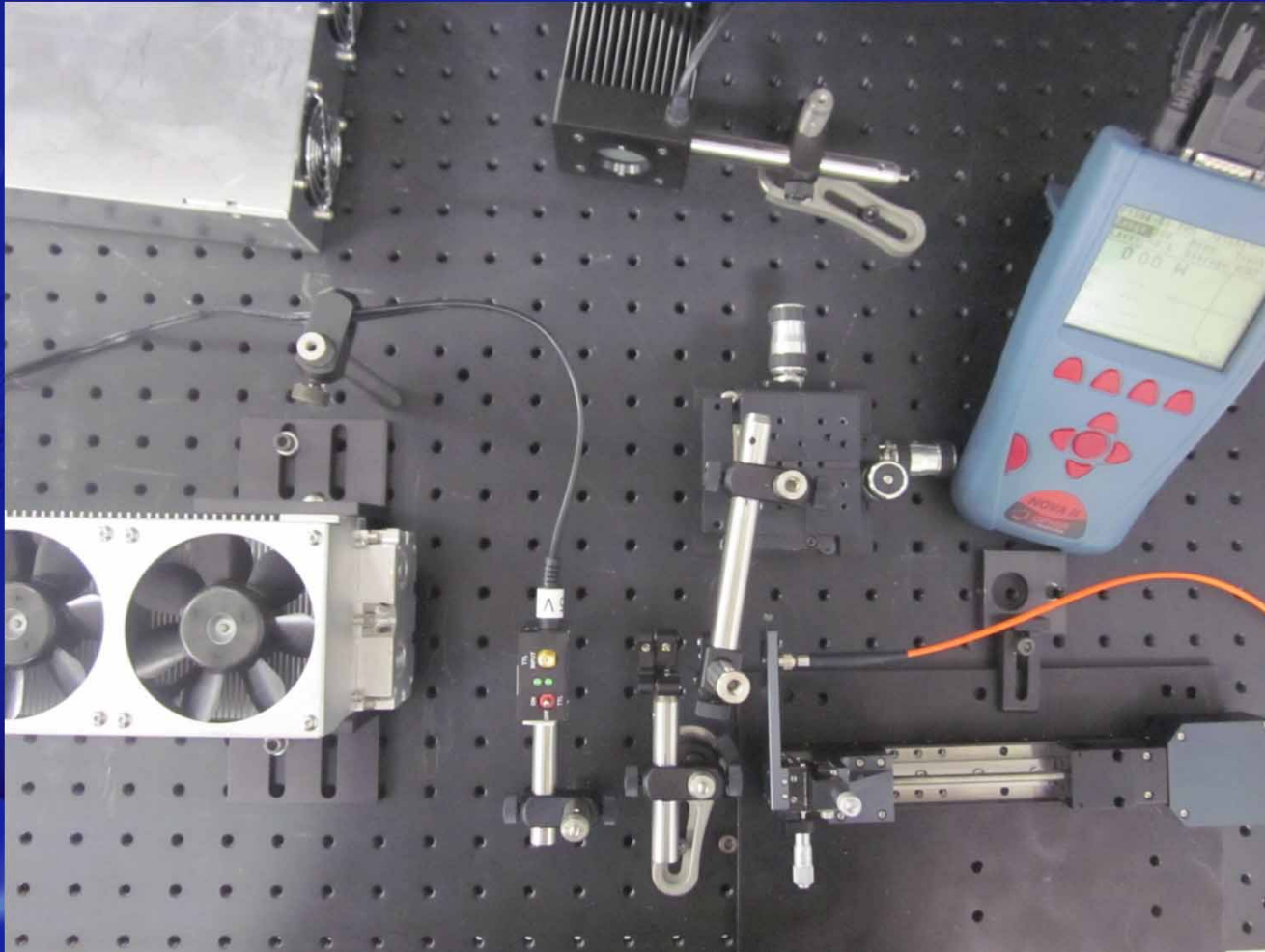


# High Power AR Coating Machine



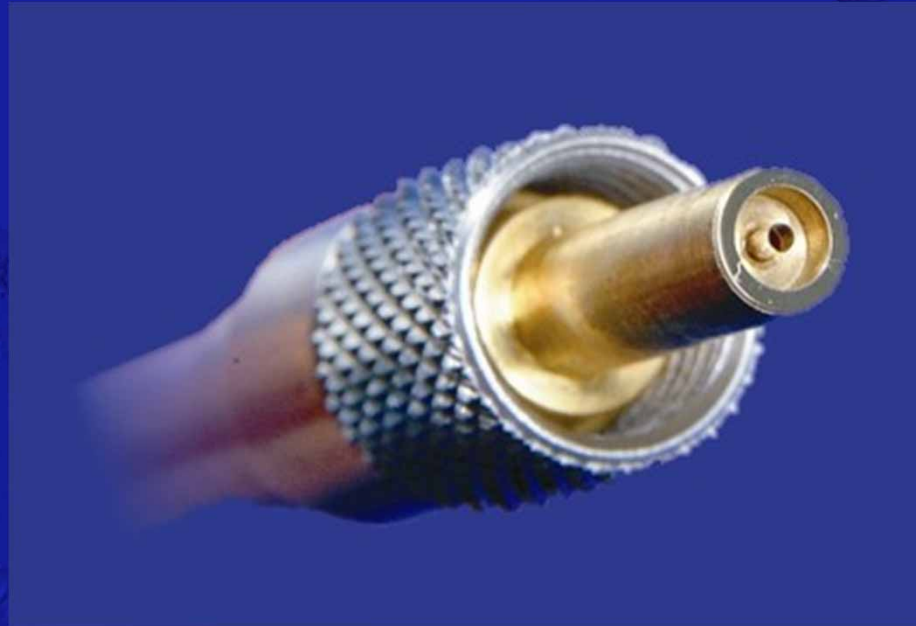
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# Laser Conditioning Station





# High Power Patchcords And Connectors



- Able To Transmit Over 100W Of Optical Power
- Operating Wavelengths From 200nm To 2000nm
- PMF, SMF, And MMF High Power AR Coatings

# High Power Patchcords And Connectors



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- PMF, SMF, And MMF High Power AR Coatings

# High Power Patchcords And Connectors



- Able To Transmit Over 100W Of Optical Power
- Operating Wavelengths From 200nm To 2000nm
- PMF, SMF, And MMF High Power AR Coatings

# OZPEN™ CO<sub>2</sub> Fiber Optic Cleaning Unit



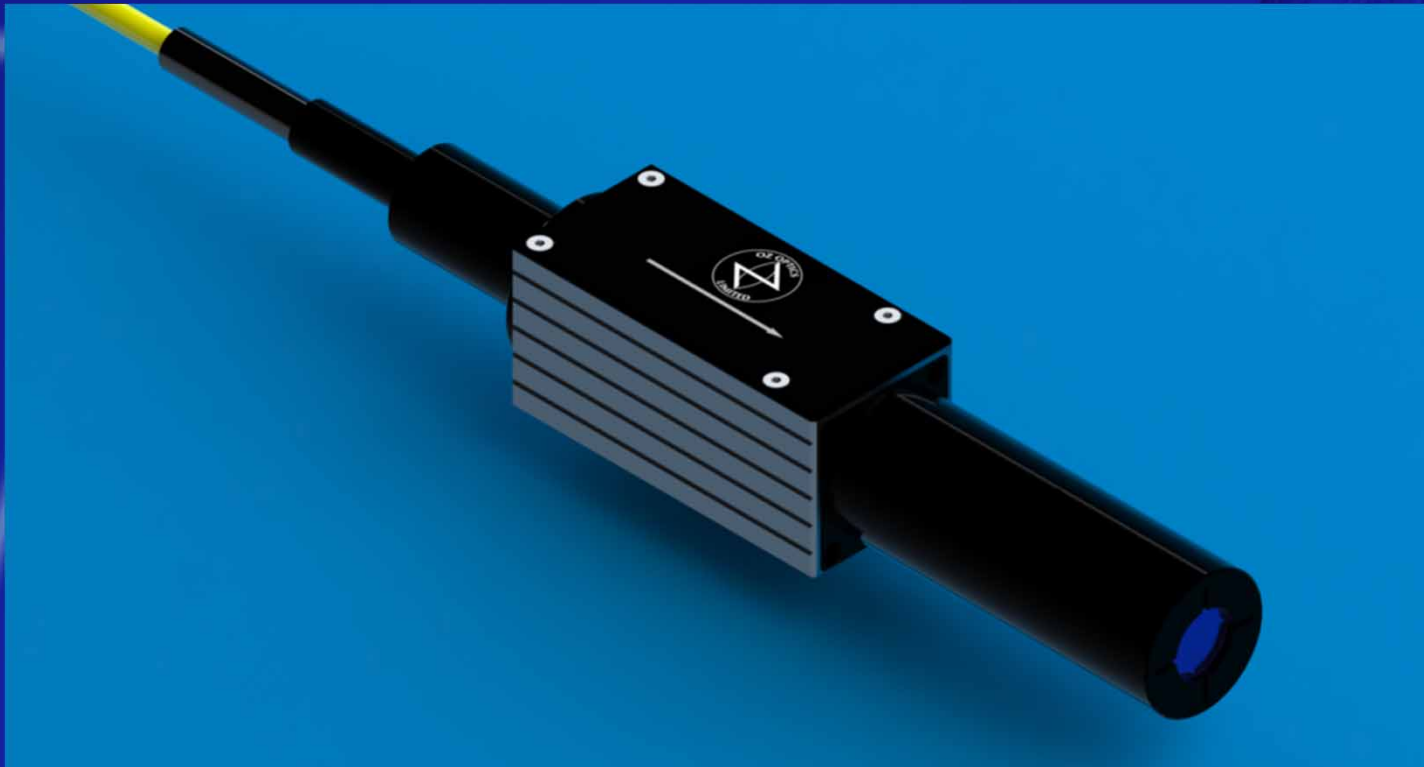
- Superior removal of contaminants on fiber optics and other components
- Quick and dry solvent free cleaning process
- Cleans variety of substrates
- Designed to clean small surface area
- Ideal for high power applications

# High Power Collimators/Focusers



- Up to 100 Watts CW Power Handling
- Available for 180nm to 2000nm Wavelengths
- Receptacle and Pigtailed Versions

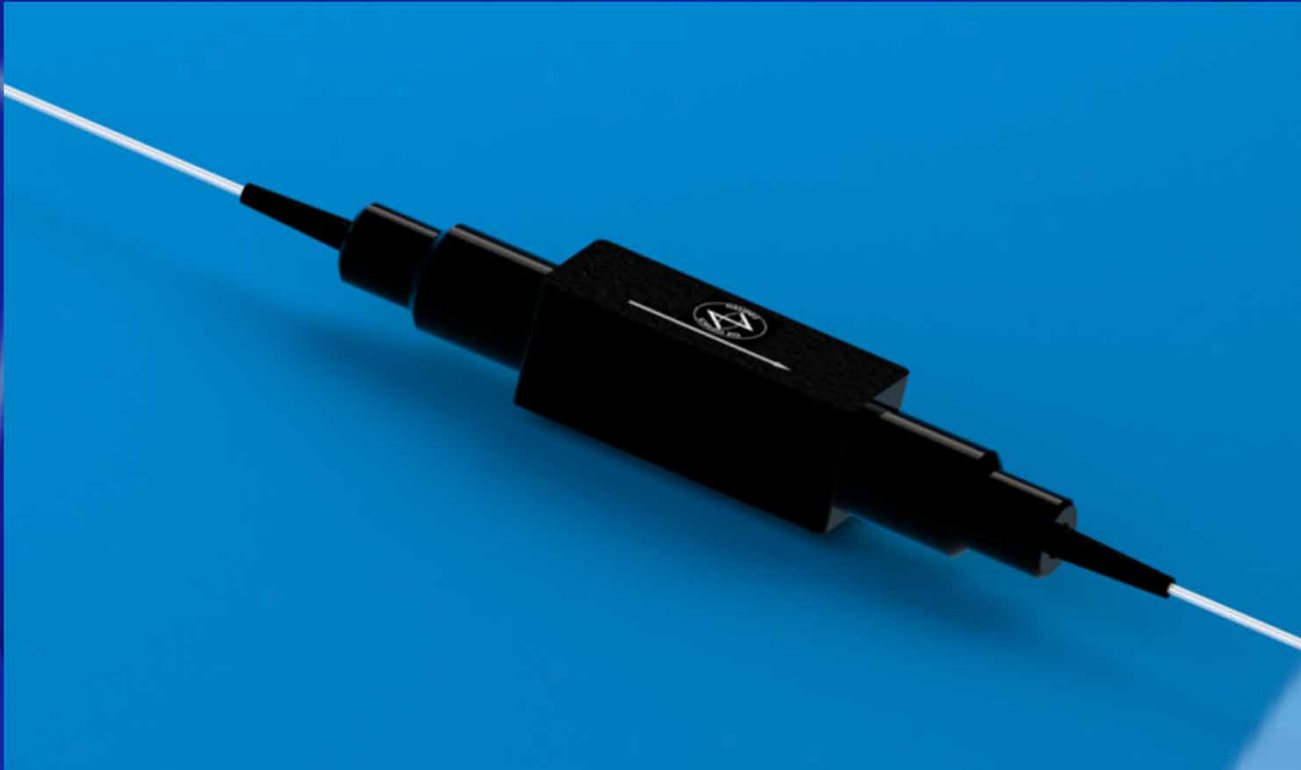
# High Power Fiber Pigtailed Isolators



- Low Insertion Loss, Up to 100 Watts
- Available From 400 - 2000nm
- Polarization Independent , High Isolation

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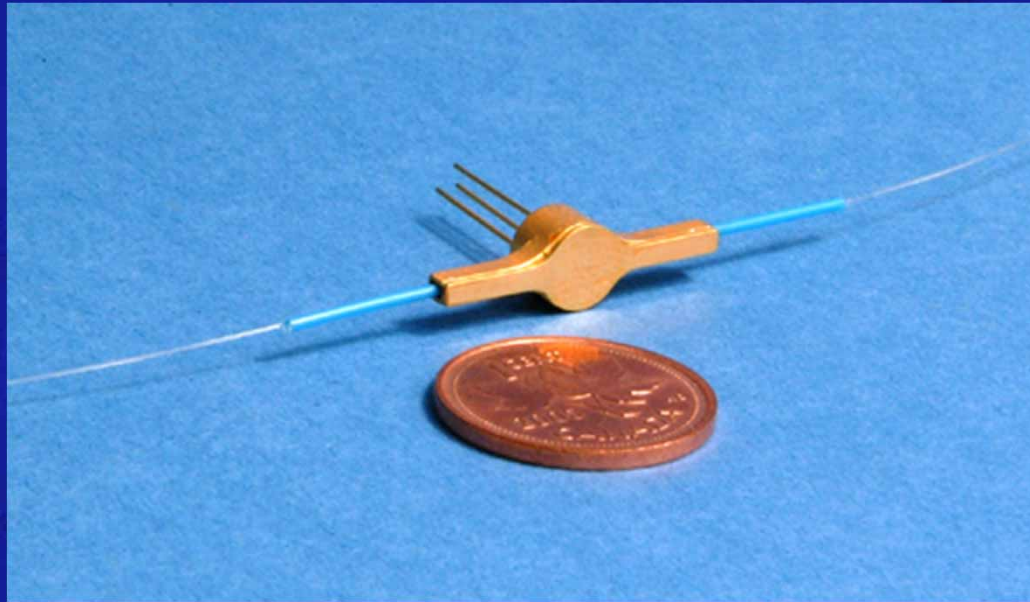
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# Mode Field Adapter



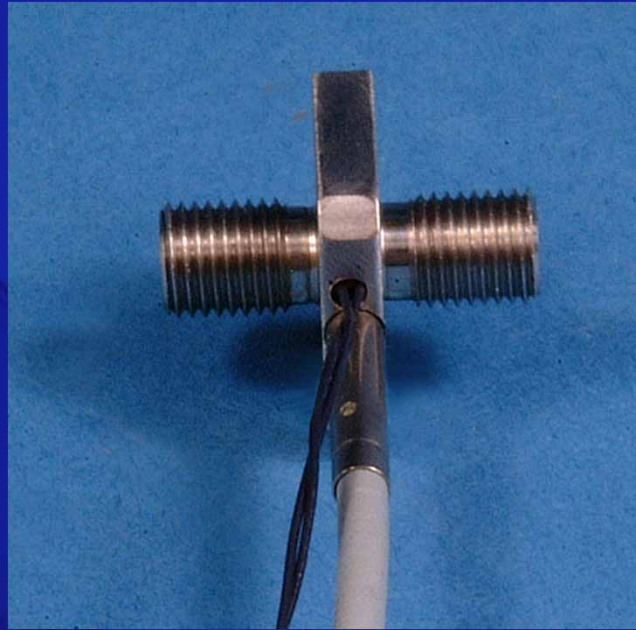
- High Power Handling
- Adapts and conserves modal content
- Singlemode and Polarization Maintaining Versions
- Custom designs available

# High Power Directional Taps/Power Monitors



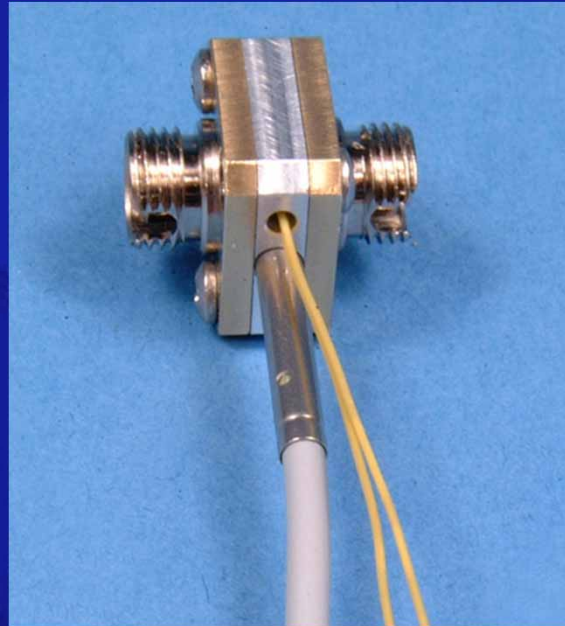
- Up to 10 Watts Power Handling
- SM, PM and Specialty Fiber Versions, including Photonic Crystal Fiber
- Available for 320nm to 2000nm Wavelengths

# High Power Shutters/Bulkhead Receptacles With Safety Interlocks



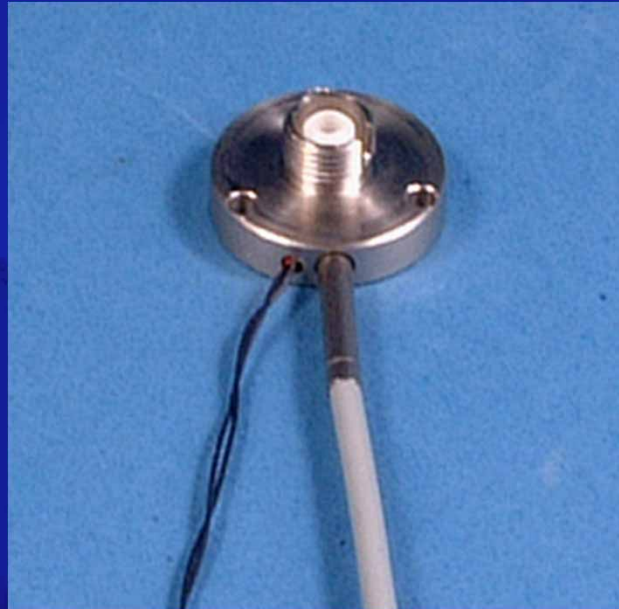
- **Multiple Watts CW Power Handling**
- **Shutter Speed of  $< 5$  msec**
- **Temperature, Contact or Proximity Sensors for Safety Interlock**
- **SMA 905 or FC Receptacles**

# High Power Shutters/Bulkhead Receptacles With Safety Interlocks



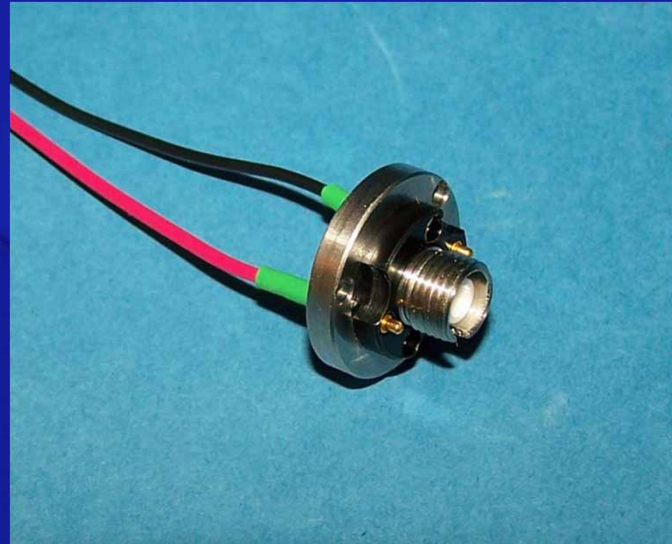
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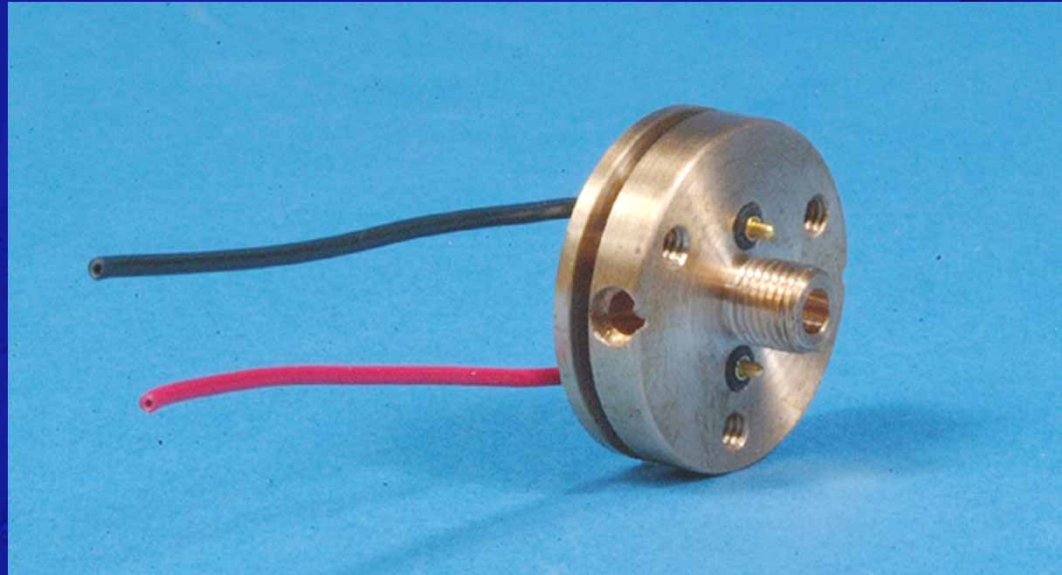
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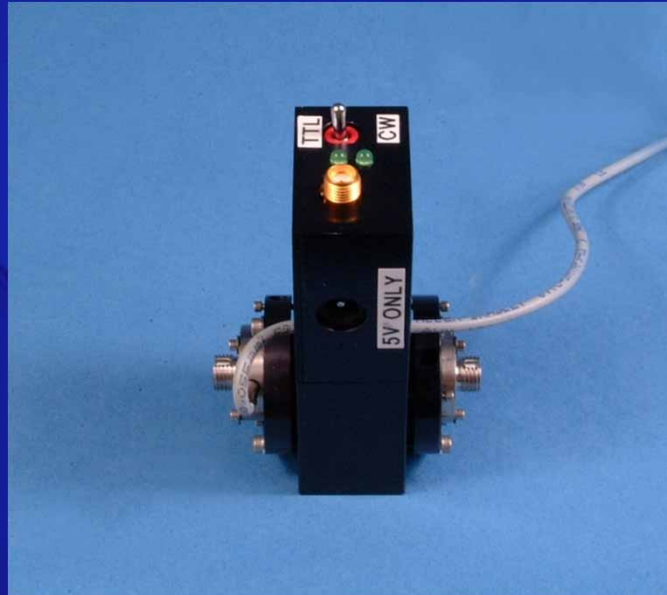
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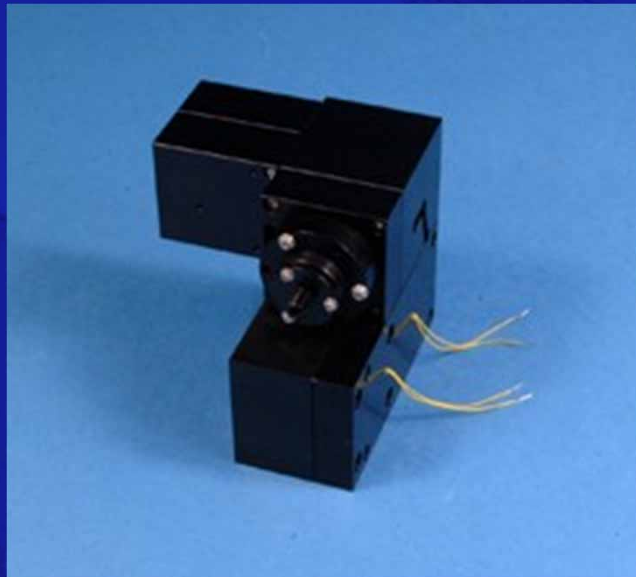


# High Power Shutters/Bulkhead Receptacles With Safety Interlocks



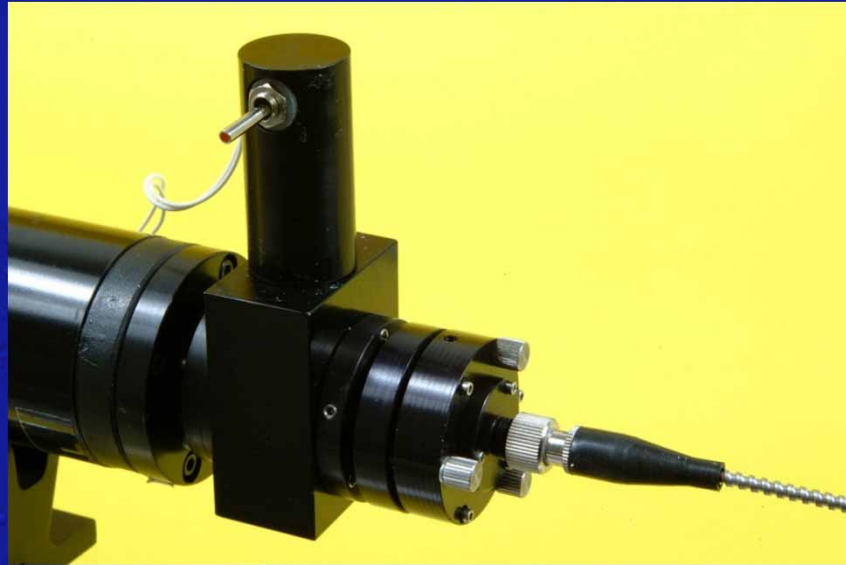
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# High Power Shutters/Bulkhead Receptacles With Safety Interlocks



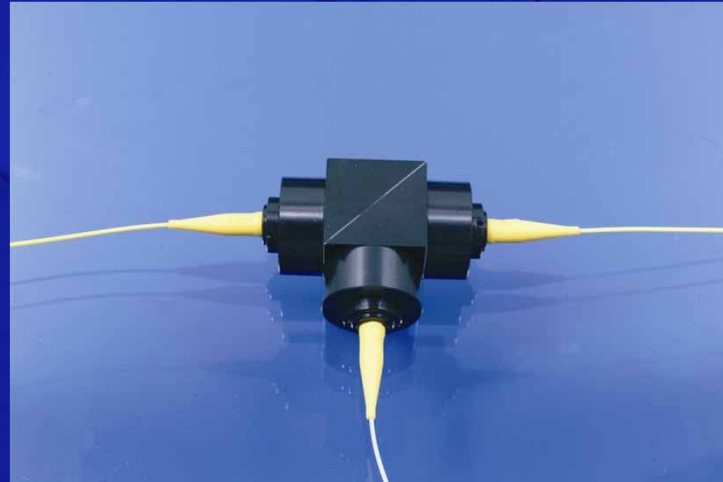
- **Multiple Watts CW Power Handling**
- **Shutter Speed of  $< 5$  msec**
- **Temperature, Contact or Proximity Sensors for Safety Interlock**
- **SMA 905 or FC Receptacles**

# Laser To Fiber Coupler With Shutters



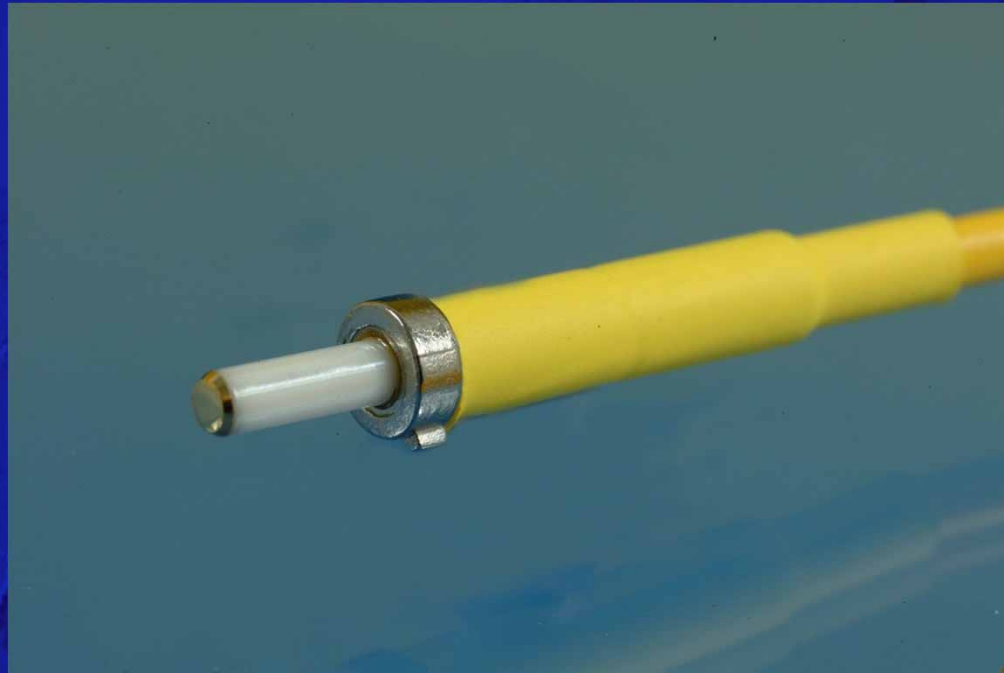
- Laser To Fiber Coupler With Shutters
- >60% Coupling Efficiency For SMF & PMF
- Up To 3 Watts Optical Power Handling
- Ideal For Safety Interlocks, Remote Control

# High Power Wavelength Division Multiplexer



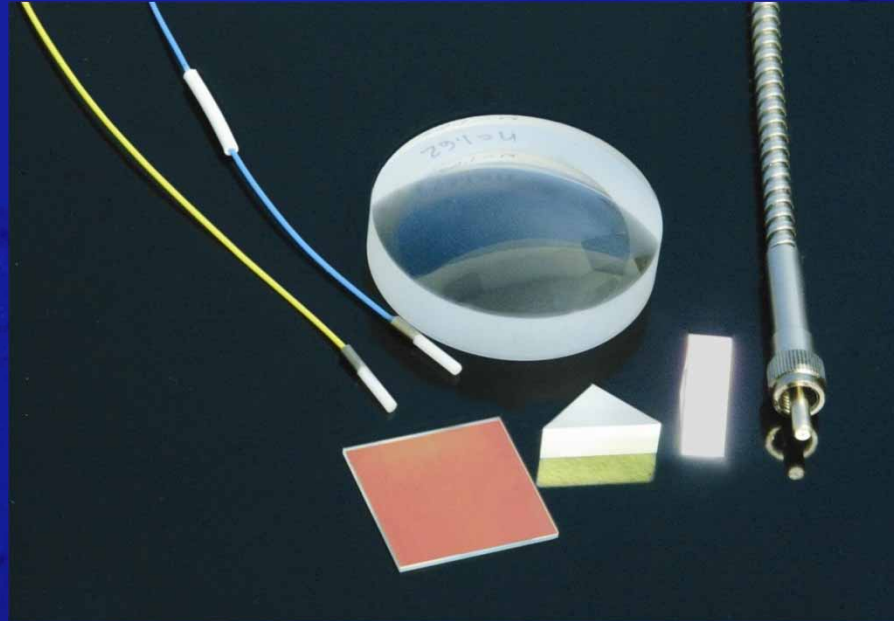
- 0.8dB Insertion Losses, 65dB Isolation
- Up To 2 Watt Power Handling
- -40dB, -50dB, -60dB Backreflection

# High Power Antireflection (AR) And Highly Reflective (HR) Coated Fiber Ends



- HR,  $R > 98\%$ , AR  $< 0.3\%$
- 350nm To 2000nm Wavelength Coatings
- SMF, MMF & PMF Versions

# High Power Optical Coatings



- High Power AR, Beamsplitter, Dichroic Coatings
- Fibers, Micro Optics, Lenses, Plates, Prisms Etc.
- Low Temperature High Abrasion Resistant Coatings

# OZ Optics

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*Please Contact Our Sales Dept:*

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Email: [sales@ozoptics.com](mailto:sales@ozoptics.com).

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