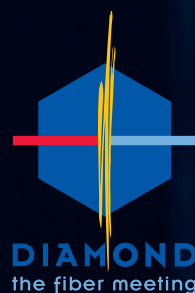


# PHOTONICS

INDUSTRIAL FIBER OPTIC INTERCONNECT SOLUTIONS

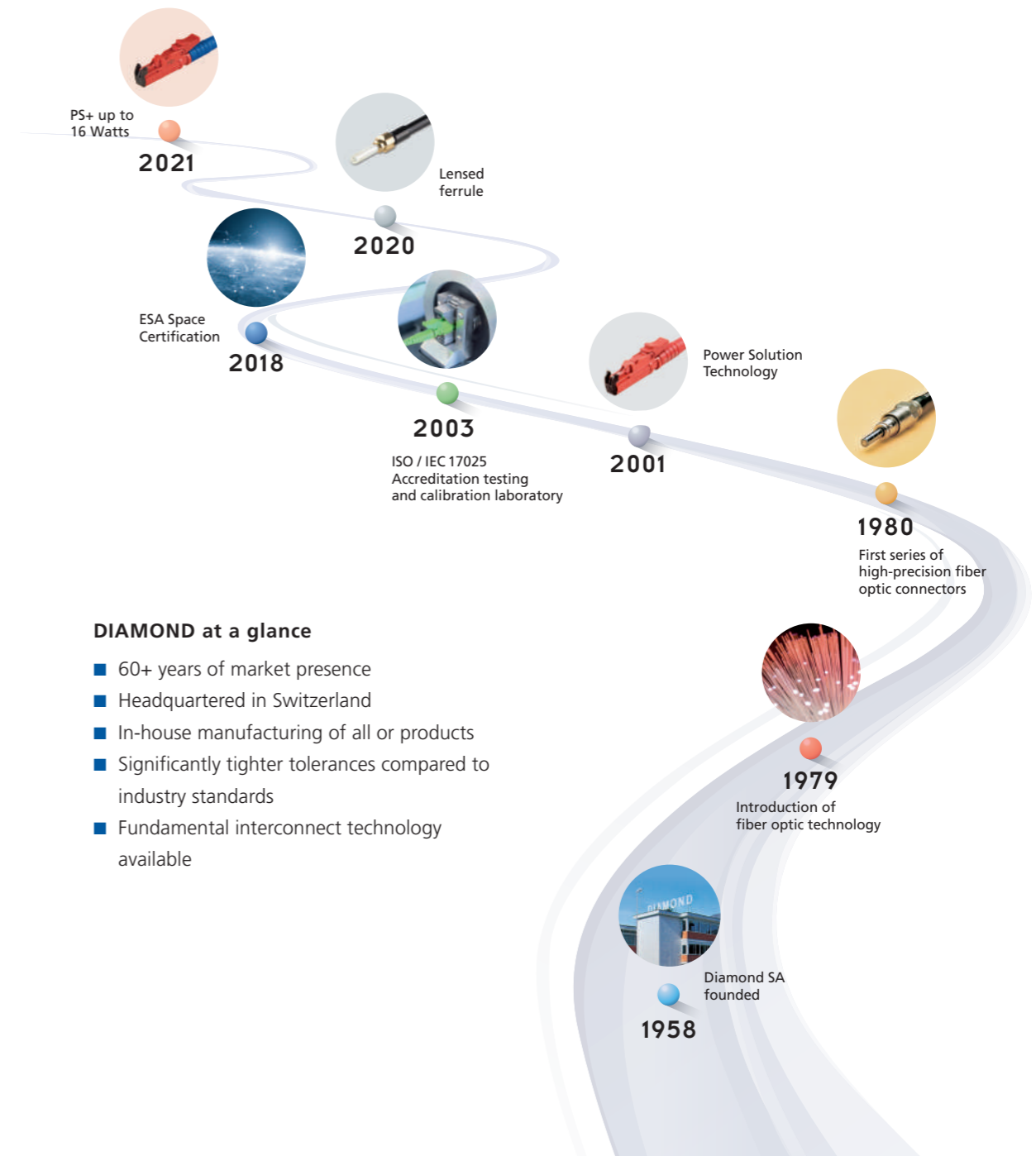


## FLEXIBLE FIBER INTERFACES

Fiber Optics are used in an array of applications because of its bandwidth capacity, environmental durability, and its ability to be deployed in numerous applications and markets. The light transmitted by fiber optics can be used as a power source, a digital signal transfer, or for analog analysis in sensing and measurement applications.

DIAMOND offers a wide range of reliable and customizable fiber optic assemblies with superior optical performance. As a vertically integrated company, Diamond has total control over the material supply chain and manufacturing process used to produce its product. This operational approach means that Diamond can guarantee that every component meets all the quality, reliability and performance standards that are expected of Diamond products worldwide.

### Striving for innovation



### DIAMOND at a glance

- 60+ years of market presence
- Headquartered in Switzerland
- In-house manufacturing of all or products
- Significantly tighter tolerances compared to industry standards
- Fundamental interconnect technology available

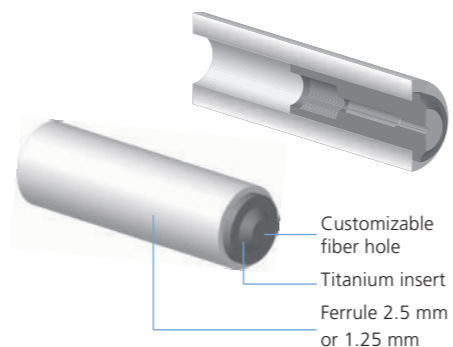
## OUR TECHNOLOGIES

### Composite Ferrule

Diamond uses a two-component connector ferrule consisting of a ceramic ferrule with a titanium insert. In combination with Diamond's Active Core Alignment process, this unique ferrule ensures that fiber cores are aligned exactly with the ferrule axis, minimizing Insertion Loss. Diamond ensures the performance of all its products through this special process.

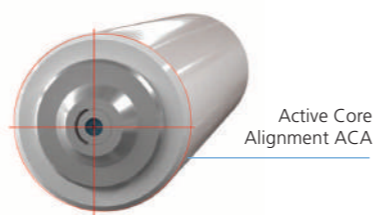
#### Advantages

- Allows plastic deformation for our Active Core Alignment process
- Superior ultra polishing
- Custom drill sizes from 80µm to 800µm
- Custom ferrules for multi-fiber technology
- Ferrule with ultra low outside diameter tolerance



### Active Core Alignment ACA

Generally, Insertion Loss is influenced by two parameters; lateral offset between the fiber cores and angular offset (between fiber core axes). Active Core Alignment (ACA) is Diamond's technology for controlling these variables. To center the fiber core with the ferrule's mechanical axis, the endface of the fiber is permanently deformed after it has been polymerized.

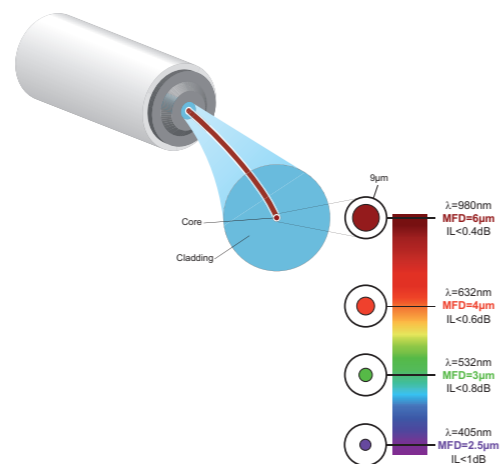


### VIS/NIR - SM Low Wavelength and small core fibers

DIAMOND offers the VIS/NIR optical interface for low wavelengths and small core fibers. By using our Active Core Alignment (ACA) technology, we can achieve unrivaled low IL performance. This technology is applicable to most connector interfaces. These assemblies offer the advantage of an extremely low lateral offset for low insertion loss. Furthermore, high return loss values can be achieved by using ultra high polish.

#### VIS/NIR Optical Interface

- ACA with ultra low eccentricity < 0.125µm
- Exit angle < 0.6°
- 0.1dB Grade ferrules with diameter tolerance < 0.2µm
- Ultra polish with 100% endface inspection

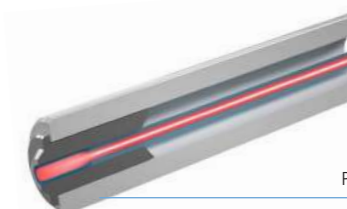


## POWER SOLUTION EXPANDED BEAM

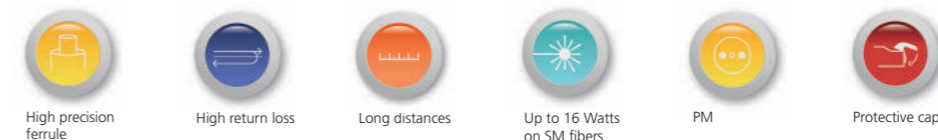
Diamond offers dedicated connectors that support higher optical power at fiber-to-fiber or air-to-fiber transitions. To reduce the risk of laser-induced damage or failures due to thermomechanical effects, different techniques are applied to increase the spot size and consequently decrease the optical power density at the interface.

### PS (Power Solution collimated)

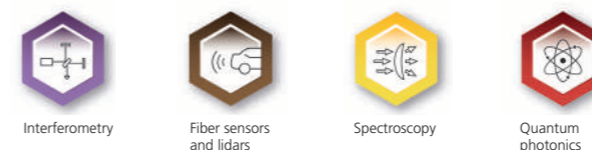
Singlemode fibers are end capped with a GRIN lens that expands and collimates the fiber's mode field at the connector's interface. When mated, PS connectors can sustain much higher optical powers while maintaining exceptionally low loss levels.



#### Features



#### Ideally suitable for



More information



### PS+

A high-power ferrule with approximately 25µm Singlemode (SM) expanded beam diameter is used in the DIAMOND PS standard connectors allowing up to 6W long life connectivity. By introducing new manufacturing techniques, the improved PS+ design offers around 36µm SM expanded Mode Field Diameter (MFD). This allows the capability of high-power transmission of up to 16W within SM optical connectors.

### Further Power Solution Techniques

Diamond's interconnect solutions rely upon different techniques to manage high optical power densities at the fiber's transition, all based upon the expansion of the optical beam. In addition to the collimated technique, other solutions such as Power Solution Injection (PSi), Power Solution free-space (PSf) as well as a Power Solution mated configuration (PSm) are available.

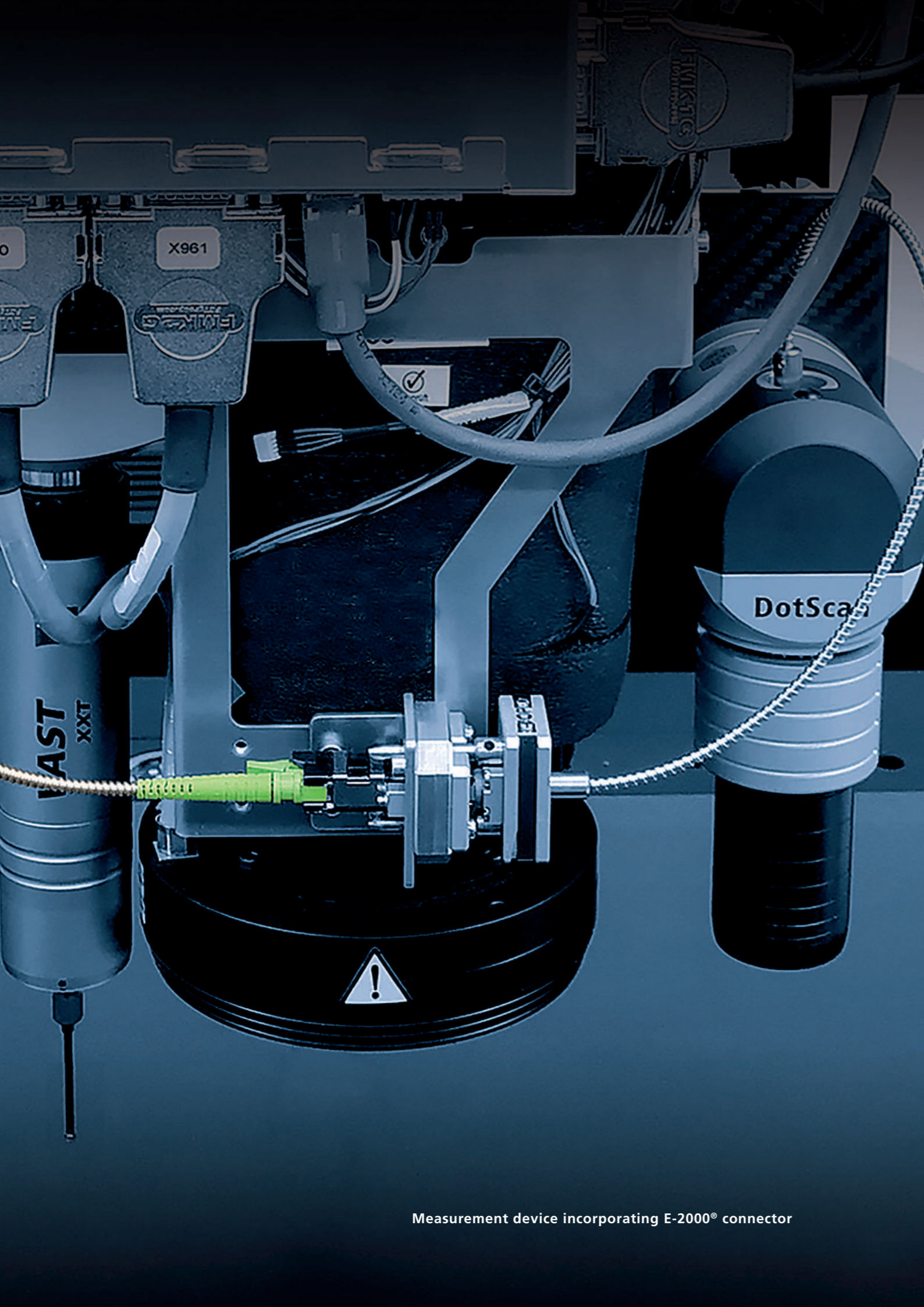
Scan the QR Code for further details about each technique.

More information



F-SMA connector





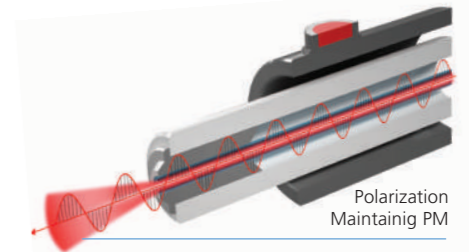
Measurement device incorporating E-2000® connector

## POLARIZATION MAINTAINING

Polarization is an important factor in industrial photonics. There is a wide range of sensors and communication systems that make use of Polarization Maintaining or Polarizing fibers. Diamond provides high-quality solutions for Polarization Maintaining (PM) and Polarizing (PZ) fiber optical interfaces.

### Polarization Maintaining PM

Diamond Polarization Maintaining connectors are renowned for their exceptional performance. The Active Core Alignment process minimizes core offset to ensure low insertion loss. Active Polarization Orientation guarantees optimal alignment of polarization axes for high extinction ratio on polarization maintaining and polarizing fibers.



Polarization Maintaining PM

#### Features



Low Insertion Loss IL



High Extinction Ratio



High Return Loss RL

More information



#### Ideally suitable for



Biomedicine



Spectroscopy



FTTA



Metrology



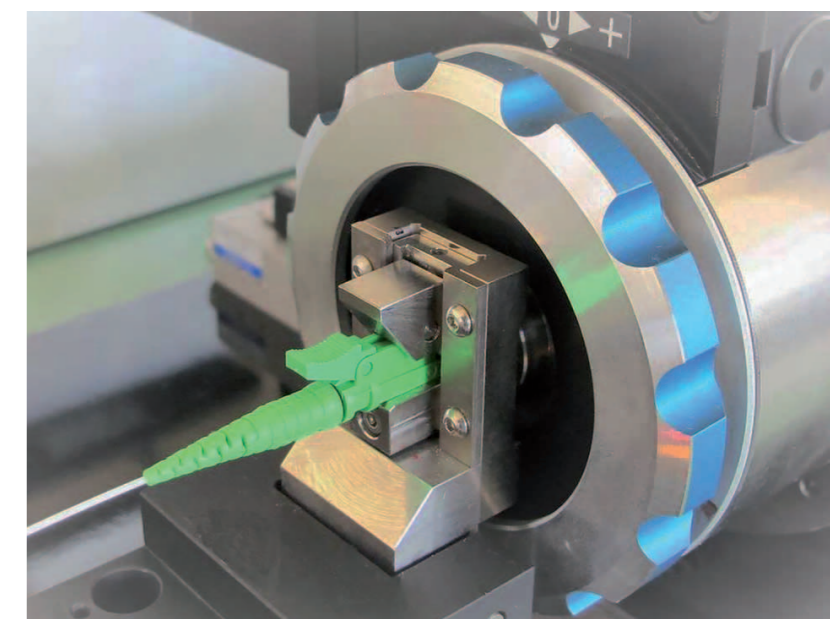
Surveillance & Security



Lithography

### Diamond's cross polarizers' measurement method

Diamond's cross polarizers' measurement method has been officially incorporated in the international standard IEC 61300-3-55:2020, as measurement method A. Furthermore, the IEC standard defines the cross polarizers' measurement method (method A) as the reference method, well suited for a higher degree of accuracy and therefore as the preferred method for the measurement of the PER as well as the keying accuracy.

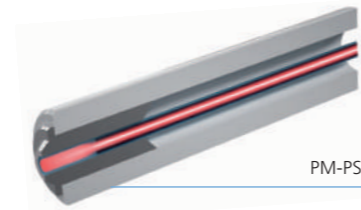


## PM-PS (Power Solution collimated for PM fibers)

The Diamond PM-PS interface addresses the reliability issues related to optical power densities close or above the damage (or safety) threshold for single mode fibers and the propagation of polarization information. Our PM contact solution can be implemented on all connector types integrated with a keying mechanism for polarization orientation purposes and is compatible with Diamond's Power Solution technology.

### PM-PS (Power Solution for polarization sensitive PM/PZ fibers)

For polarization sensitive applications combined with higher optical powers, Diamond offers a beam expanded connector based upon an integrated GRIN lens spliced to the PM or PZ fiber. The collimated beam output allows for a low loss, seamless connection to an identical PM-PS connector. The polarization state is maintained across the interface through a proper orientation of the connectors with respect to the fibers' optical axes.



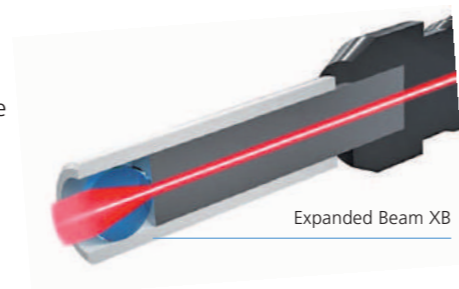
More information



## LENSED FERRULE TECHNOLOGY

### Expanded Beam XB

Unlike conventional ferrules, the lensed-ferrule operates on the expanded beam principle, ensuring reliable and low maintenance optical connections with insensitivity to dirt and debris. The use of high precision components and unique assembly techniques results in a highly repeatable, low IL ferrule, that opens new perspectives in the context of optical connections, where mating-cycles, dust insensitivity, reliability and low losses are required.



More information

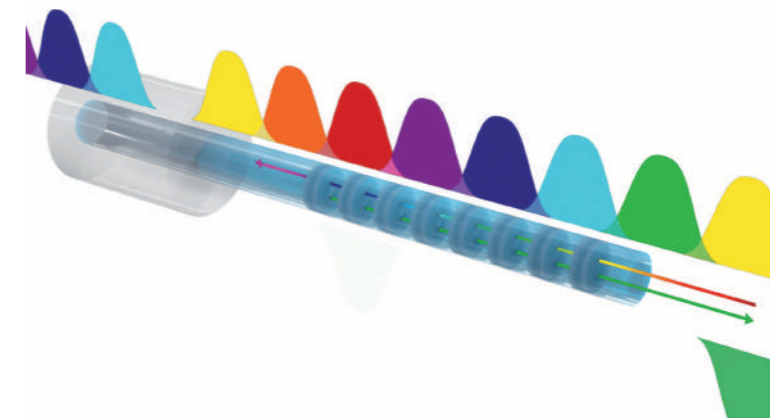


### Fiber Bragg Grating (FBG) Assemblies

One of the most commonly used optical sensors is the Fiber Bragg Grating (FBG), which reflects a wavelength of light. This depends on external influences such as temperature, pressure or expansion fluctuations on the FBG fiber.

In order for FBGs to function properly and for the optical signals to be reliable, it is essential that the FBGs are equipped with the connector types that are appropriate for the respective situation. When selecting the correct connector type, the mechanical stress and optical requirements must be taken into account.

Diamond can fall back on its extensive knowledge in the field of FBG sensor assemblies as well as in the development and manufacturing of sensor packaging, thus offering a wide range of ideal solutions for your requirements.



FBG-based monitoring system

COGI is an international patented product of Generale Costruzioni Ferroviarie S.p.A., Italy



## SERVICES

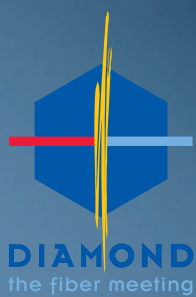
### Laboratory

The test and calibration laboratory at DIAMOND SA has been accredited by the Swiss Accreditation Service SAS since March 2002. We are accredited as testing laboratory STS 0333 for fiber optic components and as calibration laboratory SCS 0101 for fiber optic measurement instruments in accordance with the standard ISO / IEC 17025:2017. The accredited test and calibration laboratory STS 0333 / SCS 0101 performs measurements, tests and calibrations not only for DIAMOND SA, subsidiaries and DIAMOND representatives all over the world but also directly for external customers.

### ISO 6 and ISO 7 Cleanrooms

A clean room is an engineered space, which maintains a very low concentration of airborne particles. Manufacturing processes often incorporate the use of clean rooms to minimize the potential impact of foreign matter. Fiber optic assemblies that require special cleaning, drying, controlling, and packaging processes will utilize a clean room. DIAMOND is equipped with a clean room of ISO class 7 and ISO class 6 to manufacture, clean and package products that are very sensitive to contamination.





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