

# POL

## 1100 SERIES FAST POLARIZATION SCRAMBLER

SPECIFICATION SHEET

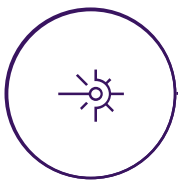
AVAILABLE IN PXI

AVAILABLE IN MATRIO

[quantifiphotonics.com](http://quantifiphotonics.com)

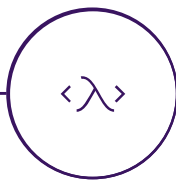
The POL-110X Series of instruments are solid-state optical polarization scramblers. The scramblers are implemented with three solid state electro-optical phase retarders oriented 45 degrees to one another which are internally driven automatically at high frequency.

Each retarder is driven at a high enough frequency in a random matter relative to each other such that it converts any input state of the polarization in the input fiber to a random number of states evenly covering all states represented on the Poincaré sphere on the output fiber.



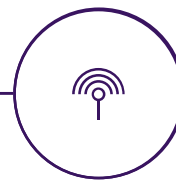
### High optical power handling

The de-polarizer is capable of handling up to 500 mW of optical power (+27 dBm).



### Broad wavelength coverage

The Pol 110X series are offered in a variety of models to cover 1064 nm, 1310 nm, and 1550 nm wavelength regions.



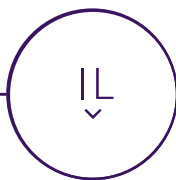
### Full remote control

The unit can be fully controlled through standard SCPI programming commands.



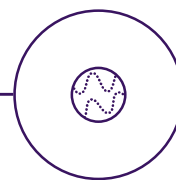
### Simple, intuitive operation with COHESIONUI™

Control the instrument from your PC or mobile device. cohesionUI offers a sleek modern interface, cross device compatibility, customizable views and remote network access.



### Low insertion loss and back reflection

The Pol 110X series offers exceptionally low insertion loss (typically <math><1\text{ dB}</math>) so you retain more signal for better measurements.



### High-speed scrambling

With 18 Mega-radian per second, the depolarizer quickly scrambles the incoming signal over the entire Poincaré Sphere quickly and evenly enabling quicker power meter averaging measurements.

## TARGET APPLICATIONS

- Optical Polarization Mux/DeMux testing
- PMD tolerance testing of transceivers
- Coherent detection testing
- Detector/Receiver/Power measurement calibration
- Polarization Dependent Loss
- Power combining
- Optical Polarization Modal Dispersion (PMD) compensation

## SCRAMBLING THE POLARIZATION

The Depolarizer operates by taking in any polarization condition and then rapidly scrambling the polarization using three solid state retarder plates.

The polarization is scrambled at a high rate (18 Mega Radians per second) such that it is the equivalent of making close to 3 million rotations in random directions around the Poincaré Sphere (which represents the state of polarization, i.e SOP).

The scrambling is fast enough that any instrument making optical measurements with a relatively slow integration time (such as optical power meters, optical spectrum analyzers etc) will effectively have so many random states of polarization over the Poincaré presented in the duration the measurement takes place that it provides an evenly distributed state of polarization with regards to the measuring instrument.

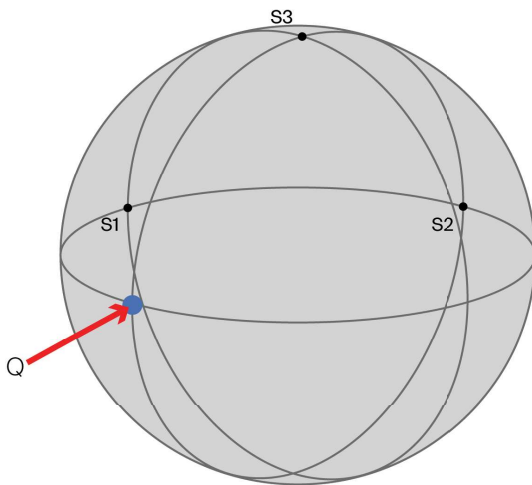


Figure 1:  
Example of a linearly polarized input

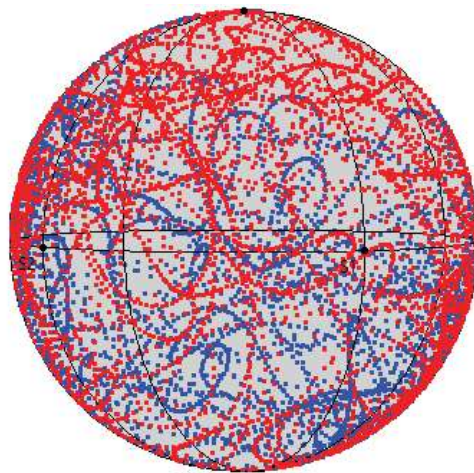


Figure 2:  
While being scrambled, the state of polarization moves around the Poincaré sphere randomly with over three million complete rotations per second.

## CHOOSE YOUR FORM FACTOR

### PXIe – MODULAR

Our expanding range of PXIe optical test solutions are used by customers in mixed-signal test and measurement systems, reducing complexity, lowering the cost of test and accelerating time to market.

- Multi vendor, open standard with over 2500 PXI modules available
- Advanced timing and synchronization capabilities across instruments
- Low latency, high performance processing and fast data throughput
- Design and build scalable, high channel count systems
- Small footprint and lower power consumption



### MATRIQ – COMPACT & PORTABLE

The MATRIQ series provides the same high-performance test capabilities of our PXIe modules in an compact benchtop design. MATRIQ instruments are simple to setup and easy to operate, making them the perfect choice for your optical lab or test bench.

- Same performance and control as our PXIe modules
- Plug and play with USB or Ethernet connectivity
- Control via the web-based GUI, COHESIONUI or SCPI commands
- Compact and portable design saves benchtop space

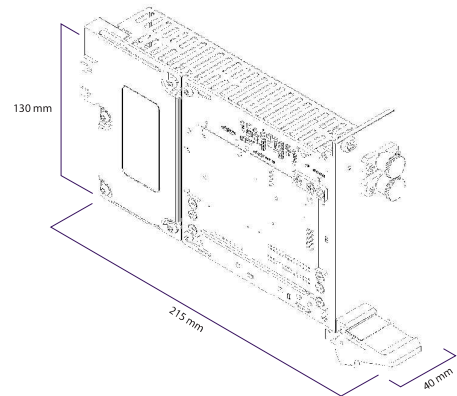


## POL TECHNICAL SPECIFICATIONS

### PXI - MODULAR



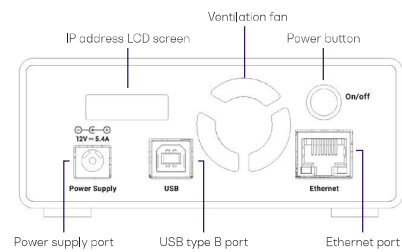
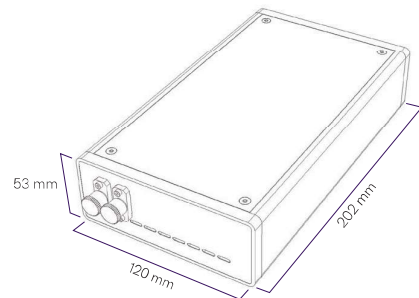
POL-1101-1-FC-PXIE



### MATRIQ - COMPACT & PORTABLE



POL-1101-1-FC-MTRQ



## POL TECHNICAL SPECIFICATIONS

General Specifications	PXI	MATRIQ
Bus connection	PXle	USB and Ethernet
Optical connectors	FC/APC, FC/PC, SC/PC, SC/APC	FC/APC, FC/PC, SC/PC, SC/APC
Slot count	2	-
Dimensions (HxWxD)	130 x 40 x 215 mm   5.1 x 1.6 x 8.5 inches	53 x 120 x 202 mm   2.1 x 4.7 x 8.0 inches
Weight	~ 1 kg   ~2.2 lbs	~ 1.1 kg   ~ 2.4 lbs
Storage temperature range	-40 °C to 70 °C   -40 °F to 158 °F	-40 °C to 70 °C   -40 °F to 158 °F
Operating temperature range	5 °C to 45 °C   41 °F to 113 °F	5 °C to 45 °C   41 °F to 113 °F

Power Specifications	PXI	MATRIQ
AC input voltage range	Please refer to the latest PXI Express Hardware Specifications published by the PXI Systems Alliance.	90 to 264 VAC
AC input current		1.3A (115Vac), 0.9A (230Vac)
AC frequency range		47 to 63 Hz
DC output voltage		12V
DC output current max		5.41A
Dimensions (LxWxH)		4.58 x 2.06 x 1.23" (116.3 x 52.4 x 31.3 mm)

Model Number	1101	1101
Number of channels	1	1
Fiber type	SMF-28	SMF-28
Operating wavelengths	1010 nm to 1110 nm	1010 nm to 1110 nm
Insertion loss <sup>2</sup>	< 1.7 dB (1.0 dB Typical)	< 1.7 dB (1.0 dB Typical)
Return loss <sup>2</sup>	> 45 dB	> 45 dB
PDL <sup>2</sup>	< 0.3 dB (0.1 dB Typical)	< 0.3 dB (0.1 dB Typical)
Degree of polarization (1 ms integration time)	< 5 % (2 % Typical)	< 5 % (2 % Typical)
Scrambling speed	18 Mrad/sec	18 Mrad/sec
Warm-up time	20 minutes	20 minutes
External trigger	Yes	Yes
Replaceable bulkheads	No	No

## POL TECHNICAL SPECIFICATIONS

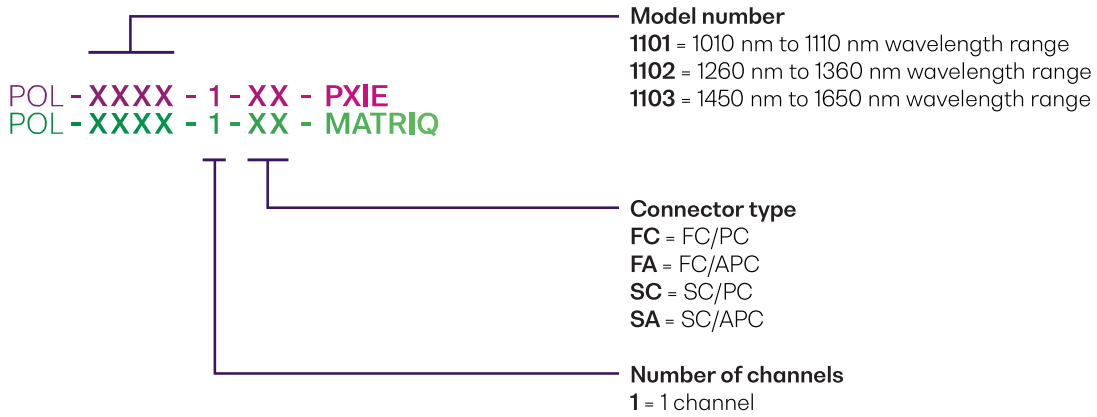
Model Number	1102	1102
Number of channels	1	1
Fiber type	SMF-28	SMF-28
Operating wavelengths	1260 nm to 1360 nm	1260 nm to 1360 nm
Insertion loss <sup>2</sup>	< 1.7 dB (1.0 dB Typical)	< 1.7 dB (1.0 dB Typical)
Return loss <sup>2</sup>	> 45 dB	> 45 dB
PDL <sup>2</sup>	< 0.3 dB (0.1 dB Typical)	< 0.3 dB (0.1 dB Typical)
Degree of polarization (1 ms integration time)	< 5 % (2 % Typical)	< 5 % (2 % Typical)
Scrambling speed	18 Mrad/sec	18 Mrad/sec
Warm-up time	20 minutes	20 minutes
External trigger	Yes	Yes
Replaceable bulkheads	No	No

Model Number	1103	1103
Number of channels	1	1
Fiber type	SMF-28	SMF-28
Operating wavelengths	1450 nm to 1650 nm	1450 nm to 1650 nm
Insertion loss <sup>2</sup>	< 1.7 dB (1.0 dB Typical)	< 1.7 dB (1.0 dB Typical)
Return loss <sup>2</sup>	> 45 dB	> 45 dB
PDL <sup>2</sup>	< 0.3 dB (0.1 dB Typical)	< 0.3 dB (0.1 dB Typical)
Degree of polarization (1 ms integration time)	< 5 % (2 % Typical)	< 5 % (2 % Typical)
Scrambling speed	18 Mrad/sec	18 Mrad/sec
Warm-up time	20 minutes	20 minutes
External trigger	Yes	Yes
Replaceable bulkheads	No	No

**Notes**

1. Specifications are valid at 23 °C ± 3 °C.
2. Excluding connectors.

## ORDERING INFORMATION



## WARRANTY INFORMATION

This product comes with a standard 1 year warranty.



## EXTENDED WARRANTIES AND CALIBRATION PLANS

With an Extended Warranty and Calibration Plan you can spend more time focused on your priorities and less time worrying about maintenance.

Over time and with regular use, all optical parts and connectors require re-calibration and maintenance to guarantee accurate and reliable performance.

Add a 3 or 5 year Extended Warranty at the time of purchase.

### Guarantee peak performance

Ensure your equipment is operating at its best for reliable and accurate results.

### Lower cost of ownership

Lock in savings and maximise your budget with a lower cost of ownership.

### Peace of mind

Spend less time worrying about maintenance and more on generating results.

## CALIBRATION PLANS FOR ADDITIONAL DISCOUNTS

Order a Calibration Plan when you purchase your Quantifi Photonics' test instruments and qualify for additional discounts.

### 10% Discount

On calibrations ordered at the time of purchase.

### 25% Discount

Add on an extended warranty and receive a 25% discount on calibrations.

With an instrument calibration performed by Quantifi Photonics technicians you receive.

- Comprehensive calibration to factory specifications.
- End-to-end inspection to ensure all instrument functions are working and connectors are clean.
- Firmware, software and documentation updates.
- Certificate of Calibration which includes detailed test results.

We recommend Quantifi Photonics optical instruments are re-calibrated every 12 months.

## How to purchase

Contact your Quantifi Photonics sales representative about our Extended Warranty or Calibration Plans or email [sales@quantifiphotonics.com](mailto:sales@quantifiphotonics.com).

Extended Warranties and Calibration Plans must be ordered at the time of purchase and are available only for Quantifi Photonics' products. The 25% calibration discount only applies to calibrations while the product is covered by the Extended Warranty period.

Our portfolio of optical and electrical test modules is rapidly expanding to meet a wide range of customer requirements and applications.

#### Tunable Laser Sources

Versatile telecom laser sources with full tunability across C or L bands. Narrow 100 kHz linewidth, up to 16.5 dBm of power, optional whisper mode to disable frequency dither.

#### Erbium-Doped Fiber Amplifier (EDFA)

High power Erbium-Doped Fiber Amplifier for signal power amplification in C and L bands with various control modes, including automatic gain control.

#### Fixed Wavelength Laser Sources

Highly customizable DFB or FP laser sources available in a wide range of wavelengths and powers. Models support SMF, MMF and PMF.

#### Variable Optical Attenuator (VOA)

Fast attenuation speed with low insertion loss and built-in power monitoring. Operates in fixed attenuation or constant output power modes. Models support SMF, MMF and PMF.

#### Optical Power Meters

Fast terminating or inline monitoring of optical signal power from -60 to +10 dBm across 750 – 1700 nm wavelengths. Model with logarithmic analog output for applications such as silicon photonics fiber alignment.

#### Optical Spectrum Analyzer (OSA)

Low cost, fast spectral measurement in a compact module with built-in analysis including SMSR, OSNR and spectral width. Targeted wavelengths for specific applications in O band, C band and L band.

#### Optical-to-Electrical Converter

High bandwidth, broadband O-to-E converter. Available in a range of configurations; choose from 1 or 2 channels, AC or DC coupling and various conversion gain and operating wavelength ranges.

#### Bit Error Rate Tester (BERT)

2 or 4-channel Pulse Pattern Generator and Error Detector at rates up to 29 Gbps for the design, characterization and production of optical transceivers and opto-electrical components.

#### Pulse Pattern Generator (PPG)

4 channel Pulse Pattern Generator from 0.3 to 30 Gbps for high-density multichannel applications. With integrated clock synthesizer and programmable de-emphasis and CTLE processor.

#### Optical Switch

Proven reliability and fast switching time. Wide variety of switch configurations: 1x4, 1x16, 16x16 and more. Models support SMF, MMF and PMF.

#### Polarization Controller & Scrambler

High-speed automated polarization control with broad wavelength coverage from 1260nm to 1650nm, low insertion loss and back reflection. Full remote control via intuitive GUI, LabVIEW or SCPI.

#### Photonic Doppler Velocimeter (PDV)

Purpose-built module for Photonic Doppler Velocimetry (PDV). A circulator, two VOAs and a passive coupler all built into one compact module.

#### Passive Component Integration

Integrate passive optical components of your choice such as WDM couplers, splitters, band-pass filters, PM beamsplitters and circulators. Models support SMF, MMF and PMF.

#### Passive Component Storage

Protect and store your own passive fiber optic components such as splitters, connector adaptor patchcords, WDM couplers, and isolators in one handy module.

PXI – TEST MODULES

MATRIQ – TEST MODULES

We provide these products as PXIe modules and compact MATRIQ benchtop instruments.

See our website for more details  
[quantifiphotonics.com/products](https://quantifiphotonics.com/products)

# Test. Measure. Solve.

Quantifi Photonics is transforming the world of photonics test and measurement. Our portfolio of optical and electrical test instruments is rapidly expanding to meet the needs of engineers and scientists around the globe. From enabling ground-breaking experiments to driving highly efficient production testing, you'll find us working with customers to solve complex problems with experience and innovation.

To find out more, get in touch with us today.

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