PSY-201

Polarization Synthesizer/Analyzer

The PSY-201 is a deterministic polarization controller designed to generate and maintain any desired state of polarization (SOP), independent of the input SOP. It integrates a polarization controller, polarimeter, and closed-loop control algorithm into a single instrument that functions as a polarization state generator, controller, stabilizer, scrambler, and analyzer. This makes it ideal for R&D and manufacturing test applications where low insertion loss, high optical power handling, and precise polarization control are required.

Users can define the output SOP directly by entering Stokes parameters or by interactively tuning the SOP to optimize a polarization-dependent metric (e.g., transmission, extinction ratio, or detector response). Once the desired SOP is achieved, the PSY-201 actively maintains that state against input polarization fluctuations, ensuring stable and repeatable measurements during automated testing. For rapid Mueller matrix-based measurements, the PSY-201 can instantly generate six predefined orthogonal SOPs. These states can be selected at the touch of a button, enabling fast switching between linear and circular polarization basis states during test sequences.

With its deterministic control, closed-loop stability, and integrated analysis capabilities, the PSY-201 provides a robust and repeatable solution for polarization identification and alignment, device characterization, and automated testing of modern optical components, including silicon photonic devices.

Low loss, high power-handling, versatile polarization control instrument

KEY FEATURES

- Up to +25 dBm operating power
- Low Insertion Loss
- 4 MHz SOP sampling rate
- 1 MHz analog bandwidth
- 45 dB input power dynamic range
- Real-time Poincaré Sphere display
- High-speed SOP generation and tracking
- High speed analog output of SOP & DOP

APPLICATIONS

- Receiver polarization sensitivity analysis
- System SOP/DOP monitoring
- PER measurement
- Polarization generation and stabilization
- Sensor system characterization
- Mueller matrix measurements

PERFORMANCE

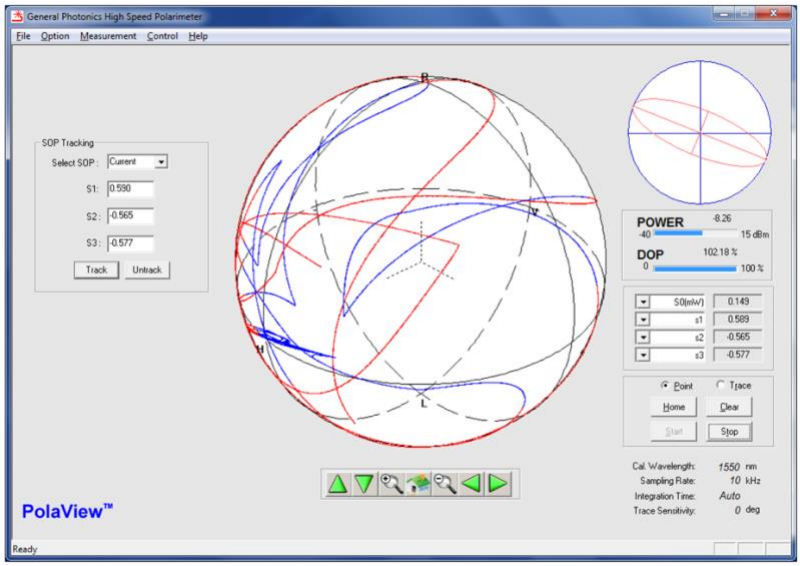
PARAMETER	SPECIFICATION			UNITS
Absolute Maximum Rating				
Optical Power Damage Threshold Standard High-Power	 300 400			mW
Power Supply	100~240, 50~60, 100			VAC, Hz, VA
Operating Temperature	0 ~ 40			℃
Storage Temperature	-20 ~ 60			℃
Relative Humidity (non-condensing)	<80			%
Optical Characteristics				
	Min.	Typical	Max.	
Operation Wavelength				
C/L band version	1480	1550	1620	nm
O band version	1280	1310	1340	nm
Sampling Rate (Max)	4,000,000 SOP			samples/s
Analog Bandwidth[1]	1,000,000			Hz
SOP Settling Time	1 (at stable input SOP)			ms
SOP Stability[2]	0.1 (with stable input SOP) 0.5 (with input SOP variation < 2 π/s) 2 (with input SOP variation < 10 π/s)			Degree[6]
SOP Measurement/Generation Uncertainty	±0.25 (after user calibration)			Degree[6]
DOP Uncertainty	±2 (using built-in calibration)[3] ±0.5 (after user calibration)[3]			%
Input Stokes Parameter Resolution	0.001			
Optical Power Uncertainty	±0.25			dB
Insertion Loss Standard High-Power	 1.6 max. at center wavelength 1.0 max. at center wavelength			dB
Return Loss	55 (APC connector) 45 (PC connector)			dB
PDL Standard High-Power	 < 0.25 < 0.20			dB
PMD	< 0.1			ps
Operating Power Range Standard High-Power	 -35 -20		 +10 +25	dBm
Communication Interfaces	High Speed USB 2.0 (30 MB/s data rate) for PolaView software, RS-232, Ethernet, GPIB			
Analog Output	0 to 5 max range, user configurable Monitor voltage for DOP, S1, S2, S3, power or dREF			V
Measurable SOP	Entire Poincaré Sphere			
Dimensions	2U, 19" half rack width 14 (L) x 8.5 (W) x 3.5 (H)			Inches
Weight	3.5			kg

NOTES

Specifications are based on the pigtail fiber SMF-28.

1. For input power > -10 dBm (Standard Version), or >5 dBm (High Power version). At lower power levels, bandwidth may change due to automatic gain control.
2. Standard version with Input Power >-25 dBm and DOP >95%; High Power version with Input Power >-10 dBm and DOP > 95%.
3. Standard version with input > -25dBm, High Power version with input > -10dBm.
4. Loss specifications are referenced without connectors.
5. Unless otherwise noted, specifications listed in table apply for standard 1480- 1620nm or 1280-1340nm operation at 23±5°C, at power levels >-25 dBm (Standard version), or at power levels > -10 dBm (High Power version)
6. On the Poincare sphere

PSY-201 GUI (PolaView)



PSY-201 Typical Performance Data

Polarization Stabilization

Figure 1. Input polarization pattern: triangle wave scramble at 1 Hz, taken over 20 sec

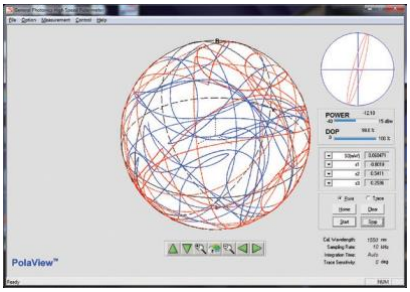
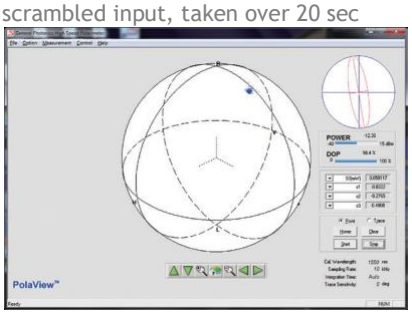


Figure 2. Output polarization stabilized by PSY- 201 against the same polarization-scrambled input, taken over 20 sec



Special polarization state/trace generation

Figure 3. Poincaré sphere pole state generation

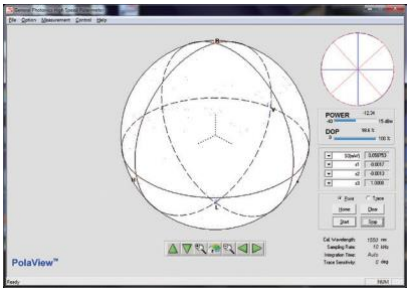
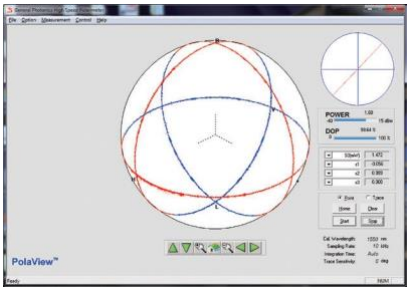


Figure 4. Trace Scans



Polarization Scrambling

Figure 5. Triangle scrambling trace, 1 Hz after 1 minute

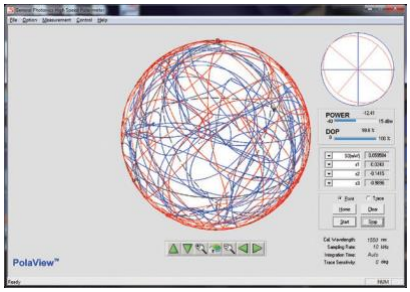
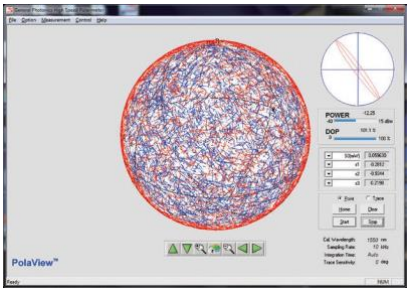


Figure 6. Discrete scrambling, 100 Hz after 1 minut



ORDERING

Catalog #	Description
PSY-201-15-FC/APC	*Polarization Synthesizer/Analyzer, 1480-1620nm, with PolaView software, FC/APC connector, standard operating power and losses*
PSY-201-13-FC/APC	*Polarization Synthesizer/Analyzer, 1280-1340nm, with PolaView software, FC/APC connector, standard operating power and losses*
PSY-201-13-FC/APC-HPL	*Polarization Synthesizer/Analyzer, 1280-1340nm, with PolaView software, FC/APC connector, high operating power of +25dBm, Low losses version*

PSY 201 REV.2.0
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