The PSY-201 is a deterministic polarization controller that can generate and maintain any state of polarization (SOP), regardless of the input SOP. It combines General Photonics’ patented polarization controller, in-line polarimeter, and control algorithm into an instrument that functions as both a polarization state generator and a polarization analyzer. The generated SOP and the corresponding Poincaré Sphere representation can be displayed on a computer screen via USB interface. The output SOP can be specified by inputting Stokes parameters using the front panel keypad or by manually tuning the SOP to reach a specific point on the Poincaré sphere or to reach an optimum value of a polarization-dependent metric. Once a desired output SOP is found, the instrument can automatically maintain this SOP against input SOP fluctuations. Another attractive feature is that the user can generate any of 6 distinct SOPs (0°, 90°, ± 45°, RHC and LHC) for Mueller matrix calculations, or select any of the 6 states at the touch of a button. Furthermore, the instrument can generate several preprogrammed SOP traces that emulate certain common polarization variations. The instrument can also function as a polarization scrambler, generating SOP scans with user-defined pattern and speed. Finally, with the internal polarization controller disabled, PolaFlex™ can function as an in-line polarimeter, displaying the instantaneous SOP and DOP of the input light beam. Features include long-term SOP monitoring, SOP markers for angle measurement, and a “SOP replay” function in sphere display mode, as well as extended triggering capability in oscilloscope mode. It puts all of the tools necessary for polarization management at your fingertips.

### Features:
- 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
- 100G system polarization characterization

### Related Products:
- Polarization Measurement System (PSGA-101)
- Multifunction Polarization Controller (MPC-203, MPC-202, MPC-201)
- Polimeter (POD-201)
- Rack Mount Kit (RCK-001)
- Components

### Tech Info:
- **What is Polarization?**
- **Combat Polarization Impairments with Dynamic Polarization Controllers**
- **Polarization Related Tests for Coherent Detection Systems**

### FAQ:
- Dynamic Polarization Controllers
- Polimeter

### Specifications:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Wavelength Range</td>
<td>1480 to 1620 nm or 1280 to 1340 nm</td>
</tr>
<tr>
<td>Sampling Rate (max.)</td>
<td>4.0M SOP samples/s</td>
</tr>
<tr>
<td>Analog Bandwidth</td>
<td>1MHz</td>
</tr>
<tr>
<td>SOP Settling Time</td>
<td>1ms at stable input SOP</td>
</tr>
<tr>
<td>SOP Stability (Input Power &gt; -25 dBm, DOP &gt; 95%)</td>
<td>0.1° with stable input SOP, 0.5° with input SOP variation &lt; 2 n/s, 2° with input SOP variation &lt; 10 n/s</td>
</tr>
<tr>
<td>SOP Measurement/Generation Uncertainty</td>
<td>±0.25° after user calibration, with input &gt; -25 dBm</td>
</tr>
<tr>
<td>DOP Uncertainty</td>
<td>±2% using built-in calibration, with input &gt; -25 dBm, ±0.5% after user calibration, with input &gt; -25 dBm</td>
</tr>
<tr>
<td>Input Stokes Parameter Resolution</td>
<td>0.001</td>
</tr>
<tr>
<td>Optical Power Uncertainty</td>
<td>±0.25 dB</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>1.6 dB max. at center wavelength</td>
</tr>
<tr>
<td>Return Loss</td>
<td>55 dB (APC connector), 45 dB (PC connector)</td>
</tr>
<tr>
<td>PDL</td>
<td>&lt; 0.25 dB</td>
</tr>
<tr>
<td>PMD</td>
<td>&lt; 0.1 ps</td>
</tr>
<tr>
<td>Operating Power Range</td>
<td>-35 dBm to +10 dBm</td>
</tr>
<tr>
<td>Optical Power Damage Threshold</td>
<td>300 mW</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0 °C to 40 °C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-20 °C to 60 °C</td>
</tr>
<tr>
<td>Front Panel Display</td>
<td>Graphic OLED</td>
</tr>
<tr>
<td>Communication Interfaces</td>
<td>High Speed USB 2.0 (30 MB/s data rate) for PolaView software, RS-232, Ethernet, GPIB</td>
</tr>
<tr>
<td>Analog Output</td>
<td>0 to 5 V max range, user configurable Monitor voltage for DOP, S1, S2, S3, power or dREF</td>
</tr>
<tr>
<td>Power Supply</td>
<td>100 – 240 VAC, 50 – 60 Hz</td>
</tr>
<tr>
<td>Software</td>
<td>PolaView™ (included)</td>
</tr>
<tr>
<td>Dimensions</td>
<td>2U, 19” half rack width 14” (L) x 8.5” (W) x 3.5” (H)</td>
</tr>
</tbody>
</table>

**Notes:**
- Loss specifications are referenced without connectors. 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.
- 1. For input power > -10 dBm. At lower power levels, bandwidth may change due to automatic gain control.
MEASUREMENT AND CHARACTERIZATION

Polarization Synthesizer/Analyzer - PolaFlex™ (PSY-201)

Application Example:
Coherent Receiver Polarization Sensitivity Test

1. Use polarization stabilizer (POS-202) to lock the polarization of one receiver input (local oscillator input).
2. Use polarization synthesizer (PSY-201) to control the polarization of the other receiver input to find the SOP that maximizes the receiver power reading.
3. Lock the PSY-201 output at that SOP to eliminate polarization fluctuations in the SM fiber. Test receiver performance.
4. Use PSY-201 to find or switch to the orthogonal SOP (minimize receiver power reading).
5. Lock PSY-201 output at that SOP to eliminate polarization fluctuations. Test receiver performance.

Sample setup for a coherent receiver performance test using a polarization stabilizer (POS-202) and a polarization synthesizer (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

- **Scrambling**
- Figure 5. Triangle scrambling trace, 1 Hz after 1 minute
- Figure 6. Discrete scrambling, 100 Hz after 1 minute

**Video:**

**Ordering Information:**

```
PSY — 201 —
Wavelength: 15=1550nm
13=1310nm
Connector Type: FC/PC, FC/APC
SC/PC, SC/APC
```