

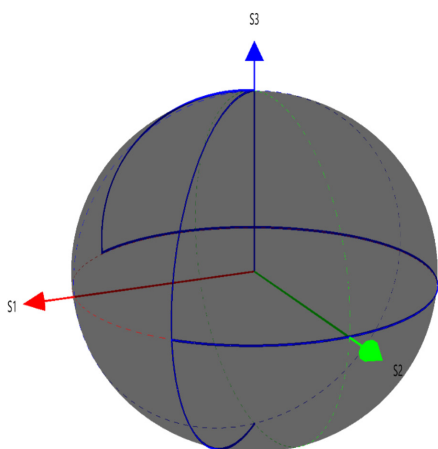


PSG 2000

High-Speed Polarization State Generator

Luna Innovations' high-speed polarization state generator (PSG 2000) enables quick generation of up to six distinctive polarization states (LCP, RCP, Linear $\pm 22.5^\circ$, Linear $\pm 67.5^\circ$) across a Poincaré sphere in less than 50 μs between two consecutive states, with high repeatability of less than 0.1 degree.

PSG 2000 uses a new self-latching PSG 4bit optical head. In addition, its predictable wavelength and temperature dependence allows for easy calibration, making it a perfect choice in swept wavelength component measurement systems. PSG 2000 comes with user interface for manually adjust and automatically sweep selected states from 6 distinctive polarization states.



Polarization Sweep Pattern Preview

**High-speed polarization state generator
for up to six distinctive polarization states.
(LCP, RCP, Linear $\pm 22.5^\circ$, Linear $\pm 67.5^\circ$)**

KEY FEATURES

- Switches between 6 polarization states: LCP, RCP, Linear $\pm 22.5^\circ$, Linear $\pm 67.5^\circ$
- Typical Switching Time 50 μs
- SOP Repeatability 0.1°
- 4-bit Control
- Continuous control
- USB 2.0, Ethernet 100BASE-TX
- SCIP command, C/C++ API, PC GUI
- Trigger in/out

APPLICATIONS

- Polarization OTDR
- Polarization Rotation
- Mueller Matrix-based Polarization Analysis
- Swept-Frequency Measurement
- Material Birefringence
- Optical Imaging

Distribution in the UK & Ireland



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SPECIFICATIONS

| PARAMETER | SPECIFICATION | | | UNITS |
|---|---------------|---------|------|-----------------|
| Absolute Maximum Rating | | | | |
| Optical input power ¹ | 300 | | | mW |
| Operating Temperature | 0 ~ 50 | | | °C |
| Storage Temperature | - 20 ~ 60 | | | °C |
| Optical Characteristics | | | | |
| Operation Wavelength ¹ | Min | Typical | Max | |
| C-band Version | 1480 | 1550 | 1620 | nm |
| O-band Version | 1260 | 1310 | 1340 | nm |
| Insertion Loss ² | | | | |
| C-band Version | | | | 1.0 dB |
| O-band Version | | | | 1.2 dB |
| State Dependent Loss (ΔIL over all SOPs at fixed wavelength) | | | | 0.1 dB |
| Wavelength Dependent Loss (ΔIL over all wavelength at fixed SOP) | | | | 0.3 dB |
| Return Loss | | | | -55 dB |
| Number of Distinct Polarization States | 6 | | | |
| SOP Relative Angle Accuracy (Deviation from 90° of angle between output SOPs on Poincaré Sphere at λ _c and 23°C with selected 6 distinct polarization states) ^{1,3} | 90 ± 2 | | | 90 ± 5 degrees |
| SOP Relative Angle Accuracy (Deviation from 90° of angle between output SOPs on Poincaré Sphere with selected 6 distinct polarization states) ^{3,4} | 90 ± 5 | | | 90 ± 10 degrees |
| Number SOP Repeatability (on Poincaré Sphere) ³ | -0.1 | | | 0.1 degrees |
| Rotation Angle Wavelength Dependence ⁵ | | | | |
| 1550 nm | -0.068 | | | degrees/nm |
| 1310 nm | -0.091 | | | degrees/nm |
| Rotation Angle Temperature Dependence ⁵ | | | | |
| 1550 nm | -0.084 | | | degrees/°C |
| 1310 nm | -0.11 | | | degrees/°C |
| SOP Switching Time | 40 | 45 | 50 | μs |
| SOP Dwell Time | 20 | 50 | | |

NOTES

Values are referenced without connectors.

- Center wavelength λ_c = 1550 nm or 1310 nm. For 1550 nm version, calibrated wavelength range 1500-1580 nm and operating wavelength range 1480-1620 nm standard. For 1310 nm version, calibrated range = operating wavelength range (1260-1340 nm). Contact Luna Innovations regarding other wavelength options.

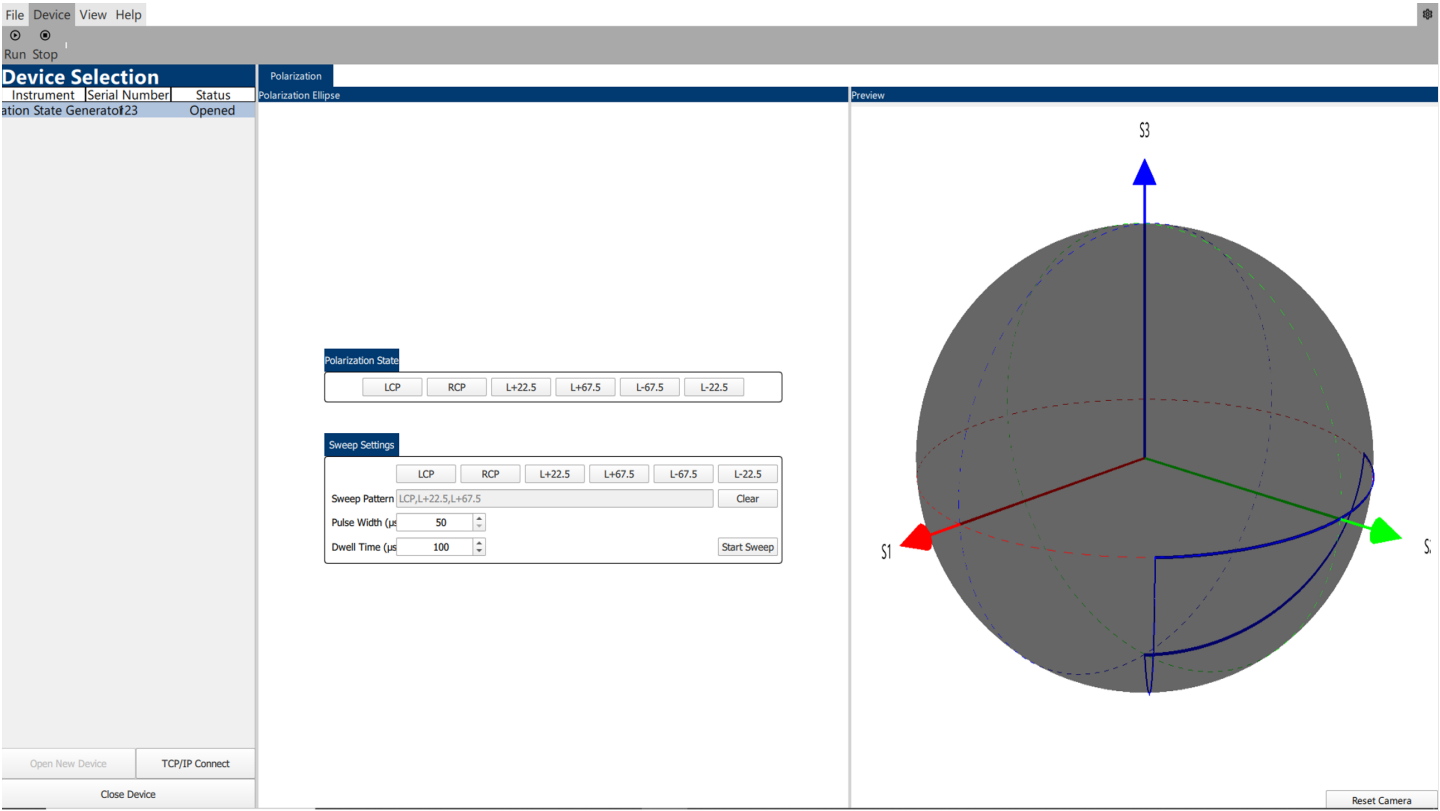
The switch rotation angles, and therefore the output SOPs, are closest to ideal values at center wavelength and room temperature. Calibration parameters are provided for users to calculate the actual output SOPs at different temperatures and wavelengths. Measurements taken over the calibrated wavelength range are used to determine the calibration parameters for each PSG.

- With input polarization aligned to polarizer transmission axis.
- Relative angles on the Poincaré sphere are twice the electrical field rotation angles in real space.
- Over all wavelengths and temperatures in the operational ranges.
- Wavelength and temperature dependence of the relative angle between adjacent linear SOPs, in real space.

A negative sign denotes that the angle decreases with increasing wavelength or temperature. Wavelength dependence tested at room temperature.

Temperature dependence tested at λ_c .

PSG 2000 GUI



PSG 2000 GUI Interface Software

ORDERING

| Catalog # | Description | Includes |
|------------------------|--|---|
| PSG 2000 - 15 - FC/APC | PSG 2000 High-speed polarization generator, 1480 nm to 1620 nm | PSG 2000 main frame for C and L band. Power cable, USB 2.0 A to B cable, USB drive for GUI and documents. |
| PSG 2000 - 13 - FC/APC | PSG 2000 High-speed polarization generator, 1260 nm to 1340 nm | PSG 2000 main frame for O band. Power cable, USB 2.0 A to B cable, USB drive for GUI and documents. |

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**Characterisation,
Measurement &
Analysis**

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