

# Polarimeters



Meadowlark Optics has a longstanding reputation for precision polarization control and metrology. Our line of user-friendly Polarimeters provides this same high accuracy and reliability in an easy to use instrument, suitable for manufacturing and laboratory applications.

These Polarimeters are compact, state-of-the-art systems with convenient computer control that accurately measures Stokes Parameters 10 times per second that quantify the State of Polarization (SOP) and then graphically displays this state on the Poincaré Sphere, Polarization Ellipse, or running chart. It contains no spinning waveplates, motors, or other moving parts to wear or cause vibrations. Patented, proprietary algorithms provide high accuracy and calibration versatility. Two models offer calibrated polarization measurement over the wavelength ranges 450 nm to 1100 nm and 900 nm to 1700 nm. Meadowlark Optics Polarimeters are computer-controlled with USB interface for increased measurement rate and convenience.

## Applications:

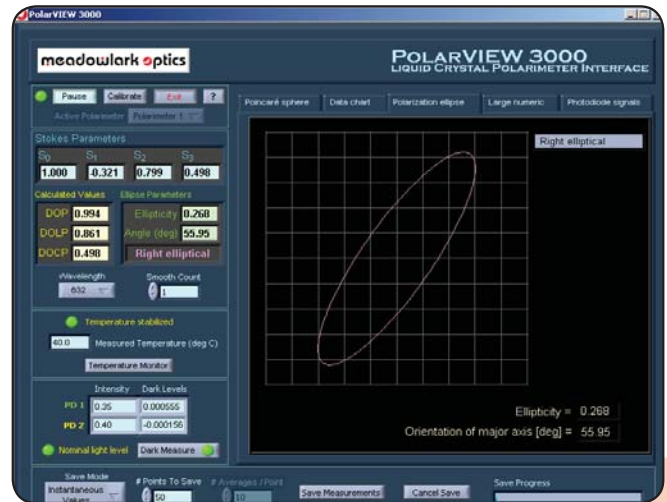
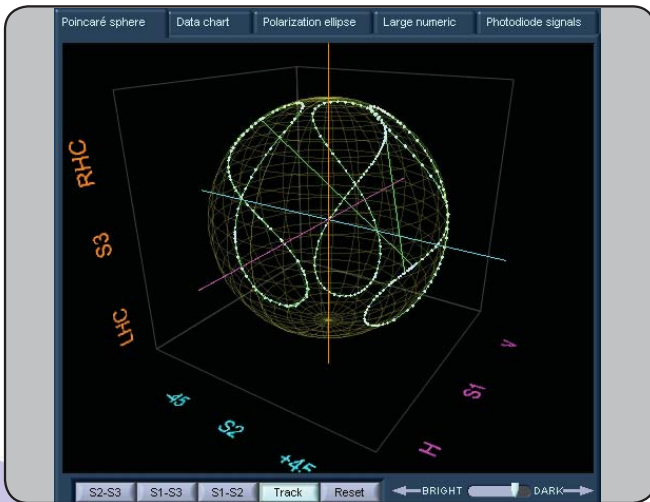
- Ellipsometry
- Test and Measurement
- Materials Characterization
- Spectroscopic Applications
- Telecom Device Manufacturing
- Pharmaceutical Development and QC
- Stokes Vector Analysis

## PolarView 3000 User Interface Software Features:

- Data Averaging
- Stokes Parameters
- Polarization Ellipse
- Degree of Polarization
- Continuous Save To File
- Continuous Chart display Option
- Poincaré Sphere with 2D Projections
- Continuous Tracking On Poincaré Sphere

## Polarimeter Package includes:

- Temperature Controlled LC Polarimeter Optical Head
- D3000 Digital Electronic Controller
- PolarView 3000 software installation CD
- User Manual
- USB and optics head cables
- Power supply and Power cable
- Calibration at up to three wavelengths included (Storage in memory of up to 12 wavelengths possible)
- LabView™ Virtual Instrument Library for Polarimeter
- One year of software support and upgrades
- One year warranty for defects in materials and workmanship



# Polarimeters

## Key Benefits

- Compact
- No moving parts
- Stokes Vector Accuracy better than 1%
- Polarization state tracking
- Software Instrument Library
- Fiber and free space versions
- User-friendly graphical interface
- Visible and near infrared versions

## ORDERING INFORMATION

Wavelength Range (nm)	Version	Part Number
450-1100	Visible	PMI - VIS
900-1700	Near Infrared	PMI - NIR

### Optional Accessories:

- Eigenstate Generator Set\*
- Fiber optic cable adapter
  - Visible
  - Near Infrared
- Angle-polished fiber collimator adapter
- Calibration at additional wavelengths

\* The Eigenstate Generator Set enables precise recalibration of your Polarimeter.

See page 74 for additional information.

## SPECIFICATIONS

<b>Wavelength Ranges (nm)</b>	
Visible	450-1100
Near Infrared	900-1700
<b>Max Absolute Degree of Polarization Error</b>	≤ 1%
<b>Wavelength Range for Calibration Accuracy</b>	± 3 nm
<b>Measurement Frequency</b>	10 Hz
<b>Resolution</b>	0.001 of a Stokes Parameter
<b>Maximum Operating Temperature</b>	40° C
<b>Optical Head Dimensions</b>	2.83 x 1.75 x 1.75 in.
<b>Minimum Optical Power to maintain accuracy</b>	10 μW sensitivity can be increased to 1 μW by special request
<b>Power Requirements</b>	100 – 240 V ac 47 – 63 Hz 500 mA
<b>Input Aperture</b>	2 mm

These specifications describe performance at 23 ± 3° C ambient temperature.

### Minimum System Requirements:

- PC with Pentium II class processor
- Windows™ 98/ME/2000/XP/Vista
- CD ROM drive
- 20 MB hard drive space
- 32 MB RAM
- USB Port
- Use of LabVIEW™ Instrument Library requires LabVIEW version 6.1 or newer full development system.

Custom versions are available.

Two and three year extended warranty options are available, please contact your Meadowlark Optics Sales Engineer.

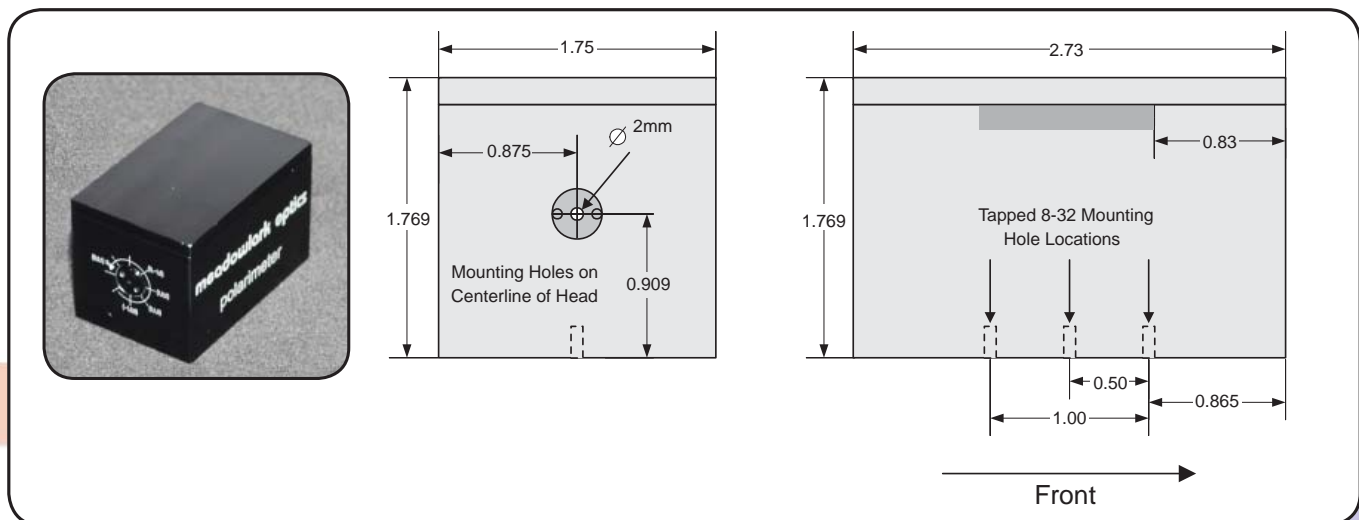
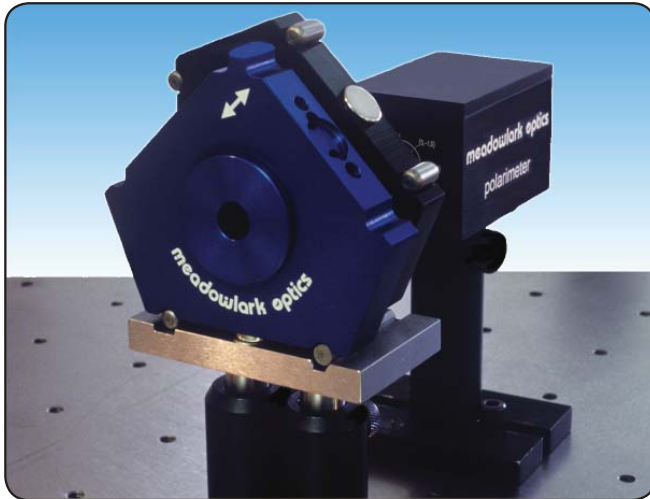


Fig. 8-1 Polarimeter Mechanical Dimensions

# Eigenstate Generator Set



### Applications:

- Ellipsometry
- Polarization Control
- Polarization Analysis
- Calibration Accessory for PMI Series Polarimeters

Meadowlark Optics Eigenstate Generator Set is a tool which produces six polarization eigenstates: linear polarized light at angles of 0, 90, +45, -45 degrees as well as circular right handed and circular left-handed polarized light.

These states are created by using a precision dichroic linear polarizer in a black housing and a precision quarter waveplate in a blue housing. The housings are CNC machined so that the accuracy of the angles is better than 1 arc minute. Pins on the housings mate to a v-groove and a flat groove in a quasi-kinematic fashion, while magnets provide holding force. This scheme facilitates precise, simple and fast indexing of the polarization eigenstates. Large arrows on the housing indicate the transmission axis of the polarizer and the fast axis of the waveplates for ease of use. Available for wavelength ranges from 450-1700 nm.

Eigenstate Retarders are additional retarders that can be purchased at the same time as your Eigenstate Generator set and polarimeter. Wavelengths available from 450-1700 nm.

Calibration Sequence	Stokes Vector	SOP Description	Polarizer Orientation	Waveplate Orientation
Step 1	(1,1,0,0)	Horizontal	$\longleftrightarrow$	Removed
Step 2	(1,-1,0,0)	Vertical	$\updownarrow$	Removed
Step 3	(1,0,1,0)	+45°	$\swarrow$	Removed
Step 4	(1,0,-1,0)	-45°	$\searrow$	Removed
Step 5	(1,0,0,1)	Right Circular	$\longleftrightarrow$	$\swarrow$
Step 6	(1,0,0,-1)	Left Circular	$\updownarrow$	$\searrow$

Fig.8-2 Polarimeter calibration is greatly simplified by the Eigenstate Generator Set sequence outlined above

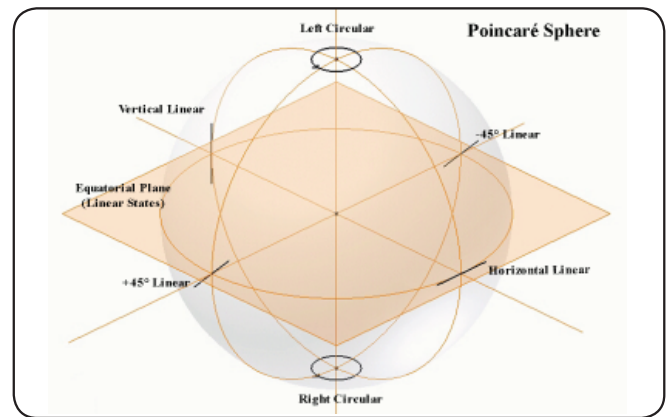


Fig. 8-3 Poincaré Sphere showing six polarization eigenstates

ORDERING INFORMATION	
Item	Part Number
Eigenstate Generator Set	EGS- $\lambda$
Eigenstate Retarders	EGR- $\lambda$

Please specify your operating wavelength  $\lambda$  in nm when ordering.

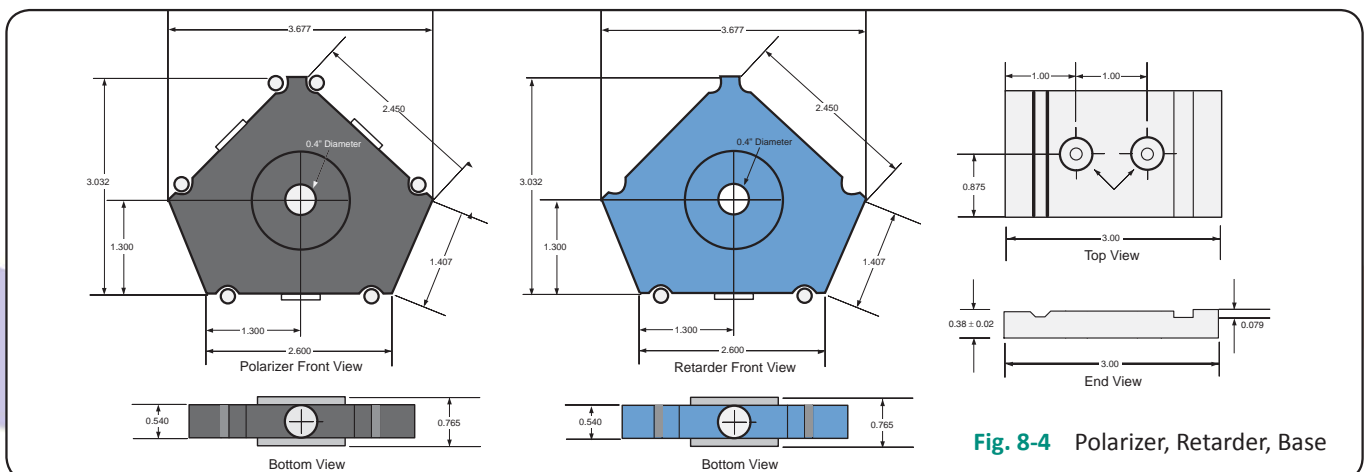


Fig. 8-4 Polarizer, Retarder, Base