

KEYSIGHT TECHNOLOGIES (AGILENT HP)

8169A

The Keysight (Agilent) 8169A is a high-performance lightwave polarization controller designed for precise state of polarization (SOP) synthesis and control. Utilizing a fixed linear polarizer followed by independently motorized quarter-wave and half-wave plates, it enables accurate and repeatable polarization settings across the standard telecommunications bands. It is widely used for polarization-dependent loss (PDL) and polarization-mode dispersion (PMD) characterization in fiber-optic communications testing.

SPECIFICATIONS

General

Interfaces	GPIB (HP-IB)
Display	Liquid Crystal Display (LCD)
Warm-up Time	20 minutes

Physical

Power Supply	100 / 115 / 230 / 240 V AC (+10% / -15%), 48 to 66 Hz, 45 VA max
Operating Temperature	0 to 55 °C °C
Dimensions (W×H×D)	213 mm × 89 mm × 345 mm mm
Weight	5.3 kg kg

Optical Specifications

Operating Wavelength Range	1475 nm to 1575 nm
Optional Wavelength Range (Option 021)	1275 nm to 1375 nm
Insertion Loss	< 1.2 dB (typically < 0.8 dB) including HMS-10 connectors
Insertion Loss Variation vs. Polarization State	< ±0.03 dB
Maximum Input Optical Power	+20 dBm (100 mW)
Return Loss	> 40 dB (typically > 48 dB with HMS-10/HP connectors)
Polarization Extinction Ratio	> 40 dB (after internal polarizer)
Fiber Type	9/125 μm Single-mode

Polarization Control & Synthesis

Polarization Control Elements	Fixed linear polarizer, motorized quarter-wave plate, motorized half-wave plate
Quarter-Wave Plate Rotation Range	0.0° to 360.0°
Half-Wave Plate Rotation Range	0.0° to 360.0°
Programming Angular Resolution	0.01°

Optical & Electrical Interfaces

Optical Input Interface	Flexible HMS-10 connector adapter system (FC/PC, SC, ST etc. compatible with options)
Optical Output Interface	Flexible HMS-10 connector adapter system
Trigger Input Level	TTL compatible (BNC connector)
Trigger Output Level	TTL compatible (BNC connector)

System Control & Software

Remote Control Interface	GPIO (IEEE-488.1 and IEEE-488.2)
Command Set	SCPI (Standard Commands for Programmable Instruments)

Environmental & Reliability

Storage Temperature Range	-40 °C to +70 °C
Operating Humidity Limits	Up to 95% R.H. non-condensing (0 °C to 40 °C)

Physical Characteristics

Form Factor	Standard HP System II 2U high cabinet (half width)
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Power Requirements

AC Input Voltage	100 V / 115 V / 230 V / 240 V AC (+10% / -15%)
AC Input Frequency	48 Hz to 66 Hz
Power Consumption	45 VA max

Options

Option 020	Straight contact optical connector interface
Option 022	Angled contact optical connector interface

Performance

Angular Repeatability	< $\pm 0.02^\circ$
Angular Accuracy	< $\pm 0.1^\circ$
Sequence Capacity	Up to 500 steps
Wavelength Setting Resolution	0.1 nm

Inputs & Outputs

Trigger Connectors	BNC (female)
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Connectivity

GPIO Capabilities	SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0
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TECHNOLOGY

Motorized Waveplates

APPLICATIONS

Polarization Synthesis and Control

