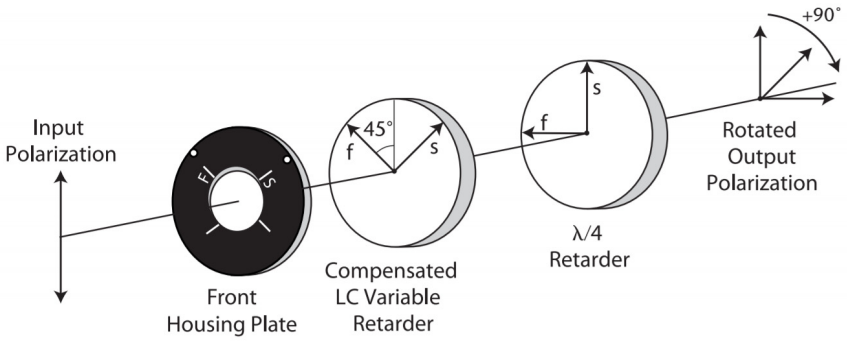
Liquid Crystal Polarization Rotators

Our Liquid Crystal Polarization Rotator (LPR) continuously rotates the polarization orientation of a monochromatic, linearly polarized input beam. Our LPR consists of a compensated Liquid Crystal Variable Retarder combined with a zero-order polymer quarter-wave retarder. The fast axis of the liquid crystal variable retarder is oriented at 45° to the slow axis of the quarter-wave retarder and the linearly polarized input must be parallel to the quarter-wave retarder slow axis. Polarization rotation is achieved by electrically controlling the retardance of the Liquid Crystal Variable Retarder, eliminating any mechanical motion.

A quarter-wave retarder converts elliptical polarization formed by the Liquid Crystal Variable Retarder to linear polarization. The rotation angle is equal to one-half the retardance change from the Liquid Crystal Variable Retarder. Response time of the LPR depends upon the desired amount of rotation. Small rotations have a longer response time because of a smaller change in the electric field strength.

Polarization purity is defined as the ratio of the rotated linear component to the orthogonal component and, on average, polarization purity (or extinction ratio) is better than 150:1. We provide test data including the required voltages corresponding to polarization orientations, in 10° increments, from approximately -40° to approximately 140° rotation. These measurements are taken at ambient temperature for your specified wavelength.

Standard Liquid Crystal Polarization Rotators are supplied without an input polarizer. Input polarization direction must be precisely aligned for optimum performance.



Operation of a Liquid Crystal Polarization Rotator showing complete rotation of a linearly polarized input beam



Key Features

- High power capability
- High polarization purity
- Computer control capability
- 180 degree polarization rotation
- Continuous rotation of linearly polarized light

Liquid Crystal Suite

Variable Retarders
Liquid Crystal Variable Retarder
UV Variable Retarder
MWIR Variable Retarder
OEM LCVR

Rotators
Achromatic High Speed Rotator
Binary Rotator
Polarization Rotator

Shutters / Attenuators
Achromatic High Speed Shutter
High Contrast Shutter
Variable Attenuator

Controllers
Analog Controller
FLC Controller
LC Digital Interface Controller
Temperature Controller
Two Channel High Voltage Controller

SPECIFICATIONS	
Retarder Material	Nematic liquid crystal with Birefringent polymer
Substrate Material	Optical quality synthetic fused silica
Wavelength	450 – 1800 nm (please specify)
Polarization Rotation	180˚ or more
Polarization Purity	150:1 average
Transmittance	> 92% with polarized input
Transmitted Wavefront Distortion (at 632.8 nm)	≤ λ/4
Surface Quality	40 – 20 scratch-dig
Beam Deviation	≤ 2 arc min
Reflectance (per surface)	≤ 0.5% at normal incidence
Diameter Tolerance	±0.005 in.
Temperature Range	0˚C to 50˚C
Recommended Safe Operating Limit	t 500 W/cm2 , CW 300 mJ/cm2 , 10 ns, visible

ORDERING INFORMATION

Diameter in. (mm)	*Clear Aperture in. (mm)*	*Thickness In. (mm)*	*Part Number*
1.00 (25.4 mm)	0.37 (9.4 mm)	1.23 (31.25 mm)	LPR – 100 – λ
2.00 (50.8 mm)	0.70 (17.8 mm)	0.75 (19.05 mm)	LPR – 200 – λ
3.00 (76.2 mm)	1.60 (40.64 mm)	1.00 (25.4 mm)	LPR – 300 – λ

Please specify operating wavelength λ in nanometers when placing your order.
Custom sizes are available. Please contact our Sales Department for a custom quote.

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