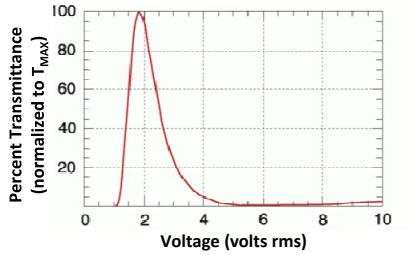
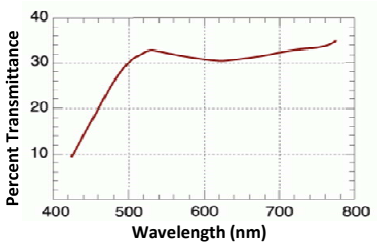
High Contrast Optical Shutter

This liquid crystal shutter is a vibration-free alternative to mechanical shutter that is especially convenient for use in polarized light beams. The liquid crystal switches between a state that rotates the input polarization by 90° with no voltage applied and a state that makes no change in the input polarization with 8 to 10 volts applied. The applied voltage is 2kHz AC as supplied by our D5020 or B1010 liquid crystal drivers. The liquid crystal configuration is twisted nematic. The shutter is supplied with integral dichroic visible polarizers that function over the wavelength range of 450 nm to 700 nm to provide an average contrast ratio of better than 1,000:1 over this wavelength range. Shutters with larger aperture sizes and with wavelength coverage to 2.1 microns are available on a custom basis. Please call with your special requirements.

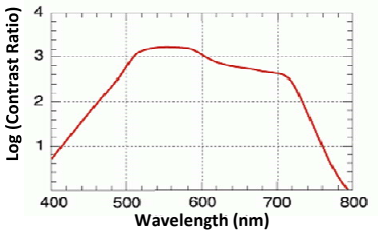
Normalized transmittance of Liquid Crystal Variable Attenuator with crossed linear polarizers at a single wavelength



Unpolarized Transmittance as a function of wavelength for LC Variable Attenuator, optimized for 550 nm, with polarizers and unpolarized input



Typical Contrast Ratio of a Liquid Crystal Variable Attenuator optimized at 550 nm



Key Features

- High contrast ratio
- Computer control capabilities
- No mechanical motion
- No vibration

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

Liquid Crystal Configuration	Twisted nematic
Substrate Material	Optical quality synthetic fused silica
Polarizer Material	Dichroic polymer
Wavelength Range	450 – 700 nm
Contrast Ratio (average)	1,000:1
Angular Field of View	25˚ incidence angle with some reduction above 10˚
Switching Time (10% to 90%) at room temperature	
Closed to Open: Open to Closed:	5 milliseconds 0.4 milliseconds
Transmitted Wavefront Distortion (at 632.8 nm)	≤ λ/2
Surface Quality	60 – 40 scratch-dig
Reflectance (per surface)	≤ 0.5% at normal incidence
Beam Deviation	≤ 5 arc min
Recommended Safe Operating Limit	1 W/cm^2, CW
Glass Thickness	0.48 – 0.52 in.
Polarization Direction	Vertical on input face, horizontal on output face
Storage Temperature	-20˚C to + 80˚C
Operating Temperature	0˚C to + 50˚C

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 (31.24 mm)	LCS – 100 – λ
2.00 (50.8 mm)	0.70 (17.8 mm)	0.75 (19.05 mm)	LCS – 200 – λ
3.00 (76.2 mm)	1.60 (40.64 mm)	1.00 (25.4 mm)	LCS – 300 – λ

Please specify operating wavelength λ in nanometers when placing your order.