Swift Optical Shutters

This liquid crystal shutter is a vibration-free alternative to mechanical shutters for use in high-speed shutter applications. It uses a Swift LC cell between crossed polarizers to provide sub-millisecond switching for both opening and closing. Switching time is 125 microseconds to open and 125 microseconds to close. The switching times are less than 50 microseconds if the shutter is heated to 40° C. The D3060HV controller provides this temperature control capability. These shutters show some haziness in the liquid crystal layer in the blue and green wavelengths. The light loss from this haze is about 1% at 700 nm but increases monotonically to about 10% loss at 450 nm. Scatter at wavelengths above 700 nm is negligible. 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 200:1. 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.

**Key Benefits**
- No mechanical motion
- Computer control capability
- Noiseless
- High speed

**SPECIFICATIONS**

- **Retarder Material**: Polymer stabilized nematic liquid crystals
- **Substrate Material**: Optical quality synthetic fused silica
- **Polarizer Material**: Dichroic Polymer
- **Wavelength Range**: 450–700 nm
- **Contrast Ratio (average)**: 200:1
- **Angular Field of View**: ± 5° incidence angle
- **Switching Time (10% to 90%) at room temperature**
  - Closed to open: 125 μs
  - Open to closed: 125 μs
- **Switching Time (10% to 90%) at 40° C**: 50 μs
- **Transmitted Wavefront Distortion**: λ/2
- **Surface Quality**: 60–40 scratch and dig
- **Reflectance (per surface)**: ≤ 0.5% at normal incidence
- **Beam Deviation**: ≤ 5 arc min
- **Recommended Safe Operating Limit**: 1 W/cm², CW
- **Glass Thickness**: 0.48 – 0.52 inches
- **Polarization Direction**: Vertical on input face, horizontal on output face
- **Storage temperature**: -20° C to +70° C
- **Operating temperature**: -10° C to +60° C

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>Diameter, ( D ) (in.)</th>
<th>Clear Aperture, ( CA ) (in.)</th>
<th>Thickness, ( t ) (in.)</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00</td>
<td>0.70</td>
<td>0.75</td>
<td>SCS - 200</td>
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</tbody>
</table>

Polarized transmission of the Swift Optical Shutter in the open state

Swift LC Response Time Plot

Ordering Information

- Diameter, \( D \) (in.): 2.00
- Clear Aperture, \( CA \) (in.): 0.70
- Thickness, \( t \) (in.): 0.75
- Part Number: SCS - 200