Deformable mirrors

Active elements for adaptive optics systems

Typical Specification

- Substrate: quartz, glass
- Clear Aperture (diameter), mm: 30-60
- Stroke, μ: 15-40
- Number of control electrodes: 13-24
- Control voltage (max), V: ±300
- Resonance frequency, Hz: >2000
- Surface quality (scratch-dig): 60-40
- Hysteresis: <15 %
- Operating temperature range °C: +10 +40
- Storage temperature range °C: -30 / +70
- Weight (max), Kg: 0.15
- Size, mm: Φ55x55

Optical Damage threshold:

- in CW operation (up to), kW/cm²: 0.1
- in pulsed operation (up to), J/cm²: 4

Reflecting coatings: protected Al, Ag, Cu, multilayer dielectric coating of reflectivity P>99%

Applications

- Medical imaging
- Laser beam control and shaping
- Optical communications
- Astronomy

Features

- Large stroke
- High surface quality
- Excellent mechanical stability
- Fast response
- Shock and vibration resistant
- Inexpensive

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www.dmphotronics.com
The bimorph (unimorph) mirror itself is constructed of two (one) thin plates of piezo electric material coupled with the substrate plate. The electrode pattern is deposited on the piezo-plates, which are then fused together to form a sandwich of electrodes. The ground plane is the common middle surface of the bimorph or the back surface of the substrate in the unimorph. An optical surface is formed on the front surface of the substrate plate. The polarization of the piezo-electric plate is chosen so that to make the plate expand or contract when voltage is applied to the electrode. The differential expansion/contraction of the substrate and piezo-plates causes the bimorph (unimorph) to bend, much in the same way as a bi-metallic strip will bend when heated. The mirrors of this type have proved so far to be highly reliable.

**Specifications of the control unit**

- Number of channels*(max) ........................................... 32
- Control interface .............................................. USB-2
- Response delay (max), s ........................................ 0.001
- Output voltage range, V ....................................... ±300
- Control step, V .................................................... 0.15
- Standard frequency bandwidth at -3dB, 100nF load, Hz .............................................. >500
- Operating temperature range, °C .................. -10 / +40
- Storage temperature range, °C .............. -10 / +70
- Weight (max), Kg ................................................. 8
- Size, mm ......................................................... 440x400x140 (19” rack mountable)
- Power supply ...................................................... 110-220V ; 50-60 Hz
- Mirror connection cable length (standard), m ........ 5

* Several units can be connected to the host computer for control mirrors with more than 32 electrodes.

**Control Software:** Device drivers for Windows 2000/XP diagnostic utility, and control with graphic interface SDK for C/C++.