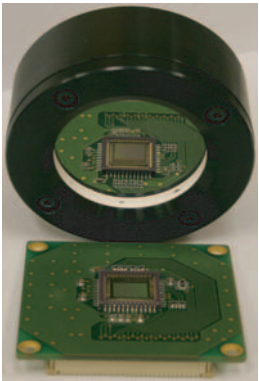


Deformable mirrors

Active elements for adaptive optics systems



Applications

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

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 $^{\circ}\text{C}$	+10 +40
Storage temperature range $^{\circ}\text{C}$	-30 / +70
Weight (max), Kg	0.15
Size, mm	$\Phi 55 \times 55$

Optical Damage threshold:

in CW operation (up to), kW/cm^2	0.1
in pulsed operation (up to), J/cm^2	4

Features

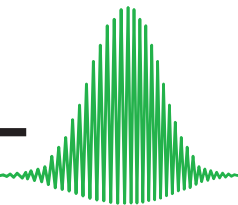
- Large stroke
- High surface quality
- Excellent mechanical stability
- Fast response
- Shock and vibration resistant
- Inexpensive

Reflecting coatings:

protected Al, Ag, Cu,
multilayer dielectric
coating of reflectivity
 $P > 99\%$



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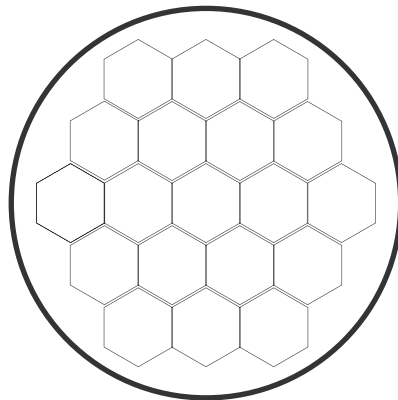
www.dmpotonics.com



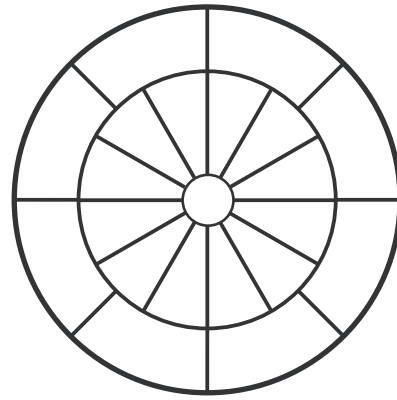
Principle of operation of mirrors bimorph and unimorph mirrors

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.

Typical electrode arrangement diagram for standard mirrors



19 electrodes HEX-arrangement



21 electrodes MDL-arrangement

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++.

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