

MFC Series

MEMS Variable Focus Mirrors

Product Features

Variable focal length: $\infty < f < 67\text{mm}$

4mm diameter clear aperture (other diameters by request)

Fast settling time $< 200\mu\text{s}$

Reflective metallic coatings = no chromatic aberrations

Aberration correction capability

Digital and analog amplifier options

Applications

- Confocal microscopy
- Multiphoton microscopy
- Laser focus control
- Compact/high speed imaging
- Fourier Transform Infrared Spectroscopy (FTIR)



A Complete Focus Control Solution

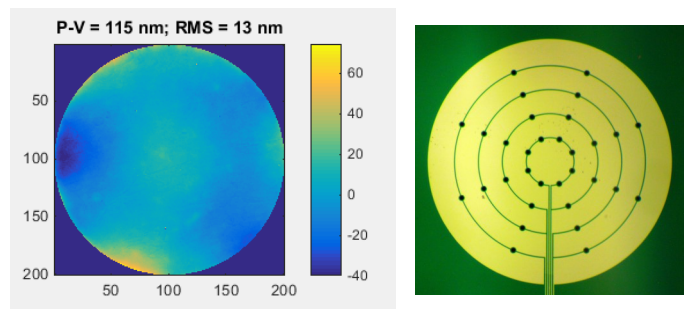
Our MFC Series variable focus mirrors are reflective optical elements with a voltage-selectable radius of curvature. The devices utilize an electrostatically actuated reflective membrane to provide rapid, repeatable focus control from infinity to less than 67mm for our standard mirrors.

The standard 1" diameter package mates easily with standard optic mounts for quick and easy setup. If a custom mounting option is preferred, our optomechanical design experience can help you incorporate the MFC Series mirrors into any OEM design.

For control of our MFC Series mirrors we provide both digital and analog amplifiers. Our flagship MHV400 digital amplifier provides a digital readout, limit set point, monitor output, analog modulation input, and digital waveform programming via a USB interface.

Spherical Aberration Correction in Real Time

Our variable focus mirrors are designed with a series of concentric electrodes, allowing the surface shape of the mirror to be adjusted to correct aberrations. With settling times less than $100\mu\text{s}$ for aberration changes, spherical aberration control can be performed in real time. This is important for optical systems with systematic aberrations that change with position.



Aberration map of Revibro Optic's deformable mirror for an unactuated device showing mirror flatness (left). The concentric electrode design enables surface shape changes for aberration correction (right).

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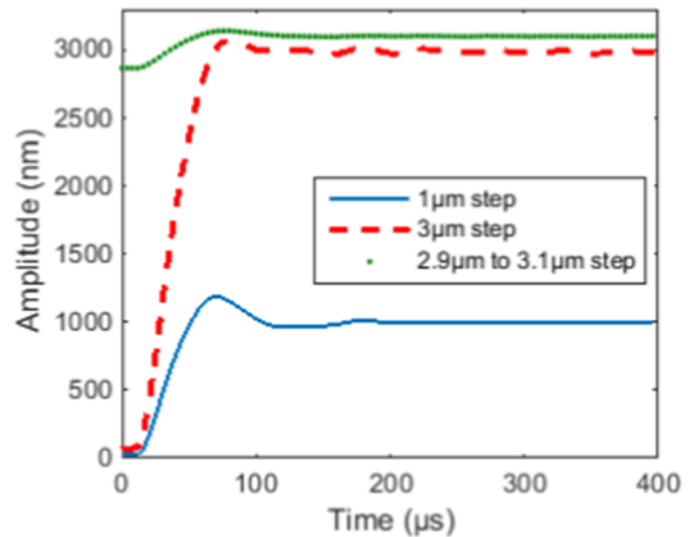
Mirror Specifications

Mirror diameter	4 mm
Maximum stroke	15 μm
Minimum focal length	<67 mm
Settling Time	<200 μs
Mirror flatness	<30nm RMS
Mirror material	Aluminum
Operational temperature	15° C to 35° C
Operational humidity	<50% RH
Standard Housing dimensions (custom packaging available)	Diameter: 1 inch Length: 0.75 inch

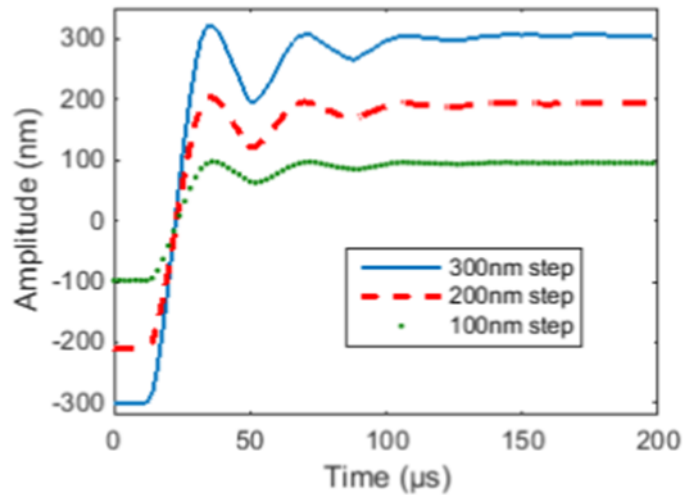
Amplifier Specifications

	MHV400	AHV400
Interface	Analog or digital	Analog only
Input voltage	0-10 V	
Output voltage	0-400 V	
# Channels	1	1-5
Small signal Bandwidth, no load	25 kHz	
Full scale bandwidth, no load	2 kHz, slew rate limited	
Slew rate, not load	2.75 V/ μs	
Inputs	BNC, USB	DSUB
Control	DC voltage control via front panel; analog input via BNC; digital input via USB	Analog input via DSUB or BNC
Power Supply	15 VDC	15-24 VDC (depends on #channels)

Defocus step response



Primary spherical step response, 3 μm defocus
Zemike $6r^2 - 6r^4 + 1$



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