

## OPTICAL POSITIONING ACTUATORS

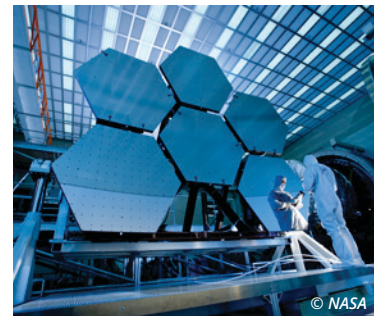
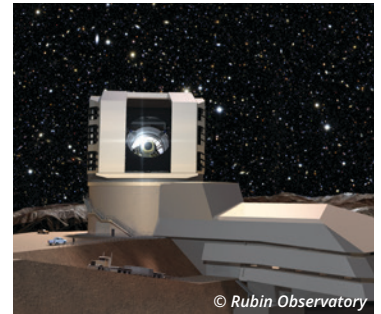


Linear actuators with high-fidelity positioning capabilities are required for aligning large optical payloads used in ground-based telescopes and the testing of space-based optical systems. Moog has developed and fielded high performance actuators that meet the needs of these demanding applications. High precision components, including a fine pitch, preloaded roller screw,

high gear ratio/backlash-free harmonic drive, flexured or preloaded end-joints, and high resolution encoders lead to exceptional positioning capability even under high loads. These customizable actuators can be incorporated into a wide variety of architectures including gimbals, tripods, and hexapods.

### TELESCOPE ACTUATOR FEATURES

- High load capacity
- High stiffness
- High resolution
- High repeatability
- High accuracy
- Self-locking
- Vacuum-compatible
- Low heat dissipation
- Long life



# HIGH LOAD OPTICAL POSITIONING ACTUATORS

The OPA series actuators are used for static positioning or slow tracking operation where minimum incremental step size, repeatability, and/or accuracy are critical. These precision actuators have high stiffness, handle heavy loads, and avoid backdriving making them ideally suited for the alignment of large optics. Outdoor, cleanroom, and vacuum-compatible versions are available. Customization of stroke length, end-joints, and other features is common to meet program-specific requirements.

## APPLICATIONS

- Ground-based telescope mirror positioning
- Testing of space-based telescopes and optical systems
- Beam/laser pointing

### PERFORMANCE CHARACTERISTICS



Model	OPA-400	OPA-500
Stroke Length <sup>1</sup>	28 mm	160 mm
Minimum Incremental Step Size	0.1 $\mu\text{m}$	0.1 $\mu\text{m}$
Repeatability (Unidirectional)	< 1 $\mu\text{m}$	< 3 $\mu\text{m}$
Repeatability (Bidirectional)	< 3 $\mu\text{m}$	< 10 $\mu\text{m}$
Accuracy	< 0.05% of Full Range	< 0.1% of Full Range
Max Speed	1.17 mm/s (0.5 mm/s Continuous)	1.17 mm/s (0.5 mm/s Continuous)
Axial Load Capacity	39.2 kN	39.2 kN
Stiffness (Excluding End-Joints)	217 N/ $\mu\text{m}$	277 N/ $\mu\text{m}$
Dimensions <sup>2</sup> (Excluding End-Joints)	230 mm D x 375 mm L	274 mm D x 480 mm L
Mass (Excluding End-Joints)	39 kg	43 kg
Motor Type	Brushless	Brushless
Gear Reduction	50:1 Harmonic Drive (Zero Backlash)	50:1 Harmonic Drive (Zero Backlash)
Screw Type	Recirculating Roller Screw w/Preloaded Nut	Recirculating Roller Screw w/Preloaded Nut
Sensor Type	Absolute Linear Encoder	Rotary Encoder
Backdrivable <sup>3</sup>	No (Self-Locking)	No (Self-Locking)
End-Joint Options	Flexures, Universal Joints w/ Preloaded Bearings, Custom	Flexures, Universal Joints w/ Preloaded Bearings, Custom
Vacuum Compatibility	With Customization	Yes
Heritage Usage	Rubin Observatory/Large Synoptic Survey Telescope (LSST)	James Webb Space Telescope Testing, NASA X-Ray and Cryogenic Facility (XRCF)

1. Custom stroke lengths available upon request

2. Length measured at midstroke position

3. Brakes available as additional protection against backdriving

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