

Rubicon II

Dual-stage Cryogenic Structural Actuator



The Rubicon II provides a fine resolution of 9 nanometers throughout a coarse stroke of 6 millimeters (see below). It is compact, stiff and power efficient. No power is required to hold position. The actuator is driven by two-phase stepper motors and the fine final stage of reduction is a proprietary elastic transducer, thereby avoiding the non-linearity and reliability problems associated with other micro-positioning devices that use smart materials (that employ piezoelectricity, electrostriction or magnetostriction). The Rubicon II operates at both ambient and cryogenic temperatures (tested at both 300° K and 25° K). It is built under license from AEH by Moog Inc. (East Aurora, NY) at their Chatsworth Operation.

Nanometer Actuator Performance Characteristics		
Typical Characteristic	Metric Units	English Units
Coarse and fine stage motors	2 Phase stepper	
Typical current drive	200 mA	
Coarse stage step size	0.025 mm	0.001 inch
Coarse stage range of motion	6 mm	0.24 inch
Fine stage step size	9 nm	0.35 uinch
Fine stage range of motion	0.1 mm	0.004 inch
Operating temperature range	20 - 300 °K	-423 - +80 °F
End of travel	Non jamming stops	
Mass - Dual stage actuator	197 gms	6.9 oz
Dual stage actuator overall length	102 mm	4.0 in
Dual stage actuator nominal diameter	36 mm	1.4 in
Axial force - Operational	12 > F > 4 N	2.7 > F > 0.9 lbs
Axial force set and hold	12 > F > 4 N	2.7 > F > 0.9 lbs
Survivability force	444 N	100 lbs
Position holding power	0.0 watts	
Power Consumption (20 °K)*	0.009 watts	
Power Consumption (300 °K)*	0.7 watts	
*(Assumes 10% duty cycle)		
Axial stiffness	>1.0 N/micron	>5.7 lb/uin

The recent report on room temperature and cryogenic testing may be down-loaded by clicking here:

[“Test Report.”](#)

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