



SA Actuators

Inertial Actuation for Vibration Generation and Control

SA series actuators deliver inertial force over a wide bandwidth in compact, rugged forms. The actuators generate force along the main axis of the cylindrical housing by reacting against a suspended mass constrained within the housing. The actuators use an electromagnetic circuit with a moving magnet that allows an internal coil to be thermally grounded to the housing.

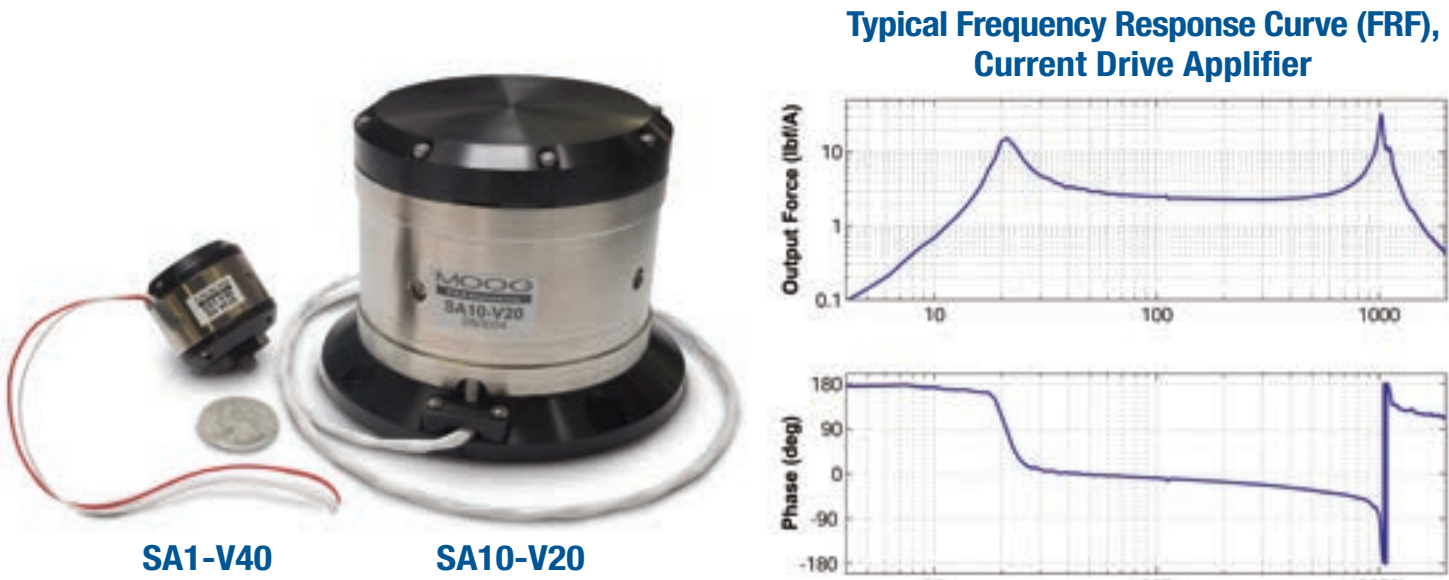
Typical applications include active damping or vibration cancellation, mounts for active vibration isolation, and disturbance generation and product testing. A rigid housing enables direct insertion of the SA actuator into structural load paths.

SA actuators are specified by force capacity and the resonant frequency of the suspended inertial body inside the actuator. The actuators can be driven by a variety of commercially available voltage or current amplifiers. Moog CSA Engineering offers standard off the shelf SA actuators in two sizes which are detailed in this datasheet, the SA1-V40 and SA10-V20.

Custom SA actuator design is offered and may be scoped in the form of small changes in the mechanical interface, electrical interface, impedance, or resonant frequency of the unit. Comprehensive ground up design is also offered for the most challenging of applications with full consideration of environmental and performance specifications. Vacuum compatible versions are available.

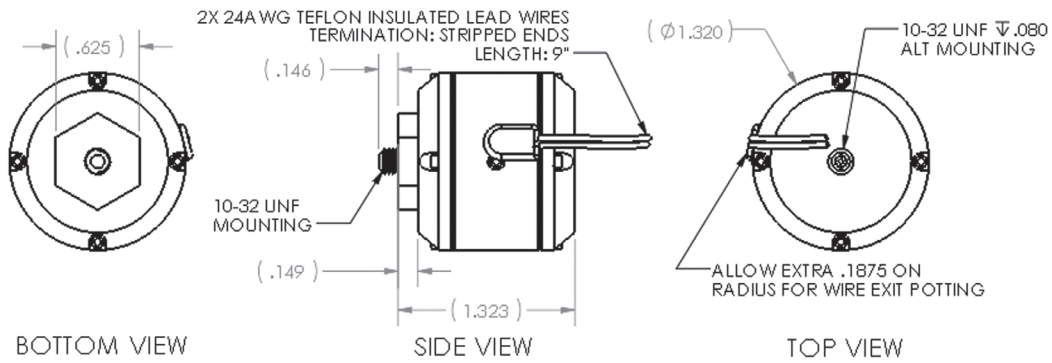


SA Actuator Features

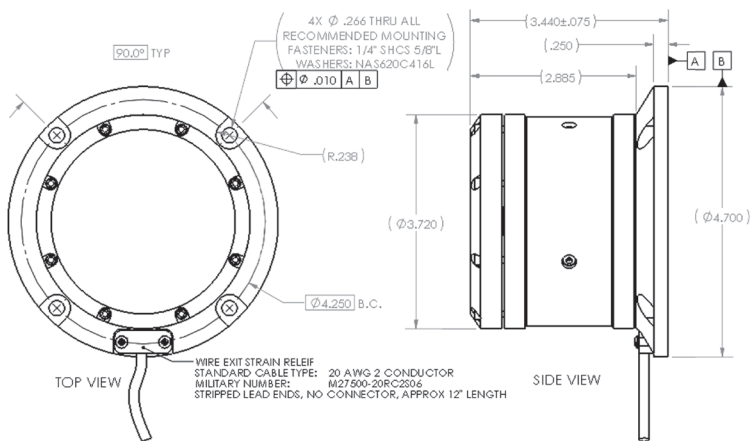


A typical representative frequency response curve (FRF) for SA actuators is shown above. SA actuators will exhibit a primary resonance at a designed frequency. The dynamic mechanical amplification characteristic near resonance can be utilized to output higher force levels for a given input power. This can be useful where power consumption is a concern. At frequencies above the primary resonance, the actuators will output forces of magnitude that is relatively linear with respect to input current. The second peak shown in the FRF at 1kHz is a resonance associated with characteristics of the host structure used during measurement.

SA1 Mechanical Dimensions



SA10 Mechanical Dimensions



Hardware Specifications*

	SA1-V40	SA10-V20
Moving Effective Weight	0.07 Lbs (.032 kg)	3.3 Lbs (1.50 kg)
Total Device Weight	0.23 Lbs (.104 kg)	5.9 Lbs (2.68 kg)
Standard Mounting Interface (<i>See mechanical dimensions for details</i>)	Stud	Flange
Standard Electrical Interface (<i>See mechanical dimensions for details</i>)	9"min 24 AWG Stripped Leads	12" min 20 AWG Stripped Leads
Construction	Various metals, treated to enhance durability and corrosion resistance. BOM available upon request.	

Performance Specifications*

Available Stroke	±.085 in (2.2 mm)	0.16 (4.0)
Force Constant	0.85 Lbf/amp (3.8 N/amp)	3.4 Lbf/amp (15.1 N/amp)
Standard Resonant Frequency	40 Hz	20 Hz
Q Factor	2.6	7
Electrical Resistance	4.2 Ohms	4.0 Ohms
Electrical Inductance	.5 mH	1.4 mH

Thermal Performance*

Thermal performance varies widely depending on ambient environment and thermal characteristics of the host structure. Provided below are basic guidelines and approximations for user reference in a controlled laboratory environment. The actuator housing temperature should be monitored and maintained well under the max operating temperature during usage to avoid damage to the actuator. Wider temperature ranges available upon request.

Maximum Operating Temperature	80°C (176°F)	80°C (176°F)
Max RMS Current (power) [force] (<i>applied for 60seconds</i>)	2.5 amps (26 watts) [2.1lbf]	6.0 amps (144 watts) [20.4 lbf]
Max RMS Current (power) [force] (<i>applied continuously</i>)	1.2 amps (6 watts) [1 lbf]	2.9 amps (34 watts) [10 lbf]

*All tables represent typically measured values. Actual performance and specifications may vary.



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Chatsworth, CA

Decatur, GA

East Aurora, NY

Gaithersburg, MD

Mountain View, CA

Northbrook, IL

Orlando, FL

Orrville, OH

Salt Lake City, UT



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