

LEE TECH TALK

TECHNICAL APPLICATION NEWS BRIEF

ULTRA-FAST MINIATURE SOLENOID VALVES PROVIDE SAVINGS FOR CUBESATS AND MICRO-THRUSTERS

The Challenge

As companies involved in CubeSat space propulsion systems work to reduce system size and cost while simultaneously increasing performance, they require high value solenoid valves capable of exceptional performance in harsh environments. High performance miniature thrusters offer improved thrust to weight ratios which demand faster, more powerful and lighter valves. For example, miniature alcohol-blend thrusters depend on ultra-fast solenoid valves to improve specific impulse and system durability, extending useful life on long missions.



The Solution

The Lee Company has enhanced their range of IEP Series Extended Performance solenoid valves. Models with flight heritage can be configured with special ports for each application, and feature durable laser-welded construction. The IEP Series also performs in a wide temperature range, up to 275° F, and an extended pressure range with differential pressure up to 800 psi. Dependability is second to none. IEP Series solenoid valves have a typical life expectancy of hundreds of millions of cycles, and quality is assured through 100% testing and inspection from beginning to end of production.

The Benefits

Lee IEP Series solenoid valves are commonly used in many types of small spacecraft propulsion systems including cold and warm gas thrusters, chemical thrusters, and electronic propulsion systems. The valves are capable of flowing alcohol, R410A, R134A, xenon, nitrogen and water among many other liquids and gases. Unparalleled response times with actuations as fast as 0.5 milliseconds at frequencies up to 500 Hz allow for modulated impulse control of propellant, maximizing specific impulse.

Potential Applications

Fast solenoid valves are vital to any propulsion application – big or small. The dimensional challenges that CubeSat sized craft face require the smallest valves to maximize performance in adverse conditions. Larger propulsion systems need small, fast solenoid valves for enhanced attitude or reaction control. Onboard science modules can use IEP Series solenoid valves thanks to their proven experience in terrestrial gas chromatograph and mass spectrometry systems.

Lee IEP Series Solenoid Valves

Lee IEP Series miniature solenoid valves are the latest innovation in an extensive offering of miniature, fast-acting valves available from The Lee Company. These valves can be configured to fit each application, with adjustments to porting, electrical, and seal materials to suit each mission. With flight heritage in CubeSat and micro-thruster designs around the Earth, Lee IEP Series solenoid valves set the standard for size, speed, and reliability.

THE LEE COMPANY

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