

4.9 Nitinol-Actuated Normally Open Valve Assembly

Statement: A zero-leak, permanent isolation valve that helps prevent leaks in hydraulic systems.

Problem: A pyrotechnic valve currently in use is not safe and has problems with testing.

Solution: A zero leak, permanent isolation valve allows to eliminate the problem.

Technology description: The actuator is made from nitinol (NiTi, nickel-titanium alloy), a heat activated non-explosive shape memory alloy, and the result is a valve that is much safer than the currently used pyrotechnic valve. It is actuated by heating a compressed piece of nitinol, which causes it to recover or elongate. This applies a force to the actuator tube which fractures it, initiating a spring that closes the valve. The technology is designed in such a way that the pressurized propellant upstream provides positive pressure on the valves seal.

Benefits of the product: Non-explosive actuator is safe, while its fabrication is simple.

Areas of application: This technology has potential where reliable emergency valve actuation is required, which includes fluid isolation and all other applications wherever normally-closed valves are used.