Dual In-line Thruster Valve

- 2 stage, single coil chemical thruster valve

The **SVS10 Dual In-line Chemical Thruster Valve [CTV-D]** has been developed by **Nammo Space** in cooperation with ESA. It is a two-stage solenoid-actuated flow control device, designed for propulsion system applications.

The CTV-D consists of a pair of identical valve stages. Each valve stage is a solenoid-operated flow control valve with a single seat, single coil, normally-closed with non-sliding fit configuration.

The design of the valve flow path interface ensures minimal flow discontinuities, reducing susceptibility to contamination-induced failures and minimising pressure losses. The valve uses a PTFE (Teflon) seal for excellent compatibility with most known propellants, and reliable performance in high cycle-life applications.

Each valve stage is opened independently by energising its respective coil. The resulting force generated by the induced magnetic flux causes the valve armature to move towards the 'fixed pole', and in doing so lifts the seal from its seat. The non-sliding fit ensures no variable frictional loads across the valve lifetime, and no risk of galling or jamming.

The thruster valve is a fully welded component for low external leak for long spacecraft missions.

The inlet incorporates a 25µm particle filter integrated in the valve inlet. The inlet to the valve can be supplied with welded or threaded connections to customer specification.

The outlet flange incorporates the interface with the thruster or other equipment. This is typically a bolted flange interface with prepared to accept an elastomer, polymer or metallic seal, and can be customised depending on the customer application.

A single stage version of the valve is also available.

Typical SVS10 thruster valves on test adapters

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Typical Operating Media	MMH, MON, Hydrazine, IPA, GN_2, GHe, H_2O, *H_2O_2
Max Expected Operating Pressure	25.4 bar
Maximum Expected Inlet Pressure	42 bar
Back Relief Pressure	Controlled to prevent over-pressure between valve stages
Surge Pressure	42 bar
Proof Pressure	105 bar
Burst Pressure	185 bar
Flow Rate / Pressure Drop	< 0.5 bar at 2 g/s H_2O
Internal Leakage	1 x 10^{-4} scc/s GHe, tested at 1.5 x MEOP
External Leakage	1 x 10^{-6} scc/s GHe, tested at 1.5 x MEOP
Operating Temperatures	0°C to 100°C (Qualification)
Non-Operating Temperatures	-40°C to 100°C
Response	< 14 ms open/close, at 24 VDC under all conditions
Electrical Interface	Flying leads, AWG26
Operating Cycle Life	1,000,000 cycles (Qualification)
Filter Rating	25 µm absolute
Wetted Materials	AISI316L, AISI304L, AISI430, PTFE
Hardware Mass	0.21 kg
Valve Length [inlet tube]	124 mm (straight inlet weld tube)
Valve Length [inlet threaded]	86 mm (AS4395-E-04 fitting)
Outlet Flange Envelope	ø 38.5 mm
Coil Body Diameter	ø 24.9 mm
Input Voltages	24 VDC to 38 VDC
Coil Power	Maximum 6.13 Watts, per stage, at 28 VDC
Fluidic Interface	1/4” tube stub or threaded AS4395-E-04 fitting
Mounting Interface	Metallic Flange with bolt holes [can be customised]
Technology Readiness Level	TRL9

* Contact Nammo to discuss Hydrogen Peroxide applications

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