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## TECHNOLOGY DESCRIPTION

The shape memory alloy valve is a one-shot normally closed device that functions like a pyro valve, but without the pyrotechnic charge. The shape memory alloy component is initially compressed into a closed-valve state. Upon heating, the alloy returns to its original shape causing the valve to remain permanently open. The valve incorporates a redundant heater, heater harness, a thermal indicator, an all EB (electron beam)-welded housing with a titanium inlet and outlet tubes and attachment interface clamps. Elastomeric sleeves at each of the two attachment interfaces isolate thermal loads between the valve and the spacecraft structure via the attachment clamps. Prior to activation, the complete valve is hermetically sealed like a pyro valve. The actuator has a nearly unlimited lifetime.



## INNOVATIVE ASPECTS

- Normally closed valve
- Non pyrotechnical NiTi actuator
- Simple electrical activation (ESCC 4009 heater)
- All-welded titanium design
- MEOP (Maximum Expected Operating Pressure): 345 bar
- Fluid compatibility: helium, argon, xenon, nitrogen, MON, MMH, hydrazine, deionized water, IPA
- Lifetime: 22.5 years in orbit / 10 on ground
- Solid state / metallic actuator, no chemical energy carrier and no pyrotechnic shock event
- No pyrotechnic combustion gases that could potentially leak into flow path
- Simple electrical activation reducing system cost (no pyro driver electronics needed)



## TECHNOLOGY READINESS (in space application)

TRL 9 (2024)

## COUNTRY OF ORIGIN

Germany

## LATEST UPDATE

06/2024

<b>TAGS</b>	#valve	#shape memory	#solid state	#electrical	#no pyro	#high lifetime
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## APPLICATION AREAS

Aviation	Energy	Construction & Civil Engineering	Chemical Engineering & Biotechnology	Mechanical Engineering	Safety & Security	Space technologies
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# TECH CARD

