

Mission Success

Ensign-Bickford Aerospace & Defense Company (EBAD) is dedicated to supporting our customers in the aerospace and defense industry through on-time delivery of innovative products that exceed expectations and assure mission success.



TiNi™ FrangiValve

FrangiValves are utilized in satellite applications to provide a simple and effective method to isolate pressurized systems (gas or liquid) with a normally closed hermetically sealed non-pyro device which is also resettable. Actuation is achieved by using a Frangibolt® Actuator to open the device. Easy to use, resetting the device is straightforward with our compression reset tool fixture and replacement of the customizable FrangiValve Valve Body Fastener. With the ability to customize, this device offers design flexibility in a compact package.

Principle of Operation

The EBAD TiNi™ FrangiValve is a “Normally Closed” isolation valve that is capable of supporting pressures up to 10,000 psi. It is hermetically sealed using an all stainless-steel valve body with a variety of orifice sizes. Actuation is achieved by using a Frangibolt® Actuator to break an internal barrier which bridges the inlet hole to the outlet port. The design is inherently scalable and available in a variety of embodiments and flow rates. The EBAD TiNi™ Frangibolt® Actuator is rated to have a maximum life of 50 cycles.

Construction

The FrangiValve starts with the frangibolt actuator which is a reliable device that contains few components. The device is comprised of a machined SMA cylinder, encapsulated with redundant resistive heaters and embedded RTD's. The whole assembly is then wrapped in a silicone rubber compound to provide both thermal and electrical isolation. The customer specified Valve Body Fastener is installed in the actuator with a washer on each side and secured with a lock nut or by directly threading into the flange or structure. EBAD's TiNi FrangiValve Valve Body Fasteners are typically specified by the customer along with any recommended accessory washers and lock nuts. The customer specifies the Valve Body Fastener type, grip and thread length as well as the notch location. These features must remain constant for all applications.

Applications

Since 1994, the frangibolt actuator system has extensive flight heritage in space applications and is the core of the FrangiValve. Applications include solar array and antenna deployment, instrument launch locks, optic cover deployment and other space applications.

Key Features

- Low-Shock NEA (Non-Explosive Actuators) – As with all EBAD TiNi™ products, the FrangiValve Actuator is non-pyrotechnic and field reset-able with a minimum qualified life of 60 cycles.
- Field Reset-able and Reliable – The Actuator is reset in the same manner as our Frangibolt® Actuators (i.e. by compressing to a shorter length using our reset tool).
- Redundant Firing Circuit – As with all EBAD TiNi™ Actuators a redundant firing circuit is incorporated. This can independently bring the valve to actuation in approximately 30 seconds.
- Customizable Valve Body Fastener – Fluid flow is through an all Stainless Steel valve body which may be configured per customer specification (i.e. tubing length, diameter, and interface) with a variety of swaged or welded end fittings.*
- Safe to Use and Operate – The Frangibolt® does not pose any safety concerns to personnel, is low shock, and insensitive to ESD (Electro-Static Discharge).

* EBAD must provide the replaceable valve body fastener. This may be readily manufactured to customer specifications.



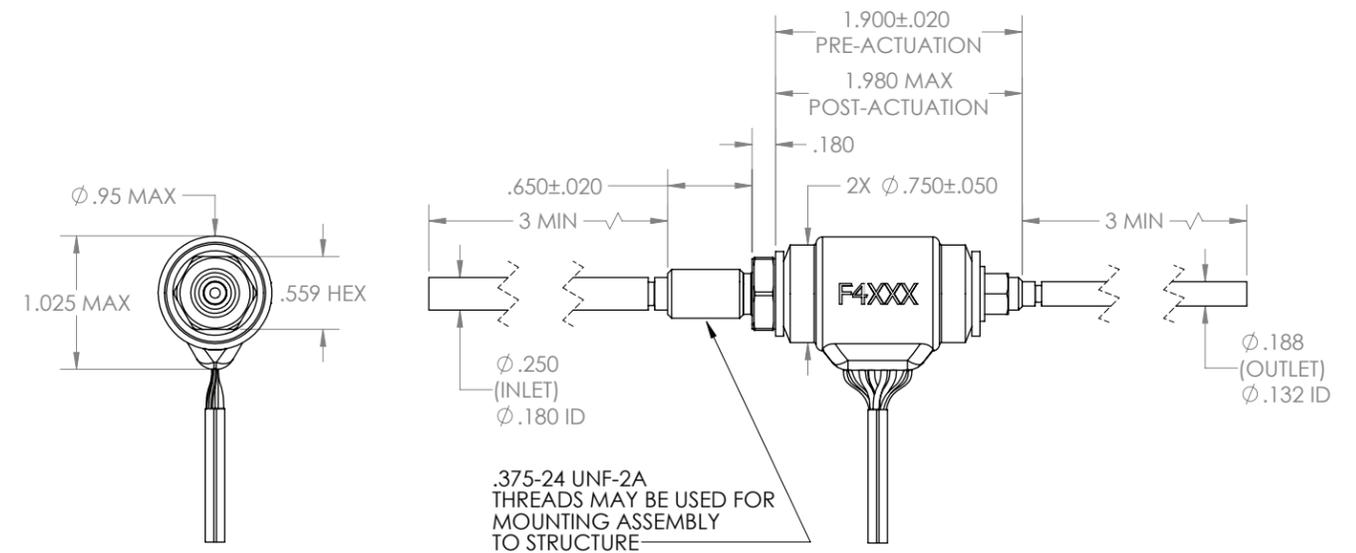
Valve Body Fastener

TiNi™ FrangiValve Technical Specifications

Actuator Family	FV4
Mass	3.5 oz [100 g]
Power	80W @ 28VDC
Operational Voltage	22-36VDC
Current Draw	2.9A @ 28VDC
Resistance	9.7±0.5 Ω
Valve Orifice Diameter	ø0.080 in [ø2 mm]
Operational Pressure	3000 psi [20.7 MPa] MAX
Burst Pressure	7500 psi [51.7 MPa] MIN
Function Time	Typical 40 sec. @ 28VDC (23°C)
RTD	1000 Ω @ 0°C
Reusable Actuator Life	60 Cycles MIN
Operational Temperature	-65°C to +60°C

Note: Nominal values for estimation purposes only. Actual function time depends on application (joint) design and circuit used (primary and/or secondary).

TiNi™ FrangiValve Mechanical Interface Drawing



Contact EBAD for a detailed ICD (Interface Control Drawing)