



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™ Flat Pack (Miniature Flat HDRM)

EBAD's TiNi™ products are non-pyrotechnic and field resettable, utilizing shape memory alloy to perform the necessary actuation for a variety of products and end applications. EBAD's TiNi™ products offer a variety of solutions for satellites, subsea and aerospace/defense applications. Launch vehicle and missiles products are manufactured with the utmost regard to quality assurance, and EBAD is committed to being the industry leader in both quality and performance.

Principle of Operation

Shape Memory Alloys (SMAs) refer to a group of materials that have the ability to return to a predetermined shape when heated. The shape memory effect is caused by a temperature dependent crystal structure. When an SMA is below its phase transformation temperature, it possesses a low yield strength crystallography referred to as Martensite. While in this state, the material can be deformed into other shapes with relatively little force. The new shape is retained, provided the material is kept below its transformation temperature. When heated above this temperature, the material reverts to its parent structure, known as Austenite, causing it to return to its original shape.

Applications

The TiNi™ Flat Pack is a miniature hold-down release mechanism (HDRM) used in a variety of low-load applications.

Typical applications include:

- Solar arrays, antenna reflectors, instruments, doors, sensors, booms.

Key Features

- Field resettable
- Auto shut-off switch
- Low height <.25"
- No debris generation
- Qualified to standard launch environments
- Range safety friendly
- Space-rated materials

Construction

Utilizing a shape memory alloy "SMA" wire, the wire is threaded through a bell crank and attached to the spring loaded electrical contacts. The bell crank retains the trigger, which keeps the drive springs on the slider compressed. Another smaller reset spring is installed to assist in the reset process.

TiNi™ Flat Pack (Miniature Flat HDRM) Technical Specifications

Parameter	Capability
Capability	50 lbs.
Mass	33 g
Fly Away Mass	1 g
Power	1.25 W @ 0.4 A
Operational Current	0.4 to 1.5 A
Release Time	130 ms @ 0.5 A (23°C)
Shock Output	<1000 g's
Temperature Range	-65°C to +70°C
Reusable	By Manual Reset
Life	100 cycles MIN

TiNi™ Flat Pack (Miniature Flat HDRM) Mechanical Interface Drawing

