NEA TO

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.



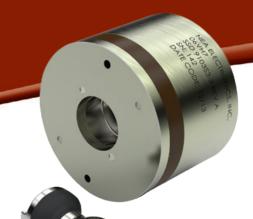
EBAD is the global leader in non-pyrotechnic Hold Down & Release Mechanisms (HDRM). Hold Down & Release Mechanisms, also sometimes referred to as Separation Nut Release Mechanisms, are offered in a range of sizes. The NEA® Model 9103 supports restrained preloads as high as 35 kN (7,868 lbf).

Principle of Operation

The NEA® HDRM is an electrically initiated, one-shot release mechanism that has the ability to carry a very high tensile preload until commanded to release. The preload is applied through a release rod held in place by two separable spool halves which are in turn held together by tight winding of restraining wire. The restraint wire is held in place by redundant electrical fuse wires; actuation of either circuit allows release, assuring maximum reliability. When sufficient electrical current is applied, the restraint wire unwinds allowing the spool halves to separate releasing the release rod and the associated preload.

The actuation is simple and reliable and forms the basis of actuation for many of EBAD's other products including Pin Pullers, Battery Cell Bypass Switches, and Non-Pyrotechnic Valves.

EBAD has developed a companion HDRM Firing Unit (HFU) that multiplexes a single Launch Vehicle firing order to fire (4) Model 9100's in diagonal pairs or simultaneously. The HFU assures proper current application to the HDRM to assure tight actuation simultaneity between the HDRMs. The HFU provides safety interlocks for Arming and Firing and provides status of HFU and HDRM for integration operations and launch readiness assurance.



Applications

Typical applications include:

- · Antennas, reflectors, solar arrays, and deployable radiators
- Booms, masts, and scientific instruments
- Satellite and spacecraft deployment
- · Launch vehicle and missile stage and fairing separation
- Missile payload separation

Key Features

- Non-explosive hold down & release function
- High restrained preload
- Extremely low release shock
- High simultaneity of multiple hold-down points
- · Wide operating temperature range
- Can be operated with pyrotechnic initiation circuitry
- Space-rated materials
- Factory refurbishments
- More than 20 years of flight heritage
- Flight pedigree on more than 750 space platforms

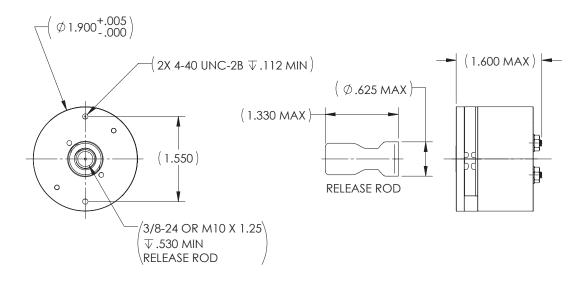
Model 9103 Technical Specifications

| Proof Load Rating41 kN (9,217 lbf)Release Load Rating35 kN (7,868 lbf)Shock @ Preload¹<750 g's @ 35kN (7,868 lbf) | Parameter | Capability |
|--|--|-----------------------------|
| Shock @ Preload¹<750 g's @ 35kN (7,868 lbf)Fuse Wire Resistance1.2 to 2.0 Ω @ 25°CActuation Current²4 Amps for 25 msNo-Fire Current³250mA at 10-5 Torr @ 110° CRelease Time⁴<50 msOperational Temperature Range⁵-135°C to +135°C | Proof Load Rating | 41 kN (9,217 lbf) |
| Fuse Wire Resistance 1.2 to 2.0 Ω @ 25°C Actuation Current² 4 Amps for 25 ms No-Fire Current³ 250mA at 10-5 Torr @ 110° C Release Time⁴ <50 ms Operational Temperature Range⁵ -135°C to +135°C | Release Load Rating | 35 kN (7,868 lbf) |
| Actuation Current ² No-Fire Current ³ Release Time ⁴ Operational Temperature Range ⁵ 4 Amps for 25 ms 250mA at 10-5 Torr @ 110° C <50 ms -135°C to +135°C | Shock @ Preload ¹ | <750 g's @ 35kN (7,868 lbf) |
| No-Fire Current ³ Release Time ⁴ Operational Temperature Range ⁵ 250 mA at 10-5 Torr @ 110° C <50 ms -135°C to +135°C | Fuse Wire Resistance | 1.2 to 2.0 Ω @ 25°C |
| Release Time ⁴ <50 ms Operational Temperature Range ⁵ -135°C to +135°C | Actuation Current ² | 4 Amps for 25 ms |
| Operational Temperature Range ⁵ -135°C to +135°C | No-Fire Current ³ | 250mA at 10-5 Torr @ 110° C |
| | Release Time ⁴ | <50 ms |
| Maximum Angular Misalignment6° Cone | Operational Temperature Range ⁵ | -135°C to +135°C |
| | Maximum Angular Misalignment | 6° Cone |
| Mass ⁶ 200g (0.44 lbm) | Mass ⁶ | 200g (0.44 lbm) |

Notes:

- ¹ Shock is preload and setup dependent
- ² Actuation can be achieved using a wide range of current
- 3 No-fire current for 5 minutes
- ⁴ Release time is dependent on actuation current, this assumes 4 A current applied.
- ⁵ The values for operational temperature range are not the limits of the device.
- ⁶ Mass does not include harnessing and lead wires.

Model 9103 Hold Down & Release Mechanism (HDRM) Mechanical Interface Drawing



Note: Model 9103 Release Mechanism shown. Different configurations available with alternate release rods, mounting features, and connectors. Metric configurations are also available.

SIGN-BICKFORD AEROSPACE & DEFENSE COMPANY 640 HOPMEADOW STREET, P.O. BOX 429, SIMSBURY, CT 06070, USA www.EBAD.com

NEA® is a registered trademark of NEA Electronics, Inc. This product and its components are protected under U.S. Patent Numbers 6,433,990 / 6,249,063 as well as France Patent Numbers 125567 / 9903335, U.K. Patent Number 1255675 and Germany Patent Number 60111923.1.

Attention: The information and recommendations described in this brochure cannot possibly cover every application of the products or variation of conditions under which the products are used. The recommendations here are based on the manufacturer's experience, research and testing. They are believed to be accurate, but no warranties are made, express or implied. In addition, the specifications contained herein are all nominal which represent our current production. The products described may be subject to change. Please feel free to contact Ensign-Bickford Aerospace & Defense Company for verification. No Warranties or Liabilities: THE PRODUCTS DESCRIBED HEREIN are sold "AS IS" and without any warranty or guaranty, express, or implied, arising by law or otherwise including without limitation any warranty of merchantability or fitness for a particular purpose. Buyer and user agree further to release and discharge seller from any and all liabilities whatsoever arising out of the purchase or use of any product described herein whether or not such liability is occasioned by seller's negligence or based upon strict products liability or upon principles of indemnity or contribution. Content©2022 Ensign-Bickford Aerospace & Defense Company, Simsbury, CT 06070, U.S.A.

Cleared for Open Publication by the Defense Office of Prepublication and Security Review, Department of Defense 01/27/2022 22-S-0867