Model 9106B Hold Down & Release Mechanism

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 9106B supports restrained preloads as high as 142 kN (32,000 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 9106B’s in diagonal pairs or simultaneously. The HFU assures proper current to the HDRMs. The HFU provides safety interlocks for Arming and Firing and application to the HDRM to assure tight actuation simultaneity between the restraint wire unwinds allowing the spool halves to separate releasing the release rod and the associated preload.

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
- Extremely low release shock
- High simultaneously of multiple hold-down points
- Wide operating temperature range
- Space-rated materials
- Factory refurbishments
- More than 20 years of flight heritage
- Flight pedigree on more than 750 space platforms

Key Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Capability</th>
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<tbody>
<tr>
<td>Proof Load Rating</td>
<td>178 kN (40,000 lbf)</td>
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<tr>
<td>Release Load Rating</td>
<td>142 kN (32,000 lbf)</td>
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<tr>
<td>Shock @ Preload</td>
<td>&lt;100 g's @ 142 kN (32,000 lbf)</td>
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<tr>
<td>Fuse Wire Resistance</td>
<td>1.2 to 2.0 Ω @ 25°C</td>
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<tr>
<td>Actuation Current (continuity)</td>
<td>4 Amps for 25 ms</td>
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<tr>
<td>No-Fire Current (continuity)</td>
<td>&lt;50 μA</td>
</tr>
<tr>
<td>Operational Temperature Range</td>
<td>-130°C to +130°C</td>
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<tr>
<td>Maximum Angular Misalignment</td>
<td>6° Cone</td>
</tr>
<tr>
<td>Mass</td>
<td>700 g (1.5 lbm)</td>
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Notes:
1. Stack is preloaded and setup dependent.
2. Current 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 4A 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 9106B Hold Down & Release Mechanism (HDRM) Mechanical Interface Drawing

Model 9106B Technical Specifications