

NEA 8040 Series Battery Cell Bypass Switches

Global Leader

NEA® Electronics, Inc. is a global leader in spacecraft mechanisms. Our low shock release devices are relied upon for spaceflight applications more than any other device.

Reliable

Our designs are reliable, simple, insensitive to adverse environments and backed up by years of heritage and loyal customers.

Quality Assured

NEA, a trusted supplier of mission critical components, is certified to ISO 9001:2008 and AS9100:2009 C

8040 Series Product Data Sheet

NEA, the global leader in non-pyrotechnic Hold Down & Release Mechanisms (HDRM) for the spacecraft market, brings this same highly reliable technology to battery protection applications with our complete line of Battery Cell Bypass Switches. Battery Cell Bypass Switches provide critical protection to battery assemblies in the event that one battery cell suffers an anomaly.

Principle of Operation

NEA's Battery Cell Bypass Switch is an electrically initiated, one-shot switch that bypasses and isolates failed battery cells. The switch consists of a spring-loaded plunger with multiple precious metal plated electrical contacts arranged in a Single-Pole, Double-Throw configuration and provides Make-Before-Break functionality as the plunger moves in the housing. The plunger is restrained using the same patented split-spool and bridge wire technology used in our Hold Down & Release Mechanisms.

Typically, switches are placed in series between battery cells and, when activated, bypass and isolate the failed cell from the battery assembly. Because of this configuration, bypass switches are always in-circuit and thus rated to carry a high continuous current for the duration of the mission. The design and construction of the bypass switch assure that there is no contact bounce during high dynamic loads seen during satellite launch. When activated, there are two features that ensure reliable system operation; Make-Before-Break functionality assures there is no voltage dropout during switching and low switch contact resistance assures high peak current carrying capability.

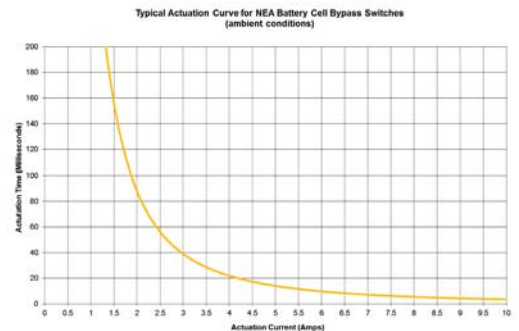
Several NEA switch models come with built-in Zener diodes that are used to autonomously redirect current through the actuation fuse wire when a failed cell is detected. This autonomous operation device can save considerable cost associated with battery cell sensing and switch actuation circuitry.



Key Features

- Available in non-autonomous and autonomous configurations
- Switch circuit can carry up to 400A of continuous current
- Single-Pole, Double-Throw (SPDT) Make-Before-Break power switch
- High reliability and long service life
- Low power switch resistance
- Lightweight
- Extended operating temperature range
- Can be operated with pyrotechnic initiation circuitry
- Range safety friendly
- Space-rated materials
- Factory refurbishment

Actuation Time



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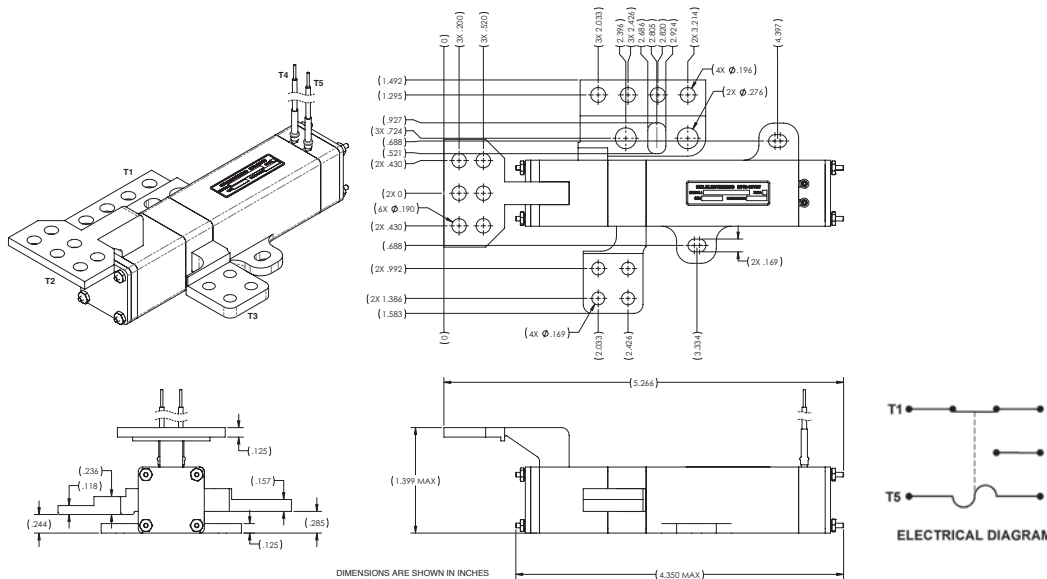
8040 Series Technical Specifications

Parameter	Series 8040 Capability
Continuous Current Ratings	400 A
Switch Resistance	<150 $\mu\Omega$ @ 400 A
Fuse Wire Resistance	0.95 to 1.6 Ω @ 25°C
Minimum Actuation Current ¹	1.2 A
Nominal Actuation Current	4 Amps for 25 ms
No-Fire Current ² (continuity)	500 mA
Actuation Time ³	<50 ms
Make Before Break Duration	<1 ms
Qualification Temperature Range ⁴	-55°C to +85°C
Mass ⁵	250 g (8.8 oz)

Notes:

- ¹Actuation can be achieved using a range of current, the value in the table is the value used for qualifying this device.
- ²No-fire current for 5 minutes or less as ambient temperature, consult NEA applications engineers for other no-fire current requirements.
- ³Actuation time is dependent on actuation current, contact applications engineering for more specific information on actuation time as a function of current.
- ⁴The values presented for qualification temperature range are not a measure of the limits of the device.
- ⁵Mass is representative and varies slightly with different specific part numbers within the series but does not include harnessing and lead wires.

Model 8043 Mechanical Interface Drawing



Note: Model 8043 Battery Cell Bypass Switch shown above as an example. Other models available with alternate mounting feet, terminal configurations and optional zener diodes for autonomous operation.

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