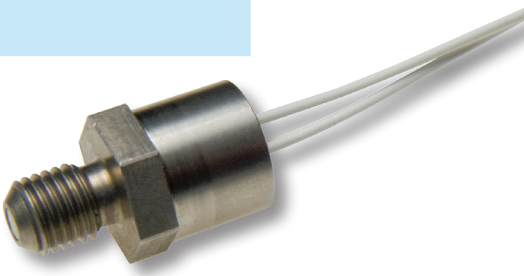
EaglePicher®
Energetic Devices
Overview

EAGLEPICHER
TECHNOLOGIES

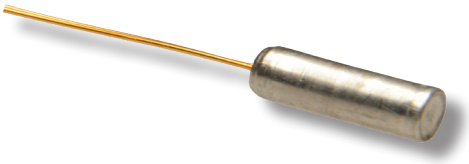
Portfolio of Energetic Devices

	Actuators	Cutters	Gas Generators
Function	▪ Forward push ▪ Linear retraction ▪ Curvilinear motion	▪ Server lines/ rods ▪ Puncture burst discs	▪ Fluid displacement ▪ Gyro spin up ▪ Pyrotechnic initiation ▪ Applied pressure
Applications	▪ Fuze arming & alignment ▪ Push/pull mechanical loads ▪ Prime/stab detonation ▪ Switch/relay operations	▪ Life support ▪ Seeker cooling ▪ Inflators	▪ Batteries ▪ Guidance systems ▪ Void expansion ▪ Energetic trains
Output	> 100k annually	> 36k annually	> 1.5k annually
Capacity	> 2.5 x annual output	> 3 x annual output	Significantly higher output

Igniters	Switches	Pyrotechnic Valves
▪ Impart hot gas/ particles ▪ Impulse	▪ Open/close electrical circuits ▪ Instantaneous or delayed	▪ Quick acting valves ▪ Start or stop liquid flow
▪ Thermal batteries ▪ Pyrotechnic valve initiation ▪ Rocket motors ▪ Guidance systems ▪ Energetic trains	▪ Sequencing multiple events from a single initiation	▪ Fire extinguishing systems ▪ Emergency activation fluid systems
> 100k annually	> 36k annually	
> 2.5 x annual output	> 2 x annual output	



Types of Devices



Explosive Devices

Detonators and boosters – use secondary explosives for their output charge

- Used in artillery, mortar, cannon, bomb fuzing and detonation of main warheads

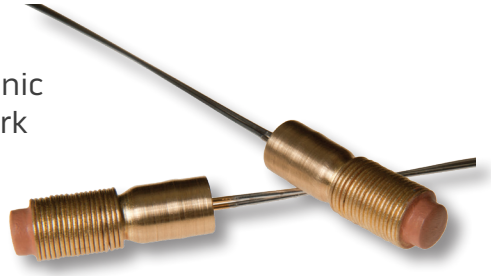
Pyrotechnic Devices

Actuated by small quantities of less powerful primary explosives

- Used to provide motion, perform work, ignite materials, generate gas and to accomplish many other tasks

Portfolio of Energetic Devices

Bellows Actuators



These devices transform pyrotechnic energy into motion to perform work against an external load. Bellows actuators produce linear or rotary motion with a relatively long stroke. When actuated, the bellows expands following any straight or curved path established by surrounding surfaces and will retain its extended position under load.

Applications include:

- Rotating a shaft
- Pushing a mechanical load
- Disconnecting a plug
- Adjusting a camera
- Arming a projectile

Piston Actuators

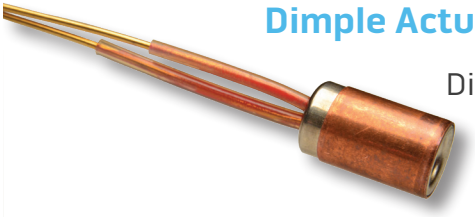
Piston actuators produce a pushing linear motion. They are available in micro miniature, miniature and large sizes with a variety of stroke lengths.

Applications include:

- Puncturing a container
- Uncasing a gyroscope
- Indicating the presence of unwanted electrical impulses
- Firing a primer or stab detonator
- Arming a projectile

Portfolio of Energetic Devices

Dimple Actuators

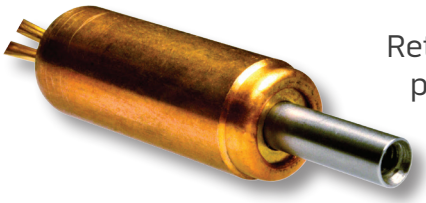


Dimple actuators produce short linear motion by inverting a dimpled cup. These products hold their position under load.

Applications include:

- Operating a switch, latch or relay
- Pushing a mechanical load
- Arming a projectile
- Locking, unlocking or releasing

Retractable Actuators



Retractable actuators produce a pulling or withdrawing type of linear motion. When actuated, a piston partially retracts into the casing and locks into place.

Applications include:

- Pulling mechanical loads
- Locking, unlocking or releasing
- Operating a switch, latch or relay

Cutters

The devices use pyrotechnic generated energy to power a wide variety of cutting mechanisms.

Applications include:

- Severing control or communication wires
- Cutting tubing to release coolant
- Puncturing diaphragms
- Rupturing gas bottle burst disks
- Severing mooring cables
- Cutting reefing lines
- Breaking glass vials to release chemicals

Gas Generators

These devices use a precisely controlled reaction to produce a specified volume of gas. The resulting gas pressure is used to do mechanical work.

Applications include:

- Displacing a liquid
- Pressurizing a container
- Operating a cartridge actuated device (CAD)
- Inflating air bags
- Actuating expelling bladders and other ejection devices
- Dispensing powder from a corked vial

Portfolio of Energetic Devices

Igniters

These devices use a precisely controlled pyrotechnic reaction to produce a specified output of gas, flame or hot particles.

Applications include:

- Igniting safety fuses
- Propellants or heat powders
- Thermal batteries
- Metal oxidant mixes
- Other deflagrating materials

Switches

These small, lightweight devices use pyrotechnic generated gas pressure to open or close one or more electrical circuits instantaneously, or with delays of up to six seconds. Each switch is hermetically sealed, preventing any leakage of pyrotechnic reaction products.

Applications include:

- Emergency power cut off
- Delay arming of fuses
- Sequencing a series of events from a single initiation
- Aborting ignition or detonation
- Triggering an alarm

Pyrotechnic Valves

These quick-acting valves are used to start or stop the flow of liquids in remote environments or space applications. They can be reset for future use without removing them from the line.

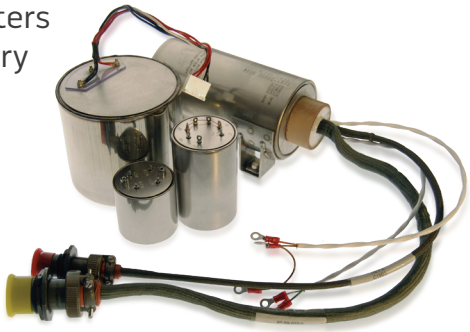
Applications include:

- Operating fire extinguishing systems
- Terminating flow of flammable gas or liquid
- Emergency activation or shutdown of fluid systems

Energetics Devices and Batteries

EaglePicher delivers 60,000+ igniters annually to support thermal battery programs.

- Igniters are critical to thermal battery activation and performance



EaglePicher delivers 1,000+ gas generators annually to support silver zinc battery programs.

- Built-in gas generators displace electrolyte during the silver zinc battery activation sequence

EaglePicher shares customers and programs between energetic devices and batteries.

- United States Government
- Boeing
- Lockheed Martin
- Raytheon
- Orbital ATK
- L3 Fuze and Ordnance Systems
- UTC
- Sandia

EaglePicher Technologies is a leading producer of batteries, battery management systems and energetic devices. For more than 75 years, we have been serving the mission-critical aerospace, defense, aviation and medical battery markets. EaglePicher's batteries are a key component of the U.S. space program; our batteries provided the emergency power that successfully brought the Apollo 13 crew home. Today, EaglePicher batteries power the International Space Station, Mars Rovers, commercial jets and helicopters, life-saving medical implants and more than 85 percent of U.S. missile platforms.

From cells and batteries to complete power systems, you can trust EaglePicher's comprehensive energy solutions to deliver power where you want it, when you need it. We bring the newest technology innovations and we offer custom battery development. What's more, we fully support our customers — from concept through final production — through our facilities on the East and West coasts, in the Midwest and in Canada.

Whether it's our cutting-edge research on lithium ion technology or the world's smallest implantable battery, we continue to set new standards. With state-of-the-art equipment and ample funding in research and development, EaglePicher stays on the leading edge of battery innovation. We are the industry leaders, offering decades of expertise.

Company Locations

Manufacturing
Pittsburg, KS
Joplin, MO
Seneca, MO
East Greenwich, RI
Vancouver, BC

Research & Development
Burlingame, CA
Joplin, MO
East Greenwich, RI

Headquarters
St. Louis, MO

Industries Served


Aviation


Defense


Medical


Space

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