

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.

1MT11 Miniature Piston Actuator

The 1MT11 Miniature Piston Actuator is a pyrotechnicactuated device that produces linear motion



Its compact size, light weight, high reliability and environmental resistance make it ideal for aerospace applications. This actuator is available with a variety of bridges with different firing characteristics.

Variations

Modifications in stroke length, force, shape of piston, type of action and environmental resistance can be made to meet specific requirements.

Characteristics

Some of the characteristics listed here are nominal; others are levels to which the units have been tested. There are no limits on design capabilities. Please consult an EaglePicher representative before using this data as a specification.

Specifications

Electrical			
Insulation Resistance, Shunted Leads to Case		Before firing: 50 megohm Min. @ 500 Vdc	
Squib	Bridge Resistance* @70°F (21°C)	All-Fire Current @ -65°F (-54°C) 10 ms	No-Fire Current @ 160°F (71°C) 5 min
Туре	Ohm	Amp, Min.	Amp, Min.
А	6.0 ± 1.0	0.30	0.03
В	4.0 ± 1.0	0.55	0.10
С	1.8 ± 0.2	1.00	0.10
F	0.33 ± 0.04	4.50	1.00
Т	0.70 ± 0.10	2 Amp (15 ms)	0.5

*Test current limited to 0.010 amp

Specifications Continued			
Mechanical			
Size	See drawing		
Weight	1.0 gm		
Stroke	1/8″ (3.175 mm)		
Load	10 lb (44N)		
Function Time*	10 ms		
*See Firing Characteristics of Pyrotec current on ignition time.	hnic-Actuated Devices for effect of		
Environmental			
Temperature	Operating range: -65°F to +160°F (-54°C to +71°C)		
Cycling	MIL-STD-202A, Method 107		
Storage	Functions normally after 2 hr at -65°F (-54°C) or +160°F (+71°C)		
Humidity	Functions normally after 8 hr at 110°F (43°C) and 95% relative humidity.		
Shock	 (1) 1/2 sine wave pulse of 400 g's for 1.5 ms in each of 3 mutually perpendicular planes. (2) 1/2 sine wave pulse of 100 g's for 11 ms in each of 3 mutually perpendicular planes. 		

Specifications Continued

Environmental cont.		
Vibration	Transportation and sinusoidal vibration of 5-2000-5 Hz at 30 g's or .34" (8.64 mm) d.a. for 15 min per cycle, 4 cycles per plane and 3 mutually perpendicular planes.	
Acceleration	30 g's for 1 min in each of 3 mutually perpendicular planes.	
Chemical		
Ignition Compound	KDNBF or LMNR/KCLO3	
Freight Classification		
Shipping Name	Release Devices, Explosive	
Identification Number	UN0173	
Hazard Classification	1.45	



FOR 1MT11, BODY LENGTH IS .530 INCH (13.462) AND STROKE LENGTH IS .125 INCH (3.175)

DIMENSIONS IN () ARE IN MM



EaglePicher Technologies, LLC PO Box 47, Joplin, Missouri 64802-0047, USA

PO Box 47, Joplin, Missouri 64802-0047, USA tel 417.623.8000 | fax 417.623.0850 www.eaglepicher.com

1MT34 Piston Actuator

The 1MT34 Piston Actuator is a pyrotechnic-actuated device that produces linear motion.

Its compact size, light weight, high reliability and environmental resistance make it ideal for aerospace and ordnance applications.

Characteristics

Some of the characteristics listed here are nominal; others are levels to which the units have been tested. There are no limits on design capabilities. Please consult an EaglePicher representative before using this data as a specification.

Specifications

Electrical	
Bridge Resistance @ 70°F (21°C)	1.0 ± 0.1 ohm
All-Fire Current	5 amp pulse, 10 ms (see graph)
No-Fire Current @ 225°F (107°C)	1 amp - 1 watt, 5 min
Insulation Resistance	1megohm minimum @ 500 Vdc
Static Resistance	25,000 V discharge from a 500 pF capacitor through a 5000 ohm series resistor
Mechanical	
Size	See drawing
Weight	2.0 gm Max.
Seal	Hermetically sealed by a glass-to- metal seal electrical feed-thru and solder seals at each end
Piston Motor	Stroke: 1/4" (6.35 mm) Force (air bellows): 20 lbs min. throughout the entire stroke. Force (peak): 200 lbs min. (zero displacement)
Function Time	10 ms Max. with 5.0 amp firing current

Specifications Continuea			
Environmental			
Temperature	Operating range: -65° to +160°F (-54° to +71°C)		
Storage	-80° to +255°F (-62° to +107°C) (limited time hot)		
Shock	1/2 sine wave pulse of 200 g's Min. for 1.5 ms and 65 g's Min. for 9 ms		
Vibration	MIL-STD-810, Table 514-1 Aircraft Category, Procedure 1, Parts 1, 2 & 3, Curve H. Each resonant and cycling period divided equally among -65°, +70°, and +200°F (-54°, +21°, and +93°C)		
Temperature Shock/Humidity/ Altitude	MIL-I-23659		
Chemical			
Ignition Compound	Barium Styphnate		
Freight Classification			
Shipping Name	Release Devices, Explosive		
Identification Number	UN0173		
Hazard Classification	1.4S		

PO Box 47 Joplin, Missouri 64802-0047 USA | tel 417.623.8000 | fax 417.623.0850 | **www.eaglepicher.com**



DIMENSIONS IN PARENTHESIS () ARE IN MM.





EaglePicher Technologies, LLC PO Box 47, Joplin, Missouri 64802-0047, USA tel 417.623.8000 | fax 417.623.0850 www.eaglepicher.com

EAGLEPICHER⁺

Remarkably small and lightweight, it is ideal for high-volume applications such as submunitions. Its co-axial design facilitates automatic insertion

into the next assembly.

1MT100 Miniature Piston Actuator

The 1MT100 Miniature Piston Actuator is a pyrotechnicactuated device that delivers linear force.

Variations

Actuator modifications can be made to meet customer requirements. Modifications can be made in lead lengths, firing characteristics, and force. The electrode can be nickel or gold plated, or altered in shape. Quantity and/or type of pyrotechnic charge can be changed to alter output force characteristics.

Characteristics

Some of the characteristics listed here are nominal; others are levels to which the units have been tested. There are no limits on design capabilities. Please consult an EaglePicher representative before using this data as a specification.

Electrical		
Bridge Resistance @ 70°F (21°C)	3.0 - 7.5 ohm	
All-Fire Energies @ -65°F (-54°C)	Capacitor discharge: 1.6 V, 100 microfarad (1280 erg)	
	Constant current: 0.15 amp, 10 ms	
No-Fire Current @ 165°F (74°C)	0.010 amp, 10 sec 0.7 V, 100 microfarad (245 erg)	
Mechanical		
Size	See drawing	
Weight	0.15 gm	
Stroke	0.100″ (2.54 mm)	
Load	30 lb to 120 lb	
Function Time	Ignites in less than 1.0 ms. Function time will be slightly longer depending on load.	

Specifications Continued		
Environmental		
Temperature	Operating range: -65°F to +165°F (-54°C to +74°C)	
Thermal Shock	IAW MIL-STD-202, Method 107, Condition A, except that the temperatures shall be -65°F and +165°F.	
Vibration	IAW MIL-STD-202, Method 204, Test condition A.	
Gun Launch Shock	60,000 g's peak for 1 ms along any transverse axis.	
Jolt	IAW MIL-STD-331, Test no. 101.2. Shall not activate and safe to handle.	
Jumble	IAW MIL-STD-331, Test no. 102.1. Shall not activate and safe to handle.	
Drop	40' drop: shall not activate and safe to handle. 5' drop: shall not activate and shall function properly.	

Specifications Continued

Chemical		
Ignition Compound	KDNBF	
Freight Classification		
Shipping Name	Release Devices, Explosive	
Identification Number	UN0173	
Hazard Classification	1.45	



DIMENSIONS ARE NOMINAL DIMENSIONS IN () ARE IN MM



EaglePicher Technologies, LLC PO Box 47, Joplin, Missouri 64802-0047, USA tel 417.623.8000 | fax 417.623.0850 *www.eaglepicher.com*

1MT171 Piston Actuator

The 1MT171 Piston Actuator is a highly reliable electroexplosive device used in ordnance defense systems.

> It is used as an electrically activated system to penetrate bursts discs. The 1MT171 Piston Actuator is a completely self-contained, non-sealed electroexplosive device. The hardness of the pointed piston is 220 Bn. The leads are copper cored and gold plated.

Variations

Two models (1MT171-2 and 1MT171-4) are described here. Modifications in bridge resistance can be made to meet specific requirements.

Characteristics

Some of the characteristics listed here are nominal; others are levels to which the units have been tested. There are no limits on design capabilities. Please consult an EaglePicher representative before using this data as a specification.

Electrical				
Actuator	Bridge Resistance @70°F (21°C)	All-Fire Current @ -65°F (-54°C) 10 ms	No-Fire Current @ 160°F (71°C) 1 min	Insulation Resistance @ 500 Vdc
Part No.	Ohm	Amp, Min.	Amp, Min.	MEG, Min.
1MT171-2	0.16 ± 0.10	4.0	1.00	10
1MT171-4	2.25 ± 0.75	0.9 ± 0.1	0.10	10

Specifications Continued			
Mechanical			
Size	See drawing		
Weight	2.25 gm Max.		
Lead	0.018″ (.46 mm) diameter		
Piston Extension	0.245" (6.22 mm) approx.		
Environmental			
Temperature	Operating range: -65°F to +165°F (-54°C to +73°C)		
	Storage range: -80°F to +165°F (-62°C to +73°C)		

Specifications Continued

Chemical		
Ignition Compound	KDNBF	
Output Compound	KDNBF	
Freight Classification		
Shipping Name	Piston Actuator	
Hazard Classification	1.4S	



DIMENSIONS IN () ARE IN MM



EaglePicher Technologies, LLC PO Box 47, Joplin, Missouri 64802-0047, USA tel 417.623.8000 | fax 417.623.0850 www.eaglepicher.com

1MT1118 Piston Actuator

The 1MT1118 Piston Actuator is a pyrotechnicactuated device that produces linear motion.

> Typically, this device is used to release mechanical locking mechanisms, e.g. gag rods. Both case and piston are 303 stainless steel.

Characteristics

Some of the characteristics listed here are nominal; others are levels to which the units have been tested. There are no limits on design capabilities. Please consult an EaglePicher representative before using this data as a specification.

Specifications

Electrical		
Bridge Resistance @ 70°F (21°C)	4.0 - 6.0 ohm	
All-Fire Energy @ -67°F (-55°C)	Capacitor discharge: 36 microfarad capacitor charged to 7.0 V through a 1.575 ohm series resistor. (5200 erg)	
No-Fire Level @ 70°F (21°C)	50 milliamp, 30 sec	
Insulation Resistance @ 300 Vdc, Leads to Case, Before Firing	20 megohm Min.	
Function Time	Less than 5 ms	
Mechanical		
Case and Pin Material	303 SS	
Size	See drawing	
Weight	4 gm Max.	
Stroke	.310″	
Load	Piston restrained, axial force: 125 lb Min. Full stroke with 20 lb load.	

Environmental		
Temperature	Operating range: -67°F to +221°F (-55°C to 105°C)	
Vibration	MIL-STD-202, Method 204, Test Condition E (50 g's peak, 10 to 2000 Hz).	
Shock	MIL-STD-202, Method 213, Test Condition E (18 shocks, 1,000 g's, 0.5 ms).	
Extreme Temperature Storage	MIL-STD-331, Test 112, -67°F (-55°C) for 28 days, followed by +160°F (+71°C) for 28 days.	
Temperature Cycling	MIL-STD-202, Method 107, Test Condition A, except temperature extremes are -55°C to +85°C.	
Chemical		
Ignition Compound	Lead Styphnate	
Freight Classification		
Shipping Name	Release Devices, Explosive	
Identification Number	UN0173	
Hazard Classification	1.4S	

PO Box 47 Joplin, Missouri 64802-0047 USA tel 417.623.8000 fax 417.623.0850 **www.eaglepicher.com**



DIMENSIONS ARE NOMINAL DIMENSIONS IN () ARE IN MM



EaglePicher Technologies, LLC PO Box 47, Joplin, Missouri 64802-0047, USA tel 417.623.8000 | fax 417.623.0850 www.eaglepicher.com

1MT1311 Piston Actuator

The 1MT1311 Piston Actuator is a pyrotechnicactuated device that produces linear motion.

> Larger than miniature piston actuators, it was developed to unlock gag rods. Both case and piston are 303 stainless steel.

Characteristics

Some of the characteristics listed here are nominal; others are levels to which the units have been tested. There are no limits on design capabilities. Please consult an EaglePicher representative before using this data as a specification.

Specifications

Electrical	
Bridge Resistance @ 70°F (21°C)	4.0 - 6.0 ohm
All-Fire Energy @ -67°F (-55°C)	Capacitor discharge: 36 microfarad capacitor charged to 7.0 V through a 1.575 ohm series resistor. (5200 erg)
No-Fire Level @ 221°F (105°C)	50 milliamp, 30 sec
Insulation Resistance @ 300 Vdc, Leads to Case, Before Firing	10 megohm Min.
Function Time	Less than 10 ms
Mechanical	
Case and Piston Material	303 SS
Size	See drawing
Weight	4 gm
Stroke	.425″
Load	250 lbs minimum load with piston restrained in initial position, 20 lbs minimum force throughout stroke length (1311).

Specifications Continued

Environmental	
Temperature	Operating range: -67°F to +221°F (-55°C to +105°C)
Vibration	MIL-STD-202, Method 204, Test Condition E (50 g's peak, 10 to 2000 Hz).
Shock	MIL-STD-202, Method 213, Test Condition E (18 shocks, 1,000 g's, 0.5 ms).
Extreme Temperature Storage	MIL-STD-331, Test 112, -67°F (-55°C) for 28 days, followed by +160°F (+71°C) for 28 days.
Thermal Shock	MIL-STD-202, Method 107, Condition A (except 10 cycles).
Transportation Vibration	MIL-STD-331, Test B1, (10-2000-10 Hz) 1 hr per perpendicular direction (3 axes). Peak 9 g ± 10%.
Chemical	
Energetic Compounds	Lead Styphnate, Barium Styphnate
Freight Classification	
Shipping Name	Release Devices, Explosive
Identification Number	UN0173
Hazard Classification	1.4S

PO Box 47 Joplin, Missouri 64802-0047 USA tel 417.623.8000 fax 417.623.0850 www.ed

This material is released to the public domain in accordance with ITAR 22 CFR 120.11

www.eaglepicher.com



DIMENSIONS ARE NOMINAL DIMENSIONS IN () ARE IN MM



EaglePicher Technologies, LLC PO Box 47, Joplin, Missouri 64802-0047, USA tel 417.623.8000 | fax 417.623.0850 *www.eaglepicher.com*

The 1MT172 Micro-Miniature Piston Actuator is a pyrotechnic-actuated device that delivers linear force.

Extremely small and lightweight, it is ideal for high-volume applications such as submunitions. It's co-axial design facilitates automatic insertion into the next assembly.

Variations

Actuator modifications can be made to meet customer requirements. The electrode can be nickel or gold plated, or altered in shape. Quantity and/or type of pyrotechnic charge can be changed to alter output force characteristics.

Characteristics

Some of the characteristics listed here are nominal; others are levels to which the units have been tested. There are no limits on design capabilities. Please consult an EaglePicher representative before using this data as a specification.

Specifications	
Electrical	
Bridge Resistance @ 70°F (21°C)	4.0 - 9.5 ohm
All-Fire Energies @ -65°F (-54°C)	Capacitor discharge: 1.6 V, 100 microfarad (1280 erg) Constant current: 0.15 amp. 10 ms
No-Fire Current @ 160°F (71°C)	0.010 amp, 10 sec

Specifications Continued

Mechanical	
Size	See drawing
Weight	0.40 gm
Stroke	0.150" (3.81 mm) Max.
Load	Will shear a 0.050" (1.27 mm) diameter 6061-T6 aluminum pin*
Function Time	lgnites in less than 1.0 ms. Function time will be slightly longer depending on load
Environmental	
Temperature	Operating Range: -65° to +160°F (-54° to +71°C)
Shock	13,000 g's Min. peak, 1/2 sine wave for 1ms, measured at 10% of peak amplitude
Vibration	MIL-STD-202C, Method 204A, Test Condition C, Modified as follows: 0.08" (2.03 mm) d.a. 5 to 10 Hz, 0.06" (1.52 mm) d.a. 10 to 55 Hz, 10 g's 55 to 500 Hz
Chemical	
Ignition Compound	Barium Styphnate, KDNBF
Freight Classification	
Shipping Name	Release Devices, Explosive
Identification Number	UN0173
Hazard Classification	1.45

* Output force is 50-300lbs

PO Box 47 Joplin, Missouri 64802-0047 USA tel 417.623.8000 fax 417.623.0850 **www.eaglepicher.com**



DIMENSIONS ARE NOMINAL DIMENSIONS IN PARENTHESIS () ARE IN MM.



EaglePicher Technologies, LLC PO Box 47, Joplin, Missouri 64802-0047, USA tel 417.623.8000 | fax 417.623.0850 **www.eaglepicher.com**



PA-100 Piston Actuator



The PA-100 Piston Actuator is a pyrotechnicactuated device that produces linear motion.

> Its long stroke and high output energy are well suited to applications requiring both large displacement and sustained high force.

Variations

Modifications in physical interface, output energy (over a range of 15 to 50 ft-lb), and shape of piston can be made to meet specific requirements. Activation energy may be supplied by flying tail leads or with any commercially available connector with at least 2 pins.

Characteristics

Some of the characteristics listed here are nominal; others are levels to which the units have been tested. There are no limits on design capabilities. Please consult an EaglePicher representative before using this data as a specification.

Electrical	
Insulation Resistance	Before activation, shunted leads to case: 1 megohm Min. @ 500 Vdc
Bridge Resistance	$1.00\Omega \pm 0.24\Omega$
All-Fire Current	$3.6A \pm 0.1A$, 50 msec
No-Fire Current	1.0A, 5 minutes
Environmental	
Temperature Operating Range	-40°C to +57°C
Thermal Shock	MIL-STD-202, Method 107, Condition A
Humidity	MIL-STD-202, Method 106
Mechanical Shock	MIL-STD-202, Method 213, Condition D
Vibration	MIL-STD-202, Method 204, Condition B



PA-102 Miniature Piston Actuator

The PA-102 Miniature Piston Actuator is a pyrotechnic-actuated device that delivers linear force.

> Remarkably small and lightweight, it is ideal for high-volume applications such as submunitions. Its co-axial design facilitates automatic insertion into the next assembly.

Variations

Actuator modifications can be made to meet customer requirements. Modifications can be made in lead lengths, firing characteristics, and force. The electrode can be nickel or gold plated, or altered in shape. Quantity and/or type of pyrotechnic charge can be changed to alter output force characteristics.

Characteristics

Some of the characteristics listed here are nominal; others are levels to which the units have been tested. There are no limits on design capabilities. Please consult an EaglePicher representative before using this data as a specification.

Electrical	
Bridge Resistance @ 70°F (21°C)	3.0 - 7.5 ohm
All-Fire Energies @ -65°F (-54°C)	Capacitor discharge: 1.6 V, 100 microfarad (1280 erg)
	Constant current: 0.15 amp, 10 ms
No-Fire Current @ 165°F (74°C)	0.010 amp, 10 sec 0.7 V, 100 microfarad (245 erg)
Mechanical	
Size	See drawing
Weight	0.15 gm
Stroke	0.125″ (3.17 mm)
Load	60 lb to 140 lb
Function Time	Ignites in less than 1.0 ms. Function time will be slightly longer depending on load.
Environmental	
Temperature	Operating range: -65°F to +165°F (-54°C to +74°C)
Chemical	
Ignition Compound	KDNBF
Freight Classification	
Shipping Name	Release Devices, Explosive
Identification Number	UN0173
Hazard Classification	1.4S



DIMENSIONS ARE NOMINAL DIMENSIONS IN () ARE IN MM



EaglePicher Technologies, LLC PO Box 47, Joplin, Missouri 64802-0047, USA tel 417.623.8000 | fax 417.623.0850 *www.eaglepicher.com*