Chemring
Energetics UK

METRON ACTUATORS

COMPACT, FAST, RELIABLE

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WHAT ARE METRON ACTUATORS?

Metron Actuators are highly reliable, light, compact, single shot, pyro-mechanical devices which can be used to perform a variety of functions. They are employed primarily to provide a linear protracting motion but can be adapted to pull, cut, shear or release when installed in a suitable mechanism.

They operate within milliseconds of receiving an appropriate electrical impulse, a rate which is almost impossible to achieve with a mechanical source of energy.

Each device uses the rapid expansion of hot gas evolved from the combustion of a small pyrotechnic charge to drive a piston with very high thrust.

This action can be used to perform mechanical work and applications include valve operation, compressed gas bottle opening and sprinkler activation to name but a few.

All pyrotechnic effects are contained within the body of the device and there is no external gas or flame resulting from ignition of the charge. As such these devices are excluded from UN Hazard Class I Explosives and, in the approved pack, can be transported by normal parcel post. No special provision is required for storage.

Metron Actuators are used globally and predominantly across four sectors – Fire Suppression, Security and Safety, Automotive and Aerospace.

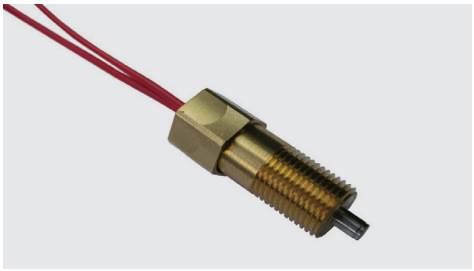
Our range of actuators offers the following advantages:

- Very high energy density
- High reliability
- Compact size and low mass
- Robust design for harsh mechanical and climatic environments
- Compatibility with hazardous atmospheres
- Suitable for automatic or remote controlled applications
- Low maintenance
- Good longevity

Due to their flexibility of use, new sectors and applications are being continually developed.

Our devices help to save lives and improve the effectiveness of many civil and military systems.

APPLICATIONS OF METRON ACTUATORS



1. FIRE SUPPRESSION/ VEHICLE FIRE SUPPRESSION

Chemring Energetics UK has been supplying pyro-mechanical actuation devices to the fire and explosion suppression market for over 40 years. With a long-standing reputation for product excellence, our Metron Actuator range is the preferred choice of many industry leaders in the fire suppression sector.

Due to their unique performance characteristics, reliability and ability to operate in demanding environments many fire suppression systems utilise our Metron Actuators as their sole means of system initiation.

With an astonishingly quick function time, within 20milliseconds of activation, it is understandable why so many systems manufacturers opt to use our Metron Actuators for safety-critical systems.

They are often used to open cylinder valves by operating directly on to the stem valve. Further adopted methods of activation include destruction of frangible bulbs in sprinkler systems, destruction of frangible links, piercing of metal diaphragms and the opening/closing of vents.

Their compact size coupled with a staggering power-to-weight ratio means they are frequently used in conjunction with CO2 canisters to pressurise fire suppression cylinders. This makes them a popular choice among many of the vehicle fire suppression systems manufacturers across the world.

Our devices are not only tasked with protecting critical systems and equipment but more importantly, human life.

2. SECURITY & SAFETY

With response time being of critical importance in the security sector, Chemring Energetics Metron Actuator range of devices are often utilised in cash protection systems due to their compact size and rapid function time. The Metron Actuator is typically used in conjunction with a CO2 canister which when activated, rapidly disperses coloured dye or fast acting adhesive, rendering bank notes unusable in the event of a robbery. With relatively low firing current required to function the device and compact size; Chemring Energetics' Metron Actuators are an ideal candidate for integration in to cash-in-transit devices.

In marine safety systems, the hermetic sealing of the Metron Actuator makes it inherently suitable for a number of diverse applications in both surface and sub-sea environments.

Our actuators can be used to provide lifebuoy or life raft release from parent vessels where again their rapid response time and ease of activation are second to none.

3. AUTOMOTIVE

Pyrotechnic devices have been an integral part of automotive safety design since the 1970s, when the first airbags were installed. Innovations in car safety continue to be a significant focus for global manufacturers in order to ensure they meet increasingly stringent standards.

At Chemring Energetics UK, we have the technical expertise, knowledge and know-how to provide manufacturers with design solutions to ensure they continue to develop safer cars and save lives.

4. AEROSPACE

Through its long association with the Aerospace sectors, Chemring Energetics UK's products meet the required high levels of qualification, tolerances and reliability. Metron Actuators are found in civil aircraft around the world, for example the Boeing 787 Dreamliner, where they play an integral role in emergency oxygen systems. Whilst many products are designed and customised specifically for its customers, Chemring Energetics UK is also able to offer cost effective off-the shelf solutions.

5. DEFENCE

Metron Actuators are also utilised widely in Military applications. These include missile fin deployment, release mechanisms, component retention / ejection and safety & arming units.

Further use of Metron Actuators includes Military Aircraft and Helicopter systems.

THE DR2000 SERIES

THE CHEMRING ENERGETICS UK LTD DR2000 SERIES OF METRONS HAS BEEN USED ON A GLOBAL SCALE SINCE THE EARLY 1970'S.

The range has been developed to meet demanding customer requirements and can be found in a wide range of applications.

Metron Actuators are a key component in many safety critical systems.

All of our actuators are hermetically sealed and have been comprehensively tested in harsh mechanical and climatic environments.

They are available in a variety of stroke lengths and different levels of energy output. There are also options on the electrical firing characteristics ranging from low threshold (0.145Amps All Fire) through to the EMC safe 1A1W-5minute No Fire standard (5 Amp All Fire).

Metrons can also be supplied with a range of cable finishes from simple flying leads to over-moulded ends with flame resistant sheathing.

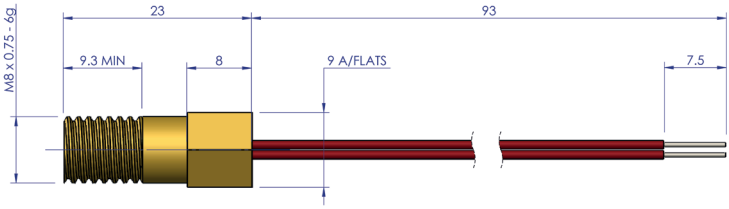
A special form of the Metron has been developed specifically for gas bottle penetrating applications. This has a unique profile in the piston which allows the bottle to be opened and gas to subsequently flow through the aperture.

The following pages provide the key characteristics of the Metron Actuators and associated cable finishes with stroke sizes ranging from 3.5mm to 14mm.

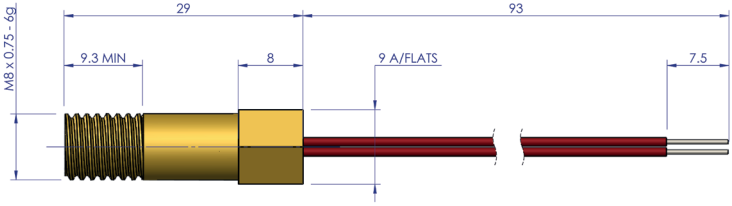
Please contact Chemring Energetics if the combination you are looking for is not listed and we will check to see if we can meet your requirements.

TECHNICAL DETAILS

DR2003



DR2005



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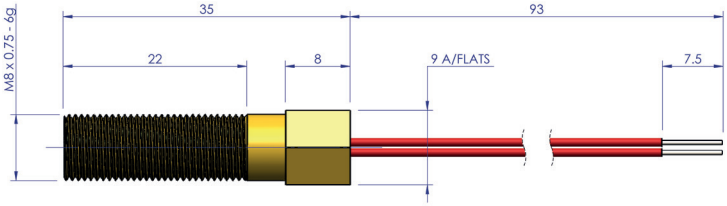
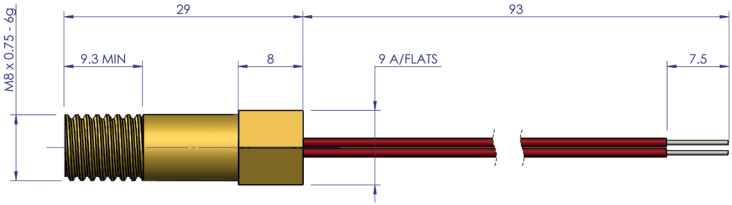
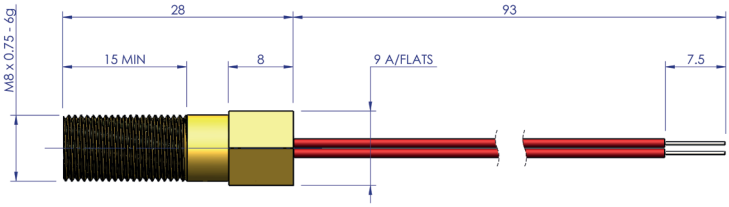


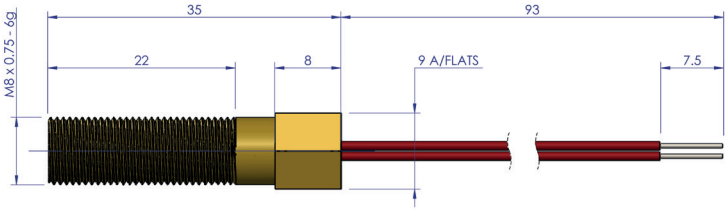
DR2027



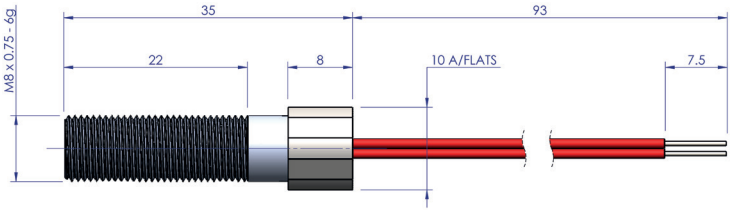
DR2085



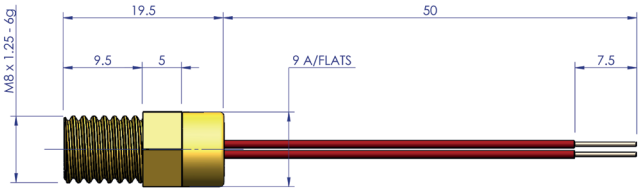
DR2006



DR2094

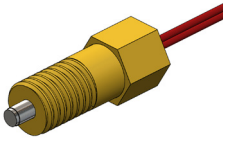


DR2075

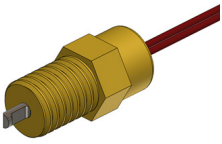


TECHNICAL DETAILS

DR2003



DR2075



Specifications		3.5mm Stroke	Bottle Punch
Minimum Piston Stroke Length (mm)		3.40	3.50
Available Cable Finishes		C1, C2, C3	C1
Minimum Work Output (Joules)		1.15	N/A
Typical Peak Thrust (Newtons)		1100	N/A
Service Life (Ambient) (Yrs)		10	10
Operating Temperature (°C)		-40 to +70	-40 to +70
Electrical Resistance Range (Ohms)		0.9 - 1.6	1.30 - 2.20
Maximum No Fire Current (Amps)	30 sec pulse	0.15	
	0.05 sec pulse	0.30	0.25 (0.5 sec pulse)
Minimum Single Fire Current (Amps)	DC	0.60	
	0.01 sec pulse	0.90	1.00
Recommended Series Firing Current (Amps)		3.00	3.00

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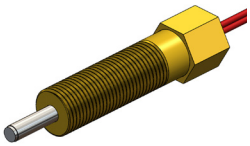
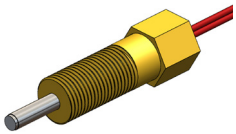
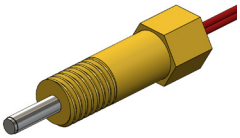
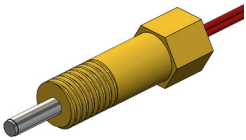
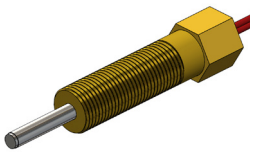
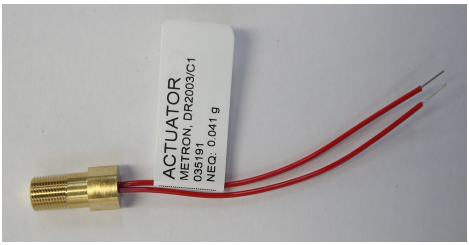
			
Specifications		**10mm Stroke**	**10mm Stroke**
Minimum Piston Stroke Length (mm)		9.50	9.50
Available Cable Finishes		C1	C1
Minimum Work Output (Joules)		4.90	3.00
Typical Peak Thrust (Newtons)		1800	2000
Service Life (Ambient) (Yrs)		10	10
Operating Temperature (^{O}C)		-40 to +70	-40 to +70
Electrical Resistance Range (Ohms)		0.9 - 1.6	0.65 - 1.90
Maximum No Fire Current (Amps)	30 sec pulse	0.15	1A1W-5 min NF
	0.05 sec pulse	0.30	
Minimum Single Fire Current (Amps)	DC	0.60	3.50 (50ms pulse)
	0.01 sec pulse	0.90	5.00
Recommended Series Firing Current (Amps)		3.00	

	DR2005	DR2027
		
Specifications	**10mm Stroke**	**10mm Stroke**
Minimum Piston Stroke Length (mm)	9.50	9.50
Available Cable Finishes	C1, C2, C3	C1
Minimum Work Output (Joules)	3.40	3.40
Typical Peak Thrust (Newtons)	2300	2300
Service Life (Ambient) (Yrs)	10	10
Operating Temperature (^{O}C)	-40 to +70	-40 to +70
Electrical Resistance Range (Ohms)	0.9 - 1.6	10.0 - 16.0
Maximum No Fire Current (Amps) — 30 sec pulse	0.15	0.03
Maximum No Fire Current (Amps) — 0.05 sec pulse	0.30	0.05
Minimum Single Fire Current (Amps) — DC	0.60	0.14
Minimum Single Fire Current (Amps) — 0.01 sec pulse	0.90	0.145
Recommended Series Firing Current (Amps)	3.00	3.00

		DR2094	DR2006
			
Specifications		**14mm Stroke**	**14mm Stroke**
Minimum Piston Stroke Length (mm)		13.60	13.50
Available Cable Finishes		C67	C1, C2, C63
Minimum Work Output (Joules)		10.00	4.90
Typical Peak Thrust (Newtons)		2275	2300
Service Life (Ambient) (Yrs)		10	10
Operating Temperature (^{O}C)		-40 to +84	-40 to +70
Electrical Resistance Range (Ohms)		0.9 - 1.6	0.9 - 1.6
Maximum No Fire Current (Amps)	30 sec pulse	0.15	0.15
	0.05 sec pulse	0.30	0.30
Minimum Single Fire Current (Amps)	DC	0.60	0.60
	0.01 sec pulse	0.90	0.90
Recommended Series Firing Current (Amps)		3.00	3.00

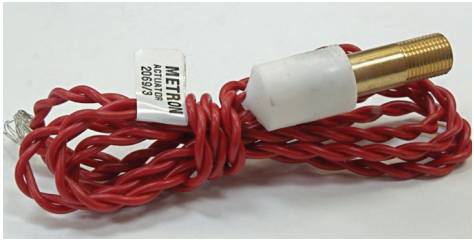
CABLE FINISHES

The cable finish is defined by C(x) where x is a number corresponding to the type of finish e.g. DR2003/C1 corresponds to a Metron Actuator defined as DR2003 with cable finish C1.

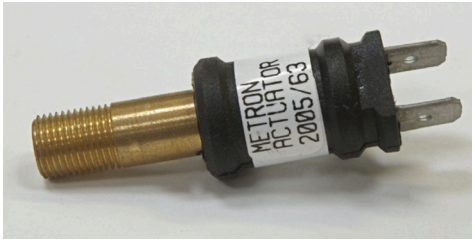


C1
Hexagonal end cap. (Fly leads approx 95mm long). PTFE sleeves.

C2
Hexagonal end cap. Multistrand leads. 1000mm long (red).



C3
Hexagonal end cap. Plastic overmould. Multistrand leads. 1000mm long (red).



C63
Plastic Overmould 1/4 Blade (0.8mm thick) Terminals.

C67
Plastic Overmould with oil and heat resistant sheathing.

The Technical details show the specific Metron/Cable finish combinations available.

If you would like to discuss other options please contact our team.

INSTALLATION AND SAFE USE OF METRON ACTUATORS

1. Instruction Scope

1.1. This section provides information on the product characteristics, handling and installation of Metron Actuators.

1.2. All information is intended for guidance only. Recipients should satisfy themselves with the suitability of the Metron Actuator for their particular purpose.

2. Actuator Characteristics

2.1. Metron Actuators are category P1 pyrotechnic articles.

2.2. These Actuators are available with varying electrical sensitivity and performance characteristics such as force, energy, function time and piston stroke length.

2.3. Initiation of a Metron Actuator will result in a forceful movement of a piston to perform mechanical work.

2.4. During the process this will result in a small metal septum being ejected from the front of the device, and a piston will project at a high velocity up to a maximum of 14mm in length. The septum will decelerate quickly due to its weight and will typically travel up to 30cm if unobstructed.

3. Linking and Arrays of Metron Actuators

3.1. Metron Actuators may be linked to form an array for some applications.

3.2. CEUK recommend series firing as being the simplest and most reliable method to fire multiple Metron Actuators simultaneously. It is critical that only Metron Actuators of the same electrical sensitivity are linked in a multiple firing circuit.

3.3. It is recommended that users contact CEUK if planning on using a multiple firing circuit.

4. Installation Guidelines

4.1. Metron Actuators are used in a wide range of applications and, as such, installation procedures are largely governed by customers systems.

4.2. Some actuators are fitted with a hexagonal end cap and care must be taken to ensure that no movement occurs at the end cap relative to the body. Actuators should be installed tight by hand force and use of a wrench avoided during installation/ removal. Movement of the end cap relative to the body may render the actuator inoperable.

4.3. Care must be taken to ensure that the actuator cable/ lead wires do not twist or flex relative to the actuator during installation. The lead wires are fragile and can be easily damaged due to twisting/ flexing. N.B. this does not refer to Metron Actuators which are supplied with twisted cables as part of the cable finish.

4.4. Electrical test meters and monitoring circuits must be limited to 0.01 Amps short circuit current to prevent inadvertent operation of the Metron Actuator. Unless otherwise stated by CEUK this monitoring level must not be exceeded.

5. Product Safety, Storage & Disposal

5.1. Users should refer to the Product Safety Data Sheet, PSDS-67, for relevant information on hazards, toxicity, storage and disposal of Metron Actuators.

5.2. The actuator should be replaced before the end of its life and this may depend on its service and conditions. Metron Actuators have a shelf life, 10 years, at standard ambient conditions. More arduous environments may require more frequent replacement. The date of manufacture can be found on the article and/ or packing label.

6. Additional Information

Additional information on performance and safety can be sought from the relevant Product Specifications Data Sheet, Product Safety Data Sheet and other technical guidance documents.

Chemring Energetics UK Ltd should be contacted if additional information is required.

APPROVALS

Metron Actuators are approved and certified to international standards including:

CE MARKING

The following devices conform to the requirements of Directive 2013/29/EU, are categorised as type "Pyromechanical Devices, Actuator", are categorised as PI and are marked with the CE Mark: DR2003, DR2005, DR2006, DR2014, DR2027, DR2075, DR2085, DR2094 Directive 2013/29/EU on the harmonisation of the laws of the Member States relates to making available on the market of pyrotechnic articles.

LOSS PREVENTION CERTIFICATION BOARD (LPCB)

The Loss Prevention Certification Board (LPCB) has been working with industry and government for more than 100 years to set the standards needed to ensure that fire and security products and services perform effectively. LPCB offers third party approval confirming that products and services have met and will continue to meet these standards.

UNDERWRITERS LABORATORIES (UL)

UL is a global independent safety science company with more than a century of expertise innovating safety solutions from the public adoption of electricity to new breakthroughs in sustainability, renewable energy and nanotechnology. Dedicated to promoting safe living and working environments, UL helps safeguard people, products and places in important ways, facilitating trade and providing peace of mind.

ISO CERTIFICATION

Chemring Energetics UK is approved to the following quality and environmental standards.

BS EN ISO 9001

ISO 9001 is a quality management system that can be integrated into any business. It is focused on ensuring the business delivers a consistent level of quality to its customers by having well defined and regularly reviewed processes and procedures.

BS EN ISO 14001

ISO 14001 sets out the criteria for an Environmental Management System (EMS).

It does not state requirements for environmental performance, but maps out a framework that a company or organization can follow to set up an effective EMS.

It can be used by any organisation that wants to improve resource efficiency, reduce waste, and drive down costs. Using ISO 14001 can provide assurance to company management and employees as well as external stakeholders that environmental impact is being measured and improved. ISO 14001 can also be integrated with other management functions and assists companies in meeting their environmental and economic goals.

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