

DADCO®

Safe Design Features



Over-Speed • Overstroke • Over-Pressure



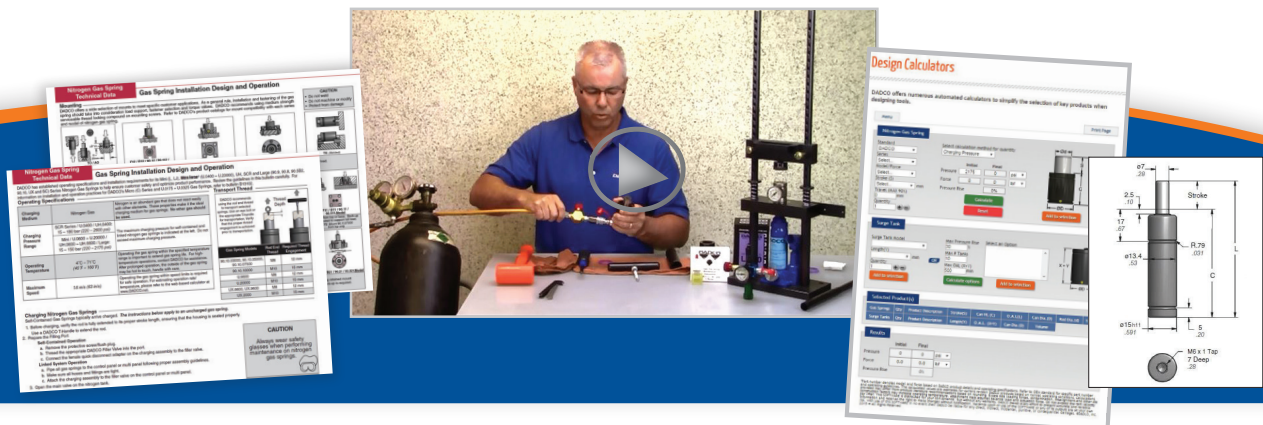


The global leader in nitrogen gas spring technology

Safety starts with intelligent engineering design followed by the incorporation of high quality materials, thoughtful analysis, and rigorous test methods. DADCO's accomplished engineering team designs our products with high quality steels and piston rods crafted from critical impact strength material to withstand conditions beyond product operating guidelines. All DADCO products undergo strenuous durability testing through our extensive research and development process. Finite element analysis, mechanical event simulation, cycle tests, component fatigue testing and hydrostatic pressure testing are utilized to validate product designs and materials. In addition, statistical process control and ultrasonic weld inspection confirm production quality for ultimate reliability.

Best practices in die design and pressroom operations can prevent most unsafe operating conditions. DADCO promotes safety awareness and proper product operation through education and training. A voluminous digital library of catalogs and support bulletins, along with online tutorial videos, on-site training classes and knowledgeable staff provide a comprehensive support system to facilitate the safe use of our products.

Providing safe, reliable, dynamic products has always been the cornerstone of DADCO's mission. These features are highlighted on the opposite page. Certified to the ISO 9001:2015 Quality Management Standard, DADCO ensures sound practices are in place for every process that effects product quality. DADCO products comply with Pressure Equipment Directive 2014/68/EU and are available globally.

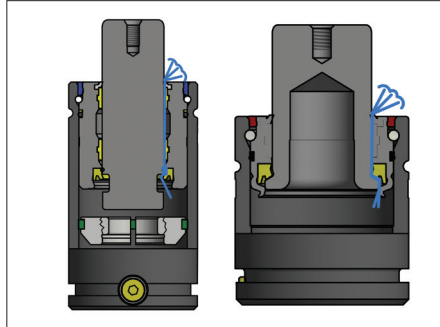


Design Overview

Over-Speed

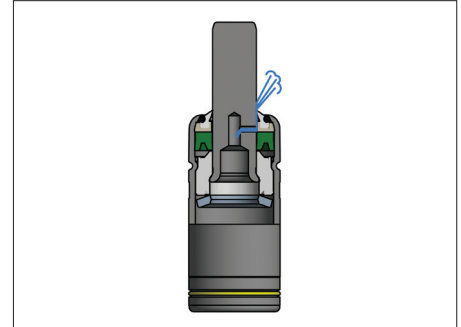


Over-speed occurs when the extension of the nitrogen gas spring piston rod exceeds recommended limits; this situation may be caused due to sudden release of parts or faulty mechanisms allowing a gas spring rod to extend freely. In cases where the velocity of the rod exceeds design limits, certain components are designed to fail and safely vent pressure while allowing the rod to be retained within the gas spring. DADCO has paid careful attention to engineer proper energy absorption to limit the forces of a high velocity event. Where there is a risk of over-speed, pre-loading the gas springs can prevent gas spring damage.



Over-Speed Safe Design Feature (Cartridge Style):

- Rod, rod retainer or safety ring embed in seal, energy is absorbed.
- Resulting seal damage simultaneously safely vents nitrogen gas.
- Part expulsion is avoided.



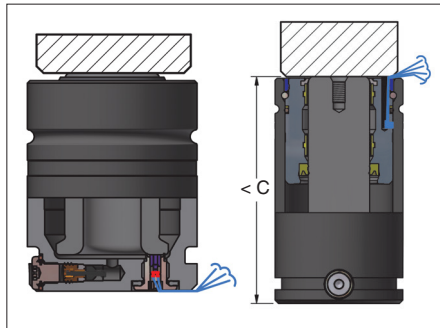
Over-Speed Safe Design Feature (Micro Style):

- Rod retainer is stripped
- Rod embeds in bearing, energy is absorbed, rod is retained.
- Cross-hole in rod is positioned to vent pressure safely.

Overstroke

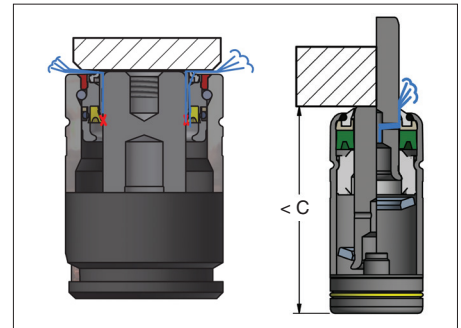


In the event that a gas spring rod is pushed further into the gas spring body than the nominal stroke length, damage will be caused to the gas spring. DADCO offers overstroke protection, patented variations to the standard product, to safely vent nitrogen gas into the atmosphere to disable the spring in the event of an overstroke condition. Best tooling design practices and standards require mechanical safety “stops” to prevent striking the top of the nitrogen gas spring body, causing critical damage, that results in an unsafe condition. DADCO also recommends at least 10% stroke reserve to prevent over-travelling and maximize performance.



Overstroke Safe Design Feature (Cartridge Style)

- Safety protection enabled through trigger pin set to zero stroke height.
- Activation of trigger pin vents nitrogen gas through pin.
- Previous construction may be retrofitted with overstroke style cartridge.



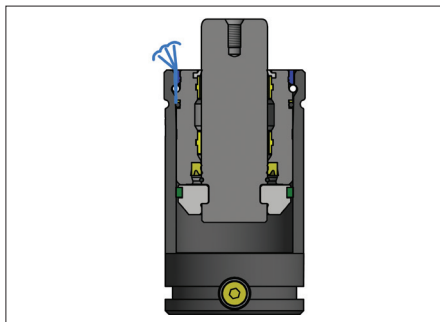
Overstroke Safe Design Feature (Micro and Mini Style)

- Front bearing sleeve forced through rod seal, venting pressure.
- Rod retainer breaks to activate overspeed feature.
- Bearing absorbs energy and positions cross-hole in rod to vent pressure safely.

Over-Pressure

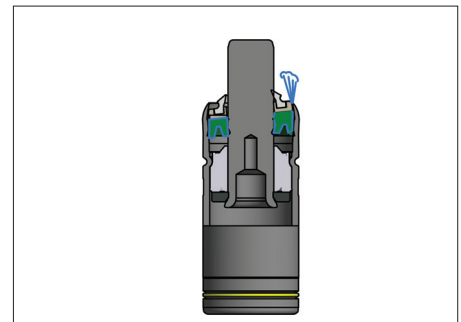


Maximum internal gas spring pressure may be exceeded by means of over charge, fluid ingestion, high temperature, or a combination of these factors. DADCO gas springs incorporate various design elements to ensure safe venting of nitrogen gas in the event of excessive internal pressure. Follow operating and installation instructions to prevent an occurrence of over-pressure from fluid ingestion or excessive heat during operation and observe maximum charging pressure restrictions.



Over-Pressure Safe Design Feature (Cartridge Style):

- Excess pressure is vented at the static o-ring seal at the point of tube deformation.



Over-Pressure Safe Design Feature (Micro Style):

- Wiper and seal vent excess pressure to one side in the event of over-pressure.

All products shown in the DADCO Nitrogen Gas Springs-EU Catalog include our over-speed, over-pressure, and overstroke protection features.

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