

Nitrogen Gas Spring
Technical Data

Gas Spring Installation Design and Operation

DADCO has established operating specifications and installation requirements for its Mini (L, LJ), **Ultra Force®** (U.0400 – U.20000), UH, SCR and Large (90.8, 90.5B2, 90.10, UX and SC) Series Nitrogen Gas Springs to help ensure customer safety and optimize product performance. Review the guidelines in this bulletin carefully. For information on installation and operation practices for DADCO's Micro (C) Series and U.0175 – U.0325 Gas Springs, refer to bulletin B13102E.

Operating Specifications

Charging Medium	Nitrogen Gas	Nitrogen is an abundant gas that does not react easily with other elements. These properties make it the ideal charging medium for gas springs. No other gas should be used.
Charging Pressure Range	15 – 150 bar (220 – 2175 psi)	The maximum charging pressure for self-contained and linked nitrogen gas springs is indicated at the left. Do not exceed maximum charging pressure.
	SCR Series / U.0400 / UH.0400: 15 – 180 bar (220 – 2600 psi)	
Operating Temperature	4°C – 71°C (40°F – 160°F)	Operating the gas spring within the specified temperature range is important to extend gas spring life. For high-temperature operations, contact DADCO for assistance. After prolonged operation, the outside of the gas spring may be hot to touch, handle with care.
Maximum Speed	1.6 m/s (63 in/s)	Operating the gas spring within speed limits is required for safe operation. For estimating operation rate/temperature, please refer to the web-based calculator at www.dadco.net .
	SCR Series .5 m/sec (20 in/sec)	

Transport Thread

DADCO recommends using the rod end thread to transport selected springs. Use an eye bolt or the appropriate T-handle for transportation. Verify that the proper thread engagement is achieved prior to transportation.

Gas Spring Models	Rod End Thread	Required Thread Engagement
90.10.03000, 90.10.05000, 90.10.07500	M8	12 mm
90.10.10000	M10	15 mm
U.9600, UX.6600, UX.9600	M8	12 mm
U.20000, UX.20000	M10	15 mm

Charging Nitrogen Gas Springs

Self-Contained Gas Springs typically arrive charged. **The instructions below apply to an uncharged gas spring.**

90.320.____

90.310.111

1.) Before charging either a Self-Contained or Linked System, verify the rod is fully extended to its proper stroke length, ensuring that the housing is seated properly against the c-style retaining ring. Use a DADCO T-Handle to extend the rod.

2a.) To prepare the Filling Port in a **Self-Contained Operation**, remove the protective screw/flush plug. Then, thread the appropriate DADCO Filler Valve into the port. Finally, connect the female quick disconnect adapter on the charging assembly to the filler valve.

2b.) In a **Linked System Operation**, pipe all gas springs to the control panel or multi panel following proper assembly guidelines. Make sure all hoses and fittings are tight. Attach the charging assembly to the filler valve on the control panel or multi panel.

3.) Open the main valve on the nitrogen tank. Set the desired charging pressure on the regulator. Slowly open the shut-off valve and allow the gas spring or system to reach the desired charging pressure. After each spring has been charged to the desired pressure, **CLOSE THE HOSE SHUT-OFF VALVE**. Disconnect the charging assembly from the filler valve. The small amount of nitrogen trapped between the shut-off valve and filler valve will bleed off as you disconnect the fitting. If you're using the 90.310.340 filling assembly with the 90.310.044 charging assembly, the gas will vent when the valve closes

4.) For **self-contained units**, verify the internal pressure using a DADCO Load Cell or Pressure Analyzer, contact DADCO for load cell instructions and additional information. **DO NOT** test the pressure using a hammer. DADCO recommends periodic checking of internal gas spring pressure as a preventive maintenance measure.

5.) CLOSE the tank shut-off valve when not charging gas springs. **NOTE:** If you're not using a DADCO Charging Assembly, make sure your charging assembly consists of a high pressure thermoplastic hose, o-ring face seal fittings and a high pressure valve.

CAUTION
Always wear safety glasses when performing maintenance on nitrogen gas springs.

Discharging

CAUTION: Before disposing of damaged or worn out gas springs, be sure to discharge all pressure. Contact DADCO for additional information.

Port plug facing up

90.360.4

90.320.8

90.320.8

1.) When discharging a DADCO Nitrogen Gas Spring, position the gas spring horizontally with the port up for safety. Remove the port plug.

2.) Keeping face and hands clear of the port, use the Valve Bleed Tool (90.360.4) or Port Servicing Tool (90.320.8) to depress the valve. Cover the port with a cloth to absorb discharge. After all of the gas pressure is exhausted, be sure that the piston rod will freely compress into the tube manually. If not, try depressing the valve again. If still unsuccessful, STOP and contact DADCO.

3.) Exhaust the nitrogen gas by opening the bleed valve on the control panel. Verify that all pressure is relieved by manually compressing the piston rod into the tube. If the rod will not fully retract release the remaining pressure. If still unsuccessful, STOP and contact DADCO.

Tools for Charging and Discharging

Pressure Analyzer
90.315.5

T-Handle
90.320.M
(M6, M8, M10)

Port Servicing Tool
90.320.8

Quick Disconnect Charging Assembly
Standard 90.310.040 • High Pressure 90.310.041/44 • European 90.310.045

Self-Venting Quick Disconnect Filling Assembly
90.310.338 • 90.310.339 • 90.310.340

M6 Charging Nipple
90.310.143

Valve Bleed Tool
90.360.4

G1/8 Charging Nipple
90.310.111

CAUTION!
This tool contains HIGH PRESSURE nitrogen gas spring systems. Exhaust to prevent pressure and release safely. Do not service gas springs in case of damage. Replacement components with trained personnel can safely remove all pressure. MAXIMUM SYSTEM CHARGE PRESSURE: 2075 psi (143 bar) MAXIMUM SYSTEM OPERATING TEMPERATURE: 160°F (71°C) NITROGEN GAS ONLY

NOTE: DADCO recommends that customers identify tools containing high pressure nitrogen gas springs with a safety plate to ensure their proper handling. Contact DADCO for Safety Plate ordering information.

Service

DADCO's Mini (L, LJ), **Ultra Force®** (U.0400 – U.20000), UH, SCR and Large (90.8, 90.5B2, 90.10, UX and SC) Series Nitrogen Gas Springs are repairable. DADCO supplies detailed repair instructions with its repair and seal kits. After reviewing the maintenance guides, if you require additional training or have any questions, please contact DADCO. Contact DADCO for SCR Series gas spring repair.



Mounting

DADCO offers a wide selection of mounts to meet specific customer applications. As a general rule, installation and fastening of the gas spring should take into consideration load support, fastener selection and torque values. DADCO recommends using medium strength serviceable thread locking compound on mounting screws. Refer to DADCO's product catalogs for mount compatibility with each series and model of nitrogen gas spring.

- CAUTION**
- Do not weld
 - Do not machine or modify
 - Protect from damage

<p>TO / AO <i>Basic Mount</i></p> <p>Drop in, flat bottom pocket. Mount from base. Choose proper length screws to maximize thread engagement (SD). Thread engagement (SD) is determined by the tolerance of SL. Not for applications with long stroke extensions (LX) in upper dies.</p>	<p>F12 / B12 / B30 / 90.12 / 90.112 / 90.212 / 90.312 / 90.30.Model</p> <p>Mount from top only. Back-up is required to support the full load.</p>	<p>TNF1 / TNF2 (Welded)</p>	<p>TR1 / TR2 (Welded)</p>	<p>TK (Welded)</p>
Mount from top only. Back-up is required to support the full load. Welded mounts available on large gas springs only.				
<p>B26 / 90.26.Model</p>	<p>B19 / B319V / 90.19 / 90.319.Model</p>	<p>TFM (Welded)</p>	<p>TSW (Welded)</p>	<p>F11 / B11 / 90.11 / 90.911.Model</p>
Mount from top only. Back-up is required to support the full load. Mount from top or base. Back-up is required to support the full load. Welded mounts available on large gas springs only. NOTE: Mount 90.11.07500 from top only.				
<p>B322 / 90.322.Model</p>	<p>B27 / 90.27.Model</p>	<p>B28 / 90.28.Model <i>(Threaded Body)</i></p>	<p>B29 / 90.29.Model <i>(Threaded Body)</i></p>	<p>B25 / 90.25 / 90.325.Model</p>
Mount from top only. Wire ring retained mount supports the full load. No back-up is required. L / LJ only. Mount from the top only. Back-up is required to support the full load. L/LJ only. DADCO recommends using anti-seize on threaded body springs, especially when utilizing a mount. L Series Only. Mount from top only. Wire ring retained mount supports the full load. No back-up is required.				

Standard Installation Principles

<p>OVERSTROKE PREVENTION</p> <p>0.9 x S = MAX Travel</p> <p>Stroke Reserve Not For Travel</p> <p>S</p> <p>DADCO recommends at least 10% stroke reserve to achieve optimal safety. Two types of overtravel (OT) can occur, OT 1 may cause a crushed spring, OT 2 may cause internal damage. Over stroking the rod or impacting the top of the cylinder will cause permanent damage. A high travel percentage may also cause the maximum operating temperature to be exceeded. 10% stroke reserve is recommended for optimal performance (20% for Ultra Force® Series Springs).</p>	<p>SIDE LOAD PREVENTION</p> <p>>1° (SC Series >0.2°)</p> <p>Avoid side loading when possible. Side loading resulting from press action or worn guide components causes increased wear on the bearing, seal, and piston rod. Rod end may wear soft die materials, use hardened contact surface (RC 25-40). The end of the piston rod has a construction thread intended for assembly and disassembly purposes only, and should never be used to mount or secure the gas spring. Die vibration and/or misalignment will damage the spring.</p>	<p>OVERPRESSURE PREVENTION</p> <p>Drain Hole</p> <p>Avoid direct contact with die lubricants and cleaners. Protect gas springs by providing adequate drainage in gas spring pockets.</p>
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Improper Installation

<p>OVERSTROKE PREVENTION</p> <p>Gap</p> <p>Verify cap screw length.</p>	<p>SIDE LOAD PREVENTION</p> <p>Induces side loading</p> <p>Ensure the rod end is not constrained. Use the bottom mount in a supported application only.</p>	<p>Gap</p> <p>Avoid large gaps in upper. Use tapped holes in base to secure, pre-load if possible.</p>	<p>OVERSPEED PREVENTION</p> <p>Jammed parts are very dangerous. If parts are jamming, determine the root cause and repair it before production continues. Slight pre-load of gas spring prevents damage from sudden release. Sudden release may damage and / or vent cylinders.</p>
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<p>Choose proper length screw to maximize thread engagement. A screw that is too long will damage the spring and one that is too short does not provide enough support. Always use thread locking compound.</p>	<p>Do not use welded mounts without proper back up.</p>	<p>Do not weld.</p>	<p>Do not grind or machine.</p>
<p>Do not use mounting screws to support the full load. Install top flange mounts from top only.</p>	<p>Do not rely on fasteners for shear loading. Always back up.</p>	<p>Do not lathe turn.</p>	

Safe Removal of Damaged Nitrogen Gas Springs

<p>• Discharge gas spring before removal.</p> <p>• Do not use a slide hammer or similar method to remove a gas spring. Slide hammer forces exceed design limits and will damage internal components.</p>	<p>Sign of over stroking. Potentially unsafe gas spring.</p>
<p>If the port is not accessible, drill through the body of the gas spring to safely discharge. It may be necessary to drill through die components. Die disassembly may also be required.</p>	