

Comprehensive Guide

This service manual is a simple step-by-step maintenance guide for DADCO's FCL Series Nitrogen Gas Springs.

Proper repair requires careful examination of all component parts and replacement of any that are worn or damaged. All DADCO replacement parts are available from factory stock. Typically, DADCO Nitrogen Gas Springs can be rebuilt in less than ten minutes by replacing only a few parts.

After reviewing this maintenance guide, if you require any additional training or have any questions please contact DADCO for assistance.

Repair Tools

C-Ring Removal Tool 90.355

To remove the C-style retaining ring safely in a single controlled motion.



C-Ring Installation Tool 90.351.00500 (for use with FCL.503) 90.351.00750 (for use with FCL.755)

To insert the C-style retaining ring into the retaining ring groove.



T-Handle 90.320.1 – M6 thread 90.320.2 – M8 thread

To remove the piston rod when disassembling and position correctly when reassembling.



Removal Sleeve 90.340.00500 (for use with FCL.503) 90.340.00750 (for use with FCL.755)

To position the cartridge assembly below the C-ring groove when assembling or disassembling a gas spring.



Port Servicing Tool 90.320.8

To perform all necessary servicing to the valve compartment.



Standard Load Cell 90.300.0300 (for use with FCL.503) 90.300.0500 (for use with FCL.755)

When used with a Portable Test Stand, the Standard Load Cell gives precise measurement of gas spring charging pressure. For more information contact DADCO.



Valve Bleed Tool 90.360.4

Use the DADCO Valve Bleed Tool to slowly discharge a spring to the desired pressure.



Quick Disconnect Filler Valve 90.310.143

Use the DADCO Quick Disconnect Filler Valve to charge the FCL Series Gas Springs. For more information contact DADCO.



DADCO Pressure Analyzer 90.315.5

Use the DADCO Pressure Analyzer to easily charge, discharge, and gauge the pressure in DADCO Gas Springs. This tool can take the place of the Valve Bleed Tool, Standard Load Cell, Quick Disconnect Filler Valve, and Portable Test Stand. For more information request bulletin #B01133E.



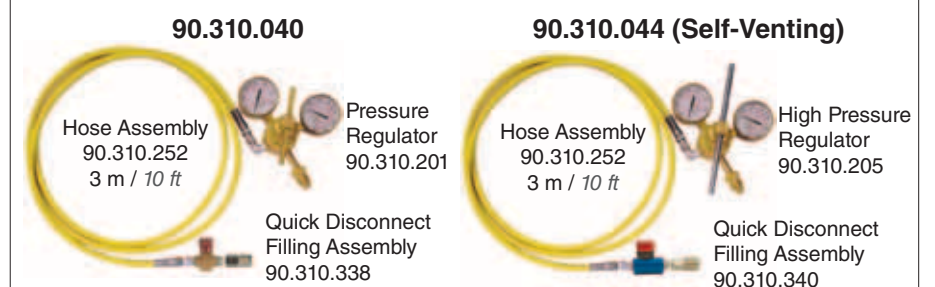
Mini Test Stand 90.305.2 90.305.2D

Use the Portable Test Stand in conjunction with a Standard Load Cell for precise measurement of gas spring force on contact. For more information request bulletin #B08108B.



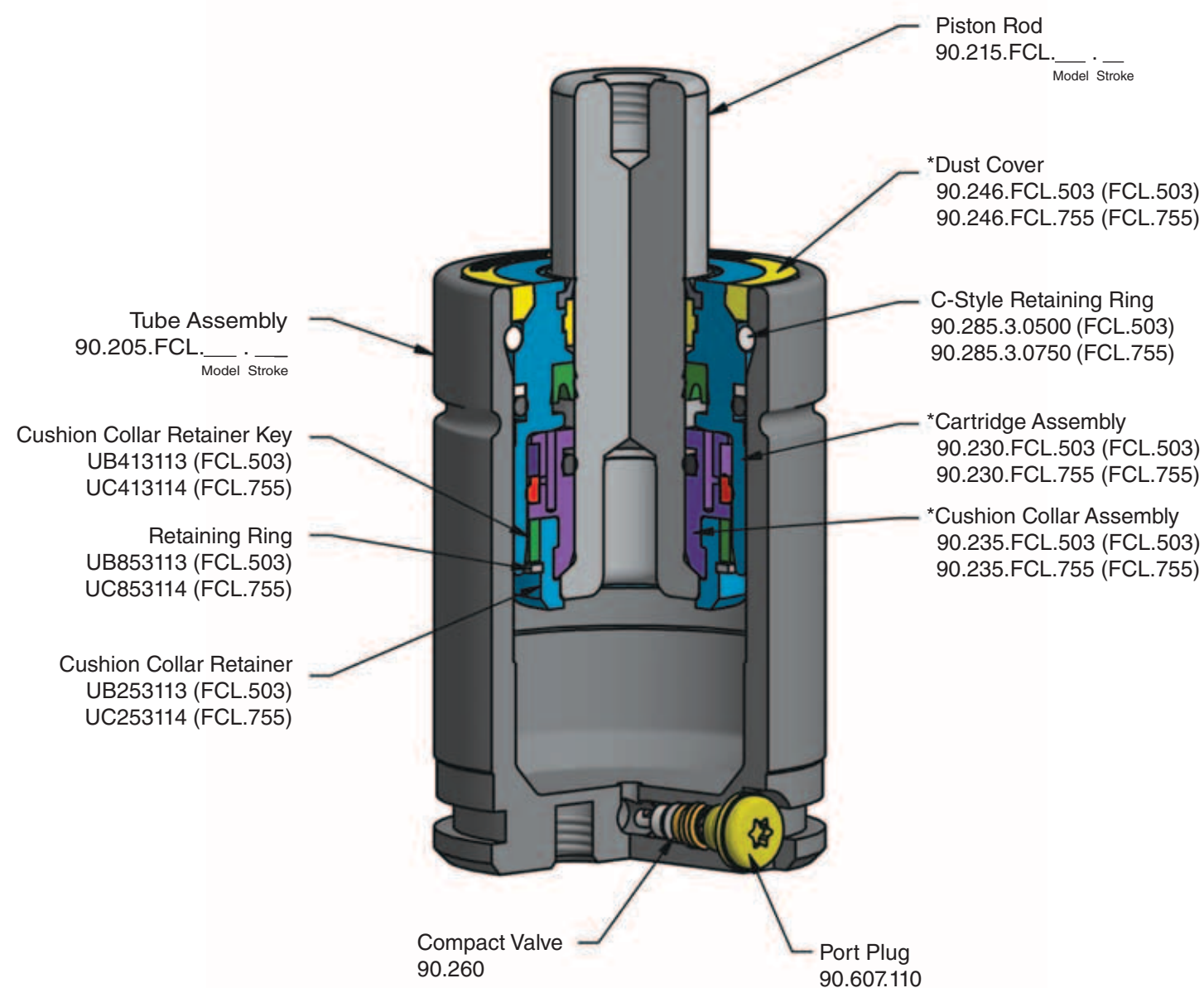
Quick Disconnect Charging Hardware

Use a DADCO Quick Disconnect Charging Assembly with the Filler Valve or Pressure Analyzer to charge self-contained gas springs. Both options may be used for charging the FCL Series. Optionally, the 90.310.044 features the high pressure regulator and releases the residual pressure after charging for easy decoupling between the filling assembly and the charging nipple.



Bulletin No. B17106

Parts List



FCL Series Repair Kit FCL.RK.503 FCL.RK.755

* FCL Series Repair Kit includes a fully assembled cartridge, cushion collar assembly, dust cover, a bottle of assembly oil and a maintenance manual.



Nitrogen Gas Spring Maintenance Instructions

FCL Series

43850 Plymouth Oaks Blvd.
Plymouth, Michigan USA 48170
Phone: 1.734.207.1100
Toll Free: 800.DADCO.USA
Fax: 1.734.207.2222
www.dadco.net

Note: Nitrogen Gas Spring repair varies slightly from model to model, and by mode of operation (self-contained or open-flow). As you proceed through the basic steps outlined in this bulletin, take care to follow the instructions pertaining to your model. All DADCO gas springs are permanently marked with model and serial number. Please refer to these numbers for corresponding repair kits and when ordering replacement parts.

All DADCO bulletins and catalogs are available for download from our web site, www.dadco.net.

CAUTION: Always wear safety goggles when performing any maintenance work.

FCL Series Gas Spring Repair Instructions

I. Exhausting Pressure



1. When exhausting pressure, position the gas spring horizontally with the port up for safety.



2. Remove the Port Plug, (90.607.110), located at the base of the spring. Retain parts for use during reassembly.



3. 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 stem, (90.260). Cover the port with a cloth to absorb discharge.



4. After all of the gas pressure is exhausted, be sure that the piston rod will freely retract into the tube manually. If not, try depressing the valve again. If still unsuccessful **STOP** and contact DADCO.

II. Port Maintenance



1. Generally the valve does not need replacing. Only if the valve appears damaged, is leaking pressure or sticking proceed to step 2, otherwise leave the valve undisturbed and proceed to "III. C-Ring Removal."



2. Remove the Compact Valve, (90.260), by unthreading it with the Port Servicing Tool, (90.320.8).



3. Thread a new Compact Valve, (90.260), into the port until it fits snugly on the seat. Avoid over torquing the valve.

III. C-Ring Removal



1. Stand the gas spring upright. Place a Removal Sleeve (90.340.x), longer than the stroke over the rod. Make sure to use the proper removal sleeve for the cylinder. Tap the sleeve until the Dust Cover, (90.246.x.x), is loosened. Remove the Dust Cover and discard.



2. Reposition the DADCO Removal Sleeve and only continue tapping until the rod cartridge assembly is slightly below the retaining ring groove. The bore of the Tube Assembly is designed to stop the cartridge in this position. DO NOT force the cartridge down further into the Tube Assembly.



3. Remove the C-style Retaining Ring, (90.285.x.x), using a C-Ring Removal Tool, (90.355). Position the hooked end of the tool below the c-ring. For best results locate the tool near either end of the c-ring.



4. Once the hooked end of the tool is firmly seated below the c-ring, begin pushing it toward the outside of the gas spring tube. The handles will close naturally, and the c-ring will be extracted as you complete this motion. For a detailed explanation of c-ring removal see bulletin #B13113A.

IV. Rod & Cartridge Removal



1. To remove the Rod with Cartridge Assembly and Cushion Assembly, thread a T-Handle, (90.320.1 or 90.320.2), into the rod end. Pull the entire assembly out of the tube. The spring body can be held in a vise (with soft jaws) while pulling out the assembly.



2. Once the cartridge, cushion and rod are removed from the Tube Assembly slide the cartridge off the rod and discard. The rod still has the Cushion Collar Assembly installed.



3. Turn the rod over to access the Cushion Collar Retainer Key (UB413113 or UC413114). Remove the Retaining Ring (UB853113 or UC853114), using a small screwdriver. Wipe the ring off using a clean cloth and retain for reassembly.



4. Remove the Cushion Collar Retainer Key (UB413113 or UC413114). Clean the key using a soft cloth and retain for reassembly.



5. Remove the two halves of the Cushion Collar Retainer (UB253113 or UC253114). Clean the retainer halves using a soft cloth and retain for reassembly.



6. Slide the Cushion Collar Assembly (90.235.FCL.503 or 90.235.FCL.755) off the rod and discard. The repair kit includes a new Cushion Collar Assembly. The rod is now ready for cleaning & inspection.

V. Cleaning & Inspection



1. Lightly polish the rod surface with an emery cloth (600 grit). Inspect the finish of the rod for any scratches or gouges. If the rod is damaged it must be replaced.



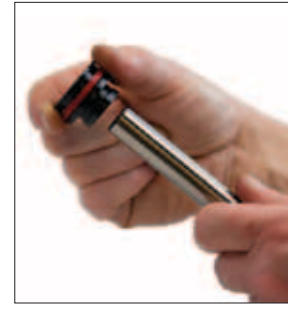
2. Inspect the Tube Assembly for any damage, especially around the mouth of the Tube Assembly. Lightly polish out any scratches at the mouth of the Tube Assembly to avoid damaging seals during the reassembly process. If damage to the Tube Assembly is severe it must be replaced. Wash, clean and dry the inside thoroughly.

NOTE: Before starting the reassembly process, be sure the repair area is clean. It is imperative that the gas spring be free of all contaminants upon reassembly. If this precaution is not taken it may lead to contamination and premature gas spring failure.

VI. Cartridge Replacement and Reassembly



1. Choose the appropriate repair kit. The repair kit number needed is laser marked on the back of the Tube Assembly. **NOTE: Repair kits are not interchangeable among models.**



2. Position the new Cushion Collar Assembly (90.235.FCL.503 or 90.235.FCL.755) over the rod, making sure that the assembly is in the correct orientation. While holding the rod vertically, slide the assembly down the rod to bottom.



3. Install the two halves of the Cushion Collar Retainer (UB253113 or UC253114) onto the Cushion Collar Assembly.



4. Slide the Cushion Collar Retainer Key (UB413113 or UC413114) onto the Cushion Collar Assembly. The key will sit on top of the Cushion Collar Retainer.



5. Install the Retaining Ring (UB853113 or UC853114) onto the Cushion Collar Assembly to hold the Cushion Collar Retainer in place. It may be necessary to start with one end of the ring and walk it around the Cushion Collar Assembly using your fingers.



6. Position the new Cartridge Assembly (90.230.x.x) onto the rod, making sure that the wiper end marked "TOP" is facing up. While holding the cartridge vertically, slide the cartridge down the rod to the Cushion Collar Assembly. **NOTE: If the seal is rolled or damaged stop and contact DADCO. DO NOT continue installation.**



7. Lubricate the inside wall of the tube with the DADCO Assembly Oil.



8. Place the rod with cartridge and cushion assembly into the tube assembly. Depress the needle valve to release any back pressure. Position the top of the cartridge just below the retaining ring groove. The bore of the cartridge assembly is designed to stop the cartridge in this position. DO NOT force the cartridge down further into the tube.



9. Insert the C-Style Retaining Ring in the retaining ring groove using a DADCO C-Ring Installation Tool, (90.351.x). Be sure the C-Style Retaining Ring is fully seated in the retaining ring groove.



10. Thread the T-Handle, (90.320.1 or 90.320.2), into the end of the piston rod. Pull up on the T-Handle until the top of the cartridge is completely past the c-ring. The rod must seat the cartridge assembly fully before charging. The cartridge should be flush with the end of the cylinder. Make sure the rod is extended to its proper stroke length. (Depress the needle valve to facilitate full rod extension.)

VII. Charging

Note: For best results, use the DADCO Charging Assembly which includes a shut off valve and Quick Disconnect Adapter at the end of the hose.

Quick Disconnect Filling Method



1. Thread the M6 end of the Quick Disconnect Filler Valve, (90.310.143), into the port of the gas spring. Connect the female end of the Quick Disconnect Charging Assembly (90.310.040 or 90.310.044) to the charging nipple. The DADCO Pressure Analyzer, (90.315.5), can also be used for charging, discharging and gauging pressure.



2. Open the main valve on the nitrogen tank.

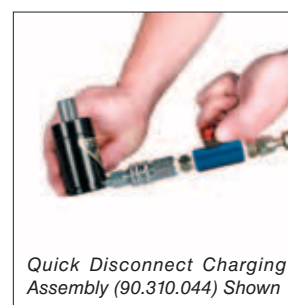


3. Set the desired charging pressure on the regulator. DADCO recommends charging the spring to the maximum charging pressure of 150 bar (2175 psi).



4. Slowly open the shut-off valve at the end of the charging hose and allow the gas spring to reach the desired charging pressure.

CAUTION! Verify rod is extended and cartridge is fully seated before charging.



5. After charging, CLOSE THE SHUT-OFF VALVE at the end of the charging hose and disconnect the charging assembly. When the 90.310.044 is used, the nitrogen trapped between the shut-off valve and filler valve will vent before disconnection. If the 90.310.040 is used, the nitrogen will bleed off as you disconnect the fitting.



6. Check for leaks at the top of the tube around the rod and at the base around the valve compartment using mineral oil or water. Verify the pressure with a DADCO Load Cell using a DADCO Portable Test Stand, (90.305.2).



7. Install the new Dust Cover, (90.246.x.x). Tap with a soft mallet until the top of the Dust Cover rests flush with the top of the Tube Assembly. The rod wiper should be visible.



8. Thread the Port Plug (90.607.110) into the port.

VIII. Adjusting Gas Spring Pressure



1. To increase the spring pressure, thread the Quick Disconnect Filler Valve, (90.310.143), into the port, set the regulator to the desired pressure and fill. The DADCO Pressure Analyzer, (90.315.5), may also be used to adjust pressure.



2. To decrease the gas spring pressure, depress the valve stem using a DADCO Valve Bleed Tool, (90.360.4).