

# Ask Ronny

by Ronny Shaver @ Ronny's Garage

Answering Your Questions About Classic Car Care Service And Restoration

Published January 14, 2011

## **Why Does My Mineral Oil Hydraulic System Car Ride So Hard In The Rear?**

by Ronny Shaver

When Rolls-Royce and Bentley converted their cars to a mineral oil based hydraulic system many changes were implemented. One major change was in the rear suspension. Instead of a standard shock absorber with a height control leveling system to correct ride height for additional passenger and luggage weight, they combined the two systems with a strut and "gas spring".

The strut essentially helps control ride height in conjunction with the height control valve. The height control valve senses the load on the suspension and the strut is pressurized to adjust ride height. The strut also has a piston with valves to control the fluid transfer when it moves like a normal shock absorber. The struts are essentially trouble free except for leakage. Leaks from the strut can be detected by "green slime" drips just inside the rear wheels. The Rolls-Royce manuals state that the strut leaks are repaired by replacement only, but the early struts with screw in fittings for the bleed line near the boot at the bottom, can be resealed with aftermarket products. Later struts have a "rolled edge" assembly method preventing reseals.

The "gas spring" is attached to the top of the strut assembly and is what gives the "give" to the strut. A "gas spring" is an accumulator assembly similar to the braking system accumulators but a lower pressure. This lower pressure allows a softer reaction to the movement of the rear suspension over bumps and potholes. When combined with the piston valve action in the struts, a "Rolls-Royce Ride" is obtained. When a "gas spring" fails, the diaphragm inside bursts or the gas charge is depleted, a faulty "gas spring" will not "give" when this happens. A common symptom is a very harsh reaction in the rear suspension when exiting a driveway onto the street, or driving down a rough street and feeling like the car is bouncing excessively. The reason for this the lack of "give" due to a failed "gas spring", is that when an accumulator loses its charge or diaphragm, it loses the ability to compensate for changes in hydraulic pressures. A bad "gas spring" will have no "give" when the strut reacts to suspension movement. To make it simpler, try squeezing a balloon then try squeezing an apple. The balloon will give and the apple will not. This is the same with the suspension. When the "gas spring" is like a balloon, or has a good gas charge and diaphragm, the ride is soft and pliable. When the "gas spring" is like an apple, or has a failed diaphragm or no gas charge, then the ride is harsh and bumpy.

To correct the "harsh ride" condition the "gas springs" must be replaced. A discerning driver will be able to detect which side is at fault. Pay attention to the car's reaction over bumps and turns. One thing is for sure in my experience, when one fails, the other one will fail soon in the future! Replacing "gas springs" in sedan cars is not too difficult. Replacing "gas springs" in convertibles can be more difficult.

To replace a "gas spring" in a sedan or coupe, remove boot carpeting, forward panel (exposing fuel tank), lift car so that rear wheels are off the ground, find bleeders under car (early cars have two bleeders located in front of rear wheels and later cars have only one), connect bleeder hoses with bottles and open bleeders. When pressure is relieved, look for the green or gray ball-shaped "spheres" atop the body structure housing the springs. Do not try to remove the valve housing the "gas spring" is attached to, the "gas spring" un-screws from that housing. Two recommended tools are the "chain-wrap" or "air-chisel". I use the air chisel, make sure that plenty of rags are stuffed under the sphere to catch the fluid that will come out. Once loosened the "gas spring" should unscrew easily and replaced with a new "quad ring" or

seal. The new "gas spring" can be tightened with a pair of large channel locks or the chain-wrap tool. Once the "gas spring" is installed, tighten the bleeders, run the car, drive it, then recheck fluid levels. The system will usually bleed its self out after a few road tests.

To replace a "gas spring" on a convertible is more difficult. First, lift the car so that the rear wheels are off the ground, then open the bleeders mentioned above to relieve pressure. Then remove the rear seat cushion and backrest. The cushion should lift out and the backrest will have some screws at the bottom side and the backside on the outer edges in the package tray area. Once the seat components are removed, then gently bend the rear package tray cover up in the center and lift it out. Once that is removed, look at the rear outer corners and notice some rounded covers. To access the screws to remove these covers, gently lift the lower edge of the headliner where it meets the package tray area, be careful not to rip it. Once the headliner is detached from the package tray, lift it about 8 inches to gain access, then remove the screws retaining the rounded covers to reveal the "gas springs". I have found it easier to remove the entire valve housing and "gas sphere" assembly on this model by disconnecting the hydraulic line and the three allen screw securing bolts. Then secure the assembly in a vise with soft jaws, and remove the "gas spring" with an air chisel or chain-wrap tool. Once the new "gas spring" is fitted to the valve housing, be sure to replace the o-rings on the top of the strut to ensure no leaks. Use some good trim glue to secure the headliner back to the package tray area. (3M Super Weatherstrip Adhesive is my choice). Once all is together, run car, road test, fill system same as the sedan.

Thank you for the questions and keep them coming. Please send your questions to Ronny at [ronnyshaver@ronnysgarage.com](mailto:ronnyshaver@ronnysgarage.com).

Happy Motoring!  
Ronny