Front Door Compensator (Spring Assist)—Modern Overhaul

For BMW Isetta 600 (BMW Isetta 300 Similar) — by Gary Rannefeld

When I finally got my BMW 600 back together, the front door compensator was just barely adequate—*without* the additional weight of the spare tire or its cover panel. The only way the door would stay fully open was to head the car downhill. This technical article describes how to overhaul your BMW 600 front door compensator to make it work at least as well as the original using a modern gas spring that is relatively inexpensive and available. Although I am not a complete purist about these things, I do try to make the substitution of non-original parts virtually undetectable by even a knowledgeable and meticulous observer. I think you will agree that the overhaul described below meets that goal. This article does *not* cover the replacement of the rubber bushings at each end of the compensator.

Background. The original door compensator (Plate 7, Key 105 through 111) contains a pair of heavy springs. After 50+ years of compression, these springs had certainly lost some of their original strength. My first task was to measure the existing force that they still provide, figuring that any replacement would need to add something like 10-20 percent of the total force measured.

CAUTION: Taking your old compensator apart without adequate knowledge or tools is **EXTREMELY DANGEROUS!** At its fully extended position, the springs inside are still compressed about 10 inches, so merely releasing the thrust nut (Plate 7, Key 109) from the outer sleeve (Plate 7, Key 106) without proper control would suddenly release a large amount of stored energy that could turn the parts into missiles, potentially injuring you or damaging the parts that you want to reuse. See below (**DISASSEMBLY and** . . . .) for some tips about how to proceed safely.

The following picture shows how I measured the existing force produced by the springs at the point (compressed spring length) where the front door would be fully open. I'll spare you the details here, but my existing compensator springs (adding both of them together) produced 200 pounds of total force when the door was fully open, apparently not as much as they exhibited when new.

Measuring the force of one of the old springs at the spring length corresponding to a fully open door.

A come-along was used to pull on the scale until 10 inches of spring compression was obtained.

Better Than a Metal Spring. The small size and high force available from a modern gas spring seemed to be the ideal characteristics for the replacement of the pair of old springs. A bonus is that a new gas spring can fit completely inside of the old spring housing (inner and outer sleeves) making this retrofit invisible from the outside.

McMaster-Carr online (www.McMaster.com) offers a large selection of gas springs. It is important to use a gas spring that is long enough to extend the old housing to its full travel and that also can be compressed enough to allow the front door to close properly. The new gas spring also needed to be stronger than the 200 pounds-force that I measured in the old pair of springs. I chose McMaster Part Number 9416K156 (a 250 pounds-force gas spring at just over $16.00 net in 2011), figuring that I could fine tune my selection later if necessary. It turned out that this gas spring worked perfectly. This is a gas spring with a threaded stud on each end.

Other Parts Required. I made a nut and washer assembly for each end of the new gas spring that would center it inside each end of the old housing and spread the force over a large area.

Nut and washer assembly, welded, for each end of the new gas spring.

You should note that the rod end of a gas spring should be placed at a lower elevation than the body so that the oil inside lubricates the gas seal. This advice echoes instructions that came with the McMaster gas spring. With this in mind, I used different sizes of washers (above) to insure that the rod end with the larger washer would always be placed into the outer housing sleeve.

DISASSEMBLY and REASSEMBLY

For a safe way to disassemble your compensator, I *strongly* suggest reading and following Bill Rogers article, Door Spring Compression Tool under **600 Downloads** on Bill's main page **http://www.IsettaDoc.com**. Bill provides instructions for making a straightforward tool from common materials that should prevent any personal hazards associated with the disassembly and reassembly of the compensator. Don't risk personal injury or property damage by taking a shortcut with this part of the repair.

The **BIG** problem with disassembly of the old spring compensator is that the pair of compensator sleeves must move apart by about 10 inches—longer than the travel range of the average hydraulic cylinder used on a press—before the spring force is fully released. Again, I strongly recommend reading and following Bill Rogers article **Door Spring Compression Tool** (see above) before attempting any disassembly.

Inner & outer Sleeves and thrust nut.

Gas spring body (with smaller washer assembly hidden) inserted into inner sleeve.

Reassembly of the compensator with the new gas spring assembly is somewhat easier (many fewer turns of the nuts) than disassembly. The gas spring I used has only to be compressed a couple of inches before the compensator housing sleeves can be secured with the thrust nut. In addition there is little tendency for the sleeves to get out of square before they are fully engaged because the gas spring has no tendency to "snake" around as the former springs do.

Finished. Now my overhauled front door compensator works at least as well as it worked when new, keeping even a fully outfitted door open when the car is parked on an uphill incline.

I should mention that this idea did not originate with me nor is it the only way to proceed. I like the idea that it uses an inexpensive gas spring that is available outside the automotive aftermarket as a catalog part with published performance data.

Note: My thanks to Bill Rogers of South Carolina for all his help and encouragement with my BMW 600 project. As this article was written, Bill's Isetta website is http://www.isettadoc.com. For questions about this article please contact me at Rannefeld@aol.com.