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Flush and Bleed Your SZ Series Car's Hydraulics & Brakes the Easy Way

Preface: The SZ series cars all use **Hydraulic System Mineral Oil Plus** (**HSMO+**) which is also known by its French name, **Liquide Hydraulique Minéral Plus** (**LHM+**), and either is interchangeable with the other. HSMO+ is tinted a dark green color and, while transparent in small amounts, becomes very difficult to see through in deep pools like those in the reservoir. It also has a very slightly cloudy cast to it even when fresh, which further complicates seeing through it.

As HSMO+ ages it slowly turns from its pure deep green color to a more brownish-green. If it's really old and past its functional life it will appear far more brown than green and sometimes thicken.

1. Turn the key to the "Run" position **without** starting the car. Depressurize the high-pressure system by depressing the brake pedal until the pressure warning lamp or lamps illuminate. You may have a separate system 1 and system 2 warning lamp on earlier SZ cars or a single brake warning lamp on later ones. Depress the brake pedal at least ten more times (more is better in this case).

2. (Optional) ***If you have any reason to suspect there may be dirt/sludge that has settled in the reservoir, then remove the reservoir lid to empty it out and examine the contents at the bottom.*** If you have any color change away from green to brown in your HSMO+ then you definitely need to do this. There are several different styles of reservoir, so how you do this depends on your model year. The full workshop and spare parts manuals for SZ cars through the 1989 model year can be downloaded at no cost from the SZ Section of the Rolls-Royce Owners' Club of Australia Post-War Technical Library. ***Check the condition of the bottom of the reservoir before continuing.*** Use a large bulb baster or industrial syringe to remove the existing HSMO+. If there are any deposits found at the bottom of the reservoir, wipe these out with a lint-free non-woven cloth (e.g. Handi-Wipe), avoiding the filter screens. Afterward, if there is anything clinging to the mesh filter screens, clean them by wiping *gently* or by using an artist's paint brush to brush the dirt into the bottom of the reservoir and wiping it up. You now have a reservoir that will not be circulating any dirt through the system.

Based upon a photo received of the bottom of an HSMO+ reservoir from a neglected car with 150K km/93K miles it appears that sludge formation is less of an issue in mineral oil systems than the former glycol based brake fluid systems. His report is that all the sludge, when removed, amounted to less than ½ tsp/2.5 ml. It was also not on the filter screens at all.

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3. If there is undercoating on any of the bleeder screws or any other coating or dirt, clean it off before proceeding. Attach clear vinyl hosing (1/4" inner diameter) to all of the bleeder screws on the brake calipers and the two for the gas springs at the rear [9 tubes in total: one on each of the front calipers (a single piston, one on the front half and the other the back half of the wheel), two on each back calipers (upper & lower pistons), and one on the gas spring bleeder screw that's just forward of the right side rear wheel]. Place the ends of all the tubing in bottles to catch fluid. I have found bottles with broad bases to be easiest to deal with.

4. Open the bleeder screws at each of the locations noted in step 3 so they are ready to let the HSMO+ flow.

5. ***If due***, replace all hoses and caliper seals according to the service schedule. There are now available Teflon hoses with stainless steel mesh protective exteriors. Provided you don't kink them their functional life is virtually perpetual. If you're not a stickler for originality this would be a very good time to consider replacing the original hoses with these. If you wish to replace your hoses with the typical style, make certain you're purchasing hoses meant for use with HSMO+/LHM+. Most common "over the counter" brake hoses are meant for DOT3/DOT4 brake fluid, not HSMO+/LHM+. ***These two fluids must NEVER be mixed and the materials used for hoses, seals, etc., for glycol based (DOT3,4,5.1) are NOT compatible with HSMO+.***

6. Refill the reservoir with fresh HSMO+ to the maximum marks.

7. Place a piece of wood between the driver's seat and the brake pedal with a thick towel covering the end that touches the seat. Move the seat forward to push the pedal to at least the half-depressed position. Alternatively you can put about 15 pounds of weight on the brake pedal itself. **This is critical, since fluid will not be sent to the calipers unless the pedal is depressed.** (I've used a stick and a tool box for the weight).

8. Turn the motor on and run for *three minutes* to flush the system. During this time you ***must*** keep watch to ensure that the HSMO+ level in the reservoir does not go below the minimum marks. If you happen to still have the reservoir lid off you can use the top of the filters as your minimum mark. The essential thing is that no air gets sucked into the system from the reservoir. As long as the HSMO+ is at least covering the filters to their tops this problem will not happen. If the HSMO+ is getting close to the minimum mark for either system add more (though you needn't go up to maximum at this point. If your reservoir base was dirty you should keep the motor running long enough so that the HSMO+ that's coming out of the bleeder screws appears to be as clean (or very nearly so) as what is going into the reservoir.

   Remove the weight from the brake pedal now.

   Turn off the motor.

9. Close all of the bleeder screws.

10. Top up the reservoir to the maximum marks with HSMO+

11. Turn on the motor and run until the brake pressure light(s) extinguish. Turn the motor off. [If any pressure light comes on during the bleeding process, then pause bleeding to run the motor

again briefly to get the pressure warning light to extinguish again. After I bleed each caliper I turn the key to the "Run" position to see if any light has now come on. They usually don't until you've bled several points on the same system, if at all.]

12. **Replace the weight on the brake pedal now.**

13. Open the main system brake bleeder screws one at a time, and collect the discharged HSMO+ until you see absolutely no bubbles in the discharged fluid, in the following order:
    a) Rear brakes, top bleeder screw then bottom bleeder screw on each caliper
    b) Front brakes, left first, then right, then repeat briefly on the left.

14. ***Add about 200 lbs of weight to the trunk/boot*** *(two people sitting in there generally does the trick if you have willing assistants handy).* This is enough weight to actuate the leveling valve. ***You should keep this weight in the trunk/boot until you are done with Step 16.***

15. Start the motor again with the transmission in Park and the driver's door open. This activates fast leveling.

16. With car running and the system still pressurized, open the gas spring bleeder screw and collect the discharged fluid until it has no bubbles. The car will lower during this process, so don't crawl under it, reach in from the side. After you close the bleeder screw, allow the car to rise again and repeat this cycle for good measure. *You can now remove whatever you were using for your additional weight from the trunk/boot.*

17. Make sure all bleeder screws are tightened and check for leaks. You should have no brake system pressure or brake fluid level warning lights illuminated. If the fluid level light is on top off your HSMO+. If the brake pressure lights are on you need to determine why the system is not accumulating sufficient pressure to turn them off. Once no warning lamps related to the brake system are illuminated, proceed to step 18.

18. Drive the car to evaluate braking performance.