

setting lever set perfectly to raise the operating valve ball $3/64$ inch up off its seat when the OD solenoid is energized. Remove the operating valve plug from the OD and screw in the operating valve plug that has the pressure gage attached. Use vise grips on the steel coupling to tighten.

Start the engine in neutral and adjust the idle to about 1500 rpm. Without feeding any gas, place the gearshift into 4th (OD off) gear while watching the gage. The pressure should increase from 0 to 300psi in TWO TO THREE SECONDS. In another 10 seconds, the pressure should have gone from 300 to 470psi, where it should remain constant. Keep the car running at 1500 rpm while watching the gage - it should stay rock steady at 470 to 490psi.

Now engage OD while watching the gage - it should drop about 100 psi when OD kicks in, then climb back up to 470-490 in about 5 seconds. While watching the gage, place the gearbox into neutral, hit the brakes, turn off the engine. When the rear wheels stop turning, the pressure will drop slowly into the low 400's, then continue dropping at a rate of about 10psi per minute down to about 250-300psi where it should stay for several hours. These numbers are not absolute, simply my records over the past 30 years. However, they will give you a benchmark of how well your OD hydraulic system is functioning and if further repairs are necessary. If your OD is working as described so far, button it up and enjoy.

If your OD is like most, it won't hit the 470psi mark and/or won't maintain the pressure. Relax, the fix is relatively simple and you won't even have to remove the unit from car.

Part Two - The OD pressure fix!

As promised, this month continues with the OD unit, specifically the OD pressure fix. However, before we start with the OD pressure fix, let me re-emphasize the need for an oil pressure gage. If you or someone else rebuilt your OD without the benefit of a pressure gage, there is NO WAY to know the status of your hydraulic system. Remember that the OD unit will engage at only 100 psi, but for proper operation, the pressure should be at 470 to 490 psi.

Now, finally... the OD low oil pressure cause and fix. A fatigued spring in the non-return valve portion of the OD (see Fig. 6.19). What? Is that it? You must be kidding - I waited two months for this? Yes, it does seem sort of anti-climactic, but this spring can cause major frustration. Springs are like people - as they age, they get shorter and weaker. As you can see in Fig. 6.19, the spring pushes against a ball and plunger. The purpose of this spring is to allow the ball to lift from its seat at each power stroke of the OD pump, allowing oil to flow into the pressurized accumulating chamber, then applying enough pressure to re-seat the ball at the non-power stroke of the OD pump. A shortened, weakened, fatigued spring does not have enough force to re-seat the ball valve, allowing oil to leak past and cannot build pressure to the required 470-490 psi.

You're probably thinking that all I have to do is replace the spring, right? Yes, that would work for a while, unless you use an incorrect spring that could be too weak, too strong, or too long. I recommend that you pre-load the existing spring by making a new, longer ball valve plunger as shown in the sketch in Fig. 6.19. This longer plunger will increase the preload on the spring by $3/32$ " - it doesn't sound like much, but its all you need. Don't make it any longer, it could

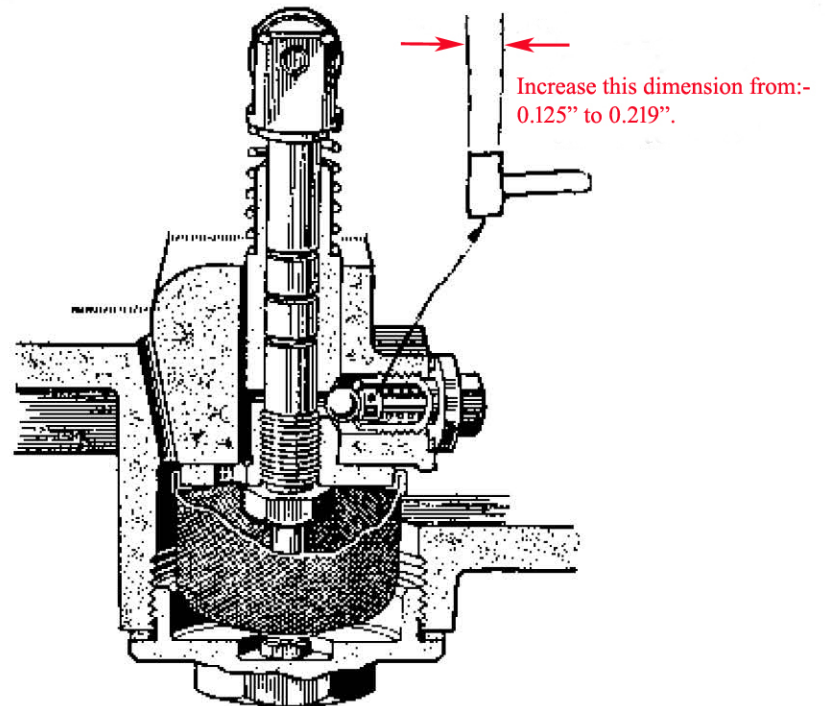


Fig 6.19 CROSS SECTIONAL VIEW THROUGH PUMP AND NON-RETURN VALVE

bottom out the spring, not allowing the ball to move off its seat. Use T040 carbon steel for the material - if you have a friend who works in a machine shop, this is duck soup.

Now for the actual fix. Remove the drain plug from the OD unit (not the gearbox) to drain the oil. Remove the solenoid from its mounting bracket. Now remove the mounting bracket - early model cars have direct access to the mounting screws, later models have a cover. All the 6-cylinders have enough room to remove this bracket with the OD in place, but if my memory is correct, the 4-cylinder Healeys have to raise the OD unit (not remove) to clear the frame. This bracket also pre-loads the OD accumulator spring, so take your time removing the screws and follow the shop manual directions closely. Note that you should have a spacer behind the clamp and a rubber O-ring sitting in its own counterbore on the back side of the bracket. Since the accumulator spring and distance tube are now loose, remove them from the unit.

You can now see the hex head of the non-return valve plug. Remove this hex head screw using an 11 mm socket. Be aware that these screws are usually VERY tight. Remove the spring, ball valve plunger, and ball. Inspect the ball for wear and inspect the valve seat for dirt and wear. Inspect the OD pump spring to ensure that it is not broken. Turn over the engine with the car in gear while watching the OD pump shaft go up and down. If everything looks good, reseat the ball by tapping it on its seat with a light hammer and drift, reassemble the pump non-return valve using the old spring and the new, longer ball valve plunger.

We're not quite done yet, but if you're like I am and REALLY want to know if the new, longer ball valve plunger solves the OD pressure problem, reassemble the OD and test as described in last month's OD tech article. You will probably find that you have 450 to 470 psi showing on the gage. The next section will get it up to 490 psi.

You already should have removed the accumulator spring and distance tube, exposing the piston and sleeve. Remove the piston and sleeve one of two ways. Using a tool that opens when you squeeze the handle (similar to outside diameter retaining ring pliers), grasp the inside diameter of the sleeve (where the distance tube fit) and remove the sleeve with piston by turning and pulling. A pair of needle nose pliers can also be used by forcing the handle open, using the outside of the pliers against the inside diameter of the sleeve. Scratches won't hurt this surface - they can easily be removed prior to reassembly.

If the sleeve and piston are stubborn and refuse to come out, remove the pressure gage, valve spring, ball valve plunger, ball, and operating valve. Now blow air into the chamber and the piston and sleeve should pop right out. I use a bicycle pump with a needle attachment (for footballs, volleyballs, etc.) inserted into the operating valve chamber, cover the hole with a rag, and one or two quick bursts always breaks the piston and sleeve loose.

Push the piston out of the sleeve and inspect the piston for broken rings. I've never seen broken springs, but I'm sure it's happened to someone. Inspect the sleeve for scoring (not the normal scuffing from the metal piston rings. Notice the O-ring at the front of the sleeve. This is a high durometer (read hard) O-ring and should be cut to remove. Because of its hardness, it's difficult to replace. If you do not have a replacement O-ring and your OD pressure was 450 psi after installing the longer ball valve plunger, why worry? Your pressure gage told you that you don't need it and it will tell you when you do. See the possibilities of this tool?

Now to get the pressure to 490 psi. Somewhere, years ago, I read where BMC increased the accumulator spring pressure to raise the pressure in the accumulating chamber from 450 to the 470-490 psi range. What I have noticed in some of the later model OD units, is a flat washer placed in the bottom of the piston that we just removed. It is my opinion that this is how BMC increased the pressure to 470-490 psi. That is how we will increase our pressure to 490 psi. Check the bottom of the piston for a flat washer. If there is none, place two washers, each 1/16" thick into the bottom of the piston. Again, this doesn't sound like much, but it will make a noticeable difference.

Insert the piston into the sleeve and place the assembly into the OD unit. Insert the distance tube and spring, then complete the assembly paying particular attention to the two hex head screws that must be screwed in together to compress the spring.

Recheck the OD oil pressure, button up everything and enjoy the responsiveness of the like-new OD. This whole process should have taken less than 4 hours from start to finish. Not bad for so much enjoyment. WHAT? You're still