

Postmortem on an Oil Pressure Switch

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If you don't want to read this whole article, here is the quick summary – “Change your Oil Pressure Switch when you rebuild the engine whether it needs it or not”. Now, on to the longer version:

The story starts with my regular car (doesn't matter what it is, it's not a classic Cadillac) getting smushed, leaving me with the need for a car to get to work – so, out comes the trusty 1959 Cadillac shown in Figure 1. Not my favorite car for commuting, but an attention getter nonetheless. I drove it for a few weeks and one day on the way to work, the oil pressure indicator light comes on. “This is not good”, I think, as I pull quickly to the side of the freeway, with cars zipping by me.



Figure 1 - My 1959 Cadillac

A quick look under the hood revealed no serious problems, a look under the car showed no puddles, and there was oil at the proper level on the dipstick. Since I didn't hear the “rattling” sound that an engine makes when it's low on oil, I guessed (correctly it turns out) that the pressure switch was not working, and so I drove the few miles remaining to work.

After parking, I noticed that there was a nice thin trail of oil leading to my car, suggesting that there was a leak. “It's probably the pressure switch leaking” is my first thought, but with no manual handy, I can't find the switch – it's not on the side of the engine where I know it is on many newer cars, and it's been years since I overhauled this engine, so I can't remember where it is. Oh, what to do?

A quick internet search to the club's web site and I find the list of experts on various cars – and as luck will have it, one in my time zone. A quick call to my friendly expert (and a public thank you here) who can of course remember where the switch is located (on this car it's at the top back of the engine, next to the distributor), and then a quick call to my friendly auto parts store (it's a common switch used on many cars, so of course it's in stock, and they have the special socket you need to get it out also), and then a quick call to my wife (hey, want a free lunch? Well then, go pick up my part and tool and come see me), and I'm sure all will be well.

Of course, to change the part you have to like on top of the engine, reach down past all the wires, the distributor, and whatnot, and extract the part. And then you have to get the

new one in without cross threading it or dropping it, but that's all possible and the new part gets installed. And, my wife and I have a nice lunch, and I go back to work.

But now we come to the crux of this article: Why did the switch fail? For that we have to take it apart. Figure 2 shows the two outer parts of the switch – a bakelite top part housing a terminal, and a metal bottom part that screws into the engine block. The bakelite top is cracked (which you cannot see in the picture) – but when I started to remove the part it was all together.

Inside is a diaphragm assembly (figures 3 and 4), which as you can see is in rather sad shape. Not shown is a spring that rides on top of the metal part in the diaphragm assembly and contacts the post at the top of the bakelite housing – that part disappeared when I removed the switch, but you can imagine it easily enough.

The way the switch works is that without pressure, the spring presses the metal diaphragm center part against the steel lower housing, forming a complete circuit from the terminal, through the spring, through the metal part of the diaphragm, and to the housing, and thence to ground. Oil pressure lifts the diaphragm and breaks the circuit, so the indicator light goes out.

So, what happened? It is not clear whether the upper housing developed a small crack, or whether the diaphragm failed allowing oil into the upper part of the housing that then caused a crack – I suspect that there may have been a crack in the housing for many years, and that the diaphragm then failed allowing oil to leak through the crack and also causing the crack to expand, leading to catastrophic failure.

Looking at Figures 3 and 4, you can see that the diaphragm assembly consists of four separate parts:

1. a red colored rubber seal, with webs that connect it to the other parts for ease of assembly
2. a copper upper cup on which the spring rests
3. a steel lower cup that contacts the steel body when oil pressure is low
4. a very thin (and now very brittle) plastic diaphragm – you can see pieces of it in figure 4 sticking out from the assembly.

The diaphragm was (is) in fact so brittle that it's like old cellophane tape – in fact it may have been cellophane, I can't be sure. What is important is that the other materials will last a very long time and won't by themselves deteriorate and lead to failure. Even a hairline crack in the Bakelite top part would be benign (unless the top separated from the bottom). But the diaphragm has become brittle and will fail due to normal flexing.

So, this is a cheap part, and it's easy to change. And, this “post mortem” shows you why, even if the pressure switch on your engine is not broken when you work on the engine, it's still worthwhile to change it – after 40 to 50 years the diaphragm material will be near to failure, or will already have failed – a few dollars spent changing the switch will save you a lot of hassle later and will help keep your hands clean when you want them to be.



Figure 2 - The exterior parts of the switch



Figure 3 Diaphragm assembly – top (no oil) side



Figure 4 Diaphragm assembly, bottom (oil) side