

Distributor Rotor Cap Anomalies

By Ron Dill

I recently attended a NCRS tech session covering electronic ignition systems and there was some discussion about the rotor caps as currently serviced by Chevrolet. The current, white, cap seems to have been designed around the higher voltages that exist in electronic ignitions. The spark gap between the pointer on the rotor cap and the plug wire post in the distributor cap is much larger than normal. Since the electronic ignitions either were not designed to use the dropping resistor or they bypass the resistor in installation, I expect the large gap has little, if any, impact on the operation of cars equipped with the electronic ignitions. However, my car still uses the dual point distributor and the dropping resistor as it was configured when originally delivered back in 1961, so I decided to do a little research on what the differences actual were.

I had to special order a rotor cap from Chevrolet, it was not normally in stock and they obtained it from a Pontiac parts supply point as Chevrolet part number (GM # 12338671) now cross-references to a Pontiac part. For comparison I picked up an Accel rotor cap and since I needed to be able to measure clearances, I obtained a Borg Warner Distributor cap which I destroyed by cutting an access port in the side so I could see and measure clearances.



You'll notice there are two Accel rotor caps in the picture – the one on the left (Part # 130120) is not correct. It was clearly meant for one of the later model electronic ignition systems – I offer it only for comparison. I spent an hour on the phone with the guy as he researched numbers and finally concluded that 130120 was just what I needed, so I ordered it. Clearly, he was mistaken.

The Accel cap on the right both feels and looks more substantial than the Delco cap in the middle. I wouldn't say that the Delco cap is flimsy – but, compared to the Accel cap it is.



I pulled out my stash of spare distributors and started my test with a '62 340 horse (1110985) unit. I installed the white Delco rotor button and my new Borg Warner cap. As best I could determine, the spark gap was approximately .105".



Now I installed the Accel rotor and measured a clearance of .088" a difference of .017". You can tell from the picture that the gap is not nearly as large.



Next, I performed the same test with a '61, 315 horse (1110914) distributor. It is equipped with a black rotor button – no part numbers or manufacturer markings are evident on the cap. I decided to check that rotor cap when I installed my test cap and I found that the clearance between the pointer and the plug post was **very** close – to the point that the pointer actually touched the post when you rotated the distributor shaft – not good, I thought.

When I tested the white cap it measured a gap of .118" and the Accel cap measured .099". Assuming a little error in my measurements, the difference between the two caps comes out roughly the same in both distributors.

I was a little troubled by the fact that the pointer on the original button actually touched the post on my test distributor cap so I decided to investigate that issue a little more. I reinstalled the original rotor and distributor cap and found that the pointer hit the post in this configuration as well. At this point I thought – good thing I tried this out before putting it in the car!! Had I set the points and installed the distributor and tried to start the car I would have created problems by either wrecking the rotor cap or the distributor cap, or both. *(I'm not sure that you would notice that the cap didn't fit right if you were installing it on the car – between the plug wires and everything else in the way, you tend to assume that everything is OK if the cap notch went in the slot and both clamps/latches are latched.)*



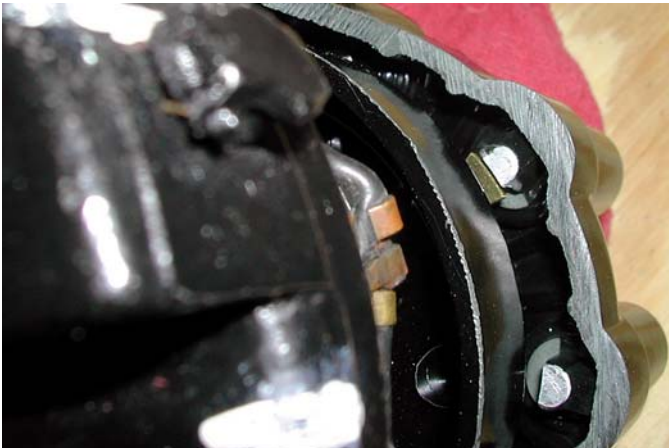
Further investigation revealed what was causing the problem. There is a screw head located close to the edge of the distributor that holds down the condenser. That screw head does not allow either the Borg Warner or the old distributor cap to seat down properly as it hits the plastic near one of the cap hold down clamps. I assume the original distributor caps were probably produced with a slot in the cap to prevent this interference. At any rate, I tried a flatter headed screw – no luck.



You can see from the picture of the cap that there is a lighter colored wear mark near the latch where the screw head was hitting the cap.

So, out comes my handy dandy Dremel tool and I ground out enough of the cap plastic to clear the screw head.

This allowed the cap to fit down properly and I rechecked the clearance.



With the improved fit on the cap and the original black rotor cap, the clearance was something under .025". Because of the curved surfaces, I wasn't able to measure it exactly. But, from the picture you can see that the clearance is dramatically smaller.

With these new numbers I retested the original '62 distributor mentioned above with the original dark brown rotor cap and I found that it had a clearance of approximately .020".

So, what does all this mean??

First of all, let me suggest that you **not** cut up one of your original AC marked distributor caps to be making any tests you might want to do yourself. I realize that using a separate test cap negates some of the conclusions but it is very difficult to see what is going on inside the distributor when the cap is on. I tried a peering through one of the point adjustment holes with a small inspection mirror and a flash light – you just cannot see the gap at all. Perhaps you might be able to use modeling clay and put a small lump on the plug wire post and then rotate the distributor shaft – it might give you some insight into the amount of clearance.

Second, there is a very large gap with the new rotor cap – we spend a lot of time trying to make certain that each of our plugs is set to exactly the specification – usually a gap of .035" – and here we have

about a .100" ± about .020" gap inside the distributor itself. While the Accel cap has a much smaller gap it still is not nearly as close as my original rotor caps. I'd think twice about just throwing an old cap away during your next tune up. *(Remember how we would just toss the old distributor cap and rotor caps away when we did a tune up – the parts were cheap and we knew that those new parts would make a world of difference in our performance – probably improve our ¼ mile times by at least a second – easy!)*

Third, research on the web indicates that we went to larger gaps on the plugs with electronic ignitions along with higher performance coils because it took a higher voltage to cause the spark over the larger gap and that caused a hotter spark which resulted in better combustion and reduced emissions. I was not able to find any information concerning the impact on the spark when you run the spark over two spark gaps in series – one of about .035" (the plug) and one of about .100" (rotor cap). *(Perhaps one of our engineer members would like to comment on this?)* However, one has to assume that the rotor cap gap will cool the spark substantially – and, if you are still running your original coil along with the dropping resistor to save your points, it is a wonder that the plugs fire at all!!!

Conclusion: If you have new parts (rotor cap and distributor cap) and are still running the old coil along with the points and dropping resistor – you might want to consider a new high voltage coil and an electronic ignition conversion. This will give you substantially better spark to the plug as well as eliminate a lot of the old point adjustment problems. Pertronix (<http://www.pertronix.com/>) makes a simple conversion (I'm sure there must be others) with only one or two wires and with a little work you can make the installation look pretty original and save your old coil for use on judgment day – I doubt that you'll fool a knowledgeable NCRS judge – but maybe.