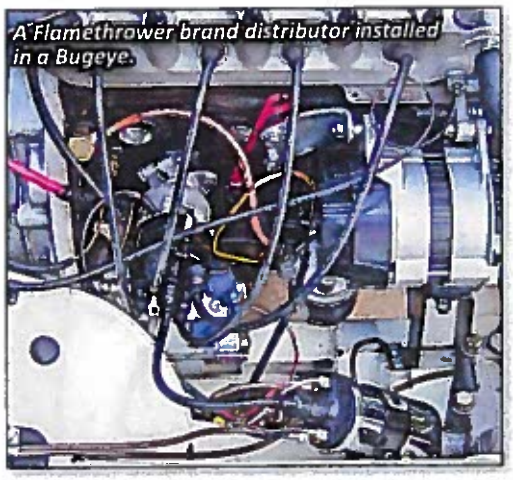
TECHNICAL SERVICE BULLETIN

The Distributor

Mike McPhail, Dripping Springs, Texas, Gulf Coast Healey Club

While we are on the subject of Lucas electrics, let's take a look at some of the components. A vital, but often-neglected item, is the distributor. This hard-working gadget often seems to perform flawlessly for decades, but it may very well be in need of servicing.


A Flamethrower brand distributor installed in a Bugeye.

The distributor is a fairly simple mechanical device that has changed little over the years. It has several functions:

- Switching current on and off to the coil to generate a timed spark.
- Directing the spark to the proper spark plug.
- Advancing the timing as the engine revs.

Lobes on the distributor shaft, which is driven by the camshaft, open and close the points when the engine is turning. When the lobe lifts the contact points and breaks the ground circuit to the coil, a spark is generated. The spark wire from the coil is connected through the distributor cap to the rotor. The spark jumps from the rotor to the spark plug wire terminal of the cap and on to the spark plug. As the engine speed increases, a pair of weights under the plate works against springs holding the top section of the shaft. This centrifugal action causes the rotor to rotate, which advances the timing. A timing light will verify this phenomenon: just rev the engine and observe the motion of the timing mark.


A Flamethrower distributor for a six-cylinder Healey.

It is not unusual to find the two-piece distributor shaft to be frozen. Long ago, rotors were stamped with "Remove to oil," but this maintenance item has been largely forgotten. Check for free movement by giving the rotor a little counter-clockwise twist. It should readily return to its original position when you let go. No? Oh goody, let's take it all apart!


The Flamethrower distributor for a four-banger.


A new four-cylinder distributor with an Ignitor III. Note the very original casting.

For Sprite and BJ8, take note of the direction the rotor is pointing and the location of the #1 plug wire on the cap before you pull the distributor, and don't try to do the following with the distributor in the car.

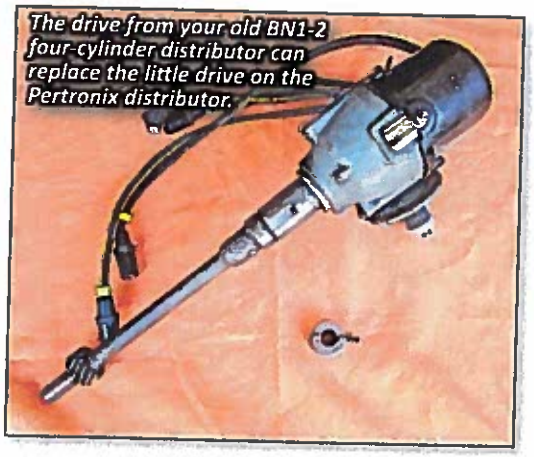
Remove the rotor, the vacuum advance rod and the two small screws securing the base plate. Take careful notice of the alignment of the rotor in relation to the key on the bottom end of the shaft; the top section can be positioned 180 degrees out, which will really screw you up. Remove the base plate with points still attached. You can now see the mechanical advance. There is typically a large and a small spring, one on each of the weights. The large spring will have a loose fit and will not pull the weights completely to their non-extended position. The small spring should bring the weights to rest when twisting the top of the shaft.

If the springs need replacing, order new ones, as you will be hard pressed to obtain satisfactory results otherwise! With new springs in hand and old springs removed, take out the screw on top of the shaft and withdraw the top section. Take careful note as to how the weights are positioned.

Since you have nearly disassembled the whole damn thing, you might as well give everything a good cleaning and oiling. Check for excessive play in the shaft and free movement of the two-piece base plate. The flimsy ground wire must be intact. The vacuum unit must operate easily with 15 inches of vacuum (about what it takes to get a chocolate malt through a

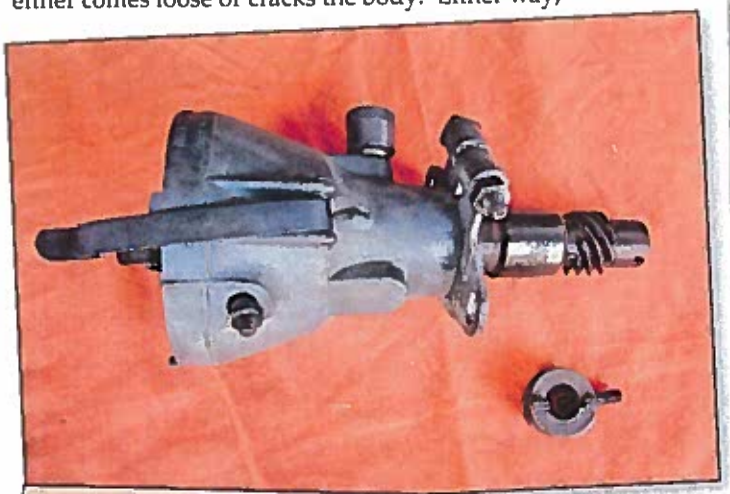
straw) and not leak down.

The vacuum advance, by the way, provides additional advance when the car is under way, while backing off under hard acceleration to avoid pinging. At idle the throttle butterfly blocks the orifice so that this action only occurs while the gas pedal is depressed. Test this by sucking on the vacuum unit at idle: engine speed will increase by a few hundred rpm if all is well.


The drive from your old BN1-2 four-cylinder distributor can replace the little drive on the Pertronix distributor.

Once you get the unit back together, check for a bent shaft by measuring the point gap on each lobe. Electronic modules are available from HEALEY MARQUE advertisers that replace the points and condenser. They have brand new distributors too!

Now let's talk about rotors. Until very recently, the usual sources were selling replacement rotors with the brass conductor riveted to the plastic body. Eventually the rivet either comes loose or cracks the body. Either way, you're walkin' home, buddy! Now you can and should get a rotor exactly like the old original molded style.



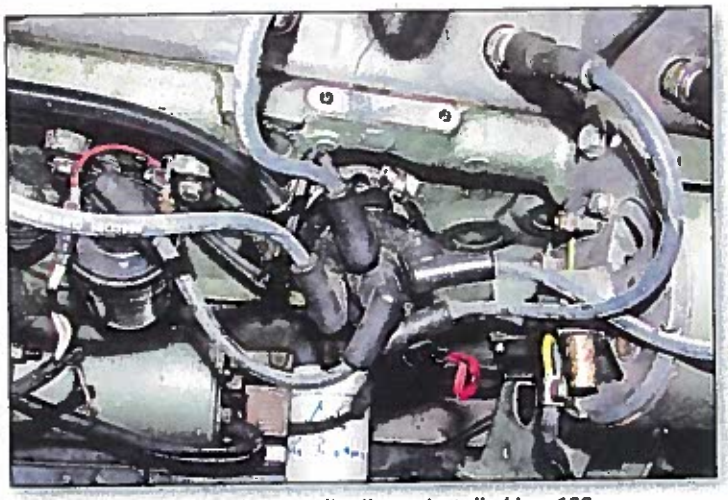
▲ *The drive from your old pre-BJ8 six-cylinder distributor can replace the little drive on the Pertronix distributor.*

◀ *Mechanical advance revealed.*

Points and condensers are cheap and easy to replace. If you have a known working condenser, you may not want to replace it, as the new ones seem to have a high failure rate. Keep spare ignition parts in the car, and/or convert to an electronic ignition module.

Caps have fallen victim to cost-over-quality issues, also. The cheap caps with aluminum terminals corrode quickly, causing problems, especially on a damp morning. A nice premium cap with copper terminals will probably be the last one you will ever have to buy.

Old wires can cause plenty of trouble, too. Wires should be as flexible as new, and should be checked with an ohmmeter. With the wires on the cap, test each wire for resistance. Modern (non-metal conductor) wires will have a reading around 5k, depending on their length. Early cars with solid wire conductors will show only the resistance that may be in their screw-on spark plug ends. These ends are notorious for burning out their internal resistor. If you do not get a reading, replace the end. The spark may jump a gap in a defective component, but that will surely affect performance.



A Flamethrower distributor installed in a 100.

Those fiddly early cap-and-wire sets are getting rather expensive and can often be replaced with the modern style. Early Sprite side-terminal style caps can be replaced with the early '70s MGB cap. Later Austin-Healey 3000 (BJ8) caps can be replaced with one from a TR6. Spark plug wires from the same cars will be needed to replace the solid wires, unless you wish to add quick-connect ends for the wire to cap connection.

Very early cars have a screw-in connection to the coil. New wires will require a new coil in this case. Be sure to get a non-external-resistor coil. Coils are not well marked as to their application, and should be checked with an ohmmeter. A reading of 3 ohms between the + and - terminals indicates a non-resistor application. Most meters are not very accurate in this range and you can expect slightly higher readings. While you are at it, check the resistance from the spark terminal to the others on a suspect coil; expect about 8000 ohms.

In lieu of disclaimers, let me quote the Haynes Manual...The reassembly procedure is the reverse of the disassembly. HM

Electrical questions

Bearing in mind that Healyphiles come from a variety of backgrounds with varying skill levels, recent questions such as: "is [illegible] on the wiring diagram negative or positive?" and "the car will crank with the wiring to the coil hooked up either way (wht-blk wire to positive or negative). What happens if you reverse the connection?" may seem obvious to some, but the strong point of the list is that where one is deficient in one discipline, there is always someone who is strong in it and more than willing to share his expertise throughout the Healey fraternity.

Dave Russell responded to these questions: "SW = ignition switch. CB = contact breaker points). For a stock Healey positive ground battery, SW is negative & CB is positive. For a negative ground battery, SW is positive & CB is negative. Other respondents added that your ignition coil work both ways, driving the car, you will not notice any difference, BUT, put your engine on a scope and the ignition picture will be upside down. Change the L.T terminals and now the picture will be correct. Ignition coils marked SW-CB are made for Positive ground cars. To be correct, you need a Lucas coil that is listed for your car marked + and -. This coil is wound to suit Negative ground and will give you 10 percent more voltage on Negative ground.

Correct Ignition Coil?

– Shawn Miller

Got the right ignition coil? Sure, I put it in and it runs fine, right? Well maybe not. With our cars changing hands over the years and shade tree mechanics working on them to keep them running, it is possible that the wrong coil is in your car! There are two types of coils that could be in your car. A coil that requires a ballast resistor and one that doesn't. How can you tell? Well its actually easy. Why? Because you could be burning your distributor contact points prematurely.

This can be done in your car with a multimeter. Remove the two connections that go to your coil (you do not need to remove the coil wire that goes to the distributor cap). They will either read "+" and "-" or "sw" and "cb". Now set your multimeter to read ohms. Connect your multimeter to the two contact poles (really doesn't matter which way) and allow to meter to level out. You will read approximately 3.6 or 1.8 ohms. 3.6 is a 3 ohm coil and the 1.8 is a 1.5 ohm coil. The 3 ohm coil does not require a ballast resistor and the 1.5 ohm coil does require an approximate 1.5 ohm ballast resistor. So in most cases for an Austin Healey, you want a 3 ohm coil.

This entry was posted in Engine on March 24, 2014 [http://www.austin-healey-stc.org/tech-articles/engine] by rick.

A Neat Way To Set Timing

As with most things on your Healey, changing one thing often impacts another. Advancing your timing to improve performance may require using a higher octance. So if you decide to mess around with your timing, you may need to do something about the octane of the gas you're using.

Once you've got your timing in the ballpark (either with a timing light, or a static light), a technique that I find very effective to fine-tune the timing is as follows:

1. Find a straight (preferably remote) road and mark off approximately a 1/8 to 1/4 mile (distance is unimportant—you just need some markers to aid in timing yourself).
2. With the engine fully warmed up, approach the "start marker" at about 20 mph in third gear. At the "start marker," floor the accelerator and time yourself to the "finish marker" (I guess distance is important in that you should be able to reach the end marker without shifting or over-revving! Also watch your speed as you want to keep a low profile in case police are around. Boy, it's tougher to write this than it is to do it.) Note your time.
3. Assuming you didn't have any pinging (pre-ignition) while first accelerating (at low revs the engine is obviously lugging, and this is when you'll likely encounter pre-ignition), advance the timing approximately a degree.
4. Repeat the above. Is your time quicker or slower? Did you hear any pinging (pre-ignition)? If your time was faster and you didn't hear any pre-ignition, continue the process. When you start to hear pinging, retard the timing slightly and double-check your time, and listen for pinging. If everything is OK, you've probably reached an optimal timing point for your engine and weather conditions.

At the End of a Rope

By Tom Mason
AHCA National Member

I have always thought that I could fix most anything on my Healey at the side of the road and that I could carry enough parts to cope with most emergencies. In fact, compared to our modern cars a Healey can usually be fixed by the roadside, whereas a modern car usually needs a tow to a garage and a computer to get it fixed. While this is still true, my Healey died last week in the parking lot of a shopping center... a pleasant evening outing gone bad.

What threw me off was that there was no spark, confirmed by attaching a plug from the trunk to the number one spark plug wire and cranking the motor over and no spark; easy enough so far, an ignition problem. I next attached a wire to the center of the coil and tried the same test; I had spark at the plug now. Okay, so electricity is not coming out of the cap, probably a bad rotor. A bad rotor is a common enough occurrence these days with the off shore parts. One of the joys of driving a Healey is that people stop to offer help and I accepted a ride home for my other car and more parts. I had a rotor but it was the short one and not the longer one that I needed.

Unfortunately, this did not fix the car and it was now getting late so I very reluctantly attached a tow rope to my Healey and had my wife begin to pull it home with her car. I went about a hundred feet and popped the clutch and my Healey started right up! I honked for my wife to stop and then I drove my car home where it refused to start again. A day later, I replaced the cap and removed the electronic ignition and went back to the manual with points and a plate that I carry in my trunk. I still had no reliable spark at the plugs, but spark at the coil. So what is wrong? Give up?

I then brushed the coil and it felt warm. I replaced the coil and the car instantly fired right back up. It was the coil all the time, making enough spark to fool me but not enough to run reliably. I replaced the electronic ignition and re-timed the car. It runs again as it should and all is right with the world. The question is, does this count as a tow since I started the car on a pull? The moral is that there is always something more to learn.

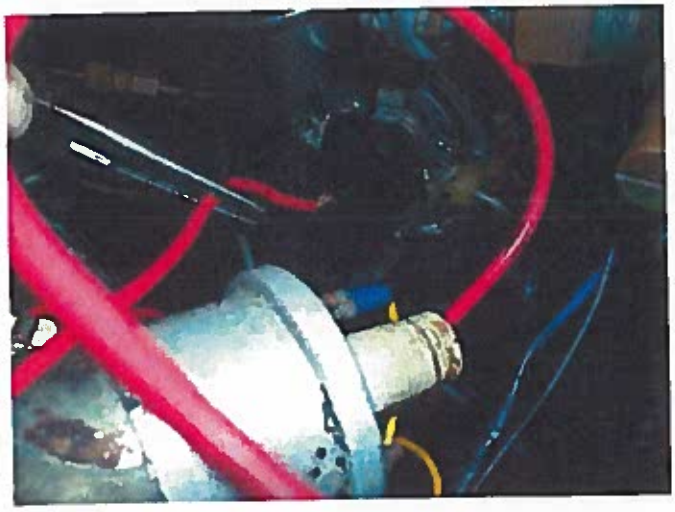
TECH TIPS

Concerning Rotors

by Shawn Miller

There is a lot of talk about remanufactured parts being substandard. YES, in some cases it is very true. I had heard about substandard ignition rotors causing many problems for LBC owners. Hopefully my recent experience with this rotor issue can be helpful to the AHSTC members.

In general there are two types of "bad" rotors out there. One has a poorly attached rotor arm that can release from the rotor base and ruin your distributor cap, also shutting down your car. The other "bad" rotor allows the spark from the coil to conduct through the rotor (black carbon material) base and into the distributor itself. Both are really BAD!



Sure enough our Bugeye had the first rotor installed on it and one time when returning from an AHSTC function the arm let loose and shut her down. I managed to bubble gum it back together to get home. And funny (not really) enough, without knowing it, I replaced it with the second "bad" rotor. After some time it had developed a "miss" that for the life of me I couldn't seem to track down. Sure seemed like a ignition issue, but after numerous attempts and many hours I was about to sell Tam's Bugeye on Craigslist. I even switched rotors and had the same "miss"- The same type "bad" rotors.

Here is how I tested the rotor: Take a piece of insulated wire about a foot long and strip both ends. Remove the HT lead from the coil and remove the distributor cap. Bend over one end of the wire so that it will stay in the coil when inserted. Hold the other end with insulated pliers about 3MM from the rotors (see photo). Now turn the motor over with the ignition turned on. There should NOT be any spark (other than a VERY small static spark) between the wire and the rotor. If there is a spark, then you have the "bad" rotor. If you have any question about the spark strength, hold the wire next to a ground (engine block, etc.) and this is what you should not be seeing at the rotor.

Also pictured is one of the "bad" type rotors.

Advanced Distributor sells rotors that address this issue: http://advanceddistributors.com/index.htm

More info on rotors can also be found on John Simms website under the tech section: http://www.healey6.com