

Why Won't It Run - III Coils

By Dick Ray

(This article first appeared in the Fall 1990 issue of THE SETOFF.)

Your car has stopped running and all of your troubleshooting has failed to find anything wrong with the ignition or the fuel system. Your allotted repair time has run out and you're being towed.

Resist the temptation to beat your car to death with a worn out crank. Maybe it's the coil. Yes, it did make an observed spark when you tested it, but there are no good, quick tests for a coil except substitution of a known good one.

Coils seldom fail suddenly, except for the broken internal connection which happens to the wood-cased Pontiac coil. They usually deteriorate slowly, giving erratic and weak ignition. It is an old axiom that coil problems always seem to be carburetor problems. Hard starting, lots of "plug fouling," and excessive sensitivity to mixture are the most noticeable symptoms.

Testing the coil by watching it fire a plug outside the engine is not a conclusive test. The reason is that the voltage needed for ionizing a 0.030 inch air gap in free air is much less than that needed when the pressure is five or six atmospheres, and a bunch of fuel and oil droplets—all insulators—are present in the air gap.

A good single-cylinder coil should produce a spark across a 1/4- to 3/8-inch gap in free air. This spark length is largely independent of voltage applied. However, the elusive "Fat Blue Spark" containing lots of energy requires at least five volts at the coil. For convenience, the vibrator point adjustment procedure is repeated on the next page.

Coils go bad due to broken internal connections or insulation failure. Do not operate a coil without a spark plug in the circuit to absorb the energy. If the points are vibrating, a spark is being generated and will jump somewhere. If it occurs inside the coil, the insulation will be damaged and will eventually leak off energy or arc over, bypassing the plug.

Some coils used to have an intentional air gap inside as a safety measure, but the Pontiac coils used on single-cylinder cars do not. They do contain a condenser which helps increase the

spark intensity, just as in automotive ignition systems.

This coil should measure 3,000-4,000 ohms from the PLUG terminal to the COM terminal. If the circuit appears to be open, a spark can still jump across the internal defect, but the wire is being slowly burned up. The coil should be replaced even if it seems to work okay today.

One subtle symptom of weak ignition, possibly due to a bad coil, is that the engine will misfire when the timing is retarded but runs better when the timing is advanced. The reason for this is that the pressure in which the plug must fire is greatest at top dead center. When the timing is advanced, the pressure may be only half as great, allowing the weak coil to fire. Reducing the plug gap to half of the normal setting may help get you home so that you can fix it properly.

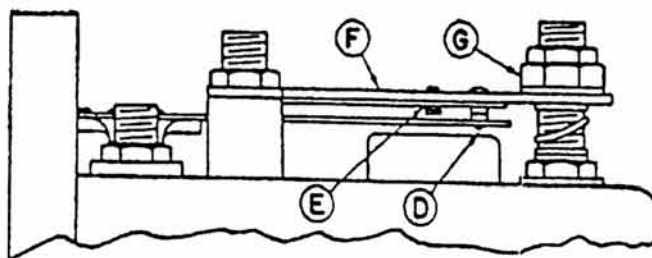
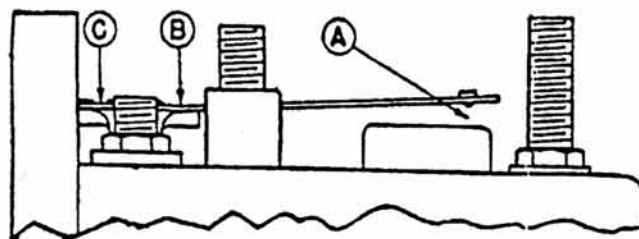
The metal-cased, dual-lead coils used on twin cylinder cars are not made by Pontiac. They also do not have a safety air gap inside. These coils should make a 1/2- to 3/4-inch spark from one plug terminal to the other, and the resistance should be near 10,000 ohms from one plug terminal to the other. These coils don't fire to ground except from one plug to the other through the engine. Arcing to ground inside the case will bypass the plug and cannot be determined except by bench testing with two 1/4- to 3/8-inch air gaps, each to the coil case. A weak spark on one side can cause one cylinder of the engine to stop firing or to be erratic. When it is firing sporadically, that plug tends to get all sooty. This in turn causes the owner to install a hotter plug in that cylinder, and to start researching ways to clean the old plugs. By now, you have realized that the coil is at fault, not the spark plugs. An RK engine with a good coil and clean fuel can run all year on one set of D21 or C88 plugs.

Therefore, efforts to clean spark plugs do not solve the fundamental problem. Some of the cleaning procedures can damage the porcelain and cause the plug to fail again. This leads to a new round of plug changing and cleaning. It's lots more fun to fix it properly and then enjoy the scenery.

Don't forget that a good solid-wire plug lead is part of the coil circuit. The high energy in the vibrator spark can quickly open up the resistive wire used on automobiles, and this wire can also be tricky to adapt to our coil connections.

Also, do not use an automotive spark coil. The Fairmont coil fires when the timer points close, while the auto coil fires when they open. This retards the spark by 36 degrees. If you can get it to run okay forward, it probably won't run at all backward.

Vibrator Point Adjustment Procedure for Fairmont Vi- brating Type Spark Cells



Install lower half of vibrator first. Carefully bend mounting bridge by tapping with a hammer and nail set or punch at "B" or "C" to obtain 1/16" gap at "A". Hold punch at "B" to reduce gap, and at "C" increase it.

Apply upper bridge, and adjust nuts "G" to obtain 1/32" gap at "D". When in this position, there must be some clearance between upper vibrator leaf and rivet head at "E". If there is no clearance at rivet head, tap upper bridge lightly with the punch at "F" until clearance is obtained. Then rest gap at "D" to 1/32". Be sure points match and seat together evenly.

Tighten all electrical connections, then connect Fairmont F7838 low reading ammeter in primary circuit and, if necessary, make further adjustment for .85 to .95 amperes current draw. This should be done by again tapping lower bridge at "B" or "C". Do not change the 1/32" gap on "D". Tighten lock nuts at "G".

Check and clean spark plug regularly, and maintain 1/32" gap at points.