Generator Tune-Up for Fairmont Motorcars

By Ron Zammit

A lot of Fairmont motorcars with two-cycle engines have an Autolite 6-volt generator and regulator TC-4301C for electrical power. If you are like me and want your car original, you keep these units. However, they usually don't work all that well and have been a source of mystery. Each one seems different and their operation is marginal at best. This article addresses how to get the maximum out of these components without damage.

In proper operation, the generator should trickle charge your fully charged battery at about 2 to 3 amps. When you load it with the lights, you should see the meter in the motorcar kick over to discharge for less than a second then come back up to a 2 or so amps charging rate. All of my generators have not worked this way when I purchased the motorcar. It has been difficult to get the things to work consistently in charging and keeping the system supplied with enough current to run the lights and wipers. (These generators will not handle a current load any larger than that required by the lights and wipers.) Additionally, the system should have the battery positive pole at ground; half of mine have been the other way when I first got the motorcar, so I've since reversed them since improper polarity will burn the regulator points very quickly.

I'm assuming the generator is working with good armature, field, brushes, bearings, etc. Almost any generator shop can check these parts. The true heart of the problems are in the regulator. This little box has two relays in it, the cutout and the step (regulator.) It is their adjustment which is so mysterious to most folks, and to most repair shops to which I have taken the units. So here is how I finally got mine to work.

To start, you need a DC power supply, variable up to 9 volts, and with a current capability of 1 amp or so. Remove the regulator from the generator body, marking the "A" (armature) and "F" (field) wires, as these can't be mixed upon reinstallation. Carefully open the regulator box, taking care not to touch any parts. The cutout is the relay with large diameter wire in its winding.

The first check is to make sure the contacts are not pitted or dirty. Remove pits with a point file and dress with emery cloth. For the adventuresome, you can carefully remove the top contact blade from the relay and inspect both sets of points. The points are held in the upper positions with springs. Make sure these springs' bodies are not touching the frames of the relays.

Now let's make the first adjustments, on the gaps. There are two on each relay. (All data is from a Prestolite service manual dated 8/22/67.) First, the armature air gap (points open) on the cutout is to be 0.010" to 0.030" measured from the relay coil pole piece to the contact blade. Adjust by bending the blade stop. Next, the point gap: when the points are open, the gap should be 0.015" to 0.045" and this is adjusted by bending the stationary point holder. For the step relay, the armature air gap should be 0.044" to 0.046" (points closed) adjusted by raising or lowering the upper point (and stationary point) holder. The point gap should be at least 0.005" adjusted by turning the brass cam, or bending an adjustable stop on units without the cam.

The next adjustments are with power applied. Connect your power supply positive to the body of the regulator, and the negative to the "A" contact. Run the voltage up above 6.5 volts and the cutout should close between 6.5 and 7.25 volts. Adjust this action by bending the spring hooks, one or both. Note that this relay will not open again unless you lower the voltage quite a bit. On the generator, it will kick out properly, because a reverse current runs through that larger wire coil when the generator's output falls below the battery's voltage.

The step relay is the most finicky as its operation is temperature dependent. Here are some open and close voltages (open - coil is active): 60° - 8.17, 6.41v; 70° - 8.10, 6.35v; 80° - 8.03, 6.28v; 90° - 7.95, 6.21v. All voltages have a tolerance of plus or minus 0.15v. Adjust for the upper value by bending the spring mounts, the lower value by the brass cam (or adjustable stop). Now is a good time to check the field resistor value. With the step relay energized, points open, you should measure between 1.85 and 2.10 ohms between the "F" terminal and ground. With the step relay points closed (not energized), you should read zero ohms. This resistor is placed in series with the field winding when the generator has high rpm's so that the output current is

limited. Without proper operation and values, you can burn out the field winding. (Most railroads put a short piece of rod in the fuse holder—like putting a penny in the fuse box at home. Use a 5 amp fuse as a minimum, but this is just a guess. Does anyone know what value for this fuse is proper? The output current does not go through it, it is for the field current. The field may also be damaged if you run the generator without a battery.)

Next, if you need to polarize the generator, install the regulator with the lid off. Be careful not to touch the relay springs and their holders or your adjustments may be ruined. With the battery connected positive terminal to ground, touch a wire connected to the negative pole to the cutoff relay's body for a few seconds. If you have reversed the electrical polarity, don't forget to reverse the connections to the motorcar's ammeter so it will read correctly. Now install the regulator lid and let's do the final test.

Start the engine and warm up. Run up to normal running rpm's and the generator should be charging. With a good battery, 2 to 3 amps should be indicated. Turn on the lights, and the ammeter should kick into discharge, then back up to 2 to 3 amps. If the "no light" current is more or less than the 2- to 3-amp reading, you need to adjust the generator output.

Stop the engine and remove the brush cover plate on the generator. You can see the three brushes with the help of a mirror. Usually, the stationary brushes (two of them) are in the six o'clock and 12 o'clock positions. The "third brush" is movable and in the three o'clock position, toward the front of the motorcar. Carefully move this brush in the direction of rotation for more current, or against the direction of rotation for less current. DO NOT TRY to move a fixed brush. The holders are old, fragile, easily broken, and no longer available. I learned the hard way! Restart the engine and see if your brush adjustment was accurate. It may take several tries to get it correct, and only adjust with the engine stopped. When finished, stop the engine and replace the brush cover.

I hope this helps you get your generators tuned up. It takes a lot of patience to adjust those relays, but once done, you'll be able to do it faster the next go round. And with all the vibration these units undergo, they'll need work again. You can count on it.

Spark Plugs

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Twin-cylinder RK engines sometimes operate better with different heat range plugs in each of the two cylinders. Usually this can be attributed to the fault of one side of the twin-lead coil shorting out. This leads to cylinder misfiring, which will foul one of the plugs. The hotter plug placed in the cylinder affected by the coil misfire won't do much for you . . . it's a temporary fix. A new coil may be in order.

Occasionally, after running your car for an extended time at very slow speeds, or when the car has idled for a considerable length of time, black, oily or sooty deposits may form on the plug. This is not necessarily an indication of fouling. These deposits will burn, and be blown off, if the speed and load on the car is increased for a short period of time. Continuous running at very slow speeds, or excess idling of the car will, of course, result in "baked on" deposits, ultimately fouling the plug.

If your car won't start with a fouled old plug, but it will after installing a new one, don't keep the old plug! It's better to find the cause of the fouling than to try and clean old plugs.

Finally, here's a tip that I use to further improve a good ignition system. I cut off half of the ground electrode on my plugs so that the spark will jump slightly further from the cut edge of the electrode to the center electrode. This puts the spark "out in the open" and insures reliable firing every revolution.