About Generator (Alternator) Testing.

In 1996, the term "generator" replaced the term "alternator" in engineering jargon. I will use the terms interchangeably. I can remember polarizing a generator.

If you think you have problems with the generator, don't even consider looking at it until you have tested the battery. This will assure you that you will not be testing the generator using a sulfated battery. If a battery is sulfated, the generator cannot charge it.

When beginning to test the generator, think basics first. Is the belt loose? Is the generator mounting bracket loose?

Note: If you are working on a 1990 to 2008+ GM car or truck, refer to: GM bulletin #43-64-07A regarding low voltage readings or dim lights at idle. Don't waste your time trying to fix something that, according to the manufacturer, is not really a problem.

The generator cannot work as engineered if there is a significant voltage drop in the feed wire between the generator and the battery positive (+) terminal, or between the generator case, and its ground back to the battery negative (-) terminal.

There have been cases where the generator was replaced with a new one and the new one did not work. This is where voltage drop testing becomes very helpful in a diagnosis.

The most common ways that a generator can fail to produce its engineered output:

1. Belt is not tight enough.
2. No voltage feed in to the rotor.
3. Voltage regulator is faulty.
4. Voltage regulator is good, but the grounding circuit for voltage regulation is faulty.
5. Diodes are shorted.

The greatest percentage of problems with any generator is with the diodes. A generator with a faulty diode can put out enough current to supply the ignition system, but not enough to keep the battery charged. Diodes that go "bad", (open or shorted) can be the result of improper test procedures, removing the generator leads while the engine is running, reversing the battery connections, and from being mishandled. Ninety-nine out of one-hundred diodes will short, rather than open, when they fail. Shorted diodes in the generator provide a direct "short to ground" for battery current.

Shorted diodes can discharge a battery in a short period of time, whine or hum at idle or low speed. The whine or hum happens because the generator, a three-phase device, is "out of phase". Shorted diodes can cause AC to ride on the DC. The vehicle electrical system relies on direct current. The vehicle electronic system relies on direct current, and also some very specific input of analog signals that can give an appearance of AC. If a diode does not rectify the AC in the generator to DC, there will be an excessive amount of AC "riding on DC" throughout the entire electrical system. Voltage and current produced in the generator is "analog" in nature, looking sometimes much like the signal produced by a crank sensor, wheel speed sensor, etc. When AC rides on DC, the AC "analog" or constantly changing signal appears everywhere that voltage is present in the entire electrical/electronic system of the vehicle. This unruly signal has no defined target, unlike the wires from a permanent magnet generator, but rather is everywhere voltage exists. Circuits, including "AC to DC" converters that normally interpret and process analog signals can process the "AC riding on DC". This causes electrical interference in the computer system. This could cause any control module to be triggered by an unwanted AC signal from the generator rather than from a sensor engineered to send a specific signal at a specific time, on a dedicated wire. The end result could be drive-ability problems, problems with cruise control, no start, etc.

Information on all of the above subjects is in my books: "Understanding and Troubleshooting Vehicle Voltage Drop", and "Vehicle "*How To*" Test Guide. Available at:

www.Vestest.com The Vehicle Voltage Drop Website