

6 And 12 Volt Generator Performance
By Uncle Milt
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CONCERNS

Does your 6 volt generator work ok at startup, then it quits charging after touring 5 miles?

Does it overcharge and boil the water in the battery?

GENERATOR TYPES

Generically, there are two types of generator voltage and amperage controls.

The early 6 volt generators (up to around 1935, most car makes) controlled the voltage and amperage with “3rd brush regulation”. In these generators the adjustable 3rd brush position was moved to increase or decrease the voltage and amperage output to the battery.

The charging rate increased above idle speed and was usually constant at cruising speeds.

Cutout relay at idle a “cutout relay” opens up the charging circuit (no charging at idle). At engine shutdown the cutout remains open. This prevents current flowing

from the battery to ground back through the generator.

VOLTAGE REGULATOR

In the mid thirties (1935) generator voltage and amperage was controlled by a “voltage regulator” mounted outside of the generator on the firewall. Most generator regulators had three coils; a voltage control a current regulator, and a cutout relay.

The cutout relay opened up at idle and with the engine off. It served the same purpose as the earlier generator cutout (no charging at idle or engine off).

The voltage and current control coils are adjustable.

NOTE: Obtain OEM service information for correct regulator adjustment procedures.

VOLTAGE PERFORMANCE TESTS (ON VEHICLE)

6 volt systems: Performance tests are best conducted at the battery on the car. Hook up a voltmeter to the battery (+) and (-).

NOTE: Some digital meters will not work accurately on old vehicles. In these cases,

use an old style analog (needle) type voltmeter.

The “rest voltage” on a fully charged up battery should be at least 6.4 on a 6 volt system. Start the engine and warm up. At idle the cutout will be open and you should read the same voltage as the battery rest voltage (6.4).

Rev the engine and hold at a steady 1000 RPM. The battery voltage should be above 6.4 and is usually between 6.6 and 7.0 volts with a good charging system.

Then, at a steady 1000 RPM, turn on the lights.

On a 3rd brush regulation system, the voltage will usually drop around 0.2 to 0.4 volts at the battery.

On 6 volt voltage regulation systems the voltage may increase 0.1 or decrease 0.1 volts.

The voltage regulator performs a better job of controlling charging voltage than the 3rd brush regulation type.

If these voltage readings are obtained and remain constant, the generator is “genning”.

12 Volt Systems: On a 12 volt system, you should measure around 12.4 volts (rest voltage) before startup and the same voltage (12.4) at idle at the battery.

Revved up to 1000 RPM you should read 12.6 up to 13.2 volts, normally, at the battery.

With the lights on, you will read slightly less voltage (0.2 volts drop) on a 6 volt 3rd brush regulation system.

On a 12 volt regulator system you will read the same voltage (± 0.1) when turning on the lights with the engine revved to 1000 RPM

Amp Meter Readings

3rd Brush Regulations: On 3rd brush generator systems the amperage is mostly constant. The dash amp meter is usually accurate enough for testing.

At idle, (cutout points open) the amps are less than 0, usually 2-4 amps. This is the ignition system current draw. As you rev the engine up to around 1000 RPM and hold it steady, the cutout points close. The charging current will usually show around 10-15 amps (constant), depending on the 3rd brush adjustment. As you rev the engine higher in RPM, the charging current may drop 4 or 5 amps. This is normal.

At a steady 1000 RPM, turn on the lights. In most cases old cars (up to the regulator era, 1935) amperage will drop around 8-10 amps. This ok and the battery is still getting from 2-5 amps charging. The

battery will stay charged up when driving at night with the lights on.

Voltage Regulator Systems: On generators with voltage regulator control, rev the engine to 1000 RPM. Note charging rate (2-10 amps). Turn on the lights. The lights will draw around 10 amps. During this test the lights should be bright and charging amps will remain around the same (2-10).

The voltage (current) regulator is maintaining the charging rate to keep the battery charged.

If all the above is happening the generator is “genning”.

CAUTION: These tests only provide an indication of charging performance. More detailed test procedures are outlined in old **Motors Auto Repair** (and other) manuals.

SERVICE AND MAINTENANCE ON CAR

Belts: If the generator is not genning, check the drive belt for slipping (glazed contact surface) tighten belt (old wide belts) until it deflects around ¾ inch when lightly pushing inward between pulleys, engine off. On “skinney” belts, the deflection should be around 1/2”.

Amp Meters: Check the amp meter connection. **Disconnect the battery ground prior to these checks.**

Most of the time you will find the AMP gauge nuts loose. Tighten nut(s) moderately. You don’t want to break up the old insulation.

Loose nuts at the gauge causes the generator to work harder (charge more) than necessary.

Brushes: Generator brushes become glazed, burned, or gummy causing, burned, or gummy causing reduced charging the armature commutator bars turn purple.

SERVICE

If the above maintenance or no charging conditions exist, remove the generator for service. Follow the auto manufacturers repair procedures in the **Motors Auto Repair Manual** procedures and specifications.

Auto marqué hobby groups usually have competent technical repair facilities listed for repairs.

One example for generator repair service is S and N Auto Electric, 2430 Manning St, Unit A, Sacramento, CA, 95815; phone 916.920.2233.