

Charging system diagnosis

What the output should be, how to test it under real load, and why the alternator is usually not the problem.

PROCEDURE

- 1 Confirm the battery first**
A failing battery makes a healthy charging system look broken. Test it before anything else.
- 2 Measure charging voltage**
At the posts, engine running, compare to spec.
- 3 Apply load**
Lights, blower, warning devices. Voltage should stay within spec at raised idle.
- 4 Check AC ripple**
Meter in AC volts at the battery, engine running.
- 5 Voltage drop the cables**
Alternator output stud to battery positive, and alternator case to battery negative, under load.

NUMBERS

Charging voltage	13.5–14.7 V typical	12 V system, temperature compensated — check OEM spec
Overcharge warning	above about 15 V	regulator fault; boils batteries
AC ripple limit	under 0.5 V AC	more indicates failed diodes
Charging cable drop	under 0.2 V	alternator output to battery positive, loaded
Alternator ground drop	under 0.1 V	case to battery negative, loaded

COMMON MISTAKES

- Condemning the alternator without voltage dropping its cables and ground.
- Testing on a discharged battery, which makes output look low as the alternator works flat out.
- Skipping the AC ripple check when chasing odd module or bus faults.
- Ignoring belt condition and tension on a high-output unit.

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