

## Ralph Thayer Automotive Guide to Your Car's Electrical System

Your engine's power comes from a constant series of gas explosions sparked by the ignition system. A car's electrical system also powers essential components such as the ignition system, starter, headlights, sensors, instrument panel and engine control unit along with a growing list of other electronic gadgets such as air conditioners, stereos and navigation systems. Take a peek under the hood and learn what powers all these components with this guide to your car's electrical system from [Ralph Thayer Automotive](#).

### Automotive batteries

A typical automotive battery is a rechargeable, 12-volt, lead-acid battery. It consists of plates made of lead and lead dioxide submerged in a sulfuric acid and water solution. Direct current electricity is produced when the acid in the solution reacts with the plates. This chemical reaction releases electrons as the surface of the plates turns to lead sulfate.

When the batteries are recharged, the opposite occurs: the plate surfaces return to their original lead and lead dioxide states. The alternator recharges the battery whenever the engine is running, transforming the mechanical energy from the crankshaft into electrical energy in the form of alternating current. A set of rectifiers that converts AC into DC power, and the voltage is regulated to ensure that the right amount of current goes into the battery for recharging.

### Electrical system

Automotive electrical systems are closed circuits. Direct current flows from the positive terminal of the battery through the wiring assembly to the various electrical components that have been turned on by a switch or a relay, ending up at the negative terminal of the battery via a thick wire called the "ground strap" after passing through the vehicle's metal chassis.

Pressure, current, resistance and power are regulated in several ways in an electrical system. Thinner wire raises the resistance, meaning less current can flow, while heavy cable ensures that the starter motor will receive enough juice for the job.

Some components are wired in series, connected one after the other in the circuit so they share the same current. Parallel wiring creates individual circuits for each item, requiring more current because there is less resistance.

Most components are wired through the ignition switch to ensure that they won't be accidentally left on when the engine is turned off and drain the battery.

Fuses of different sizes are strategically placed to protect circuits and devices from harm in case of a strong surge in current.