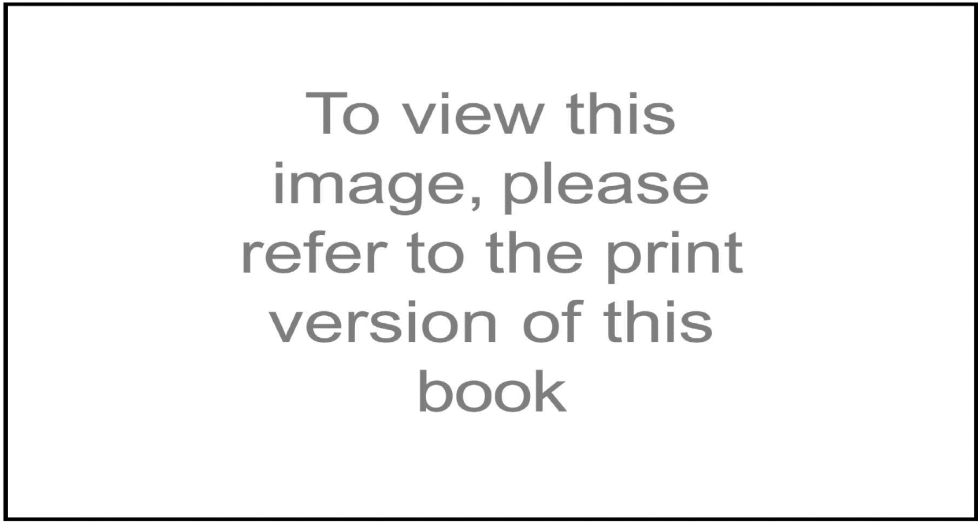


was marked for obscurity. There are several reasons why virtually all modern aircraft come equipped with alternators rather than the once-popular DC (direct current) generators.

Generators are large, heavy pieces of equipment in contrast to an alternator, which has a higher power-to-weight ratio. Another concern about the generator was the output variability with engine speed. An alternator produces more power at a lower engine RPM than a generator does—even at ground idle—a significant benefit for an aircraft sitting at the end of a runway in IFR conditions with a panel full of electronic equipment. This is accomplished by the voltage regulator, which monitors system voltage and makes the necessary adjustments to the alternator. Set correctly in a 14-volt system, for instance, the alternator will maintain system voltage  $\pm .5$  volt.

It may help you to think of the voltage regulator as the electrical system's answer to a constant-speed prop governor. Electrical system current is fed to the alternator's exciter field in varying strengths. The more current applied, the greater the AC output. The one drawback to the alternator is that there must be amperage before it can produce electricity.

Unlike DC shunt generators, which contain a permanent magnet and have residual magnetism, the alternator rotor has little or no residual magnetism to form the necessary lines of flux to start current flow. The alternator rotor requires approximately 2 amps to make the alternator self-excite and produce current. Think of it as something like using water to prime a dry pump. Before starting the engine, this "priming" voltage is supplied by the battery to the alternator field. You can trace this in Figure 8-11, which shows that activation of the battery master switch also activates the alternator field switch. Current from the battery goes to the bus, then flows through the alternator field switch to the rotor field of the alternator. Once the engine is running and the alternator is producing current, the stator output flows to the bus and, because it is a higher voltage than the battery,



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**Fig. 8-11.** *Light aircraft alternator system.*