AC vs DC

There are two basic forms of electricity: alternating current (AC) and direct current (DC). Alternating current is made up of electrons alternately flowing in one direction and then in the opposite direction under the influence of a cycling force (voltage) that acts a part of a time in one and then the opposite direction. A mechanical system representing alternating flow would be a ball bearing under the influence of a force (gravity) set at the top of a sloped device. The ball would oscillate between the peaks (assuming no friction). In DC electricity, the electrons flow in a single direction.

DC electricity is generated by such devices as batteries and photovoltaic systems. In a battery, electrons gather at an electrode as a result of a chemical reaction within the battery. In the PV cell, the electrons are generated by light and the ability of the PV cell to move charge carriers to opposite sides of the cell.

The electrons move because there is a driving force—a voltage—which is characteristic of the electric source, e.g., an electrochemical cell (battery) or a PV cell.

AC cannot be stored and must be used as produced or is wasted. DC power, which is easily stored in batteries, will not be wasted until full capacity in the batteries is reached. It can then go to direct use via transfer switches to pump water, run fans, heat water, or you name it.

DC is a purer, more efficient form of electricity than AC. The U.S, standard, 120/240 volt 60 cycle AC, actually turns on and off 120 times a second. Incandescent AC lights actually flicker at this rate. The human eye "holds" an image for 1/16 of a second so we don't see this, but insects such as flies do. (Don't ask how I know this.) This is what causes AC fluorescent lights to flicker and hum. (That hum is a 60 cycle "B" note which you can tune your guitar or banjo to.)

DC is constant power. For this reason a 25 watt DC bulb delivers as much light as a 50 watt AC bulb. A ½ horsepower DC motor will do the work of a 1 horsepower AC motor, and so on. DC fluorescent lights don't flicker or hum, and they contain no PCBs. Furthermore, I can wet my finger and stick it in a 12 volt DC outlet all day long with nary a buzz. DON'T TRY THIS WITH 120 VOLT AC. 12 volts does not have enough force to shock, let alone electrocute, a human.

But do not disregard safety, such as fuses. Although it won't shock, it can burn and start fires. For those of you that have been shocked working on your car, which is 12 volt, keep in mind that your car's coil puts out 25,000 volts AC.

To keep from being too onesided, I will mention one advantage AC has over DC. AC can be transformed, which means being stepped up to a higher voltage and then stepped back down. DC can't. For this reason AC can be transferred over great distances with minimum line loss on small wires. This is the reason for its widespread use. One last note. The power company charges $6 a foot to install these great distance lines, not to mention the fine chemicals they use to keep them clear.

by Michael Jacks of West Virginia
Peoples Network, 11/84

More from Mike in subsequent issues.

Editor . . . . . Robert A. Macoskey

ALTER Project
Slippery Rock University
Slippery Rock, PA 16057

Non-Profit Organization
U.S. Postage
PAID
Permit No. 24
Slippery Rock, PA