



## POWER CONTROLLER

A lot of the power consumed by alternating current motors is wasted because power companies feed electricity at a fixed voltage and much of the time motors do not need the voltage they are getting. The fixed voltage is what motors need to handle their heaviest loads, but more often than not they are operating at less than full load conditions. Even when a motor is idling, the fixed voltage creates high current flow and resulting heat loss—just as if the motor were working hard. With multimillions of motors in the United States, the cumulative energy wastage is of enormous order.

As part of its energy conservation research in support of the Department of Energy, Marshall Space Flight Center (MSFC) sought a means of curbing this massive wastage. The result was successful development of a device, invented by MSFC engineer Frank Nola, called the Power Factor Controller (PFC). The PFC senses shifts in the relationship between voltage and current and matches them with the motor's need—for example, when it senses a light load, it cuts voltage to the minimum needed. The power saving thus effected runs about six to eight percent under typical motor loads and as much as 65 percent when the motor is idling. NASA has granted almost 200 licenses for commercial use of the technology and about 30 companies are actively producing or developing systems based on the PFC design.

A major manufacturer is Nordic Controls Company, Batavia, Illinois, a subsidiary of Furnas Electric Company formed exclusively for production and marketing of an improved version of the PFC called the Nordic Energy Saver. The unit has, in addition to voltage control, a "soft start" feature that brings the motor gradually up to speed, protecting equipment from starting shock and thereby lengthening machinery life. Nordic Energy Savers, built in more than 100 models for motors up to 300 horsepower, are now working in more than 400 industrial applications.

An example is West Veneers, Inc., Randle,



Washington, which has installed 25 Nordic units (top left) to control machinery at the company's chipper mill (top right), where logs not suitable for veneer or board lumber are chipped and sold as paper pulp. Below is an Energy Saver-equipped drilling machine, one of many machines operated by Smith Tool Division of Smith International, Inc., Irvine, California, which manufactures drill bits for oil wells. Smith Tool has 45 Nordic units on motors ranging from 7½ to 40 horsepower; the company conducted carefully documented studies on 16 Nordic-controlled motors and found that energy savings averaged about 32 percent, or \$10,000 a year.

