

Electronic Power-Saving Devices for Appliances

Over the past few years, electronic devices for reducing the energy consumption of electric motors have entered the market place. These devices basically regulate the power delivered to an appliance's motor by continuously adjusting the 50/60 hertz (cycle per second) sine wave from the utility to match changes in the load on the motor.

The larger the motor, or the more mismatched the motor and load are, the larger the potential savings in energy that a power control device will achieve. If the load never varies, it is more efficient to always match the motor closely to the expected load than to add one of these devices. Motor loads that do vary can benefit most from these controlling devices.

Because the controller continuously applies the correct power to the motor, the motor operates consistently at its peak efficiency and cooler. As a consequence of this, manufacturers of these devices claim they will improve the efficiency and life expectancy of electric appliance motors.

Power controlling devices come in a wide variety of voltage and amperage ratings. These range from 110/120 volt-15 amps to 220/240 volt-40 amps (single-phase). There are also three-phase controllers for very large motors available.

In most new home appliances that have electric motors, such as a refrigerator, the factory-installed motor is already closely matched to the load. So an electronic controlling device will have little effect on electrical consumption. Appliances newer than 1990 may see no energy savings at all; this is due to their existing energy-saving features. In some cases, the controller slightly increased the appliance's electrical consumption.

Because they do not expect problems from the controller, many appliance manufacturers will honor their warranties if you use one of these devices.

If a problem does arise with the appliance warranty, some manufacturers will repair the appliance once and then warn you that any future claims will not be covered if you continue to use the appliance with a power controlling device.

When used with refrigerators, power controlling devices had the following observable effects: the compressor motors used less electricity, the interior lights were dimmer, and the freezers were colder. (The latter is because the device slows the circulation fan.) These effects usually reduce the electrical consumption of a refrigerator (ignoring interior temperature changes caused by opening the refrigerator door).

Tests have shown large differences in savings between various refrigerators, possibly due to different compressor motor designs, varying refrigerant coil sizes, and different insulation levels. Older, less efficient refrigerators generally realize more savings.

All of the studies used refrigerators with a constant interior temperature. The energy saved during each test ranged from 0% to 20%. 240 volt appliances, with the appropriate controller, achieve larger potential savings than 110 volt appliances. Similar savings with furnace fans, washing machines, and other large appliances that use electric motors were documented in the study below.

Electronic power controllers for residential appliances are available at many retail stores, home centers, and mail order catalog outlets. The cost ranges from \$30 to \$60. Many units have a 10 to 15 year warranty. Since the dollar value of the energy saved varies with line voltage, age/condition of the appliance, the cost of the controlling device, and the local utility electricity rates, the simple payback time for this conservation measure typically ranges from 21 months to 16 years.

Source: U.S. Department of Energy - Energy Efficiency and Renewable Energy