



**E-SAVE**  
TECHNOLOGY

# White Paper

## Single-Phase Motor Efficiency Controller

### Introduction

Power Efficiency Corp. manufactures a single phase motor controller that includes a soft start and patented E-Save Technology™ that reduces power (kw) delivered to the motor in order to supply the precise amount of energy required to maintain the motor at normal operating speed (full RPM) and the proper amount of torque to match the motor load. This technology has been tested on multiple motor size and manufacturers and has shown energy savings of up to 60% on very lightly loaded motors. As a result, this technology frequently qualifies for utility efficiency rebates.

### Energy Saving Options for Electric Motors

The first option that comes to mind is that low-tech solution: the power switch. There's no denying that the best way to save energy is to shut off the machine. However, this is not always possible or practical.

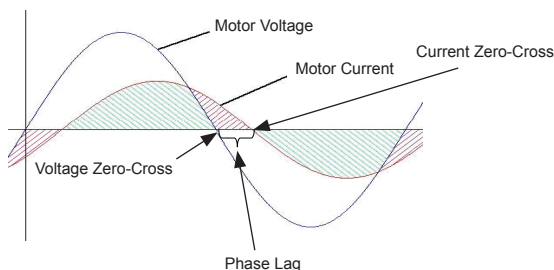
High efficiency motors are another option. Although more efficient than standard motors, high efficiency motors become inefficient when lightly loaded, just like standard motors.

Installing a variable frequency drive (VFD) is another option. By equipping the machine with a VFD, it will slow down or stop when there is no load or when it is lightly loaded and will speed up again when load increases. By slowing or stopping the electric motor, energy is saved. But there are times when slowing the motor isn't possible or when a VFD is too expensive to be economical based solely on energy savings.

The Power Efficiency's E-Save Technology™ keeps the motor running at full RPM and reduces the power used by the motor when it is lightly loaded. However, Power Efficiency Motor Efficiency Controller with E-Save Technology™ is much less expensive than most VFDs. Furthermore, the E-Save Technology™ makes high efficiency motors more efficient in the same way it operates on standard efficiency motors – reducing their efficiency at low loads.

### How E-Save Technology™ Saves Energy

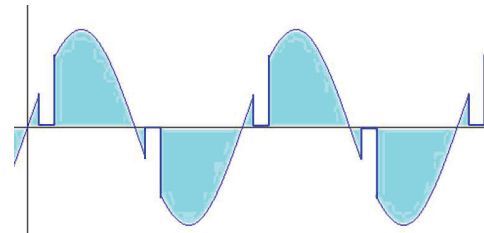
To save energy, E-Save Technology™ constantly monitors the voltage and current going to the motor. When the voltage and current sine waves diverge greatly – when the phase lag increases – the motor is lightly loaded and operating inefficiently. A picture of these wave forms on a lightly loaded motor is shown below.



When E-Save Technology™ detects a lightly loaded motor, it reduces the current and voltage appropriately, while always maintaining the motor at a constant (full) operating speed.

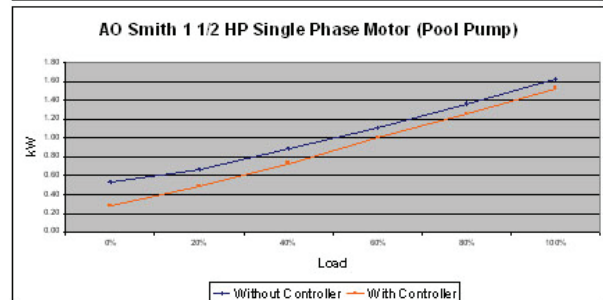
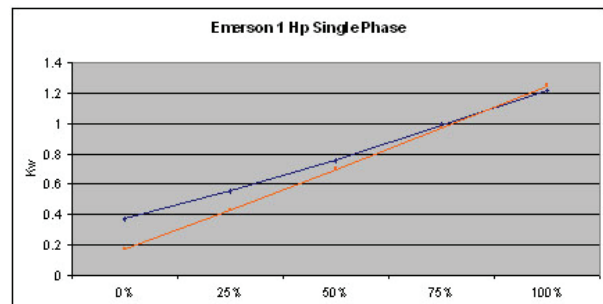
When the load on the motor increases, the E-Save Technology™ reads this condition and increases the power to the motor so it does not stall.

The picture below shows the voltage wave form to the motor which clearly shows the notches of energy that have been removed. These notches represent the energy savings that a user will see when using E-Save Technology™.



### E-Save Technology™ Test Results

Power Efficiency's E-Save Technology™ has been proven to save up to 60% of the energy consumed by a single phase electric motor, depending on the load and operation of the machine. Below are some typical results:



With energy prices on the rise and increasing concerns about green house gas emissions, Power Efficiency introduces a smart option for energy savings on single phase electric motors. Power Efficiency's patented E-Save Technology™ represents a significant advancement in single phase electric motor efficiency and near term technology to address environmental concerns.