

CASE STUDY ENERGY SAVINGS IN A HOMOGENIZER

ABSTRACT

This case study explores the installation of the starting and energy saving apparatus in a homogenizer at a food industry plant.

Benefits include:

- Reduced voltage motor starting
- Energy savings
- Improved power quality

CLIENT PROFILE

Poliva manufactures and markets raw materials for the bakery industry. The products list includes: margarines, fats, fillings, spreads, baking improvers and other materials.

Poliva has various SinuMEC installations on Amonia compressors, chocolate mixer and homogenizer. This case study explores the installation on a homogenizer.

BUSINESS REQUIREMENT

Due to the high starting currents during motor starting and local regulation, a motor starter was required.

The ever increasing electricity prices and business demands for increased profitability led the company management to explore a solution that would provide more functionality than just motor starting.

SOLUTION

The factory implemented PowerSines' innovative SinuMEC (Sinusoidal Motor Efficiency Controller) system providing harmonics-free motor starting as well as to induce energy savings. SinuMEC controlled the voltage supplied to the motor to allow reduced voltage startup; and while the motor was running the SinuMEC adjusted the voltage according to the load. Due to the structure of electric motors, reducing the supplied voltage while partially loading

OVERVIEW

PRODUCT USED

SinuMEC – Sinusoidal Motor Efficiency Controller

CLIENT PROFILE

Food & Beverages

APPLICATION

Homogenizer

BUSINESS REQUIREMENT

Stable motor starting and cutting energy costs

SOLUTION AND BENEFITS

Installation of PowerSines' Sinusoidal Motor Efficiency Controller, designed to reduce motor voltage according to motor load, improved motor efficiency and lifetime and smooth motor start.

the motor, increases its efficiency and lowers its internal losses.

Poliva purchased SinuMEC due to its industry leading starting solution; they assumed that the various energy efficiency benefits will be minimal. The homogenizer is used to mix different fluids. Prior to installation, estimations showed that the motor was fully loaded during its entire period of operation. In actuality, the homogenizer was not loaded during 30% of its operating time. During this period the SinuMEC was in "Save Mode" and improved the motor efficiency

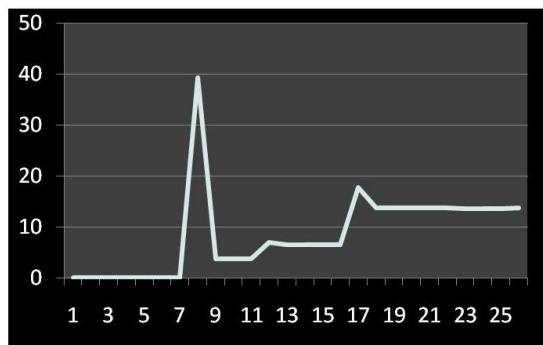
SinuMEC is built around the patented RIGHTVoltage technology, which controls and stabilizes the voltage supplied to the AC motor. It is done by utilizing proprietary methods for combining three-phase voltage vectors (VVC - Voltage Vector Combination), while maintaining a pure sinusoidal waveform. It does not generate harmonics and is EMI/RFI free.

While the motor's control voltage was kept unchanged, the power voltages supplied through SinuMEC were constantly measured for power demand and modified accordingly.

RESULTS

MOTOR STARTING

SinuMEC provided smooth motor starting with reduced voltage. The startup current was only 1.1 times the motor nominal current only as shown below, compared to much higher values without the SinuMEC, which causes voltage drops and may result with breaker tripping.



ENERGY SAVING

An energy meter was installed on the line side of SinuMEC in order to measure the energy consumed by the system. The motor operated with SinuMEC's operational "Save Mode" and in "internal bypass" mode. The following table shows the average values measured during each period:

SinuMEC Mode	Save	Bypass	Saving
Volts, RMS	408.7	409.9	-
Currents, RMS	13.68	3.65	73.3%
Line Losses			92.8%
Active Power	2.00	1.27	36.6%
Reactive Power	9.48	2.26	76.2%
Total Power	9.69	2.59	73.3%
Power Factor	0.21	0.49	136.7%

POWER QUALITY

SinuMEC does not generate any side effects and does not require any filters. In addition, it improves the power quality of the facility by filtering harmonics and improving the power factor.

The table below compares the average power quality parameters during the two measurement periods:

SinuMEC Mode	Save	Bypass	Improvement
Volts, THD	0.9	0.9	1.1%
Currents, THD	8.8	8.2	6.5%
Currents, TDD	2.10	0.52	75.1%
Power Factor	0.21	0.49	136.7%

SUMMARY

The installation of SinuMEC provides significant benefits, from motor starting, energy saving and improvement of power quality. SinuMEC increases the facilities reliability, efficiency and profitability.

Similar benefits were measured in other SinuMEC installations in low or variable load motors, such as other types of mixers and many other constant speed loads.

Results in all cases show that with SinuMEC, companies can focus on the productivity of their operation while SinuMEC handles the reliability of their motors.



SinuMEC – Sinusoidal Motor Efficiency Controller