

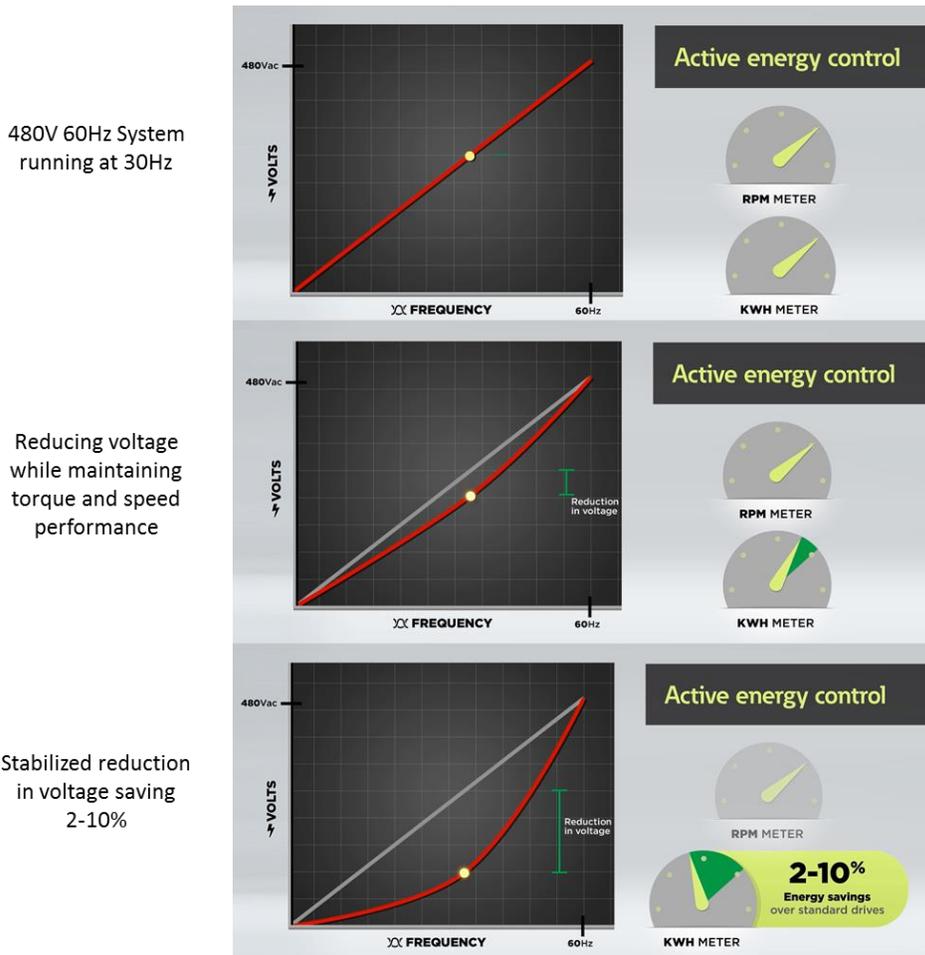
PowerXL DG1 Energy Management Solutions

Introduction

The PowerXL DG1 adjustable frequency has been specifically designed to reduce energy usage and improve motor performance and system reliability. This helps customers power their motors more efficiently, effectively, and safely. Features include Eaton’s patented Active Energy Control algorithm to optimize energy usage, a kilowatt (kW) meter for power monitoring, and an onboard energy savings calculator to capture the cost savings provided by the PowerXL DG1 drive.

Active Energy Control

A standard drive controls a motor based on a linear volts per hertz relationship. Eaton’s patented Active Energy Control algorithm dynamically adjusts the voltage down at a given reference frequency, optimizing the performance of the motor, while minimizing power usage as shown in the figure below.

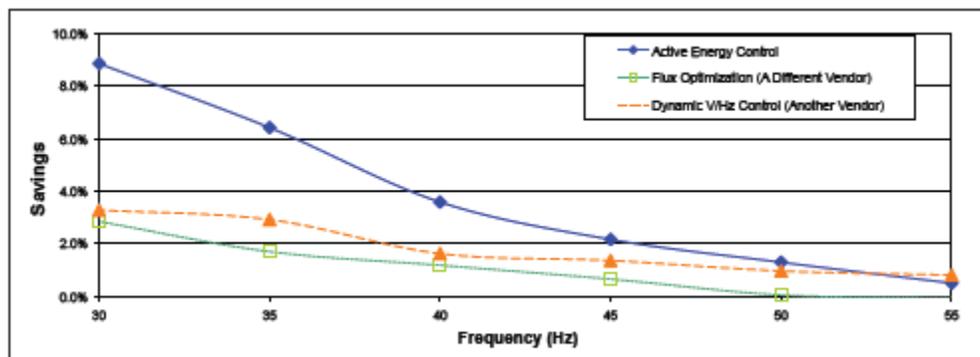
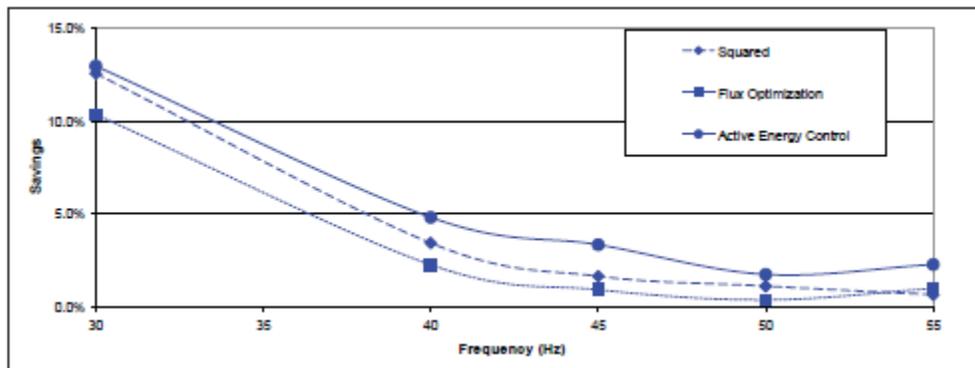


Note: This figure is a conceptual representation of Active Energy Control but not necessarily representative of the actual algorithm performance.

The Active Energy Control algorithm is active as standard out of the box when using the factory default setting for V/Hz Mode. Once the drive is given a run command, it will output a given reference frequency and voltage level which is determined based off the initialized V/Hz relationship.

If that reference frequency is steady, the drive will start to back down the output voltage in 5Vac increments to see if the motor can still provide the same torque output required at a lower voltage. If it can, it will drop the output voltage lower until it reaches a range where the torque becomes unstable. Once the drive hits the unstable region, it will bump the voltage up 10Vac to let the torque stabilize and maintain that level moving forward. With the load held at a constant speed, voltage reduced and current increased during this process, a significant power savings can be captured due to loss in the motor decreasing. If the reference frequency changes or the stability of the load has changed, the voltage will dynamically adjust back to following the linear V/Hz scale. The process then starts over, and repeats itself automatically.

Furthermore, the algorithm has been tested against other manufactured drives out of the box configuration and the test results yield a 2 to 10% cost savings when compared against a standard linear V/Hz curve performance. In addition, the algorithm has been compared to other static and dynamically adjusting control algorithms of other manufacturers, and still Active Energy Control exceeds the competition's performance in overall percentage cost savings. This competitive advantage is shown in the figures below.



Energy Monitoring

The PowerXL DG1 also provides many valuable energy counters that can be monitored through the keypad or over a desired communication protocol. They provide information on how the drive and software application are performing. The DG1 will record the total motor run time as well as the total time it has been powered with motor running or stopped. In addition to total times, the DG1 has the ability to perform trending with trip counters that can be reset by the user. There is also an instantaneous motor power meter to show the kW usage of the motor at any given time. The counters and monitoring parameters discussed can be seen in the table below.

Code	Parameter	Min.	Max.	Unit	Default	ID	Note
P21.4.1	Real Time Clock				0.0.0.1:1:13	566	
P21.4.2	Daylight Saving				0	582	0 = Off 1 = EU 2 = US
P21.4.3	Total MWh Count			Mwh		601	
P21.4.4	Total Power Day Count					603	
P21.4.5	Total Power Hr Count					606	
P21.4.6	Trip MWh Count			Mwh		604	
P21.4.7	Clear Trip MWh Count				0	635	0 = Not Reset 1 = Reset
P21.4.8	Trip Power Day Count					636	
P21.4.9	Trip Power Hr Count					637	
P21.4.10	Clear Trip Power Count				0	639	See P21.4.8
M44	Instance Motor Power			kW	0.00	1686	

Energy Savings Calculator

The PowerXL DG1 drive is designed with an energy savings calculator which will provide energy cost savings against a standard across-the-line motor starter. This is a very power feature that will enable users to immediately view the cost savings resulting from their installation. In the group of parameters shown below, the user can configure their currency type, local energy cost in that currency, and the format of the energy savings to be displayed. After setting these parameters, the drive will begin to monitor and log the instantaneous kW every 15 minutes. This data can be displayed on the keypad or pulled through a communication protocol to show the actual savings in a cumulative, daily average, monthly average, and yearly average format.

Code	Parameter	Min.	Max.	Unit	Default	ID	Note
P7.24	Currency	0	8		\$	2121	0 = \$ 1 = GBP 2 = Eur 3 = JPY 4 = Rs 5 = R\$ 6 = Fr 7 = Kr
P7.25	Energy Cost				0	2122	
P7.26	Data Type	0	4	s	0	2123	0 = Cumulative 1 = Daily Avg 2 = Monthly Avg 3 = Yearly Avg
P7.27	Energy Savings Reset	0	1	s	0	2124	0 = No Action 1 = Reset
M45	Energy Savings			Varies		2119	

Additional Help

In the US or Canada: please contact the Technical Resource Center at 1-877-ETN-CARE or 1-877-326-2273 option 2, option 6.

All other supporting documentation is located on the Eaton web site at www.eaton.com/Drives

