

# VARIABLE

# FREQUENCY

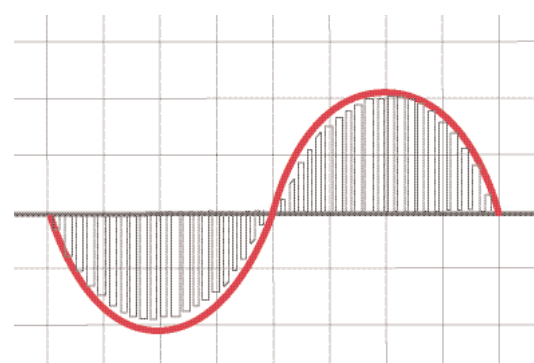
# D R I V E S

### VFD's are the answer...

The design and use of Variable Frequency Drives (VFDs) is no longer considered a black art. They have evolved from state-of-the-art technology into what is now mainstream, almost a commodity. Their popularity is due to their many advantages. Here are just some of the reasons VFDs are being installed on motors in all industries.

- Energy saving, especially in fans and pumps
- Longer equipment life due to less stress on mechanical components
- Reducing the current rush at start up
- Use of standard more economical AC motors
- Extremely versatile applications from conveyor belts to pumps

The idea behind VFDs is fairly simple. First you can't adjust the frequency of 60 Hz AC or you will have some interesting effects from blinking lights to all sorts of unexpected effects. To achieve adjustable frequencies 3 phase 60 Hz AC current is converted into DC current and then this is transformed into frequencies that mimic the 60 cycle sine wave with controlled pulses. At this point the VFD can be programmed into numerous configurations to suit your particular needs. It is a great hands-on application of technology.



With today's computer "plug and play" mentality so prevalent, there is the temptation to just install a VFD on a motor and see how it pans out. You may get lucky and it will work, but VFDs have certain idiosyncrasies that need to be addressed. Wiring up a VFD to your old motor is not the simple panacea it may appear to be. First and foremost, the actual installation and wiring has to be done correctly. This may sound obvious, but most of the complaints about VFDs can be traced back to the wiring. Long leads between the VFD and its motors are a problem, and confusing input and output will instantly buy you a new VFD!

The current pulses, or spikes, generated by the VFD can far exceed the insulation rating of the windings in the companion motor (1600 volts vs. 600 volts). Without proper "inverter" grade insulation, these voltage spikes in the coils will blow right through conventional insulation leaving conical holes (voltage ports) in the insulation. Depending on

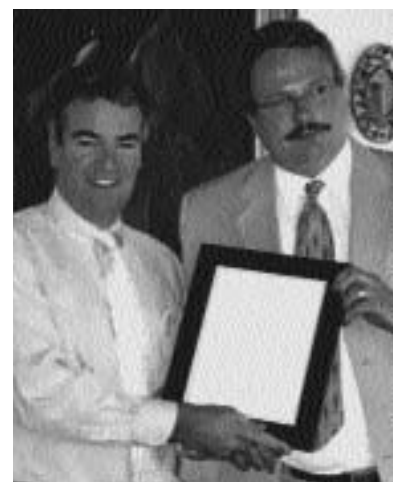
the load placed on the motor, these open ports will accumulate until the winding begins to short, and this will eventually destroy the winding/motor. All Longo rewinds are done with inverter type insulation so they are VFD compatible when they leave our shop. New energy efficient motors can now be ordered with inverter type insulation.

One of the more attractive features of the VFDs is extending the performance parameters of an existing AC motor to match the work load you have in store for it. The impact of this on the motor can be noticed in several ways. One of these is localized magnetic flux saturation. The result of this is the motor produces a much higher decibel level than its original configuration. This aberrant side effect can be problem in not just office HVAC applications, but also in production facilities, depending on its magnitude. This problem can be addressed in different ways from rotor and stator configurations to changing the carrier frequency of the drive.

There is also the problem of harmonics, which is addressed in the adjoining article. These irregular spikes created by the DC pulses can spread harmonics throughout your circuitry and create havoc to most of your computer, lighting and other sensitive equipment. This is particularly evident where the leads from the VFD to the motor are excessive (100ft). Whenever possible, these leads should be as short as possible.

As with most things, it pays to read the directions, so to speak. Take a look at the motors you want to have controlled by the VFDs and determine the correct VFDs for your use. Once you have decided that VFDs are the way to go, you may find other changes can be beneficial as well. With VFDs controlling a pump and a motor, you may find that a smaller motor will work just as well and be even more efficient. Going one step further, you may see that reconfiguring your pump to its actual demands is worth the effort as well.

As you can see, VFDs offer a significant amount of potential, but they also demand your undivided attention to reap that potential. **If you or your staff have any questions or concerns about how to get the most out of your VFD, please give us a call at 973-537-0400 or e-mail at info@elongo.com. Our experience will point out anything that may be inconsistent or a potential trouble spot, as well as providing you with the VFD's full potential.**



Joseph M. Longo, President, congratulates Scott Sanders on his promotion to Vice President.

## SCOTT SANDERS PROMOTED TO VP.

On March 15, 2005, Longo announced the promotion of Scott Sanders to Vice President. In his new position, Scott will assume the responsibility for all Longo field and on-site assignments.

In his previous position, Manager-Field Services, Scott oversaw our mechanical on-site work from removal and installation of major components to repairs. Scott will now supervise our entire field service operation including our electrical services such as switchgear, transformer and circuit breaker testing and repair as well as our complete mechanical services.

Longo's on-site work has grown considerably in recent years as we have responded to our customers' needs.

From our traditional 24/7 emergency responses and installation/removal of major mechanical components to sophisticated on-site testing and repair.

Many of our customers who have worked with Scott over the years know his 15 years experience with Longo is only matched by his drive and perseverance to see jobs through.

## PROFESSIONAL seminar SERIES



### Vibration, Thermography and Ultrasound September 2005

This vibration session goes way beyond loose nuts and bolts. Extremely interesting presentation by industry expert William Marscher. Also, how to use heat and sound to track down unseen problems.

### Fans & Submersible Pumps October 2005

Find out how to find problems, how to use both of them more effectively and at a lower cost. Presentations by AeroVent and Robot Pump representatives with plenty of time for Q&A.



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## Mr. OEM step aside...

# THE LONGO LETTER

## SPORTS QUIZ

1. What was the first year that the Mets played in Shea Stadium?  
a.1969, b.1962 c.1964 d.1966
2. When did Yankee Stadium open for business?  
a.February 6, 1921 b.April 18, 1923 c.May 30, 1938 d.May 28, 1946
3. Yankee Stadium was relatively unchanged from its opening day until the 1960s. In 1946, electric lights were added to allow for night games. In 1959 another major feature was changed. What was it?  
a.new organ player b.first electronic scoreboard c.exterior was painted white d.third tier of seats added
4. In the 2004 NASCAR Nextel Cup, which driver had the highest amount of DNF's (did not finish) in 2004?  
a.Tony Stewart b.Jamie McMurray c.Dale Jarrett d.Casey Mears
5. Which NBA team won 33 consecutive regular season wins, eclipsing the then record of 20?  
a. Milwaukee Bucks b. Boston Celtics c. Chicago Bulls d. L.A. Lakers

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## Your resource for: Motors Drives Transformers Pumps Fans Field Service Seals Circuit Breakers Predictive/Preventive Maintenance

### HOW TO CONTACT US.

• Wharton Corporate Center  
1 Harry Shupe Blvd.  
Wharton, NJ 07885  
(973) 537-0400  
(973) 537-0404 Fax

• Linden Facility  
1625 Pennsylvania Ave.  
Linden, NJ 07036  
(908) 925-2900  
(908) 925-9427 Fax

• New York Facility  
(212) 929-7128  
(212) 633-9534 Fax

• E-Mail  
info@elONGO.com

• After Hours-24/7  
Longo Emergency Response  
System  
(973) 537-0400

• Motor / Pump Sales  
(973) 537-0400 Press 1  
(973) 537-0420 Fax

• Switchgear Sales  
(973) 537-0400 Press "3"  
(973) 537-0415 Fax

• Repair Services  
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(973) 537-0420 Fax

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• Small Motors  
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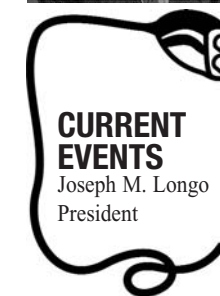
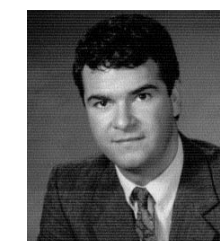
Please visit our website...

[www.elongo.com](http://www.elongo.com)  
for the latest information on products and services available from Longo... plus the latest case histories and product literature.

The Longo Letter is published by Longo Electrical-Mechanical, 1 Harry Shupe Blvd., Wharton, NJ 07885. Joseph M. Longo President. Comments and suggestions can be made via our e-mail account: info@elongo.com



Service Through Knowledge®, Since 1945



# There's a new player at the table!

It's time to pump up the volume on our mechanical capabilities as we continue to expand the size and diversity of the equipment we service.

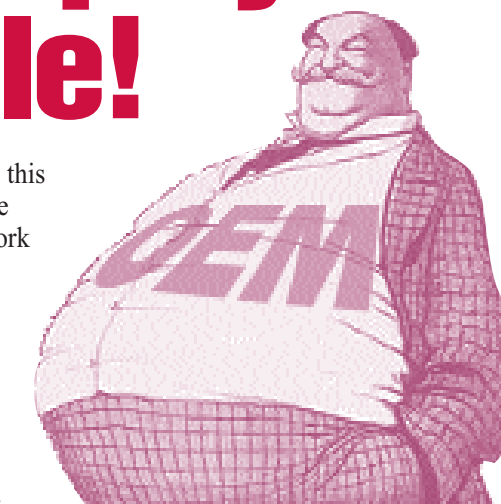
As you'll see in this issue, we have come a long way from just working on your standard "bench" pump. This pump job, detailed inside, was a critical element of a major power plant outage. The competition for the job was intense since we were up against several major OEMs and the logistics involved to complete the job were complex and numerous.

When the dust settled, the customer felt Longo provided the best overall value, and we were

awarded the job. In addition to this one major assignment, we were also awarded fan and motor work which were part of this overall project.

This diversity in abilities is one of Longo's Advantages and afforded the customer the luxury of having fewer contractors to coordinate and a single point of responsibility.

There was a day when customers only trusted the large and critical motor work to the OEMs. Today the OEMs are no longer a factor in motor repair. Now the driving forces are quality, service and price.



The pump repair market has also awakened to this reality. More and more clients are realizing better value by sourcing their repairs through independent repair companies such as Longo. We appreciate the trust you have placed with us and hope more of you will consider Longo on your critical mechanical repairs.