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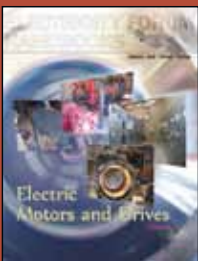
ELECTRICAL MOTORS AND VFD TRAINING



2-day courses
\$699

APRIL 8-9, 2014 - SAN DIEGO, CA
APRIL 10-11, 2014 - LOS ANGELES, CA

APRIL 28-29, 2014 - SAN FRANCISCO, CA
APRIL 30-MAY 1, 2014 - SACRAMENTO, CA



- Our Latest Electric Motors & Drives Handbook (Value \$25.00)
- \$100 Coupon Toward any 2014 Electricity Forum Event (*Restrictions Apply*)
- Course Materials in Paper Format
- FREE DVD Bonus Material: VFD Digital Books & Material
- Register Three, Get One FREE (*See details on Page 4*)

ON-SITE TRAINING
AVAILABLE
FREE
QUOTATION
Details Pg 4

www.electricityforum.com/usa/vfd-electric-motor-training.html

COURSE OUTLINE

This innovative and comprehensive Electrical Motor and VFD Training Course will be presented by Paul Wright who has more than 35 years of field and engineering experience with Motors and Variable Speed Drives. He is one of North America's most respected experts on Motor and Variable Speed Drive Applications providing technical support and application assistance for all industrial and commercial sectors.

This two-day course will highlight the proper installation of Variable Frequency Drives and Electric Motors into the distribution system. VFDs are being installed more frequently today; however there are still several

installations with VFD Issues being ignored or incorrectly being addressed. Examples of improper installations will be discussed to indicate potential problems that cause damaging consequences.

This course will provide an overview on the Distribution System from the Point of Common Coupling (Incoming Utility Power Connection Point) right down to the connection location of the motor(s). The student will be made aware of all the installation guidelines needed to ensure a successful installation of VFDs and associated Motors.

AGENDA - DAY 1

1. Typical Distribution System Overview

This seminar will discuss the Distribution components that make up a typical system and how they relate and impact the VFD and Motor selection.

- Point of Common Coupling
- Fault Capacity
- Transformers
- Capacitors
- Switchgear
- Low Voltage MCCs
- VFDs
- Motors
- Other Loads

2. Understanding Motors

This presentation will provide discussion on motor theory as applied to variable speed operation. The presentation will discuss the different motors' performance and features available to the user:

- Manufacturing and Design of a SCIM
- Rotor Construction, Die Cast Aluminum, Copper Bar and Die Cast Copper
- Motor Speed-Torque Curves
- Motor Enclosures
- Motor Cooling, Temperature Design and Insulation Class
- Stator Construction, Random versus Form Wound Coils
- Motor Equivalent Circuit
- NEMA Motor Specification Part 30 and Part 31 differences
- Nameplate Information
- Cooling Methods
- Stator Wiring
- Speed Range
- dv/dt and Voltage Stress Design

3. Understanding VFDs

This presentation will discuss the topology of today's low voltage VFDs. The function of the Rectifier, Pre Charge Circuit, DC Bus Capacitors, Chopper Circuit and Inverter section will be discussed, as well as when to select PWM Control (V/Hz) or Vector Control operating modes. There will be discussion on the selection of the voltage and current ratings of the VFD and the individual components that make up the complete system to show how the reliability of the VFD is improved.

- VFD Overview
- Enclosures Types
- Voltage Rating and Tolerance
- Current Capacity and Overload Capability
- VFD System Components
- Disconnect Switch or Circuit Breaker
- Line Filtering
- Surge Protection
- Fused Control Power
- 120Vac and 24VDC control
- Isolating Contactor
- Bypass Control Schemes
- Motor Filters
- Analog Isolators
- Enclosure Heating and Cooling Requirements
- Dedicated Customer Field Connection Terminal Blocks
- Motor Control Performance Comparison on Fixed Speed and Reduced Voltage Starting will be compared to VFD Operation
- Starting
- Stopping
- Braking
- Reversing
- Over- and Under-Nominal Line Voltage
- Dynamic Breaking System



AGENDA - DAY 2

4. Upstream Issues

This presentation will look at the line side issues that a VFD may have on the power system. All the following issues will be discussed along with the recommended solution(s) for each issue:

- Fault Capacity
- Harmonic Limitations (Voltage and Current Distortion)
- Power Quality
- Power Factor
- Voltage and Tolerance

5. Downstream Issues

This presentation will look at the load side issues that a VFD may have in the motor circuit. All the following issues will be discussed along with the recommended solution(s) for each issue:

- Bearing Currents
- Reflective Waves in Cables
- dv/dt stress > 500 Volts Per Micro Second
- Peak Voltage Stress > 1000 Volts
- VFD Cable
- Radio Frequency and Electromagnetic Interference

6. Testing and Commissioning

The testing of the VFD packaged system is a very important procedure that makes the whole system complete. This verifies the controls and power wiring function as specified. A good testing program enables the VFD to be installed and commissioned on site without any issues. The proposed testing and Commissioning procedures will be discussed.

- Routine Testing
- Certified Full Load Testing
- Heat Run Testing in 40 Degrees Celsius Ambient

Review of VFD Specification Daily Summary and Seminar wrap up

All students attending this presentation will receive an electronic copy of the 9 presentations plus several papers and booklets discussing the course and related material. A detailed VFD specification and Data Sheets will also be included to ensure future drive purchases provide reliable trouble-free installations.

BONUS MATERIAL

Each VFD Training student will receive a detailed VFD specification and check list to use to ensure that all their VFD issues are addressed.

Students will also receive an electronic copy (DVD) containing more than 1,000 pages of useful technical data including the two booklets: the "Basics of AC Drives" and the "Basics of AC Motor". This DVD provides many technical articles and papers to provide information to support the course material, thus providing valuable information for the student for future reference.

COURSE BENEFITS

- Learn the Fundamentals of Variable Frequency Drives
- Update Yourself on the Latest Advancements in VFDs
- Learn the Latest Improvements in Motor Efficiency
- Practical Approaches and Problem-Solving Solutions
- Learn How to Solve Common VFD Problems
- Learn Practical Troubleshooting Techniques
- Reduce Equipment Downtime and Operating Costs
- Reduce Reliance on Outside Service Companies
- Make Sure Your Equipment is Up and Running

COURSE INSTRUCTOR

Paul Wright, P.Eng
ECM Drive Solutions

Paul Wright, with ECM Drive Solutions, is one of North America's leading experts on Variable Frequency Drive technology. Paul is professional engineer with more than 35 years proven field experience in troubleshooting and problem solving Electric Motor and VFD applications.

**(315) 789-8323****(315) 789-8940****ON-LINE:**<http://www.electricityforum.com/usa/vfd-electric-motor-training.html>**MAIL:**The Electricity Forum
One Franklin Square, Suite 302
Geneva, NY 14456**ATTENDEE INFORMATION**To receive registration fee discounts, you must **REGISTER AND PREPAY** prior to the course date.

NAME _____

TITLE _____

COMPANY _____

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STATE _____

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E-MAIL _____

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METHOD OF PAYMENT Bill My Credit Card AMEX VISA MasterCard

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Limited Seating! Register Today!

Registration Fees: The registration fee to attend the 2-day VFD Training - Electric Motor Training Course is \$699.00. The registration fee includes: course materials, a free magazine subscription to one of our electrical magazines, a \$100 coupon towards any future 2014 Electricity Forum event (restrictions apply), refreshments. (luncheon included)

FREE**Register 3 Delegates at Full Price
and get the 4th Registration FREE!****SAVE \$50**

REGISTER AND PREPAY 14 Days prior to course date and receive an early bird discount of \$50 off the full price.

WHEN & WHERE

(Please check the date/location where you want to attend the course)

ELECTRICAL MOTORS AND VFD TRAINING**San Diego, CA - April 8-9, 2014**Holiday Inn San Diego – Bayside
4875 North Harbour Drive
San Diego, CA 92106
Tel: 619-224-3621**Los Angeles, CA - April 10-11, 2014**Radisson Hotel Los Angeles Airport
6225 West Century Blvd.
Los Angeles, CA 90045
Tel: 310-957-7443**San Francisco, CA - April 28-29, 2014**Doubletree By Hilton Airport Hotel
835 Airport Blvd.
Burlingame, CA 94010
Tel: 650-344-5500**Sacramento, CA - April 30 – May 1, 2014**Four Points by Sheraton Sacramento International Airport
4900 Duckhorn Drive, Sacramento, CA 95834
Tel: 916-263-9000**FREE ON-SITE TRAINING QUOTATION**

Our on-site training courses are tailored to meet your company's specific requirements and conducted on your own premises for your employees.

Call Randy Hurst, Electricity Forum President, to discuss your on-site training needs. 315-789-8323 Or, visit:

www.electricityforum.com/on-site-training-feedback.html