THE ELECTRICITY FORUM
Est 1986

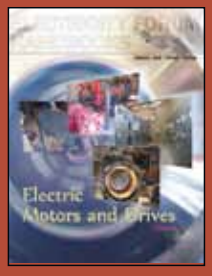
LOOK INSIDE FOR DISCOUNT PROGRAM PRICING

DESIGN, PROTECTION, TESTING AND MAINTENANCE

ELECTRIC MOTOR TRAINING

2-day courses $799

RICHMOND, BC - FEB 28-MARCH 1, 2017
EDMONTON, AB - MARCH 2-3, 2017
SASKATOON, SK - MARCH 6-7, 2017
WINNIPEG, MB - MARCH 8-9, 2017
ST. JOHN'S, NL - MARCH 13-14, 2017
TORONTO, ON - MARCH 16-17, 2017



- Our Latest Electric Motors & Drives Handbook (Value $25.00)
- $100 Coupon Toward any 2017 Electricity Forum Event (Restrictions Apply)
- Course Materials in Paper Format
- Register Three, Get One FREE (See details on Page 4)

ON-SITE TRAINING AVAILABLE
FREE QUOTATION
Details Pg 4

www.electricityforum.com/forums/electric-motors-2017.html

COURSE OUTLINE

This innovative and comprehensive two day Electrical Motor Training Course will be presented by Paul Wright, PEng. who has more than 38 years of field and engineering experience with Motors and Variable Speed Drive Systems. He is one of Nation's most respected experts on Motor Applications providing technical support and application assistants for all industrial and commercial sectors for a variety of different manufacturers' products. The AC motor is the most common component in a facility consuming a high percentage of the utilities electrical power

This two day presentation will highlight the most important principles and concepts related to the induction motor, highlighting the proper installation, maintenance, testing and operation of Electric Motors into the distribution system. The motor seminar will not only discuss the traditional motor performance for motors on fixed voltage/frequency power sources (Utility Power), but will provide in depth discussion on the performance behavior of the same motor when operated by Scalar (Volts per Hertz) and Vector Variable Frequency Drives.

The course will mostly relate to the Squirrel Cage Induction Motor however, the Wound Rotor, Synchronous motors and Permanent Magnet motors will be briefly discussed. The motors shaft torque produced is the performance indicator for the motor. A means of analysing the impact to the motor when variations in the motors performance characteristics are changed is provided. Practical examples of the more common motor failures will be discussed, explaining the failure mechanism and the means to prevent or reduce similar failures.

This course is ideally suited for the individuals that specifies, operates, maintains, purchase or is responsible for motor operation such as: Project Engineers, Electrical and Mechanical Engineers, Electrical maintenance technicians.

This is the most practical presentation approach for understanding the behaviour of the AC Motor. Understand how Voltage, Frequency, Temperature, Ambient, Environment and other conditions relate to the proper selection of the motor.

AGENDA - DAY 1

8:00AM - 1. Understanding AC Motors

This presentation will provide discussion on motor theory as applied to fixed speed and variable speed operation. The presentation will discuss the different motors' performance and features available to the user: This presentation will start at the generation of a magnetic field and how to control this field to provide useful work. The following characteristics will be individually discussed to show their impact on the overall performance of the motor. The effects of these characteristics with changes in line voltages and line frequencies will be discussed.

- Power Factor
- Rated RPM (synchronous RPM)
- Rated Voltage
- Rated Frequency
- Rated Current
- Equivalent Circuit Parameters
- Slip
- Starting, Pull-up and Breakdown Torques
- Service Factor
- Design Frames
- Insulation Ratings
- Temperature rise design

This presentation will also provide a short picture tour of a motor plant to show the different manufacturing steps to the assembly of a Squirrel cage Motor.

Rotor Construction: Die Cast Aluminum, Copper Bar and Die Cast Copper rotors will be reviewed.

Discussion of the type of rotor used and their differences, benefits and weakness that the different rotor designs have on the motors life and performance

Motor Enclosures
The enclosure defines the degree of protection for the motor windings for the operating environment for it to operate. All the common enclosure designs will be discussed as to their ability to prevent external contaminates or particles to getting to the rotor and stator assembly. (ODP, TEFC, WPI, WPII, TEAAC, TEWAC etc.

NEMA Motor Speed-Torque Curves
Understand how the motors' speed-current and speed-torque characteristics relate to the motors starting and operation performance for Fixed Speed, Reduced Speed and Variable Speed applications.

We will also show the speed torque curves of several motors for VFD applications as well as for utility operation.

Do I purchase NEMA Motor Part 30 or NEMA Part 31 motors?
This presentation will discuss when you should purchase NEMA Part 30 or Part 31 type design motors. An overview of the additional benefits of the NEMA Part 31 motor will be highlighted.

Motor Control performance Comparison
Understand how the Motor control performance compares on Fixed Speed Starting, Reduced Voltage Starting and VFD operation.

- Direct On Line
- Multispeed
- Reduced Voltage (Solid State, Auto Transformer, Resistor and Reactor Starting)
- VFD
- Motor Starting
- Stopping
- Braking
- Reversing
- Over and Under nominal Line Voltage

AGENDA - DAY 2

Bearings
- This presentation will discuss the three common types of bearings and which applications they are used on.
- The causes and remedies for bearing current issues will be discussed.
- Understanding the differences of the various bearing lubricants and the impact on the motors bearing life.
- Understand the common causes bearing failures

Bearing Currents
The effect of current flowing through the bearings will cause the inner and outer raceways to pit as the current jumps from the outer raceway to the bearing and from the bearing to the inner raceway. Over time the pitting will continue to increase the depth of the groves and the bearing will eventually be damaged beyond use. The causes and remedies for bearing current issues will be discussed.

Bearing lubrication
Understanding the differences of the various bearing lubricants designed for motors with ball or roller bearings. Having the improper selection of grease in the bearing will lead to premature bearing failures with the cause of failure indicating poor or insufficient lubrication. The motors' bearings and the lubrication must be matched for each motor depending on the actual operating environment.

Motor Testing
The common On-line and Off-Line tests will be presented along with the merits that the test provides with respect to the risk of doing the test.
- Voltage and current measurements
- Temperature measurements
- Vibration reading and analysis
- Insulation Test, Megger, DC or AC High-Pot test
- Winding Resistance
- Surge Testing

Motor Protection
All Motors require a means of detecting an abnormal condition and a means of isolating the motor from the Power System when these situations occur. Vibration, Overload, **Short Circuits and Over Temperature** are the most common occurrences requiring isolation of the motor from the Power System.

A pictorial of 12 different failures inside the motor will be provided to show failure modes for various faults.

Selection criteria for selection of the relay from a simple low cost bimetallic overload relay to the most sophisticated high cost digital motor management relay system will be discussed.

Permanent Magnet, Wound Rotor or Synchronous Motors: When are they required to be used?
A quick overview of the three other AC motors will be presented highlighting the possible applications where they can be used and their benefits.

Summary and Conclusion of Seminar.

3:30PM-4:00PM -- Daily Summary and Seminar wrap up

All students attending this presentation will receive electronic copy of the 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 MATERIALS

All students attending this presentation will receive electronic copy of the 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. Each student will receive a detailed VFD specification and Check list to use to ensure that all the above issues are addressed.

Students will also receive an electronic copy of the Basics of AC Drives and the Basics of AC Motors. These two books are more than 100 pages, providing valuable information for the student for future reference.

WAYS TO REGISTER

(905) 686-1040

(905) 686-1078

ON-LINE:

http://www.electricityforum.com/forums/electric-motors-2017.html

MAIL:

The Electricity Forum
1885 Clements Rd. Unit 215
Pickering ON L1W3V4

ATTENDEE INFORMATION

To receive registration fee discounts, you must REGISTER AND PREPAY prior to the course date.

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____

STATE _____

ZIP CODE _____

E-MAIL _____

TEL ( ) _____

FAX ( ) _____

METHOD OF PAYMENT

☐ Bill My Credit Card

☐ AMEX ☐ VISA ☐ MasterCard

Card # _____

Exp. Date _____

Signature _____

Card Holders Name _____

Limited Seating! Register Today!

Registration Fees: The registration fee to attend the 2-day Electric Motor Training Course is $799.00. The registration fee includes: course materials, a free magazine subscription to one of our electrical magazines, a $100 coupon towards any future 2017 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 TRAINING

☐ **Richmond, BC - Feb 28-March 1, 2017**
Holiday Inn Vancouver Airport
10720 Cambie Road
Richmond, BC
Tel: 604-821-1818

☐ **Edmonton, AB - March 2-3, 2017**
Sawridge Inn Edmonton South
4235 Gateway Blvd NW
Tel: 438-1222

☐ **Saskatoon, SK - March 6-7, 2017**
Sandman Airport Hotel
310 Circle Dr
Tel: 306-477-4844

☐ **Winnipeg, MB - March 8-9, 2017**
Sandman Hotel & Suites Winnipeg Airport
1750 Sargent Ave.
Winnipeg, MB
Tel: 204-775-7263

☐ **St. John's, NL - March 13-14, 2017**
Comfort Inn St. John's Airport
106 Airport Road
St. John's, NL
Tel: 709-726-3408

☐ **Toronto, ON - March 16-17, 2017**
Hampton Inn and Suites
3279 Caroga Drive, Mississauga, ON
Tel: 905-671-4730

INTERESTED IN ON-SITE ELECTRIC MOTOR TRAINING?

Cost Effective On-Site Electrical Training

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

Save the cost of travel and hotels AND save on our regular public enrollment registration fees. For more information, contact Randy Hurst, President, The Electricity Forum (905) 686-1040. You can write to randy@electricityforum.com or you can go to our on-site electrical training quotation page and ask for a FREE quotation: www.electricityforum.com/on-site-training-feedback.htm