Pump ED 101

Seminars & Training - - AC Power & Induction Motors

Joe Evans, Ph.D http://www.pumped101.com

Title: AC Power – Generation to Consumption

Level: Introductory to Intermediate – An elementary understanding of electricity is useful but not absolutely necessary. Elementary algebra and trigonometry are useful but not necessary.

Technique: Power Point presentation with animations and Excel examples. Live demonstrations by the instructor. Audience interaction.

Duration: One half day (4 hours with two 10 minute breaks)

Topics: What is Electricity?, Common Electrical Terms, DC vs AC, Ohm's Law, DC Pros & Cons, AC Pros & Cons, Peak vs Effective Voltage, Single Phase AC Sine Wave, Three Phase AC Sine Wave, Why Three Phases?, Peak vs Effective Voltage, AC Generation & Transmission, Transformers (Induction, Turns Ratio, Delta & Wye Connections), AC Loads (Resistive Loads, Inductive Loads, Inductive Reactance), Power Factor (Apparent Power, Capacitive Reactance), Single Phase Characteristics, Three Phase Characteristics (Wye Connected, Delta Connected, Common Characteristics)

Result: Upon completion, students will have a basic knowledge of single and three phase AC power. They will understand the relationship of voltage, current, power and frequency and how they apply to resistive and inductive loads. They will also gain an intuitive understanding of induction and the operation and application of transformers. Finally they will become familiar with power factor and its effect on power usage.

Title: The AC Induction Motor

Level: Introductory to Intermediate – An elementary understanding of electricity is required. Some experience with electric motors is useful but not absolutely necessary. Elementary algebra and trigonometry are useful but not necessary.

Technique: Power Point presentation with animations and live demonstrations. Audience interaction.

Duration: One half day (4 hours with two 10 minute breaks)

Topics: Magnetism, Electromagnetism, Simple DC Motor, Alternating Current, Induced Current, Simple AC Motor, Three Phase Power, Single & Three Phase Rotating Fields, Synchronous Speed, Slip Speed, Single Phase Starting (split phase, capacitor start induction run, permanent split capacitor, capacitor start capacitor run), Work & Power, Torque, Load Types (constant torque, variable torque, constant horsepower), Motor Enclosures, Service Factor, Stator Winding Techniques

Result: This seminar will allow students to gain a basic knowledge of the operation and application of single and three phase induction motors. They will become familiar with the relationship between frequency and the stator windings and its effect on synchronous and slip speed. They will also understand the typical methods used to start single phase motors and the pros and cons of each. Finally, they will gain an understanding of the different types of motor loads and the concept of work, power, and torque.