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Effective
Human
Intervention
LEADERS IN TRAINING

Variable Speed Drive Essentials

Unlock the power of Variable Speed Drives (VSD) with our comprehensive course designed to provide you with a thorough understanding of both AC induction motors and the intricacies of VSD technology. Gain insights into project planning for success and drive configuration. Enhance your technical skills and ensure optimal performance in your motor-driven systems.

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VARIABLE SPEED DRIVE ESSENTIALS

COURSE SYNOPSIS

To apply VSD's basic knowledge is needed to avoid mistakes. Basics we cover include:

- Motor understanding
- Starting motors
- VSD problems – how to overcome these
- Interaction with the load
- Implementing projects

PREREQUISITES

Electrical or Instrumentation background

COURSE OBJECTIVES

Providing a thorough understanding of:

AC Induction motors working through

- DC motor fundamentals
- DC Drives
- Speed/Torque and speed/power relationships
- Induction motor operation
- Induction motor starting methods

AC Variable Speed Drives

- Rectifiers and the DC Link
- V/F relationships
- Pulse Width Modulation
- Vector vs V/F mode

Load braking using the drive, including

- DC injection braking
- Dynamic braking
- Regenerative braking

Drive downsides, including

- Harmonics, and ways of reducing the effects of these using
 - Supply-side chokes
 - 12-pulse rectifiers
 - Active front ends
- Motor-side voltage overshoots and reducing these through:
 - Output chokes
 - dV/dt filters/terminators
 - Sinusoidal filters
- Cooling problems at low motor speeds
- EMC problems and solutions
- Torque problems at low speed: mitigation through
 - Torque boost
 - Vector control correctly implemented
- Torque problems at speeds above 50 Hz (Field weakening), and solution through
 - Use of 87/29Hz

Load/Motor/Drive interaction, with reference to

- Constant torque and variable torque loads
- Calculation of inertia and acceleration times
- Choice of motors

Project Planning for Success

Drive Configuration

Throughout the course, demonstrations are carried out on a VSD including showing voltage and current waveforms at important parts of the drive.

Demonstrations include the effect of changing the switching (modulation) frequency; inertia in action and its effect on acceleration & braking; auxiliary items such as shaft encoders; and problems regarding the measurement of voltages and currents around a VSD.

The group also works through calculations around the sizing of motors for loads, and there is group discussion.

WHO SHOULD ATTEND?

- **Engineers:** motor/drive selection; potential project problems; understanding limitations
- **Technicians:** project implementation; proper configuration; troubleshooting
- **Artisans:** commissioning; troubleshooting; configuration changes and effects

ABOUT YOUR COURSE FACILITATOR

Eric Carter founded a company specializing in automation-related training in 2005. With over 40 years of experience in engineering, installing, and commissioning automated control systems across various industries, including petrochemical, fuel distribution, iron and steel, food and beverage, and diverse manufacturing companies, Eric is a seasoned professional. He also consults on automation problems and has edited technical publications. As a Fellow of the South African Institute of Measurement and Control, he actively maintains his technical knowledge and bridges connections with suppliers and users of measurement and control equipment. Additionally, Eric applies feedback control principles to business contexts.

BENEFITS INCLUDE:

- ✓ Participation in an interactive workshop
- ✓ Learning from an industry expert
- ✓ Comprehensive course documentation
- ✓ Accredited to gain 2 CPD points by SAAMA

IN-HOUSE TRAINING

EHI In House training services delivers the full course range allowing you to gain the benefits of:

- ❖ *Training at your premises*
- ❖ *Scheduling a convenient date*
- ❖ *Customising aspects of the content*
- ❖ *Determining the frequency of training required*



Contact us today for a comprehensive quote on:
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