

Application of Variable Speed Drives and Rotating Machines

Course overview

This course will give you a comprehensive understanding of all issues surrounding rotating machines and variable speed drives, including the basic theory behind this equipment, its application, how to specify it and how to diagnose and rectify likely problems.

The course gives you detailed information at every stage, covering specialist areas such as matching torque demand to torque delivery, external factors for selecting variable speed drives, harmonics, filters and how to safely interface with electricity utilities.

The specification of AC variable speed drives is thoroughly covered, including data sheets, bid comparisons, critical items and the basic questions to address in the specification and purchase of variable speed drive systems.

Cost: Two-day course: £935 + VAT

Location: EA Technology, Capenhurst, Chester, CH1 6ES

Who should attend?

This course is essential to you if you are an electrical, mechanical or process engineer with responsibility for the connection, operation and performance of variable speed drives.

It will also be of interest to owners and operators of electricity networks that connect to rotating machines with variable speed drives. Power systems engineers from related fields will also benefit by developing a greater understanding of the characteristics of rotating machines and variable speed drives.

Benefits of attending this course

- Develop a comprehensive understanding of rotating machines and variable speed drives
- Gain expertise in installation, operation and maintenance
- Improve equipment reliability by swiftly diagnosing and rectifying faults
- Develop an understanding of how this equipment effects the wider network
- Enhance network performance by understanding these crucial interfaces
- Learn how to specify the most appropriate equipment

Substations Courses

Specialist Courses

Cables Courses

Power Networks Courses

Protection Courses

Tailored Programmes

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Course programme

Day one

Theory and Calculations

- Three phase theory and calculations
- Newton's second law of motion
- Single phase and three phase rectifiers

Electrical Machines and Transformer Reactances

- Synchronous machines and reactances
- Asynchronous machines and insulation systems
- Types of driven equipment and their torque demand curves
- Asynchronous machine performance and calculations

Introduction to Power Electronics

- Types of electronic switches
- Performance of IGCTs, IGBTs, Mosfets, gate turn off thyristors, transistors, thyristors
- Characteristics and losses of main types
- Variable outputs from AC and DC circuits
- Commutation and PWM switching
- Star modulation and assembly of rotating vectors
- Direct torque control by flux vector resolution

Application of AC Variable Speed Drives

- Overview and application examples
- Safe working on HV drive systems
- Options and types of available drives
- Dimensioning of drives
- Selection of motor and converter
- Satisfying torque speed curves

Day two

Interface with Utility Companies

- Switchgear ratings and short circuit levels
- Interconnection to utility power systems
- Demonstration of power system analysis programme
- Short circuit levels and total harmonic distortion
- Measurement of harmonics

Harmonics and Solutions

- Harmonics and reduction methods
- Transformer connections
- Active filters

Specification of AC Variable Speed Drive Systems

- Specifications and data sheets
- ATEX (hazardous areas with VSDs)
- Specification and sizing of transformers and cables
- 'K' ratings of transformers
- Motor voltage transients and VSDs
- Typical applications, problems to solve and critical limits
- EMC and cables

Installation and Commissioning

- Diagnostic and troubleshooting
- Pitfalls and problems
- Motor voltage transients and VSDs
- Ventilation of converters and motors
- Bearings
- Safety precautions when testing

Programme may be subject to amendment



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