Training Program:

Motors, Variable Speed Drives Operation, Maintenance & Troubleshooting

www.btsconsultant.com

Introduction:

The course covers all topics relating to both AC motors and their drives. AC motors represent industry's workhorse in all applications. It is no exaggeration to suggest that more than half of the energy consumed worldwide is converted by AC motors into work and these are controlled by drives.

Understanding maintenance and troubleshooting procedures of such vital industrial equipment means that reduced downtime and increased productivity for the company. The protection a requirement along with their function and integration with the overall system ensures that such expensive apparatus is well guarded against failures which further offer safety for operations personnel as well.

This course will feature:

- Understanding types of AC motors and their starting methods
- Principle of operation of variable speed drives
- Identification of the various types of variable speed drive
- Trouble shooting and maintenance of variable speed drives
- Protection of motors and drives

Who Should Attend?

This course will benefit all levels of professional in an electrical installation. It will enable them to understand operation, maintenance and troubleshooting of AC motors and drives

This course is suitable to a wide range of technical professionals but will greatly benefit:

- Electricians
- Electrical supervisors
- Plant electricians
- Operations & maintenance engineers, supervisors & technicians
- Maintenance technicians

How will this Training Course be Presented?

This course will utilise a variety of proven adult training techniques to ensure maximum understanding, comprehension and retention of the information presented. This includes presentation and discussion of latest videos and technologies on variable speed drives.

Questions are encouraged throughout, particularly at the daily wrap up sessions. This provides opportunities for participants to discuss with the Presenter specific issues and, if possible, find appropriate solutions. Specific goals of each participant will be discussed to ensure that their needs are fulfilled whenever practicable.

Course Objectives:

This course is designed to enable participants to:

- Understand the various types of AC motors and starters
- Determine the components and operations of variable speed drives
- Explain the different types of variable speed drives

- Analyse the common faults in a variable speed drive
- Design the protection requirements for motors and drives

Course Outline

Day One: AC Motors

- Fundamentals of rotating machines theory, principles of operation of AC motors and their construction, rotor slip and torque-speed characteristic
- Single-phase and three-phase AC motors, types, construction, characteristics and applications
- Starting of induction motors and associated techniques and acceleration
- Speed control requirements of AC motors and load matching
- Selection of AC motors for industrial applications and service factor
- Medium voltage motors and applications

Day Two: Troubleshooting and Maintenance of Motors

- Characteristics of motors, enclosures and cooling methods
- Predictive maintenance, motor troubleshooting and diagnostic testing
- Failures in three-phase stator windings, rewind scenarios when a motor fails
- Troubleshooting and maintenance of AC motors, routine care
- Slow acceleration or refusal to starting of an AC motor, overheating and noise
- Standards and testing instruments

Day Three: Drives

- Fundamental principles and understanding of AC Variable Speed Drives
- Power semiconductors, diode, thyristor (SCR), IGBT, MOSFET, GTO and others.
- Voltage-source, current-source and pulse width modulated (PWM) inverters
- Benefits and applications of VSD
- Two-level PWM, regeneration and dynamic braking, volts per hertz control
- Medium voltage VSDs, switching transients, harmonics and power factor

Day Four: Troubleshooting and Maintenance of Drives

- Soft starters and selecting the correct VSD
- VSD analysers for converter failures, inverters and rectifiers
- Troubleshooting techniques and maintenance for VSD
- VSD parameter guidelines and settings
- VSD bearing failures and remedies
- Testing instruments and scopemeters for VSD

Day Five: Protection of Motors and Drives

- Protection of AC motors, requirement and overload protection
- Fuses, circuit breakers, magnetic and thermal overload, and solid-state
- Motor protection curves, back-up protection
- Protection of inverters and electronic converters driving motors
- Case studies, selection and design of systems and their protection
- Q&A and wrap up session

Accreditation:

BTS attendance certificate will be issued to all attendees completing a minimum of 80% of the total course duration.