Circuit Breakers and Switchgear Maintenance and Troubleshooting

Program Description

Establishing a solid understanding of electrical switchgear design and operation is vital to its safe and reliable application. This course provides valuable technical information on circuit breakers and switchgear used in common industrial, commercial and utility applications.

This course will discuss application, installation, maintenance and testing issues related to low, medium, and high-voltage switchgear and circuit breakers. The course will provide the delegates with a solid understanding of switchgear theory and standards. The course will also make delegates aware of issues concerning the proper application, installation and maintenance of these types of equipments with a strong emphasis on safety. The course will cover a wide range of material starting from the basics and moving on to more complex issues. This course provides an overview of power system design and theory, focusing on the power distribution circuit breakers used in common utility, industrial, commercial and institutional applications. Basic circuit breaker construction, electrical safety, and common circuit breaker maintenance techniques are the major components of this course. When brought on-site, this course can be supplemented by an in-depth study of the specific circuit breaker models used at the client's facility. Hands-on training is provided wherever practical.

Objectives

This course is designed to enable participants to:

- List the voltage convention classifications used in this course
- Describe switchgear construction
- Describe a ground fault relay system
- Describe the three basic types of low and medium voltage circuit breaker contacts
- Describe the moulded case circuit breaker

Program Outline

- **Industrial Switchgear**
  - General Introduction
  - The Spectrum of Switchgear
  - Standards -- Standards Organizations, Certification Marks and Applicable Standards
  - Switchgear Drawings
  - Switchgear Ratings
  - Difference Between Switchgear & Switchboards
  - Switchgear Factory Testing
  - Short Circuit Current Estimation
  - Ground Fault Protection
  - Switchgear -- Design Features and Benefits
  - Power Circuit Breakers
  - Trip Units
- **Breaker Overview**
  - Types of Circuit Breakers
  - Purpose/Application
  - Circuit Breaker Construction
  - Circuit Breaker Operation
  - Circuit Breaker Control
  - Personnel and Equipment Safety Factors

- **Oil and Vacuum Breakers**
  - Principle of Vacuum Circuit Breakers
  - Oil Circuit Breakers
  - Vacuum Circuit Breakers
  - Circuit Breaker Maintenance Fundamentals
  - Circuit Breaker Testing
  - Oil Circuit Breaker Maintenance
  - Insulating Oil Testing
  - Oil Sampling
  - Dielectric Breakdown Voltage Testing
  - Power Factor Test
  - Colour Testing
  - Acidity Testing
  - Moisture Content Test
  - Gas Testing
  - Oxygen Testing
  - Combustible Gas Analysis
- **The Gas Circuit Breaker**
  - Sulphur Hexiflouride Gas Interruption
  - Construction and Operation SF6 Properties
  - SF6 Properties
  - Effect of SF6 Decomposition Products on the Body
  - Handling SF6 Gas
  - Inspection Procedures Prior to Maintenance Work
  - Normal SF6 Maintenance Procedures
  - Trouble Maintenance Procedures
  - Disposal of ARC Products
  - Cleaning of Non-Disposable Tools and Equipment
  - List of Required Equipment
- **Circuit Breaker Maintenance**
  - General Breaker Maintenance
  - Adjustment
  - Inspection and Testing
  - Maintenance Intervals
  - Troubleshooting and Repair
- **Switchgear Overview**
  - System Overview and Interactions
  - Switchgear Components
  - Power Buses
  - Safety
- **Switchgear Protection**
  - Switchgear Protection
  - Relay Testing
  - Instrument Transformers
  - Summary
- **Grounding**
  - Principles of Grounding
  - Grounding Procedures
  - Ground and Test Device
- **Switchgear Maintenance**
  - Operation of Switchgear Devices
  - Preventive Maintenance
  - Testing
  - Corrective Maintenance

Who Should Attend

This course is for supervisors, engineers and senior technician involved in the installation and maintenance of industrial switchgears and power circuit breakers.

For any further information please contact us at:

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