MERCURY

Safe Operation & Maintenance of Circuit Breakers & Switchgear Training Course

20 – 24 December 2026
Cairo (Egypt)



Dubai - UAE: +971 4 450 5697
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Amman - Jordan: +962 79 712 3347

Safe Operation & Maintenance of Circuit Breakers & Switchgear Training Course

Ref: 6055_301012 **Date:** 20 – 24 December 2026 **Location:** Cairo (Egypt) **Fees:** 4000 Euro

Introduction

Circuit breakers, fused switches, and switchgear, which can be found in Motor Control Centres MCC, are integral components for the electrical management of any electrical plant. Their safe operation hinges on not just the proper initial selection but also ongoing operation and maintenance.

A comprehensive understanding of the safe operation and maintenance of circuit breakers and switchgear course is crucial for the installation of these devices, as is awareness of local substation and system ratings and knowledge of the operating mechanisms of various breakers, which is essential for effective troubleshooting and repair.

The course titled Safe Operation and Maintenance of Circuit Breakers and Switchgear Training Course is designed to endow participants with either new or enriched skills that will ensure that circuit breakers and switchgear are safely installed, operated, and preserved in a manner that guarantees safe and reliable service.

Participants in the safe operation and maintenance of circuit breakers and switchgear course will learn to diagnose faults accurately and determine their root causes to mitigate the risk of recurring failures, incorporating core aspects of operation and maintenance management and adhering to guidelines for safe process operations and maintenance.

Targeted Groups

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

Course Objectives

By the conclusion of this safe operation and maintenance of circuit breakers and switchgear course, participants will:

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- Grasp the operational dynamics of circuit breakers and switchgear.
- Employ robust troubleshooting protocols specific to circuit breakers and related switchgear.
- Enhance proficiency in utilizing various test equipment.
- Comprehend failure modes and conduct accurate failure analyses for fuses, circuit breakers, and switchgear, specifically addressing air brake, vacuum, and SF6 devices.
- Renew awareness of electrical safety issues pertinent to substations and control centers.
- Calculate fault levels within substations.

Targeted Competencies

At the end of this safe operation and maintenance of circuit breakers and switchgear course, the target competencies will be able to:

- Identify types of switchgear and disconnectors.
- Understand electrical systems along with their load and fault requirements.
- Understand familiarity with substation layouts and equipment ranging from 0.4 to 36kV.
- Learn about awareness of health and safety and equipment fault voltages under earth fault conditions.
- Understand proficiency in maintaining, inspecting, testing, and certifying switching plants.
- Recognize electrical hazards, safe working distances, and permit-to-work systems.
- Identification of hazardous situations.
- Ensure safe earthing of equipment during maintenance and adoption of lockouts and labeling procedures.

Course Content

Unit 1: The Technology of Circuit Breakers and Switchgear

- What are the typical substation arrangements and MCCs?
- Definitions and terminology relevant to the industry.
- Learn about fault level calculations and their significance.
- Contribute to faults by motors and generators.
- Understand the spectrum of equipment: low voltage, medium voltage, and high voltage.
- Interpret nameplate ratings.
- What are the roles of CTs and VTs in electrical systems?
- Understand basic protection requirements for safe electrical operation and maintenance.
- Engage case studies for practical insight.

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Unit 2: Operation of Various Types of Interrupting Equipment

- Various fuse types and their applications, including motor starting fuses.
- Operate fused switches and molded case-type breakers.
- How do you handle air break switches and vacuum contactors?
- Delve into vacuum circuit breakers, SF6 puffer, and rotating arc devices.
- Special insulating requirements are necessary at 36kV.
- Address problems associated with solid and gaseous insulation.

Unit 3: The Operation and Maintenance of Circuit Breakers and Switchgear

- Utilize Digital Voltmeters DVM effectively.
- Apply oscilloscopes in maintenance procedures.
- Define the Megger as a diagnostic tool.
- Understand frequency meters and their operation.
- Use temperature probes/IR pyrometers for monitoring.
- Measure with Ammeters and Power meters.
- Learn about the employment of load banks in testing.
- Techniques using cable fault locators.

Unit 4: Special Techniques

- Utilize NEC checklists for correct installation.
- Advanced troubleshooting of Electrical Equipment.
- Clarify methods, terminology, and principles.
- Develop special techniques for unique problems.
- Interpret single-line drawings in electrical systems.

Unit 5: The Interpretation and Use of Drawings

- Understand single-line electrical drawings for system overview.
- Decipher control schematics for operations and maintenance.
- Understand essential generic wiring lists and their applications.
- Decode nameplate information effectively.
- Apply logic and standard symbols.
- Consider step and touch potentials in safety measures.

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Unit 6: The Development of a Job Plan

- What is Step-by-step sequence identification for pinpoint troubleshooting?
- Prepare procedures for comprehensive operation.
- Learn about documentation of best practices for operation and maintenance systems.
- Ensure follow-up and continuity of practices.
- Prioritizing safety considerations and training within the operation-safe framework.
- Case studies for practical applications and learning.

Unit 7: The Identification and Repair of Problems/Failures

- Investigate common mode failures and their implications.
- How do you address phase imbalance issues and phase sequence checks?
- Understand contact pitting/arcing and its causes.
- Evaluate load and fault ratings for equipment.
- Analyze electronic component failures and their solutions.
- Ensure correct operations of switches and control circuits.
- Diagnosing ground faults affecting cables and busbars.
- Review safety requirements, area classifications, and NEC electrical codes.
- Keep safety information up to date for energy operations and maintenance solutions.