Generator Protection Application and Testing

3 days | **English** | **# Cprs17en**

Get a thorough introduction to generator protection in a combination of theoretical and hands-on sessions. Get familiar with generator protection relays from different manufacturers. Learn how to efficiently test generator protection relays.

Objectives

- Become familiar with synchronous generator types used by utilities and industry
- Understand the key principals of generator protection
- Use Test Universe to effectively commission or test modern generator protective relays
- Learn to avoid common testing and maintenance pitfalls
- Become familiar with generator protection event record analysis

Content

- Generator Introduction
- Generator grounding and protection connections
- Stator ground fault protection schemes
- Stator phase fault protection schemes
- Abnormal operating conditions
- System Backup Protection
- Generator relay control functions

Solutions

Test Universe Software
CMC-Family

Audience

Technical staff from electric utilities or companies involved in commissioning or maintenance of generator relays.

Prerequisites

Knowledge of protection testing

Generator Protection Application and Testing

Details

- Introduction and Basic Concepts
  - Fundamental concepts
  - Generator types
  - Basics of generator control

- Protection connections
  - Generator Grounding
  - Open delta and wye potential transformer connections
  - CT polarity conventions
  - Efficient test connections
  - Metering checks

- Stator Ground Fault Protection
  - Ground fault protection for direct and low impedance grounded machines
  - Ground fault protection for high impedance grounded machines

- Stator phase fault protection schemes
  - Generator phase differential
  - Split phase differential
  - Overcurrent protection

- Abnormal Operating Conditions
  - Phase over/under voltage
  - Reverse power
  - Loss of field
  - Negative sequence overcurrent protection
  - Over current protection
  - Potential fuse loss
  - Out of step
  - Over/under frequency protection

- System Backup Protection
  - Phase Distance
  - Phase overcurrent
  - Neutral overcurrent

- Laboratory Testing
  - Beckwith M-3425A
  - SEL 300G

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Agenda

Day 1:

Afternoon session

1:00 PM	Welcome, Agenda Overview
1:15 PM	Introduction and Basic Concepts
3:00 PM	Protection Connections and Laboratory Practice
5:00 PM	Adjourn

Day 2:

Morning session

8:00 AM	Stator Ground Fault Protection Theory and Laboratory Practice
10:00 AM	Phase Fault Protection Theory and Laboratory Practice
12:00 PM	Lunch Break

Afternoon session

1:00 PM	Abnormal Operating Condition Theory and Laboratory Practice
4:00 PM	Adjourn

Day 3:

Morning session

8:00 AM	Abnormal Operating Condition Theory and Laboratory Practice (Continued)
12:00 PM	Lunch Break

Afternoon session

1:00 PM	System Backup Protection and Laboratory Practice
4:00 PM	Adjourn

Day 4:

Morning session

8:00 AM	System Backup Protection and Laboratory Practice (Continued)
9:00 AM	Generator Fault Event Analysis
11:30 AM	Feedback and Wrap Up,
12:00 PM	Adjourn