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Rotating Machines

**Seminar No. 710**

## **Fundamentals of Electrical Motors**

**Course Description:**

This course introduces the fundamental principles of electrical motors. Participants will learn about electromagnetism, rotating fields, induction machines and synchronous electrical machines. Additionally, they will understand the different components of motors, such as bearing units, cooling systems, frames and instrumentation.



**Learning Outcomes:**

Fundamental knowledge of the function of the components of electrical motors



**Prerequisites:**

Fundamental knowledge of basic electrical engineering



**Participants:**

Project managers, buyers, commissioning, operation and maintenance engineers



**Duration:**

½ day



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## Seminar No. 711 Alignment

### Course Description:

The aim of this course is to introduce participants to alignment. They will learn about shaft line, static and dynamic motor behavior on cold and hot status, and methods used to align electrical motors. They will discuss tolerances, couplings (elastic, semi-elastic, rigid), coupling hub fitting and extraction. This course is led by a test bench mechanical expert.



### Learning Outcomes:

Fundamental knowledge in motor alignment



### Prerequisites:

Basic knowledge in mechanical engineering



### Participants:

Mechanical maintenance and commissioning engineers



### Duration:

1 day

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## Seminar No. 712 Installation & Commissioning

### Course Description:

This course covers GE recommendations when installing an electrical motor on skid or grouting. Participants will learn about cable trays, cable glands and terminal boxes. They will also discuss customer energy connections (water, oil, air). The purpose is to also learn about preliminary checks before tests (lubrication, cooling system), and no-load and load tests. Participants will explore how to perform measurement analysis, check efficiency and consumption. The goal is to discuss and understand vibrations and noises.



### Learning Outcomes:

Best practices for installing a motor and basic knowledge for start-up assistance



### Prerequisites:

Fundamental knowledge in mechanical and electrical engineering



### Participants:

Operation, commissioning and maintenance engineers



### Duration:

1.5 day



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**Seminar No. 721**

## **Exciters and Excitation Panels**

**Course Description:**

Seminar participants will learn about different types of exciters and subcomponents like rectifier and diode block assembly. Additionally, they will understand how the cooling system works, AVR (Automatic Voltage Regulator) functions, protection and starting logical.



**Learning Outcomes:**

Basic knowledge of the function of exciters and excitation panels



**Prerequisites:**

Basic knowledge in cabling, electrical and electronic engineering



**Participants:**

Project managers, buyers, commissioning, operation and maintenance engineers



**Duration:**

1 day



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**Seminar No. 730**

## **EX Environment and Pressurization System**

**Course Description:**

This program introduces current regulations related to the different types of motor protection (exe, exd, exp) as well as the EX environment and precautions related to the environment. During this course, participants will learn about motor protection and the environment, purging systems, leakage compensation and trips.



**Learning Outcomes:**

Basic knowledge in explosive environment and purge units



**Prerequisites:**

Basic knowledge in electrical and pneumatic engineering



**Participants:**

Operation, commissioning and maintenance engineers



**Duration:**

½ day



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## Seminar No. 740 Life Cycle Management

### Course Description:

This course covers preventive and curative maintenance with three levels of maintenance, spare parts management (consumables, capital spares), GE recommendations, recording and monitoring, and spare motors.



### Learning Outcomes:

Fundamental knowledge of the maintenance of motors



### Prerequisites:

Basic knowledge in industrial maintenance



### Participants:

Maintenance engineers



### Duration:

1 day



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## Seminar No. 741 Troubleshooting

### Course Description:

During this course, participants will understand electrical and mechanical issues, how to get the data and perform an AMDEC analysis, 5W, tests and checks campaigns.



### Learning Outcomes:

Basic knowledge in diagnostics and analysis of motor troubleshooting



### Prerequisites:

Fundamental knowledge in electrical and mechanical engineering



### Participants:

Operation, commissioning and maintenance engineers



### Duration:

1 day



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## Seminar No. 742 Vibrations

### Course Description:

The aim of this course is to understand what is a vibration, where it comes from, why it is generated and how to measure it (methods of measurement on electrical motors). Additionally they will explore instrumentation such as speed sensors, vibrations sensors, and velocimeters—and discuss data analysis through spectra, waterfalls, bodes, and orbits.



### Learning Outcomes:

Basic knowledge in vibration measurements and analysis



### Prerequisites:

Fundamental knowledge in mechanical engineering



### Participants:

Operation, commissioning and maintenance engineers



### Duration:

1 day



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## Seminar No. 750 In-Depth Generator Training

### Course Description:

This course covers:

- Generator operating principles, inside-out build and components.
- Generator excitation, synchronization, operation modes (island/grid) and protection relaying.
- Generator maintenance practices, analysis of results and typical internal failure modes.



### Learning Outcomes:

In-depth understanding of generator assembly and operating principles, grid operation and typical maintenance program.



### Prerequisites:

Basic knowledge of three-phase rotating machines technology and operating principles.



### Target Audience:

Plant managers, plant operators and service technicians.



### Duration:

5 days

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## Seminar No. 751 In-Depth Generator Training – Generator Product

### Course Description:

This course covers the generator operating principles, inside-out build and components:

- Generator principles of operation.
- Main components of the generators.
- Generator technical specifications and operating characteristic.



### Learning Outcomes:

Inside-out understanding of generation principles, generator assembly, component location and typical interaction between different parts.



### Prerequisites:

Basic knowledge of three-phase rotating machines technology and operating principles.



### Target Audience:

Plant managers, plant operators and service technicians.



### Duration:

2 days

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## Seminar No. 752 In-Depth Generator Training - Generator Operation

### Course Description:

This course covers the generator excitation, synchronization, operation modes (island/grid) and protection relaying:

- Plant Single Line Diagram.
- Generator Excitation Panel.
- Generator Protection Panel.



### Learning Outcomes:

Understand generator behavior in a grid, typical operation modes, limits and grid failure modes.



### Prerequisites:

Basic knowledge of 3-phase rotating machines technology and operating principles. Basic knowledge of generator grid components.



### Participants:

Plant managers, plant operators and service technicians.



### Duration:

2 days

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## Seminar No. 753 In-Depth Generator Training - Generator Maintenance

### Course Description:

This course covers recommendable generator maintenance practices, analysis of results and typical internal failure modes:

- Regular maintenance practices.
- Recommendable inspection schedule.
- Generator testing and interpretation of results.
- Machine disassembly and reassembly.
- Troubleshooting and corrective maintenance.



### Learning Outcomes:

Understanding how to keep the generator on best health conditions, how to interpret findings and respond to failures.



### Prerequisites:

Basic knowledge of three-phase rotating machines technology and operating principles. Basic knowledge of typical generator tooling and components.



### Target Audience:

Plant managers, plant operators and service technicians.



### Duration:

1 day

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## Seminar No. 754 Generator Overview Training

### Course Description:

This course is a reduced and summarized version of the “in-depth” generator training, for a quick familiarization with GE PC generator technology.



### Learning Outcomes:

General understanding of generator assembly and operating principles, grid operation and typical maintenance program.



### Prerequisites:

Basic knowledge of three-phase rotating machines technology and operating principles.



### Target Audience:

Plant managers, plant operators and service technicians.



### Duration:

2 days

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