

# Power Generation Principles & Applications

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## Course Number

10301

## Course Duration

5 days

## Audience

This course is designed for Solar Field Employees and Customer Operators and Maintenance Technicians who are required to commission, configure, operate, and maintain Solar-supplied Generator Packages.

## Prerequisites

Participants must have completed a Solar Operation and Maintenance Principles or Package Operating Principles course. Equivalent experience is acceptable, if this course has not been completed. In addition, some knowledge of Solar's Turbotronic control system would be an advantage.

## Brief Description

This training describes the purpose, function, configuration, and operation of a Solar generator package when integrated with an industrial power generation and distribution system.

## Course Description

Participants review the basic concepts of electrical power generation along with the controls and protection needed for generators. Overviews are given of the major components of a generator system, including voltage regulation, fuel control governors, switchgear, transformers, and protective devices. The different types of load and power are described, along with the principles of load sharing for both real and reactive load. The control system configurations for various operational scenarios are discussed, including Island Mode and Grid Mode. Operational scenarios are reinforced using a Generator Operation Simulation, when appropriate online access is possible.

## Course Objectives

Upon successful completion of this course the student will be able to:

1. Describe the purpose and function of a Solar turbomachinery package used in the power generation application
2. Describe basic electrical properties, including voltage, current, resistance, and power
3. Describe the relationship between electricity and magnetism
4. Describe the basic construction and operating principles of an industrial brushless generator
5. Describe how a generator package integrates with a typical plant power generation and distribution system
6. State the parameters matched to synchronize multiple power sources, and the methods used to synchronize a Solar generator package
7. Describe how voltage and speed are controlled on a Solar generator package
8. Describe how multiple power sources share real and reactive load under various configurations
9. Determine the control system configuration options for various generator operating scenarios
10. Describe the fundamentals of generator protection, likely causes of protection initiation, and possible actions required

## Topics

1. Generator Package Overview
2. Electrical Fundamentals
3. Electromagnetic Induction
4. Generator Construction and Function
5. Generator Systems
6. Generator Synchronizing
7. Generator Voltage and Speed Control
8. Generator Load Sharing
9. Power Systems Operations
10. Generator Protection