

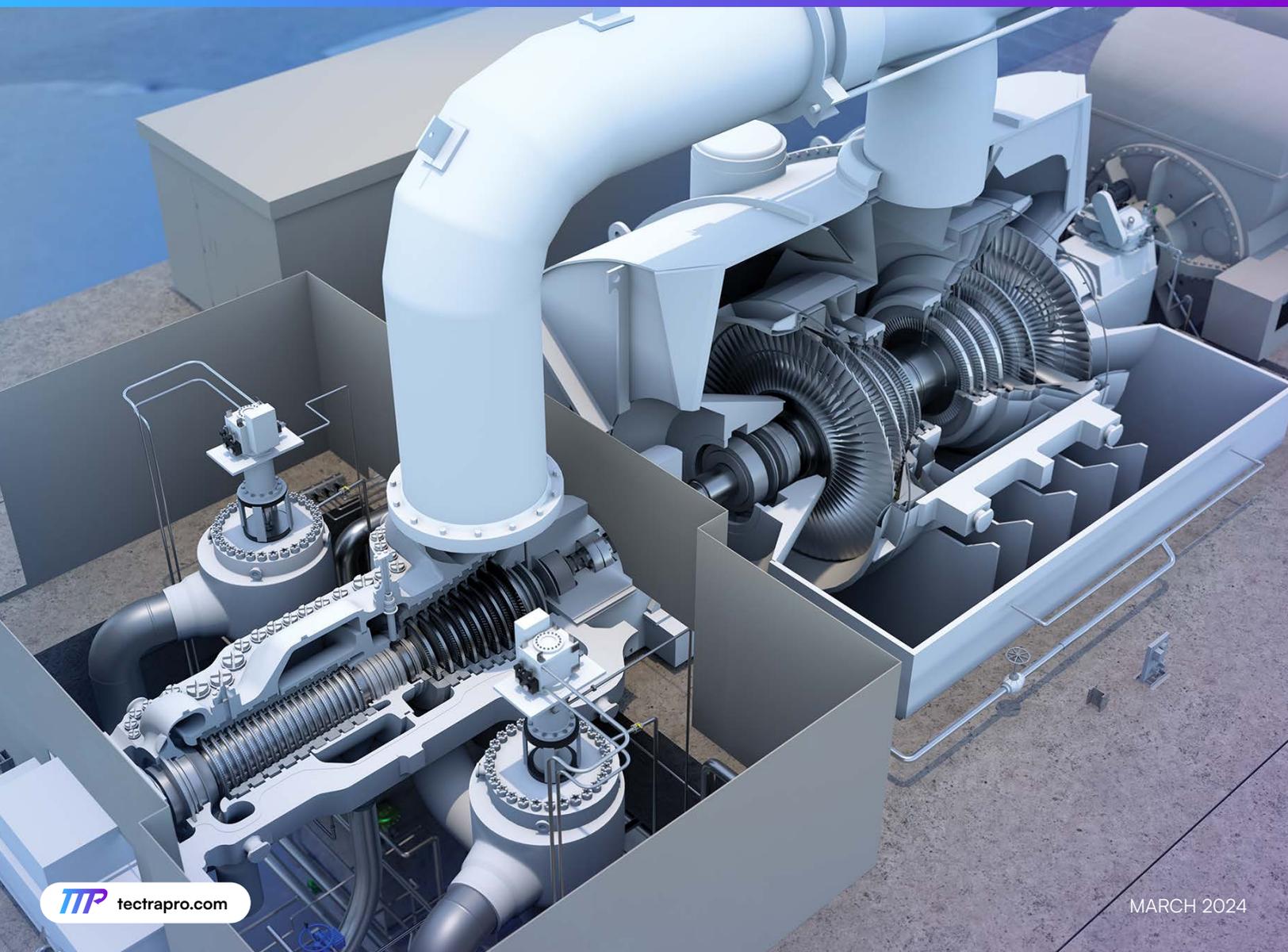


Technical  
Training  
Professionals

# Course Catalog

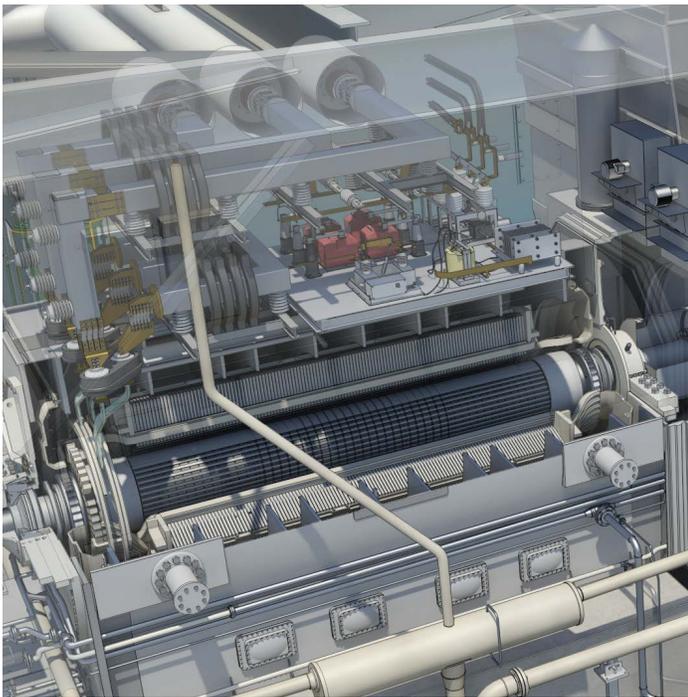
State-of-the-art 3D animated computer-based  
training courses for major industries.

Power Generation | Chemical Manufacturing | Marine & Aerospace  
Oil & Gas | Water & Wastewater Treatment



# At TTP, we turn complex technical information into dynamic, visually engaging training materials for the industries that keep America running.

Our computer-based training (CBT) courses present complex technical information through visually stunning state-of-the-art 3D animations. From illustrating the flowpaths of a gas turbine to breaking down the step-by-step procedure for disassembling a valve actuator, we visualize things you never thought possible.



## FORMAT & CONTENT

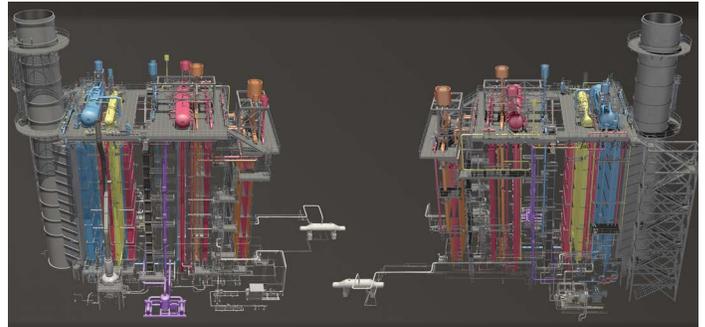
Each course consists of one or more topic-based modules aligned with course learning objectives. Courses are self-paced\* with knowledge assessments after each module. Users receive a certificate after successfully completing each course.

Most of our CBT courses focus on system process and flows using detailed 3D animations. Courses also cover control screen navigation and familiarization and unit startup and operation. We can build custom site-specific system troubleshooting courses upon request.

*\*Course Length in this catalog represents estimated time to complete.*

## EQUIPMENT

Our library features dozens of different major equipment types, manufacturers, and models. We understand every plant is unique and have cultivated a library of courses that cover many of the most common found in the industry.



### Gas Turbines

- GE 7EA
- GE 7FA.02/03
- GE 7FA.05
- GE LM2500
- GE LM6000
- GE LMS100
- Mitsubishi 501GAC
- Siemens 501F
- Siemens SGT-800
- Siemens V84.2

### Reciprocating Engines

- Wartsila 50SG

### Steam Turbines

- GE A10
- GE D11
- Mitsubishi
- Toshiba
- Siemens SST6-5000
- GE Cross-Compound

### Wind Turbines

- MHI
- Nordex

**Don't see your exact equipment listed?** Our training also covers other equipment, and many of the OEM-specific courses are applicable to other OEM models or types. Or we can create a custom course to match your exact site or equipment specifications.

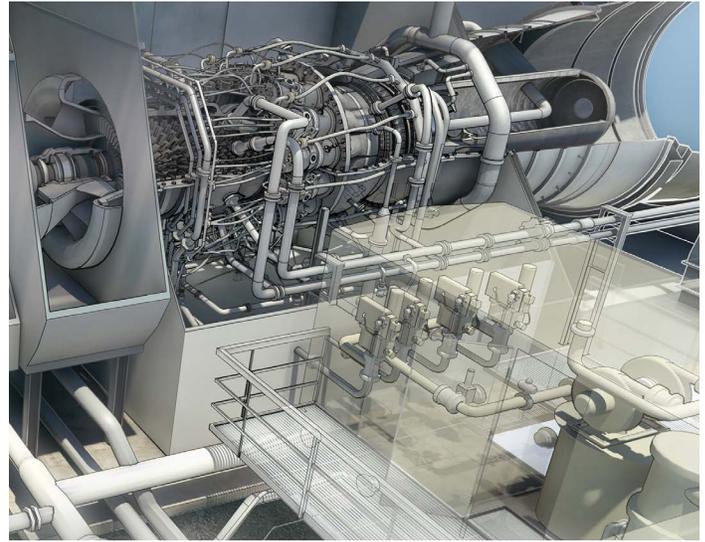
Visit [tetrapro.com/contact-us](http://tetrapro.com/contact-us) or call (913) 338-1143 to get in touch with us.

## ACCESS & INVESTMENT

We are a small, family-owned and operated business that produces elite industry training with an in-house team of less than 25 people. We do our best to provide competitive pricing while maintaining our white-glove approach and direct access to knowledgeable technical experts.

Our CBT courses are offered via 30 packages themed by industry, plant, and/or equipment that can be purchased independently or in combination. Packages are designed to meet a range of training needs and topics from fundamentals to in-depth operations and maintenance.

Our packages-based pricing structure help us expedite activation of training, as well as be more cost-effective by reducing LMS programming and optimizing SME time. All packages are priced on a per user basis as an annual subscription starting at



\$350 per user and maxing out at \$1,200 per user depending on the package(s) selected. Courses can be accessed via the TTP LMS or licensed for use in an existing LMS via AICC. See [TTP CBT Packages & Pricing](#) for details.

# TTP Services

TTP is not just a content provider. We are your training partner. Our training services go far beyond our CBT library to include a full suite of integrated and customizable training solutions:

- **Training Strategy & Gap Analysis:** Employee Progression Planning, Qualifications Programs, Assessment/Evaluation Development
- **On-Site and Virtual Training Programs:** Computer-Based Training, Virtual or In-Person Instructor-Led Training, Blended Learning Training
- **Materials & Asset Development:** System Descriptions, Operating Procedures, Instructor and Student Manuals
- **3D Equipment Rendering, Modeling, & Animation:** High-Resolution Illustrations, Detailed 3D Models & Animations, Interactive Videos & Tools
- **Custom Packages & Solutions:** We truly shine when it comes to customizing our services and training solutions to fit your exact needs. No matter how big or small, we can develop the perfect solution for your plant operations, equipment and employee needs all designed within your budget.

Not sure where to start? Experiencing an influx of new talent and not sure how much they know (or don't know)? Wondering how to integrate your different training programs? We can help you answer these questions and so much more to help you better understand where you're at, what you need and how to keep your plant running safely and efficiently.

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## POWER GENERATION

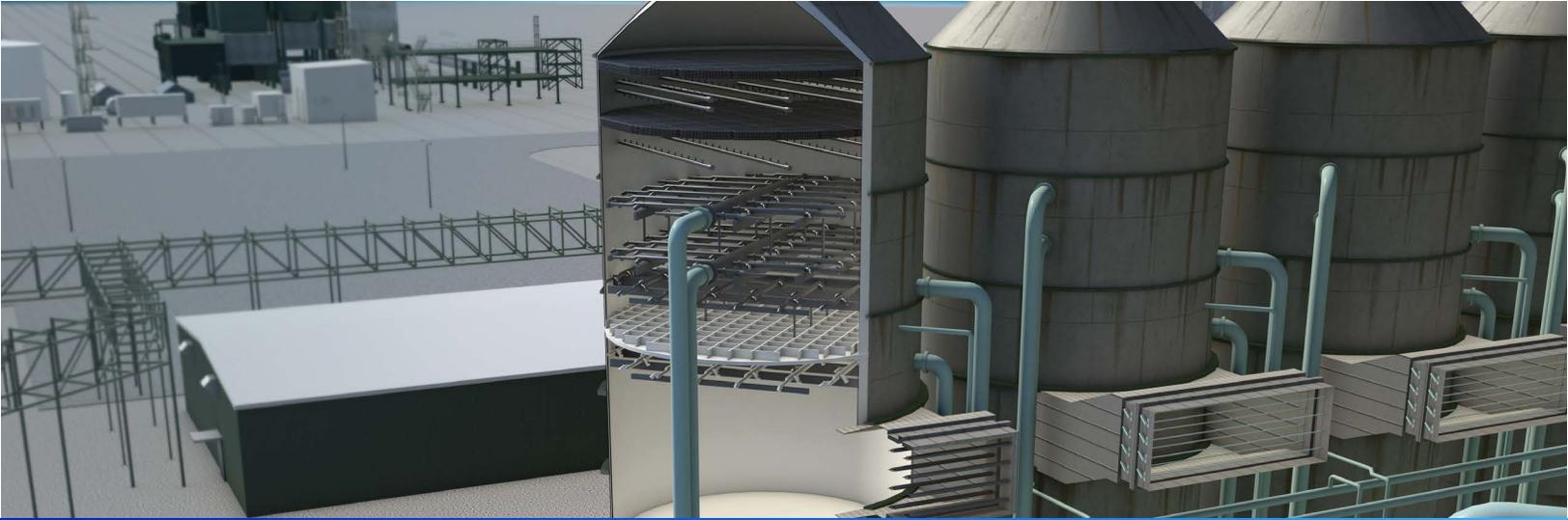
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## ALL INDUSTRIES

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## POWER GENERATION

# CONVENTIONAL

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### EQUIPMENT & PROCESSES

- Absorbers
- Air Compressors
- Condensate & Feedwater
- Circulating Water
- Selective Catalytic Reduction
- Pulverizers
- ... *and more*



# Air Quality Control Systems

## [Air Quality Control System Overview](#)

MODULES: **1** | CODE: GEN02A\_0432\_B1 | LENGTH   
Overview

## [Anhydrous Ammonia System](#)

MODULES: **2** | CODE: GEN02A\_0433\_B1 | LENGTH   
Ammonia Supply Overview, Ammonia Injection and SCR

## [Baghouse Control Screen Familiarization](#)

MODULES: **3** | CODE: GEN02A\_0130\_B2 | LENGTH   
Introduction, Baghouse System, Baghouse Component

## [Baghouse Startup](#)

MODULES: **2** | CODE: GEN02A\_0130\_B3 | LENGTH   
Introduction, Baghouse Start

## [Baghouse System](#)

MODULES: **5** | CODE: GEN02A\_0130\_B1 | LENGTH   
Baghouse Overview, Baghouse and Air Flows, Cleaning and Bags, Ash Removal System, Opacity Event

## [Continuous Emissions Monitoring System \(CEMS\) Conventional Plant](#)

MODULES: **3** | CODE: GEN02A\_0142\_B1 | LENGTH   
Overview, Hardware, Emissions

## [Dry Electrostatic Precipitators](#)

MODULES: **2** | CODE: GEN02A\_0435\_B1 | LENGTH   
Overview, Fly Ash System

## [Flue Gas Desulfurization \(FGD\) Absorber](#)

MODULES: **3** | CODE: GEN02A\_0140\_B1 | LENGTH   
Absorber Overview, Absorber Operation, Chemical Reactions in the Absorbers

## [Flue Gas Desulfurization Absorber Startup](#)

MODULES: **2** | CODE: GEN02A\_0140\_B3 | LENGTH   
Introduction, Absorber Start

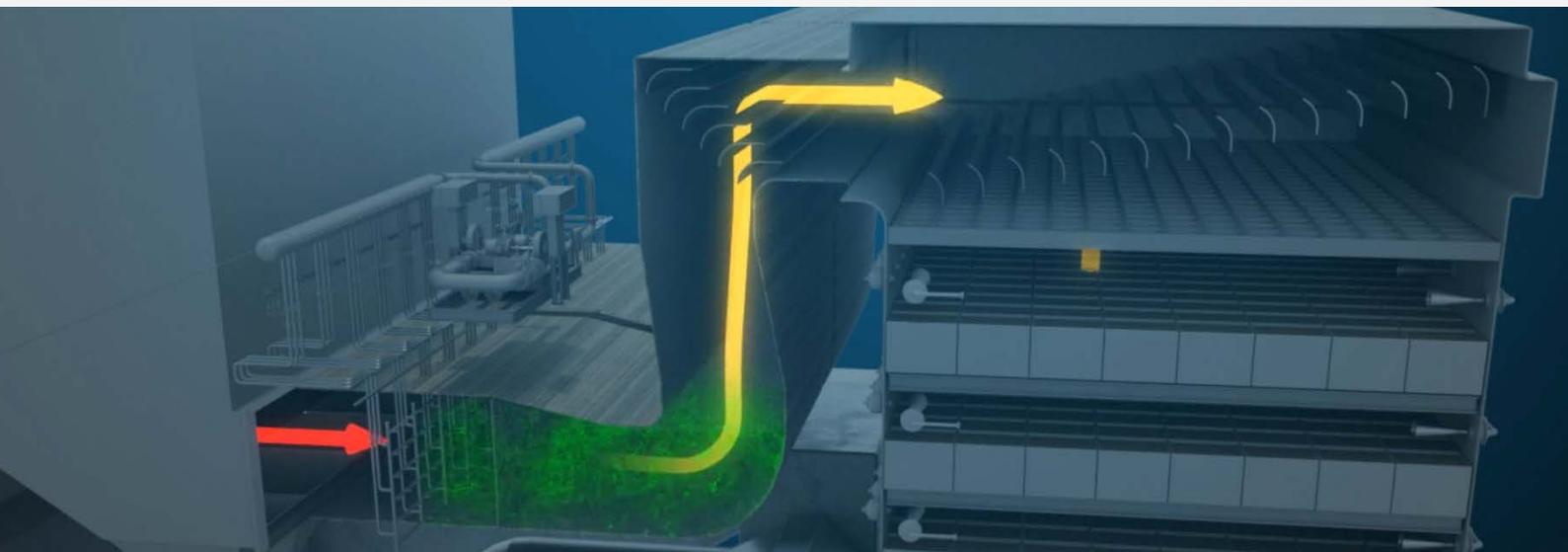
## [Flue Gas Desulfurization Lime and Absorber Control Screen Familiarization](#)

MODULES: **5** | CODE: GEN02A\_0141\_B2 | LENGTH   
Introduction, Absorber Group Familiarization, Lime Slaking Group Familiarization, Process Liquor Group Familiarization, Thickener Group Familiarization

## [Flue Gas Desulfurization Lime Slaking System Startup and Operation](#)

MODULES: **7** | CODE: GEN02A\_0141\_B3 | LENGTH   
Introduction, Lime Slaking System/Electrical and Slurry Transfer, Lime Slaking System/Grit Strainer, Lime Slaking System/Grit Conveyor and Scrubbers, Lime Slaking System/Classifier, Lime Slaking System/Slaker, Lime Slaking System/Feeders and Conveyors

COURSE LENGTH  < 1 HR  1–2 HRS  2–4 HRS  FULL DAY





# ⇒ Air Quality Control Systems

## Flue Gas Desulfurization Lime Slurry Production

MODULES: **1** | CODE: GEN02A\_0141\_B1 | LENGTH ⓘ  
Overview

## Flue Gas Fundamentals

MODULES: **5** | CODE: CBF00A\_0401\_B1 | LENGTH ⓘ ⓘ  
Overview, Electrostatic Precipitators, Baghouses, Flue Gas Desulfurization, Mercury Removal

## Flue Gas Mercury Removal

MODULES: **3** | CODE: GEN02A\_0232\_B1 | LENGTH ⓘ  
Mercury Removal System Overview, Calcium Halide Injection, Activated Carbon Injection

## Hydrated Lime

MODULES: **1** | CODE: GEN02A\_0434\_B1 | LENGTH ⓘ  
Hydrated Lime

## Induced Draft (ID) Fans

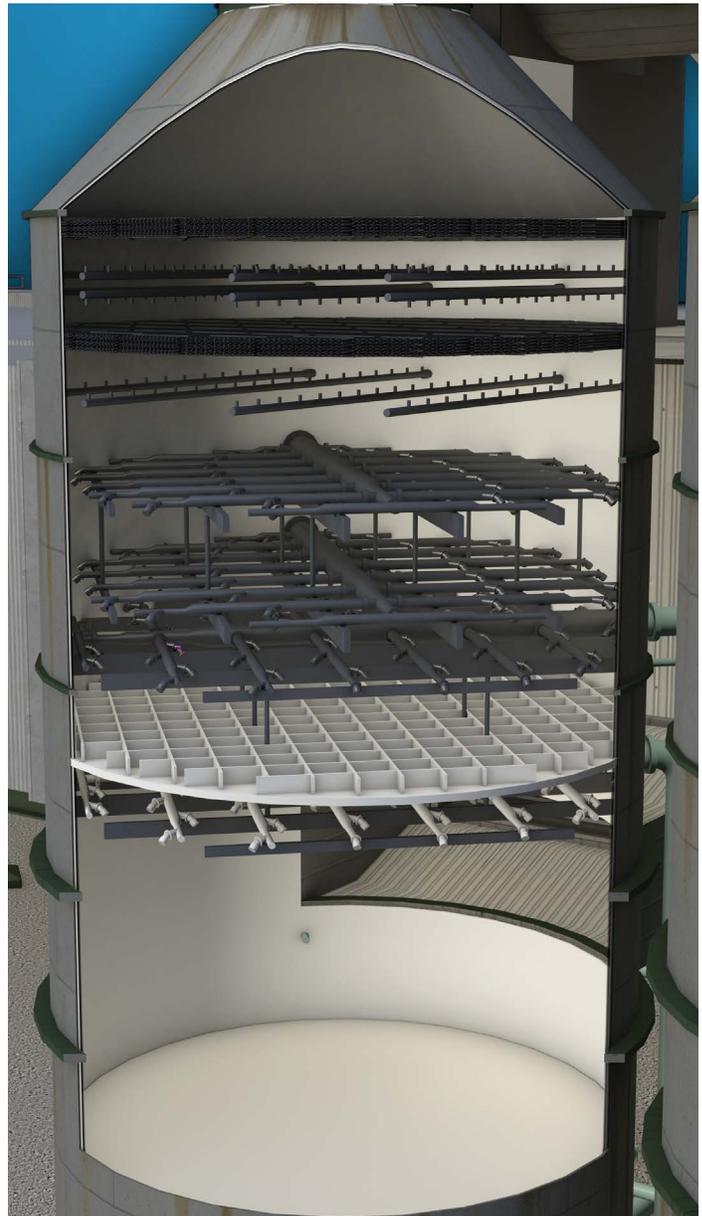
MODULES: **2** | CODE: GEN02A\_0436\_B1 | LENGTH ⓘ  
ID Fan Operation, ID Fan Support Systems

## Wet Electrostatic Precipitators

MODULES: **1** | CODE: GEN02A\_0438\_B1 | LENGTH ⓘ  
WESP Design

## Wet Flue Gas Desulfurization (FGD)

MODULES: **7** | CODE: GEN02A\_0437\_B1 | LENGTH ⓘ ⓘ ⓘ  
WFGD Overview, Limestone Storage and Feeders, Ball Mill Design and Operation, Limestone Slurry, FGD Absorbers, Absorber Chemistry, Dewatering



# Balance of Plant

## Circulating Water System (Conventional Plant)

MODULES: **4** | CODE: GEN02A\_0242\_B1 | LENGTH   
 Overview, Circulation Pumps and System Flow, Cooling Towers, Cooling Tower Chemistry

## Coal Pulverizer

MODULES: **2** | CODE: GEN02A\_0110\_B1 | LENGTH   
 Pulverizer Feed, Pulverizer Operation

## Condensate & Feedwater Systems (Conventional Plant)

MODULES: **5** | CODE: GEN02A\_0222\_B1 | LENGTH   
 Condensate/Feedwater Overview, Condenser Water Side, Condenser Steam Side, Condensate System, Feedwater System

## Lube Oil System (Conventional Plant)

MODULES: **3** | CODE: GEN02A\_0112\_B1 | LENGTH   
 Lube Oil System Overview, Component Operations, Cooler Transfer

## Rotary Screw Air Compressor

MODULES: **3** | CODE: GEN02A\_0124\_B1 | LENGTH   
 Overview, Air and Oil Systems, Operations

# Boiler Types

## Boiler (Subcritical)

MODULES: **9** | CODE: GEN02A\_0220\_B1 | LENGTH   
 Overview, Feedwater Flow, Steam Flow, Primary Air, Secondary Air, Burners, Combustion, Bottom Ash System, Fly Ash Removal System

## Furnace (Supercritical)

MODULES: **5** | CODE: GEN02A\_0120\_B1 | LENGTH   
 Overview, Primary Air System, Secondary Air System, Burners, Combustion

COURSE LENGTH < 1 HR 1–2 HRS 2–4 HRS FULL DAY



# Fundamentals

## Basic Electrical Fundamentals

MODULES: **16** | CODE: GEN00A\_0100\_B1 | LENGTH   
 Atoms and Electrons, Voltage AC and DC, Resistance, Current, Power, Capacitors, Inductors, Transformers, Instrument Transformers PT / CT / CCVT, Power Generation, Conductors, Cables and Insulators, Frequency, Impedance, Ohm's and Kirchhoff's Laws, Noise and Harmonics, Grounds and Neutrals

## Boiler Fundamentals

MODULES: **8** | CODE: CBF00A\_0301\_B1 | LENGTH   
 Overview, Feedwater and Steam Flow, Water Properties, Fuel, Primary and Secondary Air, Burners, Combustion, Gas-Fired Boiler

## Conventional Boiler Fundamentals Overview

MODULES: **1** | CODE: CBF00A\_0101\_B1 | LENGTH   
 Overview

## Conventional Boiler Plant Operation Fundamentals

MODULES: **10** | CODE: CBF00A\_0701\_B1 | LENGTH   
 Overview, Water Treatment, Condensate/Feedwater, Cooling Towers, Heat Rate, Boiler Efficiency, Boiler Control, CEMS, Ash, Electrical

## Flue Gas Fundamentals

MODULES: **5** | CODE: CBF00A\_0401\_B1 | LENGTH   
 Overview, Electrostatic Precipitators, Baghouses, Flue Gas Desulfurization, Mercury Removal

## Generator Fundamentals (Conventional Plant)

MODULES: **7** | CODE: CBF00A\_0601\_B1 | LENGTH   
 Overview, Design, Auxiliaries, Energizing, MW and MVAR, Load Control, Fault Protection

## Steam Turbine Fundamentals (Conventional Boiler)

MODULES: **5** | CODE: CBF00A\_0501\_B1 | LENGTH   
 Overview, Design, Auxiliary Systems, Condenser, Operation/Expansion

# Generators

## GE Conventional Plant Steam Turbine Generator

MODULES: **5** | CODE: GEN02A\_0111\_B1 | LENGTH   
 Overview, Stator, Rotor, Power Generation, Reactive Power

## GE Generator for Tandem-Compound Steam Turbine

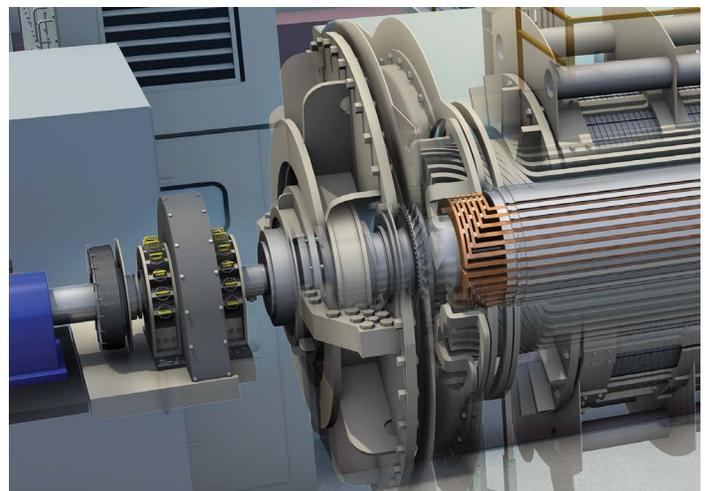
MODULES: **3** | CODE: GEN02A\_0212\_B1 | LENGTH   
 Generator Overview, Seal Oil System, Generator Gas System

## Generator Fundamentals (Conventional Plant)

MODULES: **7** | CODE: CBF00A\_0601\_B1 | LENGTH   
 Overview, Design, Auxiliaries, Energizing, MW and MVAR, Load Control, Fault Protection

## Westinghouse Generator Seal Oil

MODULES: **3** | CODE: GEN01A\_1131\_B1 | LENGTH   
 Overview, Hydrogen Side Operation, Air Side Operation



# ✓ Maintenance

## Bearings

MODULES: **5** | CODE: [GEN08A\\_012\\_B1](#) | LENGTH   
 Overview, Elliptical Bearing, Tilt Pad Journal Bearing, Thrust Bearing, Bearing Instrumentation

## Heat Exchangers

MODULES: **7** | CODE: [GEN08A\\_010\\_B1](#) | LENGTH   
 Overview, Plate Heat Exchangers, Plate Heat Exchanger Instrumentation, Main Condenser Water Side, Main Condenser Steam Side, Deaerator Overview, Shell and Tube Heat Exchanger

## Laser Alignment

MODULES: **7** | CODE: [GEN08A\\_013\\_B1](#) | LENGTH   
 Laser Alignment Overview, Soft Foot and Runout, Angularity and Offset, VibraAlign Setup, VibraAlign Measure, Rotalign Setup, Rotalign Measure

## Limitorque Actuator

MODULES: **5** | CODE: [GEN08A\\_017\\_B1](#) | LENGTH   
 Overview, Actuator Operation, Limit Switch Setting, Torque Switch Setting, Troubleshooting

## Logic Diagrams

MODULES: **4** | CODE: [GEN01A\\_1755\\_B1](#) | LENGTH   
 Overview, Logic Diagrams, Accessing Diagrams, HP Bypass Example

## MagneBlast 4160V Breaker

MODULES: **2** | CODE: [GEN02A\\_0144\\_B1](#) | LENGTH   
 Overview, Circuit Breaker Operation

## Maintenance - Electrical Switchgear

MODULES: **10** | CODE: [GEN08A\\_020\\_B1](#) | LENGTH   
 Electrical Switchgear Overview, 6.9kV Breaker Design and Operation, 6.9kV Switchgear Protection, 6.9kV Switchgear Maintenance, 6.9kV Switchgear Troubleshooting, 480V Switchgear Overview, 480V Breaker Design and Operation, 480V Switchgear Protection, 480V Switchgear Maintenance, 480V High Resistance Ground System

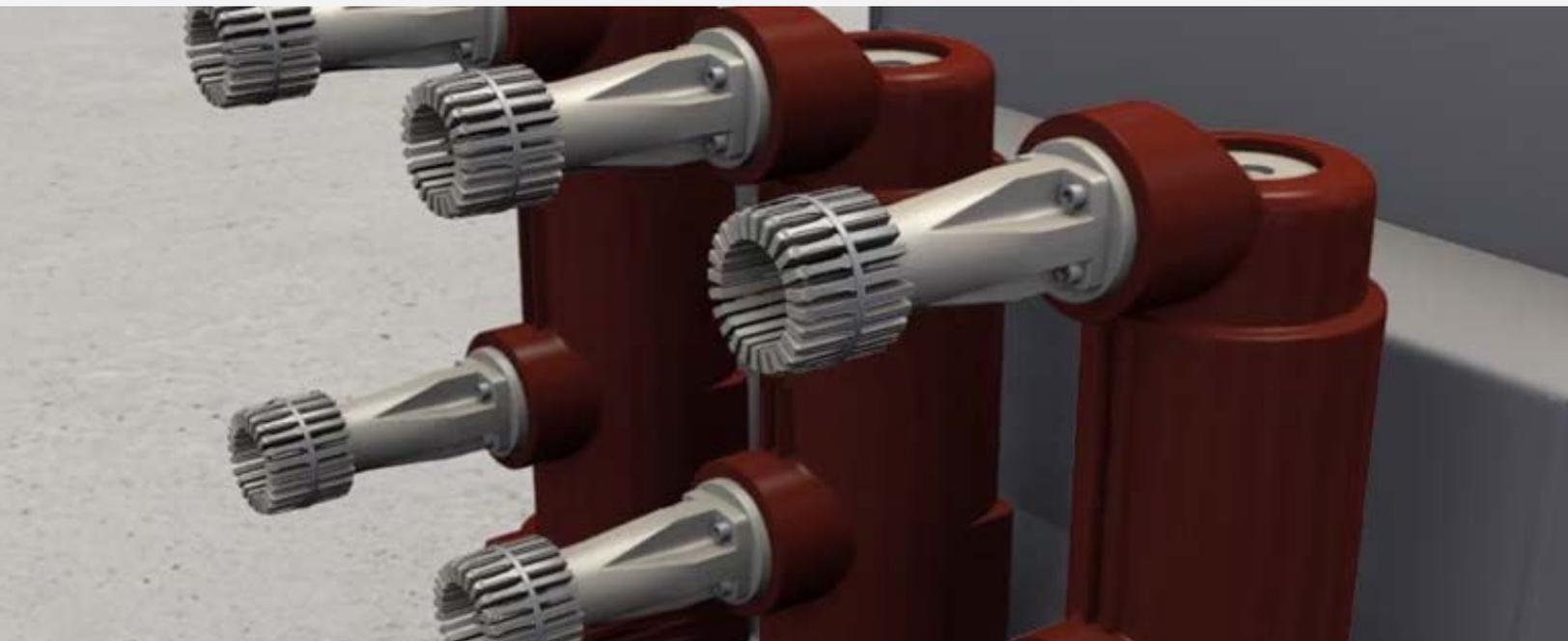
## REXA Actuators

MODULES: **7** | CODE: [GEN08A\\_011\\_B1](#) | LENGTH   
 Overview, Linear Actuator, Rotary and Direct Actuators, Disassembly, Assembly, Setup for Operation, Mechanical Troubleshooting

## Rotary Screw Air Compressor

MODULES: **3** | CODE: [GEN02A\\_0124\\_B1](#) | LENGTH   
 Overview, Air and Oil Systems, Operations

COURSE LENGTH < 1 HR 1—2 HRS 2—4 HRS FULL DAY



# Steam Turbines

## GE Steam Turbine Expansion

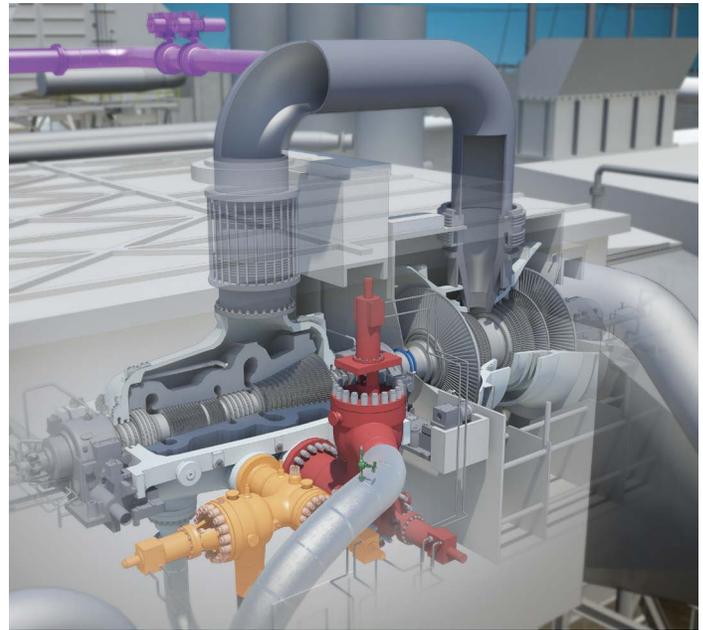
MODULES: **4** | CODE: GEN02A\_0113\_B1 | LENGTH   
 Overview, Expansion, Start Blocks to FSNL, Start and Loading

## GE Tandem-Compound Reheat Steam Turbine

MODULES: **4** | CODE: GEN02A\_0210\_B1 | LENGTH   
 Overview, Gland Seal System, Lube Oil System, EHC System

## Steam Turbine Fundamentals (Conventional Boiler)

MODULES: **5** | CODE: CBF00A\_0501\_B1 | LENGTH   
 Overview, Design, Auxiliary Systems, Condenser, Operation/Expansion



# Water Treatment

## Ion Exchange System Fundamentals

MODULES: **10** | CODE: GEN09A\_0951\_B1 | LENGTH   
 Cycle Makeup IX Overview, Activated Carbon Filter Service Cycle, Activated Carbon Filter Regeneration, Cation Vessel Service Flow, Cation Exchanger Regeneration, Forced Draft Degasifier, Anion Vessel Service Flow, Anion Exchanger Regeneration, Mixed Bed Exchanger Vessel Service Flow, Mixed Bed Exchanger Regeneration

## Ion Exchange System Operation

MODULES: **6** | CODE: GEN09A\_0952\_B1 | LENGTH   
 Overview, Activated Carbon Filter Flow, Cation System, Anion System, Mixed Bed Vessels, Deionized Neutralization System

## Recycled Water Facility

MODULES: **3** | CODE: GEN01A\_0361\_B1 | LENGTH   
 Overview, Clarifier Overview, Sand Filters Overview

## Reverse Osmosis Fundamentals

MODULES: **10** | CODE: GEN09A\_0903\_B1 | LENGTH   
 Introduction to Reverse Osmosis, Osmotic Forces, Hydrostatic Head, Osmotic Pressure, Reversing Osmosis, RO Element Construction, RO Pressure Vessel Construction, RO Flow Considerations, Typical RO System, System Configurations

## Reverse Osmosis System Operation

MODULES: **7** | CODE: GEN09A\_0941\_B1 | LENGTH   
 Raw Water Supply, Ultrafilters and Filtrate Buffer Tank, Buffer Tank Supply to RO, Operational Cycle Flowpaths for RO, Degasifier, Permeate Buffer and Storage Tank, Chemical Cleaning

## Water Treatment Plant (Reverse Osmosis)

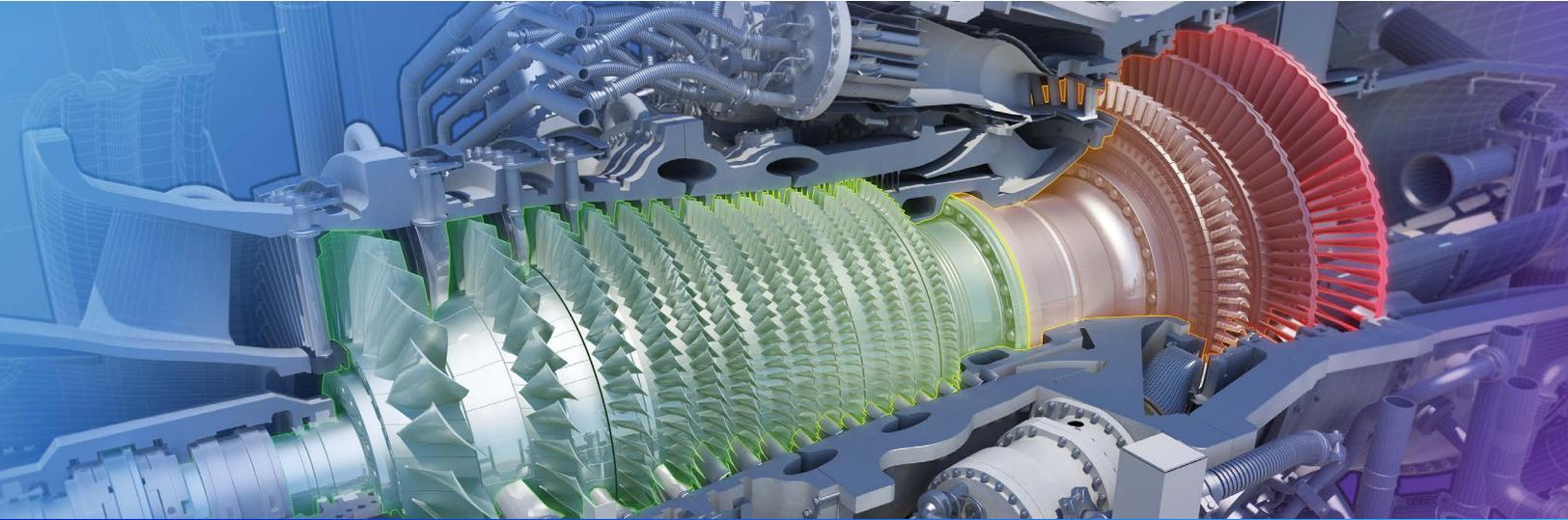
MODULES: **4** | CODE: GEN01A\_1760\_B1 | LENGTH   
 Overview, Pre-RO Equipment, Reverse Osmosis Skid, Operation

## Water Treatment Plant (Reverse Osmosis w/EDI Modules)

MODULES: **4** | CODE: GEN01A\_1660\_B1 | LENGTH   
 Water Treatment Overview, RO Flowpaths, EDI Modules and Vessels, Operation

## Zero Liquid Discharge (ZLD) System

MODULES: **4** | CODE: GEN01A\_0346\_B1 | LENGTH   
 Overview, Brine Concentrator, Crystallizer, Filter Press



## POWER GENERATION

# COMBINED/SIMPLE CYCLE GAS TURBINES

### SECTIONS

 [Balance of Plant](#)

 [Gas Turbines](#)

 [Fundamentals](#)

 [Generators](#)

 [Heat Recovery Steam Generators \(HRSG\)](#)

 [Maintenance](#)

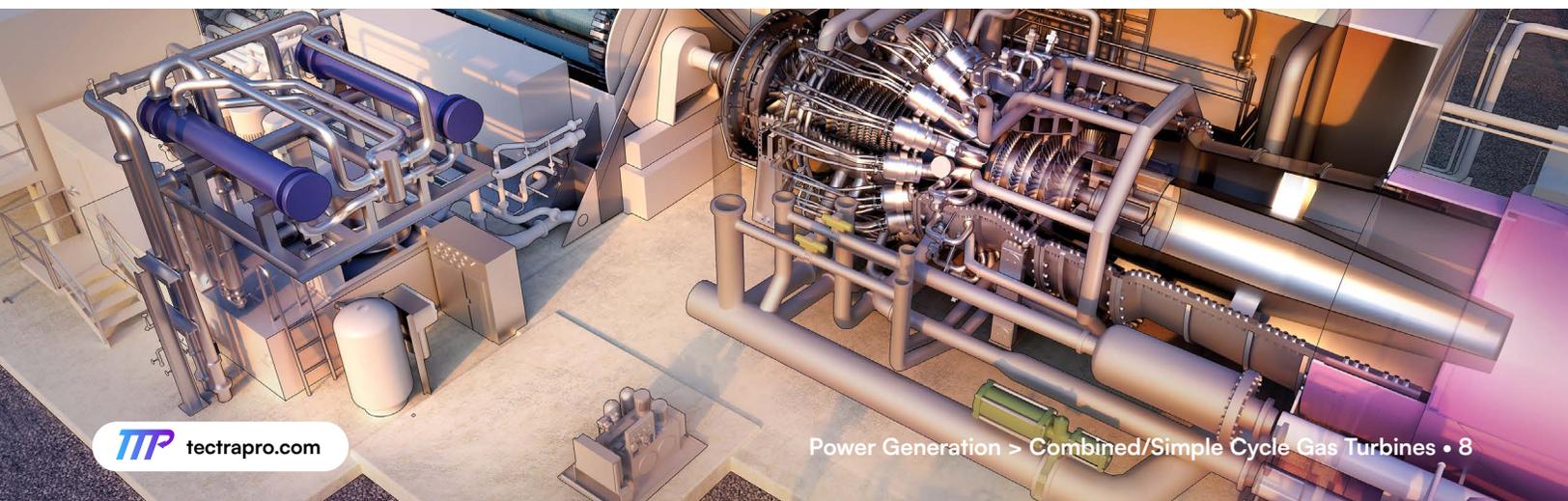
 [Reciprocating Engines](#)

 [Steam Turbines](#)

 [Water Treatment](#)

### EQUIPMENT & PROCESSES

- Circulating Water
- Condensate & Feedwater
- Boiler Feedwater Pumps
- Lubricating Oil
- Seal Oil
- Hydrogen
- Heat Exchangers
- Actuators
- ... and more



# Balance of Plant

## Auxiliary Boiler

MODULES: **6** | CODE: GEN01A\_1635\_B1 | LENGTH   
 Overview, Furnace and Flue Gas, Fuel and Burner, Feedwater and Steam, Emission, Operations and Maintenance

## Circulating Water System (Combined Cycle)

MODULES: **3** | CODE: GEN01A\_0242\_B1 | LENGTH   
 Overview, Cooling Tower, Cooling Tower Chemicals

## Cleaver Brooks Auxiliary Boiler

MODULES: **4** | CODE: GEN01A\_1735\_B1 | LENGTH   
 Auxiliary Boiler Overview, Fuel Gas and Burner, Feedwater and Steam, Auxiliary Steam Distribution

## Combined Cycle Startup (2X1) with GE 7FA Gas Turbines and GE D11 Steam Turbine

MODULES: **12** | CODE: GEN01A\_0290\_B3 | LENGTH   
 Start Familiarization, CT Prestarts, ST Prestarts, DCS Prestarts, FG and Aux Boiler, Condenser Vacuum, Lead CT Start, ST Preparations, ST Roll and Sync, Loading the ST and Lag CT, Blending and Loading, Duct Burners

## Condenser & Condensate (Combined Cycle)

MODULES: **4** | CODE: GEN01A\_0341\_B1 | LENGTH   
 Overview, Condenser Overview, Air Ejector and Gland Seal Condenser, Condenser Water Side

## Condenser & Condensate (Combined Cycle with ACC #1)

MODULES: **5** | CODE: GEN01A\_1341\_B1 | LENGTH   
 Overview, Steam Flow and Design, Condensate System, Air Removal System, Operation Modes

## Condenser & Condensate (Combined Cycle with ACC #2)

MODULES: **5** | CODE: GEN01A\_1641\_B1 | LENGTH   
 Overview, ACC Design and Operation, Air Removal System, Condensate System Design and Operation, Cleaning System

## Continuous Emissions Monitoring System (CEMS) Combined Cycle

MODULES: **4** | CODE: GEN01A\_1646\_B1 | LENGTH   
 Overview, Sample Conditioning Components, Flue Gas Analyzer Operation, Maintenance

## Electrical Distribution

MODULES: **6** | CODE: GEN01A\_1744\_B1 | LENGTH   
 Electrical Distribution Overview, High Voltage Distribution, Medium Voltage Distribution, 480V Distribution, DC and UPS, 4160V Breaker

## Gas Compressor

MODULES: **6** | CODE: GEN01A\_0347\_B1 | LENGTH   
 Overview, Fuel Gas Inlet, Compressors, Lube Oil System, Discharge, CT Gas Conditioning Skid

## Sample Panel

MODULES: **4** | CODE: GEN01A\_1623\_B1 | LENGTH   
 Overview, Sample Source, Sample Conditioning, Continuous Analysis

## Steam Plant Critical Valves (Combined Cycle)

MODULES: **7** | CODE: GEN01A\_1633\_B1 | LENGTH   
 Overview, Steam Header Isolation Valves, Attemperators and Desuperheaters, Bypass Valves, Steam Turbine Stop and Control Valves, Steam Turbine LP Valves, Cold Reheat Valves

COURSE LENGTH < 1 HR 1–2 HRS 2–4 HRS FULL DAY



# Gas Turbines

## GE 7EA Gas Turbine

MODULES: **9** | CODE: [GEN01A\\_0511\\_B1](#) | LENGTH   
Inlet Air, Compressor, Combustion and Turbine, Fuel Path Firing Modes, Lube Oil Supply and Distribution, EHC Supply and Distribution, Compressor Bleed System, Starting System, Generator Overview

## GE 7EA Gas Turbine Control Screen Familiarization

MODULES: **5** | CODE: [GEN01A\\_0511\\_B2](#) | LENGTH   
7EA Control Screen Familiarization, 7EA Mark V Control Group Familiarization, 7EA Mark V Monitor Group Familiarization, 7EA Mark V Auxiliary Group Familiarization, 7EA Mark V Tests Group Familiarization

## GE 7EA Gas Turbine Startup and Shutdown

MODULES: **2** | CODE: [GEN01A\\_0590\\_B3](#) | LENGTH   
Startup, Shutdown

## GE 7FA Gas Turbine

MODULES: **10** | CODE: [GEN01A\\_0211\\_B1](#) | LENGTH   
Overview, Inlet Air, Compressor Section, Combustors and Turbine Section, Fuel Gas System, Lube Oil Supply Distribution, EHC Supply and Distribution, Compressor Bleed System, Generator Overview, Turbine Start  
*Also available in Spanish.*

## GE 7FA Gas Turbine Control Screen Familiarization

MODULES: **5** | CODE: [GEN01A\\_0211\\_B2](#) | LENGTH   
Introduction to 7FA Screen Familiarization, 7FA Mark VI Control Group Familiarization, 7FA Mark VI Auxiliary Group Familiarization, 7FA Mark VI Monitor Group Familiarization, 7FA Mark VI Test Screen Familiarization

## GE 7FA Gas Turbine Major Inspections

MODULES: **9** | CODE: [GEN08A\\_015\\_B1](#) | LENGTH   
Overview, HGP Clearance Measurements, HGP Turbine Casing Removal, HGP Concentricity, Rotor Float, and Clearance Checks, HGP Component Removal, HGP Inspection, HGP Turbine Section Assembly, HGP Assembly Clearances, HGP Combustion Section Assembly

## GE 7FA Gas Turbine Routine Maintenance

MODULES: **6** | CODE: [GEN08A\\_014\\_B1](#) | LENGTH   
Overview, Preventative Maintenance, Combustion Inspection Overview, Pre-Maintenance Procedures, Combustion System Inspection, Combustion System Reassembly

## GE 7FA.05 Gas Turbine

MODULES: **9** | CODE: [GEN01A\\_1611\\_B1](#) | LENGTH   
Overview, Inlet Air System, Compressor Section, Combustion and Turbine Section, Fuel Gas System, Lubricating Oil System, Hydraulic Oil System, Turbine Start, Fuel Gas and Premix Valves

## GE 7FA.05 Gas Turbine Control Screen Familiarization

MODULES: **24** | CODE: [GEN01A\\_1711\\_B2](#) | LENGTH   
Overview, Turbine Protection, Inlet System, Cooling Sealing Air, Fuel Gas System, Gas Fuel Conditioning, Gas Fuel Module, Lube and Seal Oil System, Generator Cap & Hydrogen Systems, Generator Hydrogen Monitoring, Generator Temperatures & Vibrations, Generator Synchronization, Monitor Exhaust Temperatures, Monitor Rotor Tempers & Vibrations, Monitor Proximitors Vibrations, Monitor Heat & Vent, Transmitters Screen, Model Base Control Sensor Data Screen, Tasks Auxiliaries and Motors Screen, Case Temperature Management Screen, Task Timers and Counters Screen, Task Motor Timers Screen, Water Wash System Screen, Overspeed Tests Screen

COURSE LENGTH < 1 HR 1–2 HRS 2–4 HRS FULL DAY



# Gas Turbines

## GE 7HA Gas Turbine

MODULES: **9** | CODE: [GEN01A\\_2011\\_B1](#) | LENGTH   
 Overview, Inlet Air, Compressor Section, Fuel Gas System, Combustion and Turbine Sections, Lube Oil System, Seal Oil System, Generator Overview, Turbine Start  
*Planned*

## GE LM2500 Gas Turbine

MODULES: **11** | CODE: [GEN01A\\_1211\\_B1](#) | LENGTH   
 Overview, Inlet Air System, Accessory Drive, Compressor Section, Fuel Gas System, Turbine Section, Lube Oil System and Bearings, Hydraulic Oil System, Hydraulic Start System, Firing, Generator Overview

## GE LM6000 Gas Turbine

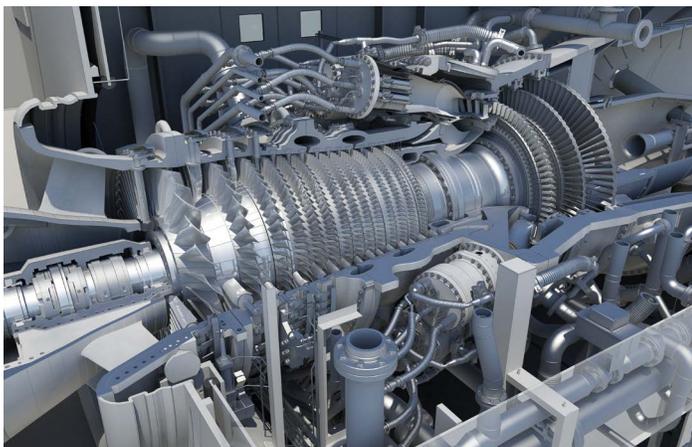
MODULES: **10** | CODE: [GEN01A\\_0611\\_B1](#) | LENGTH   
 Overview, Inlet Air, Compressor, Gas Supply, Turbine, Lube Oil, Hydraulic System, Start System, Firing, Generator Overview

## GE LM6000 Gas Turbine Control Screen Familiarization

MODULES: **5** | CODE: [GEN01A\\_0611\\_B2](#) | LENGTH   
 Introduction to LM6000 Screen Familiarization, LM6000 Control Group Familiarization, LM6000 Auxiliary Group Familiarization, LM6000 Generator Group Familiarization, LM6000 Monitor Group Familiarization

## GE LM6000 Gas Turbine Startup

MODULES: **1** | CODE: [GEN01A\\_0690\\_B3](#) | LENGTH   
 Startup



## GE LMS100 Gas Turbine

MODULES: **14** | CODE: [GEN01A\\_0911\\_B1](#) | LENGTH   
 Overview, Inlet Air System, LP Compressor, Intercooler, HP Compressor, Fuel Gas System, Turbine Sections, Accessory Drive System, Synthetic Lube Oil System, Mineral Lube Oil System, Hydraulic Oil System, Hydraulic Start System, Turbine Firing, Generator Overview

## GE LMS100 Gas Turbine Control Screen Familiarization

MODULES: **20** | CODE: [GEN01A\\_0911\\_B2](#) | LENGTH   
 Main Control Screen, Turbine Overview Screen, Generator Overview Screen, Intercooler Screen, Gas Turbine Ventilation Screen, CDP System Screen, Lube Oil Cooling Pumps Screen, Synthetic Lube Oil Pump Screen, Synthetic Lube Oil System Screen, Generator Lube Oil System Screen, Mineral Lube Oil System Screen, Mineral Lube Oil Distribution Screen, Mineral Hydraulic Oil System Screen, Fire Protection System Screen, NOx Water Injection System Screen, Fuel Gas System Screen, Hydraulic Start System Screen, Gas Turbine Enclosures Screen, Thrust Balance Screen, Permissives Screen

## GE LMS100 Gas Turbine Start

MODULES: **10** | CODE: [GEN01A\\_0990\\_B3](#) | LENGTH   
 Control, Ventilation, Oil System, Valve Cycling, Fuel Gas Test, Turbine Roll, Purge and Fire, Conditions Check, Self Sustaining, Synch and Load

## Mitsubishi 501GAC Gas Turbine

MODULES: **12** | CODE: [GEN01A\\_1911\\_B1](#) | LENGTH   
 Overview, Inlet Air System, Compressor Section, Fuel Gas System, Combustion Section, Turbine Section, Lubricating Oil System, Control Oil System, Generator Overview, Start System and Turning Gear, Turbine Start, Turbine Fire Protection

## Mitsubishi 501GAC Gas Turbine Control Screen Familiarization

MODULES: **18** | CODE: [GEN01A\\_1911\\_B2](#) | LENGTH   
 Overview, Operation 1, Operation 2, Ready to Start-Common Start Permissives, Ready to Start-Normal Gas Permissives, Ready to Start Condition, Blade Path and Exhaust Temperature Monitoring, Vibration and Bearing Temperature Monitoring, Control Oil System, Lube Oil System, Fuel Gas System, Air and Flue Gas System, Anti-Icing System, Control Block Diagram, Generator Operation 1, Generator Operation 2, Generator Temperature Monitoring, Casing Cooling System, Compressor Blade Washing System

# Gas Turbines

## Siemens 501F Gas Turbine

MODULES: **9** | CODE: [GEN01A\\_0111\\_B1](#) | LENGTH   
 Inlet Air, Compressor Section, Combustion, Turbine and Exhaust Sections, Fuel Gas System, Lube Oil System, Bleed Air System, Kettle Boiler, Electrical Starting System, Electrical Distribution System

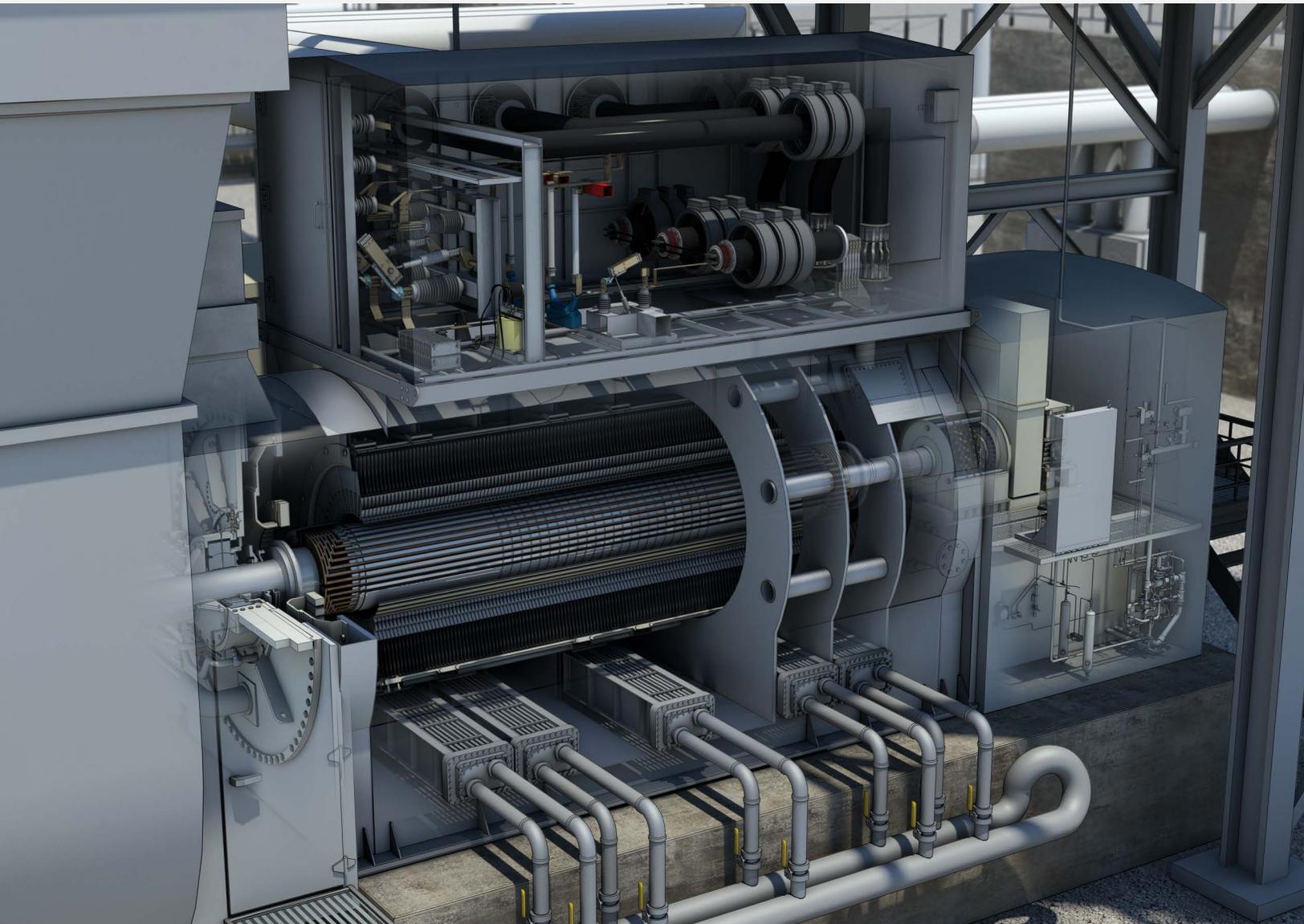
## Siemens V84.2 Gas Turbine

MODULES: **12** | CODE: [GEN01A\\_0811\\_B1](#) | LENGTH   
 Turbine Overview, Turbine Inlet Air System, Compressor, Turbine Overview, Turbine Lube Oil System, Turbine Hydraulics System, Turbine Blowoff System, Glycol Cooling Water System, Fuel Gas System, Water Injection System, Firing, Generator Overview

## Siemens SGT800 Gas Turbine

MODULES: **9** | CODE: [GEN01A\\_0711\\_B1](#) | LENGTH   
 Overview, Air Inlet System, Compressor Section, Combustion Section, Turbine Section, Lube Oil System, Turbine Start System, Turbine Firing, Generator

COURSE LENGTH < 1 HR 1–2 HRS 2–4 HRS FULL DAY



# ⚙️ Fundamentals

## Basic Electrical Fundamentals

MODULES: **16** | CODE: GEN00A\_0100\_B1 | LENGTH ⌚ ⌚ ⌚  
 Atoms and Electrons, Voltage AC and DC, Resistance, Current, Power, Capacitors, Inductors, Transformers, Instrument Transformers PT / CT / CCVT, Power Generation, Conductors, Cables and Insulators, Frequency, Impedance, Ohm's and Kirchoff's Laws, Noise and Harmonics, Grounds and Neutrals

## Combined Cycle Operation Fundamentals

MODULES: **7** | CODE: GEN00A\_0701\_B1 | LENGTH ⌚ ⌚ ⌚  
 Overview, Water Balance, Water Treatment, Electrical, Heat Rate, Output, CEMS  
*Also available in Spanish.*

## Combined Cycle Overview

MODULES: **1** | CODE: GEN00A\_0101\_B1 | LENGTH ⌚  
 CC Overview  
*Also available in Spanish.*

## Gas Turbine Fundamentals (Combined/Simple Cycle)

MODULES: **5** | CODE: GEN00A\_0301\_B1 | LENGTH ⌚ ⌚  
 Simple Cycle, Air Path, Hot Gas Path, Turbine Section, Auxiliary Equipment  
*Also available in Spanish.*

## Generator Fundamentals (Combined/Simple Cycle)

MODULES: **7** | CODE: GEN00A\_0601\_B1 | LENGTH ⌚ ⌚  
 Overview, Design, Auxiliary Systems, Energizing, MW and MVAR, Load Control, Fault Protection  
*Also available in Spanish.*

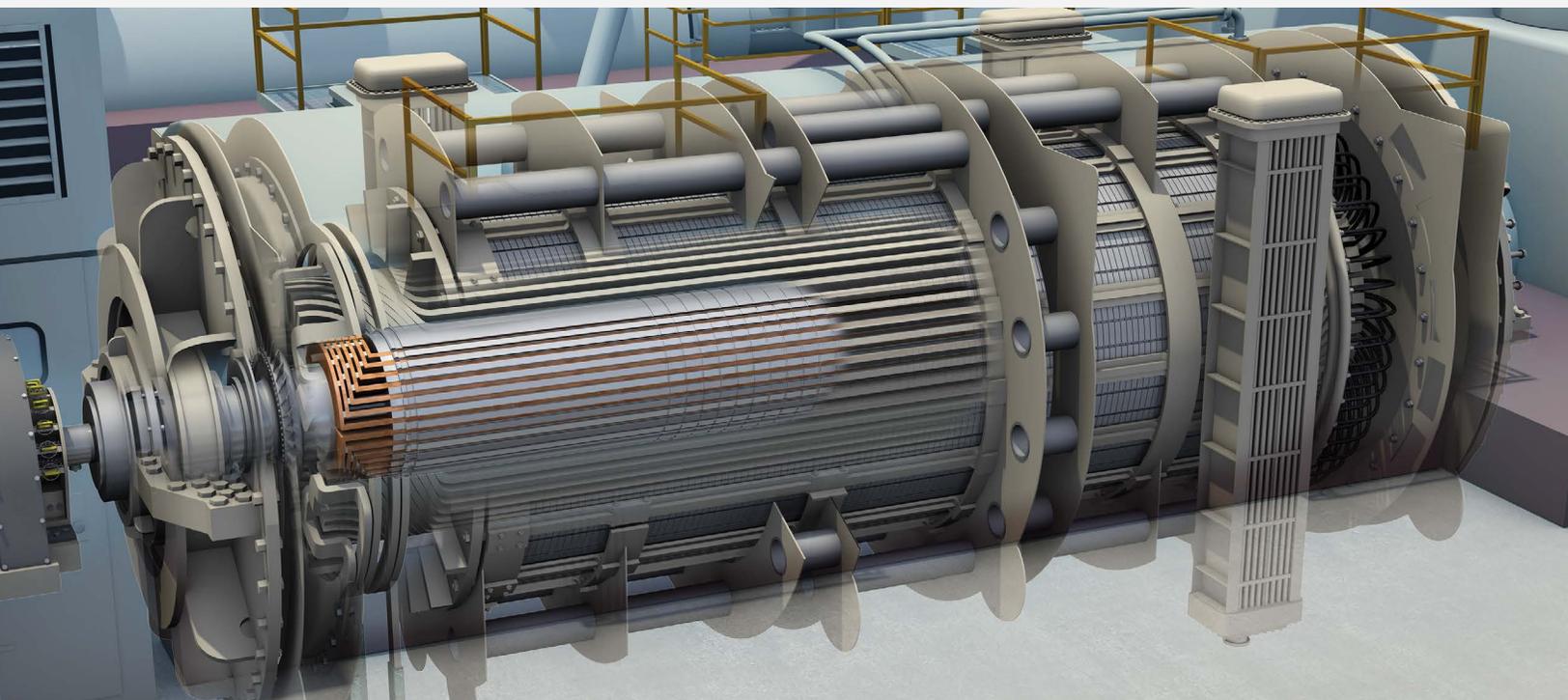
## Heat Recovery Steam Generator (HRSG) Fundamentals

MODULES: **7** | CODE: GEN00A\_0401\_B1 | LENGTH ⌚ ⌚  
 Overview, Steam, Feedwater, Level Control, Emission Reduction, Equipment, Operation  
*Also available in Spanish.*

## Steam Turbine Fundamentals (Combined Cycle)

MODULES: **4** | CODE: GEN00A\_0501\_B1 | LENGTH ⌚ ⌚  
 Design, Components, Operation, Condensate  
*Also available in Spanish.*

COURSE LENGTH ⌚ < 1 HR ⌚ ⌚ 1–2 HRS ⌚ ⌚ ⌚ 2–4 HRS ⌚ ⌚ ⌚ ⌚ FULL DAY





# Generators

## [GE 7EA Gas Turbine Generator](#)

MODULES: **1** | CODE: GEN01A\_0512\_B1 | LENGTH   
Generator Overview

## [GE 7FA Gas Turbine Generator](#)

MODULES: **10** | CODE: GEN01A\_0212\_B1 | LENGTH     
Overview, Generator Fault Protection, Generator Seal Oil System, Generator Hydrogen System, Stator Design, Rotor Design, Power Generation, Reactive Power, LCI Overview, LCI Operation  
*Also available in Spanish.*

## [GE 7FA.05 Gas Turbine Generator](#)

MODULES: **10** | CODE: GEN01A\_1612\_B1 | LENGTH     
Overview, Hydrogen Gas System, Seal Oil System, Stator Design, Rotor Design, Power Generation, Reactive Power, Generator Fault Protection, LCI Overview, LCI Operation

## [GE A10 Steam Turbine Generator](#)

MODULES: **1** | CODE: GEN01A\_1432\_B1 | LENGTH   
Generator Overview

## [GE LM2500 Gas Turbine Generator](#)

MODULES: **1** | CODE: GEN01A\_1212\_B1 | LENGTH   
Generator Overview

## [GE LM6000 Gas Turbine Generator](#)

MODULES: **1** | CODE: GEN01A\_0612\_B1 | LENGTH   
Generator Overview

## [GE LMS100 Gas Turbine Generator](#)

MODULES: **1** | CODE: GEN01A\_0912\_B1 | LENGTH   
Generator Overview

## [MHI Steam Turbine Generator](#)

MODULES: **1** | CODE: GEN01A\_0132\_B1 | LENGTH   
Generator Overview

## [Siemens SGT800 Gas Turbine Generator](#)

MODULES: **1** | CODE: GEN01A\_0712\_B1 | LENGTH   
Generator Overview

## [Siemens SST6-5000 Steam Turbine Generator](#)

MODULES: **1** | CODE: GEN01A\_1632\_B1 | LENGTH   
Generator Overview

## [Siemens V84.2 Gas Turbine Generator](#)

MODULES: **1** | CODE: GEN01A\_0812\_B1 | LENGTH   
Generator Overview

## [Toshiba Steam Turbine Generator](#)

MODULES: **5** | CODE: GEN01A\_1032\_B1 | LENGTH    
Generator Overview, Hydrogen System, Seal Oil System, Hydrogen Purge, Hydrogen Fill

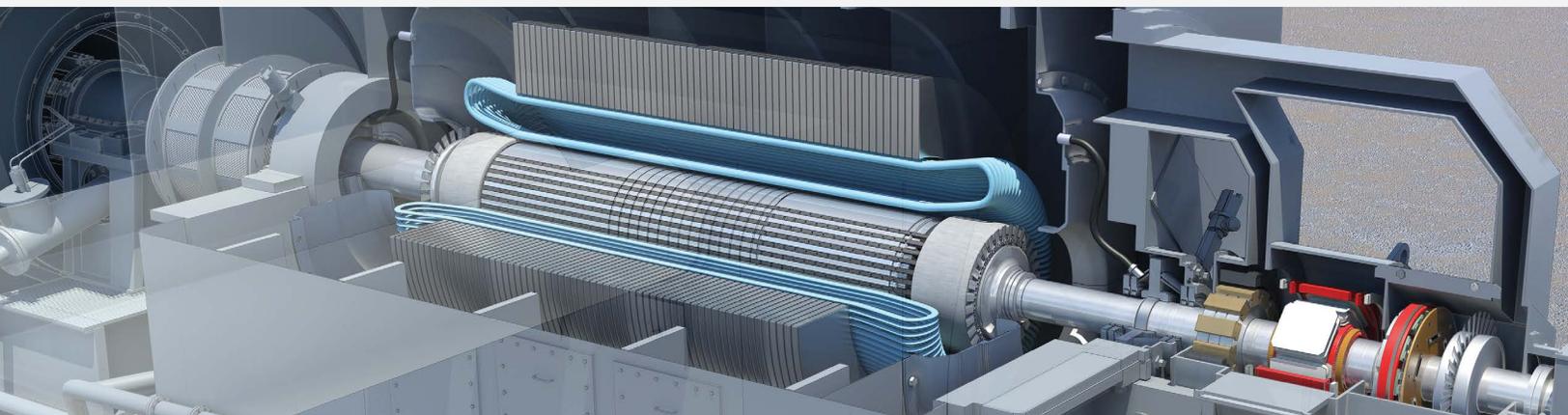
## [Toshiba TCDF-40 Steam Turbine Generator](#)

MODULES: **5** | CODE: GEN01A\_1732\_B1 | LENGTH   
Generator Overview, Generator Hydrogen System, Generator Seal Oil System, Generator Hydrogen Purge, Generator Hydrogen Fill

## [Westinghouse Generator Seal Oil](#)

MODULES: **3** | CODE: GEN01A\_1131\_B1 | LENGTH   
Overview, Hydrogen Side Operation, Air Side Operation

COURSE LENGTH  < 1 HR   1–2 HRS    2–4 HRS    FULL DAY



# Heat Recovery Steam Generators (HRSG)

## NEM 3-Drum HRSG

MODULES: **9** | CODE: GEN01A\_0121\_B1 | LENGTH   
 General Design, Water Flowpaths, Steam Flowpaths, Selective Catalytic Reduction System, Condensate Supply, LP Steam, BFW Pumps, IP Steam, Main Steam Flow

## Nooter-Eriksen 3-Drum HRSG

MODULES: **7** | CODE: GEN01A\_0221\_B1 | LENGTH   
 Overview, LP System Overview, IP System Overview, HP System Overview, Emissions & SCR System, Blowdown System Overview, Duct Burners Overview

## Nooter-Eriksen 3-Pressure HRSG

MODULES: **8** | CODE: GEN01A\_1721\_B1 | LENGTH   
 Overview, Low Pressure (LP) System, Intermediate Pressure (IP) System, High Pressure (HP) System, Emissions Reduction, Blowdown System, Duct Burners, Steam Plant

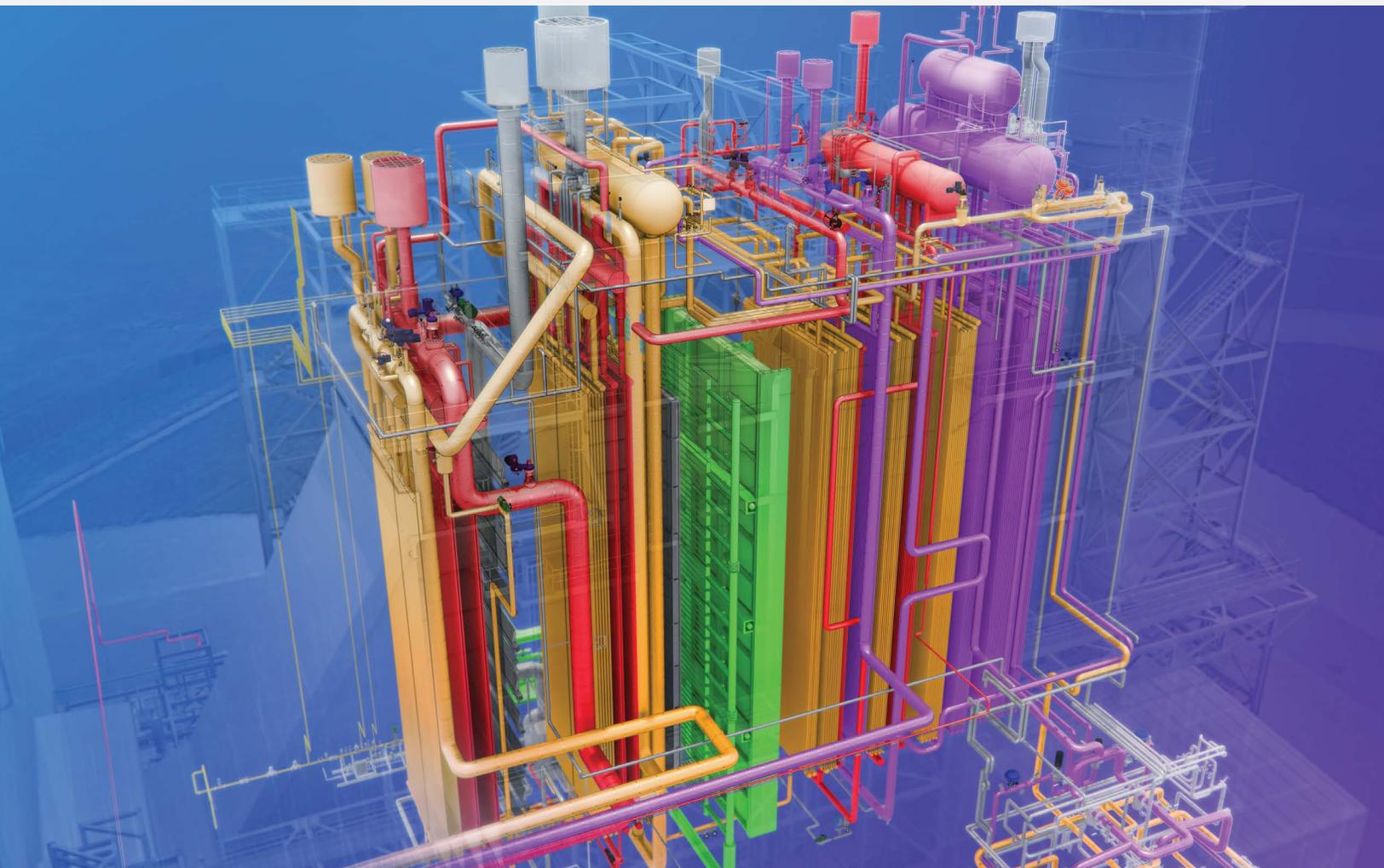
## Vogt 2-Drum HRSG

MODULES: **6** | CODE: GEN01A\_0421\_B1 | LENGTH   
 HRSG Overview, IP System Overview, HP System Overview, Emission & SCR System Overview, Blowdown System Overview, Duct Burner System Overview

## Vogt 3-Drum HRSG

MODULES: **7** | CODE: GEN01A\_1621\_B1 | LENGTH   
 Overview, LP Steam and Feedwater, IP Steam, HP Steam, Emission Reduction, Blowdown System, Steam Plant

COURSE LENGTH < 1 HR 1–2 HRS 2–4 HRS FULL DAY





# Maintenance

## Bearings

MODULES: **5** | CODE: GEN08A\_012\_B1 | LENGTH    
 Overview, Elliptical Bearing, Tilt Pad Journal Bearing, Thrust Bearing, Bearing Instrumentation

## Boiler Feedwater Pump

MODULES: **9** | CODE: GEN08A\_016\_B1 | LENGTH     
 Overview, Boiler Feed Pump Construction, Pump Accessories, Operation, Performance Curves, Troubleshooting, Bearing Replacement, Boiler Feed Pump Disassembly, Boiler Feed Pump Reassembly

## Boiler Feedwater Pump with Hydraulic Coupling

MODULES: **7** | CODE: GEN08A\_018\_B1 | LENGTH     
 Design and Operation, Pump Curves, Operational Checks and Alarms, Maintenance, Bearing Replacement, Pump Disassembly, Pump Reassembly

## GE 7FA Gas Turbine Major Inspections

MODULES: **9** | CODE: GEN08A\_015\_B1 | LENGTH     
 Overview, HGP Clearance Measurements, HGP Turbine Casing Removal, HGP Concentricity, Rotor Float, and Clearance Checks, HGP Component Removal, HGP Inspection, HGP Turbine Section Assembly, HGP Assembly Clearances, HGP Combustion Section Assembly

## GE 7FA Gas Turbine Routine Maintenance

MODULES: **6** | CODE: GEN08A\_014\_B1 | LENGTH     
 Overview, Preventative Maintenance, Combustion Inspection Overview, Pre-Maintenance Procedures, Combustion System Inspection, Combustion System Reassembly

## Heat Exchangers

MODULES: **7** | CODE: GEN08A\_010\_B1 | LENGTH    
 Overview, Plate Heat Exchangers, Plate Heat Exchanger Instrumentation, Main Condenser Water Side, Main Condenser Steam Side, Deaerator Overview, Shell and Tube Heat Exchanger

## Hydraulic Coupling for Boiler Feedwater Pump

MODULES: **4** | CODE: GEN08A\_019\_B1 | LENGTH    
 Overview, Hydraulic Coupling Design and Operation, Hydraulic Coupling Preventive Maintenance, Hydraulic Coupling Troubleshooting and Action

## Laser Alignment

MODULES: **7** | CODE: GEN08A\_013\_B1 | LENGTH    
 Laser Alignment Overview, Soft Foot and Runout, Angularity and Offset, VibraAlign Setup, VibraAlign Measure, Rotalign Setup, Rotalign Measure

## Limitorque Actuator

MODULES: **5** | CODE: GEN08A\_017\_B1 | LENGTH    
 Overview, Actuator Operation, Limit Switch Setting, Torque Switch Setting, Troubleshooting

## Logic Diagrams

MODULES: **4** | CODE: GEN01A\_1755\_B1 | LENGTH    
 Overview, Logic Diagrams, Accessing Diagrams, HP Bypass Example

## MagneBlast 4160V Breaker

MODULES: **2** | CODE: GEN02A\_0144\_B1 | LENGTH   
 Overview, Circuit Breaker Operation

## Maintenance - Electrical Switchgear

MODULES: **10** | CODE: GEN08A\_020\_B1 | LENGTH      
 Electrical Switchgear Overview, 6.9kV Breaker Design and Operation, 6.9kV Switchgear Protection, 6.9kV Switchgear Maintenance, 6.9kV Switchgear Troubleshooting, 480V Switchgear Overview, 480V Breaker Design and Operation, 480V Switchgear Protection, 480V Switchgear Maintenance, 480V High Resistance Ground System

## REXA Actuators

MODULES: **7** | CODE: GEN08A\_011\_B1 | LENGTH    
 Overview, Linear Actuator, Rotary and Direct Actuators, Disassembly, Assembly, Setup for Operation, Mechanical Troubleshooting

# Reciprocating Engines

## Wartsila 50SG Reciprocating Engine

MODULES: **7** | CODE: GEN01A\_1811\_B1 | LENGTH  

Engine Overview, Charge Air System, Fuel System, Engine Operation, Lube Oil System, Exhaust and SCR, Generator Overview

# Steam Turbines

## GE A10 Steam Turbine

MODULES: **8** | CODE: GEN01A\_1431\_B1 | LENGTH  

Overview, High Pressure Section, IP-LP Pressure Section, Lube Oil System, EHC System, Steam Seal System, Generator Overview, Steam Turbine Start

## GE D11 Steam Turbine

MODULES: **6** | CODE: GEN01A\_0231\_B1 | LENGTH  

Overview, High Pressure and Cold Reheat Steam, Hot Reheat Steam, Low Pressure Steam, Lube Oil System, Steam Turbine Start

## GE D11 Steam Turbine Control Screen Familiarization

MODULES: **5** | CODE: GEN01A\_0231\_B2 | LENGTH  

D-11 Mark VI Control Screen Familiarization, D-11 Mark VI Control Group Familiarization, D-11 Mark VI Monitor Group Familiarization, D-11 Mark VI Auxiliary Group Familiarization, D-11 Mark VI Test Group Familiarization

## MHI Steam Turbine

MODULES: **12** | CODE: GEN01A\_0131\_B1 | LENGTH  

Overview, Main Steam Flow, Reheat Steam Flow, Low Pressure Steam Flow, Main Steam Components, Reheat Steam Components, Low Pressure Steam Components, Generator Overview, Lube Oil System, Turning Gear, Control Oil, Gland Steam Condenser

## Mitsubishi TC1F Steam Turbine

MODULES: **4** | CODE: GEN01A\_0431\_B1 | LENGTH 

Steam Turbine Overview, Steam Turbine High Pressure Section, Steam Turbine IP-LP Pressure Section, Steam Turbine Lube Oil System

## Siemens SST6-5000 Steam Turbine

MODULES: **8** | CODE: GEN01A\_1631\_B1 | LENGTH   

Overview, HP Turbine Section, IP Turbine Section, LP Turbine Section, Seal Steam System, Lubricating Oil System, Hydraulic Oil System, Steam Turbine Start

## Siemens SST6-5000 Steam Turbine Control Screen Familiarization

MODULES: **17** | CODE: GEN01A\_1631\_B2 | LENGTH   

Preconditions for Starting Subgroup Control, Controller, Stop Sequence, Lubricating Oil System, Control Fluids, Seal Steam System, Steam Turbine and Valve Drains, Bearing Temperature and Vibration, Startup and Temperature, Protection 1, Protection 2, Generator Excitation, Power, Generator Temperatures, Generator Protection, Automatic Turbine Tester, Overview

## Toshiba Steam Turbine

MODULES: **12** | CODE: GEN01A\_1031\_B1 | LENGTH  

Overview, HP Turbine Section, IP Turbine Section, LP Turbine Section, Lube Oil System, EHC System, Seal Steam System, Generator Overview, Hydrogen Purge, Hydrogen System, Seal Oil System, Hydrogen Fill

## Toshiba TCDF-40 Steam Turbine

MODULES: **12** | CODE: GEN01A\_1731\_B1 | LENGTH   

Overview, High Pressure (HP) Section, Intermediate Pressure (IP) Turbine Section, Low Pressure (LP) Turbine Section, Lube Oil System, Hydraulic Oil System, Steam Seal System, Generator Overview, Generator Hydrogen System, Generator Seal Oil System, Generator Hydrogen Purge, Generator Hydrogen Fill

## Toshiba TCDF-40 Steam Turbine Screen Familiarization

MODULES: **19** | CODE: GEN01A\_1731\_B2 | LENGTH   

User Interface Constructor (UIC) Screen, Steam Turbine (ST) Automatic Start-up Screen, Automatic Start-up Inhibit Condition Screen, Start-Up Inhibit Condition Screen, Speed-Up Inhibit Condition Screen, Synchronize Inhibit Condition Screen, ST Manual Start-Up Screen, Trip Monitor Screen, ST Load Control Screen, ST Pressure Control Screen, ST Turbine Overview Screen, Redundant Sensors Monitor, ST Bearing & TSI Monitor Screen, ST Mismatch Chart Monitor Screen, ST Lube Oil System Screen, ST EHC Oil System Screen, ST Gland Steam & Prewarming System Screen, ST Drain Valve Screen, ST LO Motor Interface Plates

# Water Treatment

## Ion Exchange System Fundamentals

MODULES: **10** | CODE: GEN09A\_0951\_B1 | LENGTH     
 Cycle Makeup IX Overview, Activated Carbon Filter Service Cycle, Activated Carbon Filter Regeneration, Cation Vessel Service Flow, Cation Exchanger Regeneration, Forced Draft Degasifier, Anion Vessel Service Flow, Anion Exchanger Regeneration, Mixed Bed Exchanger Vessel Service Flow, Mixed Bed Exchanger Regeneration

## Ion Exchange System Operation

MODULES: **6** | CODE: GEN09A\_0952\_B1 | LENGTH    
 Overview, Activated Carbon Filter Flow, Cation System, Anion System, Mixed Bed Vessels, Deionized Neutralization System

## Recycled Water Facility

MODULES: **3** | CODE: GEN01A\_0361\_B1 | LENGTH   
 Overview, Clarifier Overview, Sand Filters Overview

## Reverse Osmosis Fundamentals

MODULES: **10** | CODE: GEN09A\_0903\_B1 | LENGTH    
 Introduction to Reverse Osmosis, Osmotic Forces, Hydrostatic Head, Osmotic Pressure, Reversing Osmosis, RO Element Construction, RO Pressure Vessel Construction, RO Flow Considerations, Typical RO System, System Configurations

## Reverse Osmosis System Operation

MODULES: **7** | CODE: GEN09A\_0941\_B1 | LENGTH   
 Raw Water Supply, Ultrafilters and Filtrate Buffer Tank, Buffer Tank Supply to RO, Operational Cycle Flowpaths for RO, Degasifier, Permeate Buffer and Storage Tank, Chemical Cleaning

## Water Treatment Plant (Reverse Osmosis)

MODULES: **4** | CODE: GEN01A\_1760\_B1 | LENGTH    
 Overview, Pre-RO Equipment, Reverse Osmosis Skid, Operation

## Water Treatment Plant (Reverse Osmosis w/EDI Modules)

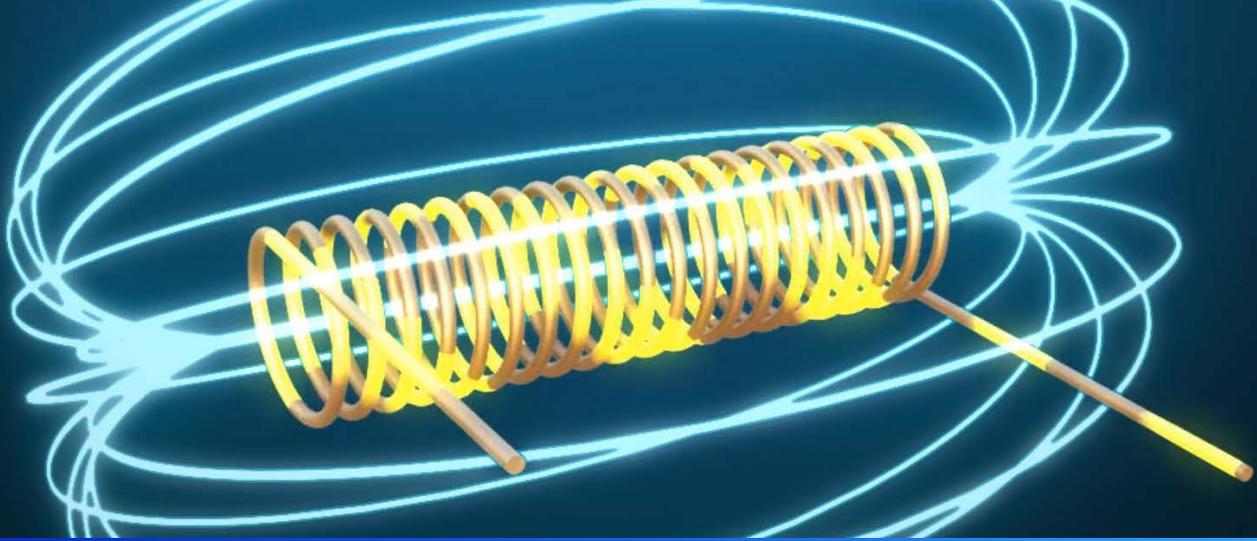
MODULES: **4** | CODE: GEN01A\_1660\_B1 | LENGTH   
 Water Treatment Overview, RO Flowpaths, EDI Modules and Vessels, Operation

## Zero Liquid Discharge (ZLD) System

MODULES: **4** | CODE: GEN01A\_0346\_B1 | LENGTH   
 Overview, Brine Concentrator, Crystallizer, Filter Press

COURSE LENGTH  < 1 HR   1—2 HRS    2—4 HRS    FULL DAY





## POWER GENERATION

# NUCLEAR POWER

### SECTIONS



[Fundamentals](#)



[Maintenance](#)



[Water Treatment](#)

### EQUIPMENT & PROCESSES

- Heat Exchangers
- Actuators
- Reverse Osmosis
- Ion Exchange
- Auxiliary Boilers
- ... and more



# Fundamentals

## Basic Electrical Fundamentals

MODULES: **16** | CODE: [GEN00A\\_0100\\_B1](#) | LENGTH   

Atoms and Electrons, Voltage AC and DC, Resistance, Current, Power, Capacitors, Inductors, Transformers, Instrument Transformers PT / CT / CCVT, Power Generation, Conductors, Cables and Insulators, Frequency, Impedance, Ohm's and Kirchhoff's Laws, Noise and Harmonics, Grounds and Neutrals

## Maintenance

### Bearings

MODULES: **5** | CODE: [GEN08A\\_012\\_B1](#) | LENGTH  

Overview, Elliptical Bearing, Tilt Pad Journal Bearing, Thrust Bearing, Bearing Instrumentation

### Heat Exchangers

MODULES: **7** | CODE: [GEN08A\\_010\\_B1](#) | LENGTH  

Overview, Plate Heat Exchangers, Plate Heat Exchanger Instrumentation, Main Condenser Water Side, Main Condenser Steam Side, Deaerator Overview, Shell and Tube Heat Exchanger

### Laser Alignment

MODULES: **7** | CODE: [GEN08A\\_013\\_B1](#) | LENGTH  

Laser Alignment Overview, Soft Foot and Runout, Angularity and Offset, VibraAlign Setup, VibraAlign Measure, Rotalign Setup, Rotalign Measure

### Limitorque Actuator

MODULES: **5** | CODE: [GEN08A\\_017\\_B1](#) | LENGTH  

Overview, Actuator Operation, Limit Switch Setting, Torque Switch Setting, Troubleshooting

### Logic Diagrams

MODULES: **4** | CODE: [GEN01A\\_1755\\_B1](#) | LENGTH  

Overview, Logic Diagrams, Accessing Diagrams, HP Bypass Example

### MagneBlast 4160V Breaker

MODULES: **2** | CODE: [GEN02A\\_0144\\_B1](#) | LENGTH 

Overview, Circuit Breaker Operation

### Maintenance - Electrical Switchgear

MODULES: **10** | CODE: [GEN08A\\_020\\_B1](#) | LENGTH    

Electrical Switchgear Overview, 6.9kV Breaker Design and Operation, 6.9kV Switchgear Protection, 6.9kV Switchgear Maintenance, 6.9kV Switchgear Troubleshooting, 480V Switchgear Overview, 480V Breaker Design and Operation, 480V Switchgear Protection, 480V Switchgear Maintenance, 480V High Resistance Ground System

### REXA Actuators

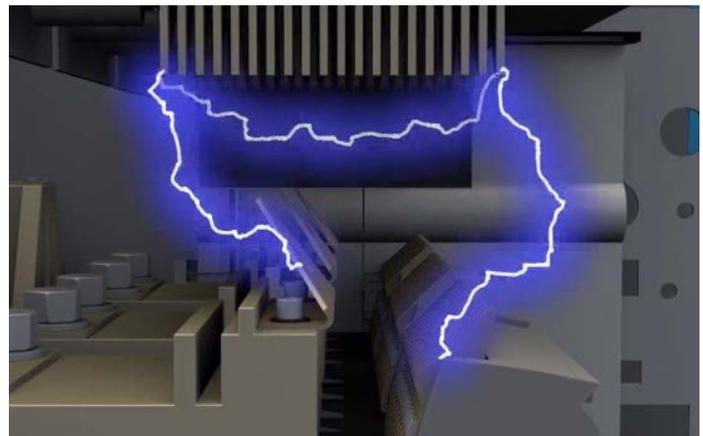
MODULES: **7** | CODE: [GEN08A\\_011\\_B1](#) | LENGTH  

Overview, Linear Actuator, Rotary and Direct Actuators, Disassembly, Assembly, Setup for Operation, Mechanical Troubleshooting

### Rotary Screw Air Compressor

MODULES: **3** | CODE: [GEN02A\\_0124\\_B1](#) | LENGTH 

Overview, Air and Oil Systems, Operations



# Water Treatment

## Ion Exchange System Fundamentals

MODULES: **10** | CODE: GEN09A\_0951\_B1 | LENGTH   
 Cycle Makeup IX Overview, Activated Carbon Filter Service Cycle, Activated Carbon Filter Regeneration, Cation Vessel Service Flow, Cation Exchanger Regeneration, Forced Draft Degasifier, Anion Vessel Service Flow, Anion Exchanger Regeneration, Mixed Bed Exchanger Vessel Service Flow, Mixed Bed Exchanger Regeneration

## Ion Exchange System Operation

MODULES: **6** | CODE: GEN09A\_0952\_B1 | LENGTH   
 Overview, Activated Carbon Filter Flow, Cation System, Anion System, Mixed Bed Vessels, Deionized Neutralization System

## Reverse Osmosis Fundamentals

MODULES: **10** | CODE: GEN09A\_0903\_B1 | LENGTH   
 Introduction to Reverse Osmosis, Osmotic Forces, Hydrostatic Head, Osmotic Pressure, Reversing Osmosis, RO Element Construction, RO Pressure Vessel Construction, RO Flow Considerations, Typical RO System, System Configurations

## Reverse Osmosis System Operation

MODULES: **7** | CODE: GEN09A\_0941\_B1 | LENGTH   
 Raw Water Supply, Ultrafilters and Filtrate Buffer Tank, Buffer Tank Supply to RO, Operational Cycle Flowpaths for RO, Degasifier, Permeate Buffer and Storage Tank, Chemical Cleaning

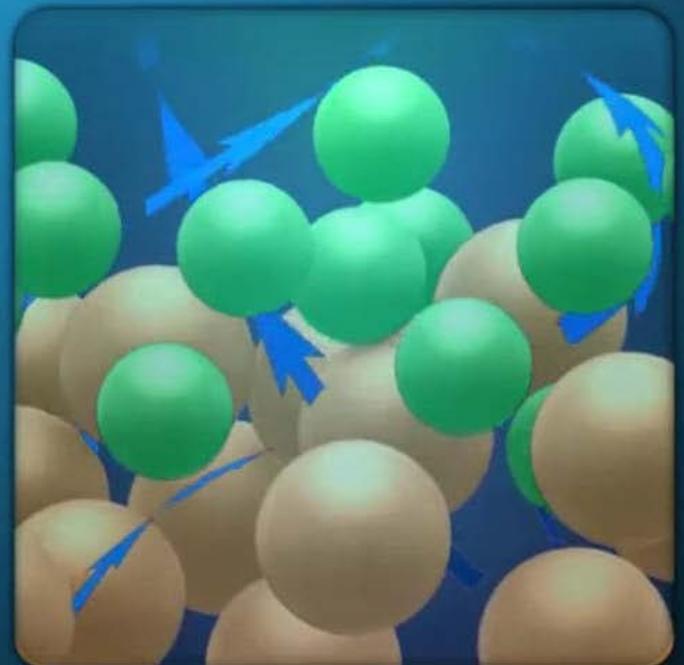
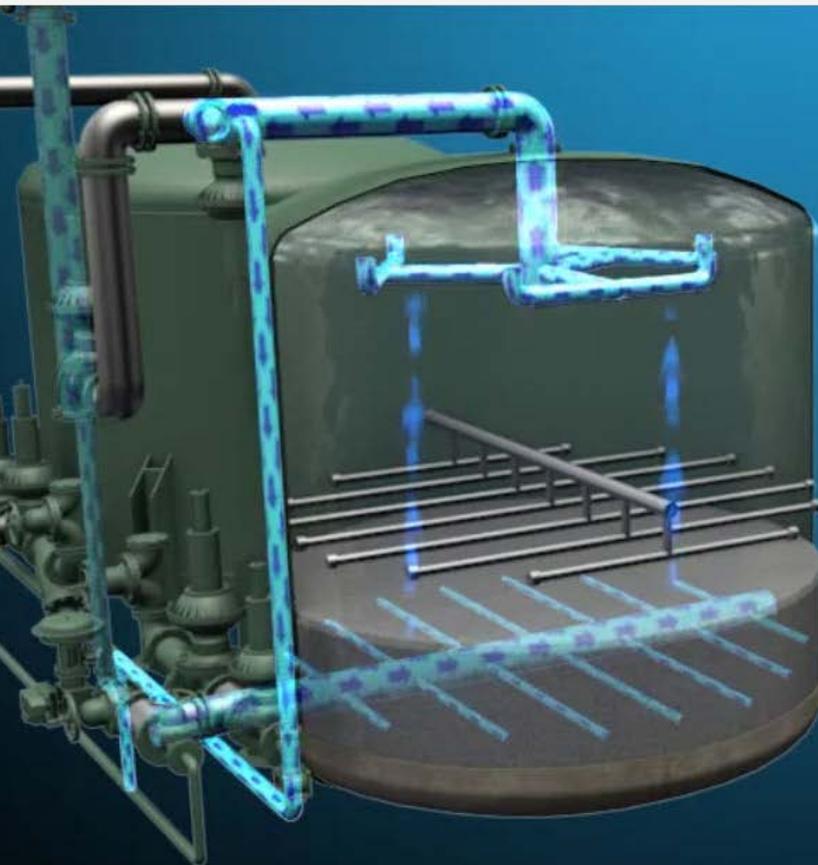
## Water Treatment Plant (Reverse Osmosis)

MODULES: **4** | CODE: GEN01A\_1760\_B1 | LENGTH   
 Overview, Pre-RO Equipment, Reverse Osmosis Skid, Operation

## Water Treatment Plant (Reverse Osmosis w/EDI Modules)

MODULES: **4** | CODE: GEN01A\_1660\_B1 | LENGTH   
 Water Treatment Overview, RO Flowpaths, EDI Modules and Vessels, Operation

COURSE LENGTH < 1 HR 1–2 HRS 2–4 HRS FULL DAY



**Reclassify:**  
**Smaller beads travel to top of resin bed**



## POWER GENERATION



# RENEWABLE & ALTERNATIVE ENERGY

### SECTIONS

 [Battery Energy Storage Systems \(BESS\)](#)

 [Solar](#)

 [Wind](#)

### EQUIPMENT & PROCESSES

- Gearboxes
- Inverters
- Maintenance Testing
- Substation
- Weather Stations
- ... and more



# Battery Energy Storage Systems (BESS)

## Basic Electrical Fundamentals

MODULES: **16** | CODE: GEN00A\_0100\_B1 | LENGTH Atoms and Electrons, Voltage AC and DC, Resistance, Current, Power, Capacitors, Inductors, Transformers, Instrument Transformers PT / CT / CCVT, Power Generation, Conductors, Cables and Insulators, Frequency, Impedance, Ohm's and Kirchhoff's Laws, Noise and Harmonics, Grounds and Neutrals

## Battery Energy Storage System Fundamentals

MODULES: **9** | CODE: GEN04A\_0311\_B1 | LENGTH Overview, Battery Module, Battery Assemblies, Inverters, Inverter Modules, Battery Charging, Electrical Distribution, Fault Protection, BESS Safety

## Fault Protection Relays

MODULES: **4** | CODE: GEN04A\_7119\_B1 | LENGTH Control Building Overview, Fault Protection, Relay Event Files, Battery Charger  
*In development*

## Inverter Fundamentals

MODULES: **11** | CODE: GEN04A\_7113\_B1 | LENGTH Overview, PLC Hardware, Digital Devices, Analog Devices, Power Supplies, Breakers and Relays, IGBTs, AC Filters, Cooling, Sungrow Inverter, Ground Fault

## Maintenance Testing

MODULES: **3** | CODE: GEN04A\_7118\_B1 | LENGTH Multimeters and Ammeters, Infrared Scan, Insulation Test  
*In development*

## Medium Voltage Transformer Fundamentals

MODULES: **7** | CODE: GEN04A\_7114\_B1 | LENGTH Overview, Live Front-Dead Front, Nitrogen Blanket, Monitoring Gauges, T-Bodies and Surge Protectors, Oil Sampling, Oil Conditioning

## Renewable Interconnect/Substation Facility

MODULES: **4** | CODE: GEN04A\_0144\_B1 | LENGTH Overview, Collector Bus, Step-up Transformers, High Voltage Equipment

## SCADA Fundamentals

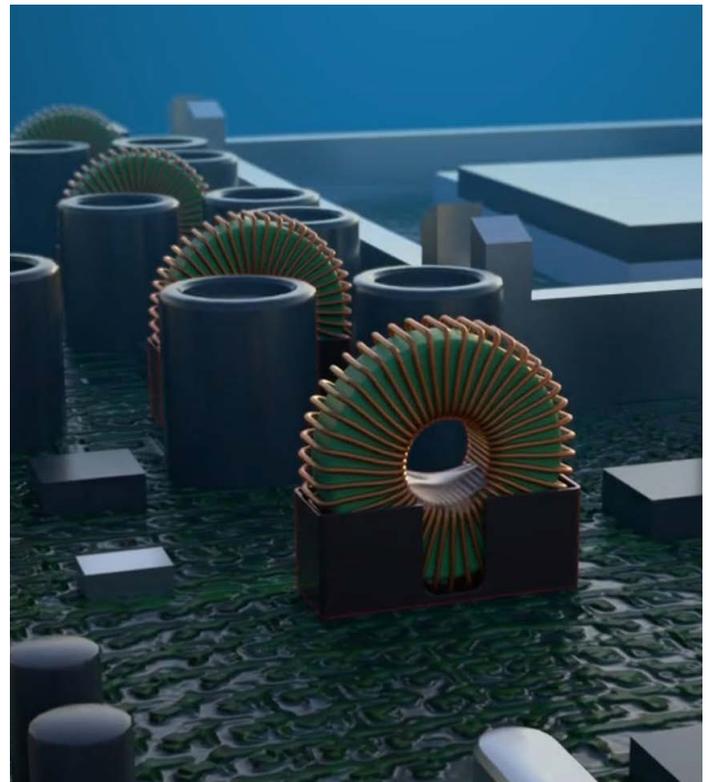
MODULES: **6** | CODE: GEN04A\_71XX\_B1 | LENGTH Overview, Network and Switches, Fiber and Ethernet, IP Addresses, Communication, Software Navigation  
*Planned*

## Substation Fundamentals

MODULES: **7** | CODE: GEN04A\_7115\_B1 | LENGTH Generator Step-up Transformer, Air Break Switches, Substation Breakers, Breaker Mechanism, Recloser, Ground Mounted Disconnect Switch, Capacitor and Reactor Banks

## Substation Safety

MODULES: **8** | CODE: GEN04A\_7110\_B1 | LENGTH Substation Safety, Approach Boundaries and Distances, Switchyard Overview, Electrical Drawings, Live Line Tools, Non-Contact Voltage Tester, Contact Voltage Tester, Protective Grounding  
*In development*



# Solar

## Basic Electrical Fundamentals

MODULES: **16** | CODE: GEN00A\_0100\_B1 | LENGTH     
 Atoms and Electrons, Voltage AC and DC, Resistance, Current, Power, Capacitors, Inductors, Transformers, Instrument Transformers PT / CT / CCVT, Power Generation, Conductors, Cables and Insulators, Frequency, Impedance, Ohm's and Kirchhoff's Laws, Noise and Harmonics, Grounds and Neutrals

## Fault Protection Relays

MODULES: **4** | CODE: GEN04A\_7119\_B1 | LENGTH    
 Control Building Overview, Fault Protection, Relay Event Files, and Battery Charger  
*In development*

## Inverter Fundamentals

MODULES: **11** | CODE: GEN04A\_7113\_B1 | LENGTH     
 Overview, PLC Hardware, Digital Devices, Analog Devices, Power Supplies, Breakers and Relays, IGBTs, AC Filters, Cooling, Sungrow Inverter, Ground Fault

## Maintenance Testing

MODULES: **3** | CODE: GEN04A\_7118\_B1 | LENGTH    
 Multimeters and Ammeters, Infrared Scan, Insulation Test  
*In development*

## Medium Voltage Transformer Fundamentals

MODULES: **7** | CODE: GEN04A\_7114\_B1 | LENGTH    
 Overview, Live Front-Dead Front, Nitrogen Blanket, Monitoring Gauges, T-Bodies and Surge Protectors, Oil Sampling, Oil Conditioning

## Photovoltaic Fundamentals

MODULES: **11** | CODE: GEN04A\_7112\_B1 | LENGTH     
 PV Panel, Whips and Harnesses, Harness Combiner Box, Bipolar vs Conventional, DC Health, DC Troubleshooting, DC Repair, Trackers, ATI Trackers, Technician Rounds, Meteorological Station

## Renewable Interconnect/Substation Facility

MODULES: **4** | CODE: GEN04A\_0144\_B1 | LENGTH     
 Overview, Collector Bus, Step-up Transformers, High Voltage Equipment

## SCADA Fundamentals

MODULES: **6** | CODE: GEN04A\_71XX\_B1 | LENGTH    
 Overview, Network and Switches, Fiber and Ethernet, IP Addresses, Communication, Software Navigation  
*Planned*

## Solar Generation Facility

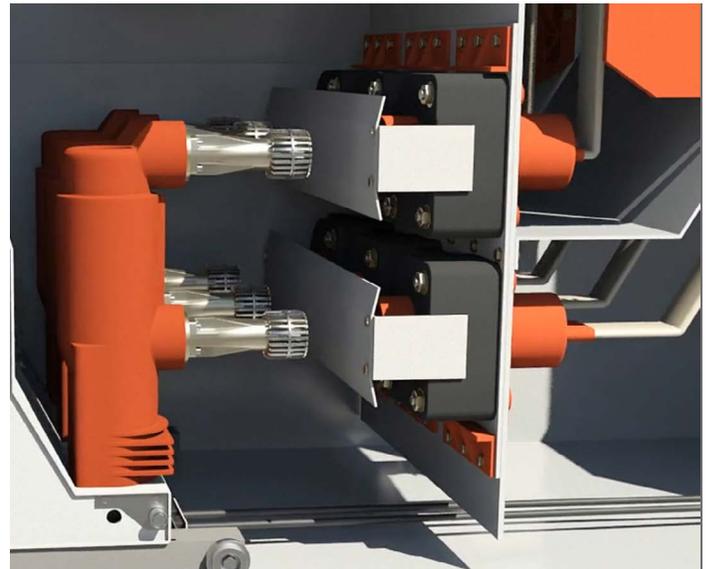
MODULES: **7** | CODE: GEN04A\_0711\_B1 | LENGTH     
 Overview, Photovoltaic Panel, Sunlight and Tracking, Inverter, Switchyard and Transformer, Capacitor and Reactor Banks, Fault Protection

## Substation Fundamentals

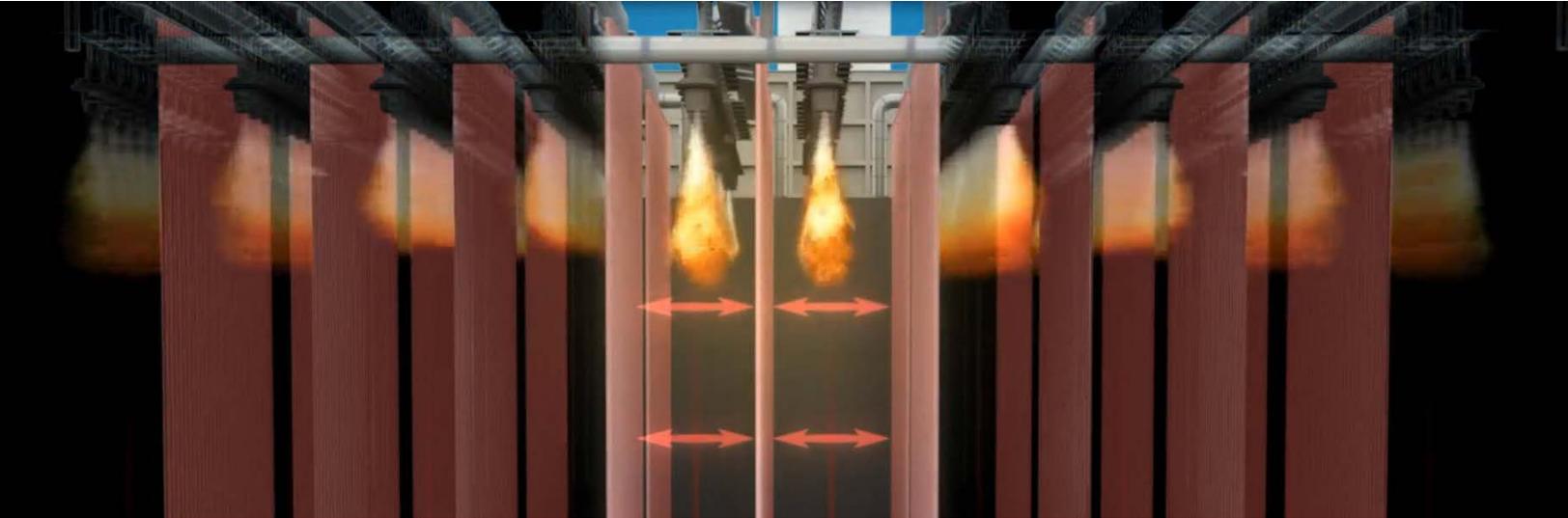
MODULES: **7** | CODE: GEN04A\_7115\_B1 | LENGTH     
 Generator Step-up Transformer, Air Break Switches, Substation Breakers, Breaker Mechanism, Recloser, Ground Mounted Disconnect Switch, Capacitor and Reactor Banks

## Substation Safety

MODULES: **8** | CODE: GEN04A\_7110\_B1 | LENGTH     
 Substation Safety, Approach Boundaries and Distances, Switchyard Overview, Electrical Drawings, Live Line Tools, Non-Contact Voltage Tester, Contact Voltage Tester, Protective Grounding  
*In development*







## OTHER INDUSTRIES



# CHEMICAL MANUFACTURING

### SECTIONS



[Chemical Processes](#)



[Fundamentals](#)



[Maintenance](#)



[Reciprocating Engines](#)



[Water Treatment](#)

### EQUIPMENT & PROCESSES

- Actuators
- Ammonia Plant
- Electrical Switchgear
- Heat Exchangers
- ... *and more*



# Chemical Processes

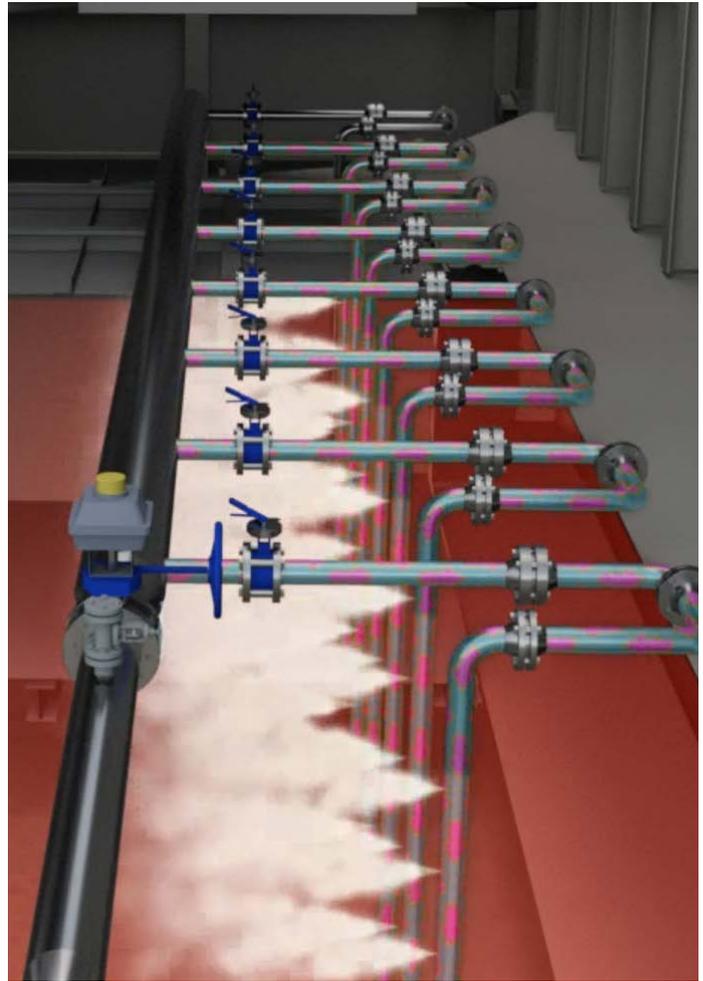
## Ammonia Plant

MODULES: 13 | CODE: GEN03A\_0101\_B1 | LENGTH ⌚ ⌚ ⌚  
 Ammonia Plant Overview, Natural Gas Supply, Steam Supply and Basic Primary Reformer, Combustion Air, Primary Reformer, Secondary Reformer, Shift Converters, CO2 Absorber, Benfield Solution System, Methanator, Synthesis Gas Loop, Ammonia Converters, Refrigeration Loop

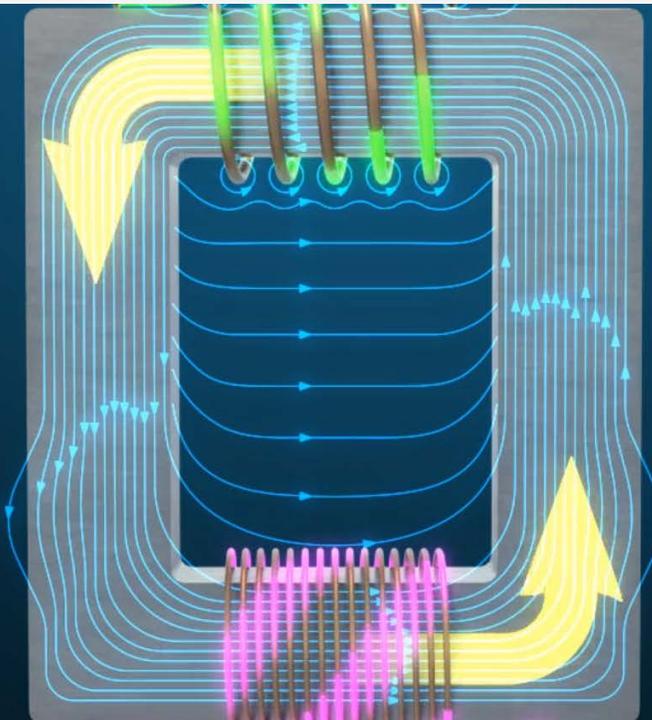
## Fundamentals

### Basic Electrical Fundamentals

MODULES: 16 | CODE: GEN00A\_0100\_B1 | LENGTH ⌚ ⌚ ⌚  
 Atoms and Electrons, Voltage AC and DC, Resistance, Current, Power, Capacitors, Inductors, Transformers, Instrument Transformers PT / CT / CCVT, Power Generation, Conductors, Cables and Insulators, Frequency, Impedance, Ohm's and Kirchhoff's Laws, Noise and Harmonics, Grounds and Neutrals



COURSE LENGTH ⌚ < 1 HR ⌚ ⌚ 1—2 HRS ⌚ ⌚ ⌚ 2—4 HRS ⌚ ⌚ ⌚ ⌚ FULL DAY



# ✓ Maintenance

## Bearings

MODULES: **5** | CODE: [GEN08A\\_012\\_B1](#) | LENGTH   
Overview, Elliptical Bearing, Tilt Pad Journal Bearing, Thrust Bearing, Bearing Instrumentation

## Heat Exchangers

MODULES: **7** | CODE: [GEN08A\\_010\\_B1](#) | LENGTH   
Overview, Plate Heat Exchangers, Plate Heat Exchanger Instrumentation, Main Condenser Water Side, Main Condenser Steam Side, Deaerator Overview, Shell and Tube Heat Exchanger

## Laser Alignment

MODULES: **7** | CODE: [GEN08A\\_013\\_B1](#) | LENGTH   
Laser Alignment Overview, Soft Foot and Runout, Angularity and Offset, VibraAlign Setup, VibraAlign Measure, Rotalign Setup, Rotalign Measure

## Limitorque Actuator

MODULES: **5** | CODE: [GEN08A\\_017\\_B1](#) | LENGTH   
Overview, Actuator Operation, Limit Switch Setting, Torque Switch Setting, Troubleshooting

## Logic Diagrams

MODULES: **4** | CODE: [GEN01A\\_1755\\_B1](#) | LENGTH   
Overview, Logic Diagrams, Accessing Diagrams, HP Bypass Example

## MagneBlast 4160V Breaker

MODULES: **2** | CODE: [GEN02A\\_0144\\_B1](#) | LENGTH   
Overview, Circuit Breaker Operation

## Maintenance - Electrical Switchgear

MODULES: **10** | CODE: [GEN08A\\_020\\_B1](#) | LENGTH   
Electrical Switchgear Overview, 6.9kV Breaker Design and Operation, 6.9kV Switchgear Protection, 6.9kV Switchgear Maintenance, 6.9kV Switchgear Troubleshooting, 480V Switchgear Overview, 480V Breaker Design and Operation, 480V Switchgear Protection, 480V Switchgear Maintenance, 480V High Resistance Ground System

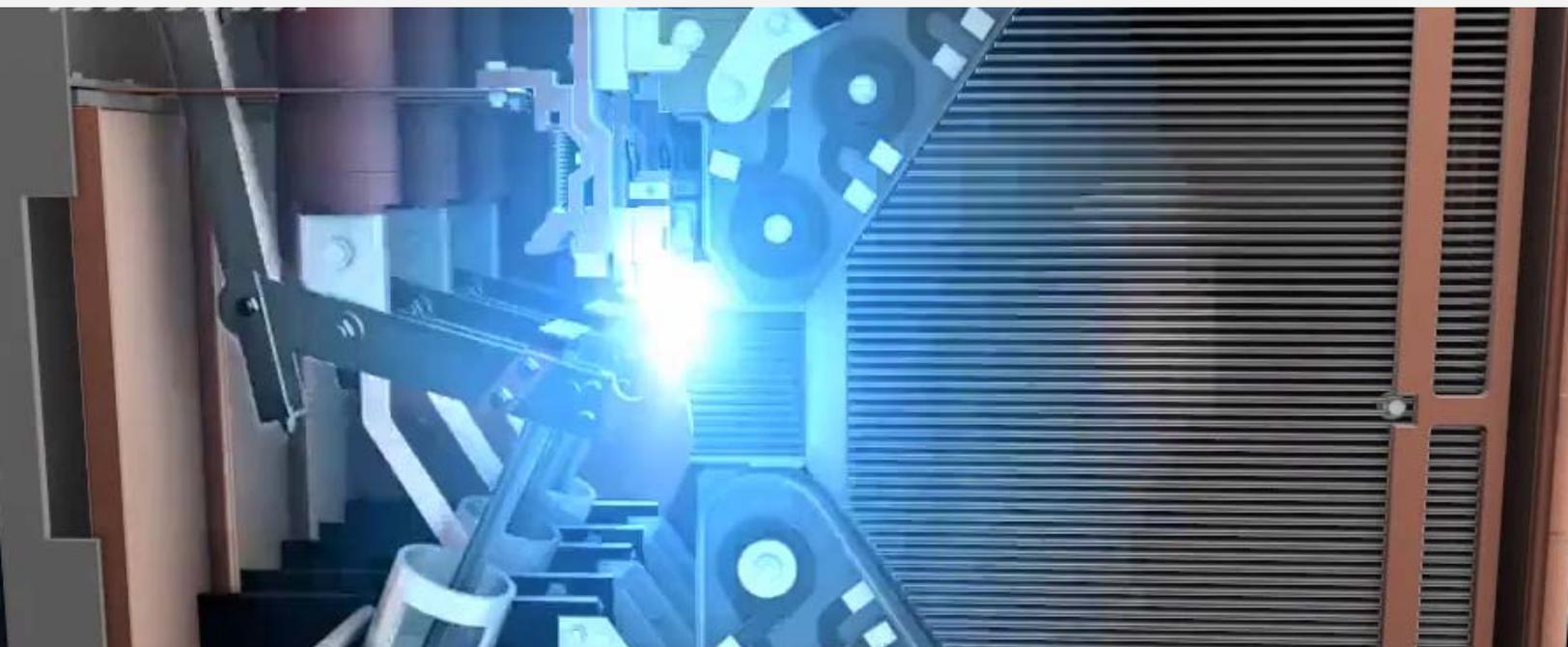
## REXA Actuators

MODULES: **7** | CODE: [GEN08A\\_011\\_B1](#) | LENGTH   
Overview, Linear Actuator, Rotary and Direct Actuators, Disassembly, Assembly, Setup for Operation, Mechanical Troubleshooting

## Rotary Screw Air Compressor

MODULES: **3** | CODE: [GEN02A\\_0124\\_B1](#) | LENGTH   
Overview, Air and Oil Systems, Operations

COURSE LENGTH < 1 HR 1–2 HRS 2–4 HRS FULL DAY



# Reciprocating Engines

## Wartsila 50SG Reciprocating Engine

MODULES: **7** | CODE: [GEN01A\\_1811\\_B1](#) | LENGTH   
 Engine Overview, Charge Air System, Fuel System, Engine Operation, Lube Oil System, Exhaust and SCR, Generator Overview

# Water Treatment

## Ion Exchange System Fundamentals

MODULES: **10** | CODE: [GEN09A\\_0951\\_B1](#) | LENGTH   
 Cycle Makeup IX Overview, Activated Carbon Filter Service Cycle, Activated Carbon Filter Regeneration, Cation Vessel Service Flow, Cation Exchanger Regeneration, Forced Draft Degasifier, Anion Vessel Service Flow, Anion Exchanger Regeneration, Mixed Bed Exchanger Vessel Service Flow, Mixed Bed Exchanger Regeneration

## Ion Exchange System Operation

MODULES: **6** | CODE: [GEN09A\\_0952\\_B1](#) | LENGTH   
 Overview, Activated Carbon Filter Flow, Cation System, Anion System, Mixed Bed Vessels, Deionized Neutralization System

## Recycled Water Facility

MODULES: **3** | CODE: [GEN01A\\_0361\\_B1](#) | LENGTH   
 Overview, Clarifier Overview, Sand Filters Overview

## Reverse Osmosis Fundamentals

MODULES: **10** | CODE: [GEN09A\\_0903\\_B1](#) | LENGTH   
 Introduction to Reverse Osmosis, Osmotic Forces, Hydrostatic Head, Osmotic Pressure, Reversing Osmosis, RO Element Construction, RO Pressure Vessel Construction, RO Flow Considerations, Typical RO System, System Configurations

## Reverse Osmosis System Operation

MODULES: **7** | CODE: [GEN09A\\_0941\\_B1](#) | LENGTH   
 Raw Water Supply, Ultrafilters and Filtrate Buffer Tank, Buffer Tank Supply to RO, Operational Cycle Flowpaths for RO, Degasifier, Permeate Buffer and Storage Tank, Chemical Cleaning

## Water Treatment Plant (Reverse Osmosis)

MODULES: **4** | CODE: [GEN01A\\_1760\\_B1](#) | LENGTH   
 Overview, Pre-RO Equipment, Reverse Osmosis Skid, Operation

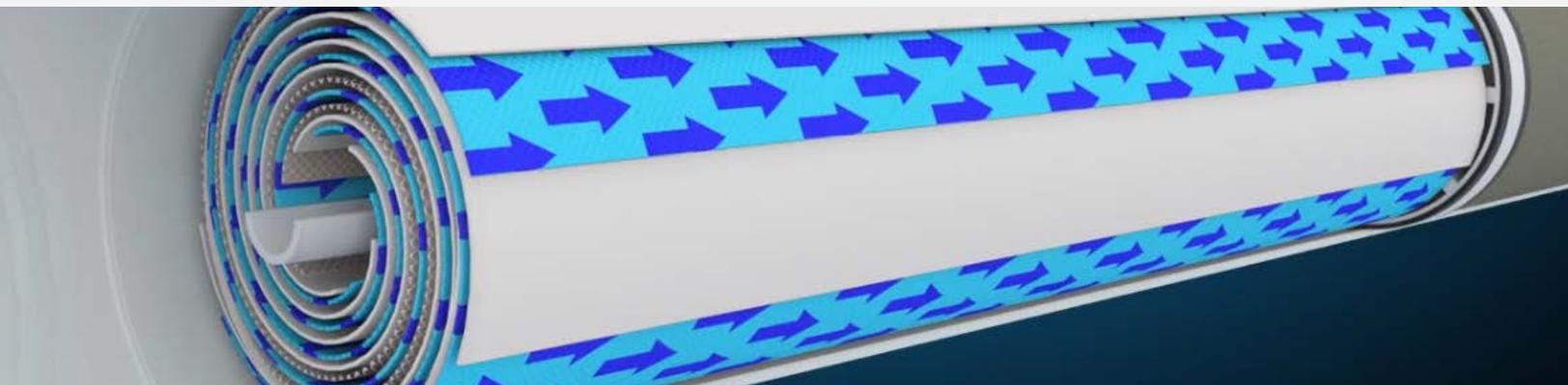
## Water Treatment Plant (Reverse Osmosis w/EDI Modules)

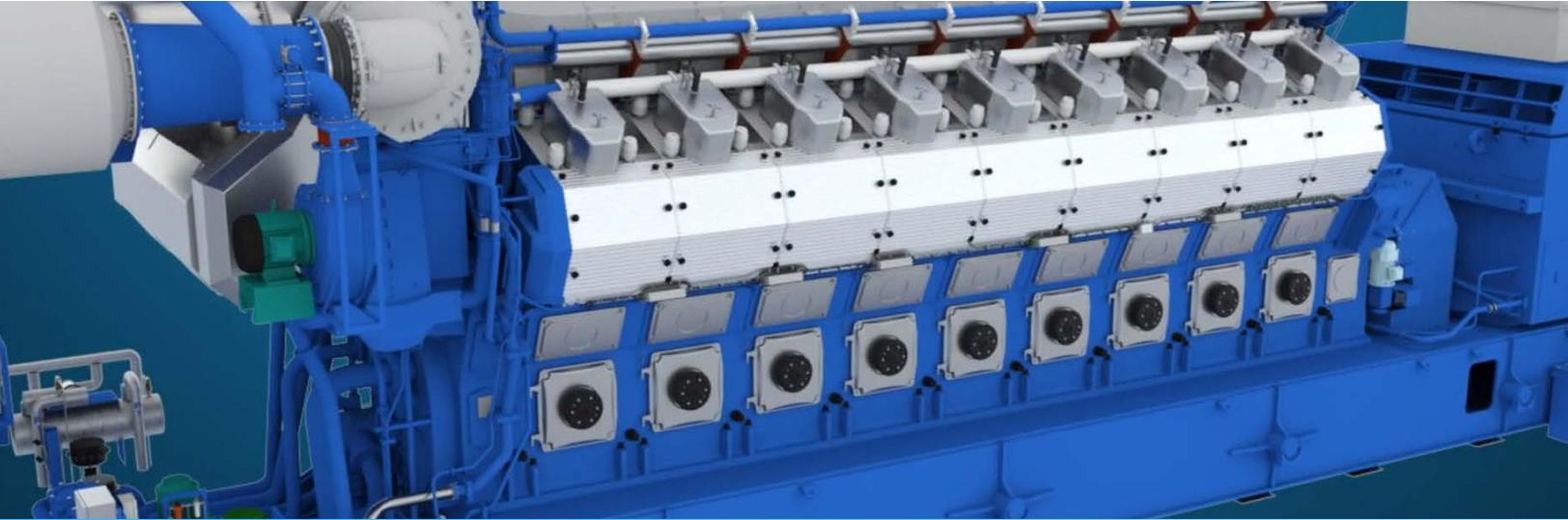
MODULES: **4** | CODE: [GEN01A\\_1660\\_B1](#) | LENGTH   
 Water Treatment Overview, RO Flowpaths, EDI Modules and Vessels, Operation

## Zero Liquid Discharge (ZLD) System

MODULES: **4** | CODE: [GEN01A\\_0346\\_B1](#) | LENGTH   
 Overview, Brine Concentrator, Crystallizer, Filter Press

COURSE LENGTH < 1 HR 1–2 HRS 2–4 HRS FULL DAY





## OTHER INDUSTRIES



# MARINE & AEROSPACE

### SECTIONS



[Fundamentals](#)



[Gas Turbines](#)



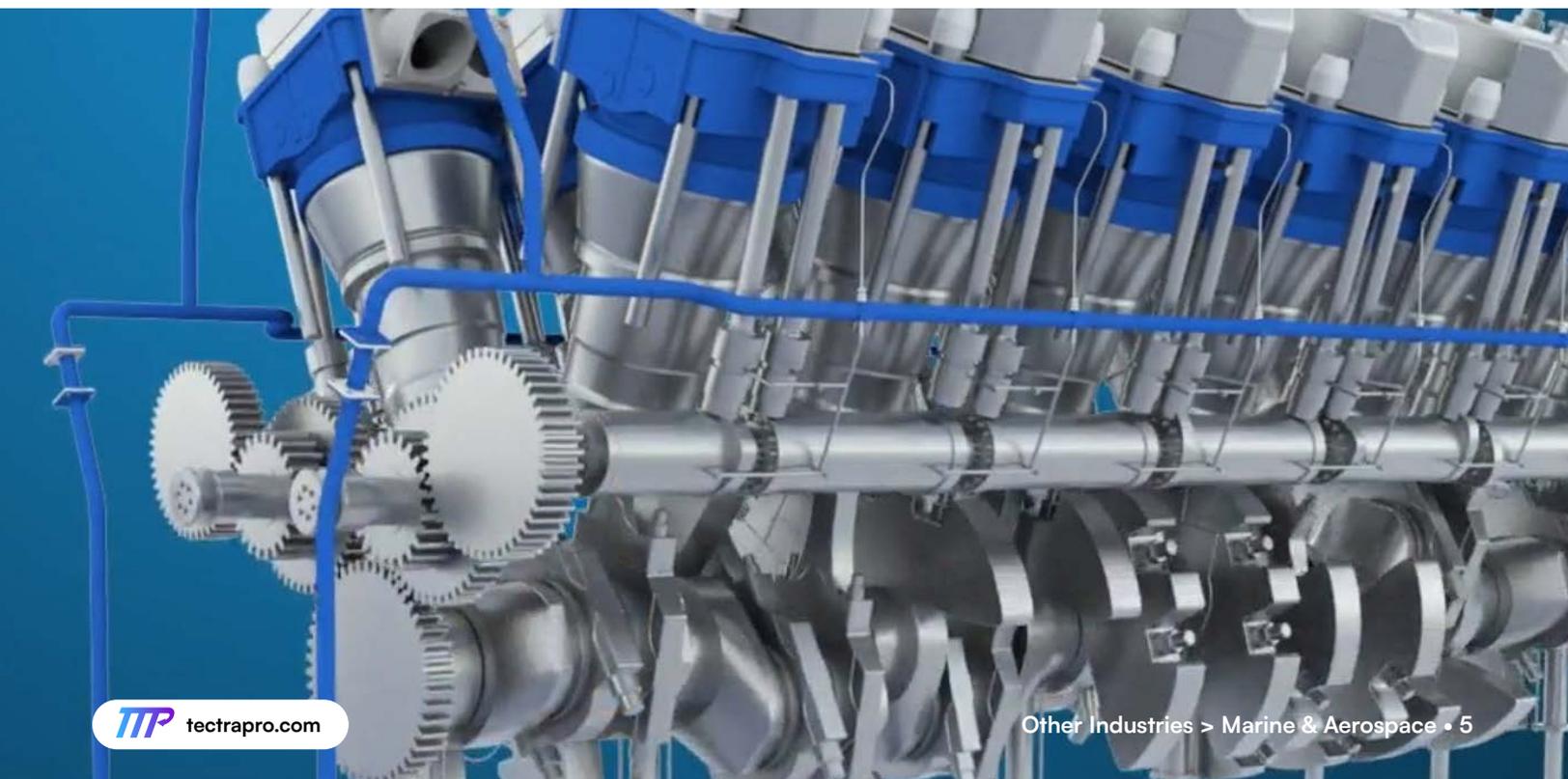
[Maintenance](#)



[Reciprocating Engines](#)

### EQUIPMENT & PROCESSES

- Actuators
- Heat Exchangers
- Electrical Switchgear
- Ion Exchange
- Reverse Osmosis
- ... and more



# ⚙️ Fundamentals

## Basic Electrical Fundamentals

MODULES: **16** | CODE: [GEN00A\\_0100\\_B1](#) | LENGTH   
 Atoms and Electrons, Voltage AC and DC, Resistance, Current, Power, Capacitors, Inductors, Transformers, Instrument Transformers PT / CT / CCVT, Power Generation, Conductors, Cables and Insulators, Frequency, Impedance, Ohm's and Kirchhoff's Laws, Noise and Harmonics, Grounds and Neutrals

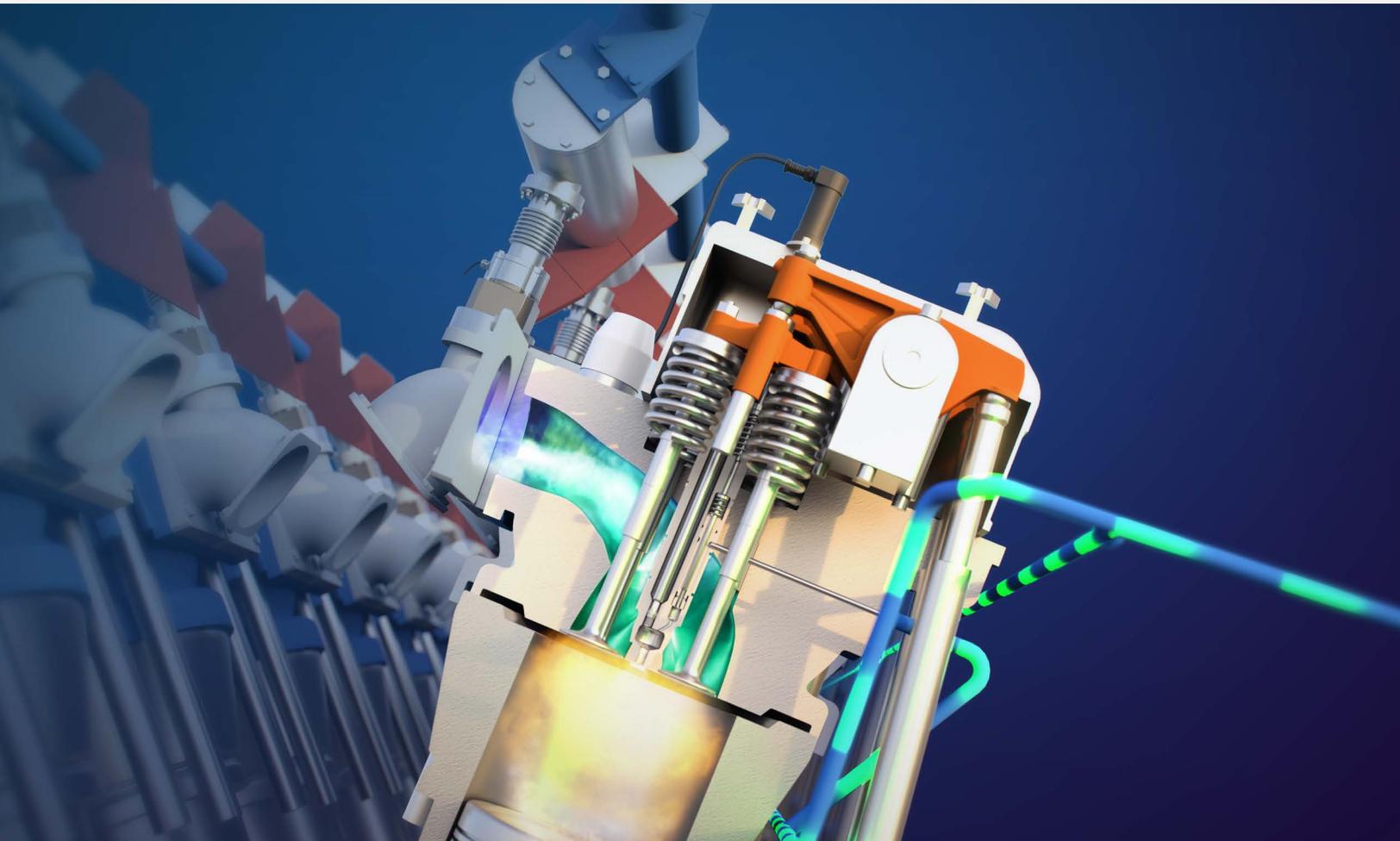
## Gas Turbines

### GE LM2500 Gas Turbine (Marine Version)

MODULES: **10** | CODE: [MAR01A\\_1211\\_B1](#) | LENGTH   
 Overview, Inlet Air System, Accessory Drive, Compressor Section, Fuel Gas System, Turbine Section, Lube Oil System and Bearings, Hydraulic Oil System, Hydraulic Start System, Firing



COURSE LENGTH < 1 HR 1–2 HRS 2–4 HRS FULL DAY





# Maintenance

## Bearings

MODULES: **5** | CODE: [GEN08A\\_012\\_B1](#) | LENGTH   
Overview, Elliptical Bearing, Tilt Pad Journal Bearing, Thrust Bearing, Bearing Instrumentation

## Heat Exchangers

MODULES: **7** | CODE: [GEN08A\\_010\\_B1](#) | LENGTH   
Overview, Plate Heat Exchangers, Plate Heat Exchanger Instrumentation, Main Condenser Water Side, Main Condenser Steam Side, Deaerator Overview, Shell and Tube Heat Exchanger

## Laser Alignment

MODULES: **7** | CODE: [GEN08A\\_013\\_B1](#) | LENGTH   
Laser Alignment Overview, Soft Foot and Runout, Angularity and Offset, VibraAlign Setup, VibraAlign Measure, Rotalign Setup, Rotalign Measure

## Limitorque Actuator

MODULES: **5** | CODE: [GEN08A\\_017\\_B1](#) | LENGTH   
Overview, Actuator Operation, Limit Switch Setting, Torque Switch Setting, Troubleshooting

## Logic Diagrams

MODULES: **4** | CODE: [GEN01A\\_1755\\_B1](#) | LENGTH   
Overview, Logic Diagrams, Accessing Diagrams, HP Bypass Example

## MagneBlast 4160V Breaker

MODULES: **2** | CODE: [GEN02A\\_0144\\_B1](#) | LENGTH   
Overview, Circuit Breaker Operation

## Maintenance - Electrical Switchgear

MODULES: **10** | CODE: [GEN08A\\_020\\_B1](#) | LENGTH   
Electrical Switchgear Overview, 6.9kV Breaker Design and Operation, 6.9kV Switchgear Protection, 6.9kV Switchgear Maintenance, 6.9kV Switchgear Troubleshooting, 480V Switchgear Overview, 480V Breaker Design and Operation, 480V Switchgear Protection, 480V Switchgear Maintenance, 480V High Resistance Ground System

## REXA Actuators

MODULES: **7** | CODE: [GEN08A\\_011\\_B1](#) | LENGTH   
Overview, Linear Actuator, Rotary and Direct Actuators, Disassembly, Assembly, Setup for Operation, Mechanical Troubleshooting

## Rotary Screw Air Compressor

MODULES: **3** | CODE: [GEN02A\\_0124\\_B1](#) | LENGTH   
Overview, Air and Oil Systems, Operations

# Reciprocating Engines

## Wartsila 50SG Reciprocating Engine

MODULES: **7** | CODE: [GEN01A\\_1811\\_B1](#) | LENGTH   
Engine Overview, Charge Air System, Fuel System, Engine Operation, Lube Oil System, Exhaust and SCR, Generator Overview



COURSE LENGTH < 1 HR 1–2 HRS 2–4 HRS FULL DAY



## OTHER INDUSTRIES

# OIL & GAS

### SECTIONS



[Fundamentals](#)



[Maintenance](#)



[Reciprocating Engines](#)



[Water Treatment](#)

### EQUIPMENT & PROCESSES

- Actuators
  - Heat Exchangers
  - Electrical Switchgear
  - Ion Exchange
  - Reverse Osmosis
- ... and more





# Fundamentals

## Basic Electrical Fundamentals

MODULES: **16** | CODE: [GEN00A\\_0100\\_B1](#) | LENGTH

Atoms and Electrons, Voltage AC and DC, Resistance, Current, Power, Capacitors, Inductors, Transformers, Instrument Transformers PT / CT / CCVT, Power Generation, Conductors, Cables and Insulators, Frequency, Impedance, Ohm's and Kirchhoff's Laws, Noise and Harmonics, Grounds and Neutrals

## Maintenance

### Bearings

MODULES: **5** | CODE: [GEN08A\\_012\\_B1](#) | LENGTH

Overview, Elliptical Bearing, Tilt Pad Journal Bearing, Thrust Bearing, Bearing Instrumentation

### Heat Exchangers

MODULES: **7** | CODE: [GEN08A\\_010\\_B1](#) | LENGTH

Overview, Plate Heat Exchangers, Plate Heat Exchanger Instrumentation, Main Condenser Water Side, Main Condenser Steam Side, Deaerator Overview, Shell and Tube Heat Exchanger

### Laser Alignment

MODULES: **7** | CODE: [GEN08A\\_013\\_B1](#) | LENGTH

Laser Alignment Overview, Soft Foot and Runout, Angularity and Offset, VibraAlign Setup, VibraAlign Measure, Rotalign Setup, Rotalign Measure

### Limitorque Actuator

MODULES: **5** | CODE: [GEN08A\\_017\\_B1](#) | LENGTH

Overview, Actuator Operation, Limit Switch Setting, Torque Switch Setting, Troubleshooting

### Logic Diagrams

MODULES: **4** | CODE: [GEN01A\\_1755\\_B1](#) | LENGTH

Overview, Logic Diagrams, Accessing Diagrams, HP Bypass Example

### MagneBlast 4160V Breaker

MODULES: **2** | CODE: [GEN02A\\_0144\\_B1](#) | LENGTH

Overview, Circuit Breaker Operation

### Maintenance - Electrical Switchgear

MODULES: **10** | CODE: [GEN08A\\_020\\_B1](#) | LENGTH

Electrical Switchgear Overview, 6.9kV Breaker Design and Operation, 6.9kV Switchgear Protection, 6.9kV Switchgear Maintenance, 6.9kV Switchgear Troubleshooting, 480V Switchgear Overview, 480V Breaker Design and Operation, 480V Switchgear Protection, 480V Switchgear Maintenance, 480V High Resistance Ground System

### REXA Actuators

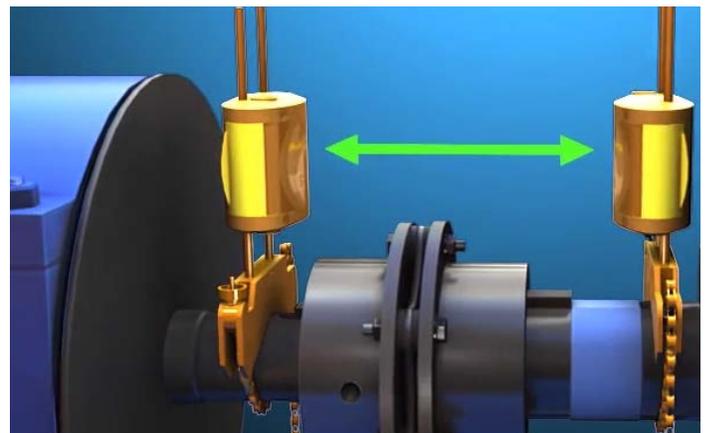
MODULES: **7** | CODE: [GEN08A\\_011\\_B1](#) | LENGTH

Overview, Linear Actuator, Rotary and Direct Actuators, Disassembly, Assembly, Setup for Operation, Mechanical Troubleshooting

### Rotary Screw Air Compressor

MODULES: **3** | CODE: [GEN02A\\_0124\\_B1](#) | LENGTH

Overview, Air and Oil Systems, Operations





# Reciprocating Engines

## Wartsila 50SG Reciprocating Engine

MODULES: 7 | CODE: [GEN01A\\_1811\\_B1](#) | LENGTH   
Engine Overview, Charge Air System, Fuel System, Engine Operation, Lube Oil System, Exhaust and SCR, Generator Overview

# Water Treatment

## Ion Exchange System Fundamentals

MODULES: 10 | CODE: [GEN09A\\_0951\\_B1](#) | LENGTH   
Cycle Makeup IX Overview, Activated Carbon Filter Service Cycle, Activated Carbon Filter Regeneration, Cation Vessel Service Flow, Cation Exchanger Regeneration, Forced Draft Degasifier, Anion Vessel Service Flow, Anion Exchanger Regeneration, Mixed Bed Exchanger Vessel Service Flow, Mixed Bed Exchanger Regeneration

## Ion Exchange System Operation

MODULES: 6 | CODE: [GEN09A\\_0952\\_B1](#) | LENGTH   
Overview, Activated Carbon Filter Flow, Cation System, Anion System, Mixed Bed Vessels, Deionized Neutralization System

## Recycled Water Facility

MODULES: 3 | CODE: [GEN01A\\_0361\\_B1](#) | LENGTH   
Overview, Clarifier Overview, Sand Filters Overview

## Reverse Osmosis Fundamentals

MODULES: 10 | CODE: [GEN09A\\_0903\\_B1](#) | LENGTH   
Introduction to Reverse Osmosis, Osmotic Forces, Hydrostatic Head, Osmotic Pressure, Reversing Osmosis, RO Element Construction, RO Pressure Vessel Construction, RO Flow Considerations, Typical RO System, System Configurations

## Reverse Osmosis System Operation

MODULES: 7 | CODE: [GEN09A\\_0941\\_B1](#) | LENGTH   
Raw Water Supply, Ultrafilters and Filtrate Buffer Tank, Buffer Tank Supply to RO, Operational Cycle Flowpaths for RO, Degasifier, Permeate Buffer and Storage Tank, Chemical Cleaning

## Water Treatment Plant (Reverse Osmosis)

MODULES: 4 | CODE: [GEN01A\\_1760\\_B1](#) | LENGTH   
Overview, Pre-RO Equipment, Reverse Osmosis Skid, Operation

## Water Treatment Plant (Reverse Osmosis w/EDI Modules)

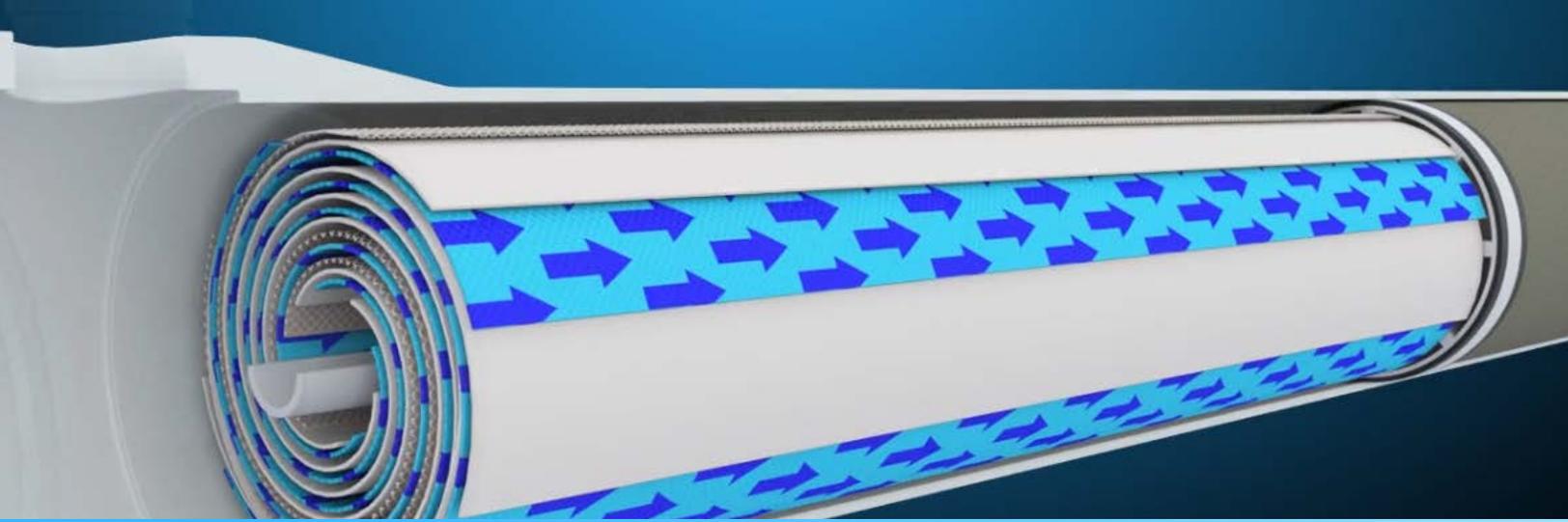
MODULES: 4 | CODE: [GEN01A\\_1660\\_B1](#) | LENGTH   
Water Treatment Overview, RO Flowpaths, EDI Modules and Vessels, Operation

## Zero Liquid Discharge (ZLD) System

MODULES: 4 | CODE: [GEN01A\\_0346\\_B1](#) | LENGTH   
Overview, Brine Concentrator, Crystallizer, Filter Press

COURSE LENGTH < 1 HR 1–2 HRS 2–4 HRS FULL DAY





## OTHER INDUSTRIES



# WATER & WASTEWATER TREATMENT

### SECTIONS



[Fundamentals](#)



[Maintenance](#)

### EQUIPMENT & PROCESSES

- Actuators
- Heat Exchangers
- Electrical Switchgear
- Ion Exchange
- Reverse Osmosis
- ... and more



# 🔧 Fundamentals

## [Ion Exchange System Fundamentals](#)

MODULES: **10** | CODE: [GEN09A\\_0951\\_B1](#) | LENGTH     
 Cycle Makeup IX Overview, Activated Carbon Filter Service Cycle, Activated Carbon Filter Regeneration, Cation Vessel Service Flow, Cation Exchanger Regeneration, Forced Draft Degasifier, Anion Vessel Service Flow, Anion Exchanger Regeneration, Mixed Bed Exchanger Vessel Service Flow, Mixed Bed Exchanger Regeneration

## [Ion Exchange System Operation](#)

MODULES: **6** | CODE: [GEN09A\\_0952\\_B1](#) | LENGTH    
 Overview, Activated Carbon Filter Flow, Cation System, Anion System, Mixed Bed Vessels, Deionized Neutralization System

## [Recycled Water Facility](#)

MODULES: **3** | CODE: [GEN01A\\_0361\\_B1](#) | LENGTH   
 Overview, Clarifier Overview, Sand Filters Overview

## [Reverse Osmosis Fundamentals](#)

MODULES: **10** | CODE: [GEN09A\\_0903\\_B1](#) | LENGTH    
 Introduction to Reverse Osmosis, Osmotic Forces, Hydrostatic Head, Osmotic Pressure, Reversing Osmosis, RO Element Construction, RO Pressure Vessel Construction, RO Flow Considerations, Typical RO System, System Configurations

## [Reverse Osmosis System Operation](#)

MODULES: **7** | CODE: [GEN09A\\_0941\\_B1](#) | LENGTH   
 Raw Water Supply, Ultrafilters and Filtrate Buffer Tank, Buffer Tank Supply to RO, Operational Cycle Flowpaths for RO, Degasifier, Permeate Buffer and Storage Tank, Chemical Cleaning

## [Water Treatment Plant \(Reverse Osmosis\)](#)

MODULES: **4** | CODE: [GEN01A\\_1760\\_B1](#) | LENGTH    
 Overview, Pre-RO Equipment, Reverse Osmosis Skid, Operation

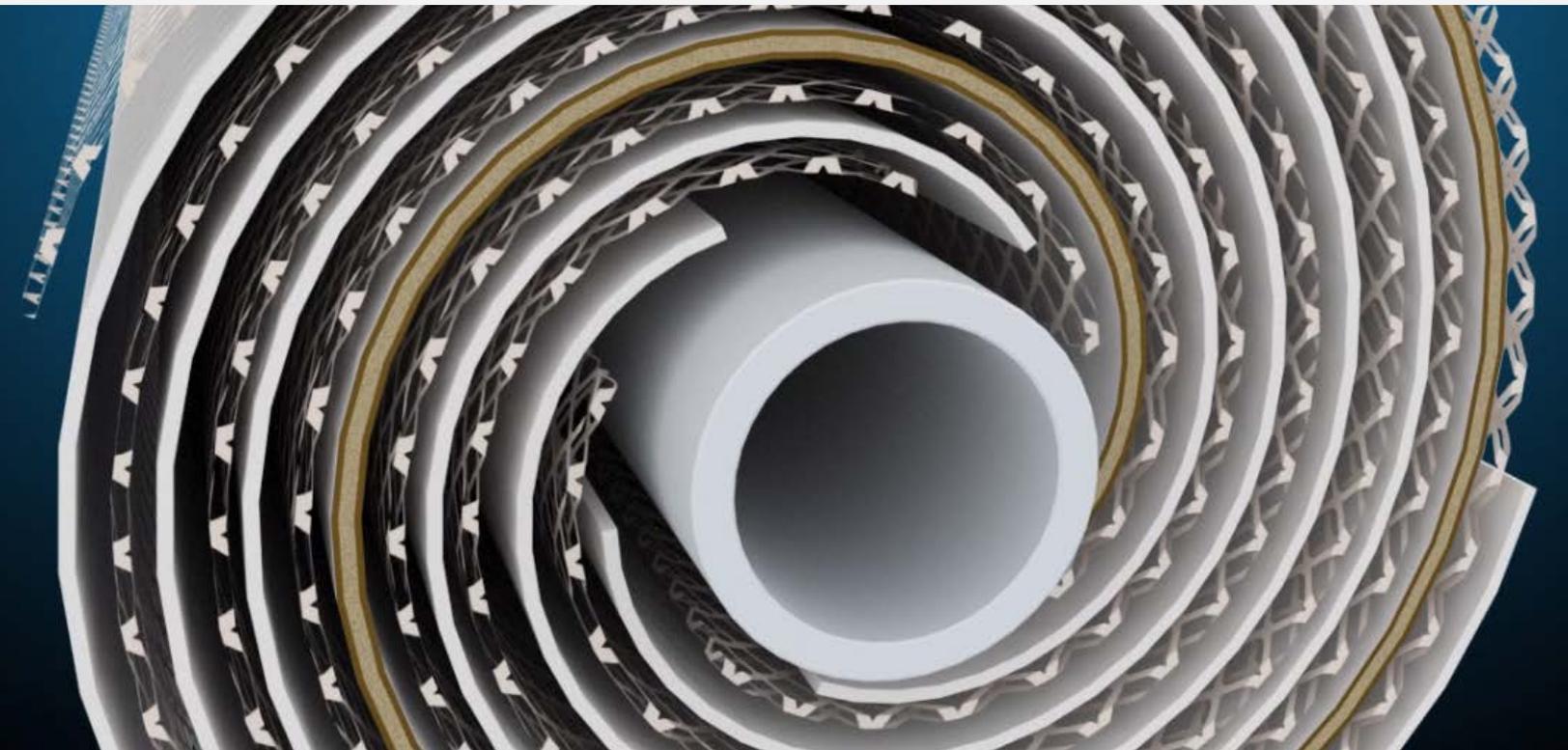
## [Water Treatment Plant \(Reverse Osmosis w/EDI Modules\)](#)

MODULES: **4** | CODE: [GEN01A\\_1660\\_B1](#) | LENGTH   
 Water Treatment Overview, RO Flowpaths, EDI Modules and Vessels, Operation

## [Zero Liquid Discharge \(ZLD\) System](#)

MODULES: **4** | CODE: [GEN01A\\_0346\\_B1](#) | LENGTH   
 Overview, Brine Concentrator, Crystallizer, Filter Press

COURSE LENGTH  < 1 HR   1–2 HRS    2–4 HRS     FULL DAY





# Maintenance

## Bearings

MODULES: **5** | CODE: [GEN08A\\_012\\_B1](#) | LENGTH   
Overview, Elliptical Bearing, Tilt Pad Journal Bearing, Thrust Bearing, Bearing Instrumentation

## Heat Exchangers

MODULES: **7** | CODE: [GEN08A\\_010\\_B1](#) | LENGTH   
Overview, Plate Heat Exchangers, Plate Heat Exchanger Instrumentation, Main Condenser Water Side, Main Condenser Steam Side, Deaerator Overview, Shell and Tube Heat Exchanger

## Laser Alignment

MODULES: **7** | CODE: [GEN08A\\_013\\_B1](#) | LENGTH   
Laser Alignment Overview, Soft Foot and Runout, Angularity and Offset, VibraAlign Setup, VibraAlign Measure, Rotalign Setup, Rotalign Measure

## Limitorque Actuator

MODULES: **5** | CODE: [GEN08A\\_017\\_B1](#) | LENGTH   
Overview, Actuator Operation, Limit Switch Setting, Torque Switch Setting, Troubleshooting

## Logic Diagrams

MODULES: **4** | CODE: [GEN01A\\_1755\\_B1](#) | LENGTH   
Overview, Logic Diagrams, Accessing Diagrams, HP Bypass Example

## MagneBlast 4160V Breaker

MODULES: **2** | CODE: [GEN02A\\_0144\\_B1](#) | LENGTH   
Overview, Circuit Breaker Operation

## Maintenance - Electrical Switchgear

MODULES: **10** | CODE: [GEN08A\\_020\\_B1](#) | LENGTH   
Electrical Switchgear Overview, 6.9kV Breaker Design and Operation, 6.9kV Switchgear Protection, 6.9kV Switchgear Maintenance, 6.9kV Switchgear Troubleshooting, 480V Switchgear Overview, 480V Breaker Design and Operation, 480V Switchgear Protection, 480V Switchgear Maintenance, 480V High Resistance Ground System

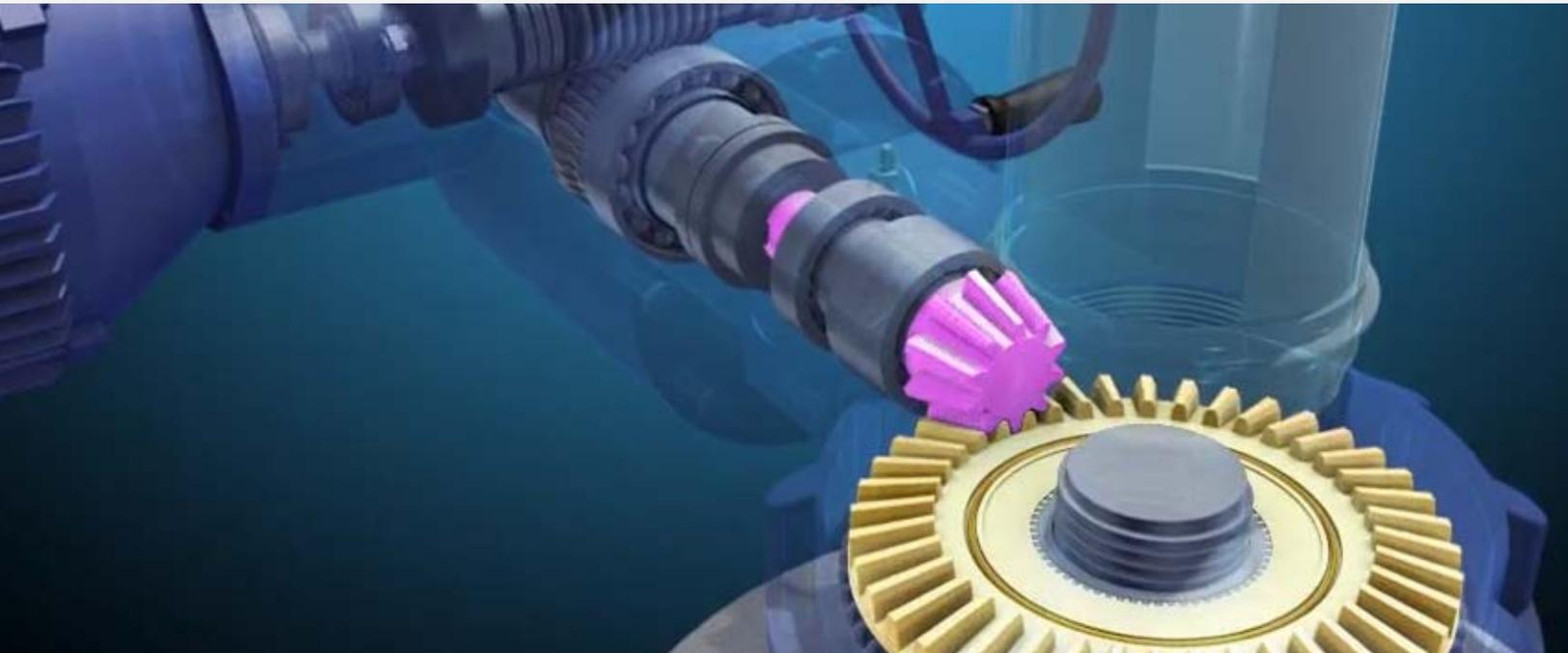
## REXA Actuators

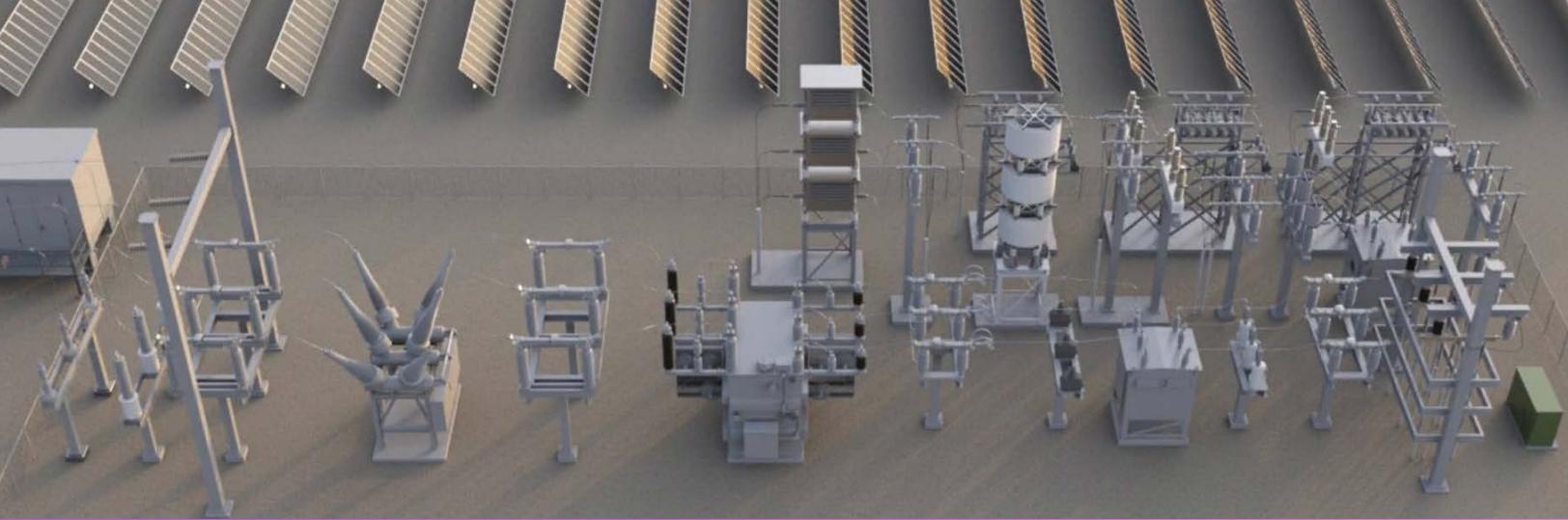
MODULES: **7** | CODE: [GEN08A\\_011\\_B1](#) | LENGTH   
Overview, Linear Actuator, Rotary and Direct Actuators, Disassembly, Assembly, Setup for Operation, Mechanical Troubleshooting

## Rotary Screw Air Compressor

MODULES: **3** | CODE: [GEN02A\\_0124\\_B1](#) | LENGTH   
Overview, Air and Oil Systems, Operations

COURSE LENGTH < 1 HR 1–2 HRS 2–4 HRS FULL DAY





## ALL INDUSTRIES



### ELECTRICAL

#### EQUIPMENT & PROCESSES

- Basic Electrical Fundamentals
- Electrical Distribution and Switchgear
- Interconnect Facility
- Battery Energy Storage Systems
- Inverter Fundamentals
- Substation Fundamentals
- Maintenance Testing

... and more

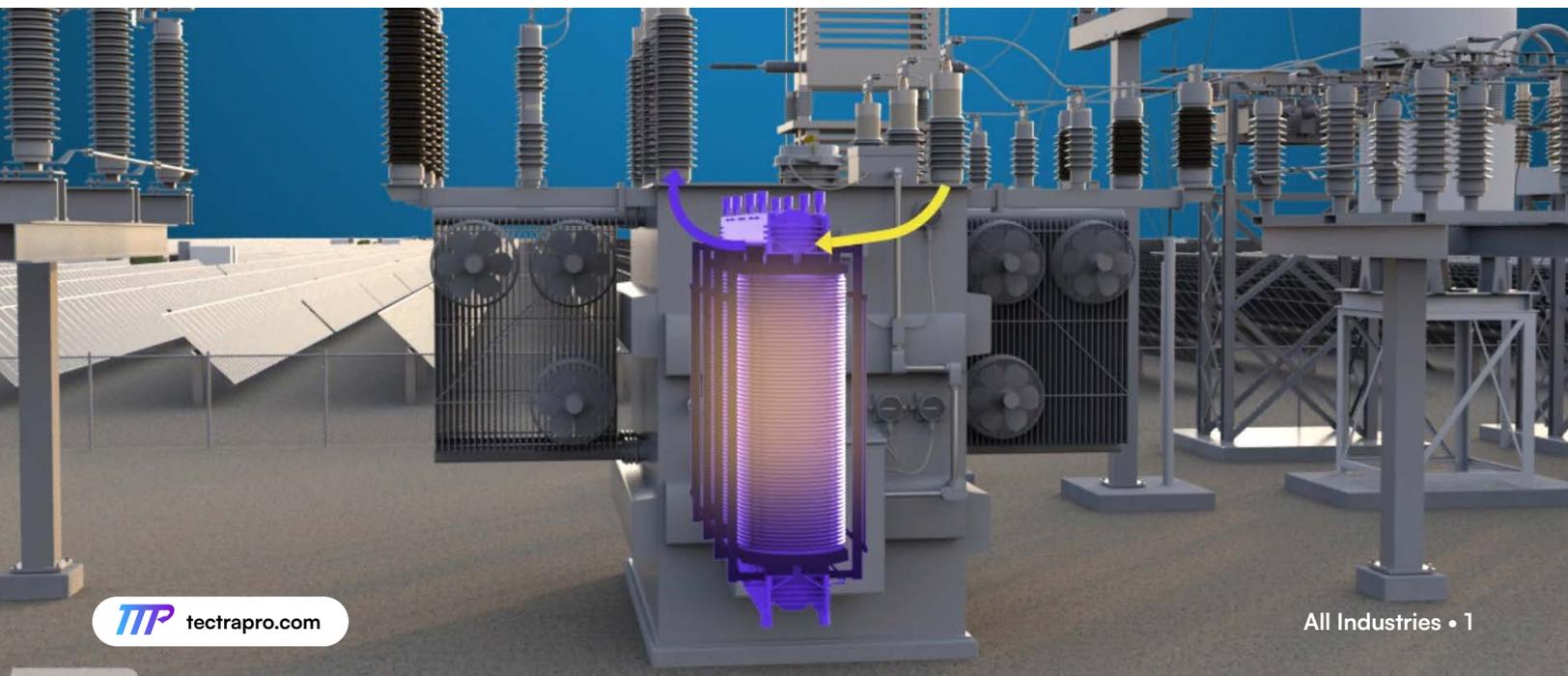


### MAINTENANCE

#### EQUIPMENT & PROCESSES

- Heat Exchangers
- REXA Actuators
- Bearings
- Laser Alignment
- Boiler Feedwater Pump
- Hydraulic Coupling for Boiler Feed Pump
- Limitorque Actuators

... and more



# Electrical

## Basic Electrical Fundamentals

MODULES: **16** | CODE: [GEN00A\\_0100\\_B1](#) | LENGTH     
 Atoms and Electrons, Voltage AC and DC, Resistance, Current, Power, Capacitors, Inductors, Transformers, Instrument Transformers PT / CT / CCVT, Power Generation, Conductors, Cables and Insulators, Frequency, Impedance, Ohm's and Kirchhoff's Laws, Noise and Harmonics, Grounds and Neutrals

## Battery Energy Storage System Fundamentals

MODULES: **9** | CODE: [GEN04A\\_0311\\_B1](#) | LENGTH     
 Overview, Battery Module, Battery Assemblies, Inverters, Inverter Modules, Battery Charging, Electrical Distribution, Fault Protection, BESS Safety

## MagneBlast 4160V Breaker

MODULES: **2** | CODE: [GEN02A\\_0144\\_B1](#) | LENGTH   
 Overview, Circuit Breaker Operation

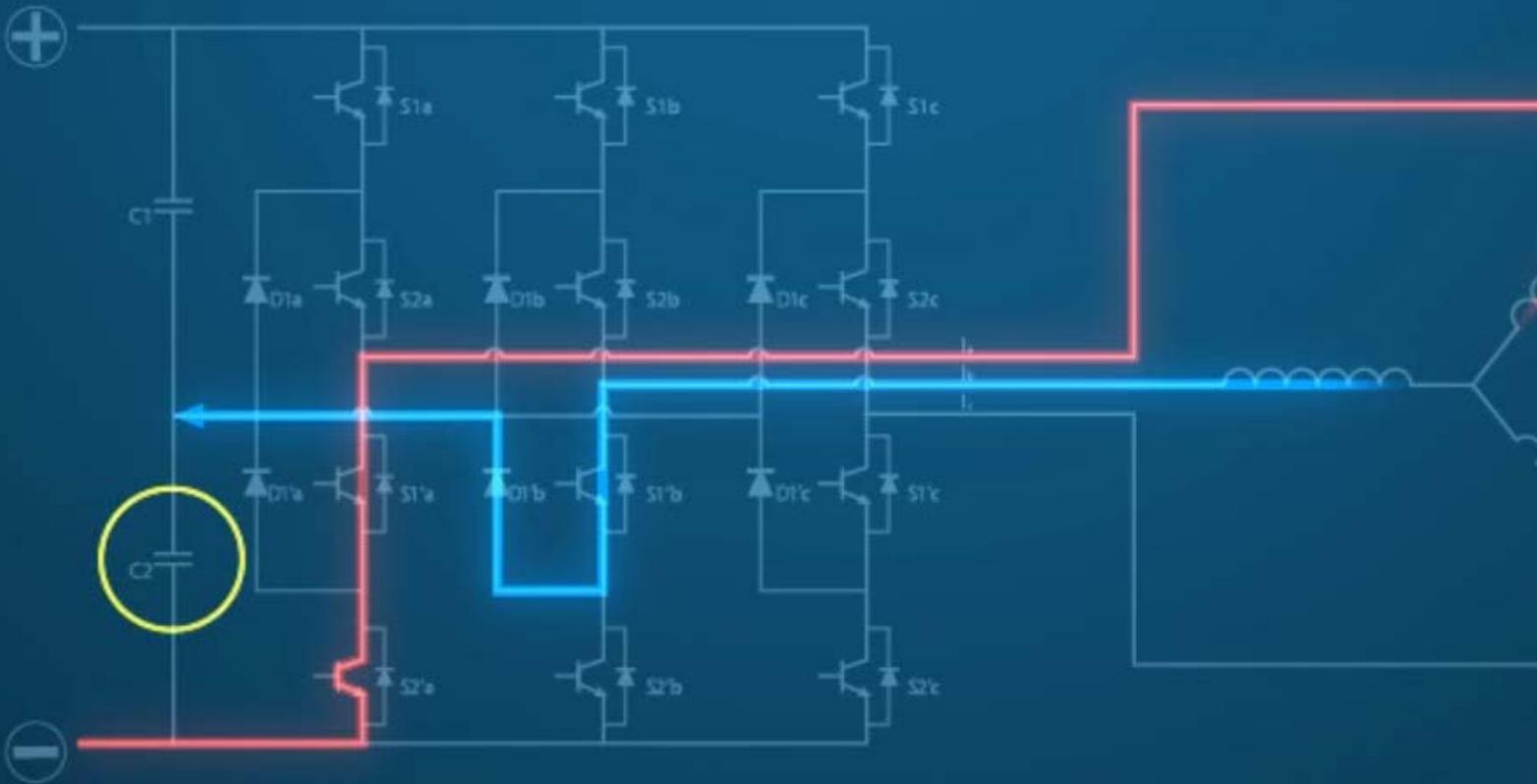
## Maintenance - Electrical Switchgear

MODULES: **10** | CODE: [GEN08A\\_020\\_B1](#) | LENGTH      
 Electrical Switchgear Overview, 6.9kV Breaker Design and Operation, 6.9kV Switchgear Protection, 6.9kV Switchgear Maintenance, 6.9kV Switchgear Troubleshooting, 480V Switchgear Overview, 480V Breaker Design and Operation, 480V Switchgear Protection, 480V Switchgear Maintenance, 480V High Resistance Ground System

## Renewable Interconnect/Substation Facility

MODULES: **4** | CODE: [GEN04A\\_0144\\_B1](#) | LENGTH     
 Overview, Collector Bus, Step-up Transformers, High Voltage Equipment

COURSE LENGTH  < 1 HR   1–2 HRS    2–4 HRS     FULL DAY



# Maintenance

## Bearings

MODULES: **5** | CODE: [GEN08A\\_012\\_B1](#) | LENGTH    
Overview, Elliptical Bearing, Tilt Pad Journal Bearing, Thrust Bearing, Bearing Instrumentation

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## Boiler Feedwater Pump

MODULES: **9** | CODE: [GEN08A\\_016\\_B1](#) | LENGTH     
Overview, Boiler Feed Pump Construction, Pump Accessories, Operation, Performance Curves, Troubleshooting, Bearing Replacement, Boiler Feed Pump Disassembly, Boiler Feed Pump Reassembly

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## Boiler Feedwater Pump with Hydraulic Coupling

MODULES: **7** | CODE: [GEN08A\\_018\\_B1](#) | LENGTH     
Design and Operation, Pump Curves, Operational Checks and Alarms, Maintenance, Bearing Replacement, Pump Disassembly, Pump Reassembly

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## GE 7FA Gas Turbine Major Inspections

MODULES: **9** | CODE: [GEN08A\\_015\\_B1](#) | LENGTH     
Overview, HGP Clearance Measurements, HGP Turbine Casing Removal, HGP Concentricity, Rotor Float, and Clearance Checks, HGP Component Removal, HGP Inspection, HGP Turbine Section Assembly, HGP Assembly Clearances, HGP Combustion Section Assembly

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## GE 7FA Gas Turbine Routine Maintenance

MODULES: **6** | CODE: [GEN08A\\_014\\_B1](#) | LENGTH     
Overview, Preventative Maintenance, Combustion Inspection Overview, Pre-Maintenance Procedures, Combustion System Inspection, Combustion System Reassembly

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## Heat Exchangers

MODULES: **7** | CODE: [GEN08A\\_010\\_B1](#) | LENGTH    
Overview, Plate Heat Exchangers, Plate Heat Exchanger Instrumentation, Main Condenser Water Side, Main Condenser Steam Side, Deaerator Overview, Shell and Tube Heat Exchanger

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## Hydraulic Coupling for Boiler Feedwater Pump

MODULES: **4** | CODE: [GEN08A\\_019\\_B1](#) | LENGTH    
Overview, Hydraulic Coupling Design and Operation, Hydraulic Coupling Preventive Maintenance, Hydraulic Coupling Troubleshooting and Action

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## Laser Alignment

MODULES: **7** | CODE: [GEN08A\\_013\\_B1](#) | LENGTH    
Laser Alignment Overview, Soft Foot and Runout, Angularity and Offset, VibraAlign Setup, VibraAlign Measure, Rotalign Setup, Rotalign Measure

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## Limitorque Actuator

MODULES: **5** | CODE: [GEN08A\\_017\\_B1](#) | LENGTH    
Overview, Actuator Operation, Limit Switch Setting, Torque Switch Setting, Troubleshooting

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## Logic Diagrams

MODULES: **4** | CODE: [GEN01A\\_1755\\_B1](#) | LENGTH    
Overview, Logic Diagrams, Accessing Diagrams, HP Bypass Example

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## MagneBlast 4160V Breaker

MODULES: **2** | CODE: [GEN02A\\_0144\\_B1](#) | LENGTH   
Overview, Circuit Breaker Operation

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## Maintenance - Electrical Switchgear

MODULES: **10** | CODE: [GEN08A\\_020\\_B1](#) | LENGTH      
Electrical Switchgear Overview, 6.9kV Breaker Design and Operation, 6.9kV Switchgear Protection, 6.9kV Switchgear Maintenance, 6.9kV Switchgear Troubleshooting, 480V Switchgear Overview, 480V Breaker Design and Operation, 480V Switchgear Protection, 480V Switchgear Maintenance, 480V High Resistance Ground System

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## REXA Actuators

MODULES: **7** | CODE: [GEN08A\\_011\\_B1](#) | LENGTH    
Overview, Linear Actuator, Rotary and Direct Actuators, Disassembly, Assembly, Setup for Operation, Mechanical Troubleshooting

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## Rotary Screw Air Compressor

MODULES: **3** | CODE: [GEN02A\\_0124\\_B1](#) | LENGTH   
Overview, Air and Oil Systems, Operations

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