

Digital Power Simulators

Educational Training Equipment for the 21st Century

Bulletin 185E

H-185-2A Advanced Boiler Trainer

Purpose

The Hampden **Model H-185-2A** Hampden Advanced Boiler Trainer serves to demonstrate principles of operation and troubleshooting techniques of a current model boiler system. The module's front panel displays a complete pictorial view of the system. All functions operate as on the actual equipment and present the student with realistic problem solving opportunities.

Description

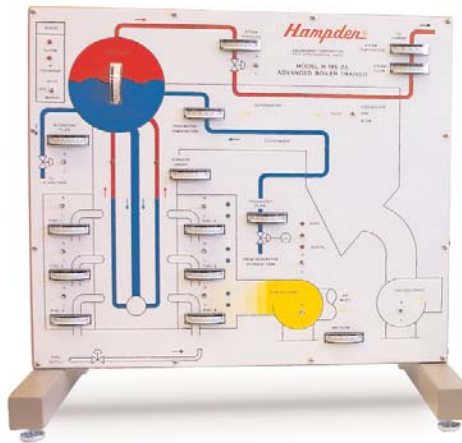
The boiler system simulation is based on a typical fossil-fired power plant including operational systems, digital controls, analog control loops, alarms and trips.

Steam, feedwater, flow, pressure, temperature, subsystems, and control positions are continuously displayed on screen to student and instructor.

Operational "hands-on" activities performed by students also include; real time, dynamic experience with all phases of oil, gas and pulverized coal firing.

The **Model H-185-2A** Advanced Boiler Trainer is a fully computer-controlled unit designed to interface with a computer and covers all aspects of plant operation including:

- System Description
- Theory
- Component Identification
- Subsystems Operation
- Controls
- Integrated Operations



Hampden **Model H-185-2A** Advanced Boiler Trainer shown with **Model H-CS** Supplied Computer System

Features

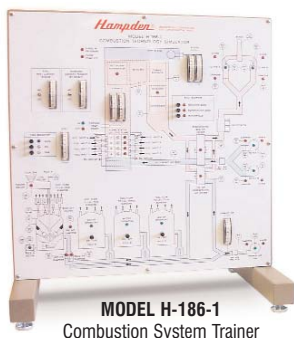
The **Model H-185-2A** Advanced Boiler Trainer can be set to simulate the following conditions:

- Cold Boiler
- No Load
- 25% Load
- 75% Load
- Drum Level Established
- 5% Load
- 50% Load
- 100% Load

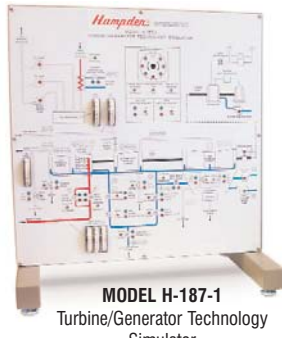
Students are able to interact with different graphic displays, view system parameters, in addition to operating digital and analog controls.

Instructors may insert simulated mechanical or electrical "faults" into the system to test a students' troubleshooting capabilities.

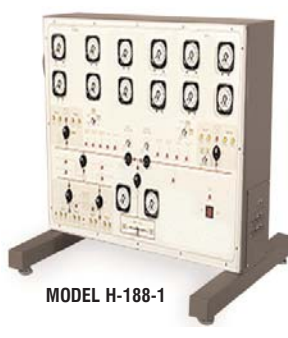
Complete your Power Plant training with these additional Hampden Digital Simulators



MODEL H-186-1
Combustion System Trainer



MODEL H-187-1
Turbine/Generator Technology Simulator



MODEL H-188-1

Simulator Malfunctions

The following insertable malfunctions may be accessed via the computer program:

- Forced Draft
- Induced Draft
- Drum Level High
- Drum Level Low
- Feedwater
- Boiler PSI High
- Low Oxygen
- Pollution
- Boiler Temp High

All Hampden units are available for operation at any voltage or frequency

Hampden
ENGINEERING CORPORATION

Boiler System Trainer

Educational Training Equipment for the 21st Century

Bulletin 185-1E

HGS-GO-181A Dual Fuel-Fired Automated Boiler Trainer

Purpose

The primary function of the Hampden Model HGS-GO-181A Dual Fuel-Fired Automated Boiler trainer is to demonstrate to the student how a dual fuel-fired boiler makes steam for power generation. This model features full-function automatic controls at all points in the process.

Description

The Hampden Dual Fuel-Fired Automated Boiler Trainer consists of a four section control panel. Equipment mounted behind this panel, such as the boiler, condenser, turbine, alternator, etc., is shown silkscreened on the lower section of the panel. All interconnecting piping is also shown so that the entire system is graphically represented. All pressure and temperature gauges are shown graphically where they appear in the system so that the student can monitor the readings of the gauges and know exactly where in the system these readings are being taken. All panel-mounted equipment is identified with silk-screened nomenclature.

This unit is also available as a fully manual configuration. Specify Model HGS-GO-181M. Any customer-specified control combination can be provided for the automated model. Contact the factory for details.

Sections 1 & 2 - Boiler and Steam/Condensate

These sections contain the trip indicator lights, alarm indicator lights, chart recorders, meters, manual/automatic controller, and control switches.

The manual/automatic controllers provided are as follows:

- Steam Pressure Control System
- Furnace Pressure Control System
- Drum Level Control System
- Level Control System
- Transmitters
- Chart Recorders\Alarm and Trip Indicator System
- Manual Controls
- Meters and Gauges



Model HGS-GO-181A
Dual Fuel-Fired
Automated Boiler Trainer

Section 3 - Turbine

This section contains the controls for the turbine. Mounted on this section are the following:

- Tachometer
- Temperature Gauges
- Pressure Gauges
- Turbine Speed Control System

Section 4 - Alternator

This section contains the controls for the alternator. Mounted on this section are the following:

- Main AC Monitoring System
- Alternator Monitoring System
- Alternator Output
- Line Synchronizing System

Boiler - The boiler is equal to a Columbia dual fuel-fired, providing 500 lbs. of steam per hour at 150 psig. It includes a condensate return tank, blowdown separator, necessary fans, valves, dampers, pumps, etc. for a functional operating system.

Turbine - The turbine is equal to a Carling 16A, Class 1, rated as follows:

- Inlet Pressure: 100 psi
- Inlet Temperature: Saturated
- Back Pressure: 5 psi

- Turbine RPM: 3000
- Shaft Horsepower: 4KW
- Overspeed Trip: Yes
- Turbine: Single pressure stage two-row velocity staged bronze rotor with stainless steel blades
- Bearings: Ball
- Packing: API Carbon ring packing with chrome plating on shaft
- Nozzles: Four

Alternator - The alternator is designed to interface with the turbine, and rated as follows:

- Voltage: 120/208VAC-3 ϕ
- Rating: 3KW
- Pole: 2
- Speed: 3600 RPM
- Insulation Class: B
- Duty: Continuous
- Excitation: 125VDC

Services Required

Oil Line Feed, Gas Line Feed, Drain, Exhaust Flue, Electric Power

All Hampden units are available for operation at any voltage or frequency

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