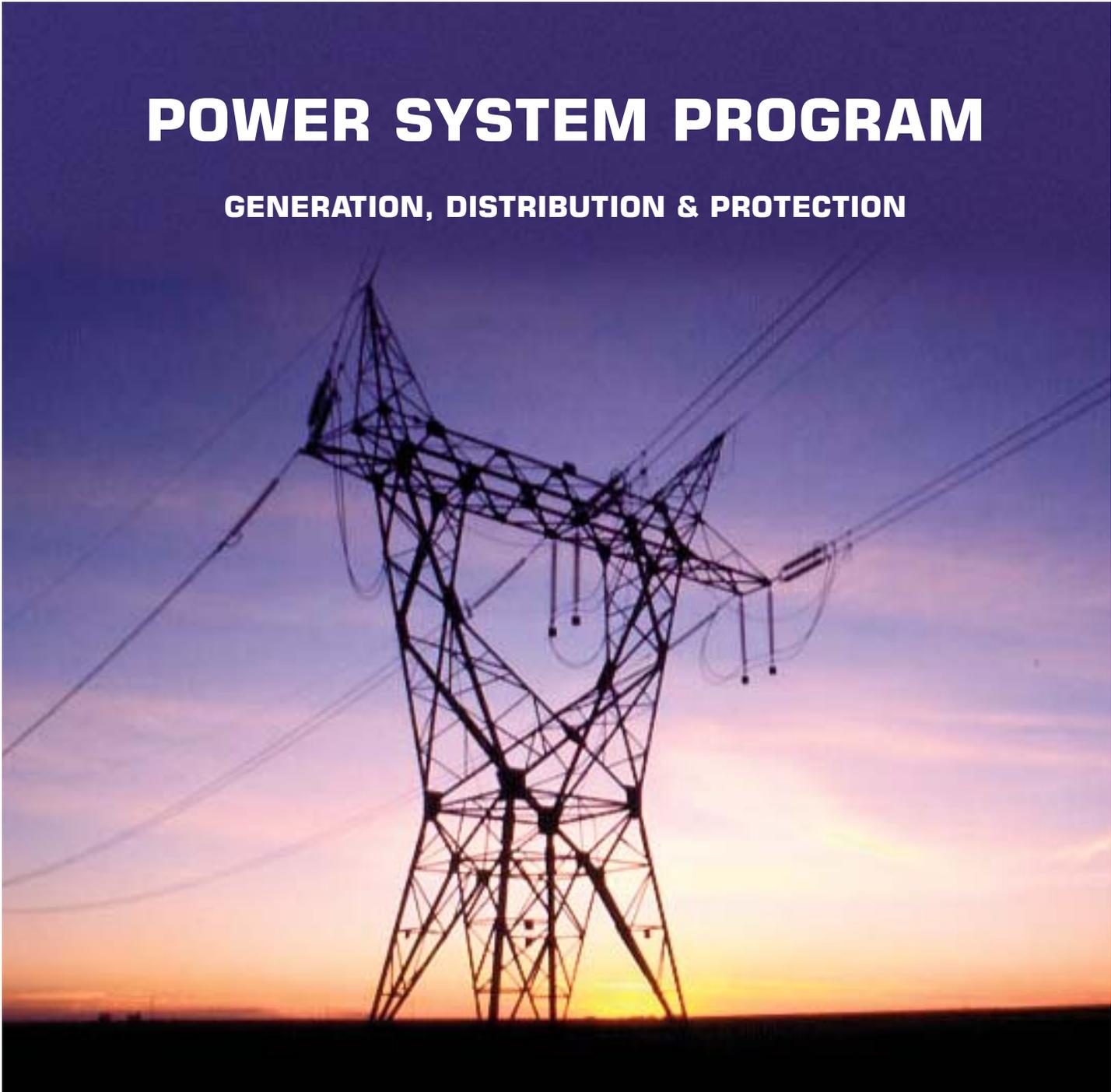


POWER SYSTEM PROGRAM

GENERATION, DISTRIBUTION & PROTECTION



Hampden[®]
ENGINEERING CORPORATION



GENERATE → **DISTRIBUTE** → **PROTECT**

Hampden Provides Multi-Level Instruction in Electrical Power Generation

Overview

Power System Program

The Hampden Power System Program is a modular training system that simulates a power system from generation to utilization. It prepares students for the complex responsibility of ensuring non-stop power flow through a range of conditions. The program features: controls, instrumentation, transformers, circuit breakers, relays and various types of loads normally encountered in a full-scale power system. Using the Hampden Power System Program, a student engineer or technician can readily conduct power system modeling in order to:

- Monitor and control power generation
- Transmit and distribute power
- Load the system
- Investigate Protective Relaying

Conduct Power System Modeling with Hampden's Complete Series of Equipment



MODEL HMD-100-CM-DA
Mobile Student Experimentation Stations with digital meters



MODEL CL-100-3
Capacitance Load



MODEL SM-100-3
Synchronous Machine

Transmission Line Simulator Program

Overview

Hampden offers a complete series of accessory equipment oriented towards the teaching of transmission line applications.

This equipment, when coupled with the broad line of Hampden AC and DC Motors and Generators, presents a complete approach to transmission line studies.

A typical program would consist of the following models in Hampden's Transmission Line Simulator Program:

- HMD-100-CM-DA Mobile Power Console
- MGB-100-DG Two Machine Bed Plate
- IM-100 Induction Motor
- SM-100-3 Synchronous Machine
- DM-100A DC Machine
- H-TLS-100 Transmission Line Simulator (2 each)
- H-RA-100 Regulating Autotransformer
- TAI-100 Torque Angle Indicator
- RL-100-3 Resistance Load
- IL-100-3 Inductance Load
- CL-100-3 Capacitance Load
- H-W/V-100 Watt VAR Meter (2 each)
- H-PAM-100 Phase Angle Meter
- VIL-100 Variable Inertia Load
- T-100-3A Three Phase Transformer
- SLA-100M Strobe Tachometer
- SLA-100-SYN Synchronizing Option for SLA-100M
- Experiment Manual

Performance Objectives

- Active and Reactive Power - Familiarity with the use of three-phase wattmeter and varmeters and understanding the concepts of positive and negative power flow
- Power Flow and Voltage Regulation - Understanding power flow in a transmission line and learning what is meant by voltage regulation
- Phase Angle and Voltage Drop - Techniques for "tuning" transmission lines to decrease losses
- Factors that Affect Active and Reactive Power Flow - Gain an understanding of active and reactive power flow in systems having more than one power source
- Parallel Lines and Transformers - Investigate the relationship between the amount of real power transmitted over a line and the phase angle between the voltages at the sending and receiving ends and study the use of transformers to increase power transfer over a transmission line
- Synchronous Alternator - Understand the factors involved in the synchronous impedance of an alternator and predict the voltage regulation based on synchronous impedance
- The Phase-Shift/Buck-Boost Transformer- Become familiar with the "buck-boost" phase shift transformer and observe how power is divided between two Transmission lines and modify that division
- Power System Transients - Understanding how the switching of one transmission line affects power and voltage on a parallel line



HAMPDEN MODEL H-TLS-100
TRANSMISSION LINE SIMULATOR

Standard Products...Designed to Meet Your Growing Needs!!!

GENERATION, DISTRIBUTION & PROTECTION

Protective Relay Simulator Program

H-PRT-100-TLS Transmission Line Simulator Protective Relay Trainer

Hampden **Model H-PRT-100-TLS** Protective Relay Trainer Program is used in conjunction with the Hampden **Series 100** Transmission Line Simulator.



When used with the Hampden **Series 100** Transmission Line Simulator and owner supplied or Hampden optional Protection Relays, the student will be provided with hands-on training in: Generation and Protection, Transformer and Protection, Transmission and Protection, Distribution and Protection, and Motor Protection. This package includes five of the most commonly used relays with optional relays available.

Basic Relays

ANSI DEVICE #	DESCRIPTION
32	Reverse Power Relay
47	Reverse Phase Relay
51	Overcurrent Relay
67	Directional Overcurrent Relay
87	Differential Relay

Optional Relays

ANSI DEVICE #	DESCRIPTION
12	Overspeed Relay
21	Distance Protection Relay
25	Synchronism Check Relay
27	Undervoltage Relay
40	Loss of Excitation Relay
46	Negative Sequence Time-Overcurrent Relay
49	Overtemperature Relay
50	Phase Fault Relay
59	Overvoltage Relay
60	Voltage Balance Relay
62	Timing Relay
64	Field Ground Relay
81	Frequency Relay
86	Lockout Relay

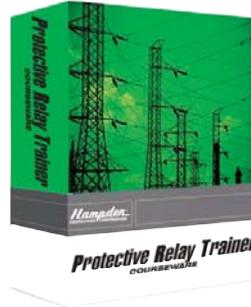
Optional Computer Data Logging Program

Hampden **Computer Data Logging Program** is used in conjunction with the Hampden Series 100 Transmission Line Simulator to monitor crucial test points. The program gives you the tools needed to plot data in real time format.

- **HMD-100-CM-DA-CDL** Deluxe Console with Digital Meters and Internal Motor Generator Interface
- **H-MGI** Motor Generator Interface
- **H-REM-LC-D** Load Cell

H-PRT-100 Protective Relay Trainer Courseware

The Hampden **Model H-PRT-100** Protective Relay Trainer Courseware covers a general description of the component and its application, references, objectives, diagrams, tables, and set-up procedures.



The topics covered include:

- Generation and Protection
- Transformers and Protection
- Transmission and Protection
- Distribution/Feeder Protection
- Motor Protection



Hampden is committed to providing industry-leading technology.

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