

INSTRUMENTATION AND CONTROLS TRAINING EQUIPMENT



Hampden ENGINEERING CORPORATION

American made since 1954

HAMPDEN INSTRUMENTATION AND CONTROLS TRAINING SIMULATORS

Hampden Engineering Corporation has been designing and manufacturing process simulators for engineering, technical, and industrial training programs since 1954. Hampden has earned its leadership position in the technical, vocational, and skills training field by integrating standard commercial instruments and controls into educational packages that facilitate the learning process.

Hampden's educational simulators and programs embrace a wide gamut of products, processes, and industries. For example, you can obtain Hampden training programs in Basic Electricity; Basic Electronics; Digital Electronics; Microcomputers; Heating, Refrigeration, and Air Conditioning; Electrical Motors and Transformers; Electrical Power Transmission and Distribution; Pneumatics; Hydraulics; Kinematics; Robotics; Instrumentation and Controls; and Process Automation.

As more and more power and process plants automate, they require personnel with knowledge and skills in Electronics, Mechanics, and Automatic Control Theory. To assist in the training of operators, technicians, and maintenance personnel, Hampden provides unique instrumentation and Controls (ICS) Training Programs. In addition to the representative ICS Training Panels shown in this brochure, custom-designed simulators may be supplied to meet plant-specific training needs.

Each of the Hampden training simulators contains a realistic process for which variables (pressure, temperature, flow, level, etc.) are measured and controlled. The measuring and controlling instruments are standard commercial devices: Foxboro, for example. You may select from among standard commercial instruments from any manufacturer, thereby tailoring the training program to your own needs.



When desired, Hampden Control Simulators may contain a number of instructor-inserted faults for practical experience in troubleshooting.

Hampden Instrumentation and Controls Trainers are fully compatible with audio/visual training programs available from such organizations as the Instrument Society of America.

All Hampden equipment may be equipped to operate on any voltage or frequency.



HAMPDEN INDUSTRIAL PROCESS TRAINERS



OPTIONAL CONTROLS

Unit can be set up for **Fieldbus** operation
or
controlled via **DeltaV** Control System

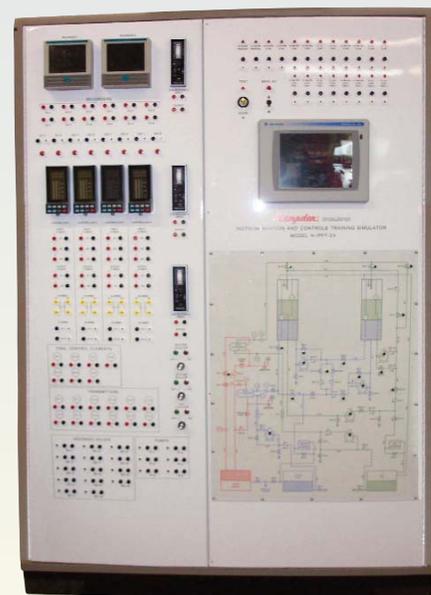
The Hampden H-IPPT-3 Process Plant Trainer simulates a full-sized industrial plant. The process incorporates two transparent towers containing two immiscible liquids, each having a different color and a different specific gravity. A separate control panel contains a full complement of indicators, recorders, and controllers, along with a complete tri-color graphic representation of the process.

Optional Equipment includes:

- **MODEL H-ICS-X** Computer control software/interface
- **MODEL H-ICS-CS** Computer system
- **MODEL H-IPPT-3FP** Fault program
- **MODEL H-IPPT-PLC-5** Programmable Logic Controller
- **MODEL H-ICS-CC** Computer Work Station

Optional Style Panel:

- **Cabinet style Control Panel** is shown at right with optional interface and touch screen operation ►



INSTRUMENTATION AND

STATE-OF-THE-ART

— SYSTEM CONTROL: H-ICS "X" SERIES —



The **Model H-ICS-FX** Flow Control Trainer is designed to provide complete instruction on the measurement and control of flow of energy. The rate of water flow is dependent on the position of the control valve and on the position of a hand-operated valve. ◀◀◀◀



The **Model H-ICS-PX** Pressure Control Trainer is designed to provide complete instruction on the measurement and control of pressure. Pressure within the vessel is dependent on the speed of the pump and the open or closed position of hand valves that permit flowing water to bypass the pressure vessel. ▶▶▶▶



The **Model H-ICS-LX** Level Control Trainer is designed to provide complete instruction on the measurement and control of level. Tank level water flow is dependent on the position of the control valve and the rate at which water is allowed to flow (by gravity) into the tank. ◀◀◀◀



The **Model H-ICS-TX** Temperature Control Trainer is designed to provide complete instruction on the measurement and control of temperature. The temperature is dependent on the current through the heater and on the position of the solenoid-operated three-way valve. ▶▶▶▶

The **Model H-ICS-pHX** pH Control Trainer is designed to provide instruction on the measurement and control of pH. Students are able to learn how pH is produced and measured; how it is sensed, and how a voltage proportional to pH is transmitted. They are provided with the opportunity to calibrate a pH transmitter and to tune a control system to match the frequency response of the loop. The system displays measured variable, set point, and controller output on the same chart for visual evidence of the results of changing control parameters. ▶▶▶▶



The **Model H-ICS-X** Instrument and Control Interface Package and Program consists of the hardware and software necessary to control the Hampden series of ICS panels. This is a graphically-oriented program, with documentation, to permit computer control of the panel's controller. ▼▼▼▼



Sample Screens from Hampden's Model H-ICS-X Software

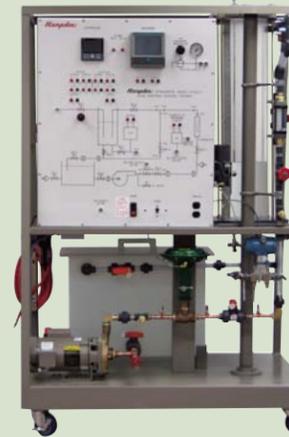
▶ **NOTE:** Instructor Insertable Faults are available as an option on the H-ICS-"X" Series when you specify **Model H-ICS-200**

CONTROL TRAINERS

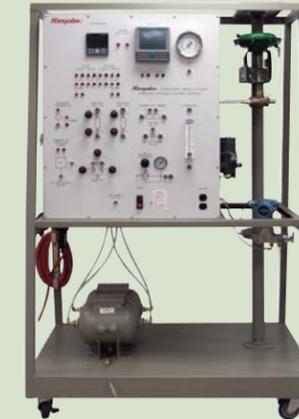
— PROCESS CONTROL: H-ICS "T" SERIES — W/BUILT-IN FAULTS



▲ The **Model H-ICS-FT** Flow Process Loop Trainer is designed to provide complete instruction on the measurement and control of flow.



▲ The **Model H-ICS-LT** Level Process Loop Trainer is designed to provide complete instruction on the measurement and control of level.



▲ The **Model H-ICS-PT** Pressure Process Loop Trainer is designed to provide complete instruction on the measurement and control of pressure.



▲ The **Model H-ICS-TT** Temperature Process Loop Trainer is designed to provide complete instruction on the measurement and control of temperature.

The **Model H-ICS-APT** Analytic Process Loop Trainer is designed to provide instruction on the measurement and control of pH, conductivity, and dissolved oxygen level as well as the temperature of water. ▼

The **Model H-ICS-pHT** pH Process Control Trainer is designed to provide instruction on the measurement and control of pH. ▼

The **Model H-ICS-HET** Heat Exchanger Process Loop Trainer is designed to provide instruction on the measurement and control of temperature utilizing a heat exchanger or a SCR. Temperature can be monitored with (4) thermocouples or from the RTD. ▼



▶ **NOTE:** Instructor Insertable Faults are included with the H-ICS-"T" Series

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

HAMPDEN PROCESS CONTROL SIMULATORS

4 LOOP PRESSURE • TEMPERATURE • FLOW • LEVEL

The **Model H-ICS-8189-4** Instrumentation and Controls Trainer provides experience in setting up, tuning, operating, and troubleshooting actual instrument and control systems of the type used in the power and process industries. By simulating a different process loop, this unit provides instruction in the measuring and transducing of such physical variables as pressure, temperature, flow and level.



4 LOOP PRESSURE • FLOW • LEVEL • pH

The **Model H-ICS-8189-4pH** Instrumentation Controls & pH Control Trainer provides experience in setting up, tuning, operating, and troubleshooting actual instrument and control systems of the type used in the power and process industries.

By simulating a different process loop, this unit provides instruction in the measuring and transducing of such physical variables as pressure, flow, level and pH.



3 LOOP PRESSURE • FLOW • LEVEL

The **Model H-ICS-8189** Process Control Trainer was developed to provide hands-on training for industrial process automation.

The system consists of a clear process level tank, reservoir tank, pump and other instrumentation mounted on or in a mobile bench. This trainer provides measurement and/or control of flow, level and pressure utilizing microprocessor based control.



HAMPDEN INSTRUMENTATION AND CONTROLS TRAINERS

TABLE TOP PROCESS CONTROL



Hampden H-ICS-TT-TR
Table Top Temperature Process Control Trainer



Hampden H-ICS-LT-TR
Table Top Level Process Control Trainer



Hampden H-ICS-FT-TR
Table Top Flow Process Control Trainer



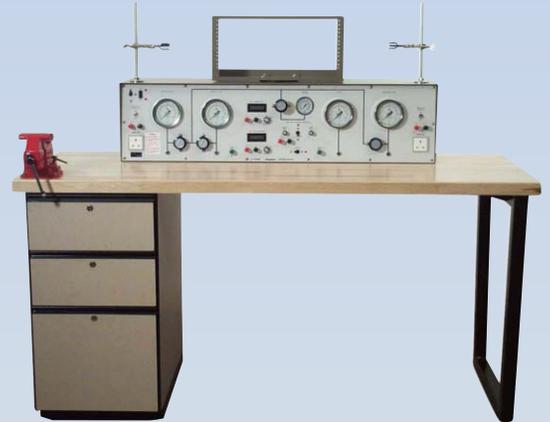
Hampden H-ICS-PT-TR
Table Top Pressure Process Control Trainer



Hampden H-ICS-FL-TT-CDL
Table Top Flow & Level
Process Control Trainer
with Computer Data Logging Option



Hampden H-ICS-PT-TT-CDL
Table Top Pressure & Temperature
Process Control Trainer
with Computer Data Logging Option



**Hampden H-6485 (shown above) and
Hampden H-6485-10 (shown below)** Calibration Benches
contains the air and electrical supplies along with the precision in-
struments need for the testing, calibration, maintenance, and re-
pair for all types of instruments and controllers.



Hampden H-9067 Instrumentation Test Bench provides a complete
platform for instrument calibration.

This unit consists of a fully outfitted equipment turret mounted to a
solid wood 1-3/4" thick work surface equipped with a high quality
vise. The supporting storage cabinet is made to exceed industrial
demands and is designed to provide generous storage space via its
twelve (12) drawers (Four drawers on left side and 8 on right side).

LOOK TO HAMPDEN FOR YOUR TRAINING NEEDS!



Hampden's selection of Instrumentation and Process Control Training equipment is far larger than we are able to show you in this brief brochure. There is literally any size and application, any degree of complexity available. As a matter of fact, Hampden can easily handle requests for trainers that are not presently cataloged. In all cases, standard commercial components are used, so that students receive real-world instruction in the laboratory classroom environment.

Hampden's Training Program offers on-site workshops for instructors and key personnel. All of Hampden's technical trainers may be equipped with computer interface terminals for data gathering, logging and controlling, and can be supplied as a turnkey package, complete with software, hardware, and experiments.

The world-wide popularity of Hampden's training equipment and programs results from the extraordinary collaboration between Hampden's engineers and technical educators. Hampden does not simply adapt standard products for international use, Hampden designs each product for the electrical power characteristics of the country in which it will be used, whatever the voltage or frequency.

Hampden Engineering Corporation is committed to providing the most up-to-date, practical hands-on training equipment.

Visit our home page at www.hampden.com to see what's new at Hampden, or send us an E-mail at sales@hampden.com.



Hampden is committed to providing industry-leading technology.

For the latest from Hampden, visit our home page at <http://www.hampden.com> or e-mail us at sales@hampden.com

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