

## Purpose

The Hampden **H-ICS "T" Series** Trainers provide experience in setting up, tuning, operating, and troubleshooting actual instrument and control systems of the type used in the power and process industries. Each panel, by simulating a different process loop, provides instruction in the measuring and transducing of such physical variables as pressure, temperature, flow and level. Student trainees learn instrumentation and control techniques of standard Fisher-Rosemount equipment. Covered are open-loop control as well as the various types of closed-loop control: on/off, proportional, proportional plus integral, and proportional plus derivative, as well as a variety of final control devices, including electric, pneumatic and electronic.

## Description

The Hampden Instrumentation and Process Control Training System is comprised of seven mobile panels, each containing a single process loop. These panels may be interconnected to form more complex control configurations. Each panel contains, in addition to the principal measuring and transducing device, an independent indication of the value of the physical variable being controlled. Microprocessor-based controllers provide maximum flexibility in setting control parameters, besides providing the computer interface for distributed control. Each panel contains a means of creating a process disturbance, and a recorder for charting the controller's response to changes in set-point or load.

The Hampden **ICS "T" Series** Trainers are equipped with six instructor-insertable faults covering both mechanical and electrical failures. The fault switches are located in a locked compartment located on the side of the units.

## H-ICS-FT Flow Process Loop

The Flow Process Loop consists of the following components:

- Single System Microcontroller (PID) with communications port RS485
- Electronic Indicating Recorder, single channel
- Transmitter, electronic d/p cell - pressure
- Venturi Tube Assembly
- Power Supply, 24V DC
- Air Regulators (2)
- Centrifugal Pump with 1/2HP motor and variable frequency drive
- Storage Tank, 20 gallon
- Flowmeter, water
- Alarm Indicating Lights (2)
- Three-way Manifold
- Receptacle
- Electromagnetic Circuit Protector Power Switch with pilot light
- Removable header assembly
- Pressure gauge, 2"
- Control Panel and mobile stand
- Patch Cords (20)
- Air Hoses (2)
- Ground Fault Interrupter
- Fault Program (6)
- Storage compartment for patch cords and air hoses



MODEL H-ICS-FT Flow Process Control Trainer

## H-ICS-LT Level Process Loop

The Level Process Loop consists of the following components:

- Single System Microcontroller (PID) with communications port RS485
- Electronic Indicating Recorder, single channel
- Transmitter, electronic d/p cell - level
- Current to Pressure (I/P) Converter
- Control Valve, air actuated
- Power Supply, 24V DC
- Air regulators (2)
- Centrifugal Pump with 1/2HP motor
- Storage Tank, 22 gallon
- Flowmeter, water
- Alarm Indicating Lights (2)
- Bubble pipe
- Pump Starter
- Level Tank (for opened and closed level measurement)
- Electromagnetic Circuit Protector Power Switch with pilot light
- Pressure Monitor Taps - Piping
- Pressure Gauge, 2"
- Control Panel and mobile stand
- Patch Cords (20)
- Air Hoses (4)
- Ground Fault Interrupter
- Fault Program (6)
- Storage compartment for patch cords and air hoses



MODEL H-ICS-LT Level Process Control Trainer

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

# Instrumentation and Control Trainers

Educational Training Equipment for the 21st Century

## H-ICS-PT

### Pressure Process Loop

The Pressure Process Loop consists of the following components:

- Single System Microcontroller (PID) with communications port RS485
- Electronic Indicating Recorder, single channel
- Transmitter, electronic - pressure
- Current to Pressure (I/P) Converter
- Control Valve, air actuated
- Power Supply, 24V DC
- Air Regulators (2)
- Pressure Process Tanks (2)
- Pressure Gauges (two, 4.5" and 2")
- Flowmeter, air
- Alarm Indicating Lights (2)
- Orifice Plate
- Receptacle
- Electromagnetic Circuit Protector Power Switch with pilot light
- Air load system
- Air muffler
- Fault Program (6)
- Control Panel and mobile stand
- Patch Cords (20)
- Air Hoses (16)
- Ground Fault Interrupter
- Storage compartment for patch cords and air hoses



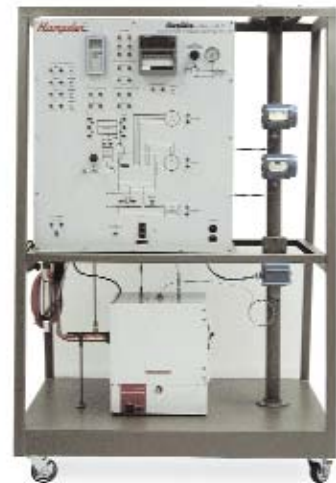
MODEL H-ICS-PT Pressure Process Trainer

## H-ICS-TT

### Temperature Process Loop

The Temperature Process Loop consists of the following components:

- Single System Microcontroller (PID) with communications port RS485
- Electronic Indicating Recorder, two channel
- Air Velocity Transmitter
- SCR Power Controller
- Power Supply, 24V DC
- Air Regulators (2)
- Alarm Indicating Lights (2)
- Temperature Transmitter (for Type T element)
- Temperature Transmitter (for RTD element)
- Thermocouple, Type T
- RTD Element
- Laboratory Oven (modified with an air cooling injector and exhaust damper)
- Thermostat Temperature Control (bulb type)
- Receptacle
- Electromagnetic Circuit Protector Power Switch with pilot light
- Fault Program (6)
- Control Panel with mobile stand
- Patch Cords (24)
- Air Hoses (2)
- Ground Fault Interrupter
- Storage compartment for patch cords and air hoses



MODEL H-ICS-TT Temperature Process Trainer

## Optional Computer Control

The Hampden **H-ICS "T" Series** Trainers are equipped with an RS-485 port so the process may be supervised by a host computer as part of a distributed control scheme.

A computer program and interface is available from Hampden, **Model H-ICS-X**. Together with the interfacing hardware supplied, this system allows for the operator to control the process from any compatible PC system.

## H-6485

### Instrumentation and Calibration Console

The Hampden **Model H-6485** Instrumentation and Calibration Console enables demonstration of the principles of calibration and measurement of process instrumentation. After calibrating an instrument, it can be installed on a trainer and utilized in a real application.



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**Hampden**  
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