

## H-ICS-PX Pressure Control Trainer

### Purpose

The Hampden **Model H-ICS-PX** Pressure Control Trainer is designed to provide complete instruction on the measurement and control of pressure. The trainer consists of a mobile A-Frame-mounted panel whose overall dimensions are 72" high, 48" wide, by 34" deep. The panel contains a single pressure loop along with all necessary measurement, indicating and recording, and control instrumentation.

### Description

#### The Process

The process loop consists of a pump, reservoir, and pressure vessel, along with associated piping and valves. Water is pumped from the reservoir into the pressure vessel. The pressure within the vessel is therefore dependent on the speed of the pump and on the open or closed position of hand valves that permit flowing water to bypass the pressure vessel.

#### The Instrumentation

Vessel pressure is indicated directly by a 0-15 gauge. In addition, pressure is sensed by a Rosemount pressure transmitter, which transmits a 4-20 mA signal, directly proportional to pressure. This signal is received by both a 6-channel-chart recorder and a microprocessor-based controller.



**MODEL H-ICS-PX** Pressure Control Trainer  
Dimensions: 72"H x 48"W x 34"D  
Shipping Weight: 920 lbs.

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

**Hampden**  
ENGINEERING CORPORATION

# Instrumentation and Control Systems

Educational Training Equipment for the 21st Century

## Control Specifications

The controller is capable of the following control actions: proportional only and proportional plus integral. An operator has the ability, through the controller's pushbutton panel, to establish and change the following parameters:

- high alarm limit
- low alarm limit
- set point
- proportional band
- integral rate
- whether alarm on value of measured variable or deviation from set point
- whether manual or automatic control
- manual control of output
- whether set point is locally or remotely set
- the range of the measured variable in engineering units

The controller outputs a 4-20 mA signal to control pump speed. The controller responds to changes in set point and to process upset caused manually by the student. The pump speed is controlled through the action of a proportional relay.

## Educational Features

With the Hampden **Model H-ICS-PX**, students are able to learn how pressure is produced and measured, how it is sensed, and how an electric current proportional to pressure is transmitted. They are provided with the opportunity of calibrating a pressure transmitter and of tuning 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. This trainer is able to perform the following range of experiments:

- Set up and tune a microprocessor-based controller for pressure control including alarm settings.
- Set up and tune a computer control system for pressure control.
- Calibrate an electronic gauge pressure transmitter for pressure measurement.
- Calibrate and operate an electronic recorder.

## Computer Compatibility

The Hampden **Model H-ICS-PX** is equipped with an ethernet port so the process can be supervised by a host computer as a part of a distributed control scheme.

A computer control 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.

## Fault Option

The Hampden **Model H-ICS-PX** can be equipped with six faults, covering both mechanical and electrical failures, accessible to the instructor via a locked compartment located on the rear of the trainer.

Designate **Model H-ICS-200** for the fault system.

## PLC Option

- PLC Control to include (1) Allen Bradley Micrologix **ML-1200** PLC with **H-LTCS** Laptop Control System and Software. Designate **Model H-ICS-PX-PLC**.

## Services Required

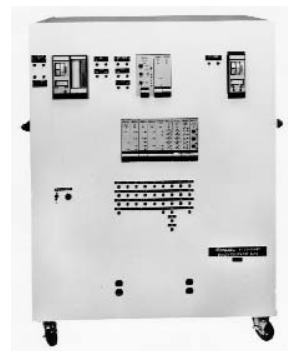
The Hampden H-ICS series operates on 120V AC - 1Ø - 60Hz. It is available for operation at other voltages.

## Instrumentation and Control System Accessories



← **MODEL H-6485 Instrumentation and Calibration Bench** provides pneumatic and electrical calibration sources for laboratory use.

**MODEL H-ICS-110 Module Rack** → provides a means of integrating site-specific apparatus into the classroom for training in servicing, calibration, and on-site replacement.



**H-ICS-110** Module Rack  
shown with optional PLC and Input/Output Jacks

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

**Hampden**  
ENGINEERING CORPORATION

032513