

H-ICS-FX Flow Control Trainer

Purpose

The Hampden **Model H-ICS-FX** Flow Control Trainer is designed to provide complete instruction on the measurement and control of flow. 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 flow loop along with all necessary measurement, indicating and recording, and control instrumentation.

Description

The Process

The process loop consists of a pump, reservoir and a pneumatic control valve, along with associated piping and valves. Water is pumped from the reservoir, through the piping back to the reservoir. Therefore, the rate of water flow is dependent on the position of the control valve.

The Instrumentation

Water flow rate is measured by a differential pressure transmitter, which outputs a 4-20 mA signal proportional to differential pressure across an orifice plate. This signal is received by both a chart recorder and a microprocessor-based controller.



Hampden **MODEL H-ICS-FX** Flow Control Panel
Dimensions: 72"H x 48"W x 34"D
Shipping Weight: 928 lbs.

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

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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:

- 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 has the ability to output a 4-20 mA signal, which is transduced to a 3-15 psi pneumatic signal to position the control valve. The controller responds to changes in set point and to process upset caused manually by the student. The other two pens of the recorder record set point and output signal.

Educational Features

With the Hampden **Model H-ICS-FX**, students are able to learn how flow is produced and measured, how it is sensed, and how an electric current proportional to flow is transmitted. They are provided with the opportunity of calibrating a differential pressure transmitter and 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 flow control including alarm settings.
- Set up and tune a computer control system for flow control.
- Calibrate an electronic differential pressure transmitter for flow measurement.
- Calibrate and operate an electronic recorder.
- Calibrate an electronic current-to-pressure converter.
- Adjust a pneumatic control valve.

Computer Compatibility

The Hampden **Model H-ICS-FX** is equipped with an ethernet port so the process may 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-FX** 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-FX-PLC**.

Services Required

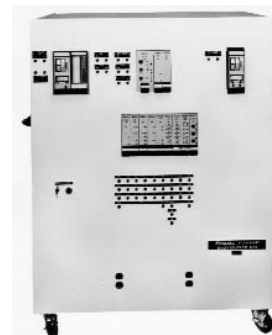
The Hampden H-ICS series operates on 120V AC - 1Ø - 60Hz. It is available for operation at other voltages.

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

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