H-ICS-pHX
pH Control Trainer

Purpose

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

Description

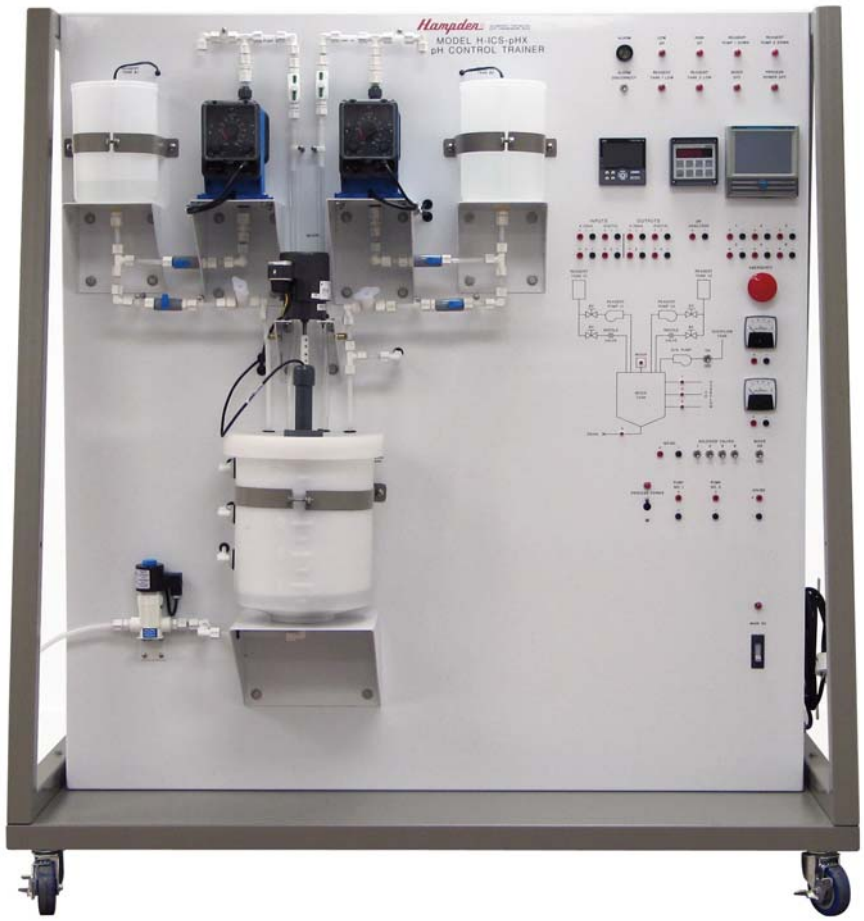
The trainer consists of a mobile A-frame mounted panel 72" high, 64" wide, by 37" deep. It contains:

- Single station microcontroller with two independent P.I.D. outputs
- Six channel recorder
- Electrochemical Analyzer
- Chemical metering pumps (2), with 4-20mA inputs
- Annunciator pilot lamps
- Mixer
- Solenoids
- Switches
- Liquid transfer pump
- Circuit breaker
- Tanks (4)
- Cord set

The Process

The process loop consists of two reagent pumps, one circulating pump, two reagent tanks, each with a gravity and pump circuit; one mixing tank with three controlled level output flow circuits and one controlled drain circuit and one storage tank with liquid transfer pump.

The acidic and/or caustic reagents are pumped or gravity fed from their respective tanks into the mixing tank. The pH sensor transmits a 4-20mA signal to the controller. The controller, in turn, then sends a 4-20mA control loop signal to vary the speed of the appropriate metering pump required to bring the solution in the mixing tank to the setpoint level.



Model H-ICS-pHX pH Control Trainer
Dimensions: 72"H x 64"W x 37"D, Shipping Weight: 1,080 lbs.

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

Hampden® ENGINEERING CORPORATION

032513

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Process Control Training Systems

Educational Training Equipment for the 21st Century

Instrumentation Supplied

Process pH is measured by an electrode assembly which transmits a voltage signal to a pH/ORP analyzer. This ph/ORP unit transmits a 4-20mA signal, directly proportional to pH which is received by both a chart recorder and a microprocessor-based controller. The controller is capable of the following control actions: proportional only, proportional plus integral, and proportional plus integral plus derivative. An operator has the ability, through the controller's push-button panel, to establish and change:

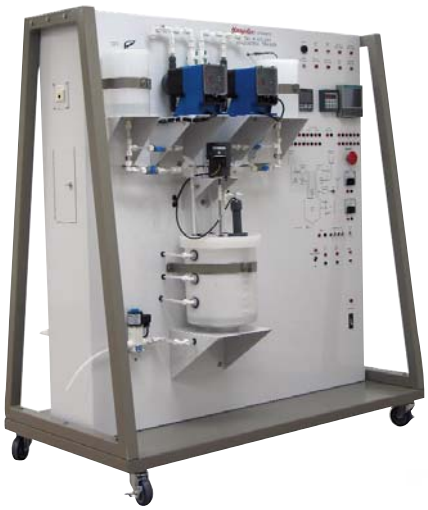
(1) high alarm limit;
(2) low alarm limit;
(3) set point;
(4) proportional band;
(5) integral rate;
(6) derivative rate;
(7) whether alarm on value of measured variable or deviation from set point;
(8) whether manual or automatic control;
(9) manual control of output;
(10) whether set point is locally or remotely set; and
(11) the range of the measured variable in engineering units.

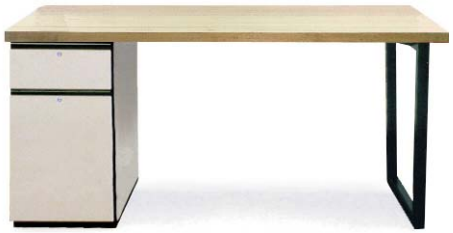
The controller outputs two 4-20mA signals to control each reagent pump speed. The controller responds to changes in set point and to process upset caused manually by the student.

The pump speed is controlled through the 4-20mA input. The status of key process variables are indicated by an annunciator pilot light. This section contains the following alarm points: low pH; high pH; mixer off; reagent pump one down; reagent pump two down; reagent tank one low; and reagent tank two low.

Educational Features

With the Hampden **Model H-ICS-pHX**, 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.





Model H-ICS-pHX can modified to be operated remotely with a separate control bench **Model H-ICS-pHX-CB** (must be specified at time of original order)

Computer Compatibility

The Hampden **Model H-ICS-pHX** is equipped with an ethernet port so the process may be supervised by a host computer as a part of a distributed control scheme. The unit is capable of operating with either supervisory control (set point control) or direct-digital control.

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.

Corrosive Liquid Compatibility

The Hampden **Model H-ICS-pHX** is constructed out of materials which are chemical resistant.

Fault Option

The Hampden **Model H-ICS-pHX** 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-pHX-PLC**.

Services Required

The Hampden **H-ICS** series operates on 120V AC, 1Ø, 60Hz.

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

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