

H-ICS-8189-4pH Instrumentation, Controls & pH Control Trainer

Purpose

The **Model H-ICS-8189-4pH** 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. Students and trainees learn instrumentation and control techniques of standard commercial manufacturers, such as Yokogawa, and Rosemount. Various types of closed-loop control: on/off, proportional, proportional plus integral, and proportional plus integral plus derivative, as well as a variety of final control devices, including electric, pneumatic and electronic are covered.

Description

The system consists of two sections: one with a clear process level tank, reservoir tank, pump and other instrumentation mounted on or inside the mobile bench to provide measurement and control of flow, level and pressure utilizing microprocessor based controls. The pH process loop section contains 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, 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 4-20 mA signal to the controller. The controller, in turn, then sends a 4-20 mA control loop signal to vary the speed of the appropriate metering pump required to bring the solution in the missing tank to the setpoint level. It is designed to provide instruction on the measurement and control of pH.



MODEL H-ICS-8189-4pH Instrumentation, Controls, and pH Control Trainer
Dimensions: 75"W x 62"H x 30"D - Shipping Weight: 1,175 lbs

In level loop, water is pumped through the delay loop to the level tank. The water level in the level tank is controlled by changes in the control valve. The 4-20 mA input loop consists of a level transmitter, recorder, and controller. The output signal is a 4-20 mA control signal, driving the valve toward either the open or closed position.

The pressure loop consists of a pressure transmitter measuring the pneumatic pressure of the I/P valve positioner.

In flow loop, water is pumped at a rate determined by the position of the control valve and of a hand-operated stop valve. Flow is sensed by an orifice differential pressure transmitter. The 4-20 mA output loop contains the controller, recorder, and a current-to-pneumatic converter positioner to control the position of the valve.

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

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Specifications

Construction:

- Mobile bench with doors and control panel. The bench is finished in instrument tan enamel and the control panel in instrument white enamel.

Casters:

- Two stationary, two swivel with locks

Bench Top:

- 75" x 30" x 1 1/16". Unit consists of a 1/16" thick white plastic laminate fastened to 1" thick medite.

Instrumentation:

- Yokogawa PID controllers with ethernet communications port
- Mocharch 6-channel single-station electronic recorder
- Smart d/p cell transmitters, level/flow
- Smart electronic gauge pressure transmitter.
- pH and ORP sensor
- pH/ORP analyzer



MODEL H-ICS-8189-4pH Control Panel

Plumbing:

- For flow and level, all piping on the bench is clear PVC. Fittings are PVC and piping inside the trainer is copper tubing
- The pH section is constructed out of materials which are chemical resistant

Components:

- Main circuit breaker with ground fault interrupter protection.
- Globe style control valve with current to pneumatic (I/P) valve positioner.
- Mixer and mixer switch.
- Two Chemical metering pumps with 4-20mA inputs
- Solenoids
- Liquid transfer pump.
- Two reagent tanks.
- Mixing tank and Storage tank.
- Pumps control switches.
- Oil-less air compressor rated 0.85 CFM at 90 psi complete with two gallon tank and regulator with gauges.
- Reservoir tank, 11 gallon with fill and drain ball valve with hose fitting.
- Clear process tank, 5 gallon with fittings for overflow, manual load needle valve and level transmitters.
- Pump, rated 6 GPM at 6.0' head.
- Three-way valve with 50' dead time flow circuit.
- Orifice plate assembly w/flexible tube interface and quick-connect fittings.
- Power cord, 8ft.
- Cord storage rack

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Faults

Fault package providing 12 instructor insertable faults with switches located in a locked compartment.

Services Required

Electrical:

120V AC 1Ø 60Hz via 3/c power cord.

Water:

Cold - normal cold water service

Drain: Floor

Options

MODEL H-ICS-8189-CC

Computer Workstation

MODEL H-ICS-8189-CCS

Computer Control System with program and interface hardware

MODEL H-ICS-8189-PO

Ink-jet Color Printer

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-8189-4pHX-PLC**.

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