H-ICS-TX

Temperature Control Trainer

Purpose

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

Description

The Process

The process loop consists of a pump, reservoir with an electric heater, and a radiator, along with associated piping valves. Water is pumped from the reservoir through either a short loop, or through the radiator, back to the reservoir. Therefore, the temperature is dependent on the current through the heater and on the position of the solenoid-operated three-way valve.

The Instrumentation

Water temperature is measured by a thermocouple. The thermocouple outputs a millivolt signal proportional to temperature. This signal is received by a thermocouple transmitter which transmits a 4-20 mA signal to both a 6-channel-chart recorder and a microprocessor-based controller.

Hampden **MODEL H-ICS-TX** Temperature 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

012119

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Instrumentation and Control Systems

Educational Training Equipment for the 21st Century

Control Specifications

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 pushbutton panel, to establish and change:

- high alarm limit
- low alarm limit
- set point
- proportional band
- integral rate
- derivative time
- 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 responds to changes in set point and to process upset caused manually by the student. The heater current is controlled through the action of a proportional power controller that operates on 4-20 mA controller output.

Educational Features

With the Hampden **Model H-ICS-TX**, students are able to learn how heat is added to or removed from a process, how temperature is sensed, and how a voltage proportional to temperature is transmitted. They are provided with the opportunity 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. This trainer is able to perform the following range of experiments:

- Set up and tune a microprocessor-based controller for temperature control including alarm settings.
- Set up and tune a computer control system for temperature control.
- Calibrate an electronic temperature transmitter for temperature measurement.
- Calibrate an electronic recorder.
- Operation of three-way control valve or proportional heater controller as the final control element.

Computer Compatibility

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

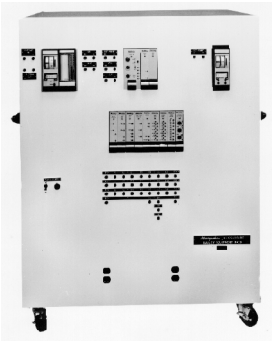
Services Required

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

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