

# ENGINEERING TRAINING SYSTEMS



**Hampden**  
ENGINEERING CORPORATION



# ENGINEERING TRAINING SYSTEMS

**Hampden Engineering** is a world leader in design and development of engineering training systems for universities, colleges, and technical institutes. Since 1954, Hampden has supplied state-of-the-art equipment to engineering schools throughout the United States and in more than 50 countries worldwide.

## Comprehensive Engineering Training Systems

Hampden offers complete hardware and software for engineering training at all levels of complexity. Its comprehensive engineering equipment solutions address a range of engineering disciplines, including:

- Heat mass and transfer
- Fluid mechanics
- Civil engineering
- Chemical engineering

Hampden continues to develop and introduce new products in response to technological needs.

## Real World Trainers for Real Training

Hampden's success in hands-on engineering training is grounded in the philosophy of Real World Trainers = Real Training. Hampden's personnel bring real-world experience in both engineering and training. The result is the best in engineering training systems, coupling in-depth engineering expertise with hands-on, real-world training.



**Standard Products...Designed to Meet your Growing Needs!**

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# ENGINEERING TRAINING SYSTEMS

## Mechanical Engineering

### Fluid Mechanics



**Model H-6910-CDL**  
Wind Tunnel



**Model H-6910-12A**  
Wind Tunnel

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# Mechanical Engineering

## Fluid Mechanics Continued



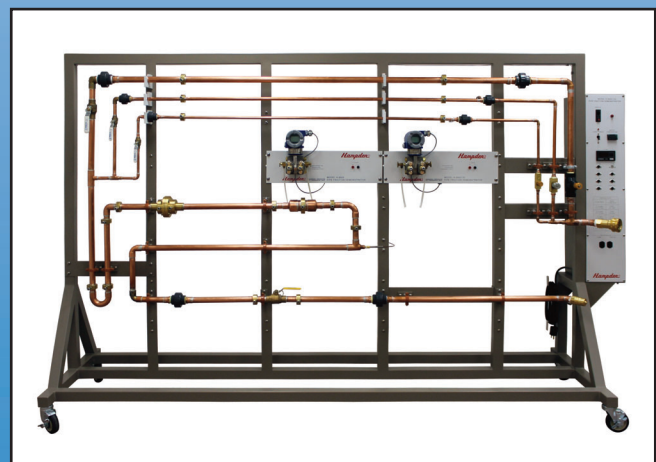
**Model H-6950**  
Flow Measurement Unit



**Model H-6981**  
Centrifugal Pump Test Demonstrator



**Model H-6960**  
Laminar Flow Analysis Demonstrator



**Model H-6920**  
Pipe Friction Demonstrator

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# ENGINEERING TRAINING SYSTEMS

## Mechanical Engineering Fluid Mechanics Continued



**Model H-6985**  
Waterhammer Demonstrator



**Model H-6980**  
Series/Parallel Pump Test Demonstrator



**Model H-6640**  
Air Flow Unit, Shown with Options -10A, -10B, -20A, -20B



**Model H-6970**  
Hydrokinetics Demonstrator  
Shown with H-6970-U Ultrasonic Height Gauge Option



**Model H-6925-CDL**  
Fluid Circuit Demonstrator with Computer Data Logging Option

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# Mechanical Engineering

## Fluid Mechanics Continued



**Model H-6740**  
Air Ventilation System Trainer



**Model H-6878-CDL**  
Six-Pass Heat Exchanger Demonstrator w/ Computer Data Logging Option



**Model H-6990**  
Tilting Water Channel and Gate

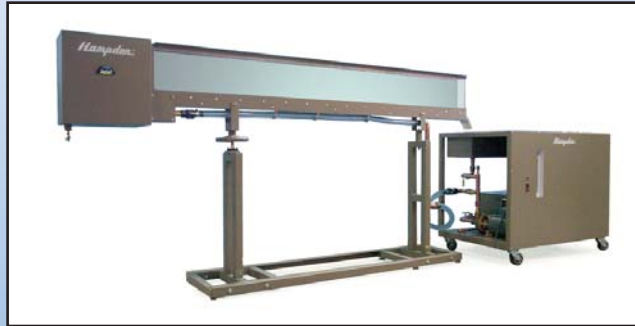


**Model H-6540**  
Water Hydration System (Options shown: H-6540-10 Water Hydraulic Bench,  
H-6540-15 Bernoulli's Theorem Demonstration Apparatus,  
H-6540-16 Impact of a Jet Module, and H-6540-17 Calibration of Orifices)

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# ENGINEERING TRAINING SYSTEMS

## Mechanical Engineering Fluid Mechanics Continued



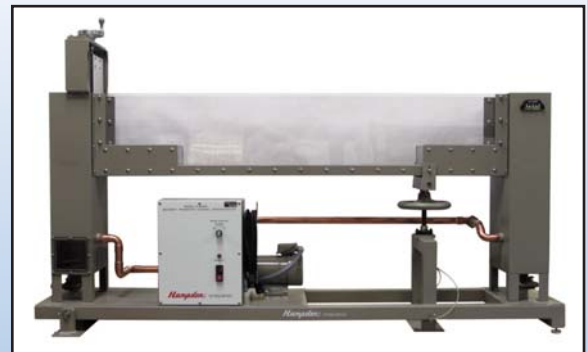
**Model H-6940**  
Multi-Purpose Flume



**Model H-6530**  
Hydraulic Demonstration Channel



**Model H-6531**  
Hydraulic Demonstration Channel



**Model H-6523A**  
Sediment Transport Channel Demonstrator



**Model H-6510**  
Drainage and Seepage Tank Demonstrator



**Model H-6520**  
Infiltration Demonstrator

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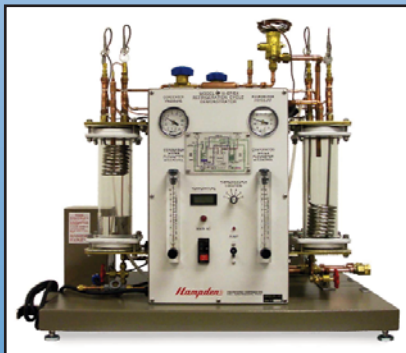
# Mechanical Engineering

## Heat Mass and Transfer



**Model H-6710-CDL**

Refrigeration Demonstrator with Computer  
Data Logging Option



**Model H-6715**

Refrigeration Cycle Demonstrator



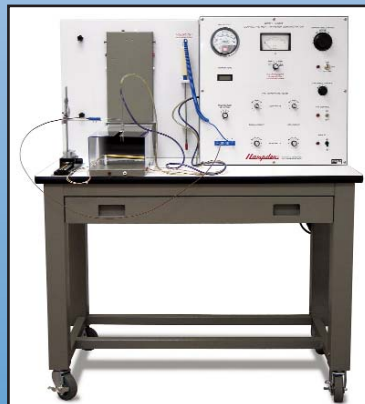
**Model H-6878-CDL**

Six-Pass Heat Exchanger Demonstrator w/ Computer Data Logging Option



**Model H-6850-21**

Concentric Tube Heat Exchanger



**Model H-6882-CDL**

Convection Heat Transfer Demonstrator  
with Computer Data Logging Option



**Model H-6870**

Cooling Tower Demonstrator, shown  
with Water Distribution Column #3



**Model H-6856**

Cross-Flow Heat Exchanger



**Model H-6830**

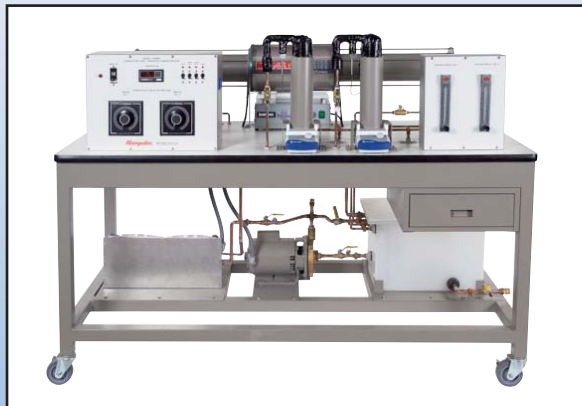
Heat Pump Trainer

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# ENGINEERING TRAINING SYSTEMS

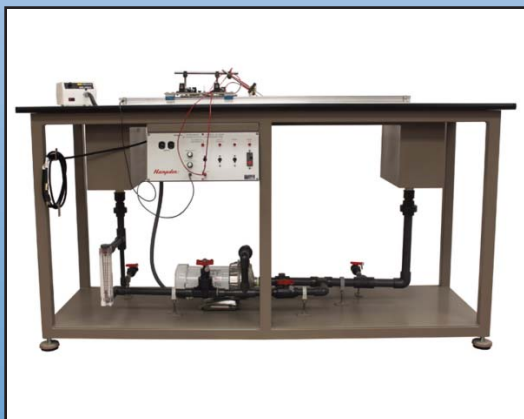
## Mechanical Engineering

### Heat Mass and Transfer Continued



**Model H-6860**

Conduction Heat Transfer Demonstrator



**Model H-6970**

Hydrokinetics Demonstrator



**Model H-6850-20-CDL**

Double-Pipe Heat Exchanger (Water to Steam)



**Model H-6820-CDL**

Dual Heat Pump Demonstrator



**Model H-6862A**

Conduction Heat Transfer Demonstrator



**Model H-6898**

Thermal Radiation Trainer



**Model H-6852**

Modular Heat Exchange Demonstrator

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# Mechanical Engineering

## Heat Mass and Transfer Continued



**Model H-6879-CDL**

Nucleate Boiling Heat Transfer Demonstrator  
with Computer Data Logging Option



**Model H-181-100A**

Steam Boiler Trainer



**Model H-6720**

Refrigeration Unit



**Model H-6899A**

Thermal Radiation Demonstrator



**Model H-GTL-1**

Geothermal Trainer

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## Mechanical Engineering

### Heat Mass and Transfer Continued



**Model H-CRT-1**  
Commercial Refrigeration Trainer



**Model H-ACT-1**  
Air Conditioning System Trainer



**Model H-ACD-1A-CDL**  
Air Conditioning Demonstrator

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## Chemical Engineering



**Model H-6173**  
Fractional Distillation System

The Model H-6173 makes educational and industrial experimentation possible in a virtually limitless range—from simple steady-state binary separations to highly sophisticated process dynamics research including column hydraulics and packing materials. Even bench-scale pilot production runs are feasible with appropriate modifications.

Because of its compact size, relatively large capacity boiler, relatively large condensing tube surface and versatile rapidlymanipulable feed and measurement hardware, this system possesses considerably more flexibility than conventional laboratory distillation equipment. Changes in operating conditions are quickly effected and column response is rapid. Students, teachers and industrial researchers are able to collect more pertinent data in a shorter time than with conventional

equipment and carry exploration into distillation phenomena and processes further and at a lower cost.

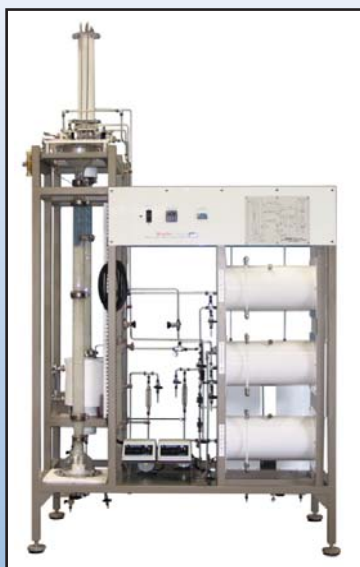
The effects of vaporization, condensation and liquid-vapor mixing—relative to the separation of volatile liquid systems by the application of heat—are observed and measured under the dynamic conditions of column operation.

The Model H-6173 requires only water and electrical connections for operation. Because the unit has very rapid response and glass column walls, it is also used effectively in lecture demonstrations. The unit is designed for closed-loop operation with feed and product streams cycled through a common reservoir tank. However, it can be arranged to effectively separate a feedstream with separate distillate and bottoms product.

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# ENGINEERING TRAINING SYSTEMS

## Chemical Engineering Continued



**Model H-6150**  
Liquid-to-Liquid Extraction  
Demonstrator



**Model H-6160**  
Solid-to-Liquid Extraction  
Demonstrator



**Model H-6290-CDLC**  
Gas/Liquid Tubular Absorption  
Column with Computer Data  
Logging & Control



**Model H-6252**  
Modular Chemical Reactor System



**Model H-FPST-1**  
Flame Propagation and Study Trainer



**Model H-6140**  
Double-Effect Evaporator Demonstrator

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## Chemical Engineering Continued



**Model H-IDK-1**  
Desalination Process Trainer



**Model H-6250**  
Chemical Liquid Reactor Demonstrator



**Model H-6260**  
Chemical Liquid Tubular Reactor Demonstrator



**Model H-6271**  
Mass Transfer and Diffusion Coefficients



**Model H-6180**  
Tray Drier Demonstrator



**Model H-6290**  
Gas/Liquid Absorption Column

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# ENGINEERING TRAINING SYSTEMS

## Chemical Engineering Continued



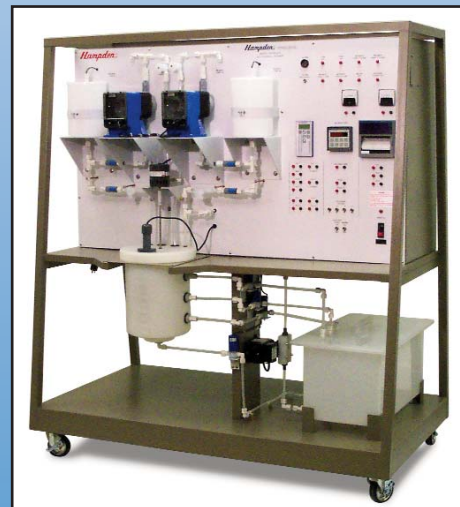
**Model H-ICS-8189-4**  
Instrumentation & Controls Trainer



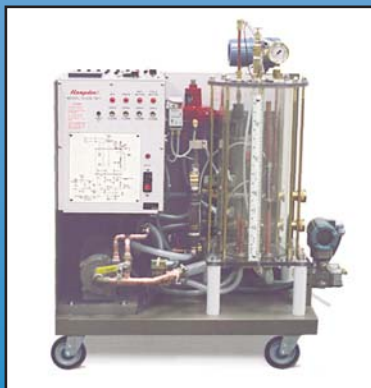
**Model H-ICS-8189-4ph**  
Instrumentation, Controls & pH Control Trainer



**Model H-ICS-pHX**  
pH Control Trainer



**Model H-ICS-pHT**  
pH Process Control Trainer



**Model H-ICS-7617**  
Instrument and Process Control Trainer



**Model H-ICS-7627**  
Instrumentation & Controls Program

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# Civil Engineering

## Hydrology



**Model H-6535**  
Hydrostatics Bench



**Model H-6530**  
Hydraulic Demonstration Channel



**Model H-6925**  
Fluid Circuit Demonstrator



**Model H-6510**  
Drainage and Seepage Tank Demonstrator



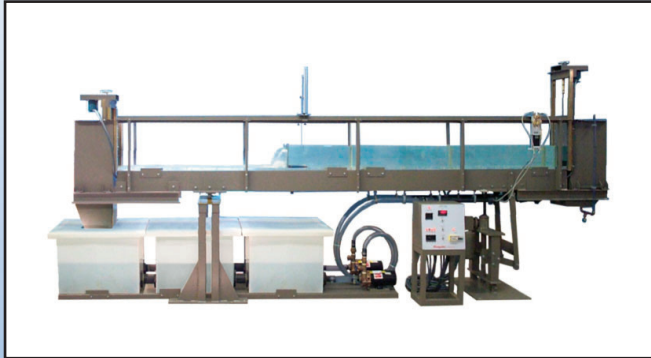
**Model H-6524**  
Mobile Bed and Flow Visualization Tank Demonstrator

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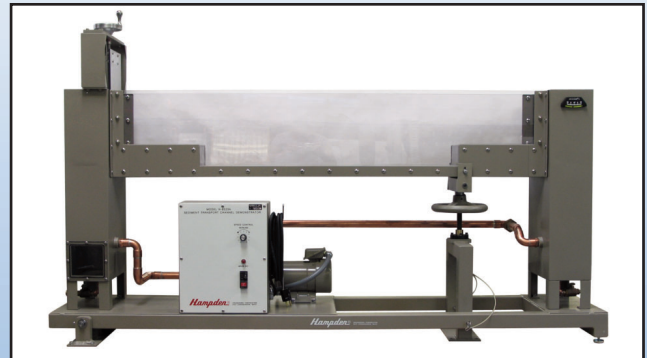


# ENGINEERING TRAINING SYSTEMS

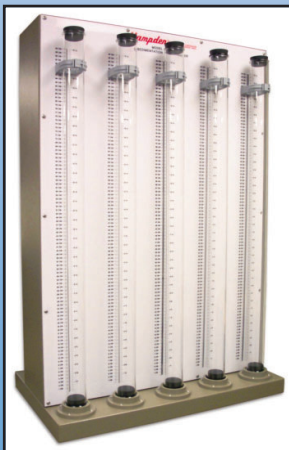
## Civil Engineering Hydrology Continued



**Model H-6531**  
Hydraulic Demonstration Channel



**Model H-6523A**  
Sediment Transport Channel Demonstrator



**Model H-6527**  
Sedimentation Study Trainer



**Model H-6920**  
Pipe Friction Demonstrator



**Model H-6526**  
Ground Water Flow Tank



**Model H-6540**  
Water Hydration System (Options shown: H-6540-10 Water Hydraulic Bench, H-6540-15 Bernoulli's Theorem Demonstration Apparatus, H-6540-16 Impact of a Jet Module, and H-6540-17 Calibration of Orifices)

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## Civil Engineering Hydrology Continued



**Model H-6940**  
Multi-Purpose Flume



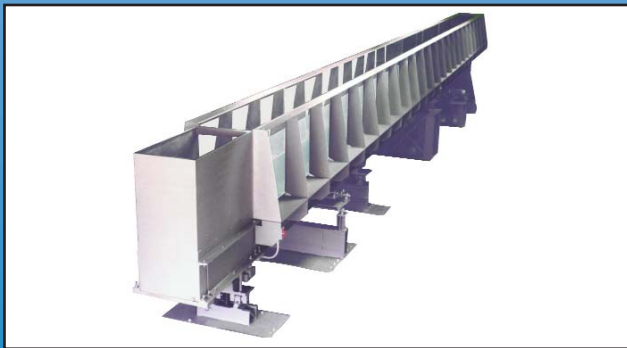
**Model H-6950**  
Flow Measurement Unit



**Model H-6960**  
Laminar Flow Analysis Demonstrator



**Model H-6970**  
Hydrokinetics Demonstrator



**Model H-6990**  
Tilting Water Channel and Gate



**Model H-6850**  
Heat Transfer Unit

*to Meet your Growing Needs!*

# ENGINEERING TRAINING SYSTEMS

## Civil Engineering Air Flow Systems



**Model H-6910-12A-CDL**  
Wind Tunnel



**Model H-6910-CDL**  
Wind Tunnel



**Model H-6910-24-CDL-250**  
Wind Tunnel (Shown with control unit)



**Model H-6640**  
Air Flow Unit



**Model H-6740**  
Air Ventilation System Trainer

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# Civil Engineering Structures



**Model H-6320**

Structures Test System  
shown with H-6320-10 plastic truss option



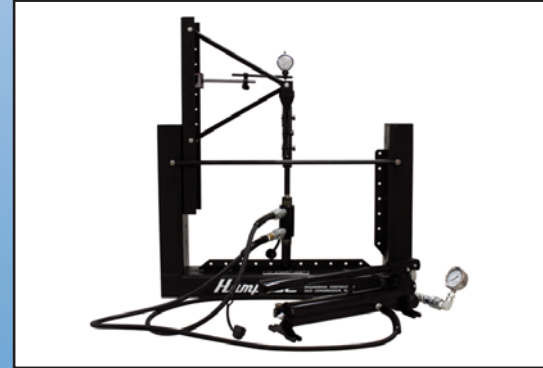
**Model H-6320**

Structures Test System  
shown with H-6320-20 wing-beam with whiffle tree option



**Model H-6320**

Structures Test System  
shown with H-6320-60 crane beam option



**Model H-6320**

Structures Test System  
shown with H-6320-70 vertical mounted truss option



**Model H-6320**

Structures Test System  
shown with H-6320-71 flat beam assembly option



**Model H-6311**

Torsion Test Demonstrator

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# ENGINEERING TRAINING SYSTEMS

## Civil Engineering Structures Continued

A hydraulic tensile testing machine with a screw-type operating cylinder which gives completely smooth and step-less loading. The cylinder is operated by means of a lever which is designed so that only light hand power is required to obtain maximum load. The convenient size and the sturdy structure make the Model H-6310 a highly reliable and risk-free machine. The power is read on a large and clearly visible indicating instrument. The instrument is provided with a maximum-value indicator which shows the power at failure on the test rod.



**Model H-6310-10**

Hydraulic Tension Testing Machine  
(Shown with option -10 Tensile  
Test Rod Set)



**Model H-6310-30**

Hydraulic Tension Testing Machine  
(Shown with option -30  
Recording Device)



**Model H-6310-20**

Hydraulic Tension Testing  
Machine (Shown with option  
-20 Brinell Test Piece Set)



**Model H-6310-31**

Hydraulic Tension Testing  
Machine (Shown with option  
-31 Bending Device)



**Model H-6310-32**

Hydraulic Tension Testing  
Machine (Shown with option  
-32 Large Compression  
Plates)



← **Model H-6310-35**

Hydraulic Tension  
Testing Machine  
(Shown with option -35  
Electronic Force  
Measurement)



**Model H-6310-38**

Hydraulic Tension Testing Machine  
(Shown with option -38 PC-Aided  
Measurement Recording System)



**Model H-6310-33**

Hydraulic Tension Testing  
Machine (Shown with option  
-33 Helical Spring Test)



**Model H-6310-34**

Hydraulic Tension Testing  
Machine (Shown with option  
-34 Disc Spring Test)



**Model H-6310-36**

Hydraulic Tension Testing  
Machine (Shown with  
option -36 Shear Test)



**Model H-6310-37**

Hydraulic Tension Testing  
Machine (Shown with option  
-37 Deep Draw Test)

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# Bio Engineering



**Model H-BIO-100**  
Bio Diesel Demonstrator



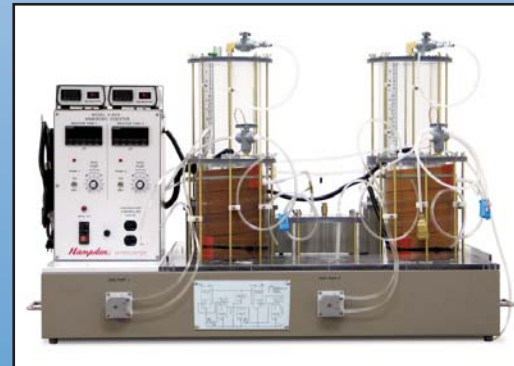
**Model H-ETS-1A**  
Ethanol Production Process System



**Model H-6150-TT**  
Table Top Liquid to Liquid  
Extraction Demonstrator



**Model H-6252**  
Modular Chemical Reactor System



**Model H-6515**  
Anaerobic Digester



**Model H-6535**  
Hydrostatics Bench



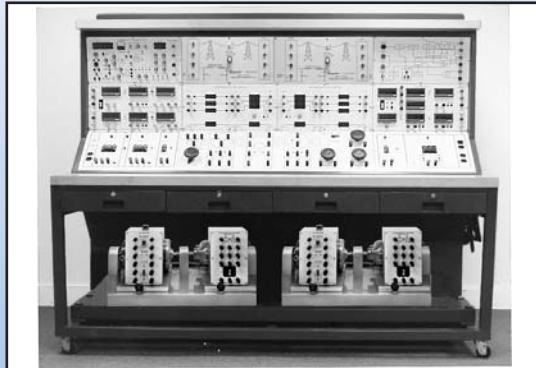
**Model H-6518**  
Aerobic Digester

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## Electrical Engineering

## Electrical Mechanics



**Model H-EWC-100AX**

Rotating Machine Mobile Console



**Model H-EWC-300AX**

Rotating Machine Mobile Console



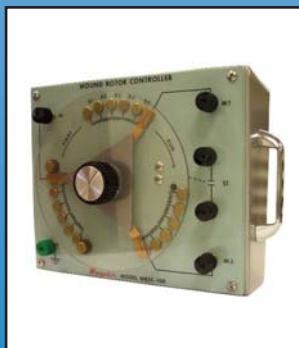
**Model HMD-102-CM**

Hampden Console



**Model HMD-100-CM-DA**

Hampden Console with digital meters



**Model WRSC-100**

Wound Rotor Speed Controller



**Model WRM-100-3A**

Wound Rotor Motor



**Model SM-100-3**

Synchronous Machine



**Model CSM-100**

Capacitor Start Motor

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# Electrical Engineering

## Power Electronics



**Model H-VFD-100C**  
Variable Frequency Drive Trainer



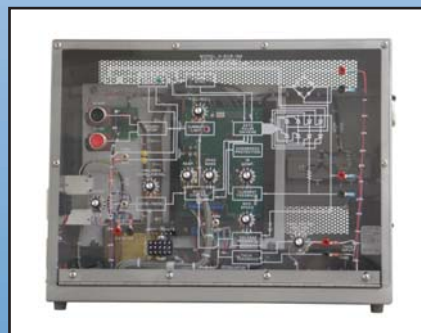
**Model H-R-SCR-1A**  
Thyristor Circuits Trainer



**Model H-R-SCR-2**  
Power Electronic System



**Model H-R-SCR-3**  
Power Electronics System



**Model H-SCR-104**  
Four-Quadrant DC Speed Controller



**Model H-ACVD-100**  
AC Vector Drive Training System



**Model ACC-100**  
AC Controller



**Model DCC-100**  
DC Controller

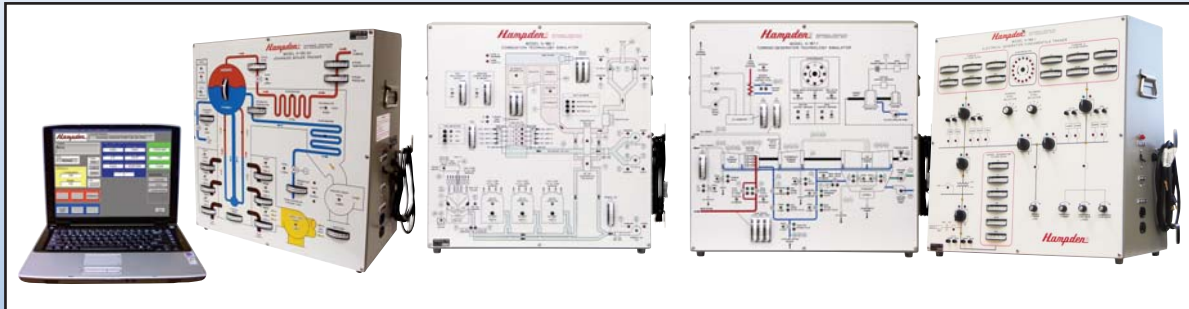


**Model T-100-3A**  
3 Phase Experimental Transformer

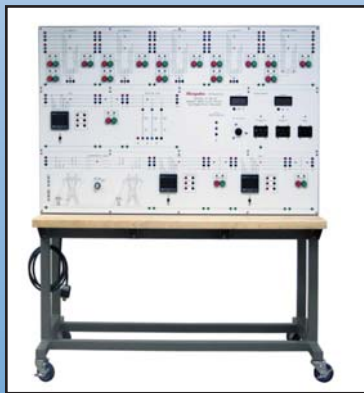
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# ENGINEERING TRAINING SYSTEMS

## Electrical Engineering Smart Grid Systems



**Models H-185-2A** Advanced Boiler Trainer, **H-186-1** Combustion Technology Simulator  
**H-187-1** Turbine/Generator Technology Simulator, and **H-188-1** Electrical Generation Fundamentals Trainer



**Model H-190-1A**  
Smart Grid Electrical  
Distribution Trainer



**Model H-190-2A**  
Smart Grid Load  
Monitoring Trainer



**Model H-190-3**  
Smart Grid Electrical Generation  
Synchronization Trainer



**Model H-190-4**  
Smart Grid Solar Photovoltaic  
and Wind Turbine Trainer



**Model H-190-5**  
Smart Grid Power Shedding  
and Load Management Trainer

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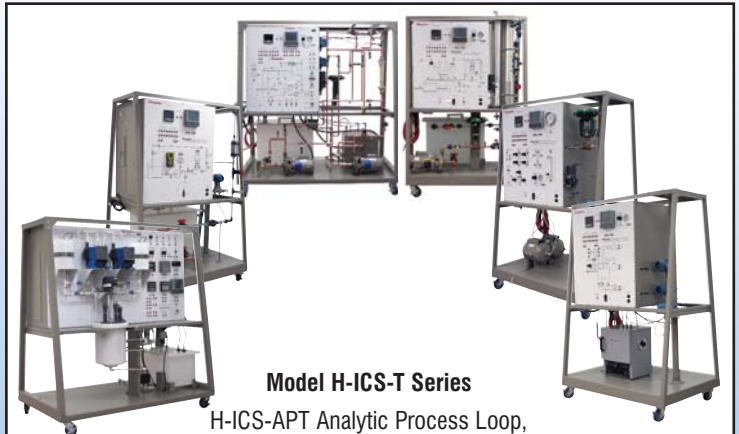


# Electrical Engineering Instrumentation



## Model H-ICS-X Series

H-ICS-FX Flow Control Trainer, H-ICS-LX Level Control Trainer,  
H-ICS-PX Pressure Control Trainer, and  
H-ICS-TX Temperature Control Trainer



## Model H-ICS-T Series

H-ICS-APT Analytic Process Loop,  
H-ICS-FT Flow Control Trainer,  
H-ICS-HET Heat Exchanger Process Loop,  
H-ICS-LT Level Control Trainer,  
H-ICS-PT Pressure Control Trainer,  
and H-ICS-TT Temperature Control Trainer



## Model H-IPPT-3

Industrial Process Plant Trainer



## Model H-ICS-FLT

Flow/Level Process Control Trainer with PLC



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

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# ENGINEERING TRAINING SYSTEMS

## Electrical Engineering

### High Voltage



**Model H-MHVS-1**

Modular High Voltage System

Hampden **Model H-MHVS-1** Modular High Voltage System control panel is used to operate the modular high voltage AC and DC test equipment. The control panel includes the necessary power and test instruments required to run the set-ups.

Parts include:

- Control Panel
- Control Desk
- Voltmeters (3)
- HV Test Meter
- HV Flexible Connector
- Earthing Rod
- Connecting Rod
- Connecting Cup
- Floor Pedestal
- Rectifier
- Impulse Capacitor
- Measuring Resistor
- Charging Resistor
- Wavefront Resistor
- Wavetail Resistor
- Earthing Switch
- Voltage Divider
- Insulating Rod
- Spheregap
- Electrical Drive for Sphere Gap
- Electrodes (4)
- Voltage Dividers (2)
- Low Voltage Dividers
- Trigger Divider
- Electronic Triggersphere
- Spacer Tube
- DC Load Resistor
- Measuring Sphere Gap
- Oil Testing Cup
- Cascade Connection Set
- Component Stand
- Safety Cage
- Vessel for Vacuum and Pressure with Pump and Compressor
- Corona Cage
- Standard Capacitor
- Coupling Capacitors (2).

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**Measuring Spark Gap**



**Component Stands**

**Modular High Voltage Unit Set ups**

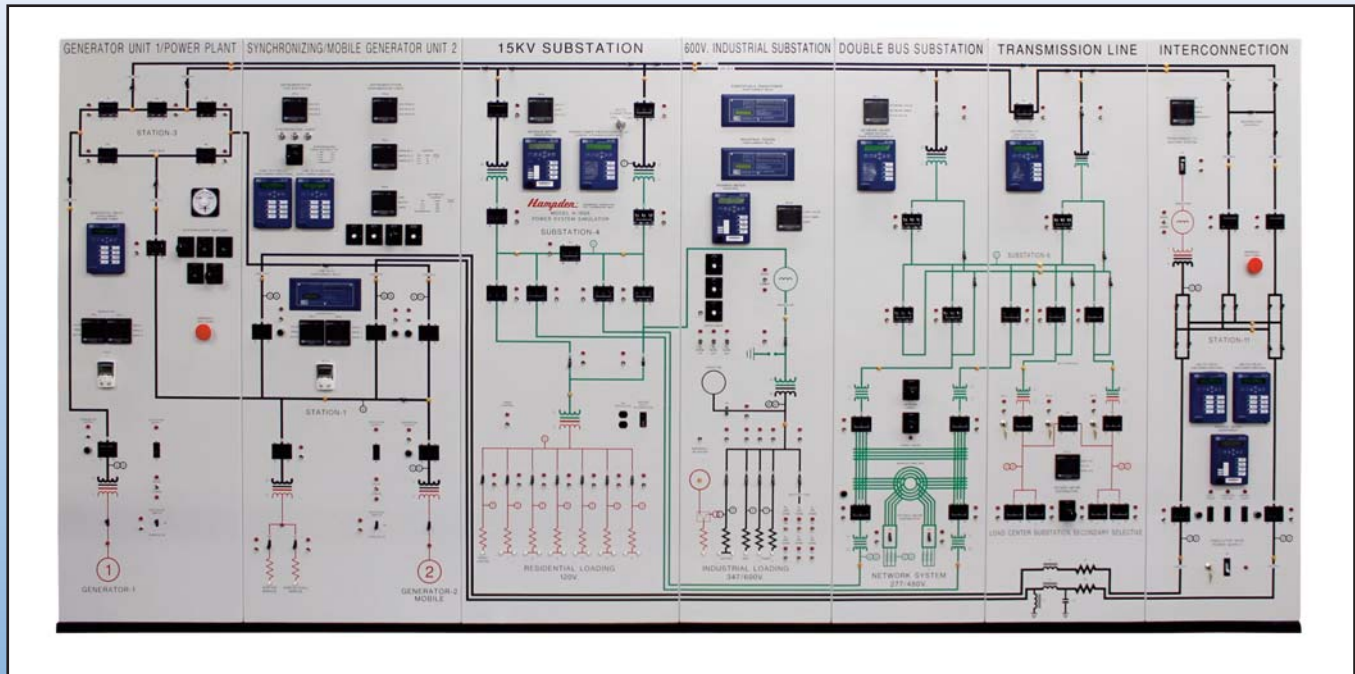


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# ENGINEERING TRAINING SYSTEMS

## Electrical Engineering Power System Simulator



Model H-180A Power System Simulator

The intent of the Power System Simulator is to incorporate all the aspects of a power system from generation and interconnection through transmission to distribution. Three distinct levels of voltage shall be utilized. The 208\* or 220\* volt level will be used for interconnection and generation, as well as for residential and network voltages, 380\* volts will be used by the distribution and industrial levels and 600\* volts will be used for the transmission levels.

\* These voltages are adapted to the voltage at the end user's site.

The insertion of all faults will be done by the instructor at the instructor's computer.

**Section 1 – GENERATOR UNIT-1/POWER PLANT** shall contain facilities for generation and a substation incorporating the generation and power transmission.

**Section – 2 SYNCHRONIZING & GENERATOR UNIT-2 (Mobile)** shall contain facilities for synchronization and generation and a station incorporating the generation and power transmission.

**Section 3 – 15 KV SUBSTATION** shall incorporate a distribution sub-station and distribution functions covering residential distribution.

**Section 4 – 600V INDUSTRIAL SUBSTATION** shall incorporate an industrial sub-station and distribution functions covering industrial distribution.

**Section 5 – DOUBLE BUS SUBSTATION & Section 6 – TRANSMISSION LINES** shall incorporate a double bus distribution sub-station, a network system and a selective secondary distribution load center.

**Section 6 – TRANSMISSION LINES** in addition to the double buss distribution sub-station, shall incorporate the line settings for two transmission lines.

**Section 7 – INTERCONNECTION** shall incorporate facilities for inter-connection with a separate power system (in the case of this power system simulator, it would be a local power company) and shall contain facilities for generation and a substation incorporating the generation and power transmission.

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# Electrical Engineering

## Power Plant System



**Model H-181A** Steam Power Plant System (Boiler Trainer)

The primary function of the Hampden **Model H-181A** Steam Power Plant System (Boiler Trainer) is to demonstrate to the student how a boiler makes steam for power generation. This model features full-function automatic controls at all points in the process. The Hampden Steam Power Plant System (Boiler Trainer) consists of a control bench. Equipment behind the bench, such as the boiler, condenser, turbine, alternator, etc., is shown silkscreened on the lower section of the panel. All interconnecting piping is also shown so that the entire system is graphically represented. All pressure and temperature gauges are shown graphically where they appear in the system so that the student can monitor the readings of the gauges and know exactly where in the system these readings are being taken.

### **Control Bench**

The control bench panel includes all the controls and monitoring devices to operate the boiler system. Included are (2) two touch screen computer stations that fully monitor the boiler system and allow for data logging.

### **Boiler and Steam/Condensate**

Contains the trip indicator lights, alarm indicator lights, chart recorder, virtual meters, manual/automatic controller, and control switches.

The manual/automatic controllers provided are as follows: Steam Pressure Control System, Furnace Pressure, Control System, Drum Level Control System, Level Control System, Transmitters, Chart Recorders\Alarm and Trip Indicator System, Manual Controls, Meters and Gauges - (Virtual)

### **Turbine**

Contains the controls for the turbine. Mounted on this section are the following: Tachometer - (Virtual), Temperature Gauges - (Virtual), Pressure Gauges - (Virtual), Turbine Speed Control System

### **Alternator**

Contains the controls for the alternator. Mounted on this section are the following: Main AC Monitoring System - (Virtual), Alternator Monitoring System - (Virtual), Alternator Output - (Virtual), Line Synchronizing System

**Boiler** - The boiler is a Columbia providing 500 lbs. of steam per hour at 150 psig. It includes a condensate return tank, blowdown separator, necessary fans, valves, dampers, pumps, etc. for a functional operating system.

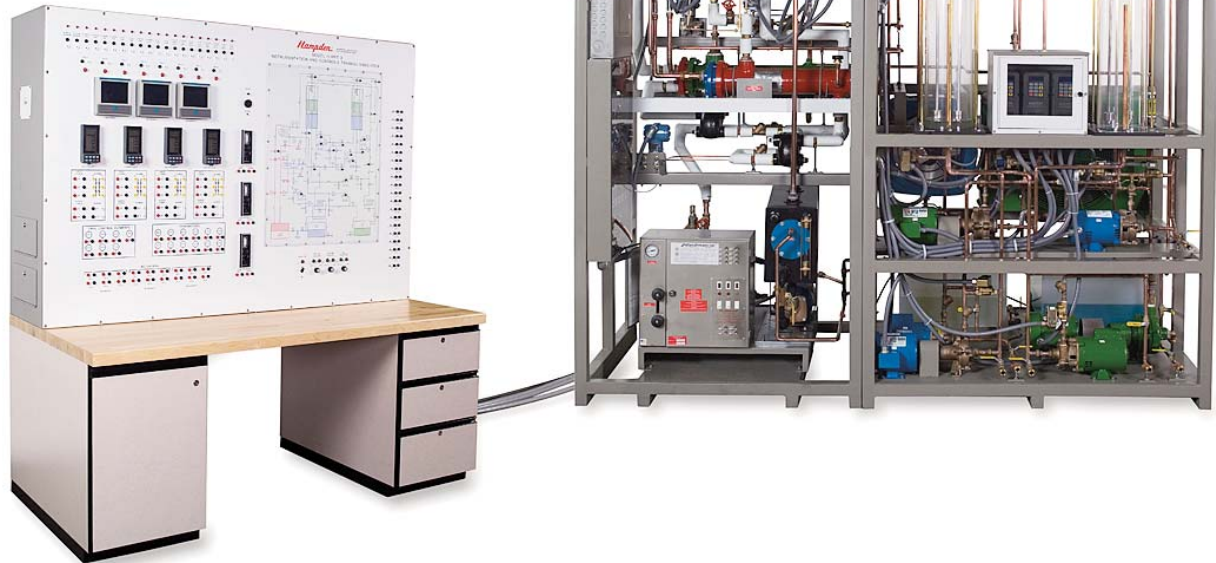
**Turbine** - The turbine is equal to a Carling 16A, Class 1.

**Alternator** - The alternator is designed to interface with the turbine.

***Standard Products...Designed to Meet your Growing Needs!***

# ENGINEERING TRAINING SYSTEMS

## Model H-IPPT-3 Industrial Process Plant



The Hampden **Model H-IPPT-3** Industrial Process Plant is a pilot plant unit designed for training engineers, technicians, repairmen, and operators in the following ways:

- Enables students to familiarize themselves with actual industrial process systems. It is designed to expose them to the different kinds of industrial equipment used in measurement and control.
- Has all the operating characteristics of a full-sized industrial plant without the psychological pressures and dangers inherent in an actual process plant. This permits students to make and experience the results of errors in system operation with no danger to the process or operator.
- It is designed to allow student development in the areas of system start-up, tuning, and troubleshooting, all of which are of critical importance to the instrument technician.

The Hampden **Model H-IPPT-3** is comprised of two sections. The Control Section contains all control equipment, remote control interface and a complete tri-colored graphic representation of the pilot plant.

The Process Plant incorporates transparent level towers that make it possible for the students to actually see the process in action. The two liquids used in the Process Plant have different specific gravities, different colors, and are immiscible. These

liquids are non-corrosive to brass and copper alloys, non-toxic, and non-flammable.

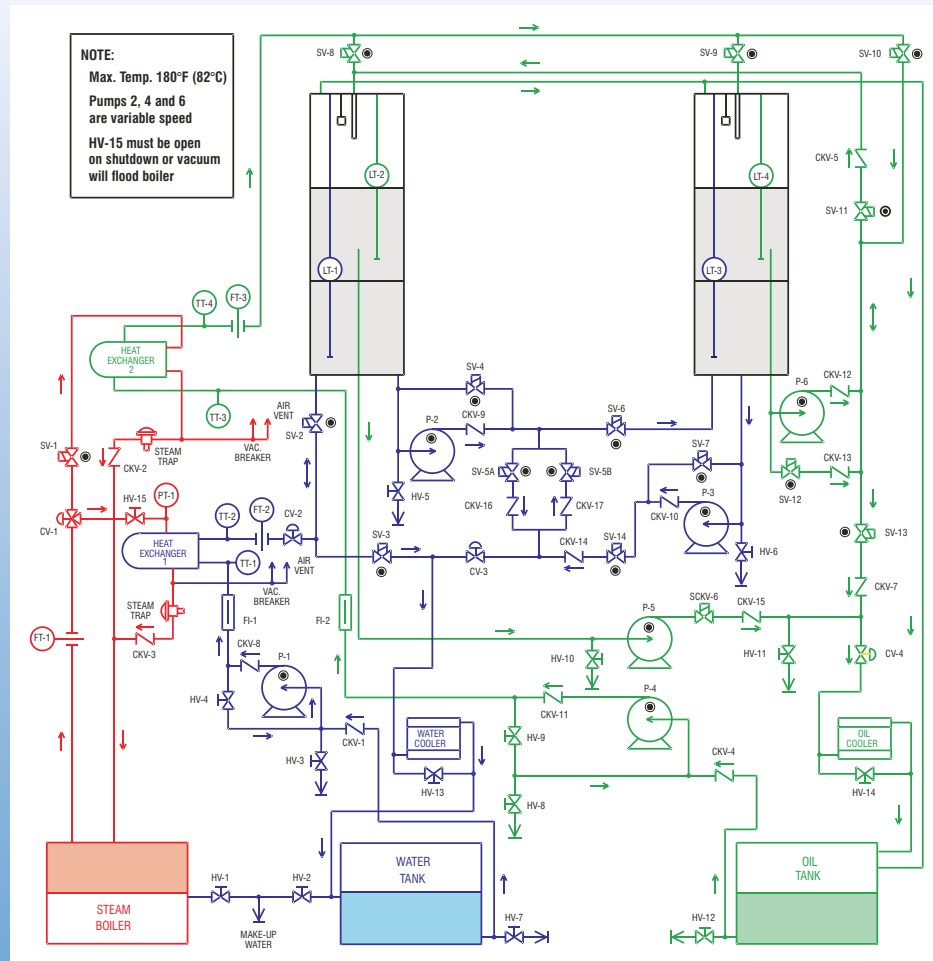
The Process Plant is factory assembled and is supplied with a pair of transparent towers, two storage tanks, circulating pumps, four heat exchangers, a low-pressure steam generating boiler and all necessary hand valves together with its copper and applicable transparent piping. It comes completely equipped with the instrumentation necessary to allow instruction in operation, measurement, control, and control system tuning adjustment of the process and control system variables.

### Equipment Supplied

- Electric boiler
- Steam heat exchangers
- Air heat exchangers
- Microprocessor-based controllers
- Recorders
- Temperature transmitters
- Differential pressure transmitters
- Pressure transmitter
- Level transmitters
- Control valves
- Auto/manual stations
- Interconnecting cords

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## Model H-IPPT-3 Industrial Process Plant - Continued



H-IPPT-3 Flow Diagram

### Optional Equipment

**MODEL H-ICS-X** - Computer Control Software/Interface

**MODEL H-ICS-CS** - Computer System

**MODEL H-IPPT-3-FP** - Fault Program

**MODEL H-IPPT-PLC-5** Programmable Logic Controller

**MODEL H-ICS-CC** - Computer Workstation

### Services Required

#### Electrical—

208/120V. AC-3Ø-60Hz-100A for electric steam boiler and water chiller (other voltages available)

#### Air—

1/4" line, clean dry instrument air, 60-100 psig

#### Water—

1/2" line - drain (customer connection),

1/2" line - boiler make-up



# DATA ACQUISITION

**H**ampden provides the widest array of experimental and educational training equipment available today. Students around the world use our products to extend their classroom knowledge into a real world, hands-on environment.

Today's standard industrial and laboratory procedures have evolved to include automated monitoring as well as computer control of virtually every process. To simulate this modern apparatus within a laboratory, typical stand-alone experiment equipment must be updated in order to allow for computer linking. This is accomplished by replacing the typical analog gauges, meters and sensors with digital products; such as special thermocouples and microprocessor-based controllers. The next step to acquiring data via computer is to add the acquisition modules. Modules mounted on the demonstrator are connected to the laptop computer via a cable. The easiest interface for your lab!



**Complete Computer Data Logging  
Solutions for  
Any Type of Equipment!...  
LabVIEW™ Compatible...**



## INPUT

Connections of  
4-20mA/0-5V DC Input

## PROCESS

Convert to digital signal  
by using  
National Instruments  
modules



## VISUAL

Graphic display of readings on monitor



Hampden's **Model H-LTCS**—Pentium based laptop computer system is selected, tested and configured to perform with your CDL equipment.

## The Right Stuff...

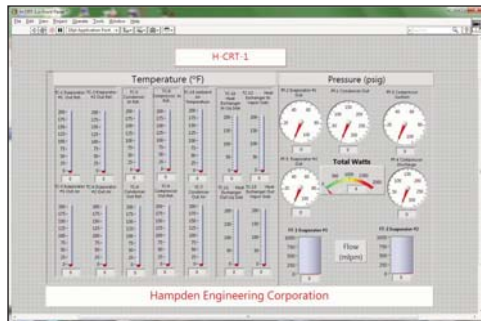
Hampden offers the planning and implementation of complete data acquisition solutions for the training of engineering students. Our engineers and technicians use only the best components and materials available and make sure that a complete approach is mapped out for all our CDL products. We include templates for LabVIEW™ control software with most CDL packages. In short, the right combination of hardware, software and courseware is your assurance that your new Hampden built equipment will provide maximum performance right from the start.

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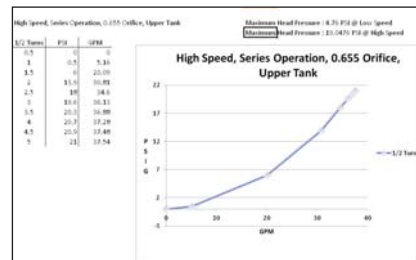
# EXPAND ANY ENGINEERING TRAINING EQUIPMENT WITH DATA ACQUISITION



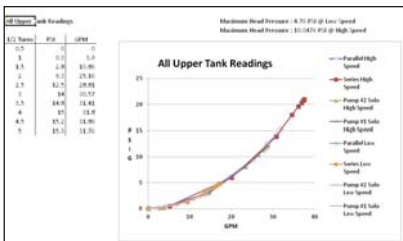
The Hampden **Model H-CRT-1-CDL** Commercial Refrigeration Trainer contains two evaporators, which may be operated singly or in parallel. Three types of liquid control devices are included: capillary tube, thermostatic expansion valve, and an automatic expansion valve. Sight glasses at the inlet and outlet of the evaporators and condenser allow students to monitor the changes in refrigerant state.



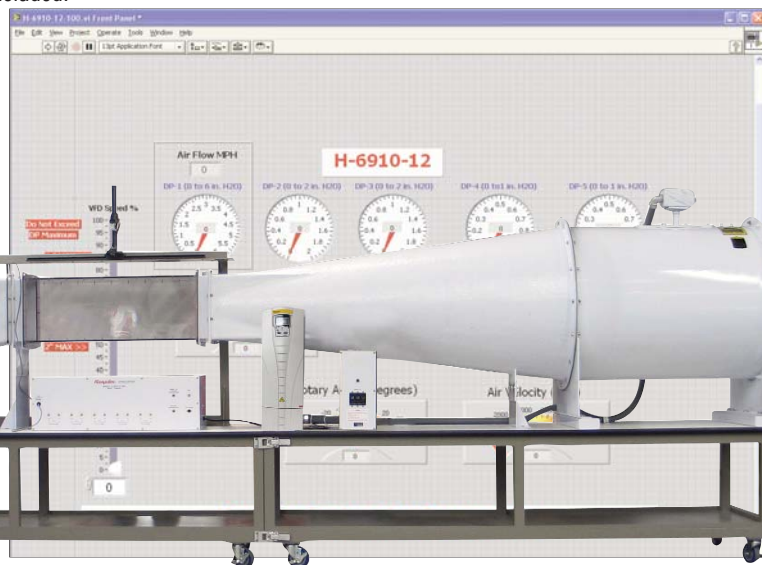
The Hampden **Model H-6925-CDL** Fluid Circuit Demonstrator provides complete facilities for the investigation of the phenomena associated with incompressible fluid flow in conduits. The analog outputs are factory



wired to National Instruments I/O modules where the signals are converted and terminate to a USB receptacle. Templates for LabVIEW™ control software are included.



The Hampden **Model H-6910-12A-CDL** Wind Tunnel has been designed to provide the fundamental air flow facilities and provide full visibility of test sections. The trainer is fully instrumented for static and dynamic pressure. This model features five differential pressure transducers, one air velocity transmitter, one rotary transducer, lift/drag input, and one fan speed. Templates for LabVIEW™ control software are included.



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# ENGINEERING TRAINING SYSTEMS

## Look to Hampden for Your Engineering Training Needs!

Since 1954 Hampden Engineering Corporation has been the foremost designer and manufacturer of engineering apparatus in the electrical, mechanical, chemical, civil, industrial, agricultural, and engineering technology programs. Hampden provides equipment to the laboratories of nearly all these engineering disciplines.

Hampden's equipment covers the cross spectrum of engineering applications from the very basic devices, through the standard array of demonstration apparatus, to the most complicated simulation and computer data logging systems available. Hampden's equipment uses real world applications in design and functionality in experiments that truly work. Many of Hampden products carry the U/L® label.

Hampden's equipment comes factory assembled, tested, and ready to operate as soon as it is delivered to your engineering lab.

Setup and training on Hampden equipment is available through our staff of engineers and can be done here at our factory or in your laboratory. Please contact us with your specific needs and allow us to work together to provide the best in engineering training equipment for your application.

The world-wide popularity of Hampden's training equipment and programs is a result of the extraordinary collaboration between Hampden engineers and technical educators. Hampden does not simply adapt standard products for your specific use; Hampden designs each product for the electrical power characteristics of the educational environment in which it will be used.



Factory and Field Training Available



Factory and Field Training Available



Factory and Field Training Available



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