Air Distribution Systems

Educational Training Equipment for the 21st Century

Bulletin 227-2B

H-AP-2

Air Distribution System Trainer

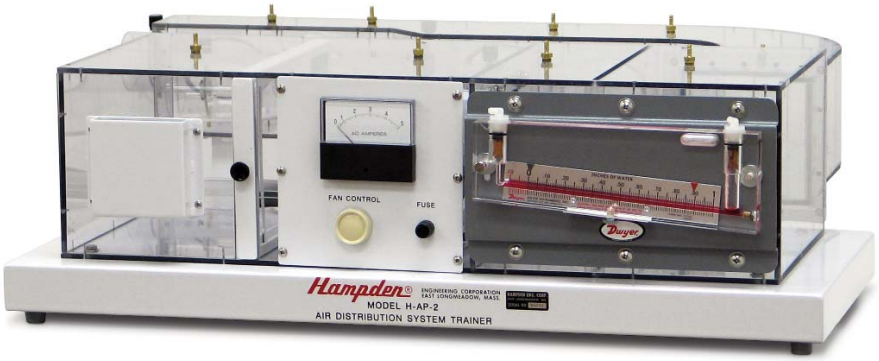
Purpose

The Hampden **Model H-AP-2** Air Distribution System Trainer is designed to acquaint the student with the fundamentals of air movement found in typical forced air heating and air conditioning systems. The trainer aids the student in acquiring a better understanding of static pressures, velocity pressures, and air volumes. The trainer shows the student how air moves under various conditions created in the distribution system.

Description

Test instruments supplied with the trainer include an inclined manometer, air meter and air velocity meter. These test instruments enable the student to take pressure readings and measure air volumes. By adding obstructions, simulating dirty filters and cooling coil restrictions, the instructor can change the pressure and air volume. The student also learns how to balance this type of air distribution system.

Operating from any 120 volt outlet, this trainer is suitable for classroom demonstrations and/or individualized instruction. An instructor manual is supplied to explain trainer operation.



Dimensions: 10"H x 34"W x 15"D
Shipping Weight: 120 lbs.

Specifications

The **H-AP-2** is constructed of clear Lexan, permitting the student visual access to the inside of the trainer. The trainer is divided into a return air and supply air chamber. A separate, clear Lexan, four outlet, extended duct system can be attached at the supply air chamber. These outlets have adjustable dampers. By turning the dampers to various positions, the student may study the air movement effects. A miniature blower with a fractional horsepower motor is used to move air through the system. An ammeter mounted on the trainer records motor current draw under various conditions. The trainer also includes two filters: one clean and one dirty, and a removable grid representing a cooling coil.

Electrical: 120V, 60Hz, 2 amps

Learning Objectives:

- Check for positive static pressure.
- Check for negative static pressure.
- Check for differential static pressure.
- Examine air volume at system outlets
- Measure air volume within duct.
- Perform duct system balancing procedures
- Become familiar with various test instruments

Option

H-AP-2-SS Second Story Addition will add a second level to the air distribution trainer. The second story will include an adjustable damper to simulate pressure loss.

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

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Heating/Cooling Trainers

Educational Training Equipment for the 21st Century

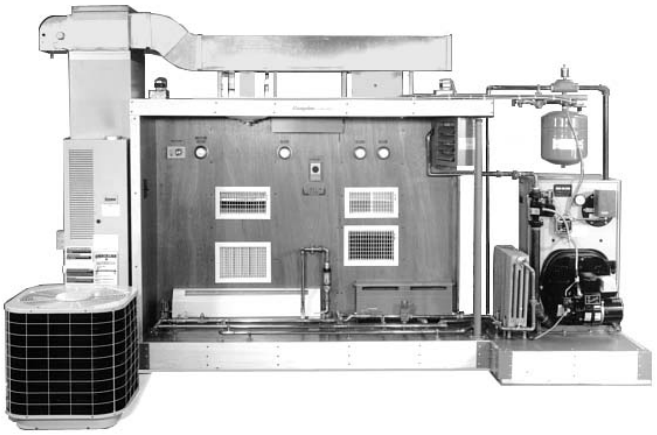
Bulletin 227E

Purpose

Hampden Engineering's wide variety of forced air and hydronic heating and cooling system trainers provide students with experience in gas, oil, and electric furnaces, oil and electric boilers, forced air heating and cooling, and circulating hot water heating and chilled water cooling.

Description

The typical trainers shown are representative of the many types available. Systems are fully equipped and carefully arranged to provide maximum accessibility to the student. All equipment and hardware is of commercial quality and is typical of that encountered in the field by the service technician. All units that have forced air heating may also be equipped with air conditioning. Similarly, all units that have hydronic heating may also be equipped with chilled water cooling. All units are 7 ft. high and 4 ft. deep. Width varies with equipment installed.



H-AHST-D2

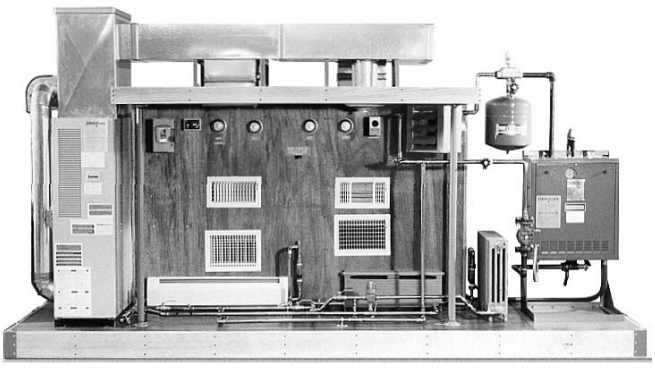
Air/Hydronic: Gas/Oil

Dimensions: 7'H x 12'W x 4'D
Shipping Weight: 2400 lbs.

H-FAHT-1-G

Forced Air Heating Trainer

Dimensions: 7'H x 8'W x 4'D
Shipping Weight: 1400 lbs.



H-AHST-D3

Air/Hydronic: Gas/Electric

Dimensions: 7'H x 12'W x 4'D
Shipping Weight: 2400 lbs.

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

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Heating/Cooling Trainers

Educational Training Equipment for the 21st Century

Bulletin 227E

Purpose

Hampden Engineering's wide variety of forced air and hydronic heating and cooling system trainers provide students with experience in gas, oil, and electric furnaces, oil and electric boilers, forced air heating and cooling, and circulating hot water heating and chilled water cooling.

Description

The typical trainers shown are representative of the many types available. Systems are fully equipped and carefully arranged to provide maximum accessibility to the student. All equipment and hardware is of commercial quality and is typical of that encountered in the field by the service technician. All units that have forced air heating may also be equipped with air conditioning. Similarly, all units that have hydronic heating may also be equipped with chilled water cooling. All units are 7 ft. high and 4 ft. deep. Width varies with equipment installed.

H-AHST-D2

Air/Hydronic: Gas/Oil

Dimensions: 7'H x 12'W x 4'D
Shipping Weight: 2400 lbs.

H-FAHT-1-G

Forced Air Heating Trainer

Dimensions: 7'H x 8'W x 4'D
Shipping Weight: 1400 lbs.

H-AHST-D3

Air/Hydronic: Gas/Electric

Dimensions: 7'H x 12'W x 4'D
Shipping Weight: 2400 lbs.

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

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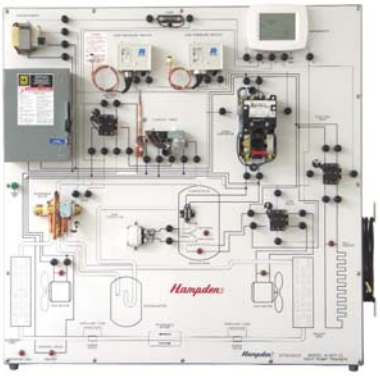
A/C-Heat Pump-Controls Trainers

Educational Training Equipment for the 21st Century

Bulletin 228E

H-HPT-1C

Heat Pump Controls Trainer



MODEL H-HPT-1C
Dimensions: 36"H x 36"W x 13"D
Shipping Weight: 265 lbs

The Hampden **Model H-HPT-1C** Heat Pump Controls Trainer provides students with the opportunity to operate, test, and troubleshoot the electrical controls found in large heat pump installations. It is furnished completely wired and tested. Control components are surface mounted for visibility and accessibility. A complete circuit diagram and numerous test points are provided on the panel. Twenty-four fault switches allow the instructor to introduce a variety of malfunctions for student troubleshooting experience. The student never applies power to any test points. When the unit is energized, realistic system voltages display across actual and simulated devices. Combined audio and visual signals indicate a running compressor. When de-energized, all components and devices may be easily isolated for resistance and continuity tests. Power required: 120V AC 1ϕ 60Hz.

To order this unit for mounting on a Mobile A-Frame mobile stand (see Bulletin 246-1), specify **Model H-HPT-1C-MCI-1000**.

H-ACCS-2

Air Conditioner/Heat Pump Controls Trainer

The Hampden **Model H-ACCS-2** Air Conditioner/Heat Pump Controls Trainer provides students with the opportunity to operate, test, and troubleshoot the electrical controls of a motel-type air conditioning unit that includes a heat pump. It contains the actual control components and devices. The compressor, fan motors and heater are simulated with suitable sized resistances. The trainer is furnished completely wired and tested. The twenty fault switches located behind a lockable panel permit the instructor to introduce a malfunction for student troubleshooting experience. Power is never applied externally to any of the binding post test points. When the trainer is energized, realistic voltages appear across the actual and simulated devices. When de-energized, all components and devices may easily be isolated for resistance and continuity tests. Power required: 120V AC 1ϕ 60Hz.

MODEL H-ACCS-2
Dimensions: 24½"H x 36"W x 16"D
Shipping Weight: 100 lbs

H-HP-3

Heat Pump Demonstrator

MODEL H-HP-3
Dimensions: 60"H x 30"W x 28"D
Shipping Weight: 375 lbs

The Hampden **Model H-HP-3** Heat Pump Demonstrator provides students with the ability to observe and operate a full-size combination air conditioning/heat pump unit. It is a combination system that uses the refrigeration cycle to either extract heat from, or deliver heat to, a comfort conditioned area. A readily detachable box encloses the area to be cooled/heated. When the thermostat is set for cooling, the enclosed coils act as an evaporator. A resistance heater provides additional heat load, as desired. For heating, the same coil acts as a condenser, discharging heat into the area. Power required: 120V AC 1ϕ 60Hz.

The **Model H-HP-3** is charged with a non-CFC refrigerant.

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

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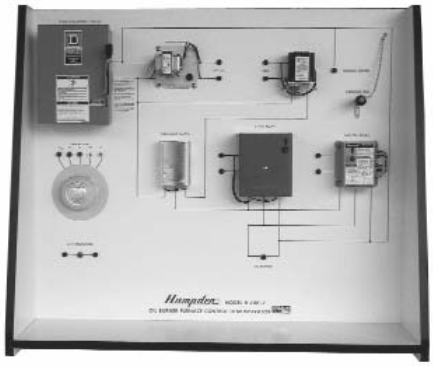
Furnace Controls Trainers

Educational Training Equipment for the 21st Century

Bulletin 229G



MODEL H-OBF-2
Dimensions: 31½"H x 37"W x 18"D
Shipping Weight: 120 lbs

H-OBF-2

Oil Burner Furnace Control Demonstrator

The Hampden **Model H-OBF-2** Oil Burner Furnace Control Demonstrator provides students with experience in connecting and operating two standard residential oil-fired furnace control systems for both winter heating and summer cooling. It contains all the standard control components used with isolated heating/cooling systems of oil-fired furnaces of both the stack relay type and the cadmium sulfide flame sensing relay type. Pilot lamps indicate the operation of the simulated air conditioning contactor, the oil burner, and the blower motor. Input power is 120V AC 1ϕ 60Hz through a power cord and fused disconnect switch. All AC supply circuits are prewired. Students connect the low voltage circuits via the supplied patch cords between Hampden **HR-1S** socket receptacles

To order this unit for mounting on a Mobile A-Frame stand (see Bulletin 246-1), specify **Model H-OBF-2-MCI-1000**.

H-GC-2A

Gas Controls Trainer

The Hampden **Model H-GC-2A** Gas Controls Trainer provides students with experience in connecting and operating three standard residential gas-fired furnace control systems for both winter heating and summer cooling. It contains all the standard control components for the following three types of systems: (1) single-function gas valve and pilotstat switch, (2) combination gas control valve system, (3) powerpile system. Pilot lamps indicate the operation of a simulated furnace blower and air conditioning compressor. Input power is 120V AC 1ϕ 60Hz through a power cord and fused disconnect switch. All AC supply circuits are prewired. Students connect the low-voltage circuits via the supplied patch cords between Hampden **HR-1S** socket receptacles. A propane torch (not supplied) may be used as a heat source for automatic thermostat operation.

To order this unit for mounting on a Mobile A-Frame stand (see Bulletin 246-1), specify **Model H-GC-2A-MCI-1000**.

MODEL H-GC-2A
Dimensions: 36"H x 36"W x 13"D
Shipping Weight: 260 lbs

MODEL H-EHF-2A
Dimensions: 36"H x 36"W x 13"D
Shipping Weight: 260 lbs

H-EHF-2A

Electric Heat Furnace Demonstrator

The Hampden **Model H-EHF-2A** Electric Heat Furnace Demonstrator provides students with experience in connecting and operating an electric heat furnace of the type found in residential dwellings and commercial establishments. It contains all the standard control components used with an electric heat furnace. Pilot lamps indicate the operation of simulated resistance heaters and blower motor. Input power is 120V AC 1ϕ 60Hz through a power cord and fused disconnect switch. All AC supply circuits are prewired. Students connect the low-voltage circuits via the supplied patch cords between Hampden **HR-1S** socket receptacles. When properly connected, the system functions to sequence resistance heaters on and off and to operate the blower either manually or automatically, as in an actual installation.

To order this unit for mounting on a Mobile A-Frame stand (see Bulletin 246-1), specify **Model H-EHF-2A-MCI-1000**.

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

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Environmental Systems Trainers

Educational Training Equipment for the 21st Century

Bulletin 230M

H-DSSCT-1
Solid State Controls Trainer

The Hampden **Model H-DSSCT-1** Solid State Controls Trainer contains the actual control components of a two stage heating and cooling system using both digital and analog thermostats. Each component terminates at Hampden binding posts for easy interconnection into a variety of configurations. Up to 15 faults may be inserted from the panel on the rear. Furnished with cords. The typical fault panel is found on the side of Hampden Environmental Systems Trainers.

MODEL H-DSSCT-1
Dimensions: 36"H x 36"W x 13"D
Shipping Weight: 260 lbs.

MODEL H-PS-1A
Dimensions: 36"H x 36"W x 13"D
Shipping Weight: 260 lbs.

H-PS-1A
Power Saver Trainer

The Hampden **Model H-PS-1A** Power Saver Trainer contains the control components of a "mixed air" temperature control system that saves power by using outside air whenever possible for cooling. The trainer incorporates several elements of the mixed air control system and adapts the layout for student use. The student learns important design concepts and methods of operation normally associated with commercial HVAC equipment. The **H-PS-1A** may be used as a stand-alone trainer or in conjunction with the **Model H-TPCT-1** Three Phase Compressor Trainer (Bulletin #228-1) and the **Model H-GHT-2A** Gas Heat Trainer (Bulletin #229-3). Up to 13 faults may be inserted from the side panel. Furnished with cords.

H-CFS-1B
Compressor Fault Simulator

The Hampden **Model H-CFS-1B** Compressor Fault Simulator is designed to give students experience with troubleshooting hermetic compressors. Up to 16 faults may be inserted into the compressor, the current relay, the capacitors, the overload relay, or the power wiring. Using a standard hermetic compressor tester, the student determines the fault and simulates corrective action via toggle switches on the front of the panel. Lights are used to signal successful or unsuccessful results of the action. Available on a tabletop unit (shown) or for mounting on an A-frame mobile stand (as described on Bulletin 246-1). Furnished with cords.

MODEL H-CFS-1B
Dimensions: 24"H x 36"W x 11"D
Shipping Weight: 160 lbs.

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

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Environmental Systems Trainer

Educational Training Equipment for the 21st Century

Bulletin 234J

H-SPT-AC-1
Solar Photovoltaic Trainer

The Hampden **Model H-SPT-AC-1** contains two solar photovoltaic modules with a nominal voltage output of 15.5V DC at 2.26A, an inverter that converts the DC to single-phase AC, a high-capacity solar battery, controls to monitor power from solar modules and to switch to battery power when necessary, four test points, two power take-off points (12V DC and 120V AC), a 0-20V DC voltmeter, a multi-range DC ammeter, and a 0-150V AC voltmeter. The mobile frame is constructed of code gauge furniture stock steel with four swivel casters, two with locks. Furnished complete with a set of interconnecting cords.

MODEL H-SPT-AC-1
(Front View at left,
back view right)
Dimensions:
74"H (max tilt) x 54"W x 26"D
Shipping Weight:
450 lbs

H-DSCT-1
Dual Speed Compressor Trainer

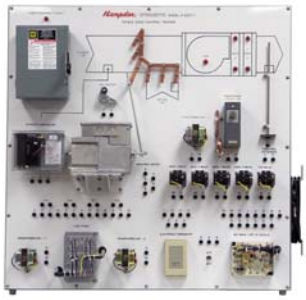
The Hampden **MODEL H-DSCT-1** facilitates the study and troubleshooting of the electrical and control circuits of a three-phase, dual-speed hermetic compressor. Standard commercial components are wired into an operating electrical control system, while the compressor is simulated with pilot lights and sound. Up to 16 malfunctions may be inserted via the fault switches mounted on the side of the trainer. Input power is single-phase AC. Three-phase power to operate the trainer is obtained from a built-in converter.

Dimensions: 36"H x 36"W x 13"D.
Shipping weight: 260 lbs.

H-EHST-1A
Electric Heat Service Trainer

The Hampden **MODEL H-EHST-1A** facilitates the study and troubleshooting of the electrical and control circuits of an electric heat furnace. Standard commercial components are wired into an operating electrical control system, while the heaters and blower are simulated by pilot lights and resistors. Up to 34 malfunctions may be inserted via the fault switches mounted on the side of the trainer. Power input is single-phase AC. The 240V for the simulated heaters is obtained from a step-up transformer.

Dimensions: 36"H x 36"W x 13"D.
Shipping weight: 260 lbs.



H-SZCT-1
Single Zone Control System Trainer

The Hampden **MODEL H-SZCT-1** contains all of the control components of a roof top, two-stage, heating/cooling commercial air conditioning system, including outside air damper control, heating setup and cooling setup, enthalpy control, transformers, electronic thermostat, single-zone logic panel, thermistor sensor, and control relays. Students wire these components with patch cords into a fully operational system. Fault switches mounted on the side of the trainer permit the instructor to insert up to 16 malfunctions.

Dimensions: 36"H x 36"W x 13"D.
Shipping weight: 260 lbs.

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

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HVAC Electrical System Trainers

Educational Training Equipment for the 21st Century

Bulletin 236-1H

MODEL HEE-11A-FT-1
Dimensions: 36"H x 36"W x 11"D
Shipping Weight: 230 lbs

HEE-11A-FT-1
Intermediate Electricity Trainer

The Hampden **Model HEE-11A-FT-1** Intermediate Electricity Trainer provides students with the opportunity of wiring actual heating and cooling control components into realistic electrical circuits. Further, the instructor may insert up to 15 faults to provide students with troubleshooting experience. Connections to all of the components terminate at Hampden HR-1S color coded socket receptacles. The student uses interconnecting cords to construct real control systems. Pilot lights are used to simulate the compressor, resistance heater, and the blower fan motors. Input power standard 120V AC 1Ø 60Hz. This model is also available to mount on a mobile A-frame. Specify Hampden **Model HEE-11A-FT-1-MCI-1000** when ordering.

HEE-11
Heating & Air Conditioning Electrical Wiring Trainer

The Hampden **Model HEE-11** Heating & Air Conditioning Electircal Wiring Trainer is designed to cover low voltage pilot circuits as well as series and parallel circuits. Consists of a fused disconnect, four resistance load lamp sockets complete with lamps, one step down 24 volt AC control transformer, one relay with 24 volt AC coil with one normally open and one normally closed contact, two SPST switches, and two SPDT switches. With these components, basic furnace and air conditioning circuits can be wired and tested. The Lexan® control panel shows all components via silkscreen symbols. All the components are wired to Hampden HR-1S color coded socket receptacles.

Provided with a 6 foot power cord and interconnecting cords. Input power standard 120V AC 1Ø 60Hz.

MODEL HEE-11
Dimensions: 8½"H x 19"W x 8½"D
Shipping Weight: 35 lbs

HEE-11R
Basic Electricity Relay Trainer

The Hampden **Model HEE-11R** Basic Electricity Relay Trainer facilitates the study and troubleshooting of the control components and circuits used in refrigeration and air conditioning systems. Included on the trainer are two pushbuttons (one N.O.; one N.C.), two SPST switches, a control transformer, a DPDT relay, a contactor, a time delay relay, a current relay, a potential relay, a resistor, a rheostat, four pilot lights, and an ON/OFF circuit breaker. Furnished complete with interconnecting cords. Up to 21 malfunctions may be inserted via the fault switches mounted on the rear of the trainer. Input power standard 120V AC 1Ø 60Hz.

MODEL HEE-11R
Dimensions: 16⅝"H x 19"W x 10"D
Shipping Weight: 80 lbs

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

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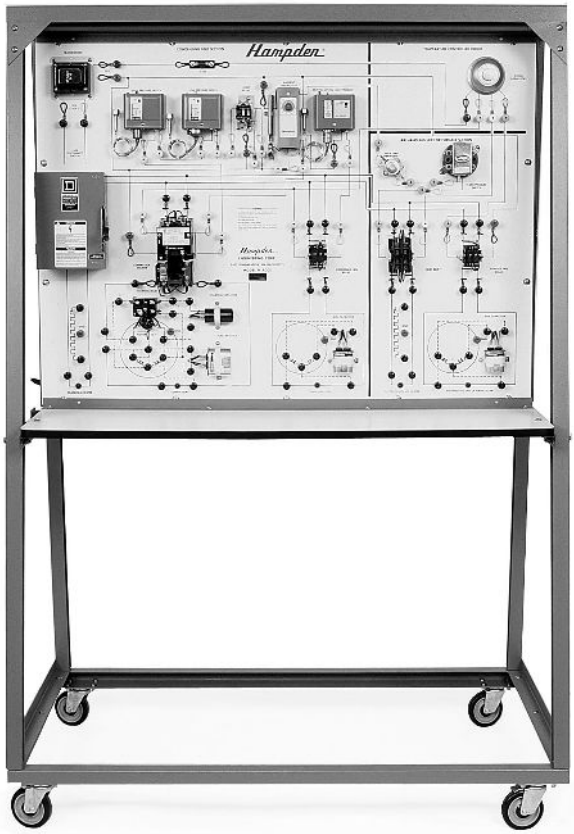
HVAC Control Systems

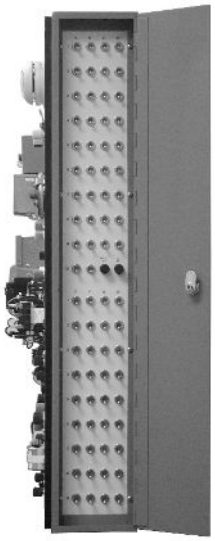
Educational Training Equipment for the 21st Century

Bulletin 236G

H-ACCS
Air Conditioning Control System



MODEL H-ACCS shown with included mobile A-frame
Dimensions: 36"H x 48"W x 7"D (not including A-frame)
Shipping Weight: 450 lbs
(see Bulletin 246-1 for A-frame dimensions)



Right side view of **H-ACCS** showing Fault Switch compartment and lockable access door

The Hampden **Model H-ACCS** Air Conditioning Control System contains the actual components used in the control of commercial and residential heating/cooling systems. All components are prewired into a complete thermostat-actuated control system and then diagrammed to facilitate understanding and use.

The Hampden **H-ACCS** helps students become familiar with the functions of each control component and how they work together to regulate summer cooling and winter heating. Students learn correct procedures for systematically checking-out and establishing settings on new installations, as well as developing the skill of diagnosing malfunctions based on a customer complaint. Integral fault switches provide "real world" troubleshooting experience.

The system is furnished completely wired and tested. It plugs into a standard single-phase supply. Fuse protection is provided for the line voltage circuit and the low voltage control signal circuit. Numerous test points are provided. Students never apply power to any of the binding post test points. Voltage readings may be taken while the system is energized. When de-energized, all components and devices may be isolated for resistance and continuity tests. Visually, the unit is comprised of three equipment sections

1. **Temperature Controlled Room** - contains a standard operating thermostat measuring the actual temperature which can be set for a temperature high enough to actuate heating control circuits or low enough to actuate cooling control circuits.

2. **Furnace** - contains the furnace, furnace fan, and respective controls. The control components, (high limit thermostat, static pressure switch, heat relay, and furnace fan relay) are real, while the furnace and fan motor are simulated with pilot lights to indicate operating conditions.

3. **Condensing Unit** - contains all of the controls and protective devices for the refrigeration cycle along with a simulated crankcase heater, compressor, and condenser fan.

Fault Switches

74 fault switches located behind a lockable door create short or open conditions for all components and devices (including simulated components). Also provided is a list of possible "customer complaints" and corresponding combinations of fault switches required to produce an appropriate symptom. Students work circuit diagrams, a multimeter, and an instruction manual to systematically isolate and identify the cause. Instruction manual also contains procedures for capacitor testing, motor lead identification and other problems encountered on the job.

Power required: 120V AC 1ϕ 60Hz

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

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HVAC Electrical System Trainers

Educational Training Equipment for the 21st Century

Bulletin 236-1G

HEE-11A-FT

Intermediate Electricity Trainer

The Hampden **Model HEE-11A-FT** Intermediate Electricity Trainer provides students with the opportunity of wiring actual heating and cooling control components into realistic electrical circuits. Further, the instructor may insert up to 15 faults to provide students with troubleshooting experience. Connections to all of the components terminate at Hampden HR-1S color coded socket receptacles. The student uses interconnecting cords to construct real control systems. Pilot lights are used to simulate the compressor, resistance heater, and the blower fan motors. Input power standard 120V AC 1ϕ 60Hz. This model is also available to mount on a mobile A-frame. Specify Hampden **Model HEE-11A-FT-MCI-1000** when ordering.

MODEL HEE-11A-FT
Dimensions: 37"H x 31½"W x 18"D
Shipping Weight: 120 lbs

HEE-11

Heating & Air Conditioning Electrical Wiring Trainer

The Hampden **Model HEE-11** Heating & Air Conditioning Electircal Wiring Trainer is designed to cover low voltage pilot circuits as well as series and parallel circuits. Consists of a fused disconnect, four resistance load lamp sockets complete with lamps, one step down 24 volt AC control transformer, one relay with 24 volt AC coil with one normally open and one normally closed contact, two SPST switches, and two SPDT switches. With these components, basic furnace and air conditioning circuits can be wired and tested. The Lexan® control panel shows all components via silkscreen symbols. All the components are wired to Hampden HR-1S color coded socket receptacles.

Provided with a 6 foot power cord and interconnecting cords. Input power standard 120V AC 1ϕ 60Hz.

MODEL HEE-11
Dimensions: 8½"H x 19"W x 8½"D
Shipping Weight: 35 lbs

HEE-11R

Basic Electricity Relay Trainer

The Hampden **Model HEE-11R** Basic Electricity Relay Trainer facilitates the study and troubleshooting of the control components and circuits used in refrigeration and air conditioning systems. Included on the trainer are two pushbuttons (one N.O.; one N.C.), two SPST switches, a control transformer, a DPDT relay, a contactor, a time delay relay, a current relay, a potential relay, a resistor, a rheostat, four pilot lights, and an ON/OFF circuit breaker. Furnished complete with interconnecting cords. Up to 21 malfunctions may be inserted via the fault switches mounted on the rear of the trainer. Input power standard 120V AC 1ϕ 60Hz.

MODEL HEE-11R
Dimensions: 16⅝"H x 19"W x 10"D
Shipping Weight: 80 lbs

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

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Heat Pump Trainer

Educational Training Equipment for the 21st Century

Bulletin 237-107-1D

H-RST-17
Heat Pump Trainer

Description

The Hampden **MODEL H-RST-17** Heat Pump Trainer consists of commercial components completely plumbed and wired for demonstration. The student will study the thermodynamic cycle of the typical heat pump. This system supplies either heating or cooling for a separate closed circuit air handler.

The Trainer consists of a mobile table with component panel and cold box evaporator enclosure. One operational instruction manual is provided.

Specifications

Mobile Table:

- Construction:
  2" mechanical steel tubing finished in instrument tan texture.
- Top:
  Woodcore plastic laminate top
- Casters:
  Swivel with locks, 4 required

Component Panel:

- Frame:
  14 gauge furniture stock steel finished in instrument tan texture.
- Panel:
  11 gauge furniture stock steel finished in instrument white enamel.
- Cold box:
  Furniture stock steel and clear polycarbonate.

Nomenclature and Graphics:

Black silk screen enamel.

Components:

- Hermetic Compressor
- Condenser, water cooled
- Evaporator, refrigerant to water
- Thermostatic Expansion Valve, 2 required
- Sight Glass
- Filter Drier
- Gauge, Refrigerant Pressure
- Gauge, Refrigerant Compound
- Gauge, Water Pressure
- Flowmeter, Refrigerant R-134a, 2 required
- Flowmeter, water
- Pressure Control, high/low
- Thermostat, heating/cooling
- Reversing Valve
- Check Valves, 4 required
- Hand Valve
- Solenoid Valves, 2 required
- Temperature Indicator,digital type T
- Selector Switch, thermocouple
- Thermocouples, type T, 8 required
- Voltmeter, AC
- Ammeter, AC
- Wattmeter, AC
- Main Circuit Breaker
- Lot of switches and pilot lights
- Lot of copper tubing and fittings
- Air Handler, water to air
- Water Circulator
- Expansion Tank
- Suction Accumulator
- Fill Valve

This system is charged with R-134a refrigerant. Overall dimensions are 70" H x 70" W x 32" D.

Computer Data Logging (CDL) Add-on Package

The **MODEL H-RST-17** Heat Pump Trainer Computer Data Logging (CDL) Add-on Package consists of:

- Control Panel, surface mounted with circuit breaker, pilot light and RS-232 port
- Thermocouples, type T, 8 required
- Pressure Transducers, 4 required
- Flow Transducer, 2 required
- Power Supply – 24V DC
- Analog Input Module – 4–20mA
- Analog Input module – Thermocouples, 2 required
- Watt Transducer
- Isolated RS-232/RS-485 Converter Module
- Software Package:
  Utility Software
  Genie SCADA Software

NOTE: The CDL Add-on Package is factory installed. Add suffix **-CDL** when ordering (**H-RST-17-CDL**).

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

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Heat Pump Trainer

Educational Training Equipment for the 21st Century

Bulletin 237-107E

H-RST-12
Heat Pump Trainer

Purpose

The Hampden **Model H-RST-12** Heat Pump Trainer provides the student with an introduction to the principle components of heat pump systems.

For practical electrical troubleshooting, the instructor has the ability to insert eighteen commonly found electrical faults such as: defective capacitor, motor, and timer. The instructor may also insert three mechanical faults such as two defective thermal expansion valves (faulted filter and faulted rods) and defective filter-drier.

Specifications

Compressor: Hermetic, 1/3HP

Condenser: Water cooled with flowmeter, pressure regulator, pressure gauge, two ball valves and two hose fittings.

Evaporator: Forced Air cooled

Environmental Chamber: Steel with clear Lexan removable or hinged panels and emergency heater

Thermostats: Digital programmable and digital non-programmable heat pump

Metering Devices: Capillary tube, 2 required Thermostatic Expansion Valve, 2 requiredd

Accessories:
- Sight glass with moisture indicator
- Check valves, 4 required
- Filter drier - dual
- Liquid receiver with isolation valves
- Dual pressure controller
- Reversing valve, 4-way Electric Suction Accumulator
- Pressure Gauge
- Compound Gauge
- Defrost Timer
- Fan Limit Control
- Valves, 7 required

Control Panel:
- Main circuit breaker
- Defrost timer switch
- Low voltage transformer with fuse
- Thermostat selector switch
- Temperature meter Digital Type-T
- Thermocouple, Type-T, 10-required
- Thermocouple Selector Switch
- Light, Power On
- Wattmeter, Analog

Cabinet: 16-gauge furniture stock steel finished in instrument tan enamel. Doors are hinged with handle and lock. Storage space is approx. 26"H x 47"W x 30"D

Panel: 14-gauge enclosure finished in instrument tan enamel with a 12-gauge panel finished in instrument white enamel.

Carrier: Mobile with locking storage and control panel

Cabinet Top: Medite wood core covered with antique white plastic laminate with black plastic trim

Casters: Four 3" swivel casters, two with locks

Power Cord: 8-foot 3/c power cord with plug and cord holder

Courseware:
- Correlated student manual
- Correlated intructor's manual with fault guide, pre and post tests

Input: 120V AC, single-phase, 60Hz (available for operation on any voltage or frequency)

Refrigerant: R-134a

MODEL H-RST-12
Dimensions: 75"H x 48"W x 30"D
Shipping Weight: 850 lbs.

Accessories:
- Thermometer, wet bulb
- Psychrometer, hand
- Condensate graduate

Option

Computer Data Logging is available, specify **Model H-RST-12-CDL** (must be specified at time of original order)

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

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A/C & Refrigeration System Trainers

Educational Training Equipment for the 21st Century

Bulletin 237I

MODEL H-RST-6
Dimensions: 80"H x 48"W x 28"D
Shipping Weight: 700 lbs

H-RST-8

Heat Pump Trainer

The Hampden **Model H-RST-8** Heat Pump Trainer provides students with an introduction to the principal components of heat pump systems. The instructor is able to insert eighteen electrical faults, including: defective fan motor, switches, relay and compressor faults.

The Hampden **Model H-RST-8** contains one environmental enclosure, fan cooled evaporator, emergency heat, thermal cutout switch, digital programmable thermostat, digital thermostat, defrost timer, reversing valve, hermetic compressor with condenser, liquid receiver, gauges, valves, check valves, high and low pressure switch, filter-drier, sight glass moisture indicator, thermostatic expansion valve and capillary tube for each coil, and lockable storage cabinet. Charged with R-134a HFC refrigerant.

Option

H-RST-8-CDL Heat Pump Trainer with Computer Data Logging Package, allows monitoring of the following:

- temperature
- pressure.

Option must be specified at time of original order.

Power Required: 120V AC 1Ø 60 Hz.

H-RST-6

Basic Refrigeration Trainer

The Hampden **Model H-RST-6** Basic Refrigeration Trainer provides students with an introduction to the principal components of basic refrigeration systems. The instructor is able to insert ten electrical faults, including: defective motors, switches, and relays for electrical troubleshooting, as well as three mechanical faults.

The Hampden **Model H-RST-6** contains one evaporator and condenser with the front coils of clear tempered glass, three metering devices, electric reversing valve, hermetic compressor with liquid receiver and suction accumulator, fan speed controller, pilot lights, gauges, filter-drier, sight glass moisture indicator, flowmeter, high and low pressure controls, digital temperature indicator with thermocouple transfer switch, solenoid, hand valves, flow diagram, and lockable storage cabinet. Charged with R-134a HFC refrigerant.

Option

H-RST-6-CDL Basic Refrigeration Trainer with Computer Data Logging Package, allows monitoring of the following:

- temperature
- pressure

Option must be specified at time of original order.

Power Required: 120V AC 1Ø 60 Hz.

MODEL H-RST-8
Dimensions: 75"H x 48"W x 30"D
Shipping Weight: 850 lbs

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

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Pneumatic/Electric Controls Systems

Educational Training Equipment for the 21st Century

Bulletin 239-3A

Hampden H-PCT-1 Pneumatic Controls Trainer

Purpose

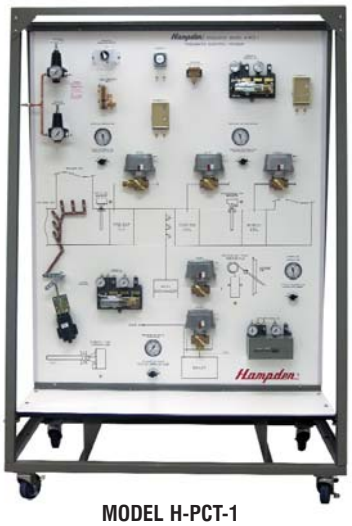
To aid students in learning the operation and maintenance of commercial pneumatically-controlled heating/cooling systems.

Description

The Hampden **Model H-PCT-1** Pneumatic Controls Trainer contains standard commercial control components of comfort conditioning systems of the type found in many industrial or institutional buildings. The totally pneumatic trainer includes thermostats, a humidistat, relays, switches, temperature transmitters, controllers, and pneumatic actuators for valves and the damper.

By interconnecting the various components with flexible tubing, students are able to assemble actual control systems for simulated heating, humidifying, ventilating and/or cooling applications. Thus, they learn the principles of comfort conditioning as well as the principles of pneumatic controls.

Also available for bench top mounting.



MODEL H-PCT-1
Dimensions: 76"H x 51"W x 31"D
Shipping Weight: 375 lbs

H-EHF-1 Electric Heat Furnace Control System

Purpose

The Hampden **Model H-EHF-1** contains the actual components used in the control of commercial and residential electric furnaces. With it the student gains experience in designing, wiring, checking out, and troubleshooting electric furnace control systems.

Description

All of the control components are mounted on the face of the Hampden Electric Heat Furnace Control System Trainer, where their wiring terminates at heavy-duty binding posts. Students use banana-plug leads to interconnect the components into an operating electric furnace control system.

Included are the following:

- Double-pole, single throw disconnect switch
- Fuses protecting line voltage components
- Sequencers
- Thermal contacts
- Thermostat
- Transformer with secondary protection
- Two-speed blower with secondary blower control
- Time delay and blower relays

Power input is 1Ø AC, 60Hz supplied through a grounding type power cord. Furnished complete with interconnecting cords and instruction manual.

Twenty-two fault switches, located behind a lockable door create open or shorted conditions. This allows the students to gain real-world troubleshooting experience.

Faults may be inserted into electric furnace control systems by these fault switches.

MODEL H-EHF-1 Enclosed in steel cabinet, 36"H x 48"W x 7"D
Designed for mounting on mobile A-frame(included)
Shipping Weight: 300 lbs.

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

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