Heat Pump Control Trainers

Educational Training Equipment for the 21st Century

Bulletin 228-2A

H-HPT-2

Advanced Heat Pump Control Trainer

Purpose

The Hampden **MODEL H-HPT-2** Advanced Heat Pump Control Trainer is designed to facilitate instruction in the understanding and troubleshooting of the electrical controls of a heat pump system. It makes use of actual "live" components wired into an operating electrical controls system. The compressor and heaters are simulated by means of indicator lights.

Description

All components are mounted on a self-supporting, wood core white melamine covered panel. The electrical circuit legends and a diagram of the refrigerant system are silkscreened in black on the panel face.

Components are wired to insulated five-way binding posts so that they can be easily disconnected for testing. An enameled steel enclosure on the rear provides mounting for an input circuit breaker and twenty-five fault injection switches.

Furnished complete with interconnecting cords.

Hampden **MODEL H-HPT-2** Advanced Heat Pump Control Trainer
Dimensions: 45"H x 48"W x 20-1/2"D
Shipping Weight: 160 LBS.

Specifications

- Fused Main Disconnect Switch
- Compressor Contactor
- Capacitor
- Low Pressure Switch
- Heater Relay with Circuit Board (2)
- Heater Overloads (3)
- Defrost Sensor
- Defrost Circuit Board
- Variable Speed Blower
- Static Pressure Regulating Damper
- Low Voltage Heat Pump Control Transformer
- Thermostat
- Four-Way Reversing Valve
- High Pressure Switch
- Fan Control
- Programmable Heat Pump Thermostat
- RTD Element
- Magnehelic Gauge 0-3" H_2O (2)

Services Required

Operating voltage is 240 volts AC from an input of 120 volts AC.

NOTE: To have unit mounted on a mobile "A" frame stand, add the suffix MCI-1000 (**H-HPT-2-MCI-1000**)

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

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Heat Pump Control Trainers

Educational Training Equipment for the 21st Century

Bulletin 228-3

H-HPT-3
Heat Pump Trainer

Purpose

The Hampden **MODEL H-HPT-3** Heat Pump Trainer simulates the split system heat pump. Split system heat pump units are designed for use with a wide variety of fossil fuel furnaces, electric furnaces, air handlers, and evaporator coil combinations.

Description

A heat pump is a heat moving mechanism. Heat is absorbed in an evaporator in one location and released through a condenser in another location. The system can reverse its operation so that the evaporator becomes the condenser and the condenser becomes the evaporator. Heat flow is reversed. By using a special reversing valve, the mechanism either heats or cools the conditioned space. The flow through the compressor is always in the same direction.

Heat pumps use a compression type refrigerating mechanism, similar to a regular refrigerating mechanism. They have two heat transfer surfaces—one located inside the conditioned space and one located outdoors.

Specifications

- Fused Main Disconnect Switch
- Compressor Contactor
- Capacitor
- Low Pressure Switch
- Heater Relay with Circuit Board (2)
- Heater Overloads (3)
- Defrost Sensor
- Defrost Circuit Board
- Variable Speed Blower
- Static Pressure Regulating Damper
- Low Voltage Heat Pump Control Transformer
- Thermostat
- Four-Way Reversing Valve
- High Pressure Switch
- Fan Control
- Programmable Heat Pump Thermostat
- RTD Element

Services Required

Operating voltage is 240 volts AC.

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

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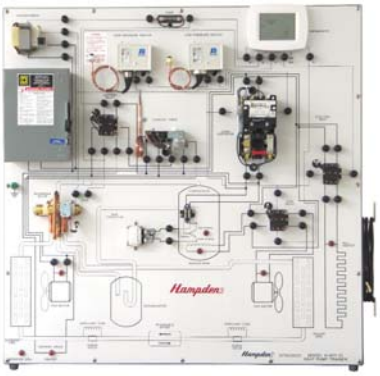
A/C-Heat Pump-Controls Trainers

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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Gas Controls Trainers

Educational Training Equipment for the 21st Century

Bulletin 229-1F

H-GT-1

Gas Control Demonstration Trainer

MODEL H-GT-1
Dimensions: 20"H x 20"W x 12"D
Shipping Weight: 120 lbs

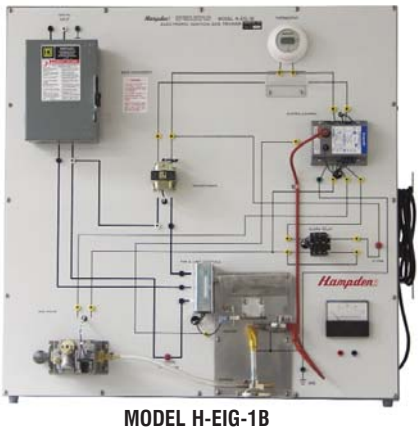
The Hampden **Model H-GT-1** Gas Control Demonstration Trainer provides students with experience in operating and testing the gas controls, electrical circuits, and gas burner operation of a pilot flame-type gas ignition system. It contains all the components of a pilot flame type gas burner system, completely assembled, prewired and tested. With the addition of a propane fuel tank (not supplied), the trainer is ready to plug into any standard single-phase AC supply and operate. The low voltage thermostat is typical of those found in actual installations. A potentiometer on the high voltage side of the transformer demonstrates the effect of a low line voltage or complete loss of power. A ten-turn loop current multiplier is provided for current measurement in the low voltage circuit.

H-EIG-1B

Electronic Ignition Gas Trainer

The Hampden **Model H-EIG-1B** Electric Ignition Gas Trainer provides students with the opportunity to operate, test, and troubleshoot the gas controls, electrical circuits, and electronics components of an electronically-controlled direct spark ignition system. It contains all the components of a direct spark ignition gas burner system, completely assembled, prewired, and tested. With the addition of a propane fuel tank (not supplied), the trainer is ready to plug into any standard single-phase AC supply and operate. All components function exactly as they do on the job with the exception of the simulated combustion air fan. The instructor has the ability to provide students with realistic troubleshooting experience by inserting up to nine faults via toggle switches on the side. A 20μA DC ammeter is included for convenience. Components may easily be isolated from the test points for resistance and continuity testing. Furnished complete with cords.

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



MODEL H-EIG-1B
Dimensions: 36"H x 36"W x 13"D
Shipping Weight: 255 lbs

H-GT-2

Gas Trainer with Vent Damper & Retrofit Ignition

MODEL H-GT-2
Dimensions: 20"H x 20"W x 12"D
Shipping Weight: 120 lbs

The Hampden **Model H-GT-2** Gas Trainer with Vent Damper and Retrofit Ignition provides students with experience in operating and testing a retrofit spark-ignited pilot gas system with automatic operation of a vent damper to retain heat when burner is off. It contains all the actual control components of an energy efficient spark-ignited, pilot fired furnace control system having automatic vent damper control. The trainer is supplied assembled, prewired, and tested. It contains an automatic vent damper, a thermostat, a temperature sensor, a control transformer, main valve, electronic spark ignition control, retrofit pilot igniter and flame sensor, and fan/limit control. With the addition of a propane fuel tank (not supplied), it is ready to plug into any standard single-phase AC supply and operate. On a call for heat, events occur in the following sequence: (1) the vent damper opens, (2) pilot flame is ignited by electronic spark, (3) sensing probe proves pilot flame, (4) main gas valve opens. The gas valves and damper close when the temperature sensor mounted above the main burner warms to the preset temperature.

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

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Gas Burner Trainers

Educational Training Equipment for the 21st Century

Bulletin 229-2A

H-GHT-3

Mobile Gas Burner Demonstrator

Purpose

The Hampden **Model H-GHT-3** Mobile Gas Burner Demonstrator provides hands-on experience for students to conduct tests and adjustments on modern forced air gas furnaces.

Description

The unit consists of:

- Mobile bench
- Gas manifold
- Draft diverter
- Thermostat
- Instruction Manual and Text Book
- Gas burner
- Forced air heat exchanger
- Direct spark ignition
- Gas solenoid valve

The heat exchanger is protected with an expanded metal protector.

* Natural gas supply and connection to the gas solenoid are not included, customer is responsible for meeting all local and state code requirements prior to hook-up.

** Liquid Propane available on request.

Model H-GHT-3 Mobile Gas Burner Demonstrator ➤
Dimensions: 60½"H x 48"W x 25"D
Shipping Weight: 600 lbs.

H-GHT-1B Gas Heat Trainer

Purpose

The Hampden **MODEL H-GHT-1B** Gas Heat Trainer provides practical experience in the operation, testing, and troubleshooting of gas-fired furnaces, and furnace control system.

Description

The Hampden Gas Heat Trainer is a standard commercial furnace that operates on natural gas. If desired, however, it may be supplied for propane gas operation.

The unit plugs into a standard 1ϕ AC receptacle. For a thorough understanding of its operation, thirty points in the electrical circuit are brought out to pin jacks on the front of the Trainer. This provides the student with easy access to measurement and test points.

Operation

With the Hampden Gas Heat Trainer, the student can gain an understanding of four aspects of gas furnace operation.

Model H-GHT-1B
Dimensions: 15-3/8"H x 30-1/8"W x 48-1/8"D
Shipping Weight: 282 lbs

1. Learn to identify, by appearance and function, the mechanical and electrical components of a gas-fired furnace.
2. Develop an appreciation for the safety precautions necessary when connecting, operating, and servicing furnaces.
3. Observe the correct operating sequence, analyze the reasons for each step, and learn how the control and protective devices operate.
4. Acquire practical troubleshooting experience. On the side panel, there are fifteen toggle switches which can be used to insert faults in the electrical circuit. After the instructor has programmed in the desired faults, it is up to the student to discover the source of the problem.

H-GHT-1T Gas Heat Trainer Test Kit

The **Model H-GHT-1T** Hampden Gas Heat Trainer Test Kit contains the equipment necessary to make tests and perform experiments with Hampden's line of **H-GHT Series** Gas Heat Trainers.

The equipment in the **Model H-GHT-1T** Gas Heat Trainer Kit consist of:

- Gas Testing Kit
- Hampden H-444-1 Digital Multimeter

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

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Gas Heat Trainer

Educational Training Equipment for the 21st Century

Bulletin 229-3B

Purpose

Hampden's **Model H-GHT-4** Gas Fired Warm Air Heating Trainer provides hands-on training by allowing students to conduct tests and adjustments on a modern forced air gas modulating furnace.

Specifications

The **H-GHT-4** Gas Fired Warm Air Heating Trainer consists of the following:

- Mobile Bench
- Gas Burner
- Gas Manifold
- Forced Air Heat Exchanger
- Lo/Hi Gas Valves
- 92,000 BTU Gas Fired Furnace
- Two-stage 24V Heating Thermostat
- Hot Surface Ignition
- Electronic Blower Speed Control
- Instruction Manual and Text Book

The following components shall be mounted on mobile bench:

- Forced Air Gas Furnace
- Main Disconnect Switch
- 24V Two-Stage Heating Thermostat
- Power Cord

The **H-GHT-4** incorporates 38 **HR-1S** socket receptacles inserted in the furnace circuit for testing purposes.

Input Power: 120V AC–1Ø–60Hz

Faults: Seventeen

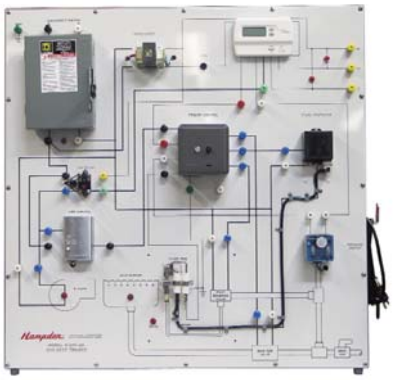
Description

The **H-GHT-4** Gas Fired Warm Air Heating Trainer is equipped with a two-stage heating and modulating fan control. This Trainer is fired by either natural gas or liquefied petroleum.

1. **Sealed Combustion:** Designed to bring in air from outside to support combustion, helping to prevent drafts so that furnace will perform safely.
2. **Pressure Switch:** If airflow inside the heat exchanger is interrupted, the pressure switch signals the furnace to shut down.
3. **Stainless Steel Secondary Heat Exchanger:** Provides added efficiency by extracting residual heat from the air after it passes through the primary heat exchanger.
4. **Induced Draft Motor Blower:** Creates the flow for the gases through the heat exchanger. For added safety it runs before and after each heating cycle.
5. **New Ignitor Technology** with 30 second temperature ramp-up to increase ignitor life by 25%.
6. **Multi-Speed Blower** designed for a wide range of heating capacities.
7. **Variable Speed Blower** maximizes system efficiencies. Using whisper-quiet variable speed motor technology, the blower improves air quality by mixing air from floor to ceiling to create more uniform temperatures.

H-GHT-4
Gas Fired Warm Air Heating Trainer

Model H-GHT-4 Gas Fired Warm Air Heating Trainer
Dimensions: 79-3/8"H x 62"W x 28"D
Shipping Weight: 600 lbs.



Model H-GHT-2A Gas Heat Trainer
Dimensions: 36"H x 36"W x 13"D
Shipping Wt.: 260 lbs.

H-GHT-2A
Gas Heat Trainer

The Hampden **Model H-GHT-2A** Gas Heat Trainer contains the actual control components of a commercial gas heat installation. No gas is required. Although operation of the blower motor, along with the pilot and main burner are simulated, the spark ignitor is real and fully functional. Up to 15 faults may be inserted from rear panel.

This unit is also available to mount on a mobile A-frame. Specify Hampden **Model H-GHT-2A-MCI-1000**

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

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Oil Burner Demonstrators and Trainers

Educational Training Equipment for the 21st Century

Bulletin 229-106-1F

H-OBT-2 Oil Burner Trainer

Purpose

The Hampden **Model H-OBT-2** Oil Burner Trainer is a fully functional oil burner & supply system—unassembled kit form. It is designed to familiarize the student with the system components and principles of operation.

MODEL H-OBT-2 Oil Burner Trainer (shown assembled)
Dimensions: 18"H x 48"W x 18"D, Shipping Weight: 120 lbs.

NOTE: This unit must be used in an area where proper ventilation for this type of unit is available and in-use. **NEVER** run this trainer without proper ventilation.

Description

The components included are as follows: Oil Burner, Combustion Chamber, Primary Control, Oil Filter, Shut-Off Valve—Fused, Pressure Gauge, Vacuum Gauge, Fuel Line Tubing, Thermostat, and Base

Typical Operations of the **H-OBT-2** include: Oil Burner Assembly, One Pipe System, Two Pipe System, Oil Pressure, Oil Line Restriction, Oil Line Air Leak, Combustion Air, and Cad Cell Resistance

Optional Components:

A. 5-Gallon Oil Tank with filler, gauge and fittings
B. Nozzle Set
  1 - 0.5 to 0.75 gph
  1 - 0.85 to 1.75 gph

H-OBD-5B
Domestic Oil Furnace Demonstrator

Purpose

The Hampden **Model H-OBD-5B** Domestic Oil Furnace Demonstrator consists of a standard domestic oil fired furnace modified for educational purposes. The control panel has electrical controls that include: flame detector, fan control, thermostat, and control transformer. Also included is a plenum cabinet with registers. Faults include: ignition failure, flame failure, electrical power failure, and high limit conditions. The unit is mounted on a mobile bench.

This unit is provided with thermometer access ports for testing stack and limit controls and it is designed to interface with the following separately sold Add-On units:

MODEL H-OBD-5PH Power Humidifier

MODEL H-OBD-5C Cooling unit

MODEL H-OBD-5B
Domestic Oil Furnace Demonstrator
Dimensions: 81-1/8"H x 48"W x 24"D
Shipping Weight: 550 lbs.
(Shown with TMP Option)

H-OBD-1T Oil Burner Test Kit

Purpose

The **H-OBD-1T** Oil Burner Test Kit contains the equipment necessary to make tests and perform experiments with all **MODEL H-OBD** and **H-OBT** Oil Burner Demonstrators.

Description

- 3 ½ digit DMM, LCD readout, w/case
- Oil Burner Combustion Testing Kit, consisting of the following:
  1 - Case, carrying
  1 - Tester, smoke
  1 - Fire efficiency finder
  1 - Moisture absorption material
  1 - Sampling hose assembly
  1 - CO_2 indicator
  1 - Thermometer, 1000°F
  1 - Draft gauge
  1 - Manual

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

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Oil Burner Demonstrators and Trainers

Educational Training Equipment for the 21st Century

Bulletin 229-106E

H-OBD-2 Mobile Oil Burner Demonstrator

Purpose

The Hampden **Model H-OBD-2** Mobile Oil Burner Demonstrator duplicates typical field installations from oil tank to combustion chamber, flame and draft adjustment to indicate variable firing efficiency and observation of flame and nozzle patterns.

Description

The unit consists of:

- Mobile bench
- Oil burner
- Blast tube pressure gauge
- Instant glow combustion chamber w/shield
- Oil fuel filter
- Oil tank w/fuel gauge
- Thermostat
- Protectorelay oil burner control
- Interchangeable nozzles (2)
- Instruction Manual & Text Book

The unit is completely piped including necessary safety valves which would be found in standard residential systems.

MODEL H-OBD-2 Oil Burner Demonstrator ➤
Dimensions: 76"H x 64"W x 23"D
Shipping Weight: 600 lbs.

H-OBD-3 Mobile Dual-Fueled Burner Demonstrator

MODEL H-OBD-3 Mobile Dual-Fueled Burner Demonstrator
Dimensions: 95¼"H x 60"W x 30"D
(Shown without oil tank)

Purpose

The Hampden **Model H-OBD-3** Mobile Dual-Fueled Burner Demonstrator duplicates typical field installation from oil tank to combustion chamber, flame and draft adjustment to indicate variable firing efficiency and observation of flame and nozzle patterns. This unit operates on oil and natural gas utilizing a commercial burner management system.

Description

The unit consists of:

- Mobile bench
- Oil burner
- Blast tube
- Instant glow combustion chamber w/shield
- Oil fuel filter
- Oil tank w/fuel gauge
- Thermostat
- Burner management system
- Interchangeable nozzles
- Fuel change-over switch
- Direct spark ignition
- Oil pump pressure and compound gauges
- Gas solenoid valve
- Instruction Manual & Text Book

Natural gas supply and connection to the gas solenoid are not included, customer is responsible for meeting all local and state code requirements prior to hook-up.

The unit is completely piped including necessary safety valves which would be found in standard commercial systems.

Hampden H-OBD-1 Oil Burner Demonstrator

Purpose

The Hampden **Model H-OBD-1** contains all of the mechanical and electrical components necessary to operate an actual oil burner of the type used in oil-fired furnaces and hot water heaters.

With the Hampden Oil Burner Demonstrator, the student learns how to adjust, check-out, operate, and troubleshoot oil burners and their control systems. They learn to identify components by appearance and function. They acquire the skills required to make mechanical and electrical connections. Further, the student learns how to identify the symptoms produced by malfunctioning components; to diagnose, isolate, and repair the system, both mechanically and electrically.

MODEL H-OBD-1 mounted on Transite-II-top steel bench
Overall Dimensions: 50"H x 60"W x 30"D - Shipping weight: 500 lbs

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

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Oil Burner Demonstrators and Trainers

Educational Training Equipment for the 21st Century

Bulletin 229-106-1E

H-OBT-2 Oil Burner Trainer

Purpose

The Hampden **Model H-OBT-2** Oil Burner Trainer is a fully functional oil burner & supply system—unassembled kit form. It is designed to familiarize the student with the system components and principles of operation.

MODEL H-OBT-2 Oil Burner Trainer (shown assembled)
Dimensions: 18"H x 48"W x 18"D, Shipping Weight: 120 lbs.

NOTE: This unit must be used in an area where proper ventilation for this type of unit is available and in-use. **NEVER** run this trainer without proper ventilation.

Description

The components included are as follows: Oil Burner, Combustion Chamber, Primary Control, Oil Filter, Shut-Off Valve—Fused, Pressure Gauge, Vacuum Gauge, Fuel Line Tubing, Thermostat, and Base

Typical Operations of the **H-OBT-2** include: Oil Burner Assembly, One Pipe System, Two Pipe System, Oil Pressure, Oil Line Restriction, Oil Line Air Leak, Combustion Air, and Cad Cell Resistance

Optional Components:

A. 5-Gallon Oil Tank with filler, gauge and fittings
B. Nozzle Set
- 1 - 0.5 to 0.75 gph
- 1 - 0.85 to 1.75 gph

H-OBD-5A
Domestic Oil Furnace Demonstrator

Purpose

The Hampden **Model H-OBD-5A** Domestic Oil Furnace Demonstrator consists of a standard domestic oil fired furnace modified for educational purposes. The control panel has electrical controls that include: flame detector, fan control, thermostat, and control transformer. Faults include: ignition failure, flame failure, electrical power failure, and high limit conditions. The unit is mounted on a mobile bench.

This unit is provided with thermometer access ports for testing stack and limit controls and it is designed to interface with the following separately sold Add-On units:

MODEL H-OBD-5P Plenum cabinet

MODEL H-OBD-5PH Power Humidifier

MODEL H-OBD-5C Cooling unit

MODEL H-OBD-5A
Domestic Oil Furnace Demonstrator
Dimensions: 81-1/8"H x 48"W x 24"D
Shipping Weight: 550 lbs.

H-OBD-1T Oil Burner Test Kit

Purpose

The **H-OBD-1T** Oil Burner Test Kit contains the equipment necessary to make tests and perform experiments with all **MODEL H-OBD** and **H-OBT** Oil Burner Demonstrators.

Description

- 3 ½ digit DMM, LCD readout, w/case
- Oil Burner Combustion Testing Kit, consisting of the following:
  - 1 - Case, carrying
  - 1 - Tester, smoke
  - 1 - Fire efficiency finder
  - 1 - Moisture absorption material
  - 1 - Sampling hose assembly
  - 1 - CO_2 indicator
  - 1 - Thermometer, 1000°F
  - 1 - Draft gauge
  - 1 - Manual

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

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Oil Burner Demonstrators and Trainers

Educational Training Equipment for the 21st Century

Bulletin 229-106E

H-OBD-2 Mobile Oil Burner Demonstrator

Purpose

The Hampden **Model H-OBD-2** Mobile Oil Burner Demonstrator duplicates typical field installations from oil tank to combustion chamber, flame and draft adjustment to indicate variable firing efficiency and observation of flame and nozzle patterns.

Description

The unit consists of:

- Mobile bench
- Oil burner
- Blast tube pressure gauge
- Instant glow combustion chamber w/shield
- Oil fuel filter
- Oil tank w/fuel gauge
- Thermostat
- Protectorelay oil burner control
- Interchangeable nozzles (2)
- Instruction Manual & Text Book

The unit is completely piped including necessary safety valves which would be found in standard residential systems.

MODEL H-OBD-2 Oil Burner Demonstrator ➤
Dimensions: 76"H x 64"W x 23"D
Shipping Weight: 600 lbs.

H-OBD-3 Mobile Dual-Fueled Burner Demonstrator

MODEL H-OBD-3 Mobile Dual-Fueled Burner Demonstrator
Dimensions: 95¼"H x 60"W x 30"D
(Shown without oil tank)

Purpose

The Hampden **Model H-OBD-3** Mobile Dual-Fueled Burner Demonstrator duplicates typical field installation from oil tank to combustion chamber, flame and draft adjustment to indicate variable firing efficiency and observation of flame and nozzle patterns. This unit operates on oil and natural gas utilizing a commercial burner management system.

Description

The unit consists of:

- Mobile bench
- Oil burner
- Blast tube
- Instant glow combustion chamber w/shield
- Oil fuel filter
- Oil tank w/fuel gauge
- Thermostat
- Burner management system
- Interchangeable nozzles
- Fuel change-over switch
- Direct spark ignition
- Oil pump pressure and compound gauges
- Gas solenoid valve
- Instruction Manual & Text Book

Natural gas supply and connection to the gas solenoid are not included, customer is responsible for meeting all local and state code requirements prior to hook-up.

The unit is completely piped including necessary safety valves which would be found in standard commercial systems.

H-OBD-1 Oil Burner Demonstrator

Purpose

The Hampden **Model H-OBD-1** contains all of the mechanical and electrical components necessary to operate an actual oil burner of the type used in oil-fired furnaces and hot water heaters.

With the Hampden Oil Burner Demonstrator, the student learns how to adjust, check-out, operate, and troubleshoot oil burners and their control systems. They learn to identify components by appearance and function. They acquire the skills required to make mechanical and electrical connections. Further, the student learns how to identify the symptoms produced by malfunctioning components; to diagnose, isolate, and repair the system, both mechanically and electrically.

MODEL H-OBD-1 mounted on Transite-II-top steel bench
Overall Dimensions: 50"H x 60"W x 30"D - Shipping weight: 500 lbs

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

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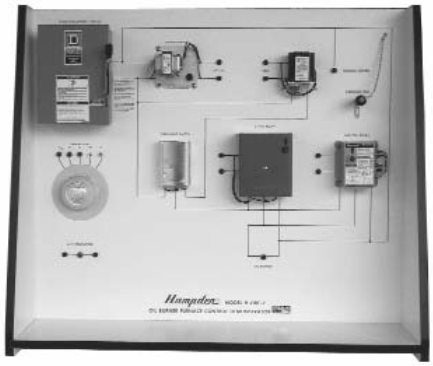
Furnace Controls Trainers

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 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

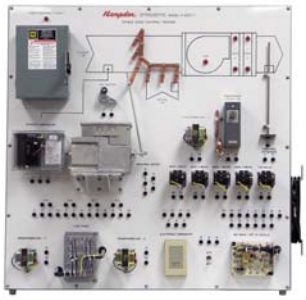
The Hampden **MODEL H-DSCT-1** facilitates the study and troubleshooting of the electrical and control circuits of a three-phase, dual-speed hermetic compressor. Standard commercial components are wired into an operating electrical control system, while the compressor is simulated with pilot lights and 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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Pneumatic/Electric Controls Systems

Educational Training Equipment for the 21st Century

Bulletin 239-3A

Hampden H-PCT-1 Pneumatic Controls Trainer

Purpose

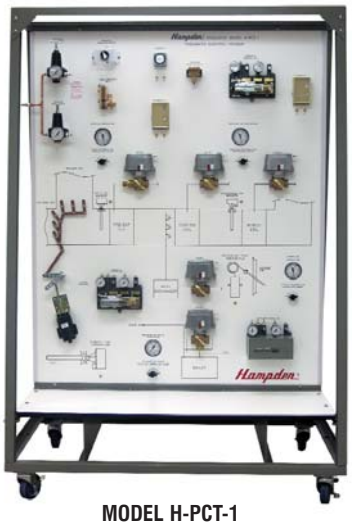
To aid students in learning the operation and maintenance of commercial pneumatically-controlled heating/cooling systems.

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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