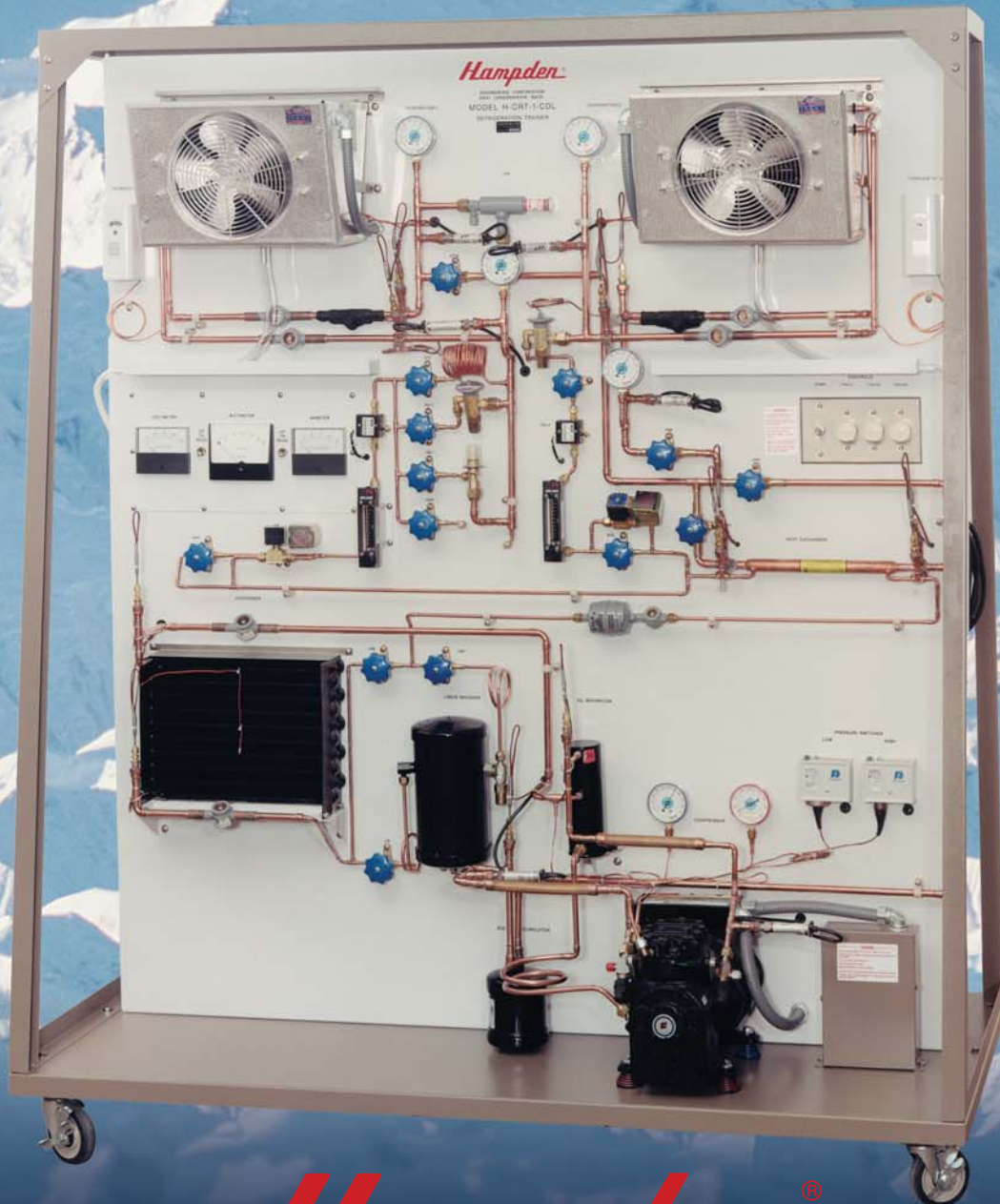


# Refrigeration and Air Conditioning



**Hampden**<sup>®</sup>  
ENGINEERING CORPORATION



# Hampden: The Leader in Real-World Training

**Hampden Engineering Corporation** has been designing and manufacturing educational training devices for engineering, technical, and industrial training programs since 1954. Hampden has earned its leadership position in the technical, vocational and skills training field by integrating standard commercial equipment and controls into educational packages that facilitate the learning process.

Hampden's educational simulators and programs embrace a wide gamut of products, processes, and industries. For example, you can obtain Hampden training programs in Basic Electricity; Basic Electronics; Digital Electronics; Microcomputers; Heating, Refrigeration and Air Conditioning; Electrical Motors and Transformers; Electrical Power Transmission and Distribution; Pneumatics; Hydraulics; Kinematics; Robotics; Instrumentation and Controls; and Process Automation.

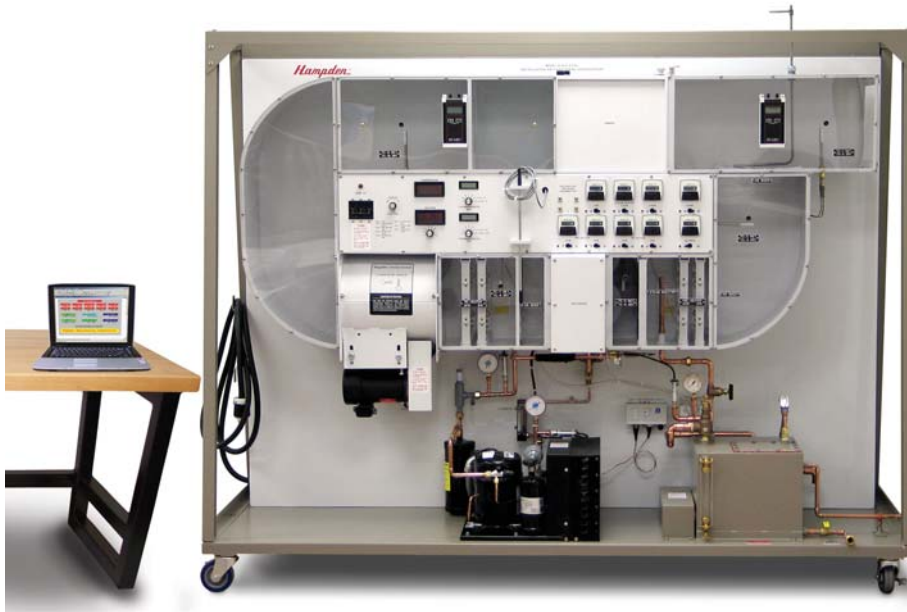
Hampden's Heating, Refrigeration and Air Conditioning training programs, which include basic principles through advanced industrial systems, utilize actual commercial components throughout. These training programs follow curriculum guidelines developed by the Air Conditioning and Refrigeration Institute (ARI) and the Association of Home Appliance Manufacturers (AHAM). Hampden also follows the guidelines of HVAC Excellence Certification. For this reason Hampden equipment is widely used in secondary and post-secondary vocational schools, community colleges, and technical institutes.

Furthermore, Hampden's Training Equipment

is manufactured to operate at the specific voltage and frequency of the country in which it is to be used. Consequently, heating and refrigeration technicians all over the world are being trained with the help of Hampden Educational Systems.

Hampden offers the widest selection of basic, intermediate, and advanced programs, which provide the consistency so vital to vocational and skills training. For advanced automation training, Hampden's Heating, Refrigeration, and Air Conditioning trainers may be equipped with the sensors and signal conditioners required for automatic data acquisition, logging, processing, and control. Additionally, the trainers may incorporate electrical indicators and instructor-programmed faults.

Hampden trainers contain EPA-approved, non-CFC environmentally safe refrigerant.



## AIR CONDITIONING CONTROLS TRAINER MODEL H-ACCS-1



The Hampden Model H-ACCS-1 Air Conditioning Controls Trainer contains all of the actual components used in the control of commercial and residential heating/cooling systems. The trainer simulates a system that provides warm air in the winter from an electric furnace, and cool air in the summer from an air conditioner. The components are pre-wired into the complete thermostatic-actuated system, arranged and diagrammed to facilitate the learning process. The student learns correct procedures for systematically checking out and establishing settings on new installations as well as developing skills for diagnosing malfunctions based on customer complaints. The instructor can insert up to 74 faults, producing a real-world troubleshooting experience.

## REFRIGERATION SYSTEM TRAINER MODEL H-RST-2

The Hampden Model H-RST-2 Refrigeration System Trainer has evaporator and condenser coils and Hi and Low pressure receivers made of tempered glass – to permit students to observe the change in refrigerant state. Either a thermostatic expansion valve or a capillary tube may be used for the liquid control device. A reversing valve allows the trainer to be operated as a heat pump. The trainer can also operate as a Flooded Evaporator system.

### Optional Equipment

**MODEL H-RST-2-CDL:** Computer Data Logging Package

**MODEL H-RST-MP:** Meter Package

**MODEL H-RST-FP-10E:** Electrical Fault Package

**MODEL H-RST-TP:** Test Point Package for H-RST-FP-10E



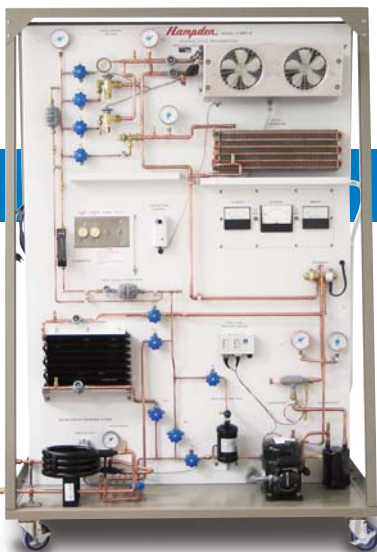
## REVERSE-CYCLE REFRIGERATION TRAINER MODEL H-RST-9

The Hampden Model H-RST-9 Reverse-Cycle Refrigeration Trainer demonstrates the operation of both an air conditioner and a heat pump. The system utilizes a 1/3 HP hermetic compressor, control panel, two condensers, two evaporators, four metering devices (automatic expansion valve, two thermostatic expansion valves; capillary tube).

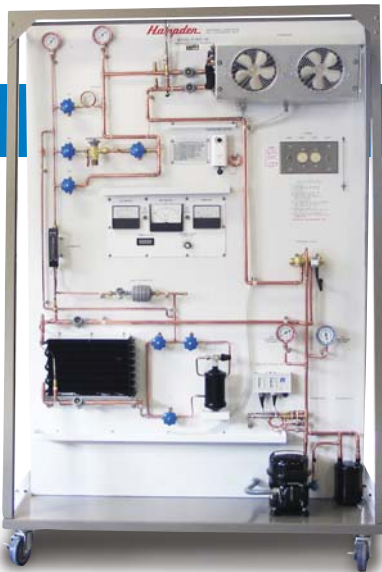
### Optional Equipment

**MODEL H-RST-9-CDL:** Computer Data Logging Package

**MODEL H-RST-MP:** Meter Package



## REFRIGERATION AND AIR CONDITIONING



### BASIC REFRIGERATION TRAINER MODEL H-RST-3B

The Hampden Model H-RST-3B Basic Refrigeration Trainer contains a reversing valve so that the system may be run as a heat pump in addition to operation as a refrigeration system. Three types of liquid control devices are included: capillary tube, thermostatic expansion valve, and hand expansion valve. Sight glasses at the inlet and outlet of the evaporator and condenser allow students to monitor the change in refrigerant state.

#### Optional Equipment

**MODEL H-RST-MP:** Meter Package

**MODEL H-RST-FP-10E:** Electrical Fault Package

**MODEL H-RST-FP-M:** Mechanical Fault Package

**MODEL H-RST-TC:** Digital Temperature Module with Thermocouples  
(Included w/ H-RST-3B-CDL)

**MODEL H-RST-3B-CDL:** Computer Data Logging Package

### COMMERCIAL REFRIGERATION TRAINER MODEL H-CRT-1

The Hampden Model H-CRT-1 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.

#### Optional Equipment

**MODEL H-RST-MP:** Meter Package

**MODEL H-CRT-FP-18E:** Electrical Fault Package

**MODEL H-CRT-FP-M:** Mechanical Fault Package

**MODEL H-CRT-TC:** Digital Temperature Module with Thermocouples

**MODEL H-CRT-1-CDL:** Computer Data Logging Package



### COMMERCIAL REFRIGERATION TRAINER MODEL H-CRT-2

The Hampden Model H-CRT-2 Commercial Refrigeration Trainer contains two evaporators, which may be operated singly or in parallel. Three types of liquid control devices, (Cap tube, TEV, and AEV); sight glasses at the inlet and outlet of the evaporator and condenser; pressure gauges; thermocouples; temperatures and pressure controls; heat exchanger; flow meters; receiver; oil separator; accumulator; and mobile storage bench. Includes 20 instructor-insertable faults (18 electrical; 2 mechanical).

#### Optional Equipment

**MODEL H-CRT-2-CDL:** Computer Data Logging Package

## INDUSTRIAL REFRIGERATION TRAINER MODEL H-IRT-1

The Hampden Model H-IRT-1 Industrial Refrigeration Trainer is a complete solution for providing students with experience operating and servicing large industrial systems requiring water-cooled condensers (tube-in-tube and shell-in-tube), electric or hot-gas defrost systems, cooling towers, hot bypass capacity control systems, crankcase pressure regulators, crankcase heaters, and pressure pumps. The two evaporators (each with its own thermostatic expansion valve and pressure gauges) are enclosed within clear plastic panels, permitting temperatures inside this area to fall to realistic levels. Students are able to configure a number of different systems by opening and closing the appropriate hand valves.

### Optional Equipment

**MODEL H-IRT-FP-M:** Mechanical Fault Package

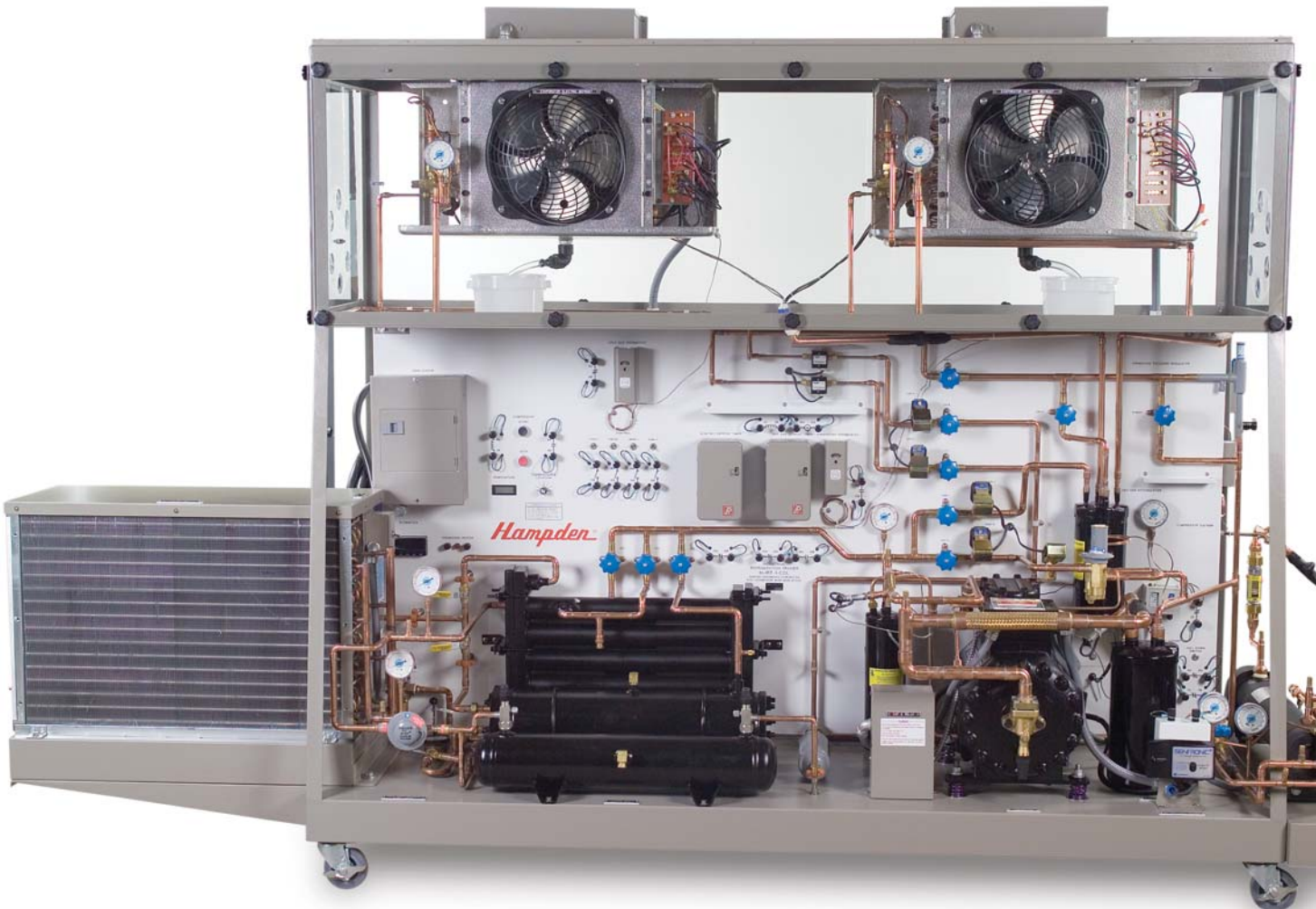
**MODEL H-IRT-1-CDL:** Computer Data Logging Package

**MODEL H-IRT-FP-18E:** Electrical Fault Package

**MODEL H-ACTK-CT:** Water Cooling Tower

**MODEL H-IRT-ACC:** Third Condenser to expand training capabilities (Air Cooled)

**MODEL H-IRT-EC:** Evaporator Chiller, shell and tube type water chiller



## REFRIGERATION AND AIR CONDITIONING



### REFRIGERATION AND AIR CONDITIONING TRAINER MODEL H-RST-5

The Hampden Model H-RST-5 Refrigeration and Air Conditioning Trainer, is a thermostatic expansion valve (TEV) controlled refrigerating system. Gauges read evaporation and condensing pressures, while strategically located temperature wells permit temperature measurements. The lower portion of the workbench houses the evaporator with its fan, permitting the compressor to cycle based on evaporating pressure. The trainer is provided with faulted components which the instructor can temporarily install in place of the functioning components.

#### Optional Equipment

**MODEL H-RST-5-CDL:** Computer Data Logging Package

### BASIC REFRIGERATION TRAINER MODEL H-RST-6

The Hampden Model H-RST-6 Basic Refrigeration Trainer contains evaporator and condenser coils made of clear tempered glass, three liquid metering devices, electric reversing valve, hermetic compressor with lights, gauges, filter/drier, sight glass and moisture indicator, flow meter, high and low pressure controls, digital temperature indicator with thermocouple transfer switch, solenoid, hand valves, and mobile storage cabinet. Included are instructor-insertable faults (10 electrical; 2 mechanical)

#### Optional Equipment

**MODEL H-RST-6-CDL:** Computer Data Logging Package



### AIR CONDITIONING DEMONSTRATOR MODEL H-ACD-1A

The Hampden Model H-ACD-1A Air Conditioning Demonstrator provides a pitot tube pressure sensor and a manometer for measuring air flow, a refrigerant flow meter, wet and dry bulb thermometers, and gauges for measuring evaporation and condensing pressures. The variable speed blower, the moisture injector, the duct heating elements, and the eight interchangeable end plates with size orifices all combine to provide an enormous variety of operating conditions for students to investigate.

#### Optional Equipment

**MODEL H-ACD-1A-CDL:** Computer Data Logging Package

**MODEL H-ACD-1-FP:** Electrical Fault Package





## RECIRCULATING AIR CONDITIONING DEMONSTRATOR MODEL H-ACD-2

The Hampden Model H-ACD-2 Recirculating Air Conditioning Demonstrator contains all of the equipment and measuring instruments required for a thorough investigation of systems that recycle and condition air for personal comfort. The basic trainer includes a blower, manometers, damper, mixers, preheater, humidifier, evaporator, and reheater. The optional H-ACD-2-CDL Computer Data Logging Package, consists of a power supply, thirteen dual thermocouples, six 4-20mA transmitters (one air velocity, three pressure, and two differential), two wattmeters, and nine elapsed time meters.

### Optional Equipment

**MODEL H-ACD-2-CDL:** Computer Data Logging Package

**MODEL H-ACD-2-FP:** Electrical Fault Package

## DOMESTIC AIR CONDITIONING TRAINER KIT MODEL H-MACK-10

The Hampden Model H-MACK-10 Domestic Air Conditioning Trainer Kit includes a 1/2 HP hermetic compressor, fan-cooled condenser, fan-cooled evaporator, thermostatic expansion valve, filter/drier, liquid receiver, low-pressure control, room thermostat, air filter, evaporator fan speed control, hardware kit, cold box, and a Mobile Storage Cabinet.



## COMMERCIAL WALK-IN COOLER TRAINER KIT MODEL MACK-9

The Hampden Model H-MACK-9 Commercial Walk-In Cooler Trainer Kit includes a 1/2 HP hermetic compressor, water-cooled condenser, fan-cooled evaporator, thermostatic expansion valve, filter/drier, high/low pressure control, pressure control water valve, liquid receiver, evaporator fan speed control, hardware kit, cold box, and a Mobile Storage Cabinet.

## REFRIGERATION AND AIR CONDITIONING

### AIR CONDITIONING SYSTEM TRAINER MODEL H-ACT-1



The Hampden Model H-ACT-1 Air Conditioning System Trainer is based on R-410A refrigerant. R-410A is an efficient and environmentally friendly refrigerant. The Model H-ACT-1 is designed to provide the student with a thorough understanding of the systems used in residential and commercial applications. The system components are panel mounted and provide easy access for testing and troubleshooting. When specified, the trainer can be supplied with an integral fault package comprised of ten electrical faults, mounted in a locking box on the rear of the trainer. Also available is a panel mounted meter package that permits monitoring of the system voltage, current and watts, and a digital temperature package with thermocouples to display the system temperatures at critical locations.

#### Optional Equipment

**MODEL H-ACT-MP:** Meter Package

**MODEL H-ACT-FP-10E:** Electrical Fault Package

**MODEL H-ACT-TC:** Digital Temperature Module with thermocouples

**MODEL H-ACT-1-CDL:** Computer Data Logging Package

### COMMERCIAL MULTI-COMPRESSOR RACK REFRIGERATION SYSTEM TRAINER w/ Electrical Fault Package MODEL H-CRT-4B

The Hampden Model H-CRT-4B Commercial Multi-Compressor Rack Refrigeration System Trainer was designed to provide students with a thorough understanding of the multiple compressor refrigeration cycle, including measurement of pressure, vacuum, flow rate, and temperature. The system components are panel mounted to provide easy access for testing and troubleshooting. When specified, the Hampden Model H-CRT-4B is supplied with an integral Fault Package, comprised of preset electrical faults mounted in a locking box on the side of the trainer.



### ADVANCED COMMERCIAL REFRIGERATION TRAINER MODEL H-CRT-3

The Hampden Model H-CRT-3 Advanced Commercial Refrigeration Trainer provides students with a hands-on introduction to the principal components of a small scale cold room. This advanced system incorporates ten instructor-controlled programmed switchable faults inside a lockable compartment. The Hampden Model H-CRT-3 consists of a control panel with compressor switch, variable heater control, and variable fan control - evaporator, cold box (insulated) with heater, compressor (semi-hermetic 1/2 HP), fan cooled condenser, evaporator with defrost, TEV (1 internal, 2 external). Charged with R-134a HFC refrigerant.

#### Optional Equipment

**MODEL H-CRT-3-TK:** Tool Kit

**MODEL H-CRT-3-TS:** Test & Service Package

**MODEL H-CRT-3-MPP:** Maintenance & Practice Package

**MODEL H-CRT-3-CDL:** Computer Data Logging Package





## AIR CONDITIONING AND REFRIGERATION TRAINING KITS MODEL H-ACTK (SERIES)

Hampden Model H-ACTK Air Conditioning and Refrigeration Training Kits provide practical hands-on experience in connecting, charging, and servicing of current air conditioning and refrigeration systems. The various trainers are suitable for a wide range of institutions including: technical and community colleges, industrial corporations, and government and military training centers. Each kit comes complete with the necessary tubing, fittings, and electrical hardware as well as the compressor, condenser, evaporator, and auxiliary apparatus and is supplied with a mobile cart of code-gauge furniture stock steel finished in instrument tan enamel with 4-inch swivel rubber-tired casters, except for H-ACTK-20 which is supplied with a mobile cabinet.

**MODEL H-ACTK-1:** Beverage Cooler

**MODEL H-ACTK-2:** Single Evaporator Refrigeration/Freezer

**MODEL H-ACTK-3:** Two-Door Refrigerator

**MODEL H-ACTK-4:** Grocery Reach-in Cooler

**MODEL H-ACTK-5:** Small Walk-in Meat Cooler

**MODEL H-ACTK-6:** Multiple Case Cooler

**MODEL H-ACTK-7:** Ice Cream Freezer

**MODEL H-ACTK-8:** Restaurant High-Temperature Salad-Box

**MODEL H-ACTK-9:** Commercial Florist Cooler

**MODEL H-ACTK-10:** Room Air Conditioner

**MODEL H-ACTK-11:** Small Air Conditioner

**MODEL H-ACTK-12:** Water Chiller Trainer

**MODEL H-ACTK-15:** Freezer Trainer

**MODEL H-ACTK-20:** AC/Refrigeration Control Kit

**MODEL H-ACTK-21:** Split-Type AC Trainer

**MODEL H-ACTK-22:** Split-Type Heat Pump Trainer

**MODEL H-ACTK-23:** Geothermal Trainer

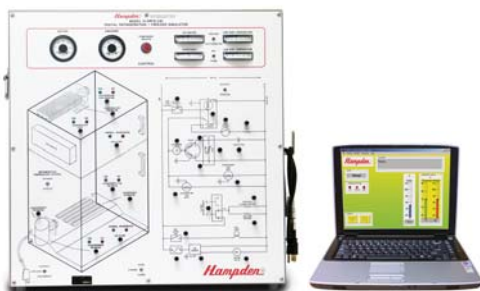


## DIGITAL INSTRUCTIONS MODULES

The Hampden Computer Simulated Instruction Modules are designed to demonstrate the principles of operation and troubleshooting of various types of systems. These “modules” provide a complete aid for the teacher who desires to teach appliance analysis and troubleshooting. Each module’s front panel displays both a complete schematic and pictorial of the system. All functions operate as on the actual equipment and present the student with realistic problem situations that would be very difficult for the instructor to create. Both mechanical and electrical problems are simulated. Pushbuttons are used to “replace” suspected defective parts. Simulator includes H-LTCS Laptop Computer.

**MODEL H-DRFS-CSI:** Digital Refrigeration/Freezer Simulator

**MODEL H-DACS-CSI:** Digital Air Conditioner Simulator



# REFRIGERATION AND AIR CONDITIONING



## REFRIGERATION TRAINER MODEL H-RST-10

The Hampden Model H-RST-10 Refrigeration Trainer is a commercial refrigeration component completely plumbed and wired for student operation. This unit consists of refrigeration components rated for a one ton (12000 BTU) system.

## TRUCK REFRIGERATION TRAINER MODEL H-RST-7A

The Hampden Model H-RST-7A Truck Refrigeration System Trainer is a practical hands-on refrigeration system trainer used to familiarize the student with the design concepts and operating procedures of Thermo King Transport Refrigeration systems. The Trainer is a completely functional refrigeration-heating type system. The equipment is securely mounted on a mobile stand and arranged to provide maximum accessibility for both instructor and students. Each component, which is clearly labeled, is of commercial quality and is typical of the kind encountered in the field.



## HEAT PUMP TRAINER MODEL H-RST-8

The Hampden Model H-RST-8 Heat Pump Trainer contains an environmental enclosure with damper, fan-cooled evaporator, emergency heat, thermal cut-out switch, manual 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 with moisture indicator, thermostatic expansion valve and cap tube for each heating/cooling coil, and includes mobile storage cabinet.

### Optional Equipment

**MODEL H-RST-8-CDL:** Computer Data Logging Package



## HEAT PUMP TRAINER MODEL H-RST-17

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.

### Optional Equipment

**MODEL H-RST-17-CDL:** Computer Data Logging Package

## HEAT PUMP TRAINER MODEL H-RST-12

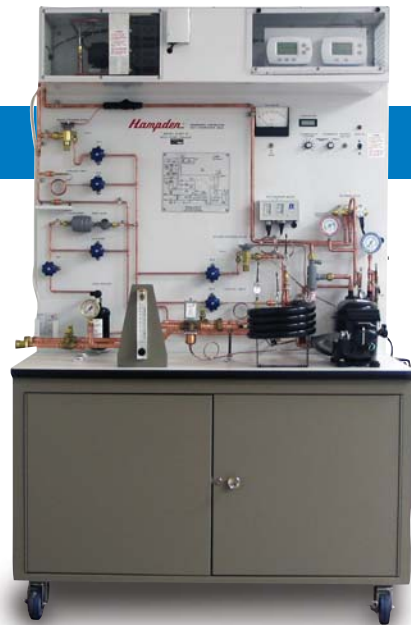
The Hampden Model H-RST-12 Heat Pump Trainer provides the student with an introduction to the principle components of heat pump systems. For practical electrical troubleshooting, the instructor has the ability to insert eighteen commonly found electrical faults such as:

- Defective capacitor
- Motor
- Timer

The instructor may also insert two mechanical faults, a defective thermal expansion valve and defective filter-drier.

### Optional Equipment

**MODEL H-RST-12-CDL:** Computer Data Logging Package



## AIR CONDITIONING AND REFRIGERATION TEST BENCH MODEL 262-19X



The Hampden Model 262-19X Air Conditioning and Refrigeration Test Bench provides a convenient work surface, storage facilities, and the most often used auxiliary and test equipment for the refrigeration and air conditioning shop. The bench and panel are constructed of code gauge steel. The front panel is finished in white enamel, the panel housing and bench are finished in instrument tan texture enamel, and the face of the lockable drawer is white laminate. Panel-mounted equipment includes: A charging cylinder, a manifold gauge set, a vacuum manifold, a vapor charger, a refrigerant valve, an electronic vacuum gauge, a compressor analyzer, an electrical multimeter, three AC receptacles, a 3-phase 20A receptacle, a 208V single phase 15A refrigeration receptacle, and a 3 pole main circuit breaker with pilot lamp. Also supplied is a vise, a torch kit, and a refrigeration hose set.

# Hampden: Committed to Practical, Hands-on Training Equipment.

Hampden's complete selection of Refrigeration and Air Conditioning training equipment is far too extensive to include in this brochure. We build standard and custom products to any size, application or degree of complexity. Our experienced engineers can easily handle requests for trainers that are not presently cataloged.

Hampden's Training Programs for Comfort Conditioning Systems also include a full array of Solar, Heat Pump, Oil, Electric, and Gas heating furnaces and controls for both forced air and hydronics. In many cases the furnace is an integral part of the trainer. In all cases, standard commercial components are used, so that students receive real-world instruction in the laboratory classroom environment. All of Hampden's technical trainers may be equipped with computer interface terminals for data gathering, logging and control.

The worldwide popularity of Hampden's training equipment and programs results from the extraordinary collaboration between Hampden engineers and the technical educators. Hampden does not simply adapt standard products for international use; Hampden designs each product for the electrical power characteristics of the country in which it will be used, whatever the voltage or frequency.



Hampden is committed to providing the most up-to-date, practical hands-on training equipment. Visit our home page at [www.hampden.com](http://www.hampden.com) to see what's new at Hampden, or send us e-mail at [sales@hampden.com](mailto:sales@hampden.com)

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