

## H-6710 Refrigeration Demonstrator

### Purpose

The Hampden **Model H-6710** Refrigeration Demonstrator has been designed to illustrate the fundamental aspects of the refrigeration cycle. This unit allows the student to measure the temperature and pressure at critical points throughout the cycle to better comprehend the processes that occur in the refrigeration cycle.

### Description

The Hampden **Model H-6710** Refrigeration Demonstrator allows for the measurement and display of the important cycle parameters which are:

- Input torque
- Motor RPM
- Temperature of the condenser coolant at the inlet and outlet ports
- Temperature and pressure at various points in the basic cycle including the inlet and outlet of the compressor, condenser, evaporator, and the expansion valve

- Temperature in the load tank
- Refrigerant flow rate
- Condenser coolant flow rate
- Power input to heater and compressor.

With the data available, it is possible to determine the coefficient of performance, the compressor efficiency, sources of irreversibility in the cycle, and the overall heat balance under various load conditions. In addition, the temperature-entropy and enthalpy-entropy diagrams can be constructed which will allow the cycle and component processes to be readily visualized.

This unit utilizes a trunnion-mounted AC motor/dynamometer assembly to measure the motor torque. The evaporator is housed in a thermally-insulated stainless steel load tank containing a circulator, water and an electric immersion heater which is infinitely variable over the range. This unit also features an electronic control center housing the AC main circuit breaker, pilot lights associated with the ON/OFF status of the system components, and associated controls. This unit comes complete with an operation and maintenance manual, experiment manual and teacher's manual .

The entire unit is mounted on a mobile bench constructed of code-gauge square mechanical tube frame with a plastic laminate top and 4 swivel casters, two with locks. The overall dimensions of this unit are approximately 60" high, 72" wide, and 30" deep. Also supplied is an 8 foot power cord with a cord holding rack.



**Model H-6710** Refrigeration Demonstrator  
Dimensions: 60"H x 72"W x 30"D, Shipping Weight: 600 lbs.

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

# Thermodynamics Trainers

Educational Training Equipment for the 21st Century

## Specifications

### Refrigeration Cycle:

The basic components of the refrigeration cycle are:

- One 0.25 kW (1/3 HP) Compressor (open type)
- One 1.20 kW (4100 Btu/hr) Condenser (water-cooled)
- One 1.20 kW (4100 Btu/hr) Evaporator
- One Thermostatic Expansion Valve
- One Load Tank

In addition to the basic refrigeration cycle components, this unit comes complete with the necessary auxiliary components to make this a workable cycle. These auxiliary components are:

- One high-low pressure cutout (primary cycle)
- Three quick-disconnect fittings
- One filter-drier
- Five sight glasses
- One liquid receiver
- Six ball valves
- One accumulator
- One condenser pressure regulator
- One evaporator pressure regulator
- One control panel with one main GFI circuit breaker and pilot light, three circuit breaker switches and pilot lights
- One photoelectric tachometer pick-up module
- One 1/3 HP, 3 $\phi$ , Induction Motor/Trunnion-mounted

## Instrumentation:

This unit also comes complete with the following instrumentation needed to monitor the cycle parameters of interest, which are:

- Five pressure or compound gauges
- Two pressure gauges - water
- Ten thermocouples, Type T
- One temperature selector switch (control panel mounted)
- One digital temperature indicator (control panel mounted)
- Two watt-hour meters (to measure electrical power input to compressor and heater)
- One digital tachometer
- One water flowmeter with needle valve
- One refrigerant flowmeter
- One digital heater control with temperature cut-out
- One torque scale with linkage
- One variable frequency drive

## Services Required

### Voltage Input

120V AC, 1 $\phi$ , 50/60 Hz.

### Water

Condenser Cooling

### Waste

Floor Drain

## Computer Data Logging

This feature adds ten thermocouple outputs, six pressure transmitters, two flow transmitters, one torque meter output, and one compressor speed output into the system. One interface package containing National Instruments I/O modules is provided for interfacing into a PC computer through the USB port. LabVIEW® control software and templates for LabVIEW® control software are included. Computer is included.

Specify **Model H-6710-CDL**. ♦

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