Air Conditioning / Heat Pump Operations Learning System

T7082

THERMAL

Learning Topics:

- Refrigeration
- Temperature Units
- Pressure Units
- Compressors
- Enthalpy
- Combined Gas Law
- Condensers
- Phase Change
- Metering Devices
- Evaporators
- Temperature Control
- Pressure Control
- Reversing Valves
- Refrigerants

Air Conditioning and Heat Pump systems play a key role in industry, commercial, and residential applications by providing heating and cooling of living spaces, food storage, and various manufacturing processes. The model T7082 Air Conditioning/Heat Pump Operations Learning System is a working system with industrial components that can perform heat pump, air conditioning, and refrigeration systems operation. The T7082 uses the principle of vapor compression and offers three different types of expansion methods, enabling learners to explore a wide range of thermal applications and system designs.

The T7082 is specially designed as a teaching system with its components arranged in a breadboard fashion to make it easy for learners to follow the system flow and understand its operation. Manual valves are provided throughout so learners can create faults and change system performance. Extensive instrumentation is also provided so that learners can study how these systems operate and how to improve performance. The T7082 system consists of a standing workstation, vapor-compression type thermal system, curriculum, and instructor's guide.

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Technical Data

Complete technical specifications available upon request.

1-Workstation with: 30”W x 72”H x 72”L
- -Welded 1.5-in steel tube construction
- -Drip pans for evaporator and condenser
- -All components mounted and plumbed on two heavy duty gauge steel panels which are painted and silkscreened

1-Compressor:
- -Electric motor, 1/5 hp
- -Hermetically sealed
- -Thermal electrical overload protection
- -Pre-charged with Polyester Oil
- -Supports medium and high temp applications

1-Pressure Control System:
- -Dual pressure setpoint
- -High compressor protection
- -Low pressure cycling or safety functions

1-Refrigerant Type R134-A

1-Refrigeration Circuit:
- 2-Check Valves
- 7-Manual Valves
- 1-Receiver with liquid level gauge
- 1-Filter/Dryer
- 1-Suction Accumulator
- 1-Moisture Indicator with sight glass
- 1-Reversing Valve, solenoid operated
- 2-Evaporator Condenser Coils, 7-in. x 7-in.
- 1-Reversing valve control
- 1-Capillary Tube
- 1-Automatic Expansion Valve
- 1-Thermostatic Expansion Valve

1-Instrumentation:
- 1-Current Meter, analog, 0-10 Amp, panel mounted
- 4-Temperature Gauge, 0-200 F
- 4-Pressure Gauge, 0-300 psi
- 1-Flow Meter, rotameter type with needle valve

1-Temperature Control System:
- 1-Microprocessor-Control
- 1-Programmable Sealed Keypad
- 1-Digital Display, LCD type with setpoint and current temperature
- 1-Lockout Switch
- 1-RTD Remote temperature probe

1-Blower Control System:
- 2-Blowers
- 2-Dampers
- 2-Electric Motor Drives

1-Valve Wrench

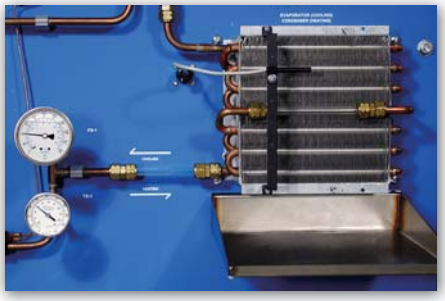
1-Main Power:
- 1-Master Power Switch, manual rocker type
- 1-Circuit Breaker, 15-Amp

1-11609 Student Curriculum

1-11619 Teachers’ Guide

Power Requirements:
- 1-Phase, 110 VAC, 60 Hz, 9 Amps or
- 1-Phase, 230 VAC, 50 Hz, 6 Amps

Instrumentation Features

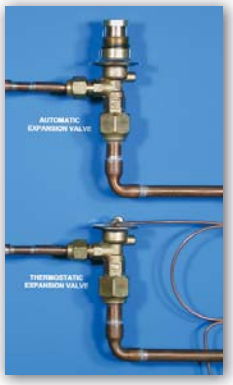


Evaporator Sight Glass and Instrumentation

The T7082 includes many instrumentation features to observe and monitor system operation. Sight glasses are located at three points on both the evaporator and condenser coils to show how the refrigerant changes phase as it passes through each coil. Pressure and temperature gauges are placed at the inlet and outlet of the condenser and evaporator to determine heating and cooling performance. Other teaching components include moisture indicator, panel-mounted compressor ammeter, and flow meter.

Three Types of Refrigerant Control

The T7082 features three types of control valves: capillary tube, automatic expansion valve, and thermostatic expansion valve. This allows learners to study a wide range of thermal system applications. Manual valves are used to switch between the various control methods.



Industrial Blower with Damper (shown with blower guard removed)

Variable Conditions

The T7082 replicates a variety of performance conditions with features such as heavy-duty industrial blowers attached to the condenser and evaporator coils and manual valves placed throughout the refrigeration system. The blowers have dampers that can vary the air flow across the coils, showing the effect of varying the heat transfer rate. Manual valves are used to restrict the flow of refrigerant and change the amount of refrigerant in the system.

Modern Temperature Control

The T7082 uses a modern microprocessor-based temperature control of the air temperature at the coil. It includes a programmable keypad for both heating and cooling modes, electrical reversing valve, RTD-type remote temperature probe, and digital display. The display shows current temperature and set-point.

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