



DEGEM
SYSTEMS

A/C &
Refrigeration

DAR-3300

Refrigeration & Air Conditioning Training Systems

Objectives

The refrigeration and air conditioning training systems are designed to provide students with the fundamental and advanced training programs in basic and industrial refrigeration and air conditioning. The training system exposes the student to various systems and real components.

The training systems provide a comprehensive view of entire refrigeration and air conditioning systems. The training program covers actual components and their interconnection, related functions, operation, diagnosis and repair methods through safe, hands-on practical activities.

Description

Each training system utilizes the DAR-3301 - a main platform for air conditioning and refrigeration. This unit is designed to accommodate various plug-in panels, such as:

- DAR-3311 Basic refrigeration
- DAR-3312 Industrial refrigeration
- DAR-3321 Basic air conditioning
- DAR-3322 Industrial air conditioning

Important principles, functions and operation of the entire system as well as individual components are demonstrated. Students can acquire valuable practical experience by performing tests and measurements as well as troubleshoot each system.

The main platform and plug-in panels also include graphics, switches, push buttons, LCD display, test points, potentiometers, sensors and peripheral connections

The training system can be operated as a standalone system without a PC. It can be connected to a PC (not supplied) with RS232 or USB using DCOOL software to monitor and control the training system. Student PC's can be monitored by the instructor PC for course management and storing student records using the optional DCML software.



Modules

DAR-3301 Main Platform Unit

The main platform provides various features required by the other plug-in panels. Changing modules is facilitated by the quick connection fasteners.

Control and display

- Power on switch with indicating light
- Warning indicating light
- Operating switches
- Temperature sensors (4)
- Pressure sensors and transducers (2)
- Solenoid valves (9)
- PC / manual mode switch
- LED's (8) to show troubleshooting state
- Mode switches and status display
- Fault insertion switches and fault display
- Numeric keyboard
- Remote control unit
- Remote sensing unit
- Low pressure gauge, 0 – 300 psi
- High pressure gauge, 0 – 500 psi
- Graphic / alphanumeric LCD display
- USB or serial interface with the PC
- DCOOL Windows-based control software

Refrigeration and air-conditioning components

- 1/6 HP hermetic-type refrigerant compressor
- R-134a refrigerant
- Condenser and condenser fan
- Thermostatic expansion valve
- Capillary tube
- Refrigerant gas filter
- Liquid accumulator
- Refrigerant flow monitoring eye piece
- Non-return valve and Reversing valves
- Quick connection for DAR training modules

DAR-3332 Piping Kit for Refrigeration Systems

The kit includes the essential materials for installation and maintenance of refrigeration piping.

DAR-3333 Thermodynamic Chart

The thermodynamic chart should show pressure in PSI and bars and temperature in °C and °F for R-134a refrigerant gas.

DAR-3341 Charging Station

The DAR-3341 module loads and evacuates the DAR-3000 training system with R-134a refrigerant gas and contains:

- Vacuum pump
- Service manifold for R-134a refrigerant gas
- Service pipes for manifold for R-134a refrigerant gas
- Electronic refrigerant scale

DAR-3342 Halide Leak Detector

The DAR-3342 electronic refrigerant leak detector is an accurate and reliable field detector that is easy to use. It can readily test for R-134a refrigerant gas leaks used in all DAR training systems.

DAR-3311 Basic Refrigeration Experiments

- Introduction to cooling and refrigeration
- Principles of cooling and the basic cooling cycle
- Operating the main system
- Hermetic type compressor
- Control system components and circuits
- Electrical system components and circuits
- Structure and operation of the system
- Adjustment of the thermostatic expansion valve
- Evaporation techniques
- Regulation devices
- Control methods and system response
- Thermal loads
- Maintenance methods
- Diagnosis, repairing faults and fault simulation

DAR-3312 Industrial Refrigeration Experiments

- Introduction to industrial refrigeration
- Principles of operation and components
- Principles of cooling
- Regulation devices
- System response
- Parallel and series connection of evaporators
- Defrosting components
- Filling techniques with refrigerant gas
- System operation and stabilization techniques
- Fault diagnosis and repair using a computer
- Faults simulation and diagnosis procedure

DAR-3321 Basic Air Conditioning Experiments

- Principles of air conditioning
- System operation and components
- Regulation devices
- Response of electrical control systems
- Thermal cycle
- Use of psychrometric diagrams
- Operation of capillary tube and expansion valve
- System operation with various control methods
- Cooling and heating operating modes
- Thermal load variation at the compressor & evaporator
- Heat flow through system components
- Filling techniques with refrigerant gas
- Fault diagnosis and repair using a computer
- Faults simulation and diagnosis procedure

DAR-3322 Professional Air Conditioning

- Introduction to air conditioning
- Principles of air conditioning
- Reverse thermal cycle procedure
- System operation and components
- Use of psychrometric diagrams
- Effect of pressure drop
- Cooling procedure with regulation devices
- Heating procedure
- Humidification and air drying – test procedure
- Reheating
- Use of recycled air for air conditioning
- Use of air, cleaning, mixing and distribution
- Fault diagnosis and repair
- Maintenance methods