



DEGEM
SYSTEMS

Autotronics

AT-3005

Car Air-conditioning & Climate Control Simulator

Multi-point injection

Electronic ignition

ABS 4 channel system

Engine controls & sensors

Car air-conditioning & climate control

Suspension

Transmission

Safety systems

Automotive accessories

Main Panel

Multipoint Fuel Injection

Emission Control

Airbag Systems

Electronic Stability Program

Hybrid Vehicle Systems

Objectives

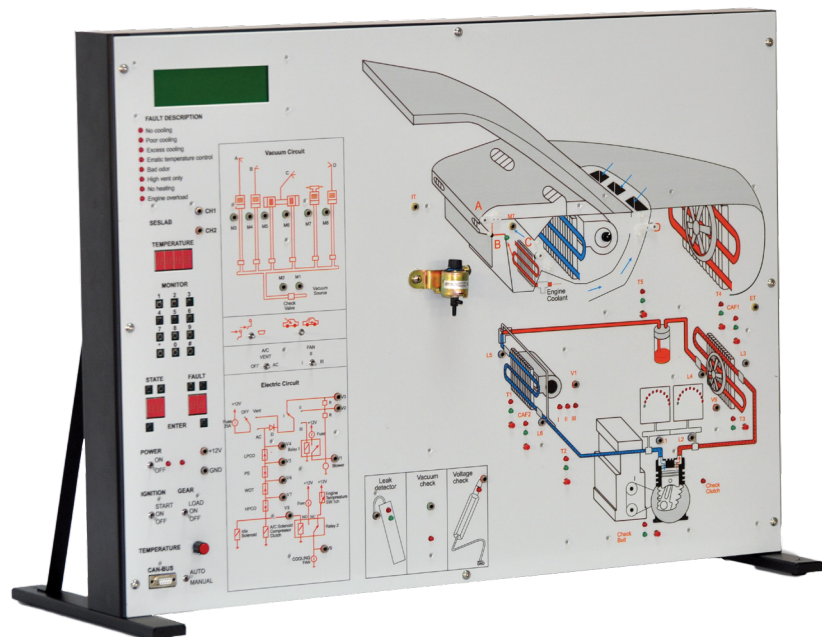
The AT-3005 Automotive Car Air-conditioning and Climate Control Simulator is designed to provide students with automotive training program introducing various systems and real components in modern cars.

The simulator brings a comprehensive view of the entire system in the car, the system's actual components and their interconnection, functions, operation, signals, diagnosis and repair methods under hands-on safe activities.

Description

The simulator includes real and simulated components controlled by internal controller that produces the signals for measurement according to its internal simulating program or according to PC simulation programs.

The simulator's panel is with colored graphics clearly presenting the system components, connections and inter-relations with test points for real measurements and LED's to indicate the component status.



Specifications

TECHNICAL CHARACTERISTICS

The simulator is in a wide metal enclosure with a cored printed circuit experiment panel (80 x 60 x 10 cm), which ensures easy handling and good visibility of the components and the simulation part.

The simulator includes real components and simulation components modules. The experimenting panel includes the system drawings with test points and banana sockets.

The simulator can be operated as a stand-alone system without a PC, guided by experimental book using built in oscilloscope or an external oscilloscope.

The simulator can be connected to a PC in USB communication using CBT courseware and D-SCOPE software for signal display.

A record of the student progress can be recorded on the student PC using the optional DCML software and can be accessed by the instructor for monitoring, course management and records if a local area network (not supplied) is available.

THE SYSTEM INCLUDES

- A power switch with indicating light
- D-SCOPE 2-channel digital oscilloscope
- 7 segment display and control switches, one for fault insertion unit and one for selecting simulation mode
- Eight (8) LED's to indicate troubleshooting state
- Engine status mode switches and display
- Warning indicating light
- Graphic and Alphanumeric LCD display 64X240 pixels
- Numeric keyboard
- CAN-BUS interface
- Serial or USB communication interface with the PC

THE SYSTEM INCLUDES

- PC / MANUAL switch
- 12V Power adapter
- Digital multimeter
- Operating and simulation switches
- Simulation potentiometers
- Electric fan with speed regulator for climate control,
- Stepper motors for mixing warm and cold air, for air-distributor motors and for air-recirculation
- External temperature sensor potentiometer simulation
- Mixed air temperature sensor potentiometer and display simulation
- Internal temperature sensor potentiometer and display
- Fuses and relays simulator
- Diagnostic sockets and testers
- Compressor operation simulation
- Condenser electric fan operation simulation
- Minimum and maximum pressure transmitter sensor simulation
- Ice state simulation
- Distribution and regulation system of flow rate of mixed air and electronic control unit simulation for:
 - Control of air temperature at the required value
 - Control of warm air/cold air mixing
 - Speed control of electric fan
 - Control of mixed air distribution
 - Control of air-recirculation vent
 - Starting climate control system with cold engine
 - Elimination of overloads on starting engine
 - Self-diagnostics warning lights
 - Key switch
 - Remote control switch for controlling fan and electromagnetic control

EXPERIMENTS

This system enables the student to perform several experiments and covers the following topics:

- Refrigeration circuit components
 - Temperature and pressure characteristics
 - Cooling circuit gas pressure control
 - Condenser fan control
 - Electronic temperature regulation
 - Air distribution control with vacuum valves
 - Air distribution control with stepper motors
 - Fan speed control with electronic switching regulation
 - Climate control automatic and manual operation in relation to external, mixed and internal temperature analysis
 - Various operating conditions and their effect on climate control
 - Automatic operation of the system in relation to external, and internal temperature as well as analysis of manual operation and automatic regulation of internal temperature and speed of electric fan
 - Checking the operating conditions: cold start, air recirculation, the direction of air in relation to the position of the air distribution control
 - Connecting and disconnecting conditions of the electric fan, condenser and the simulated compressor
 - Choosing of air recirculation, un-fogging function and economic cycle
 - Troubleshooting and maintenance
- An experiment manual for the student and instructor manual accompany the system.

OPTIONAL ACCESSORIES

- Personal computer with MS-Windows
- DCML (Degem Computer Managed Laboratory)