



SMART SYSTEM FOR THE STUDY OF REFRIGERATION AND AIR-CONDITIONING DL TMACM-RS



This smart system for the study of refrigeration and air conditioning integrates the most advanced components to control and optimize the systems in an efficient and sustainable way. It uses sensors, transducers, measurement devices and management and supervision software to monitor and collect real-time data on critical parameters such as pressure, humidity, flow and temperature.

It offers numerous advantages, including:

- Energy efficiency with the ability to continuously monitor and adjust operating parameters thus reducing energy consumption,
- Integration with other devices for centralized and optimized management,
- Improved air quality by including sensors that activate filtering and purification functions when necessary.

The system includes connectors and taps for the necessary electrical and hydraulic connections (via flexible pipes) with the experimental module under examination. In this way, it is possible to prepare different configurations that represent various aspects of refrigeration and air conditioning techniques.

It includes a display for viewing data, and it is controlled via PC with the help of a specific software, different for each operation module, and some non-destructive failures can be inserted into the system.



TECHNICAL FEATURES

The trainer is composed of a tabletop unit mounted on an aluminium structure including the following components:

- Hermetic compressor,
- High and low pressure gauges,
- Sight glass, dehydrator filter, liquid separator,
- Variable speed fan air condenser,
- Voltage, current and power transducers,
- 2 temperature sensors to be applied onto different points of the hydraulic circuit,
- High and low pressure transducers,
- Electronic flowmeter,
- Double pressure switch,
- Solenoid valves for inserting faults,
- Operating valve for filling and bleeding the refrigerant,
- Cocks and flexible pipes with valve for the connection with the experimental module.

The Switchboard includes:

- Start button with pilot lamp,
- Emergency button,
- Thermomagnetic - earth leakage control button,
- Power cord.

And the data acquisition and control system have the following characteristics:

- Remote Control (via PC, not included in the equipment),
- Display for viewing the acquired data such as: temperature, pressure, relative humidity, volume flow rate, air speed, voltage, current, electric power,
- USB interface for connection with PC,
- Fault insertion according to the experimental module in use.

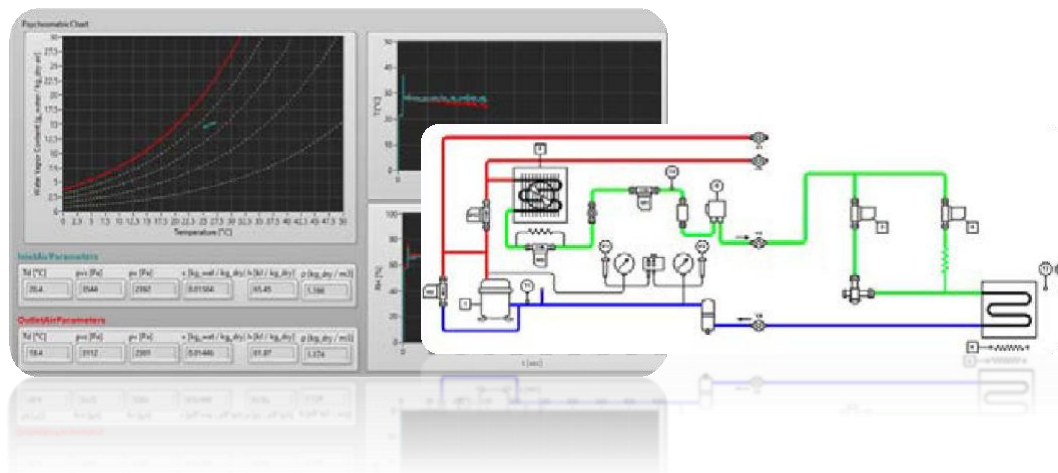
Power supply: Single-phase 230Vac/50Hz/350VA.

IT IS REQUIRED AT LEAST ONE OF THE FOLLOWING MODULES:

- **DL TMACM-CR** – MODULE FOR THE STUDY OF DOMESTIC REFRIGERATION
- **DL TMACM-AC** – MODULE FOR THE STUDY OF DOMESTIC AIR-CONDITIONING
- **DL TMACM-ICR** – MODULE FOR THE STUDY OF INDUSTRIAL REFRIGERATION
- **DL TMACM-IAC** – MODULE FOR THE STUDY OF INDUSTRIAL AIR-CONDITIONING



SOFTWARE'S VIEW



The supervision software allows to control analogue and digital inputs and outputs, the state of solenoid valves, of compressor, of fan, of heating, cooling, humidification and dehumidification, among others. It is different for each experimental module and designed to study and verify the laws of thermodynamics and their actual applications to refrigeration and to air conditioning. Each program enables to acquire and process the values of input variables and to control the output variables manually or automatically (for the modules that offers this option) according to the logics of industrial processes. They also allow to send the control signals to the actuators for the management of the selected Experimental Module.

The teacher, through this software, can also insert some non-destructive faults into the system, or modify some operating parameters and consequently the analysis results.

Some features:

- Automatic calculation of the heat balances at the compressor, at the evaporator and at the condenser,
- Displaying of the volumetric efficiency of the compressor, the **Coefficient Of Performance (COP)** or the **Energy Efficiency Ratio (EER)**,
- Determination of parameters of the air such as temperature, relative and specific humidity, and enthalpy.