HVAC System Trainer (SMT-RAC-05)

This Air Conditioning Laboratory Unit is experimental unit that enables students to investigate the basic air conditioning processes of heating, cooling, humidification, de- humidification and air movement that are of fundamental importance to undergraduate engineers. The flow velocity, temperature and humidity of the air can be modified by air conditioning systems in accordance with the requirements for the desired room climate. The trainer SMT-RAC-05 examines the operation and effect of the individual components of an air conditioning system. SMT-RAC-05 includes all the components also used in building services engineering. Particular importance was placed on the use of original components.

The unit has Touch LCD display for visualization of process and the measurements. The Unit is also connected to Software for computer connectivity and data analysis. The Touch screen and computer software is included in the package.

Technical Specifications

Specifications:

- Touch LCD with GUI Interface for better monitoring and accurate measurement of Plant variables.
- Effect of typical air conditioning system components on the conditioning of room air.
- Air conditioning system with open air duct, air cooler, steam humidifier, fan, air preheaters and re heater.
- All components can be switched on and off individually.
- Combined sensors for the air humidity and temperature before and after each stage.
- Sensor for the pressure and temperature of the refrigerant.
- ESOLS DAQ Software for monitoring and control.

Technical Data:

- Steam humidifier:
    - Power consumption: 4kW.
    - Steam capacity: 5.5kg/h, switchable in three stages.
- Fan:
    - Power consumption: 200W Aprox
    - Max. Volumetric flow rate: 1150m3/h.
    - Speed: 0 to 2600min-1.
    - Δp: max: 460Pa.
- Air preheater: 1kW, switchable in two stages.
- Air re heater: 2kW, switchable in two stages.
- Air duct, WxH: 300x350mm.
- Condensing unit:
    - Power consumption: 1kW at -5/50°C.
    - Refrigeration capacity: 2.1kW at -5/50°C.
- Measuring ranges:
    - Differential pressure: 0 to 100Pa.
    - Temperature: 5x 0 to 50°C, 4x -100 to 200°C.
    - Humidity: 5x 10 to 90%.
    - Pressure: 1x -1 to 15bar, 1x -1 to 24bar (refrigerant).
    - Flow rate: 0 to 80kg/h (refrigerant).

- Touch LCD with GUI Interface for better monitoring and accurate measurement of Plant variables.
- ESOLS DAQ Software for monitoring and control.
    - Graphical visualization.
    - Security mechanism for login.
    - USB Connected
    - Compatible with Windows 7,8.1,10.
- Digital Instrumentation
- Capability to modify according to end user.
- Can be used in Research Purposes.
- LxWxH: 2600x800x1700mm.
- Weight: approx. 300kg.

Experiments:

- Air conditioning of room air
    - Setup of an air conditioning system: main components and their function
    - Variables in air conditioning
    - Measure temperature and air humidity
    - Effect of the air flow
    - Changes of state in the h-x diagram
- Setup of a refrigeration system: main components and their function
- Measurements in the refrigeration circuit
    - Cyclic process in the log p-h diagram
    - Determine heating and cooling capacities