

AIR CONDITIONING SYSTEM MODEL



Experimental capabilities

- Identification of the components of an AHU small size
- Commissioning and setup of the system
- Measuring of the parameters (temperature, humidity..) and understanding the various air treatment
- Studying the various air treatment types (outdoor air, mixed air, supply air..)
- Plotting the air cycle on the psychrometric chart in different types of air treatment
- Plotting the refrigeration cycle on the enthalpy diagram
- Analysing the global way of functioning and calculating the thermal efficiency of the system
- Influence of the thermal load in the enclosure

Operating principle

The CRA520 is made for studying a small AHU system with one fan. It includes the standard elements of an AHU : a cooling coil, a refrigeration system, a humidifier, a heating coil, a fan, an enclosure to simulate a room with a thermal load and some dampers.

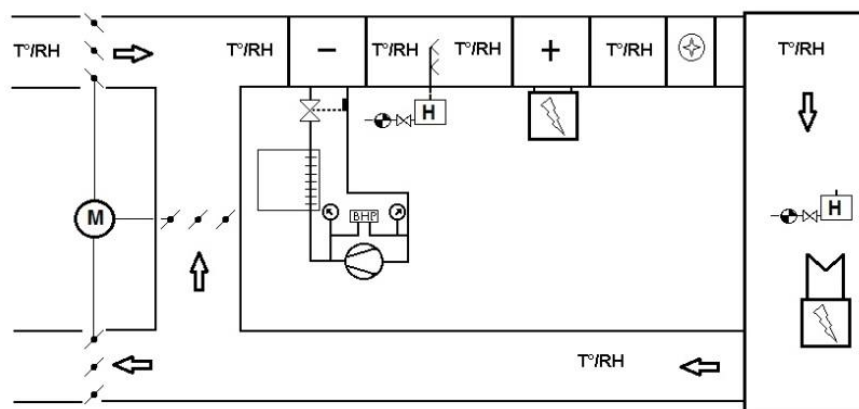
The students should first identify the components of the system and the direction of the air. Then they should do the commissioning and setup by following the instruction of the teacher (air conditioning mode or heating mode).

When the temperature and humidity are stable, they could proceed to the measurements of all the parameters (temperature, humidity, flow...) with the provided instruments.

Finally they can analyse the data and plot the air cycle on the psychrometric chart and calculate all the efficiencies of the system.

The robust design of this device makes it suitable for use in schools. The equipment is set up on an Anodized aluminium frame on casters wheels. This gives it great strength and a flexibility of integration into your premises. The manufacture of this equipment complies with the European standard for machinery manufacturing.

Illustrations



Technical details

1. Mixing dampers

Mixing dampers with electrical actuator and position indication. The system includes 3 dampers : outdoor air, mixing air and exhaust air

2. Cooling coil with refrigeration system

Cooling coil with fins set up inside the ductwork

Refrigeration system, power : 350W at 5°C

The refrigeration system includes all the components needed for the safe running :

Air condenser, receiver, expansion valve, HLP pressure switch, low pressure gauge, high pressure gauge.
Condensate collection bin on the bottom

3. Steam humidifier

The steam flow is adjustable

Electrical power : 400W

Steam injector

4. Heating coil (electrical)

Heating with electrical cartridge (x6)

Total power : 360W

5. Fan

Axial fan

6. Enclosure with loads

1 load for the humidity

1 thermal load

7. Instrumentation

1 frigorific fluid flowmeter (R134a) with a dial with needle and magnetic transmission

1 pressure sensor HP on the frigorific circuit

1 pressure sensor LP on the frigorific circuit

6 temperature and humidity sensor (0-50°C et 10-90%HR)

1 measurement for the electrical power of the compressor

3 thermocouple sensor on the frigorific circuit

1 air velocity sensor 0 à 2.5m/s

8. Frame made of screwed aluminum profiles

The structure is in anodized aluminum profile screwed with four castors with brake

Side panels of transparent and removable processing ductwork.

Section of passage of the processing ductwork 155 x 155mm

9. Electrical box of the installation:

The machine comprises an electrical box complies with european standards. It contains at least:

- A general power switch

- A 30mA differential circuit breaker

- The necessary relay circuitry and circuit breakers to the operation

- Push-button switches and indicators required to the operation

- An emergency stop button

- A speed controller for the fan blower

CRA520



Services required

- Electrical supply : 230 Vac – 50 Hz – 20 A
- Electrical network : 1 phase(s) + Neutral + Earth.
- Water supply : 0.5 L/min – 1 bars
- Water drain : on the floor
- Dimensions: (LxWxH mm): 1900 x 800 x 1900
- weight (Kg): 240

Note : if the equipment installation is operated by our staff, all supplies and exhaust connections required must stand at less than 2m from the machine

Documentation

- User's manual
- Pedagogical manual
- Technical documentation of the components
- Lab exercises
- Electrical diagram
- Hydraulic diagram
- Aeraulic diagram
- Certificate of conformity CE

Options

- Data acquisition system
- Ref : CRA521