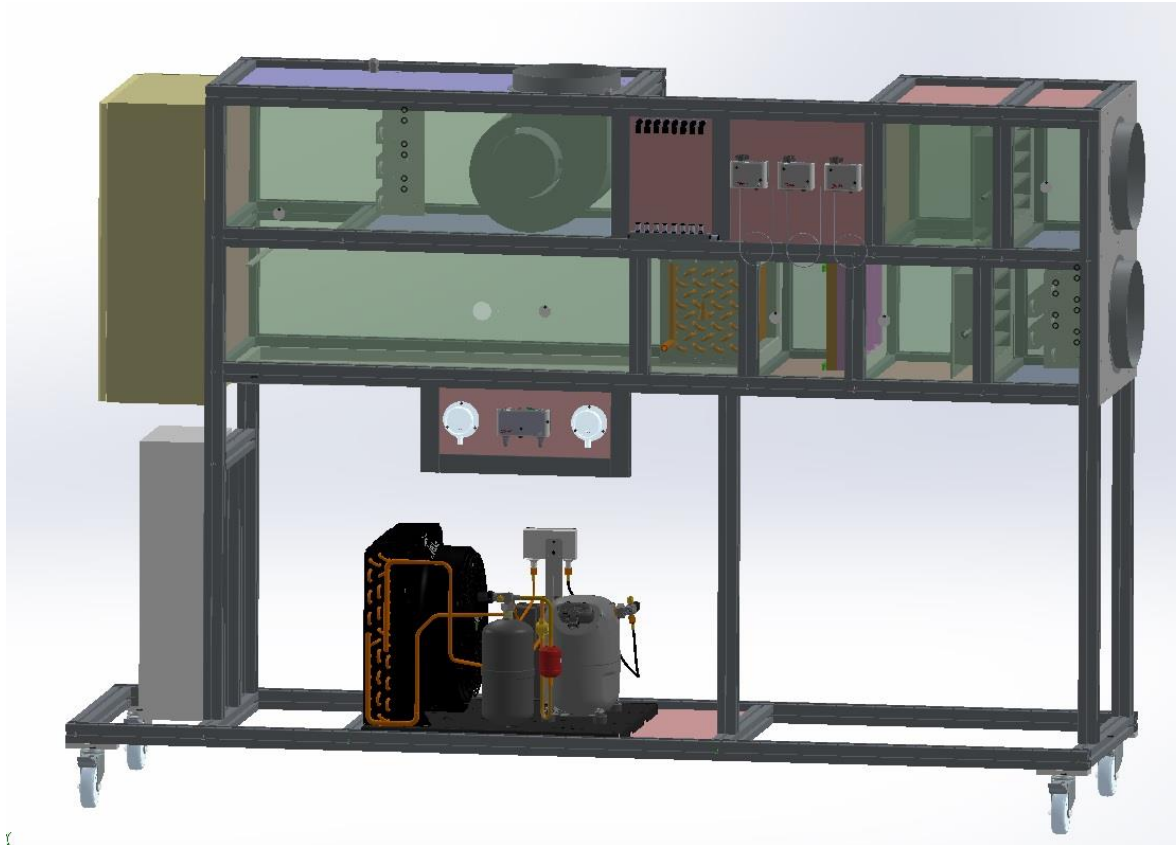


BASIC AIR HANDLING UNIT WITH MIXING CHAMBER



Experimental capabilities

- Identification of the components of an air handling unit and a refrigeration unit with direct expansion.
- Commissioning and controls of operation of the unit.
- Measures of operating parameters (air temperature, relative humidity of the air, air velocity, and differential pressure).
- Study of heat exchanges and transformation of the air (electric heating coil, direct expansion cooling coil, humidifier).
- Plot of the air cycle on a psychrometric diagram.
- Plot of fan characteristic curve (pressure according to flow rate)
- Study of the refrigeration cycle and plot the cycle on an enthalpy diagram

Operating principle

The CRA530 bench allows the study of an industrial air handling unit single-flow type (a fan). It includes the classic elements of a network, namely: filters, a cooling coil, a cooling unit, a humidifier, a heating coil, a fan blower and mixing dampers.

Students will as a first step identify the components of the unit and the direction of air circulation.

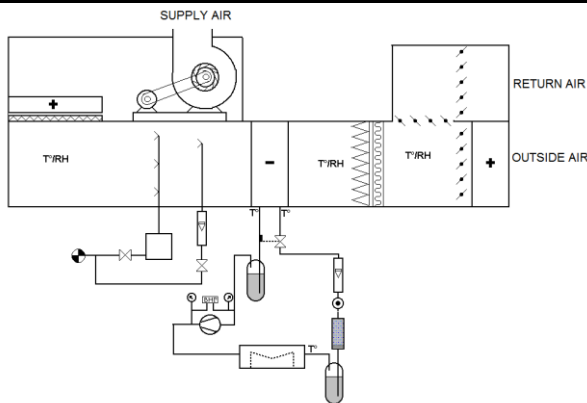
They will then activate the system under conditions prescribed by the teacher (cooling mode or heating mode).

When the operation plan is established, then they must measure the operating parameters (temperature, humidity, air flow rate) with portable devices provided.

The next job is to exploit the measures by drawing the air cycle on a psychrometric diagram and by calculating the powers of the exchangers. The air handling bench also allows to study the refrigeration cycle through the direct expansion condensing unit.

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 with 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



1. Outside air intake

outside air with inlet temperature simulation heaters
Heating resistors with fins
Power: 2550W
Power adjustable from 0 to 100%

2. Mixing damper

Mixing damper with manual control and position indication. The damper is comprised of 3 shutters: fresh air, mixing and return air

3. Filtration

A gravimetric coarse filter
A fine filter opacimetric

4. Cooling coil with refrigeration unit

Cooling coil with fins placed in the air handling ductwork.
Complete refrigeration unit with power of 2400W at 0°C
The unit includes all the accessories needed for operation:
Air condenser, liquid tank, thermostatic expansion valve, a suction line accumulator, HLP safety pressure switch, power control valve, low pressure manometer, high pressure manometer.
Condensate collection bin on the bottom

Technical details

4. Steam humidifier

Adjustable steam flow rate: 0.4 to 4 kg/h
Power: 3.1kW
Steam rail made of stainless steel

5. Electrical heating coil

Droplet separator in stainless steel
Heating resistors with fins
Power: 1500W
Power adjustable from 0 to 100%

6. Fan

Direct drive fan
Nominal flow rate: 1500 m³/h/400Pa
Rated engine speed: 1490 rev/ min.
Speed variation 0% to 100%
Power: 0.37KW

7. Instrumentation

1 manometer with eight columns of water for the measurement of static pressures on the duct
1 refrigerant flowmeter with needle dial and magnetic transmission
1 HP manometer on the refrigerant circuit
1 LP manometer on the refrigerant circuit
1 portable thermometer with thermocouple wire probe and contact probe
1 thermo portable hygrometer
1 fixed air velocity measurement system with profiled fins (principle of averaging pitot) and manometer with liquid column

8. Frame in screwed aluminum profiles

The structure is in anodized aluminum profile screwed with four castors with brake
Side panels of transparent and removable processing ductwork with holes for the insertion of probes for portable measurement devices.
Section of passage of the processing ductwork 400 x 300mm

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
- Four graduated potentiometers from 0 to 100% for the control of:
 - Fan blower
 - Humidifier
 - Heating coil for processing
 - Fresh air battery simulation

CRA530



Services required

- Electrical supply : 400 Vac – 50 Hz – 20 A
- Electrical network : 3 phase(s) + Neutral + Earth.
- Water supply : 1 L/min – 2 bars
- Dimensions: (LxWxH mm): 2350 x 650 x 1670
- weight (Kg): 220

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
- R134a enthalpic diagram
- Psychrometric diagram for the air
- Certificate of conformity CE