

HEAT PUMP COUPLED WITH FLUID DYNAMICS



Experimental capabilities

- How a heat pump and its different components
- Use of R134a refrigerant diagram
- Draw of the refrigerating cycle on diagram (H-logP)
- Study of regular and singular pressure losses (different diameters, diameter reduction)
- Bernoulli's Theorem using an orifice plate

Operating principle

The bench CRD 150 allows to study the operation of a heat pump coupled to a fluid dynamics study.

The bench comprises an evaporator, a condenser through which a refrigerant of type R134a.

The fluid dynamics study is directly performed on the refrigerant circuit with the presence of pipes of different diameters, a sudden reduction of section and a long coil pipe.

The pressure losses will be measured using two pressure sensors. These values will transmit on a digital display and the temperature measurements.

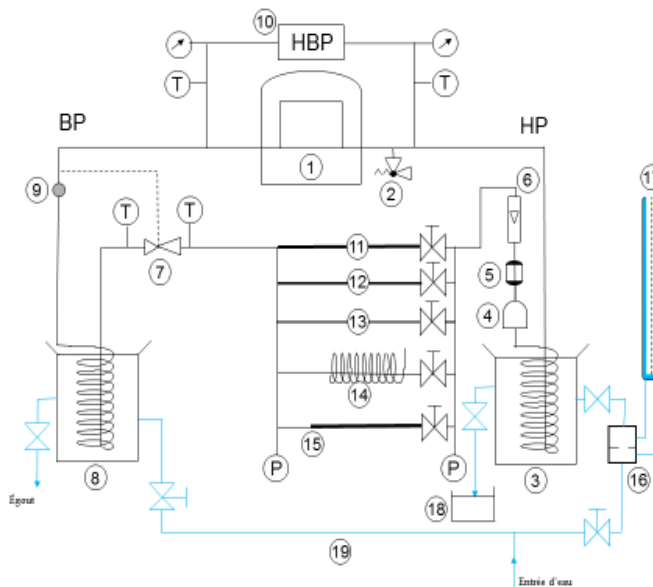
The bench is equipped with a water supply on which is connected an orifice (diaphragm) coupled with a water column manometer and a quick-check beaker for further study of fluid dynamics.

The robust design of this equipment makes it perfectly suited for use in schools.

Its anodized aluminum structure on feet gives it great robustness as well as great flexibility of integration into your premises. The manufacturing of this equipment meets the European machine directive

Illustrations

Technical details



T: Four temperature readings by thermocouple

P: Two pressure sensors 0-40 bars

 **BP** = low pressure manometer

 **HP** = High pressure manometer

Electrical box includes :

- A white indicator of voltage presence
- Multi-line digital temperature - pressure display
- A switch of M/A compressor
- A general power disconnect

1. Hermetic compressor

Refrigerating production 262 W at evaporation temperature -5°C. R134a refrigerant

2. Safety valve 16 bars

3. Coil condenser and its water vessel

4. Liquid tank

5. Dehydrator filter with solid cartridge

6. Flowmeter with range 50mL - 100mL/min

7. Thermostatic expansion valve with internal pressure equalization

8. Coil evaporator and its water vessel

9. Liquid and gas indicator

10. Low pressure and high pressure safety

11. Piping : $\varnothing = 1/4$ et L= 50cm

12. Piping : $\varnothing = 1/4$ L= 12m ; $\varnothing=0,8$ mm L=20cm

13. Piping : $\varnothing=0,8$ mm L= 40cm ; $\varnothing=1/4$ L=10cm

14. Piping : $\varnothing=0,8$ mm L = 50cm

15. Piping : $\varnothing=0,8$ mm L = 60cm

15. Piping : $\varnothing=0,8$ mm L = 70cm

16. Orifice plate to measure a ΔP

Diaphragm \varnothing hole = 4 mm

17. Manometer with calibrated water column

18. Quick-check beaker for flow rate measurement by potting

19. Water circuit connected to the water system with control valve

CRD150



Services required

- Power supply : 230 VAC mono - 50Hz - 20A
- Water supply : 1 to 2 L /min
- Dimensions: (LxWxH mm): 1100 x 550 x 965
- weight (Kg): 45

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
- Certificate of conformity CE

Multi line display



Temperature and pressure display :

- T°C Compressor Input
- T°C Compressor Output
- T°C Regulator Input
- T°C Output Regulator
- Pressure Line input mecha fluid
- Pressure Line output mecha fluid

Illustrations

