

REVERSIBLE REFRIGERATION CYCLE DEMONSTRATION UNIT (WATER/WATER)



Experimental capabilities

- Identification of the components of a heat pump installation water / water reversible
- Visualization of the implementation of the system
- Visualization of the processing of the refrigerant through glass grilles (evaporation and condensation)
- Switching on, use and settings
- Measurement of various operating parameters (power consumption, temperature of refrigerant and of the water, pressures)
- Energy efficiency analysis of the system and trace on the refrigerating cycle on enthalpy diagram
- Study of a reversible system

Operating principle

The CRI 100 bench allows the study of a reversible refrigerating cycle.

The bench is made of standard elements of a refrigeration circuit. The compressor will first elevate the pressure and the gas temperature (R134a). The water condenser will then transform this high pressure gas in the high pressure liquid. Students visualize the transformation because the refrigerant condenses between the glass shell and the cooling coil.

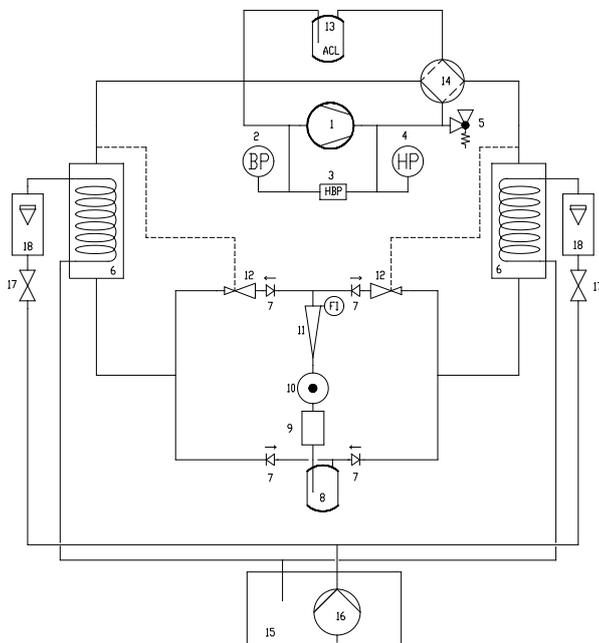
The high-pressure liquid will then be stored in a bottle and then be sent towards the expansion valves. This will change the state of the fluid; it will go from a high pressure liquid to a low pressure liquid. This low pressure liquid is now in the evaporator and will draw its energy to the water coil (and thus cool it). Students visualize the transformation because the refrigerant evaporates between the glass shell and the cooling coil.

At the outlet of the evaporator, the fluid is in the form low pressure steam, it goes through a suction line accumulator and be compressed again by the compressor.

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



This unit is set up on a frame made of aluminum profile with 4 wheels. It includes an electrical cabinet with main switch and differential circuit breaker.

1. Piston hermetic compressor 408W for a range 7.2°C / 55°C
2. Low pressure manometer R134a with dual scale temperature / pressure
3. HP and LP safety pressure switch
4. High pressure manometer R134a with dual scale temperature / pressure
5. Safety valve set to 16 bars
6. Exchangers (X2):
 - Resistant glass shell (pressure and temperature)
 - Copper coil
 - Volume of the exchanger: 1.19L
 - Circulation of fluid between the grille and the coil
 - Rear lighting by neon (improves the visualization)

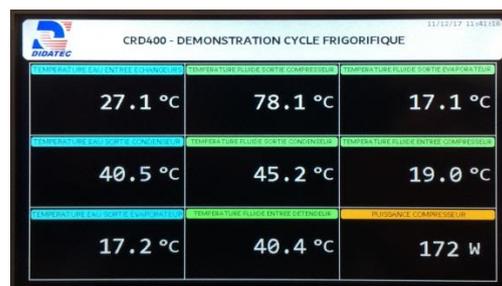
Technical specifications

7. Check valve
8. Liquid tank bottle in steel volume 0.7L with service valve
9. Dehydrator filter
10. Fluid state indicator
11. R134a refrigerant needle flowmeter with magnetic transmission
12. Thermostatic expansion valve with internal pressure equalization (X2)
13. Suction line accumulator in steel volume 0.3L
14. Reverse cycle 4-way valve with electrical coil
15. Cooling water tank with lid:
 - material: white polyethylene
 - volume: 75L
 - drainage valve in lower part
16. Submersible pump, Body, suction strainer and turbine in techno polymer
 - Power: 0.37KW-Flow rate HMT maximum: 6m³ /h
 - HMT maximum : 9mCE
17. Water flow rate control valve
18. Water float flowmeter (X2)

Integrated instrumentation:

- Low pressure manometer: -1 to 10bars
- High pressure manometer: -1 to 30bars
- Fluid flowmeter R134a: 40 to 250mL/min
- Water flowmeter (X2): 0.2 1.5 L/min
- Thermocouple temperature probes T (X13): -20 to + 100°C
- Compressor power wattmeter: 0 to 1150W

The temperatures and the power are displayed on a 7" touch screen :



CRI100



Services required

- Electrical supply : 230 Vac – 50 Hz – 10 A
- Electrical network : 1 live(s) + Neutral + Earth.
- Water supply : filling (70L)
- Dimensions: (LxWxH mm): 1000 x 800 x 1510
- weight (Kg): 110

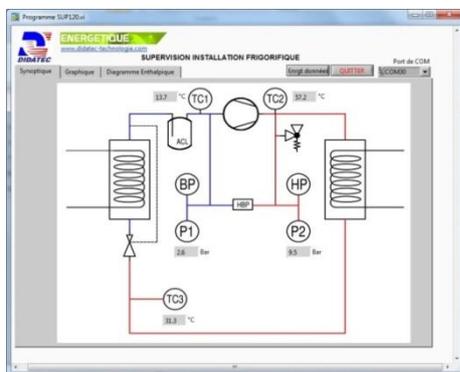
Note : if the equipment installation is operated by our staff, all supplies and exhaust connections required must stand at less than 2m from the machine

Documentation

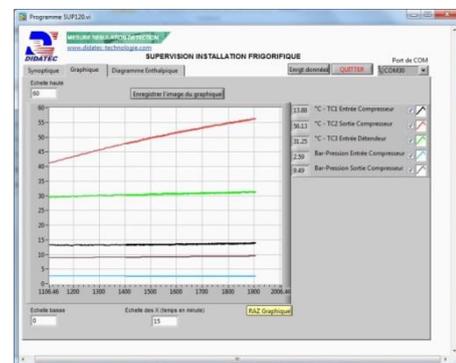
- User's manual
- Lab exercises
- Pedagogical manual
- Technical documentation of the components
- Wiring diagram
- Fluidic diagram (PID)
- Enthalpic diagram
- Certificate of conformity CE

Options

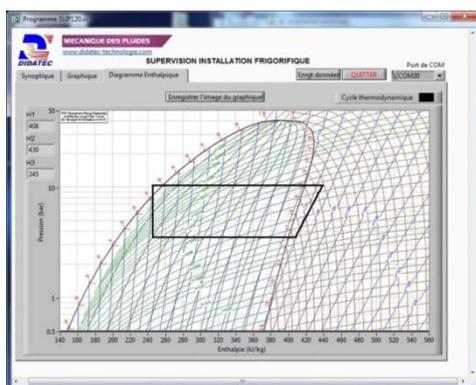
- Data acquisition system and real time drawing of the enthalpic diagram 3 temperature sensors and 2 pressure sensors (HP and LP) • Ref : CRI101
- Full Data acquisition system and real time drawing of the enthalpic diagram 13 temperature sensors, 2 pressure sensors (HP and LP), 3 flow sensors (water and frigorific fluid) • Ref : CRI102



Schematic diagram with real time display



Real time trend



Real time enthalpic diagram