

CASCADE REFRIGERATION SYSTEM



Experimental capabilities

- Identifying the Components of a Cascade Refrigeration System
- Commissioning and functional verification
- Study of the basic concept of a cascade refrigeration system.
- Study of the thermodynamic cycle on an enthalpy diagram.
- Study of regulation
- Calculation of cooling capacities at heat exchangers.
- Overall efficiency of the unit.

Operating principle

The CMF100 bench allows the study of a cascade compressor plant. It consists of two semi-hermetic industrial compressors connected in cascade by means of a plate exchanger and a cold room in which a forced convection evaporator is placed. The primary stage works with a medium-temperature fluid and the secondary stage with a low-temperature fluid. The system includes all the standard components used in industrial power plants (anti-liquid bottle, dehydrator, regulator, etc.). In addition to this, the bench is instrumented in order to expand its pedagogical exploitation.

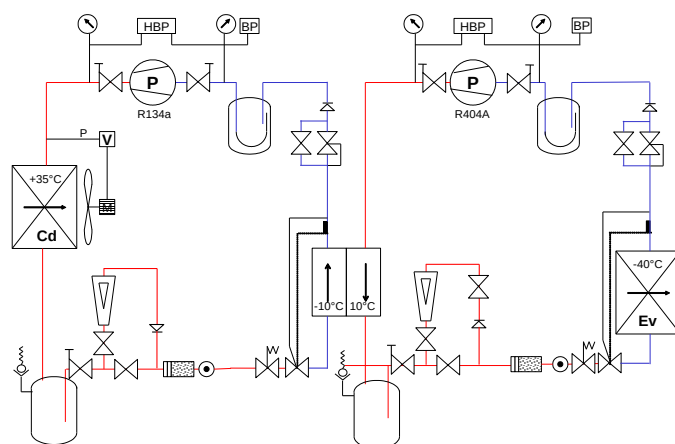
Students will first need to understand the system and identify the components of the installation. They will then be able to make the necessary commissioning and adjustments (pressure switches, regulators, regulator, etc.).

When the system is in operation, they will be able to check the parameters (pressure, temperature, flow rate, etc.). They will calculate the yield and plot the enthalpy diagram for each stage of the system.

The rugged design of this equipment makes it perfectly suited for use in a school setting.

Its anodized aluminum structure on wheels gives it great robustness as well as great flexibility of integration into your premises. The manufacture of this equipment complies with the European Machinery Directive

Illustrations



Technical specifications

FIRST STAGE

1. Semi-hermetic compressor power approx. 4.5KW for 10°C/40°C (evaporation/condensation)
2. Pressure switch combined HLP
3. LP Control Pressure Switch
4. High Pressure Gauge
5. Low pressure gauge
6. Forced convection condenser with pressure dimmer
7. Liquid tank with service valve
8. Fluid Flow Meter
9. Filter Dehydrator
10. Liquid sight glass
11. Magnetic Control Valve
12. Thermostatic expansion valve with external equalization
13. Plate evaporator (the other side of the exchanger is connected to the second stage HP)
14. Constant pressure valve type KVP (evaporative pressure regulation) with bypass valve and outlet valve
15. accumulator Bottle

SECOND STAGE

16. Semi-hermetic compressor power approx. 2.1KW for -35°C/10°C (evaporation/condensation)
17. Pressure switch combined HLP
18. BP Control Pressure Switch
19. High pressure gauge,
20. Low pressure gauge,
21. Plate condenser (the other side of the exchanger is connected to the first stage LP)
22. Liquid tank with service valve
23. Fluid Flow Meter
24. Filter Dehydrator
25. Liquid sight glass
26. Magnetic Control Valve
27. Thermostatic expansion valve with external equalization
28. Forced convection evaporator
29. Constant pressure valve type KVP (evaporative pressure regulation) with bypass valve and outlet valve
30. accumulator Bottle

The bench also features:

- a cold room of internal dimensions at 120x120x160cm with door, pressure relief valve and load simulation by electric heating. The thickness of the walls of the chambers is 140mm
- an electrical box comprising the elements of protection (circuit breaker, etc.), control (power button, general disconnector, emergency stop of the punch type), visualization (operating and fault lights), regulation (1 general regulator) and measurement (7-inch touch screen with temperature probes at the characteristic points).

Services required

- Power supply: 400 Vac – 50 Hz – 20 A
- Power supply Type: 3 phase(s) + Neutral + Earth.
- Dimensions: (LxWxH mm): 2000 x 3500 x 2300
- weight (Kg): 550

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
- Wiring diagram
- Fluidic diagram
- Certificate of conformity CE