BIE100

REFRIGERATION INSTALLATION WITH TWO STAGE COMPRESSOR

Experimental capabilities

- **Identification of the components of a refrigerating system with two stage compressor**
- **Commissioning and verification of operation**
- **Study of the basic concept of a refrigeration installation R404A, with two stages.**
- **Study of the thermodynamic cycle on enthalpic diagram.**
- **Calculation of cooling power to the condenser and evaporators.**
- **Overall efficiency of the unit.**
- **Preventive and curative maintenance**
- **Study of oil circuit**

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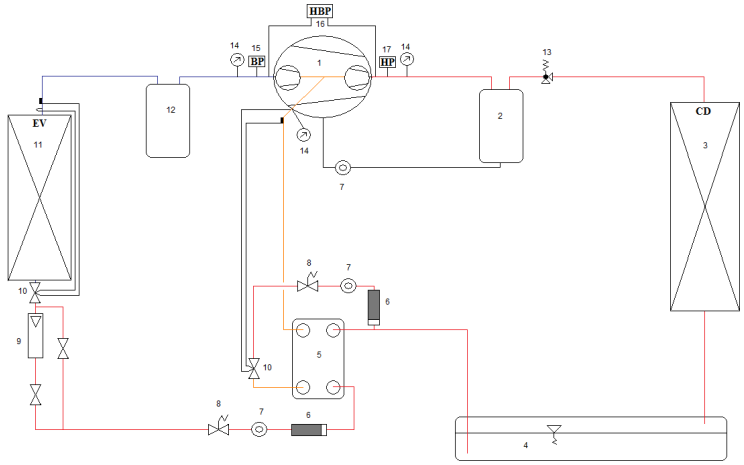
Operating principle

The BIE100 bench allows the study of a low pressure refrigeration cycle with two-stage compressor.
The system allows viewing the two compression stages and validates the difference in performance compared to a conventional compressor. Students will start up the system and do temperature readings with different operating modes.
They will analyze the data and understand what is the influence of the different components on the system.
The robust design of this equipment makes it perfectly suited for use in schools.
Its anodized aluminum structure on wheels makes it extremely robust as well as great flexibility of integration into your premises.
The manufacturing of this equipment meets the European machine directive.

Illustrations



Technical details

1. Semi-hermetic compressor accessible two-stage
   Industrial type
   Refrigerant: R404A
   Condensing temperature + 35°C
   Evaporating temperature -35°C
   Cooling capacity: 6210 W
2. Oil Separator
3. Air condenser
4. Liquid receiver with service valve
5. Brazed plate exchanger
6. Drier filter
7. Sight glass
8. An electromagnetic valve
9. Refrigerant flowmeter 40-400kg/h with bypass valve
10. Thermostatic expansion valve with external equalizer
11. Evaporator with forced ventilation of ceiling type.
    The evaporator is installed in a cold chamber of interior dimensions of 1230x1030x2030mm. The chamber is equipped with standard components (anti panic bar, valve ...). The load is simulated by electrical heater of 2000W with ON/OFF thermostat
12. Suction line accumulator.
13. Safety valve
14. High pressure, medium pressure and low pressure gauge with dual scale pressure temperature
15. Low pressure switch (control pump down)
16. Combined pressure switch HLP (safety)
17. High pressure switch (control of the condenser fan)
18. Oil differential pressure switch

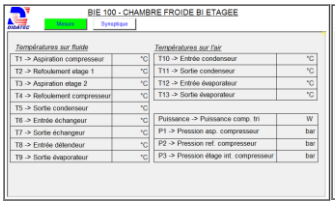
<u>Structure:</u>

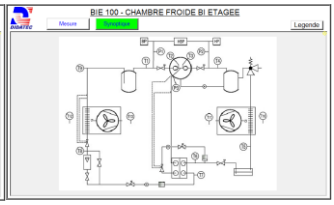
all the components are assembled on a screwed anodized aluminium profile structure equipped with directional wheels with brake

<u>Electric box:</u>

The electrical enclosure is made according to the European standards. It includes safety elements such as GFCI, main switch, emergency stop button, earthing, start buttoning ...

It is equipped with a touch screen 7 "which displays the temperatures, the electric power consumed, the pressures and the fluidic diagram of the machine





A refrigeration temperature controller manages the operation of the unit, the regulation of the temperature of the cold room and the defrosting phases

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Instrumentation:
The bench has the following instrumentation:

1. Thermocouple type temperature sensors (x13):
On the refrigerant circuit:
- -compressor suction
- -stage 1 discharge
- -stage 2 suction
- -compressor discharge
- -condenser outlet
- -exchanger inlet
- -exchanger outlet
- -expansion valve inlet
- -evaporator outlet

On the air:
- -condenser inlet
- -condenser outlet
- -evaporator inlet
- -evaporator outlet

2. Pressure Sensors with Analog Output 0-40bar (x3):
On the refrigerant circuit:
- -low pressure (suction compressor)
- -middle pressure (intermediate stage)
- -high pressure (compressor discharge)

3. Refrigerant Flow Sensor with Magnetic Transmission 40-400kg / h (x1):
On the refrigerant circuit
- -liquid line at the inlet of the expansion valve

4. Network analyser for measuring the electrical power consumed by the system (x1)

Services required

- Power supply: 400Vac – 50 Hz – 25 A
- Power supply type: 3 phase(s) + Neutral + Earth.
- Dimensions: (LxWxH mm): 3830 x 1300 x 2500
- weight (Kg): 400

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

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