BOOCO2

CO2 BOOSTER SYSTEM





TRAINING APPLICATIONS

- **Identification of the components of a Booster system**
- **Commissioning and verification of operations**
- **Study of the basic concept of a two-stage CO2 refrigeration system operating at two temperature levels.**
- **Study of the thermodynamic cycle on a pressure–enthalpy diagram.**
- **Study of control in the three operating cases listed in the source: low-temperature and medium-temperature refrigeration; low-temperature and medium-temperature refrigeration.**
- **Study of the effect of pressure rise during a malfunction, using the independent safety unit.**
- **Study of capacity control on the medium-temperature compressor using a variable frequency drive to adjust its rotational speed, and capacity control on the low-temperature compressor in response to changes in internal loads.**
- **Comparative study of the regulator to manage the different phases of operation**
- **Handling CO2 refrigerant for maintenance operations such as replacing a filter-drier. Specialised tools (manifold and detector) are included.**

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Technical specifications

(1) Structure:
- Lightweight frame: bolted anodised aluminium profiles with sealing strips for the cold-room section, and a steel frame for the condensing-unit section.

(2) The machine consists of:
- A low-temperature semi-hermetic CO2 compressor, approximately 2 kW, fitted with a variable frequency drive operating from 30 to 70 Hz.
- Two medium-temperature semi-hermetic CO2 compressors, approximately 8 kW, fitted with a variable frequency drive operating from 30 to 70 Hz.
- All equipment required by the regulations (dual safety valves, relief valve) and for CO2 use is included, along with CO2-specific servicing and maintenance tools.
- A fully equipped industrial low-temperature cold room.
- A 2.6 kW CO2 evaporator matched to the low-temperature compressor, fitted with an electronic expansion valve.
- A variable heat load matched to the evaporator capacity.
- A fully equipped industrial medium-temperature cold room.
- An 8.1 kW CO2 evaporator matched to the medium-temperature compressor, fitted with an electronic expansion valve.
- An air-cooled gas cooler integrated into the frame.
- Oil separator, reservoir and oil return with electronic level control.
- A system that starts the medium-temperature compressor during prolonged shutdowns when power is available but no refrigeration is being produced.
- An independent safety unit that controls liquid receiver pressure during servicing when no electrical power is available.
- Safety valves all connected to a common manifold at the bottom, with provision for discharge outdoors.
- An electronic high-pressure control valve for the receiver
- A liquid line with a replaceable-cartridge filter-drier and the valves needed for replacement, a liquid sight glass, relief valves and a heat exchanger for enhanced subcooling.
- A CO2 gas detector
- All pipework complies with the standards for CO2 use: K65 copper-iron (CuFe) tubing.

(3) Instrumentation:

- 16 temperature sensors on the cooling circuit with analogue output
- 6 temperature sensors on air at exchangers with analogue output
- 4 pressure sensors on the cooling circuit with analogue output
- An electrical power analyser measuring voltage, current, phase shift and the various electrical power quantities.
- A system schematic on a touchscreen, with LEDs showing which electrical devices are operating.

(4) The electrical part includes:
- An electrical supply box
- Standard safety components (main isolator, residual-current circuit breaker, earth connection and white indicator light).
- A thermal-magnetic circuit breaker for each component.
- Signal lights for each element
- Measurements displayed on a 10-inch touchscreen, including a system schematic and real-time graphs.
- The data acquisition system can connect to a PC locally via Ethernet or Wi-Fi, or remotely via the internet. All data can be retrieved in an Excel-compatible file.

Installation requirements

- Power supply machine : 400 Vac – 50 Hz – 16 A
- Type of power supply: 3 phase(s) + Neutral + Earth.
- Backup electrical supply for the pressure-maintaining unit: 230 Vac – 50 Hz – 16 A
- Type of power supply: 1 phase(s) + Neutral + Earth.
- Safety valve discharge: diameter 7/8 inch
- Dimensions (L × W × H, mm): 4500 x 1400 x 1900
- Weight (kg): 1150

Note: If the equipment is installed by our team, all utility connections must be located within 2 m of the machine.

Documentation

- Instruction manual
- Teaching manual
- Technical documentation
- Practical exercises
- Electrical diagram
- Fluid circuit diagram
- CO2 pressure–enthalpy diagram
- Data acquisition software
- CE certificate of conformity

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