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PRODUCT DATA SHEET
Catalogue reference for product evaluation

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Refrigeration System with Open Compressor | PolarX - 520

Category: Refrigeration and Air Conditioning · **Country of Origin:** India

Product Overview

The Refrigeration System with Open Compressor PolarX - 520 is a trainer built to make the thermodynamic processes of a refrigeration circuit as transparent as possible. It features an open compressor with variable speed, a water-cooled condenser, a thermostatic expansion valve, and an evaporator heated by a hot water circuit. Pressure and temperature measuring points at all relevant locations allow detailed investigation of pressure and heat losses. This refrigeration system with open compressor supports determination of compressor capacity, refrigeration capacity, compression ratio, volumetric efficiency, and coefficient of performance.

View this product online: https://scienticoindia.com/product/refrigeration-system-with-open-compressor-polarx-520/



Request a model-specific quotation
Include quantity and delivery country.

Technical Specifications

Refrigeration System with Open Compressor PolarX - 520, Technical Specifications

Specification	Detail
System Investigation	Investigation of a refrigeration circuit with speed-controlled compressor
Circuit Configuration	Open compressor, condenser, thermostatic expansion valve and evaporator in refrigeration chamber
Cooling Load Control	Adjustable via heater in the refrigeration chamber
Condenser and Evaporator	With fan
Thermodynamic Cycle Representation	P-h diagram (software, optional)
Compressor Efficiency	Determinable via measured values
Compressor Flow Rate Effect	Investigable on the refrigeration circuit
Pressure Switch	Protects the compressor
Sensors	Pressure, temperature, power and speed
Refrigerant Mass Flow Rate	Calculated in software from recorded measured values (optional)

Technical Data

Open Compressor

Parameter	Value
Refrigeration Capacity	Approx. 970W (at speed: 1450 min-1 and 5/40°C)

Condenser (with fan)

Parameter	Value
Transfer Area	2.5 m2
Capacity	Approx. 1950W at 25°C air temperature (ambient), Δt=15°C

Evaporator

Parameter	Value
Transfer Area	3.63 m2
Capacity	460W at 3°C air temperature (chamber), Δt=13°C

General

Parameter	Value
Heater Power	1000W
Refrigerant	R513A
GWP	631 CO2-equivalent

Measuring Ranges

Parameter	Value
Temperature	5x -100°C to 400°C
Pressure (Low Side)	-1 to 16 bar
Pressure (High Side)	-1 to 24 bar
Speed	0 to 1000 min-1
Flow Rate	2 to 18 m3/h

Key Features

Key Features

- Transparent Process Design: Thermodynamic processes made as visible as possible for study
- Measurable Capacities: Compressor, evaporator and condenser capacities can all be measured
- Measuring Points: Pressure and temperature points at all relevant locations
- Open Compressor: Variable speed, pendulum bearing motor with frequency converter
- Drive Torque Measurement: Force transducer determines drive torque and mechanical drive power
- Condenser: Water-cooled, capacity measured via cooling water flow
- Evaporator: Heated by hot water circuit, freely adjustable and displayed heating power
- Expansion Element: Thermostatic expansion valve
- Digital Displays: Direct reading of measured values
- USB Data Transfer: Measured values sent to PC in real time (optional)
- P-h Diagram Software: Displays compressor pressure ratio and coefficient of performance (optional)
- Trainer Application: This refrigeration system with open compressor supports detailed study of pressure and heat losses

Experiments

- Fundamentals of refrigeration

- Design and components of a refrigeration system:
  - Open compressor with drive
  - Condenser
  - Evaporator
  - Thermostatic expansion valve
  - Pressure switch
- Determination of important characteristic variables:
  - Coefficient of performance
  - Compressor capacity
  - Refrigeration capacity
  - Compression ratio
  - Volumetric efficiency

Construction and Design

The Refrigeration System with Open Compressor PolarX - 520 is built around a refrigeration circuit that includes an open compressor with variable speed, a water-cooled condenser, a thermostatic expansion valve, and an evaporator heated by a hot water circuit. The compressor is driven by a pendulum bearing motor fitted with a frequency converter for speed adjustment. A force transducer measures the drive torque, and the mechanical drive power of the compressor is determined using the speed. The evaporator is located in a refrigeration chamber, with cooling load adjustable via a heater. The condenser and evaporator are each fitted with a fan. Pressure and temperature measuring points are positioned at all relevant locations across this refrigeration system with open compressor, allowing pressure and heat losses to be investigated in detail. A pressure switch protects the compressor. Sensors monitor pressure, temperature, power, and speed throughout the circuit.

Software

Software PolarX - 520 (optional)

DAQ software designed in National Instruments™ LabVIEW™ environment to measure and calculate the results of the apparatus. The software is optional. When the software is used, a set of electronic sensors is included. The software can be run on any Windows™ environment.

Scope of Delivery

- 1 experimental module
- 1 instruction manual

Required for Operation

- Water supply (for the water-cooled condenser and hot water circuit)

Optional Accessories

- Software PolarX - 520 (DAQ software, National Instruments™ LabVIEW™ environment, requires electronic sensor set)
- USB data transmission to PC
- P-h diagram representation in software
- Refrigerant mass flow rate calculation in software

Ordering & Delivery

- Send the product name, quantity, delivery country and destination with your enquiry.
- Production schedule, freight, payment terms and export documents are confirmed in the written quotation.

Frequently Asked Questions

Q: What does the Refrigeration System with Open Compressor PolarX - 520 demonstrate?
A: It demonstrates the thermodynamic processes of a refrigeration circuit with an open compressor, water-cooled condenser, thermostatic expansion valve, and evaporator heated by a hot water circuit.

Q: How is the drive torque of the compressor measured?
A: A force transducer measures the drive torque, and the mechanical drive power is determined using the speed.

Q: What refrigerant does the unit use?
A: R513A, with a GWP of 631 CO2-equivalent.

Q: Can measured values be transmitted to a PC?
A: Yes, measured values can be transmitted directly to a PC via USB (optional).

Q: Is the PolarX - 520 software required to operate the unit?
A: No, the software is optional. A set of electronic sensors is included when the software is used.

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