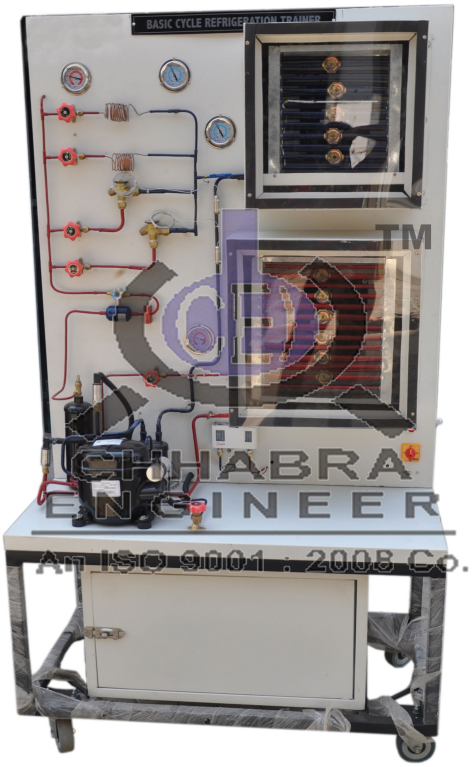
Product Name : " BASIC CYCLE REFRIGERATION TRAINER "
Product Code : " R.A.C 13 "



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Description :

BASIC CYCLE REFRIGERATION TRAINER:-

AIM:-

Familiarisation with refrigerant circuit

- Familiarisation with functioning and operating behaviour of individual components
- Comparison of operation with expansion valve or capillary tubes with different lengths

- Thermodynamic Cyclic process on a log p-h diagram

INTRODUCTION:-

Refrigeration is the branch of science that deals with the process of reducing and maintaining the temperature of a space of material below the temperature of the surrounding. Heat must be removed from the body being refrigerated and transferred to another whose temperature is below that of the refrigerated body.

TECHNICAL SPECIFICATION:-

The most common form of refrigerating installations is a refrigeration system with compressor. The physical effect of absorbing heat from the environment during transition from liquid to gaseous state of the refrigerant is used (evaporation enthalpy).

Specification

1. Investigation of a refrigeration system with different expansion elements.
2. Refrigerant circuit consisting of hermetic compressor, condenser, evaporator and expansion element.
3. Condenser and evaporator: tube heat exchangers, both fitted with a fan for a better heat exchange.
4. Expansion valve and capillary tubes with different lengths as expansion elements.
5. Copper pipes and sight glass to watch the phase transitions of the refrigerant.
6. Collector for Underfilling respectively overfilling the system with refrigerant.
7. Sensors measure pressures and temperatures.
8. CFC-free refrigerant R134a.
9. Compressor fitted with two pressure switches.

Software for data acquisition via PCI.

Temperature sensor & enthalpy details: -

- T_1 = Temperature Of Compressor Inlet
- T_2 = Temperature Of Compressor Outlet (Condenser Inlet)
- T_3 = Temperature Of Condenser Outlet
- T_4 = Temperature Of Evaporator Inlet
- T_5 = Temperature Of Air Duct

- H_1 = Enthalpy of refrigeration effects at Compressor Inlet, kJ/kg.
- H_2 = Enthalpy of compressor work at Compressor Inlet, kJ/kg.
- H_3 = Enthalpy of sub cooling at the outlet of Condenser, kJ/kg.
- H_4 = Enthalpy of refrigerant Inlet of Evaporator, kJ/kg.
- P_1 = Pressure at Compressor Suction, kJ/cm^2.
- P_2 = Pressure at Compressor Discharge, kJ/cm^2

CALCULATIONS:

Mark points 1, 2, 3 using (P_1, T_1), (P_2, T_2), (P_2, T_3) respectively on P-h diagram for (R-134a) and read H_1, H_2 and H_3 (where $H_3 = H_4$) to calculate COP.

$$COP_{act} = \frac{Ma / Hai - Hao}{Voltage \times current \times Cos\ f}$$

Ma (mass flow) = Density of Air x duct size x air velocity

H_{ai} = Inlet temperature of air (Ambient Temp.)

H_{ao} = Outlet temperature of air (Final Temp.)

$$COP_{theo} = \frac{H_1 - H_3}{H_2 - H_1}$$