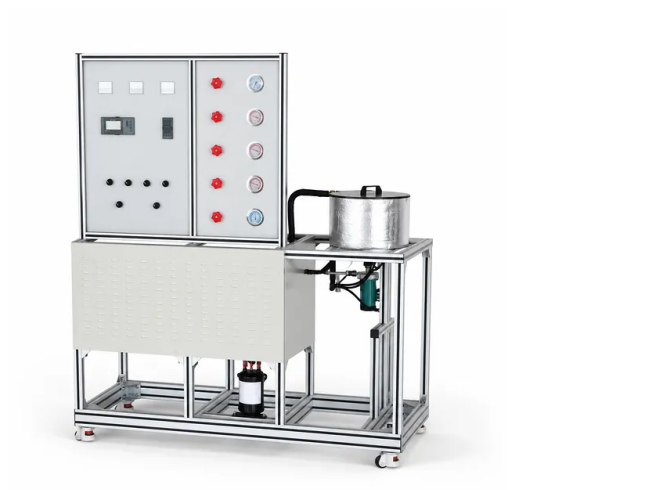


Educational Compression Refrigeration Performance Determination Unit Operations Pilot Plant

Item Number: LPK-SRDE



Introduction

This educational pilot plant for compression refrigeration performance determination offers dual COP evaluation, regenerative cycle comparison, and calorimeter calibration. Customizable for curriculum integration, it features environmentally conscious design. Supports thermodynamic mapping on pressure-enthalpy diagrams and synchronous monitoring with centralized instrumentation.

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Parameter	Specification / Details
Structure	Industrial-grade aluminum alloy frame with heavy-duty lockable casters for mobility
Overall Dimensions	≤ 1480 mm × 580 mm × 1780 mm (L × W × H)
Core Components	Hermetic refrigeration compressor, water-cooled condenser, calorimeter (heater), regenerator (heat exchanger), expansion valve
Instrumentation	High/low-pressure gauges, electronic temperature sensors, digital power meters, flow control valves
Working Fluid	Environmentally compliant secondary heat transfer fluid
Safety Features	Overpressure protection, electrical leakage protection, and overload protection

Experimental Module	Learning Objectives	Academic Concepts & Textbook Reference
Compressor COP Determination	Calculate electrical power input and heat absorption to evaluate compressor performance.	Vapor-Compression Cycles, Work of Compression (<i>Unit Operations of Chemical Engineering</i>)
Overall Unit COP Analysis	Measure cumulative energy inputs and cooling outputs under varying load conditions.	Coefficient of Performance, Energy Balances (<i>Transport Processes and Unit Operations</i>)
Regenerative Cycle Performance	Compare system metrics when routing refrigerant through the regenerator versus direct expansion.	Heat Recovery, Refrigerant Subcooling (<i>Chemical Engineering Design</i>)
Calorimeter Calibration	Determine the thermal loss factor of the heater vessel to correct experimental COP values.	Heat Leakage, Thermal Insulation, Steady-State Heat Transfer (<i>Unit Operations of Chemical Engineering</i>)
Pressure-Enthalpy Analysis	Construct and analyze thermodynamic cycles using real-time pressure and temperature data.	Saturated and Superheated Vapor States (<i>Transport Processes and Unit Operations</i>)