KHT-051

COOLING USING PELTIER EFFECT APPARATUS

Cooling Using Peltier Effect Apparatus Model KHT-051 is designed to demonstrate cooling using the Peltier Effect (Thermoelectric Effect)**.** The central component of the system is a Peltier element. When current flows through the element, one side becomes hot while the other side becomes cold. The heating and refrigeration capacity of the Peltier element are dissipated via water flows.

Heating and refrigeration capacities are determined by measuring the water flow rate along with the inlet and outlet temperatures. The supplied electrical power is calculated using current and voltage measurements.

Well-structured instructional material is provided, explaining the fundamentals and offering a step-by-step guide to conducting experiments.

Instruments for measuring temperature at different points and power consumption are integrated into the instrument panel. The flow of water in both the hot and cold circuits is measured using a rotameter with a calibrated scale.

The entire setup is mounted on a sturdy steel frame made of mild steel tubes and sheets, finished with powder coating for enhanced durability.

Features

- Designed to demonstrate the Thermoelectric Refrigeration effect
- Facility to simulate variable heat load conditions and study its effect on cycle performance
- Comprehensive instrumentation panel with all necessary measuring instruments

Specifications

- Peltier Element (Water-Cooled)
  - Max. refrigeration capacity: 200 W
  - Max. current: 13 A
  - Max. voltage: 24.1 V
  - Max. temperature difference: 68 °C
- Pump: 120 W
- Water Tank: 7 L

Note: Specifications and Photos can be altered without prior notice in our constant efforts for improvement.

- Measuring Instruments
  - Ammeter: 0–20 A DC
  - Voltmeter: 0–50 V DC
  - Temperature sensors: RTD PT-100 sensors for precise measurement
  - Temperature indicator: 8-channel digital indicator, range -20 … 200 °C, resolution 0.1 °C
  - Water flow meter: 1 × 2 … 27 L/h, 1 × 10 … 105 L/h
  - Thermostat
- Other Details
  - Power consumption: 120 W
  - Digital display for temperature, current, and voltage
  - Base frame: made of M.S. square tubes & sheets, welded and powder coated for long life

Experimental Capabilities

- Study of function and operation of a Peltier element for cooling and heating (heat pump mode)
- Determination of cooling and heating capacity
- Recording typical characteristics (e.g., cooling capacity via temperature differences)
  - Energy balance analysis
  - Calculation of coefficient of performance (COP)

Options

- Data Acquisition System (optional)

Services Required

- Electric Supply: 230 V AC, 6 A, Single Phase, Earthed
- Tap Water & Drainage

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