

WATER TO WATER HEAT PUMP R560



Year 1
study

3 to 4
participants

15 mins
setup

2 hours
duration

Space required
3(L) x 2(W) m

RE590
modules

Features

- Stabilises in minutes allowing many tests to be conducted in a typical laboratory period.
- Allows a complete refrigerant pressure-enthalpy cycle diagram to be drawn at all operating conditions.
- Operates on CFC free R134a refrigerant.
- Allows a complete energy balance to be performed between electrical input and thermal input/output.
- Allows generation of heat pump performance curves over a range of conditions.
- Optional Data Acquisition Upgrade.

Description

A heat pump is a machine whose prime function is to absorb heat from a low grade source, and to deliver heat at a useful temperature, e.g. suitable for space heating or domestic hot water. The R560 Hilton Water to Water Heat Pump has been designed specifically to allow students to obtain an overall understanding and appreciation of the performance and characteristics of a heat pump working on the vapour compression cycle and having an electrically driven compressor. The low grade heat source is water. This may be obtained from the local water supply or alternatively the Optional Hilton RE590 Ground Source Simulator is available. This provides a recirculated glycol/water source with a large container that may be filled with locally sourced soil, sand or water to simulate a static heat source. Heat delivered by the unit is in the form of water at up to 55°C depending upon the water source temperature. The work input is in the form of electrical energy supplied to a hermetically sealed compressor.

Related Laws/Applications

- Water-Water Engineering
- Agricultural Engineering
- Energy Conservation
- Thermodynamics
- Building Services
- Chemical Engineering
- Marine Engineering
- Plant & Process Engineering
- Refrigeration and Air Conditioning
- Food Technology

Learning capabilities

- Determination of power input, heat output and coefficient of performance.
- Production of heat pump performance curves over a range of source and delivery temperatures.
- Plotting the vapour compression cycle on a p-h diagram and comparing this with the ideal cycle.
- Determination of energy balances for condenser and compressor.
- Production of heat pump performance curves based on R134a properties, at a variety of evaporating and condensing temperatures.
- Estimation of the effects of compressor pressure ratio on volumetric efficiency.

Technical Specification

- Refrigerant: R134a (HFC134a).
- Panel: High quality ABS.
- Compressor: Fully hermetic single cylinder reciprocating type. Displacement 18.5cm³ rev⁻¹
- Condenser: Refrigerant to water insulated plate heat exchanger.
- Liquid Receiver: With valves. Contains entire refrigerant charge if required.
- Evaporator: Water to refrigerant efficient plate heat exchanger.
- Digital Thermometer: Resolution 0.1°C, with switch to select from six thermocouples.
- Flow Meters x 3: Variable area type – to indicate R134a and water flow rates.
- Pressure Gauges x 2: To indicate R134a pressures in evaporator and condenser.
- Electrical Energy Meter: Direct Reading Digital display wattmeter.
- Safety Features: Condenser high pressure switch and compressor thermal overload switch. Residual current circuit breaker and a combined double pole main switch and overload cut out. All electrical components connected to common earth conductor.

Recommended Ancillaries

- R100: Pressure/Enthalpy Software
- RE590: Ground Source Simulator

What's in the Box?

- 1 x R560
- 1 x Transformer (115V only)
- 4 x 3m Reinforced PVC tube
- 1 x Power lead
- R134a Thermal Property Tables
- R134a Pressure/Enthalpy diagram
- R560 Schematic and holder
- Instruction manual
- Packing list
- Test sheet

Weights & Dimensions

- Weight: 65 kg
- Weight: 69 kg (115V version)
- 950(L) x 650(W) x 460(H) mm
- Net Weight: 65kg. (approx.)
- Gross Weight: 95 kg. (approx.)
- Packing Case Dimensions: 112 x 82 x 76 cm (approx.)
- Packing Case Volume: 0.69m³ (approx.)

Essential Services

- 800W 220-240 Volts, Single Phase 50 Hz (with earth /ground). Line current up to 3.0A at 230V.
- 800W 110-120 Volts, Single Phase 60 Hz (with earth /ground). Line current up to 6.0A at 110V.
- Water: Cold water, continuous supply, 180 litres/Hour at 15 m head minimum.

Ordering information

To order this product, please call PA Hilton quoting the following codes:
 R560/230
 R560/115
 R560/230/RC: Data Acquisition R560
 R560/115/RC: Data Acquisition R560

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