

3.6.02-00 Heat pump



What you can learn about ...

- Refrigerator
- Compressor
- Restrictor valve
- Cycle
- Vaporization
- Condensation
- Vapour pressure
- Vaporisation enthalpy

Principle:

Pressures and temperatures in the circulation of the heat electrical compression heat pump are measured as a function of time when it is operated as a water-water heat pump.

The energy taken up and released is calculated from the heating and cooling of the two water baths.

When it is operated as an air-water heat pump, the coefficient of performance at different vaporiser temperatures is determined.

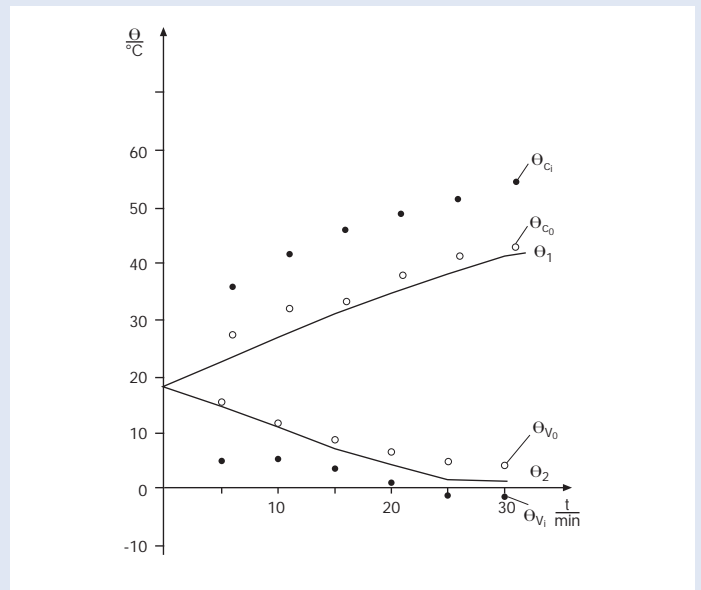
What you need:

Heat pump, compressor principle	04370.88	1
Laboratory thermometers, -10...+100°C	38056.00	4
Laboratory thermometer -10...+110 °C	38060.00	2
Heat conductive paste, 50 g	03747.00	1
Hot/cold air blower, 1700 W	04030.93	1
Stopwatch, digital, 1/100 s	03071.01	1
Tripod base -PASS-	02002.55	1
Support rod -PASS-, square, $l = 250$ mm	02025.55	1
Universal clamp with joint	37716.00	1
Beaker, DURAN®, tall form, 2000 ml	36010.00	1
Stirring rods, BORO 3.3, $l = 300$ mm, $d = 7$ mm	40485.05	2

Option:

Work and power meter	13715.93	1
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Complete Equipment Set, Manual on CD-ROM included
Heat pump P2360200



Temperatures at the inlet and outlet of the vaporiser Θ_{V1} (●), Θ_{V0} (○) and condenser Θ_{C1} (●), Θ_{C0} (○) as a function of the operating time; continuous curves: temperature in water reservoirs.

Tasks:

1. Water heat pump:
 - To measure pressure and temperature in the circuit and in the water reservoirs on the condenser side and the vaporiser side alternately. To calculate energy taken up and released, also the volume concentration in the circuit and the volumetric efficiency of the compressor.
 - the condenser side under different operating conditions on the vaporiser side,
 - 2.1 with stream of cold air
 - 2.2 with stream of hot air
 - 2.3 without blower.
2. Air-water heat pump:
 - To measure vaporiser temperature and water bath temperature on
 - If a power meter is available, the electric power consumed by the compressor can be determined with it and the coefficient of performance calculated.