



## UNSTEADY STATE HEAT TRANSFER MODULE H112G



Year 1  
study

### Description

A small scale bench top accessory designed to allow experimental investigation of unsteady state heat transfer by conduction and convection. Instrumented solid shapes of different materials are plunged into a controlled temperature water bath and the temperature changes at the geometric centre of the shapes (via thermocouples) are recorded at regular intervals. As the shapes are of regular geometric form standard empirical methods may be used to predict the temperature variation with time and determine factors about the material properties. The accessory also allows investigation of the lumped thermal capacitance method of thermal analysis. The controlled temperature water bath has a variable speed circulating pump and central cylindrical flow channel to establish stable forced convection conditions to be maintained around the immersed shapes. All the thermocouples and the variable speed circulating pump power supply plug directly into the Heat Transfer Service Unit H112 and readings are displayed on digital panel meters.

### Related Laws/Applications

- Mechanical Engineering
- Nuclear Engineering
- Chemical Engineering
- Control and Instrumentation
- Plant and Process Engineering
- Building Services
- Engineering Physics
- Refrigeration
- Marine Engineering

### Learning capabilities

- To observe unsteady state conduction of heat to the centre of a solid shape (qualitative only using optional updated H112 Base Unit with Data Acquisition) when a step change is applied to the temperature at the surface of the shape.
- To Using analytical transient-temperature/heat flow charts to determine the thermal conductivity of a solid cylinder from measurements taken on a similar cylinder but having a different thermal conductivity.
- To Investigation of the effect of shape, size and material properties on unsteady heat flow. Using analytical transient-temperature heat flow charts to analyse the results obtained from different solid shapes.
- Investigation of the Lumped Thermal Capacitance method of transient temperature analysis.

### Technical Specification

- Bath capacity approx.: 30 litres
- Heating element: 3kW (at 240Vac)
- Brass Cylinder: Ø20mm x 100mm (L)
- Stainless Steel Cylinder: Ø20mm x 100mm (L)
- Brass Cylinder: Ø30mm x 100mm (L)
- Brass slab: 70 (L) x 15(W) x 76(H) mm
- Stainless Steel: 70 (L) x 15(W) x 76(H) mm
- Brass Sphere: Ø45mm
- Stainless Sphere: Ø45mm

### Essential Ancillaries

- H112 Base Unit

### What's in the Box?

- 1 x H112G
- 1 x Plastic Jug
- Instruction manual
- Packing List
- Test sheet

### Weights & Dimensions

- Weight: 23.2 kg
- Length: 600mm
- Width: 400mm
- Height: 670mm

### Essential Services

- H112/230 - Base Unit
- 220-240 Volts, Single Phase, 50Hz.
- (With earth/ground), 13 Amps.
- 110-120 Volts, Single Phase, 60Hz.
- (With earth/ground), 26 Amps.

### Ordering information

To order this product, please call PA Hilton quoting the following codes:  
H112G/230 - Unsteady State Heat Transfer Module  
H112G/115 - Unsteady State Heat Transfer Module

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COUNTRY OF ORIGIN - UK WARRANTY PERIOD - 5 YEARS