



LINEAR HEAT CONDUCTION MODULE

H112A



Year 1
study

Description

A small-scale accessory that allows experimental investigation of linear heat conduction and the measurement of the thermal conductivity of various solid conductors and insulators. An insulated, 25mm diameter brass heated section and cooling section that may be either clamped together, or assembled with one of four insulated intermediate sections or test specimens between the interfaces. The hot end uses a nominal 75W heater (operating at 240v maximum), which is fitted with a high temperature limit switch. The power supplied to the heater is controlled and measured by the H112, Heat Transfer Service Unit. The cold section is of identical dimensions to the hot end and is water-cooled. Both the heated and cooled ends are each fitted with three thermocouples at 15mm intervals to measure the temperature gradients along the bars. All eight thermocouples plug directly into the H112, Heat Transfer Service Unit and temperatures are displayed on its digital panel meter. You may also be interested in: H112B: Radial Heat Conduction Module H112D: Combined Convection and Radiation Module H112H: Thermal Conductivity of Liquid and Gases Module H112N: Thermal Conductivity of Building Material Unit

Related Laws/Applications

- Fourier Rate

Learning capabilities

- To measure the temperature distribution for steady state conduction of energy through a uniform plane wall and demonstrate the effect of a change in heat flow.
- To understand the use of the Fourier Rate Equation in determining rate of heat flow through solid materials for one dimensional, steady flow of heat.
- To measure the temperature distribution for steady state conduction of energy through a composite plane wall and determine the Overall Heat Transfer Coefficient for the flow of heat through a combination of different materials in use.
- To determine the thermal conductivity k of a metal specimen.
- To demonstrate that the temperature gradient is inversely proportional to the cross-sectional area for one dimensional flow of heat in a solid material of constant thermal conductivity.
- To demonstrate the effect of contact resistance on thermal conduction between adjacent materials.
- To understand the application of poor thermal conductors and determine the thermal conductivity k of a poor thermal conductor.
- To observe unsteady state conduction of heat and to use this in observation of the time to reach stable conditions.

Technical Specification

- Heated Section. Material: Brass, Ø25mm.
- Cooled Section. Material: Brass, Ø25mm.
- Brass Intermediate Specimen: Ø25mm x 30mm long.
- Stainless Steel Intermediate Specimen: Ø25mm x 30mm long.
- Phosphor Bronze Intermediate Specimen: Ø25mm x 30mm long.
- Reduced Diameter Brass Intermediate Specimen: Ø13mm x 30mm long.

Essential Ancillaries

- H112: Heat Transfer Service Unit

What's in the Box?

- 1 x H112A
- 0.6m PVC hose
- 3 x Hose clips
- 1 x Thermal paste
- 1 x Paper Insulation Disc
- 1 x Cork Insulation Disc
- Instruction manual
- Packing List
- Test sheet

Weights & Dimensions

- Unit: 240(L) x 240(W) x 305(H)mm
- Nett Weight: 4 kg
- Gross Weight: 6.45 kg
- Packing Case Volume: 0.18 m³

Essential Services

- H112: Heat Transfer Service Unit
- Water: 1.5 litres/minute at a minimum 10m head

Operational Conditions

- Storage temperature: -10°C to +70°C
- Operating temperature range: +10°C to +50°C
- Operating relative humidity range: 0 to 95%, noncondensing

Ordering information

To order this product, please call PA Hilton quoting the following code:
H112A

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