



## Unsteady State Heat Transfer Unit (SMT-HT-26)

The Unsteady State Heat Transfer unit is designed for the investigation of the temperature variation with time and heat flow within solid shapes that are subjected to sudden heating. The unit consists of a stainless steel water bath and integral flow duct with external water circulating pump. The bath has a capacity of approximately 30 liters and is heated by a thermostatically controlled 3 kW electric heating element in the base of the bath. Adjustment of the thermostat allows the bath to be set to a nominally constant temperature before beginning the experimental procedure. The heating element incorporates internal thermal protection so that power is switched off in the event of the heater being turned on when not covered by water. However, repeatedly allowing the heater to overheat in this way should be avoided as it will eventually fail. The control panel is provided having all the necessary wiring, temperature measurements and digital indicators.

The unit has Touch LCD display for visualization of process and the measurements. The Unit is also connected to Software for computer connectivity and data analysis. The Touch screen and computer software is included in the package.

## TECHNICAL SPECIFICATIONS

### Specifications:

- Complete stand-alone unit to demonstrate and measurement of unsteady state heat transfer.
- Touch LCD 7" with GUI Interface for better monitoring and accurate measurement of Plant variables.
- DAQ Software for PC Connect and Data measurement and Calculations.
- A bench top unit designed to allow experiments on unsteady state heat transfer.
- Water Bath: 30 litres insulated stainless steel tank with top plate and mounting for solid shapes holder. The heating is by a 3.0kW electric heater with thermostat control while the water circulation is by a centrifugal pump.
- Solid Shapes: 7 Pieces of solid specimens made of brass and stainless steel are supplied. The three different shapes are solid sphere, rectangular slab and long solid cylinder. Each solid shape has a built-in temperature sensor at the centre.



## Experiments:

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- Monitoring the changes in temperature for bodies of different sizes, shapes and materials, which are dropped into the hot water bath.
- Analysis of the results obtained from different solid shapes using analytical temperature/heat flow charts provided.
- Determination of the conductivity of a shape using the results obtained from similar shape made of different material.
- The effect of shape, size and material properties upon unsteady heat flows.