



Features:

- Table Top, Compact, comprehensive, sturdy design
- Complete instrumentation for study of Temperature Measurement using different instruments.
- Comparison of different methods of temperature devices
- Calibration of different types of Temperature sensors can be studied.

System Description:

Tesca Temperature Measurement & Calibration Apparatus is a self-contained unit capable of studying Temperature measurement by different instruments. The basic setup consists of an electrically heated water bath with temperature controller. The temperature of the water bath can be maintained at different set points so that number of readings can be obtained. Different type of temperature sensors are inserted in the water bath along with Thermometer. The temperatures recorded by the thermocouples are displayed on a Digital indicator. The entire setup is mounted on a sturdy steel frame or table mountable frame.

The Temperature Measurement and Calibration apparatus fits on a desk or bench top. It includes eight different temperature measurement devices

Note: Specifications are subject to change.

Tesca Technologies Pvt. Ltd.

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and shows their characteristics and how to calibrate them against a standard. The built-in precision reference sensor works as an accurate temperature reference. A display shows the temperature from the reference sensor and the local (barometric) pressure from the built-in pressure sensor. The display also calculates the local boiling point of water based on the barometric pressure.

Students add crushed ice (not supplied) to the insulated icebox and clean water to the fully guarded water heater tank. A carefully rated immersion heater in the tank heats the water steadily up to boiling, giving time to take accurate results. The water heater tank includes a water level float switch and a safety temperature cut-out switch to turn off the heater in case of low water level. The water heater tank has a drain tap for connection to a suitable container or local water drain. This helps students to change the heated water safely and quickly, reducing experiment time. As an extra reference, a liquid crystal temperature indicator strip on the front of the heater tank shows its temperature during experiments.

To the right of the temperature indicator strip, a window allows students to test the thermal infrared thermometer on a matt black or brushed steel surface of the heater tank. This shows limitations of infrared measurements caused by surfaces of different emissivity.

The equipment includes a thermowell that works with the gas (vapour) thermometer to show temperature lag.

Sockets on the front panel connect to electronic circuits and a multiline display that work with the electrical resistance and thermocouple devices. The sockets include resistances to simulate a resistance device and show the problems of adding resistances (for example - long wires) to your measuring circuits.

The electronic circuits also include

An amplifier to increase the output of the thermocouples for more useful voltage measurement. Constant current and voltage sources, and a resistive bridge. These show the problems with different measurement circuits and power sources for electrical temperature measurement devices. Optionally the trainer can be computer interfaced using 'Sci-Cal' interface & software.

Optionally temperature measurements using Bi-metallic thermometer, Gas thermometer, Mercury thermometer and Psychrometer Wet & Dry Bulb type are offered.

List Of Experiments

- Study of different types of temperature measuring devices.
- Study calibration of Different Temperature sensors.
- Functions of individual temperature measuring devices
- Response characteristics of sensors
- Steady state & Non-steady state behavior of the temperature measuring devices.
- Simulation of two, three and four wire connection of a platinum resistance thermometer (PRT)
- Constant current and voltage sources
- Calibration and linearity of temperature measurement devices and temperature lag
- Thermal infrared temperature measurement on surfaces of different emissivity
- Thermocouples in series, parallel and the Seebeck effect
- Resistance in thermocouple circuits

System Components

- Electrically heated Hot Water bath of rating 2KW with temperature limit of @ 800C.
- Motorized Stirrer
- Temperature controller with indicator
- Bi-metallic temperature indicator: 0-4000C
- Vapor pressure thermometer
- Self-Adhesive surface temperature indicators
- Wet & Dry Bulb Thermometer
- Digital resistance/mW Meter
- Thermocouple – Type J & K.....-400 - + 2000C
- RTD, PT-100 Sensor.....-500C - +4000C
- Platinum Resistance Thermometer 0-1000C
- Thermistor (NTC)200 - 550C
- Base frame: M.S. frame, Powder coated
- Electrical Switches & Indicators
- 2 x liquid in glass thermometers
- Bimetal and gas (vapour) pressure thermometers
- Liquid crystal temperature indicator strip (for reference only)
- Hand-held infrared thermometer

Optional Accessories

- Mercury Thermometer...0 – 1000C
- Bi-metallic thermometer...0 – 1000C
- Psychrometer...0 – 600C
- Line Recorder
- Computer based Multimedia Training package for Instrumentation: 'Sci-Cal' interface & software
- Set of Transparencies & Charts

Operation & Maintenance Manual:

- Self-explanatory operating & maintenance manual will be provided. This will include Theory,

operating procedure, standard results, and maintenance procedures.

Service Required At Site

- Electric Supply 230V, 50Hz with proper earthing.
- Tap Water supply & drainage

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