TD - 003

Temperature Measurements Educational Unit

Overview

The Temperature Measurement Educational unit designed to demonstrate the different temperature measurement procedures. The trainer is composed of different temperature sensors such as liquid thermometers, bimetallic thermometers, thermocouple, Pt100 and NTC thermistor.

Specifications

- Different temperature measuring methods.
- The temperature sensors being studied are attached to a height-adjustable device above the experimental tank.
- Temperature sensors equipped are liquid thermometer, bimetal thermometer, Pt100, thermistor (NTC), type K thermocouple.
- A fan is included to ensure almost constant ambient conditions.
- A second tank with electronically controlled heater supplies water temperatures up to approx. 80°C.
- The heated water at a specified temperature is fed into the experimental tank.
- By lowering the height-adjustable device, the temperature sensors are immersed in the water and the temperature measurement begins.
- The measured values can be read as analogue or digital values.
- A 3-channel line recorder can record the measured values of the electronic temperature sensors continuously over time and thus also document the different time response.
- Defined temperature jumps and steady and transient temperature behavior can be studied.
- Both tanks are equipped with stirring machine

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Experiments

- Familiarization with different temperature measurement methods:
  - » Non-electrical methods: liquid thermometers, bimetal thermometers.
  - » Electronic methods: thermocouple, Pt100 resistance thermometer, NTC thermistor.
- Determination of air humidity with a psychrometer.
- Familiarization with the function of the individual temperature measuring instruments.
- Response behavior of the sensors.
- Steady and transient behavior.

Technical Data

Heater

- » Output: 2Kw
- » Tank capacity: 4 L

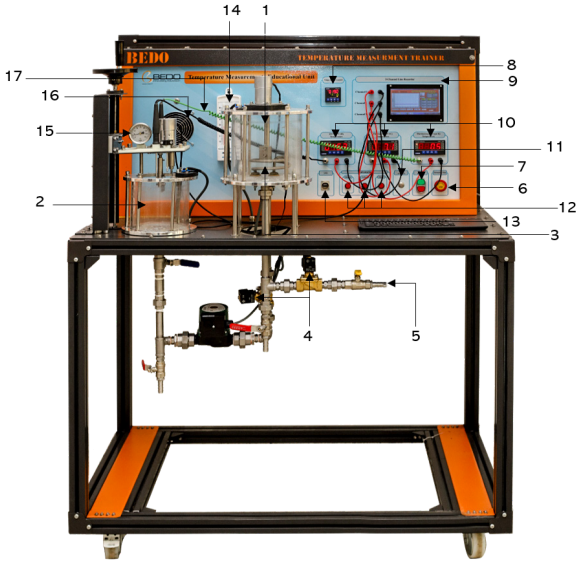
Temperature Controller

- » PID, line recorder
- » 3 Channels
- » Serial interface

Temperature Sensors

- PT100
  - » range -200 to 250°C
  - » Response 10 seconds
- NTC
  - » range -30 to 80°C
  - » Accuracy: ±0.5°C
- Bimetal Dial Thermometer:
  - » Range -50 to 500°C
  - » Class 1
- K probe
  - » Range -200 to 1100°C
  - » Response time 2 second
- Liquid in glass thermometer
  - » Range 0 to 100°C
- Wet/Dry Bulb thermometer/hygrometer
  - » Temperature range 0 to 50°C
  - » Humidity range 10 to 95% RH

Components



1	Main tank (heating tank)	2	Experimentation tank
3	Electric heater (heating coil)	4	Solenoid valves
5	Water supply inlet	6	Emergency button
7	Trainer ON/OFF switch	8	Temperature control indicator
9	3-channel line recorder	10	Temperature sensors displays
11	System ON/OFF button	12	Solenoid valves & heater operation indicators
13	USB port	14	psychrometer
15	Bimetallic thermometers	16	PT100
17	Thermocouple K		

Scope of Delivery

- Temperature Measurements Educational (TD - 003)
- Bedo software
- Hard copy user manual

Required of Operation

- Laboratory PC

Options

- Digital content (BI-01)

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