RADIATION ERRORS in TEMPERATURE MEASUREMENT MODULE

H112F

Year 1
study

Description

A small scale bench top accessory designed to experimentally investigate how measured temperatures can be influenced by the effects of radiation, temperature sensor design and surface finish. Three temperature sensors of different form and surface finish are mounted centrally in a circular stainless steel duct that is surrounded locally by an electrical heater. An additional temperature sensor records the temperature of the inside of the heated duct adjacent to the centrally mounted thermocouples. A radiation shield may be raised or lowered over the centrally mounted thermocouples to investigate the effects of shielding. The circular duct is mounted on the discharge from a centrifugal fan. Air from the fan is blown through the duct past the temperature sensors at a controlled velocity of between 0 and 8m/s. The air velocity is measured by an in duct anemometer. The heater power supply and temperature sensors connect to the Heat Transfer Service Unit H112 while velocity is recorded on auxiliary instrumentation supplied as part of the H112F unit.

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

- Demonstration of how temperature measurements can be affected by radiant heat transfer to a sensor from its surroundings
- Effect of temperature difference between the sensor and its surroundings
- Effect of air velocity.
- Effect of sensor size.
- Effect of sensor Emissivity.
- Demonstration of methods of reducing the errors in temperature measurement, which are due to radiation from a source that is visible to the sensor.
- Use of a radiation shield between the sensor and the source of radiation.
- Design of a radiation resistant sensor.

Technical Specification

- Three Test thermocouples
- Ø1.5mm polished bead
- Ø1.5mm matt black bead
- Ø3.0mm matt black bead
- Heater: 200W at 230Vac
- Air velocity: 0…8m/s

Essential Ancillaries

- H112

What's in the Box?

- 1 x H112F
- 1 x Power Cable
- Instruction manual
- Packing List
- Test sheet
- Wiring Diagram

Weights & Dimensions

- Weight: 19.1 kg
- Length: 300mm
- Width: 350mm
- Height: 1220mm

Essential Services

- H112

Ordering information

To order this product, please call PA Hilton quoting the following code: H112F