

# Edexcel Physics IAL

## Core Practical 12: Calibrating a Thermistor in a Potential Divider Circuit

### Practical Notes



## Core Practical 12: Calibrate a thermistor in a potential divider circuit as a thermostat

### Equipment

- Thermistor
- Ohmmeter
- Kettle
- Alcohol thermometer
- Variable resistor
- Ice
- Beaker

### Method

1. Set up a circuit with the resistor and thermistor in series, and with the ohmmeter attached across the thermistor.
2. Pour boiling water into the beaker and carefully submerge the thermistor.
3. Record the initial temperature using a thermometer, and record the corresponding resistance from the ohmmeter.
4. Gradually add in small quantities of ice, stir and then record the new temperature and resistance.
5. Repeat until all the ice has been used up and the water is below room temperature.

### Calculations

- Plot a graph of resistance against temperature - this is known as a calibration curve.
- Use the curve to determine the resistance at the desired switch on temperature and then use:

$$\blacksquare V_{out} = V_{in} \left( \frac{R_1}{R_1 + R_2} \right)$$

- Construct a potential divider circuit, with the required second resistance to produce the desired  $V_{out}$ .

### Tips

- You can test how successful you have been by heating water up to the required switch on temperature and measuring the resistance over the thermistor at that temperature.

### Safety Precautions

- Take care when pouring boiling water.
- Don't touch the beaker when the water temperature is high.
- Keep electrical connections away from the water, and clean up any spillages immediately.

