

Electronics with the Modular System

Basic Electronic Circuits
Special resistors

Temperature-dependent
NTC and PTC resistors

Objective of the experiment

To investigate the resistance variation of NTC and PTC resistors when heated.

Setup



Apparatus

| | | |
|---|---------|---------------------------------|
| 1 | 539 021 | NTC probe 4.7 k Ω , BST |
| 1 | 539 022 | PTC probe 30 Ω , BST |
| 1 | 539 065 | Cell, BST |
| 4 | 539 004 | Connector blocks BST, 90° angle |
| 4 | 539 000 | Bridging plug, BST |
| 2 | 531 900 | Demo multimeter, active |
| 4 | 500 644 | Safety connection lead, 100 cm |
| 1 | 303 25 | Immersion heater |
| 1 | 590 06 | Plastic beaker 1000 ml |
| 1 | 382 21 | Stirring thermometer |
| 1 | 301 300 | Demonstration experiment frame |
| 1 | 301 301 | Adhesive magnetic board |

Carrying out the experiment

- After room-temperature equalization, read the resistances of NTC and PTC on the demo multimeters.
- In the plastic beaker, heat 500 ml of water to 60 °C.
- Fill the cell with the warm water and immerse the NTC and PTC probes.
- Observe the resistance variation on the demo multimeters.

Observation

| Temperature ϑ / °C | Resistance R_{NTC} | Resistance R_{PTC} |
|------------------------------|----------------------|----------------------|
| 25°C | 4.7 kΩ | 30 Ω |
| >25°C | decreases | increases |

Evaluation

NTC and PTC are temperature-dependent resistors (thermistors).

NTC thermistors exhibit a decrease in electrical resistance with increasing temperature, while PTC thermistors show an increase in electrical resistance with increasing temperature.

NTC is the abbreviation for "Negative Temperature Coefficient" and PTC for "Positive Temperature Coefficient".