# Resistors in series and parallel

**Requirements**

A set of resistors marked with the letters A through to E.

3 clip component holders or 6 crocodile clips

4 mm leads

digital multimeter

**Experiment 1: Resistors in series**

1. Use the multimeter to measure the resistance of each of the resistors you have been given. Do not be tempted to accept the manufacturer's marked value even if you can see it. Remember the tolerance can be as much as 10%! Record your results in a table like the one shown below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Resistor | A | B | C | D | E |
|  |  |  |  |  |  |

Which two resistors have the same nominal value?

2. If resistor A is placed in series with resistor B what would you expect their combined resistance to be?

3. Place resistors A and B in series and measure the resistance across the two.

Repeat steps 2 and 3 with resistors C and D

Repeat steps 2 and 3 with three resistors A, C and E in series.

Do your measured results agree with your predictions?

**RESULTS**

**Experiment 2: Resistors in parallel**

Use the same set of resistors as for Experiment 1.

2. Use the parallel resistors formula to complete the second column of the table below.

3. Use an ohm-meter to measure the combined resistance of each combination, and complete the third column. Do your measured results agree with your predictions?

|  |  |  |
| --- | --- | --- |
| Parallel combinations of resistors | Predicted resistance of the parallel combination / Ω | Measured resistance of the parallel combination  (Rtot) / Ω |
| A&B |  |  |
| B&C |  |  |
| C&D |  |  |
| D&E |  |  |
| A,B&C |  |  |
| C,D&E |  |  |

**External references**

This activity is taken from Advancing Physics Chapter 2, 120E