

Basic Electric Circuits

Electric Resistance

Correlation between resistance and length of a wire
Set-up with the apparatus for resistance measurements

Objects of the experiment

1. Investigating the correlation between resistance and length of a wire.

Set-up



Preparation of the constantan wires ($d = 0,7 \text{ mm}$):

- Connect both constantan-wires in series.
- Measure 0,75 m at the upper wire and mark it with the felt-tip pencil on the apparatus.
- On the lower wire measure and mark 0,25 m and 0,75 m accordingly.

Apparatus

1 Apparatus for resistance measurements.....	550 57
2 Demo-Multimeter, passive.....	531 905
1 Power supply, 12 V, DC, 230 V.....	521 49
5 Connecting lead, 100 cm.....	500 444
1 Connecting lead, 25 cm.....	500 414
1 Insulated crocodile-clips.....	from 501 83
1 wooden ruler.....	31103
1 Felt-tip pencil.....	667 019
2 Stand base, V-shape.....	300 02
2 Stand rod, 250 mm.....	300 41
2 Leybold multiclamp.....	301 01
2 Metal plate.....	200 655 59

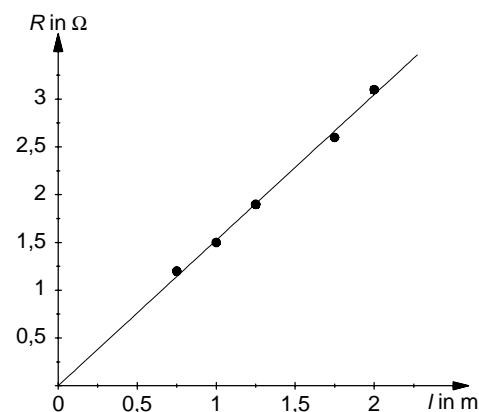
Carrying out the experiment

- Set up the circuitry and calliper 0,75 m with the crocodile clip.
- Set a voltage of ca. 0,5 V on the power supply.
- Read current and voltage on the multimeters and write it in the table.
- Repeat the measurement with 1.00 m, 1.25 m, 1.75 m und 2.00 m.
- Calculate Resistances R using voltages U and currents I .

Measuring example

L in m	U in V	I in A	R in Ω
0,75	0,5	0,42	1,2
1,00	0,5	0,34	1,5
1,25	0,5	0,26	1,9
1,75	0,5	0,2	2,5
2,00	0,5	0,16	3,1

Evaluation



The resistance R of a wire is increasing proportionally with the length L of that wire: $R \sim L$.