

# Resistance measurement

## Student Group

| First Name | Surname | Matrikel Nr. |
|------------|---------|--------------|
|            |         |              |
|            |         |              |
|            |         |              |

## Table of Contents

**Resistance measurement** ..... 2  
    Direct resistance measurement ..... 2  
    Indirect resistance measurement ..... 3

# Resistance measurement

Procedure for resistance measurement:

1. Set the measuring device to resistance measurement.
2. Connect the resistor to be measured to the corresponding sockets on the measuring device (the sockets labelled COM and  $\Omega$ ).
3. Read the measured value.

There are different types of resistance measurement:

- **direct** resistance measurement
- **indirect** resistance measurement

## Direct resistance measurement

Determine the nominal and measured values of the resistance for  $R_{\text{1}}$  (brown, green, orange),  $R_{\text{2}}$  (yellow, violet, red),  $R_{\text{3}}$  (red, violet, red), and the incandescent lamp  $R_{\text{L}}$ . Also measure the approximate resistance  $R_{\text{K}}$  of your body from your right hand to your left hand.

|                | $R_{\text{1}}$ | $R_{\text{2}}$ | $R_{\text{3}}$ | $R_{\text{L}}$ | $R_{\text{K}}$ |
|----------------|----------------|----------------|----------------|----------------|----------------|
| nominal value  |                |                |                |                |                |
| measured value |                |                |                |                |                |

Tab. 1: Direct resistance measurement

How do you explain the deviation between  $R_{\text{L,nominal}}$  and  $R_{\text{L,meas}}$ ?

What consequences can  $R_{\text{K}}$  have?

Now determine the series and parallel combinations of resistors  $R_{\text{1}}$ ,  $R_{\text{2}}$  and  $R_{\text{3}}$ .

State the formulae used:

$$R_{\text{series}} = R_{\text{a}} + R_{\text{b}}$$

$$R_{\text{parallel}} = R_{\text{a}} \parallel R_{\text{b}} = \frac{R_{\text{a}} \cdot R_{\text{b}}}{R_{\text{a}} + R_{\text{b}}}$$

|            | R1+R2 | R1+R3 | R2+R3 | R1    R2 | R1    R3 | R2    R3 |
|------------|-------|-------|-------|----------|----------|----------|
| calculated |       |       |       |          |          |          |
| measured   |       |       |       |          |          |          |

Text is not SVG - cannot display

Tab. 2: Series and parallel combinations

### Indirect resistance measurement

Resistance can also be determined by measuring current and voltage.

**Ohm's law:** In an electrical circuit, the current increases with increasing voltage and decreases with increasing resistance.

$$I = \frac{U}{R}$$

Build the measurement circuit shown in [figure 1](#) for each of the three resistors and set the voltage on the power supply to  $12 \text{ V}$ .

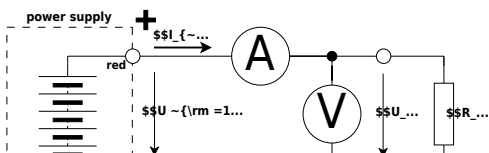
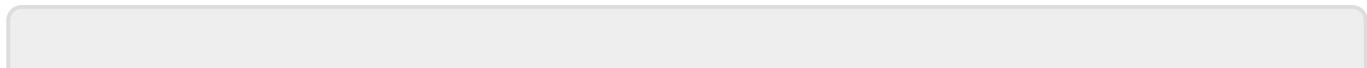


Fig. 1: Indirect resistance measurement

Measure  $U_{\{n\}}$  and  $I_{\{n\}}$ . Calculate  $R_{\{n\}}$  from these values.

| $I_{\{n\}}$ | $U_{\{n\}}$ | $R_{\{n\}}$ | $I_{\{n\}}$ | $U_{\{n\}}$ | $R_{\{n\}}$ | $I_{\{n\}}$ | $U_{\{n\}}$ | $R_{\{n\}}$ |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|             |             |             |             |             |             |             |             |             |

Tab. 3: Indirect resistance measurement



From:  
<https://wiki.mexle.org/> - **MEXLE Wiki**

Permanent link:  
[https://wiki.mexle.org/lab\\_electrical\\_engineering/1\\_resistors/resistance-measurement?rev=1773618589](https://wiki.mexle.org/lab_electrical_engineering/1_resistors/resistance-measurement?rev=1773618589)

Last update: **2026/03/16 00:49**

