

Resistance measurement

Student Group

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Resistance measurement

Procedure for resistance measurement:

- Set the measuring device to resistance measurement
- Connect the resistance to be measured to the corresponding sockets on the measuring device (the measuring device sockets labeled COM and Ω)
- 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_{1} (brown, green, orange), R_{2} (yellow, violet, red), R_{3} (red, violet, red) and the incandescent lamp R_{L} . Also measure the approximate resistance R_{K} of your body from your right to your left hand.

	R_{1}	R_{2}	R_{3}	R_{L}	R_{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_{K} have?

Now determine the series and parallel connections of resistors R_{1} , R_{2} and R_{3} .

Specify the formulas used:

$R_{\text{serial}} =$

$R_{\text{parallel}} (= R_{\text{a}} || R_{\text{b}}) =$

	R_1+R_2	R_1+R_3	R_2+R_3	$R_1 R_2$	$R_1 R_3$	$R_2 R_3$
calculated						
measured						

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Tab. 2: Series and parallel connections

Indirect resistance measurement

The resistances can also be determined by measuring the current/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 measuring circuit shown in [figure 1](#) for each of the three resistors and set the voltage on the power supply to $\sim 12 \text{ V}$.



Fig. 1: Indirect resistance measurement

Measure $U_{\text{r}n}$ [V] and $I_{\text{r}n}$ [mA]. Calculate $R_{\text{r}n}$ [k Ω] from these values.

$I_{\text{r}n}$	$U_{\text{r}n}$	$R_{\text{r}n}$	$I_{\text{r}n}$	$U_{\text{r}n}$	$R_{\text{r}n}$	$I_{\text{r}n}$	$U_{\text{r}n}$	$R_{\text{r}n}$

Tab. 3: Indirect resistance measurement

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Last update: **2026/03/10 03:17**

