

Resistance measurement

Student Group

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Resistance measurement

Procedure for resistance measurement:

1. Set the measuring device to resistance measurement
2. Connect the resistance to be measured to the corresponding sockets on the measuring device (the measuring device sockets labeled COM and Ω)
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_{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:

$R_{\text{serial}} =$

$R_{\text{parallel}} (= R_a || R_b) =$

	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 $U \approx 12 \text{ V}$.



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.

$I_{\text{r}1}$	$U_{\text{r}1}$	$R_{\text{r}1}$	$I_{\text{r}2}$	$U_{\text{r}2}$	$R_{\text{r}2}$	$I_{\text{r}3}$	$U_{\text{r}3}$	$R_{\text{r}3}$

Tab. 3: Indirect resistance measurement

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