

## 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  $\Omega$ )
- 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  $R_{L,nominal}$  and  $R_{L,meas}$ ?

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:

$R_{\text{serial}} =$

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

	R1+R2	R1+R3	R2+R3	R1    R2	R1    R3	R2    R3
calculated						
measured						

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 12 V.



Fig. 1: Indirect resistance measurement

Measure  $U_n$  [V] and  $I_n$  [mA]. Calculate  $R_n$  [kΩ] from these values.



Tab. 3: Indirect resistance measurement

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