

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 resistor to be measured to the corresponding sockets on the measuring device (the sockets labelled 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 $R_{\rm 1}$ (brown, green, orange), $R_{\rm 2}$ (yellow, violet, red), $R_{\rm 3}$ (red, violet, red), and the incandescent lamp $R_{\rm L}$. Also measure the approximate resistance $R_{\rm K}$ of your body from your right hand to your left hand.

	$R_{\rm 1}$	$R_{\rm 2}$	$R_{\rm 3}$	$R_{\rm L}$	$R_{\rm K}$
nominal value					
measured value					

Tab. 1: Direct resistance measurement

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

What consequences can R_K have?

Now determine the series and parallel combinations of resistors R_1 , R_2 and R_3 .
State the formulae used:

$R_{\text{series}} = R_a + R_b$
 $R_{\text{parallel}} = R_a \parallel R_b = \frac{R_a \cdot R_b}{R_a + R_b}$

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

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 V .

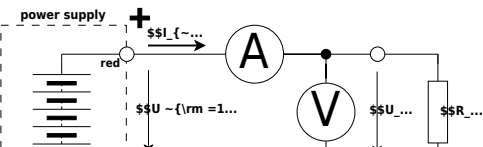


Fig. 1: Indirect resistance measurement

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

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