Resistance measurement

Student Group

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Table of Contents

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 $R_{\rm K}$ have?

Now determine the series and parallel combinations of resistors $R_{\rm 1}$, $R_{\rm 2}$ and $R_{\rm 3}$.
State the formulae used:

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

	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 $12 ~{\rm V}$.

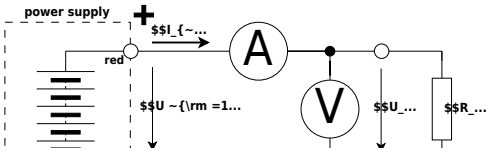

Fig. 1: Indirect resistance measurement

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

$I_{~\rm	$U_{~\rm	$R_{~\rm	$I_{~\rm	$U_{~\rm	$R_{~\rm	$I_{~\rm	$U_{~\rm	$R_{~\rm...

Tab. 3: Indirect resistance measurement