Experiment Procedure:

# Ohm's Law

1. Ensure that the power source is turned off.
2. Construct the circuit by connecting the power source, resistor, and ammeter in series.
3. Connect the voltmeter across the resistor in parallel.
4. Turn on the power source and adjust the output potential to 1V.
5. Increase the output potential from 1V to 5V in increments of 1V.
6. Record the measured current and potential values for each potential.
7. ***Plot and interpret the current-potential (I-V) graph.***
8. ***Calculate the resistance value from the slope of the graph.***
9. ***Determine the margin of error between the experimental and actual resistance values.***
10. Repeat the experiment for the second resistor.

Note: Ensure that the power source is turned off when changing the resistor.

# Connecting Resistors in Series and Parallel

### Series Connected Resistors

1. Ensure that the power source is turned off.
2. Connect two resistors in series and construct the circuit.
3. Turn on the power source and set the output potential to 5V.
4. Measure the current passing through the circuit using the ammeter.
5. Measure the potential across each resistor using the voltmeter.
6. ***Calculate the equivalent resistance and determine the current passing through the circuit and the potential across the resistors.***
7. ***Calculate the margin of error between the measured and calculated values.***

### Parallel Connected Resistors

1. Ensure that the power source is turned off.
2. Connect two resistors in parallel and construct the circuit.
3. Turn on the power source and set the output potential to 5V.
4. Measure the overall current of the circuit using the ammeter and calculate the equivalent resistance.
5. ***Perform theoretical calculations for resistors with known values.***
6. ***Calculate the margin of error by comparing the results.***

**Ohm’s Law:**

|  |  |  |
| --- | --- | --- |
| **Power Source** | **Current (Amperes)** | **Potential (Volt)** |
| 1V | 103.7 | 1.03 |
| 2V | 202.8 | 2.01 |
| 3V | 302.5 | 2.99 |
| 4V | 399.7 | 3.96 |
| 5V | 501.7 | 4.97 |

Req (R1+R2): 9.90 × kΩ

Req (VT/I): 9.90 × kΩ

Margin of Error: 0%

## Resistors in Series:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Current (A)** | **R1 (Ω)** | **R2 (Ω)** | **V1** (𝑰𝑹𝟏) | **V2** (𝑰𝑹𝟐) |
| 413.4 A | 2.2kΩ | 10k Ω | 0.89 | 4.1 |

Req (R1+R2): 12.08 kΩ

Req (VT/I): 12.07 kΩ

Margin of Error: 0.08%

## Resistors in Parallel:

|  |  |  |  |
| --- | --- | --- | --- |
| **R1 (Ω)** | **R2 (Ω)** | **Current (A)** | **Potential (V)** |
| 2.2kΩ | 10 kΩ | 2.84 mA | 5.08 |

Req (calculated): 1.8 kΩ

Req (V/I): 1.79 kΩ

Margin of Error: 0.56%

**DON’T FORGET THE UNITS**