Title: **Resistors** Lab: 1

Course: Electrical Applications Unit: Electrical Lab CLO: 2, 3, 4

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Grade \_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Objectives**

1. Student shall comprehend the various settings of a multimeter.
2. Student shall set up and obtain an accurate measurement of the given resistors values using multimeter.
3. Student shall calculate resistor tolerance and determine the viability of the resistor.

**Assessment**

Students shall demonstrate a comprehension of the objectives listed above by scoring a minimum of 75% on this Lab. Grading shall be based on instructor evaluation.

**Materials**

|  |  |
| --- | --- |
| Student Provided Materials | **Department Provided** |
| 390kΩ resistor |  |
| 22Ω resistor |  |
| 8.2kΩ resistor |  |
| 100kΩ resistor |  |
| 820Ω resistor |  |

**Theory**

When measuring resistance, the component being tested must be isolated from the circuit. It is important to ensure the ohmmeter is connected solely to the item under test and not to anything else. When measuring resistance, start at the highest setting and work toward zero resistance. Each time the range selector is changed, the meter must be “zeroed”. This is accomplished by shorting or placing leads together, then using the zeroing adjustment to move the needle to zero ohms.



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Band 1 | Band 2 | Band 3 | Multiplier | Tolerance |
| 0 Black | 0 Black | 0 Black | 100 Black | +/- 20% None |
| 1 Brown | 1 Brown | 1 Brown | 101 Brown | +/- 10% Silver |
| 2 Red | 2 Red | 2 Red | 102 Red | +/- 5% Gold |
| 3 Orange | 3 Orange | 3 Orange | 103 Orange | +/- 2% Red |
| 4 Yellow | 4 Yellow | 4 Yellow | 104 Yellow | +/- 1% Brown |
| 5 Green | 5 Green | 5 Green | 106 Green |  |
| 6 Blue | 6 Blue | 6 Blue | 107 Blue |  |
| 7 Violet | 7 Violet | 7 Violet | 10-2 Silver |  |
| 8 Grey | 8 Grey | 8 Grey | 10-1 Gold |  |
| 9 White | 9 White | 9 White |  |  |

What is often overlooked is that resistor also have a power rating, expressed in watts (W). In your kit, most if not all the resistors are what we call ¼W which translates to 250mW. The resistor’s ohm value and wattage can be used to determine the maximum current the resistor can handle. More on that calculation later.

**Instructions**

1. Install the black lead in the COMM and the red lead in the Ω ports.
2. Turn the dial on your multimeter to read ohms. (Ask instructor for help)
3. With the leads not touching, what is the reading on the display? \_\_\_\_\_\_\_\_\_\_
4. Using the color code locate a 390kΩ resistor.
5. Being careful not to touch the lead tips or the resistor wire with your fingers, measure the resistance. \_\_\_\_\_\_\_\_\_\_\_\_
6. Is the reading on the meter close to the 390kΩ resistance expected? Yes / No

If you answered “No” above, get instructor assistance.

1. Measure the resistor again, this time making sure your fingertips are touching the lead tips.

\_\_\_\_\_\_\_\_\_\_\_\_

1. Explain the difference between the measured values in steps 5 and 7.

1. Practice measuring resistance by completing the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| Resistor Size | Measured Value | Calculated Tolerance | In/Out of Tolerance |
| 22Ω |  |  | In / Out |
| 8.2kΩ |  |  | In / Out |
| 100kΩ |  |  | In / Out |
| 820Ω |  |  | In / Out |