

Student's name

Instructor's name

Course

Date

Assembling an Electrical Circuit and Measuring a Current in Its Various Parts

Abstract

This report discusses the basic information from the course and online materials that are required to assemble an electric circuit. The focus of this report is made on the technological aspects of the process and the core details that are required to build the simplest electric circuit. Additionally, information in this report features methods of measuring a current in different parts of a circuit with the use of instruments that are available in a laboratory toolkit.

Objectives

- To build a simple series board electric circuit.
- To measure the current in different parts of the circuit with the use of a Digital Multi-Meter.

Background Information about the Main Tools

- A Digital Multi-Meter (DMM) is a tool that is broadly used by engineers for several purposes, which includes testing and measuring electrical values that have voltage, current, and resistance. As you can see, this multitool is highly effective, as it combines

three core testing functions that are required to analyze the quality and stability of a circuit board ("What Is A DMM | Digital Multimeter").

- A project board is a base that is used for the construction of prototypes and various types of electronic devices. The construction of a project board is solderless, so it is reusable, which makes it useful in creating various temporary prototypes and circuit boards in order to experiment with it.

Basic Terminology of Current Electricity

Current electricity refers to a movement of electrons from its source (a battery) along an established path (copper wires). The electricity is carried to an installed electronic device (light bulb) and transforms it into a type of energy that is determined by the powered device. After the electricity passes through the electronic device, it returns to the battery and forms a cycle that continues until the circle is broken by the use of a knife switch.

There are several essential parts of any electronic circuit:

- The source of electrons to power the circuit
- A switch that is used to control the flow of electrons in the closed system
- Routes that allow electrons to move from the energy source to the device
- A device, or several devices, that turn electrons into a different form of energy

There are two types of connections in electric circuits:

- A series circuit that is characterized by a single path from the energy source to the device and then back to the source again

- A parallel circuit that is characterized by separate paths to each of the connected devices. Therefore, each device has its own mini-circuit. This type is more efficient because it allows the electrons to maintain flow even if one of the devices becomes unusable, although it is more complex when it comes to the assembly process.

Components Required to Build a Circuit Board

- ✓ Project board
- ✓ Copper wires
- ✓ Lamp holders
- ✓ Light bulbs that fit into lamp holders
- ✓ Battery receptacle that fits two type-D batteries
- ✓ Two type-D batteries
- ✓ A knife switch

Assembly Process for a Series Circuit

The first step is to space out the components of a future circuit board, which include a knife switch, lamp holders, and a battery receptacle. For the purpose of convenience, it is advisable to place lamp holders at the same distance from each other in order to comfortably attach the wires later. Now, it is possible to attach the components to the project board with the use of screws and a screwdriver. The next step is to expose the ends of the copper wires with the employment of wire strippers that are available in a laboratory toolkit. It is important to expose enough of the wire in order to be able to wrap it around the required parts of the details later.

With everything attached to the board, it is possible to begin wiring all the components. The negative terminal of the battery has to be attached to one of the bulbs of a switch while the second wire should be connected to the second light bulb. The next step is to connect the second and first light bulbs by using another wire. The last step is to attach the first light bulb to the knife switch. As a result, it is possible to create a series electric circuit with a single path for the electrons to move along.

The Process of Measuring the Current in a Series Electric Circuit

In the case of a series electric circuit, the process of measuring the current is easy, especially with the use of DMM. First of all, it is required to know that a typical DMM consists of the device itself and two cables with probe tips on one side and banana jacks on another. Therefore, the first step is to plug the banana jacks into the DMM. The second step is to turn on the knife switch in order to begin the flow of electrons through the system. The third step is to carefully place each of the probe tips to each side of the light bulb, and the device will show the current (Mano). Finally, because of the fact that a series electric circuit has a single flow of electrons, the current will remain the same at every point of the connection (Mano). Due to the fact that D-type batteries have 3 volts (V) and the power of both light bulbs equals 2 watts (W), the current in the system is only 0.66 amps (A).

Works Cited

Mano, Carlos. "How To Find Voltage & Current Across A Circuit In Series & In Parallel".

Sciencing, 2017, <https://sciencing.com/voltage-across-circuit-series-parallel-8549523.html>. Accessed 7 Aug 2018.

"What Is A DMM | Digital Multimeter." *Electronics Notes*, 2018, <https://www.electronics-notes.com/articles/test-methods/meters/dmm-digital-multimeter.php>. Accessed 7 Aug 2018.