

Voltage and Current

1. In order to be able to measure the movement of electrons along a conductor, it is necessary to have units of measurement. This is somewhat difficult since you cannot see, taste, smell, or hear electricity. Feeling it is possible, but dangerous. This means that some way must be devised to be able to detect its presence, its direction of flow, and its magnitude. Before you can measure amount, you must have some type of unit to measure electricity in.

VOLTS

2. We measure the difference of potential between two plates in a battery in terms of volts (V). It is actually *electric pressure* exerted on electrons in a circuit. A circuit is a pathway for the movement of electrons. An external force exerted on electrons to make them flow through a conductor is known as *electromotive force*, or emf. It is measured in volts. Electric pressure, potential difference, and emf mean the same thing. The words *voltage drop* and *potential drop* can be interchanged.

CURRENT

3. For electrons to move in a particular direction, it is necessary for a potential difference to exist between two points of the emf source. If 6,250,000,000,000,000 electrons pass a given point in one second, there is said to be one ampere (A) of current flowing. The same number of electrons stored on an object (a static charge) and not moving is called a *coulomb* (C).

As mentioned above, current is measured in amperes. However, in electronics it is sometimes necessary to use smaller units of measurement.

The *milliampere* is abbreviated as mA. It is one-thousand (0.001) of an ampere.

The *microampere* is abbreviated as μA . It is one-millionth (0.000001) of an ampere.

Note the Greek letter *mu* (μ) is used for micro.

4. Current flow is assumed to be from negative (–) to positive (+) in our explanations here.

Electron flow is negative (–) to positive (+), and we assume that current flow and electron flow are one and the same. It makes explanations simpler as we progress into electronics.

The *conventional* current flow is the opposite or positive (+) to negative (–).

An ammeter is used to measure current flow in a circuit. A milliammeter is used to measure smaller amounts, while the microammeter is used to measure very small amounts of current.

A voltmeter is used to measure voltage. In some instances it is possible to obtain a meter which will measure both voltage and current plus resistance. This is called a *multimeter*, or *volt-ohm-milliammeter* (VOM).

(from Electronics, “*The Easy Way*” - Barron’s pagg.10, 11)

a. Here are some answers, ask the questions:

1. We need them to measure the movement of electrons along a conductor.

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2. It’s a pathway for the movement of electrons.

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3. They mean the same thing.

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4. It’s the electrical pressure needed to push electrons along a conductor.

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5. It's measured in amperes.

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6. It flows from positive (+) to negative (-).

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b. Match each words in column A with its definition in column B:

A	B
1. volt	a. An electric current meter calibrated in milliamperes.
2. ammeter	b. An instrument for measuring the electrical potential in volts between two points in a circuit.
3. milliammeter	c. A meter having a scale that reads in micro-ammeter, for measuring extremely small currents.
4. microammeter	d. An instrument for measuring the strength of an electric current in units of amperes, milliamperes or microamperes.
5. voltmeter	e. An instrument for measuring current, potential difference and resistance and used for testing and fault-finding in the design and use of electronic circuits.
6. multimeter	f. The unit of electrical potential difference that causes a current of one ampere to flow through a resistance of one ohm.

c. Match these words with synonyms from the text:

- hard (par. 1)
- to locate (par. 1)
- exchanged (par. 2)
- required (par. 3)
- nevertheless, though (par. 3)
- believe, presume (par. 4)
- move on (par. 4)
- cases (par. 4)