

Chapter 1

Electricals and Electronics



Learning Objectives

1. Understand electricity and electricity generation.
2. Measure electrical potential or pressure in volts, rate of electricity flow in Amperes and the level of resistance to the electricity flow in ohms.

Electricity



Electricity is the flow of electrons. All matter is made up of atoms, and an atom has a centre, called the nucleus. The nucleus contains positively charged particles called protons and neutral particles called neutrons. The nucleus of an atom is surrounded by negatively charged particles called electrons.

Electricity Generation



Most Electricity is generated with steam turbines using fossil fuels, nuclear energy, biomass and solar thermal energy. Other major electricity generation technologies include gas turbines, hydro turbines, water and wind turbines and solar powered photo voltaic cells. Electricity is produced inside an electric power plant using some kind of fuel source, such as coal, oil, natural gas or nuclear energy that produces heat. The heat is used to boil water to create steam. The steam under high pressure is used to spin a turbine.

Generators are machines for converting motion energy into electricity. The three most basic components of electricity are Voltage, Ampere and Resistance.

Voltage difference is the amount of potential energy difference between two points in a circuit. One point has more charge pressure than the another. This difference in charge pressure between the two points is called **voltage difference** (V).

⚡ If we know the total current and the voltage across the whole circuit, we can find the total resistance in ohms.

⚡ If the voltage difference is increased, the current will increase provided that the resistance of the circuit has not been changed.

An ampere (A) is the unit used to measure electric current. Current is a count of the number of electrons flowing through a circuit. One ampere is the amount of current produced by a force of one volt acting across a resistance of one ohm. Current is usually denoted by the symbol (I). Ohm's law relates the current flowing through a conductor to the voltage V and the resistance R; that is $V=IR$.

$$V = IR$$

Voltage is the difference in charge pressure between two points, while **current** is the rate at which charges are flowing. Resistance is a materials' tendency to resist the rate of flow of charges (current).

Electrical and electronic circuitry



A circuit diagram shows all of the components' connecting points in their relative positions, and the conductors used to connect the components.

The importance of a circuit diagram is that it allows for easy and accurate positioning of the required components.

Symbols used in circuits diagrams are pictograms used to represent various electrical and electronic devices such as wires, batteries, switches, and other components.

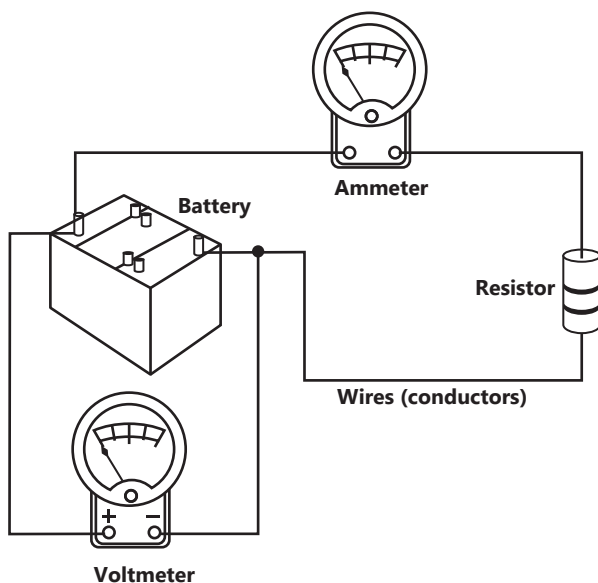


Figure 1.1

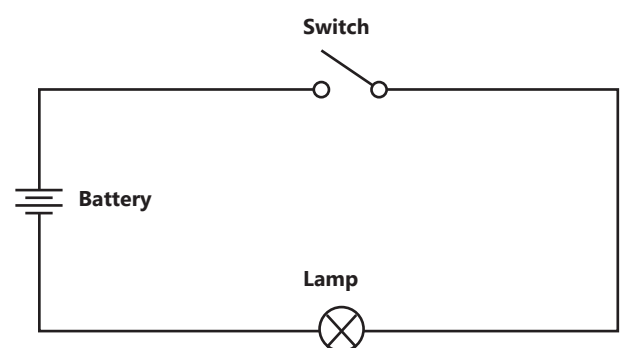


Figure 1.2

Chapter 2

Electrical Technology



Learning Objectives

1. Identify house wiring accessories.
2. Constructing an extension power cord assembly.

House wiring accessories



Plug base



Single Switch



Gang switch



Lamp holder



Ceiling rose



Sunk box

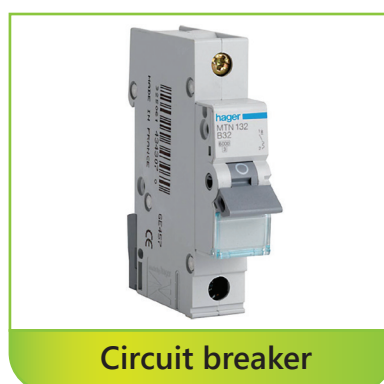


Figure 2.1 House wiring accessories.