

...cont'd

Work (or energy)

Because electricity is a form of energy, this energy is measured using the standard unit of work or energy, the *joule* (J).

Power

The unit of power is the *watt* (W), and the symbol for power is P. One watt is equal to one joule per second and is calculated by:

$$\text{power } (P) = W/t \quad \text{therefore, energy } (W) = Pt$$

(Where W is energy or the work done in joules, P is the power in watts and t is the time in seconds.)

Charge

The unit of charge is the *coulomb* (C), and the symbol for charge is Q. One coulomb is equal to one ampere second:

$$\text{charge } (Q) = It$$

(Where Q is the charge in coulombs, I is the current in amperes, and t is the time in seconds.)

Electrical potential (and emf)

The difference in potential between two points in a conductor or electric circuit is called *electrical potential*. A change in that electrical potential is called a *potential difference*. The unit of electrical potential is the *volt* (V), and the symbol is V. One volt is equal to one joule per coulomb. Voltage is calculated as follows:

$$\text{volts } (V) = P/I \quad \text{therefore, power } (P) = IV$$

(Where V is the voltage in volts, P is the power in watts, and I is the current in amperes.)

Electromotive force (emf), symbol E, is also measured in volts.

Resistance

Opposition to the flow of electrical current is called *resistance*. Its unit is the *ohm* (Ω), and the symbol for electrical resistance is R. As one ohm equals one volt per ampere, resistance is calculated by:

$$\text{resistance } (R) = V/I \quad \text{therefore, } V = IR \text{ and } I = V/R$$

(Where R is the resistance in ohms, V is the potential difference in volts across the resistance and I is the current in amperes flowing through the resistance. The above is called *Ohm's law*.)



You may remember Ohm's law from school. Although you probably thought you would never use it, it will now be very handy for simple calculations you may have to make – for example, establishing the current drawn by a circuit you have built so you can protect it with the correct value fuse.



Try not to become confused by all the symbols and abbreviations used. Take some time to study these few pages and all will become clearer later.