

AMPERE

The ampere (symbol: A) is the SI base unit of electric current equal to one coulomb per second. It is named after André-Marie Ampère, one of the main discoverers of electromagnetism.

Definition

The ampere is that constant current which, if maintained in two straight parallel conductors of infinite length, of negligible circular cross-section, and placed 1 metre apart in vacuum, would produce between these conductors a force equal to 2×10^{-7} newton per metre of length.

Explanation

Because it is a base unit, the definition of the ampere is not tied to any other electrical unit. The definition for the ampere is equivalent to fixing a value of the permeability of vacuum to $\mu_0 = 4\pi \times 10^{-7}$ H/m. Prior to 1948, the so-called "international ampere" was used, defined in terms of the electrolytic deposition rate of silver. The older unit is equal to 0.999 85 A.

The ampere is most accurately realised using an ampere balance, but is in practice maintained via Ohm's Law from the units of voltage and resistance, the volt and the ohm, since the latter two can be tied to physical phenomena that are relatively easy to reproduce, the Josephson junction and the quantum Hall effect, respectively.

The unit of electric charge, the coulomb, is defined in terms of the ampere: one coulomb is the amount of electric charge (formerly quantity of electricity) carried in a

current of one ampere flowing for one second. Current (electricity), then, is the rate at which charge flows through a wire or surface. One ampere of current (I) is equal to a flow of one coulomb of charge (Q) per second of time (t):

$$I = Q/t$$

Since a coulomb is approximately equal to 6.24×10^{18} elementary charges, one ampere is equivalent to 6.24×10^{18} elementary charges, such as electrons, moving through a surface in one second. More precisely, using the SI definitions for the conventional values of the Josephson constant and von Klitzing constants, the ampere can be defined as exactly $6.241\,509\,629\,152\,65 \times 10^{18}$ elementary charges per second.

Source : <http://engineering.wikia.com/wiki/Ampere>