

D.C INTO A.C

The energy stored in a battery is dispensed in the form of *direct current*, (D.C) which flows in one direction only, from the negative terminal, through the wiring system and appliances and finally to the positive terminal. The vast majority of modern electrical appliances operate on *alternating current*, (A.C) which, as it's name suggests, alternates in polarity and direction of flow at regular intervals, normally fifty times per second. (50Hz) One complete cycle of A.C is shown in figure 7.1. This example is a *sine wave*, as produced by a power stations alternators, a naturally occurring phenomenon, which is the result of interaction between stationary and rotating magnetic fields.

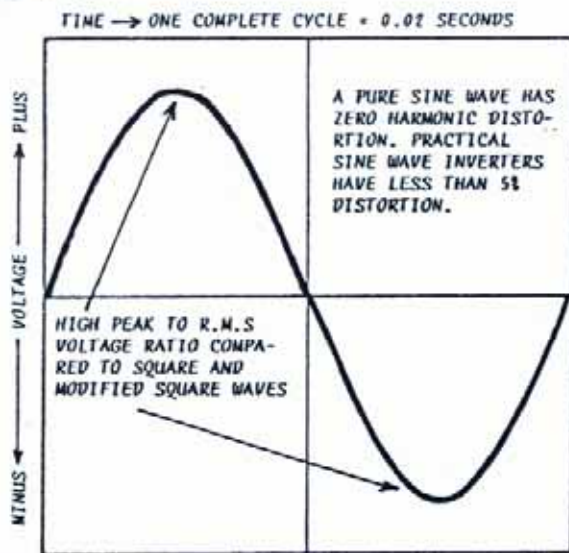


Fig 7.1 Sine wave

Naturally occurring logarithmic wave form, suitable for use with all A.C appliances for optimum performance..

A pure sine wave would have zero harmonic distortion, however, this can only be achieved with laboratory instruments and electronic music synthesisers. It is interesting to note that a 50 Hz tone is just within the range of audibility, perceived as a very deep bass sound. In practice, distortion figures of less than 5% are typical with modern sine wave inverters and this is generally superior to the quality of power supplied by the utility company and engine driven generators.

Other types of A.C waveforms can be produced; for example, the *square wave* in figure 7.2 and it's derivative, the *modified*

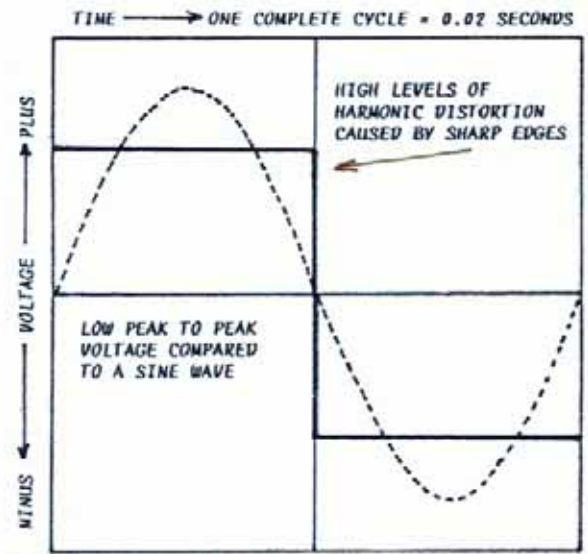


Fig 7.2 Square wave

This type of wave form is practically obsolete, apart from mini types built into low voltage fluorescent lamps.

square wave in figure 7.3. There are some important differences between these wave forms which can produce degraded and unsatisfactory performance with certain appliances. The true sine wave in fig 7.1 has a high peak to average voltage ratio compared to square and modified square waves. A *true sine wave* is the perfect wave form to operate electric motors, driving all forms of rotating electrical machinery, because a sine wave is itself the natural product of a rotating magnetic field, as in an alternator.

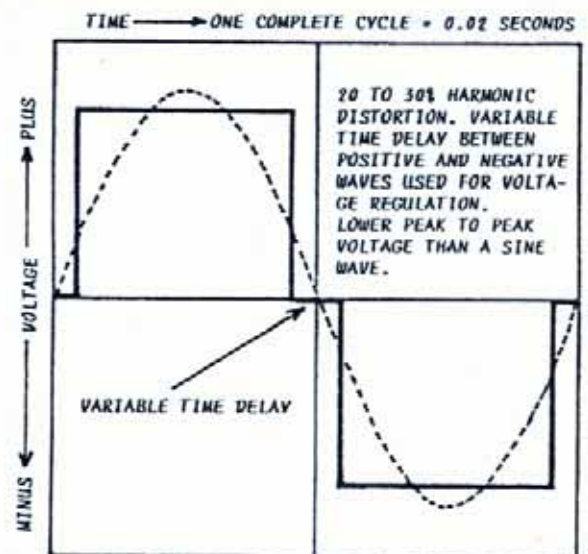


Fig 7.3 Modified square wave

Obtained by introducing a small time delay between the positive and negative halves of a square wave.