

Test Equipment

An electric current is the ordered movement of electrons through the conductor. When a bulb is connected to a battery, a current flows through the bulb and causes it to light up. The more electrons that flow through the bulb, the higher the current. An instrument called an ammeter is used to measure the current.

●Moving Coil Meter

Until a few years ago, most measurements in electronics were undertaken with MOVING COIL meters. A rectangular coil wound onto a soft iron core, is mounted on a shaft which is free to rotate between the poles of a permanent magnet. Attached to the shaft is a pointer which moves as the coil rotates.

If current passes through the coil, a magnetic field is produced which interacts with the permanent magnet field, tending to turn the coil/shaft combination, in the same way that the shaft of a motor rotates. If the current through the coil is direct and constant, the coil rotates. Until the force tending to turn it equals the force of the spring tending to push it back, at which point the coil is stationary. A larger current thus turns the coil further, a small current turns the coil less.

A moving coil meter may be used to measure electrical current. It may equally be used to measure the other main electrical quality - Voltage.

●AC Measurement The moving coil meter we have described is only capable of indicating direct current and voltages. An alternating current (AC) voltage will attempt to make the coil rotate first in one direction then the other. A full wave bridge rectifier may be used to rectify the alternating current to be measured to DC.

●Multimeters Certain types of meters exist which allow a user to measure a variety of voltages, currents and resistances simply by selecting a range required, on a switch mechanism. Such meters are called MULTIMETERS.

●Digital Meters A different type of multimeter, based on an entirely different principle to the moving coil analogue meter, is the DIGITAL MULTIMETER. In a digital multimeter, the voltage, current or resistance measurement is indicated in digital form as a numerical read-out.

●Oscilloscopes An OSCILLOSCOPE is a device which can display a visual representation of a waveform. It may be used to show waveforms of voltage signals present in electronic circuits and is useful as an item of test equipment in design, production and servicing of all kinds of electrical equipment. For example, a television engineer may use an oscilloscope to check the voltage signal waveforms present in a faulty television. By comparing those actually found with the waveforms which should be present, the engineer may be able to isolate and repair the fault.

The waveform displayed by the oscilloscope is a representation of the actual electrical signal producing the waveform, and can be measured on the display. In this respect, the oscilloscope is used as a form of multimeter. However, it is far more versatile than this especially for testing high frequencies.