

Electrical Circuit Lab Equipment's

1. Cathode ray oscilloscope CRO

The CRO displays the amplitude of the electrical signals, on screen, as a function of time. The horizontal axis of the CRO is deflected at a constant time rate, while the vertical axis is deflected in response to the amplitude of an input signal. The heart of the oscilloscope is the cathode ray tube (CRT). The CRT generates an electron beam, accelerates the beam to high velocity, and deflects it to create the image. The oscilloscope has a time base generator which supplies the correct voltage to the CRT to deflect the beam (a spot on the screen) horizontally, at a constant time rate. The signal under study is fed to the vertical amplifier, to increase its amplitude, and then to the CRT to deflect the beam vertically. To synchronize the horizontal and vertical deflections, a triggering circuit is used.



2. Function Generator FG

The function generator is an instrument that delivers a choice of different waveforms, with adjustable frequency over a wide range. The most common waveforms are: sine, triangle and square. The value of the current is controlled by the frequency control circuit, the constant current is fed to an integration circuit, the output of which is a triangular signal. A comparator uses the triangular wave to supply a sine wave. While the sine shaping circuit converts the triangular wave into a sinusoidal signal. Through a selector the amplifier provides the output signal.



3. Power Supply PS

The DC power supply is used to generate a constant voltage (CV) or a constant current (CI). That is, it may be used as a DC voltage source or as a DC current to drive the circuit under test. The unit in the lab has two supplies: output 1 and output 2. Both outputs are variable voltage/current supplies. The variable supplies can be used independently to achieve positive or negative output.



4. Digital Multimeter DMM



This device is used to measure values of electrical quantities; such as voltage, current, resistance, etc. The DMM is easy to use, and necessary for all electronics labs.

Voltage Measurement

Turn on the Multi-meter. Using the rotary selector switch, select the voltage function [VDC]. Select the *AUTO* range mode by making a long press on the *range* button. Insert the positive (+) lead (normally red) in the voltage socket and the negative (-) lead (normally black) in the common socket. Place the red probe on the higher voltage point and the black probe on the lower voltage point. The DMM will display the voltage drop between the probe tips. Voltage Measurement between any two points is made in parallel with the components between those two points. If the probes are reversed the reading will be negative of the original value. A Voltmeter has very large internal resistance, which is considered as open circuit (O.C.) during calculations.

Current Measurement

Turn on the DMM and select the current function. Place the positive (+) probe in the current socket and the negative (-) one in the common socket. Select *AUTO* range mode. Connect the tips of the probes in series with the component through which the current is being measured. A positive reading will indicate current direction from the positive (+) to the negative (-) probes.

Electrical Lab Circuit Experiments

- 1. Lab. Equipment Familiarization**
- 2. Measurement on DC Circuit**
- 3. Techniques of Circuit Analysis (1)**
- 4. Techniques of Circuit Analysis (2)**
- 5. The Function Generator & Oscilloscope.**
- 6. Step Response of AC Circuits.**
- 7. Basic Laws on AC Circuits.**
- 8. Complex Power and Power Factor**