



Electronic Instrumentation

DIGITAL MULTIMETER

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DIGITAL Multimeter

- ▶ It is an instrument which measures AC and DC voltages, AC and DC currents and resistances over a wide range
- ▶ The name digital indicates that the device has a digital or LCD output
- ▶ The multimeter indicates that a single device can be used for multi purpose measurement

Digital multimeter



Ammeter– currents
Voltmeter–Voltage
Ohmmeter–Resistance



Parts

- ▶ Display screen– It has illuminated display screen for better visualisation
- ▶ Five digits
 1. One is for sign value
 2. Four for number representation

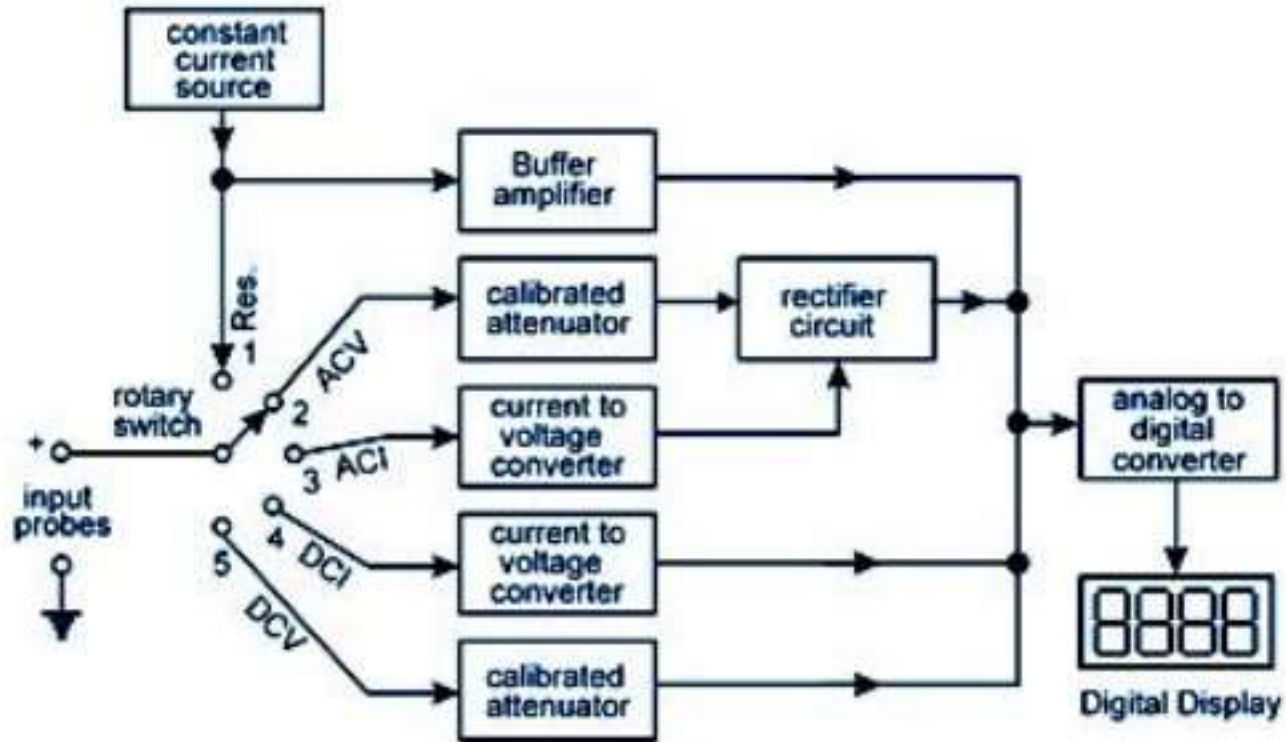
Selection knob

- ▶ As the multimeter is used for several measurements like voltage, current, resistance It is used for selection of different measurements by choosing
- ▶ Port –
 1. mA, V, Ohm (Red probe)
 2. Common port (Black probe)

10A port– it is a current port

- ▶ Current is measured (greater than 10A)

Block diagram



DMM

Parts....

- 1) Resistance
- 2) ACV (Alternating voltage)
- 3) ACI(Alternating current)
- 4) DCI(direct current
- 5) DCV(Direct voltage

Digital multimeter

- ▶ The current is converted into voltage by passing it through low shunt resistance
- ▶ The AC quantities are converted into DC quantities by employing various rectifier and filtering circuits
- ▶ The resistance measurement consists of a low current source that is applied across an unknown resistance

Applications – Voltage measurement

- ▶ For measurement of AC voltage, the input voltage is fed through a calibrated and compensated attenuator to a precision full wave rectifier followed by a ripple reduction filter.
- ▶ For AC voltage measurements—Attenuator, fullwave rectifier and ripple reduction filter, A/D converter

Measurement of current

- ▶ For current measurements, the voltage drop across an internal calibrated shunt is measured directly by the ADC in the DC current mode and after AC to DC conversion in the AC current mode
- ▶ Resistance voltage drop($I=V/R$)

Measurement of Resistance

- ▶ Digital multimeter measures the voltage across the externally connected resistance, resulting from a current forced through it from a calibrated current source

Thank you