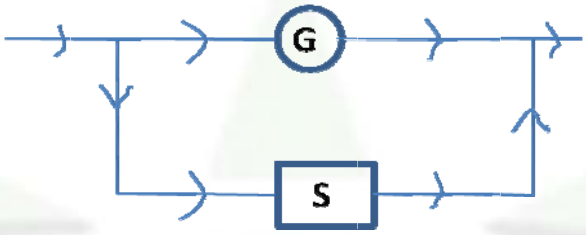
Ammeter

Ammeter: Ammeter is an instrument mainly used to measure current.

A galvanometer can be converted into Ammeter by connecting low resistance in parallel with the coil of the galvanometer which can be explained with the following example.

When a low resistance is connected in parallel to a coil it is known as shunt. A shunt is generally connected to protect a galvanometer from heavy current flowing through it. We find the current through the galvanometer and the shunt.



Given: i = the current flowing through the circuit

G & S = the resistance of the galvanometer coil and shunt respectively

Let R be the equivalent resistance between the points A & B

$$\frac{1}{R}=\frac{1}{G}+\frac{1}{S}$$

$$S=\frac{GS}{G+S}$$

Potential difference between the points A & B: $V_{AB}=IR=I\frac{GS}{S+G}\rightarrow(1)$

Let I_G & I_S be the current flowing through the galvanometer and shunt respectively.

$\therefore$ The potential difference accross the galvanometer = Potential difference accross AB

$$I_G G=I\frac{GS}{S+G}\quad\therefore I_G=\frac{IS}{S+G}\rightarrow(2)$$

The P.D across the shunt = P.D across the points A & B

$$I_S S=I\frac{GS}{S+G}\quad\therefore I_S=\frac{IG}{S+G}\rightarrow(3)$$

A galvanometer coil has a resistance of 50Ω and gives a full scale deflection with 10 mA current covert it into an ammeter to give a full scale deflection when 10 amp current flows through it.

Given: $I=10\,\text{amp}, G=50\Omega, i_g=10^{-2}\,amp, S=?$

$$i_g=\frac{IS}{G+S}$$

$$S=0.5\Omega$$

A shunt of 0.05Ω should be connected in parallel to the galvanometer coil to give full scale deflection with 10 amp current