$$\text{Or, } I = \frac{k\emptyset}{BNA}$$
$$\therefore I = G\emptyset$$

Where $G = \frac{k}{BNA}$ is constant and known as galvanometer constant.

Current sensitivity:

It is defined as the deflection per unit current.

We have, $BINA = k\emptyset$

$$\text{Or, } \frac{\emptyset}{I} = \frac{BNA}{K}$$

Current Sensitivity $(S_I) = \frac{BNA}{K}$

We can increase the current sensitivity by increasing B, N and A. Also by using material having less torsion constant.

Voltage sensitivity:

It is defined as the deflection per unit potential difference.

We have, $BINA = k\emptyset$

$$\text{Or, } \frac{\emptyset}{V} = \frac{BINA}{VK}$$
$$\text{Or, } \frac{\emptyset}{V} = \frac{BINA}{IRK}$$
$$\text{Or, } \frac{\emptyset}{V} = \frac{BNA}{RK}$$

Voltage Sensitivity $(S_v) = \frac{BNA}{KR}$

$\therefore$ Voltage sensitivity can be increased by increasing B, N and A, or by decreasing the R and by using material with less k.

Hall Effect: (Edwin Hall-1879)

Application:

- **Measuring the drift velocity of charge carriers**
- **Detecting nature of majority charge carriers in semiconductor**
- **Concentration of charge carriers (Semiconductor)**
- **Hall Probe (Hall effect sensor)**

It is well established fact that, a beam of electrons projected in vacuum can be deflected by externally applied magnetic field. This kind of deflection by the externally applied magnetic field is possible also for the drifting conduction electron in wire.

The phenomenon of production of transverse voltage in a current carrying metallic slab on applying a magnetic field along a direction perpendicular to the direction of current is called Hall Effect. The transverse voltage produced in this effect is called Hall Voltage.

Consider a copper strip of width $'d'$ and thickness $'t'$ carrying current $'I'$. The charge carriers in such conductors are electrons and hence these drift in the direction opposite to current. Let this copper strip is placed in uniform magnetic field $'B'$ that is perpendicularly to plane of paper. Due to this magnetic field $'B'$ the moving electron experience a force known as Lorentz force.