## Answer on question #52306, Physics, Electromagnetism

**Question** A galvanometer of resistance 120 Ohm a full scale deflection with a current of 0.0005A. How would you convert it to an ammeter that reads a maximum current of 5A?

**Solution** Since galvanometer is a very sensitive instrument therefore it cant measure heavy currents. In order to convert a galvanometer into an ammeter, a very low resistance known as "shunt" resistance is connected in parallel to galvanometer. Value of shunt is so adjusted that most of the current passes through the shunt. In this way a galvanometer is converted into ammeter and can measure heavy currents without fully deflected.

Let resistance of galvanometer is  $R_g = 120\Omega$  and it gives full-scale deflection when current  $I_g = 0.0005$  A is passed through it. Then,

$$V_g = I_g R_g$$

Let a shunt of resistance  $(R_s)$  is connected in parallel to galvanometer. If total current through the circuit is I = 5 A, then current through shunt:

$$I_s = I - I_R$$

and potential difference across the shunt:

$$V_s = I_s R_s = (I - I_g) R_s$$

But

$$V_s = V_g$$
$$(I - I_g)R_s = I_g R_g$$

and finally

$$R_s = \frac{I_s}{I - I_s} R_g = \frac{0.0005}{5 - 0005} 120 \approx 0.012\Omega$$

Answer is: you have connect in parallel 0.012 Ohm shunt.