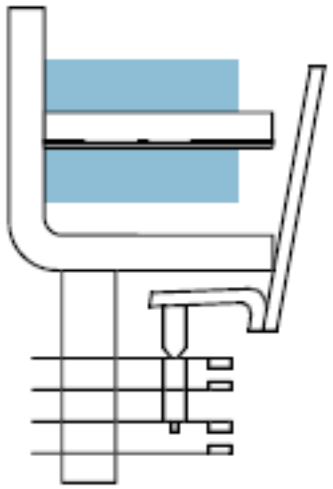
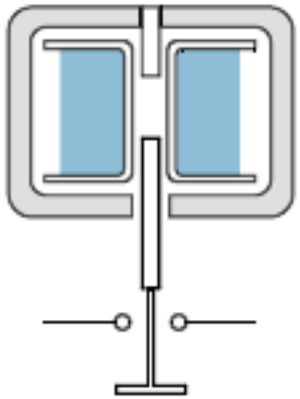
Electromagnetic, attracted and induction type relays

Attracted armature relay

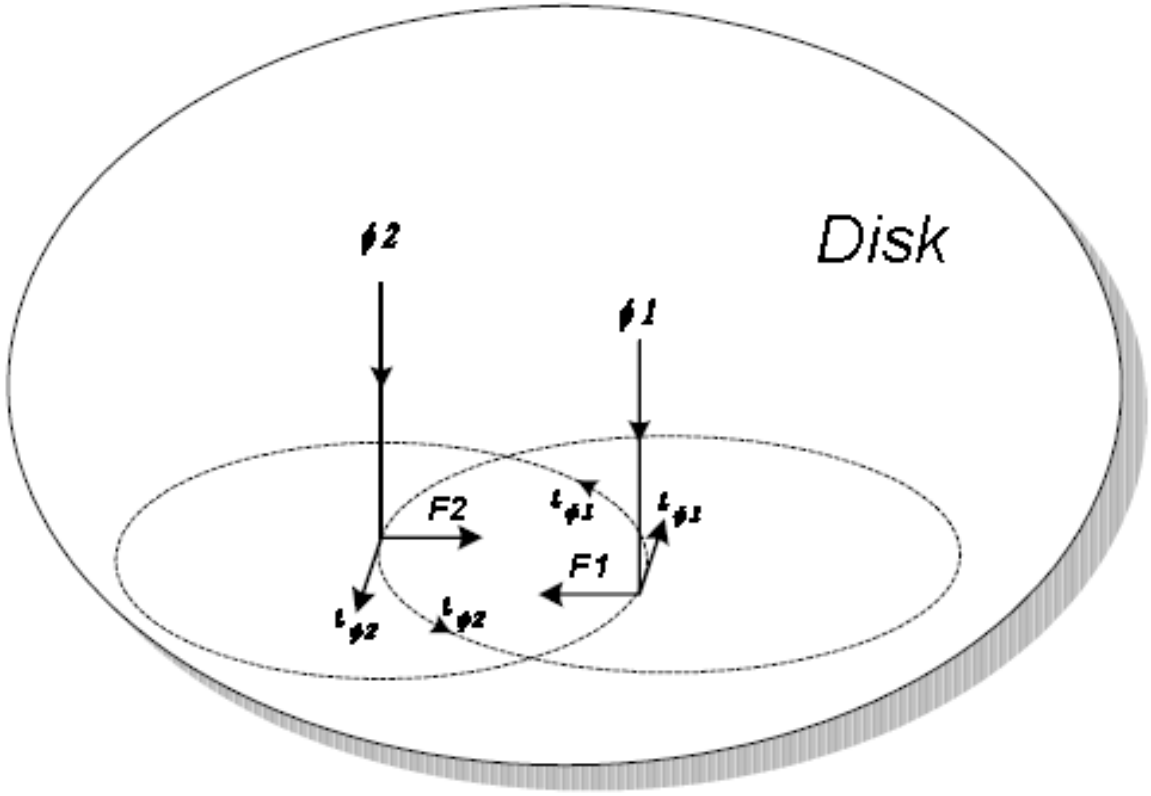


(a) D.C. relay



(c) Solenoid relay

Torque production in induction type relay



Induced Currents and Forces Resulting From Two Flux Paths on a Metallic Disk

$$\phi 1 = \Phi 1_M \sin(\omega t)$$

$$\phi 2 = \Phi 2_M \sin(\omega t + \theta)$$

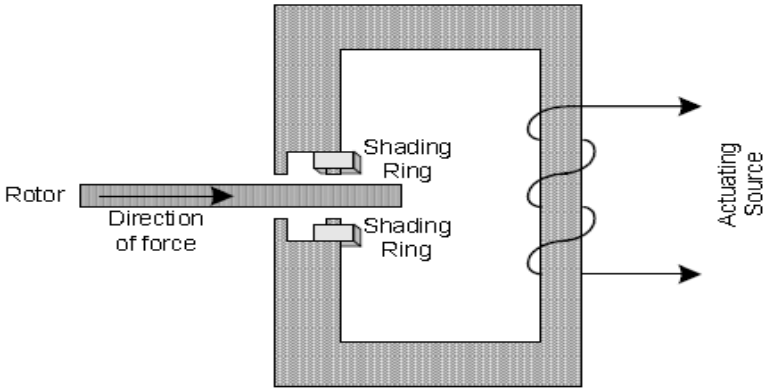
$$i_{\phi 1} \propto \frac{d\phi 1}{dt} \propto \Phi 1_M \cos(\omega t)$$

$$i_{\phi 2} \propto \frac{d\phi 2}{dt} \propto \Phi 2_M \cos(\omega t + \theta)$$

$$F = F2 - F1 \propto \left(\phi 2 \cdot i_{\phi 1} - \phi 1 \cdot i_{\phi 2} \right)$$

$$F \propto \Phi 1_M \Phi 2_M \left[\sin(\omega t + \theta)\cos(\omega t) - \cos(\omega t + \theta)\sin(\omega t) \right]$$

$$F \propto \Phi 1_M \Phi 2_M \sin(\theta)$$



Shaded-Pole Induction Disk

$$\theta_2 - \theta_1 = \frac{\tau_s}{K_d}\left(\left(\frac{I}{I_p}\right)^2 - 1\right)(t_2 - t_1)$$

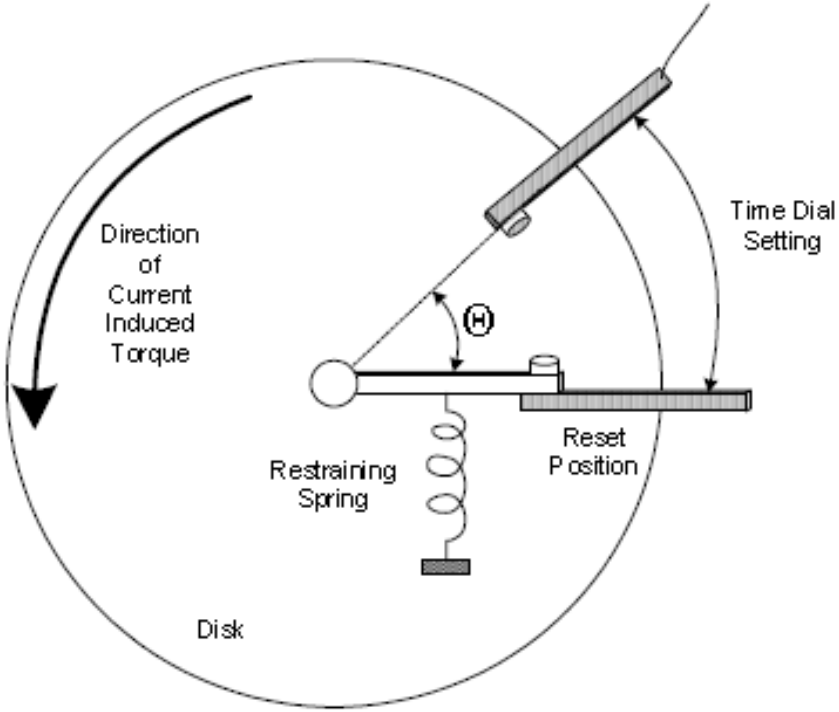


Diagram of Induction Disk Relay

Induction Disk type O/C Relay