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FACULTY OF ENGINEERING & TECHNOLOGY

Electrical Machine-1

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Need of starter

The general motor emf equation is:

$$E = E_b + I_a \cdot R_a$$

Where E =Supply Voltage; E_b =Back EMF; I_a =Armature Current; and R_a =Armature Resistance. Since at starting $E_b = 0$, then $E = I_a \cdot R_a$. Hence we can rearrange for the armature current I_a :

$$\therefore I_a = \frac{E}{R_a}$$

We can see from the above equation that the current will be dangerously high at starting (as the armature resistance R_a is small). This is why it's important that we make use of a device like the 3 point starter to limit the starting current to acceptably low value.

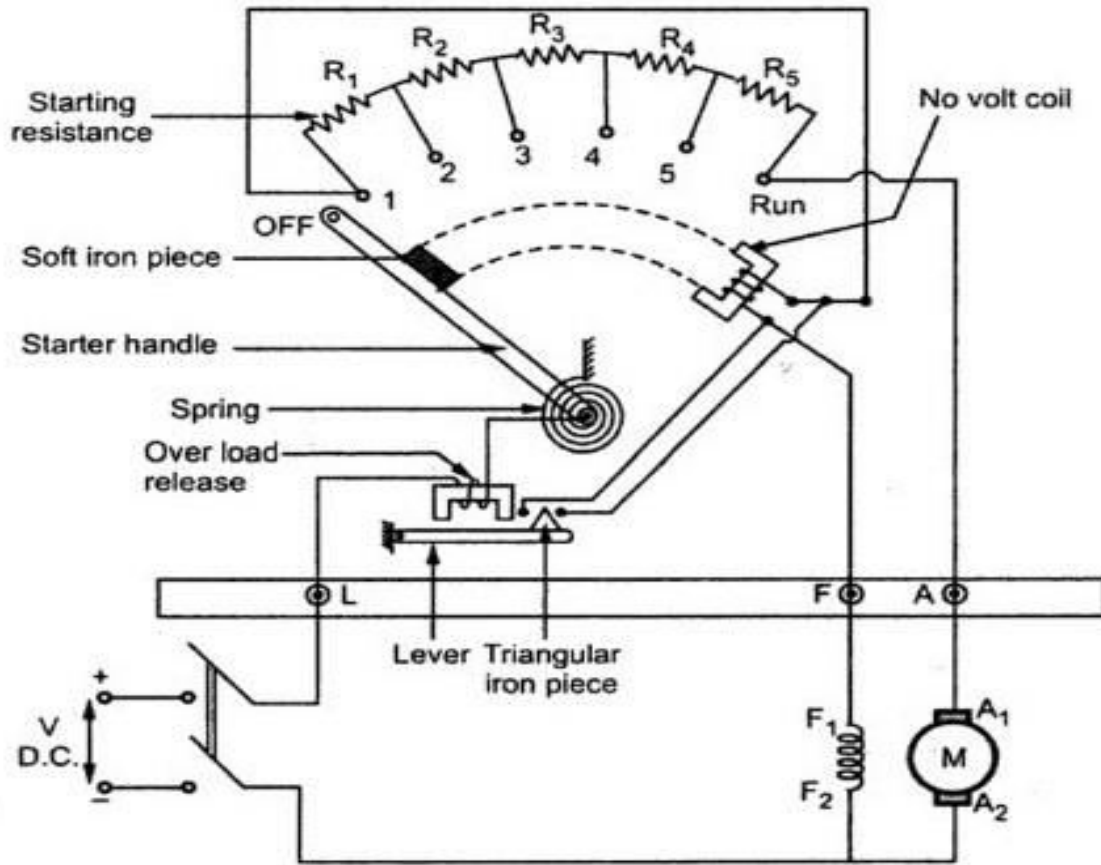
Working off a Three-Point Starter



The handle of the 3 point starter can be moved from one stud to another stud (contact positions), and this increases the speed of the motor till gets the RUN position. There are three main points are considered in this position which includes the following.

The H-handle in the circuit is held in RUN condition with an electromagnet strengthened by an NVC (no volt trip coil). This NVC coil can be coupled in series with the motor field winding. In the incident turned OFF or dropped below a fixed value, then the NVC will get energized. By the act of S-spring, the handle-H is released as well as pulled back to the OFF condition.

DC MACHINES



3 Point Starter Circuit Diagram