

Power Factor

Methods of Improving Power Factor:

- Normally the power factor of the system ranges between 0.8 to 0.9, however in case of low P.F. there is a need of improving power factor.
- There are three main methods used to improve the power factor of the system:
 - i. Static Capacitor
 - ii. Phase Advancer
 - iii. Synchronous Condenser

i) Static Capacitor

- The power factor can be improved by connecting capacitors in parallel with the equipment operating at lagging power factor.
- The capacitor (Generally known as static capacitor) draws a leading current and partly or completely neutralizes the lagging reactive component of load current. This rises the power factor of load.

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- For three-phase loads, the capacitors can be connected in delta or star as shown in below fig.
- Static capacitors are invariably used for power factor improvement in factories.

Advantages:

- i. They have low losses.
- ii. They require little maintenance as there are no rotating parts.
- iii. They can be easily installed as they are light and require no foundation.
- iv. They can work under ordinary atmospheric conditions.

Disadvantages:

- i. They have short service life ranging from 8 to 10 years.
- ii. They are easily damaged if the voltage exceeds the rated value.
- iii. Once the capacitors are damaged, their repair is uneconomical.

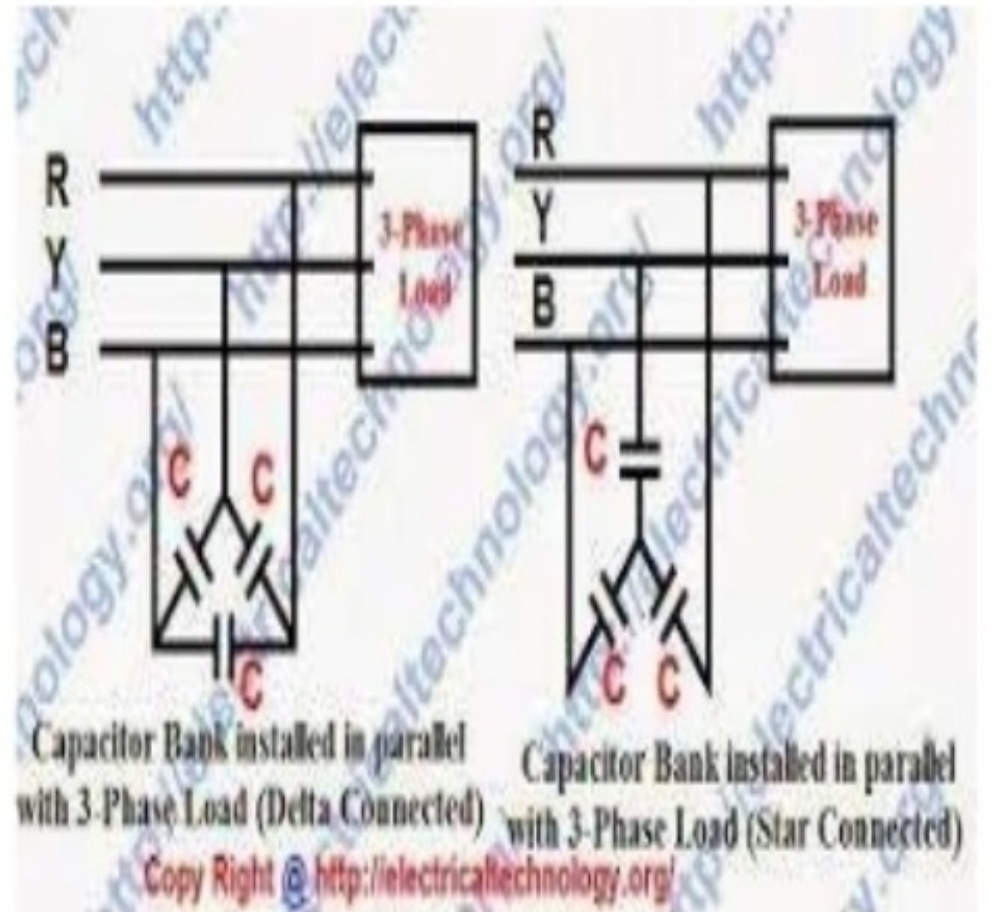
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ii) Phase advancer

- Phase advancer are used to improve the power factor of induction motor.
- The low power factor of an induction motor is due to the fact that its stator winding draws exciting current which lags behind the supply voltage by 90° .
- If the exciting ampere turns can be provided from some other a.c. source, then the stator winding will be relieved of exciting current and the power factor of motor can be improved.
- This job is accomplished by the phase advancer which is simply an a.c. exciter.
- The phase advancer is mounted on the same shaft as the main motor and is connected in the rotor circuit of motor.
- The major disadvantage of phase advancers is that they are not economical for motors below 200 H.P.

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