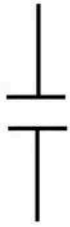


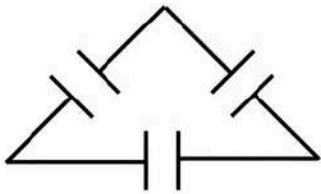
CALCULATIONS

REACTIVE OUTPUTS FOR DIFFERENT CONNECTIONS



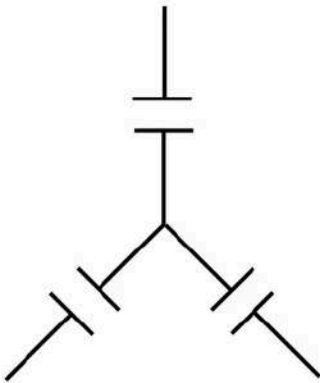
$$\frac{V_n I_L}{1000}$$

$$\frac{2\pi f C V_n^2}{10^9}$$



$$\frac{\sqrt{3} V_n I_L}{1000}$$

$$\frac{4\pi f C V_n^2}{10^9}$$



$$\frac{\sqrt{3} V_n I_L}{1000}$$

$$\frac{4\pi f C V_n^2}{10^9}$$

Where

- f = Rated frequency
- V_n = Rated voltage
- C = Capacitance (microfarads)
- I_L = Line Current

MOTOR POWER FACT CORRECTION

Useful Capacitor Formulas

Nomenclature: C – Capacitance in μF

V – Voltage

A – Current

K – 1000

A. Additional Data

1. Simplified Voltage Rise:

$$\% \text{ L.R.} = \frac{\text{kVAR (Cap.)} \times \% \text{ Transformer Reactance}}{\text{kVA (Transformer)}}$$

2. Losses Reduction:

$$\% \text{ L.R.} = 100 - 100 \left(\frac{\text{Original PF}}{\text{Improved PF}} \right)^2$$

3. Operation at other than rated voltage and frequency
Note: Use of voltages and frequencies above the rated values can be dangerous. Consult the factory for any unusual operating conditions.

a. Reduced Voltage:

$$\text{Actual kVAR (Output)} = \text{Rated kVAR} \left(\frac{\text{Actual Voltage}}{\text{Rated Voltage}} \right)^2$$

b. Reduced Frequency:

$$\text{Actual kVAR} = \text{Rated kVAR} \left(\frac{\text{Actual Freq.}}{\text{Rated Freq.}} \right)^2$$

c. Examples:

(a) Voltage Reduction:

$$\text{kVAR (208)} = \text{kVAR (240)} \left(\frac{208}{240} \right)^2 = 0.75$$

$$(10 \text{ kVAR @ } 240\text{V} = 7.5 \text{ kVAR @ } 208\text{V})$$

$$\text{kVAR (120)} = \text{kVAR (240)} \left(\frac{120}{240} \right)^2 = 0.25$$

$$(10 \text{ kVAR @ } 240\text{V} = 2.5 \text{ kVAR @ } 120\text{V})$$

(b) Frequency Reduction:

$$\text{kVAR (50 Hz)} = \text{kVAR (60 Hz)} \left(\frac{50}{60} \right) = 0.83$$

$$(60 \text{ kVAR @ } 480\text{V } 60 \text{ Hz} = 50 \text{ kVAR, } 480\text{V, } 50 \text{ Hz})$$