ILLINOIS CAPACITOR, INC.
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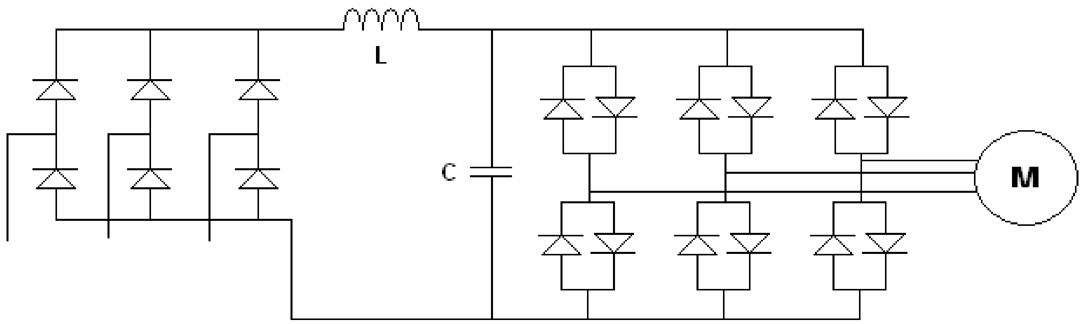
Capacitor design for an LC Filter for AC-motor drive



Peak Voltage: $V_{pk}= V_{rms}*\sqrt{2}$

Minimum voltage: $V_{min} = V_{max}-V_{ripple}$

Power rating = $[(1/2)*C*V_{max}^2-(1/2)*C*V_{min}]*f$

Capacitor Charge time: $Tc=\arccos(V_{min}/V_{max})/ (2*PI*fin)$
Fin= mains power source frequency(60HZ typically)

Capacitor Discharge Time: $T_d= 1/ (f_{rect}-Tc)$
F_{rect}= Frequency of rectified input

Capacitor Peak charging current: $Ic=C*dv/dtc$

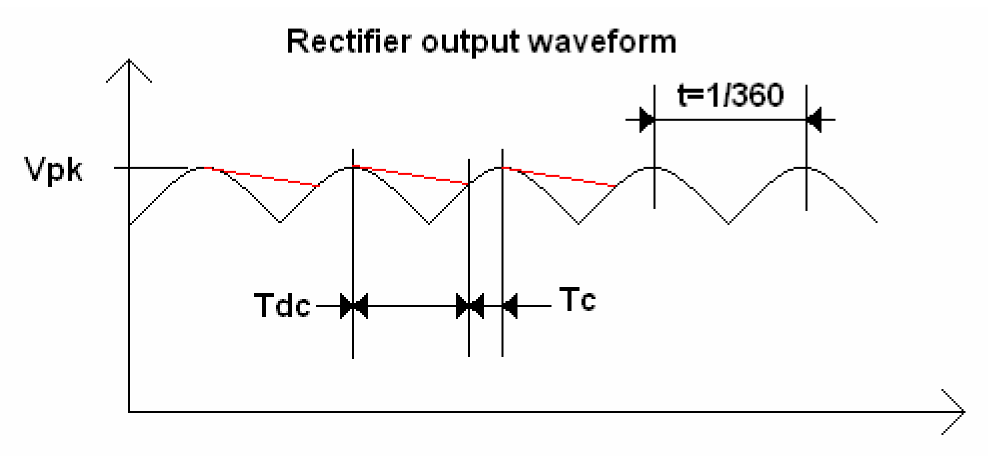
RMS Capacitor charging current: $I_{dc/rms} = i_{PK}^2*Tc*f$

Capacitor Peak discharging current: $I_d=C*dv/dt_d$

RMS Capacitor discharging current: $I_{dc/rms} = i_{PK}^2*T_d*f$

Total rms current: $I_{rms}= \sqrt{(Ic^2 + I_d^2)}$

Load current: $I_L=P/ ((Vmax- V_{min})/2)$



Total Capacitor power loss:

Pt=Ps+Pr

Ps= $I_{rms}^2 + I_L^2$

Temperature rise in capacitor
Allowing a maximum temperature rise of 15C above the ambient temperature yields

Temp Rise= Ps/ (B*A)

Where B=.001W/°C*cm^2
A= surface area of capacitor in cm.