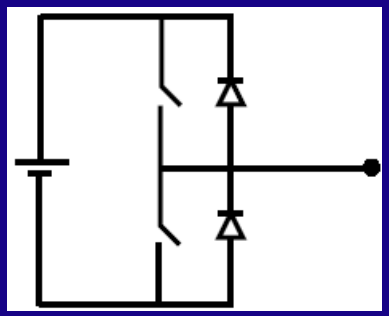
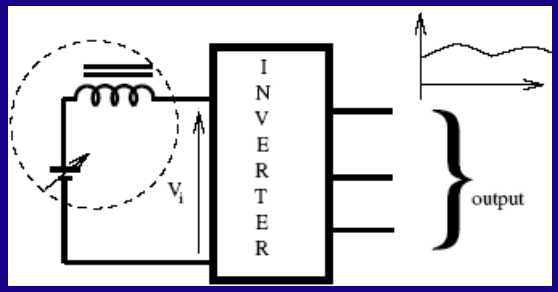
Review :

1) Features of DC-AC converters are
   (a) Constant V & F
   (b) V.V.V.F till rated voltage & constant V
   variable F above rated



2) V.S.I → Input is a voltage source
   ⇒ I can reverse
   ⇒ Anti-parallel diodes are essential
   ⇒ Switching signals for devices
   of the same leg are complimentary
   ⇒ Dead time required
   ⇒ Fast devices are used

3) C.S.I → Input is a current source
→ Input 'V' to the inverter can change



⇒ Due to the presence of a large 'L', there is no possibility of a shoot through fault. Easier to protect the device against any shoot through fault

⇒ Circuit is rugged & reliable

⇒ Device having anti parallel diode cannot be used

$\frac{1}{2}$ Bridge Inverter

⇒ Input is V_{DC} without any Z

⇒ O/P is a square wave with $\frac{1}{2} V_{DC}$

⇒ Has all odd harmonics

⇒ T.H.D. → 48%

⇒ Time for which S_1 / S_2 is ON will determine o/p 'F'

⇒ Switch may not carry I for π radians

Case 2 : Load = L

γ for D = γ for S = $\frac{\pi}{2}$ radians

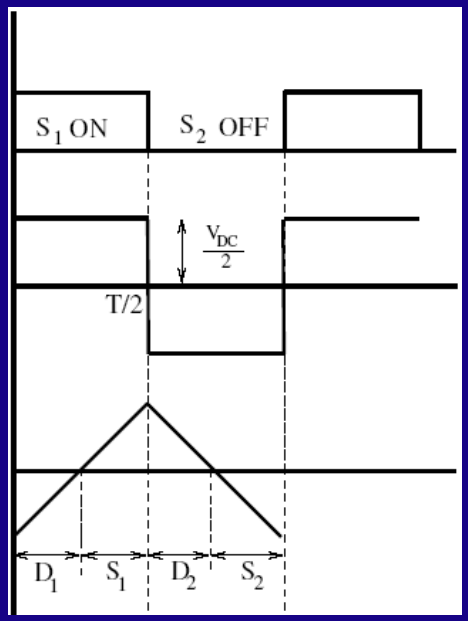
average power = 0

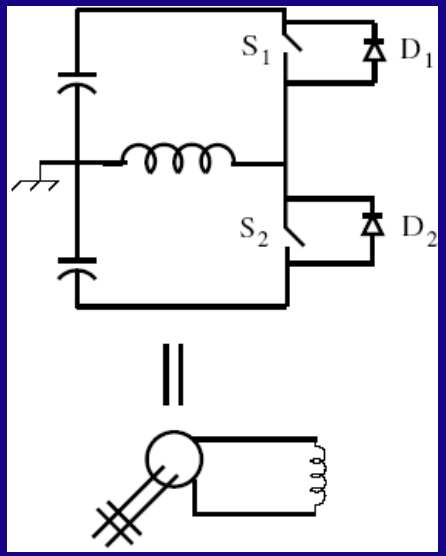
input power = 0 (neglect loss)

⇒ replace battery by 'C'

⇒ VSI can supply reactive power

⇒ active input = inverter losses





load : R-L-C

⇒ Series R-L-C with $\omega<\omega_r$

$X_c > X_L$

⇒ P.F. is leading

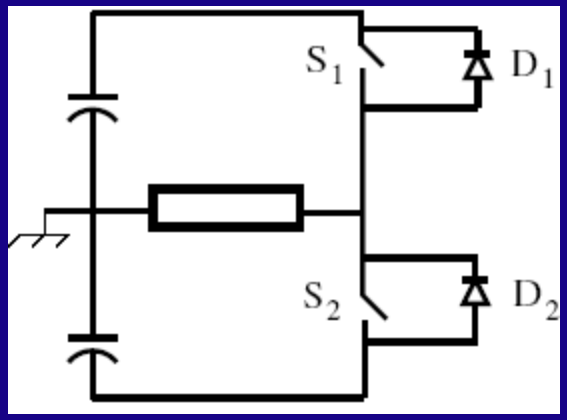
⇒ i_L is ; sinusoidal

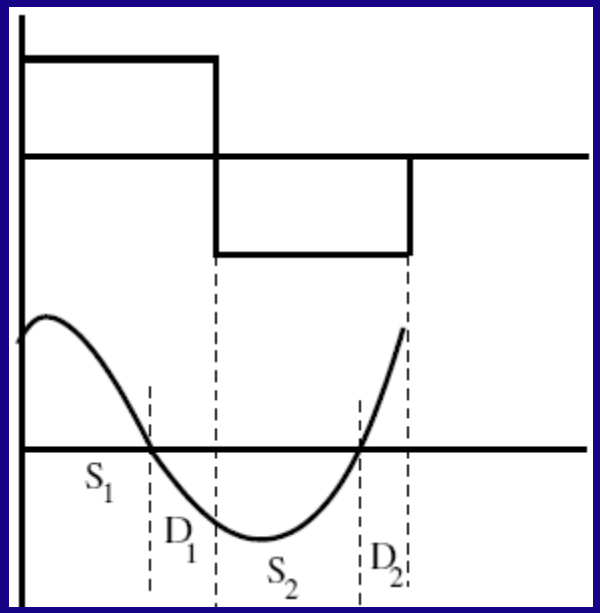
⇒ 'i' through the device has become zero much before it is turned

⇒ Device is turned off of its own

⇒ Reason: Load I is leading

⇒ Load Commutation





If all switches are SCR's & load is R-L

Input to DC: SCR cannot be turned OFF through Gate

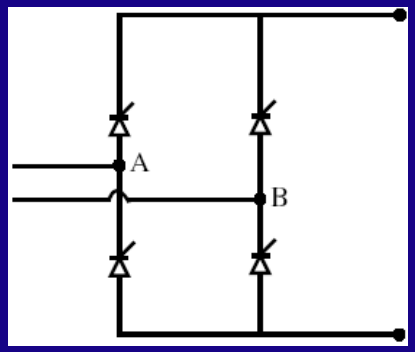
$i_{DEVICE} < i_{HOLDING}$

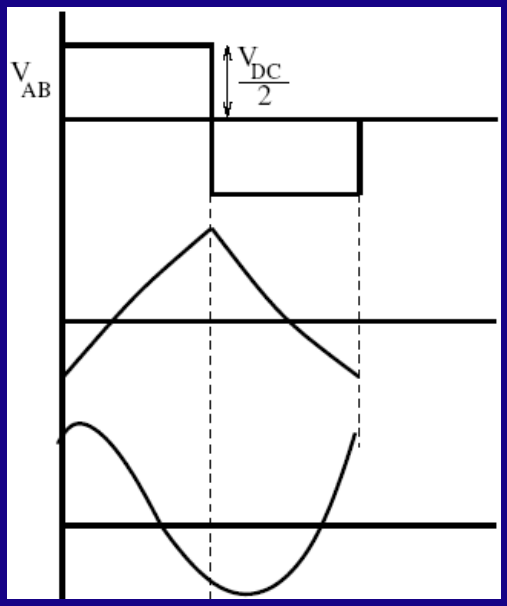
Reverse voltage should be applied to turn it OFF

⇒ Separate L & C

⇒ Forcibly turned OFF

⇒ Forced Commutation





⇒ Bulky & Noisy

⇒ Inverter grade SCR's are required

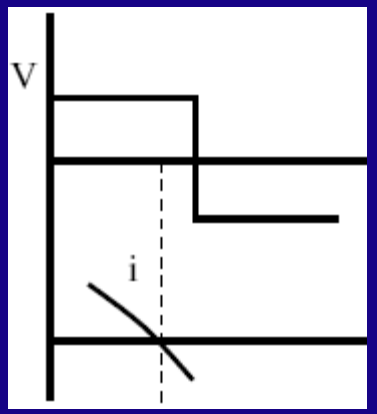
If P.F. is leading

'i' through the device = 0 & flows through the diode of its complimentary switch before the voltage is reversed

⇒ SCR has turned OFF

⇒ No external L-C circuit is required

⇒ Inverter using SCR's feeding a leading P.F. load is quite attractive.

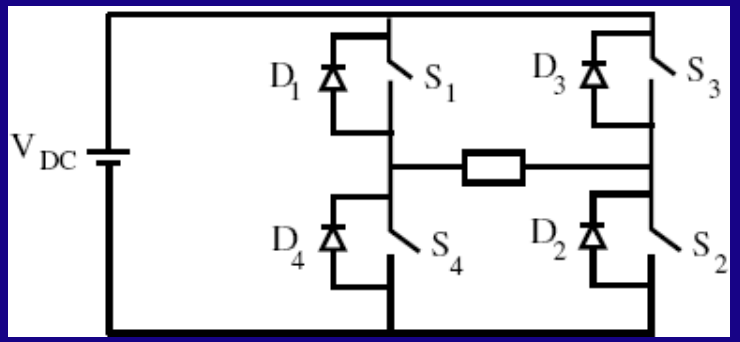


⇒ Inverter feeding over-excited synchronous motor

⇒ Large power

⇒ Load commutated inverter fed synchronous motor

Limitations of $\frac{1}{2}$ Bridge :



Input = V_{DC}

Ouput = $\frac{V_{DC}}{2}$

⇒ One device is conducting at a time.

Instead use a Full Bridge

⇒ 2 devices are conducting at a time

⇒ Center point of DC link is not required