



MEDIUM & HIGH VOLTAGE CAPACITORS

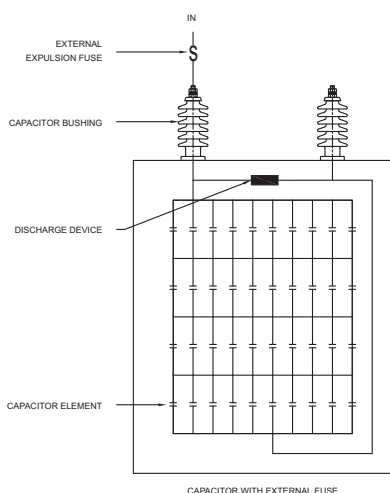
Shreem Electric Ltd. manufactures high performance, high reliability based all film foil capacitors for power factor and harmonic filters in electrical network with 40 years of strong experience in manufacturing & design. Shreem is the largest supplier of capacitor bank in India's transmission & distribution companies as well as major industries, many countries across the globe. Capacitors are designed & manufactured according to world's best standards with high precision process. Shreem is accredited with ISO 9001, ISO 14001 & ISO 18001.

Construction :

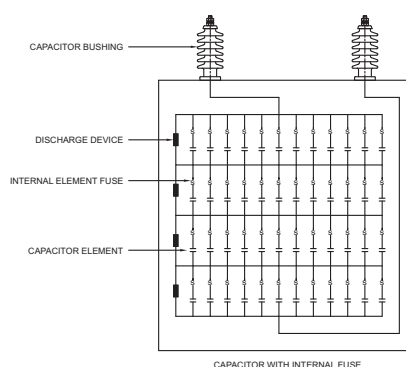
Capacitor unit is single phase with 2 bushings having live connection or one bushing with live steel case. Three phase capacitor units are internally delta or star connected with 3/4 bushings.

It consists of small elements which are wound on state of art Automatic winding machine. Elements are made of 2 or 3 layers of polypropylene film as dielectric with aluminium foil as electrode. These elements are stacked, connected together with series and parallel arrangement. Stacked capacitor with warped layers of paper insulation is inserted into a steel container and it is vacuum dried at certain temperature in vacuum plant. Unit is impregnated with oil and then steel container is hermetically sealed.

Features :



External fuse
Fig-1



Internal fuse
Fig-2

- Impregnated by non-PCB, bio-degradable low viscosity capacitor oil
- Capacitors are protected by internal elements fuses or by external unit fuse (Fig.1 & 2)
- Mild or Stainless steel tank with polyurethane light gray paint finish after shot blasting for resistant to severely corrosive atmospheres
- Wet process - porcelain bushing glazed for high strength and durability and hermetically sealed to the capacitor tank.
- Internal discharge resistors that reduce terminal voltage at 75 Volts or less within ten minutes after capacitor has been disconnected.
- Aluminum nameplate containing required IS/IEC/IEEE data.
- Capacitor meets all the parameters as per IEC-60871 - 2014 part 1 to 4 & IEEE 18:1012.
- BIL upto 200KV peak.

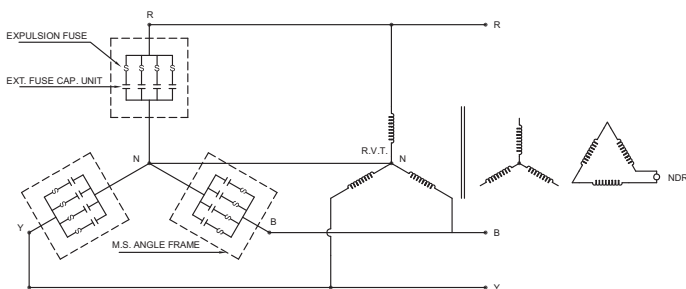
Capacitor Banks :

MV & HV capacitor banks are installed at substations and big industries to achieve the power factor and to maintain optimum reactive power. Capacitor bank consists of single phase capacitor units which are connected together with series and parallel groups depending on voltage and required total KVAR rating. Series groups are mounted on steel racks or enclosures and are insulated by interstack insulators.

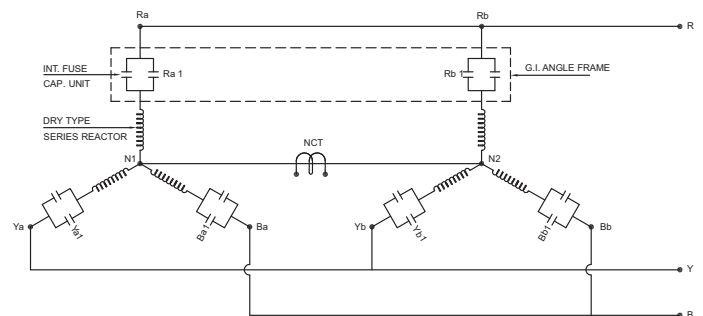


11 & 33 KV fixed capacitor banks are single or double star connected with unbalance voltage or current protection by using RVT or NCT. This primary of these protection transformer are connected to the star point of bank. In case any failure happens, there will be unbalance at secondary side of transformer generating unbalance voltage or current. Thus voltage or current relay will give instant command to tripping relay of controlling switchgear.

Series Reactor rating 0.2%, 1% or 6% of capacitor bank is designed & connected in series. This provides additional reactance in the circuit in order to limit inrush short circuit current to a safe value for purpose of protecting capacitor bank. 0.2% series reactors are neutral side while 6% are connected in line before capacitor bank.



(Residual Voltage Transformer)
RVT connection



(Natural Current Transformer)
NCT connection

HV & EHV Capacitor Banks :

HV banks are installed at substation beyond voltage level of 33KV & upto 220KV System voltage. Banks are provided for power factor correction and for maintaining voltage profile by reducing voltage drops. These banks increase power transmission capacity.



54 MVAR, 132 KV TERNA Rete, Italy.

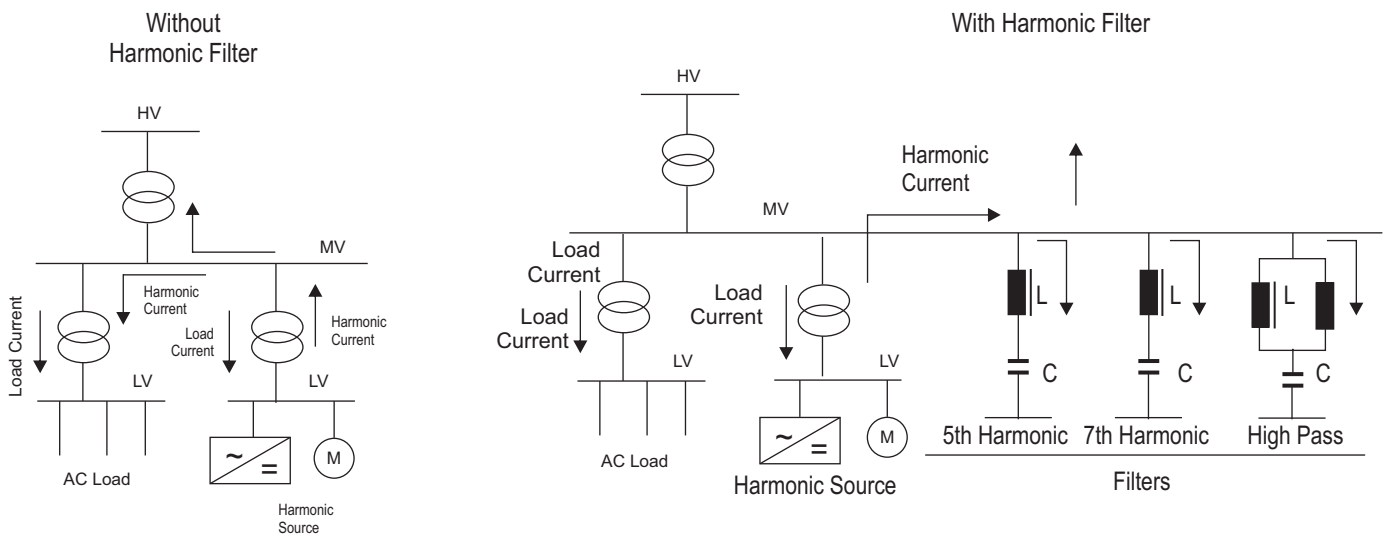


132 KV Fuseless Capacitor Bank, Phaltan, Maharashtra, MSETCL

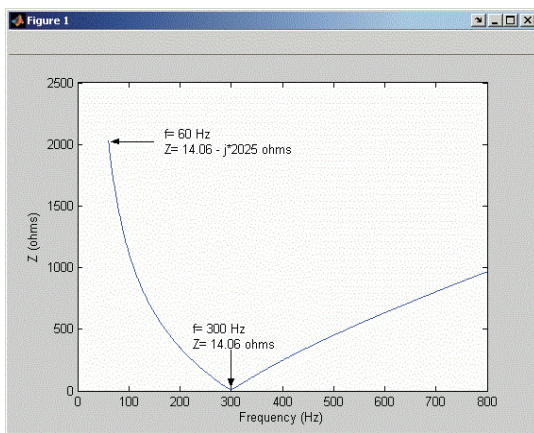
Harmonic Filters :

Harmonic Filters are either de-tuned or tuned. In de-tuned filter normally 6% S.R. is connected in series with capacitor bank. Reactor will provide high impedance path for higher level harmonics so all the harmonics are blocked, only less amount of harmonics will flow through reactor & capacitor combination depends upon short circuit capacity of electrical network Also this combination is used to avoid harmonic amplification as compare to bare capacitor & also avoids parallel resonance.

In tuned filter tuning frequency is matched to the dominant harmonic normally 3rd, 5th, 7th or 11th. It's designed with maximum optimization & with specific current distribution limit



For such filters it is required to carry out detailed harmonic analysis by user so that filter will be designed with optimum rating to match the result as per IEEE 519-2014. Shreem offers services for analysis and matlab simulation to check design parameters in accordance with source impedance and filter reactance.



Impedance Curves Filter Construction

