

## POWER CAPACITORS AND HARMONICS

Presence of harmonics in the electric mains can produce overcurrent in the power capacitors as well as several problems in many other loads of the installation. If it is achieved a resonance point, the result can be very dangerous for the whole installation (See chapter "HARMONICS" in catalogue "POWER CAPACITORS AND AUTOMATIC BANKS").

It is complex to make an accurate analysis of a power factor correction installation with loads generating harmonics and it is required a certain information that it is not always possible to have immediately (such as, power of the feeding transformer, short circuit voltage of the transformer, short circuit power of the network, and so on). Besides, it is also convenient to make a monitoring and a recording of the loads generating harmonics during a reasonable period of time.

When above information is not available, a first evaluation of the risk can be done from two only data:

**ST** = Power of the feeding transformer (kVA)

**SH** = Power of the load(s) generating harmonics (kVA)

Depending on the relation of these two parameters following situations can be established:

RELATION	EQUIPMENT TO BE USED	REMARKS
$\frac{S_H}{S_T} \leq 15\sim 20\%$	Standard capacitors and automatic banks.	<b>BATL series</b> <b>POLB, POLT &amp; FML series</b>
$\frac{S_H}{S_T} > 15\sim 20\%$	Protection Filters <b>(INR or INA) + FMLF or</b> <b>POLB_HD series</b>	Danger of resonance is eliminated and the overload of capacitors is limited. With protection filters tuned to 189 Hz, it is besides obtained, an absorption of even 20% of the 5th harmonic
$\frac{S_H}{S_T} > 55\%$	Active Filter <b>SINAF2.0</b> Suitable design for each installation	Danger of resonance is eliminated. Selection of filter as per current (A) of the order/s of harmonic/s to be eliminated.

**Remark:**

- 1) These relations (%) are approximated and it is an estimation of several parameters of the electric mains. Higher security an accurate study must be developed for each project/system for more suitable solution.
- 2) When ACTIVE FILTER is used, existing and new capacitor banks must be equipped with protection filter (de-tuning reactor).