The presence of non-sinusoidal currents in industrial plants produces undesired phenomena and in some situations real operating anomalies, that grow when the intensity of the **harmonic components** is higher..

To quantify the presence of all the harmonics, the **THD (Total Harmonic Distorsion)** factor has been introduced:

$$THD\% = 100 \text{ x } \sqrt{\sum_{n=2}^{N} \left(\frac{An}{A_1}\right)^2}$$

A_1 = amplitude of the fundamental	An = amplitude of the harmonic of order n	N = higher degree of harmonic order

In order to carry out power factor correction when high harmonic currents are present, it is necessary to choose equipment with blocking reactors (detuned inductances) that are arranged in series with the capacitors, so as to compose an LC branch that has a tuning frequency at a lower value than the lowest harmonic. Typically it is equal to:

- **189 Hz (7%)** when the lowest is the **5th harmonic**
- **138 Hz (14%)** when the lowest is the **3rd harmonic**

In industrial plants, where the loads power can be very high, any harmonic component may not be acceptable: therefore, a real action of reducing, if not eliminating, the harmonics is required.

For this purpose **passive filters** are the traditional means of resolution. This equipment consists of several LC branches in each of which the resonant frequency coincides with one of the undesired harmonic frequencies.

The system thus composed constitutes a preferential path through which the harmonic currents find a way to close again and do not affect the upstream network.

Appropriate design is needed to avoid resonance phenomena.
Further information on harmonics can be found in the "Technical Information" on our website www.comarcond.com .