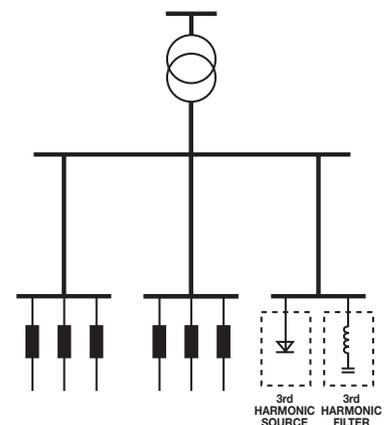


# THIRD HARMONIC FILTER



Power transmission and distribution systems are designed to operate with sinusoidal voltage and current waveforms at a constant frequency. However, when nonlinear loads are connected to the system, excessive harmonic currents are generated, and this causes both current and voltage distortion. Nonlinear one-phase loads such as fluorescent illuminators and computers which are connected between phase and neutral, are generating third harmonic and multiple of it. All harmonic currents cause both current and voltage distortion. In addition to this third harmonic currents accumulate in the neutral wire increasing the risk of overloading and causes magnetic field having frequency of 150Hz. By filtering third harmonic from the network the above mentioned problems can be eliminated.

The best result can be reached, when the filter is connected as close as possible to the harmonic source. This is the best way to minimize harmonic current and voltage distortion.



In case 3rd harmonic voltage distortion and/or overloading of transformer due to 3rd harmonic current are major problems it is recommended to install the filter in the main switchboard.

## Required data for dimensioning the filter:

- 3rd harmonic current in neutral wire and/or in line wire
- Voltage distortion (phase-neutral) at the point of filter connection
- Needed reactive compensative power
- Size (S/kVA) and short circuit percentage (zk/%) of the transformer
- Installation location (main or sub switchboard)

# POWER FACTOR CORRECTION AND 3rd HARMONIC FILTERING

3rd harmonic filter consists of capacitor units, which are connected in series with reactors. The harmonic filter produces reactive power at fundamental frequency in order to reach the target power factor. The inductance of the reactor has been chosen to create very low impedance series resonance circuit for 3rd harmonic. As a result of this, most of 3rd harmonic current can be filtered.

The filter cubicle has a contactor, a thermal overload relay, reactors, capacitors and a voltage control relay. The filter is usually connected to the fused feeders on the main or sub switch-board. As ordinary compensation capacitors also 3rd harmonic filter can be controlled by a power factor regulator. Alternatively 3rd harmonic filter can be controlled ON and OFF according to the current in neutral wire by external current relay or filter control can be connected parallel with load control.

The harmonic filters are usually designed case by case according to the measurements and assembled by using standard components. This guarantees the best reactive power compensation and harmonic filtering with reasonable investment costs.



1. Contactor
2. Voltage control relay
3. Over current relay
4. Cable terminal
5. Reactors
6. Terminal blocks
7. Capacitor unit

<b>Type:</b>	3HF50/400-50/ 150-108/77-0816	3HF35/400-50/ 150-127/116-0816	3HF15/400-50/ 150-50/44-0812S *
<b>Nominal voltage:</b>	400 V	400 V	400 V
<b>Fundamental frequency:</b>	50 Hz	50 Hz	50 Hz
<b>Reactive power:</b>	50 kvar	35 kvar	15 kvar
<b>Nominal current (phase/neutral):</b>	108/230 A	127/348 A	50/133 A
<b>3th harmonic current (phase/neutral):</b>	77/230 A	116/348 A	44/133 A
<b>Fuse:</b>	160 A	160 A	63 A
<b>Cabinet dimensions (width x depth x height):</b>	800x600x1600	800x600x1600	800x350x1200
<b>Weight:</b>	300 kg	310 kg	150 kg
<b>IP-class:</b>	IP20C	IP20C	IP20C

\* Wall mounted. Support frame on request.

Other configurations available on request. In line with our policy of on-going product development we reserve the right to alter specification.

ISO 9001, ISO 14001.



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