NexelFlow

A full line of

POWER FACTOR CORRECTION & POWER CONDITIONING SYSTEM

- You must improve your Power Factor?
- You must filter your Harmonics?
- You must do it within a "fast changing load" environment?
- You require something more powerful to improve power quality and enhance kW/kWh savings?

We have it all!

NEXELFlow "SERIE 1" – Power Factor Correction (PFC)

The rational use of electrical energy calls for economical generation, transmission and distribution with little losses. That means restricting all factors in electrical networks that cause losses. One of these factors is lagging reactive power.

The purpose of systems for power factor correction in networks is to compensate the generated lagging reactive power by leading reactive power at defined nodes. This also serves to avoid impermissibly high voltage drops and additional ohmic losses. The necessary leading power is produced by capacitors parallel to the supply network, as close as possible to the inductive load.

Capacitive compensation devices reduce the lagging reactive power component transmitted over the network (fig. 1). If grid conditions change, the required leading reactive power can be matched in steps by adding or taking out single steps to compensate the lagging reactive power.

Benefits of Power Factor Correction

- Power factor correction reduces the reactive powerand kVA demand
- Effective use of installation
- Fast return on investment through lower power costs and avoiding penalties from the utility ($)

NEXELFlow "SERIE 2" – Detuned PFC

When installing capacitors for PFC purpose, harmonics need to be taken into account when designing the PFC system in order to prevent resonance conditions that would damage the whole electrical system (fig. 2). When PFC capacitors are connected, the inductance of the transformer together with the capacitors forms a resonant circuit that could be excited by a harmonic current generated by the load. This resonant circuit has a resonance frequency, and if a harmonic current of this frequency exists, it will lead the circuit into a resonance condition where high current will flow through the branches, overloading them and raising the voltage across them and across the whole electrical system that is connected in parallel.

Detuned PFC filtering is a technique to correct the power factor and avoiding the risk of resonance condition performed by shifting the resonance frequency to lower values where no harmonic currents are present. This is achieved by modifying the basic LC circuit formed by the transformer and the capacitor bank, introducing a filter reactor in series with the capacitors. This way, we obtain a more complex resonant circuit but with the desired feature of having a resonance frequency below the first existing harmonic. Besides this main objective, the reactor connected in series with capacitors will offer a low impedance path. Filtering of harmonic currents and "cleaning" of the grid will be achieved.

fig. 1

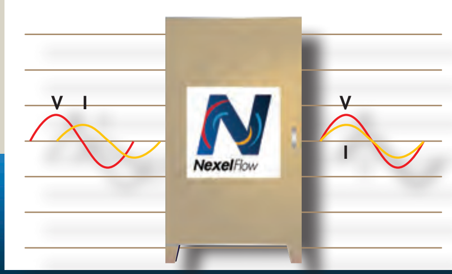
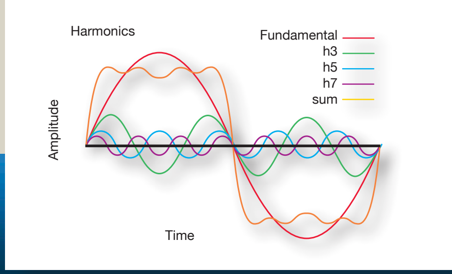


fig. 2



NEXELFlow “SERIE 3” – DYNAMIC PFC

Conventional PFC systems quickly reach their limits when they have to deal with fast changing loads. Applications like rolling mills, steel presses, wind turbines, container cranes and large buildings may require a reactive power adjustment on the ms scale. Spot welding, production equipment, elevators, chillers, and other electric devices not only require such dynamic reactions of the power factor compensation equipment, they also lead very soon to a total number of switchings that exceeds the specifications of standard electromechanical contactors by far. Standard contactors are used to switch capacitor steps on and off, built for 100 000 to 200 000 switching operations in total during their life time. Burnt main contacts may produce oscillation or “unclean” (re-bouncing) switching operations. This massive over-load not only shortens the life expectancy of the capacitor, but also increases the risk of premature failure and in the worst case represents a potential safety risk.

In dynamic PFC systems, the capacitor contactors are replaced by thyristor modules that are suitable for nearly unlimited number of switching operations as there is no mechanical wear-off. Thyristor modules feature electronic semiconductor switches that are able to react to a changing reactive power demand on the ms scale and that can switch capacitors without additional stress. It keeps the capacitors at the peak value of the grid voltage and connect them only when the grid reaches this peak voltage value. Thus the capacitors are switched current free and inrush currents that can reach values of 200 times the nominal current for conventional contactors are avoided.

NEXELFlow “PREMIUM” – POWER CONDITIONING

NEXELflow PREMIUM, an integrated power conditioning system, enhances power quality throughout the entire facility: protecting equipment, increased longevity, reduced downtime and maintenance. It consists of multi-stage LRC tank circuits (inductive-resistive-capacitive), specifically designed to meet the exact needs of each application.

On top of correcting Power factor, NEXELflow PREMIUM will solve common issues linked to power quality:

1. Improve and stabilize voltage (fig. 3)
2. Enhance three-phase balancing (fig. 3)
3. Protect against surges and transients (up to 300 000 V), (fig. 4)
4. Reduce harmonic distortion
5. Protect against brownouts , voltage sags and intermittent supply failure (Optional), (fig.5)

By improving power quality, you’ll eliminate energy consumption and losses which may range from 2 to 8% (kWh).

fig.3

fig.4

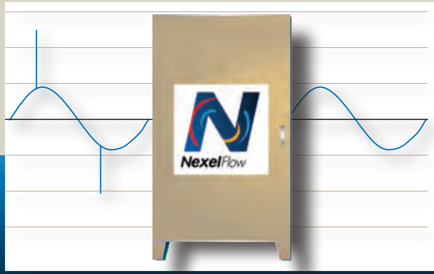
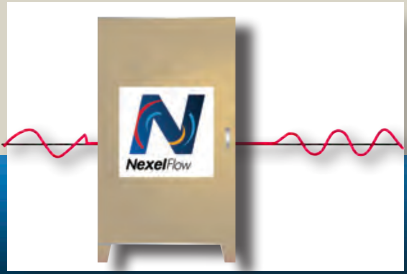


fig.5



NexelFlow

Complete Analysis

We offer a complete and comprehensive electrical analysis of your current situation and load profile.

Warranty

System components carry an OEM one-year repair/replacement warranty. Optional extended warranty is also available.

Catalog

Refer to www.nexelflow.ca

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NexelFlow	SERIE 1	SERIE 2	SERIE 3	PREMIUM
1. Power Factor Improvement	✓	✓	✓	✓
2. Eliminating PF penalties or kVAR charges ($)	✓	✓	✓	✓
3. kVA Release	✓	✓	✓	✓
4. Reducing Voltage drops	✓	✓	✓	✓
5. Harmonic Filtering		✓		✓
6. Unlimited number of switching on milli-second scale, no inrush			✓	
7. Voltage stability				✓
8. Filtering surges and transients				✓
9. Phase balancing				✓
10. Reduced Consumption in KWh ($)				✓
11. Reduced equipement failures and downtime ($)				✓
12. Improved Plant power quality				✓
13. Intermittent supply failure proctection				Optional
14. Lifetime expectancy	10 years	10 years	10 years	20 years

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