



NEWS

Capacitors to Portuguese wind parks

Nokian Capacitors has been supplying capacitor bank solutions to Portuguese wind parks since 2001. Supplies to Electricidade de Portugal will continue through 2005.

- Portuguese law says that wind parks must produce reactive as well as active power, which means that the plants require capacitors. The compensation power of a wind park is usually a third of the total power output of the station, says Sales Manager Risto Uusitalo from Nokian Capacitors.

- So far, we have supplied more than 20 capacitor banks to Portugal, with an aggregate capacity of around 100 MVar. Installations are done by local construction and electricity companies.

The combined output of Portuguese wind parks in 2003 was still relatively modest at 300 megawatts. But the country is determined to increase the production of wind power tenfold by 2010.

Product development at the terms of wind power

Uusitalo says that Nokian Capacitors has engineered four basic solutions for the production of reactive power in wind parks.

- The overall construction is always the same, but we have tailored various customer-specific enclosures for different needs.

- In an enclosed solution, control and protection systems are incorporated in the capacitor banks at the manufacturing plant, whereas in an open application the technology is added during building and electrical installations at the site.

- For wind park purposes, the power will be divided in steps, which allows reactive power to be controlled in relation to the active power generated by the capacitor banks. At request, the customer can have the enclosed capacitor banks furnished with ventilation, which is an obvious advantage in the Portuguese climate.

Thanks to their modular construction, enclosed capacitor banks can easily be extended whenever necessary. The banks have been designed for outdoor as well as indoor use. Special attention has been paid to the safety and reliability of operation to minimize the need for maintenance. The success of Nokian Capacitors' customer-oriented development is reflected in the increasing demand for enclosed capacitor banks compared to open applications.



Portuguese wind parks produce reactive power with capacitor banks manufactured by Nokian Capacitors

Outstanding expertise at all voltage levels, in all conditions

The customers of Nokian Capacitors need reactive power compensation or filtering of harmonic currents at all voltage levels, ranging from 400V to 750 kV. Besides, clients operating in various parts of the world require equipment and solutions that endure all kinds of trials - freezing colds in Canada, burning heat and sand in Saudi Arabia, salty seawater in Norway, and the dampness of underground mines in South Africa. Our continuous product development, elaborate testing and careful manufacturing processes ensure that our devices operate reliably even in such extreme conditions.

We master the technology of reactive power compensation and harmonic current filtering from basic solutions to the most challenging applications. Our recognized expertise in compensation at all voltage levels enables us to offer our clients a comprehensive service. In addition to a turn-key equipment delivery, our package includes the comparison of pros and cons of different compensation options and an assessment of their financial implications.

Our extensive range of services supports our R&D work. Various kinds of projects and different types of clients throughout the world increase and reinforce our know-how on a continuous basis. Our recipe for high quality is simple: premium quality materials and manufacturing processes combined with expert engineering.

From under one roof we provide extensive professional knowledge, a choice of solutions, and the execution of the chosen compensation option - even for the most demanding applications. Happy customers all over the world are the best demonstration of the success of our comprehensive service, high level of competence, and reliable products.



Risto Tuominen
Sales Director

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The RTDS Simulator - a cost-effective technology for more accurate testing

Nokian Capacitors employs a new digital technology in the design and testing of Static Var Compensators. The Utility Static Var Compensator (SVC) is used for voltage regulation and reactive power compensation to support the network during faults and thus secure the stability of power systems.

The digital technology we use includes a Real Time Digital Simulator that allows the simulation of the customer's network. This enables network developers and designers not only to make a static analysis but also to simulate various changes. In field conditions, it is often an expensive and time-consuming exercise to test changes that may affect the networks of companies or power utilities; at times it is impossible because of potential risks. RTDS is a cost-effective means of anticipating faults and preventing damage.

The modular system, designed by RTDS Technologies Inc., is state of the art technology and an ideal tool for the most challenging simulation tasks. For example, we have used our RTDS tool in designing and testing a SVC system for Furnas, the biggest Brazilian utility.

Our simulator is located on the premises of the Tampere University of Technology, where it is also used for educational purposes. TUT and Nokian Capacitors have worked together for years in education, R&D and testing.

SVC control system connected to the RTDS.



A NEW VERSION OF THE FASTEST ACTIVE FILTER IN THE WORLD:

MaxSine V5.0

The MaxSine Active Filter manufactured by Nokian Capacitors is the fastest compensator of harmonic currents on the network available on the market. The patented control and adjustment system makes MaxSine practically a real-time device, which constantly monitors the network status and responds to any changes in less than a millisecond by eliminating the detrimental effects of harmonic distortion. The newest version, MaxSine V5.0, features improved performance in measurement data processing and versatile use of the available compensation capacity.

Many types of electrical equipment used in industrial plants and offices degenerate power quality by producing undesirable harmonic currents on the network. Typical non-linear loads are created, for instance, by the motor drives of lifts. Owing to their dynamic character, conventional passive harmonic filtering is not possible; real-time active filtering is the only solution.

More options for compensation

With digital signal processing and a user-friendly menu-based interface, MaxSine V5.0 brings new options for compensation. Fundamental-frequency reactive power and harmonics can now be compensated exactly as required, just by using the commissioning menu of MaxSine V5.0 to select the desired compensation factor (0-100 %) for each specific frequency. Even the option of Direct Phase Current Control, known from the previous design, which compensates all frequencies differing from the fundamental current, continues to be available in MaxSine V5.0. The measurement menu shows the network variables key to the function of the active filter. In case of a disturbance in the network or active filter, the alarm appears on the menu and the alarm relay is closed.

MONEY SAVED - POWER QUALITY IMPROVED

BaoLai Plastic Packing Material Ltd., BaoSuo Group, BaoDing City in HeBei province.

The company manufactures 20,000 tons of BOPP film annually. The production line, which was imported from France, was put into operation in August 2002.

Original reactive power compensation equipment with a total capacity of 720 kvar was installed when the production line was taken into operation in August 2002. Several capacitor faults were found since October 2002. Therefore, the customer looked for proposals in improvement. After an evaluation the customer adopted Nokian Capacitors' solution.

Nokian Capacitors' Low-voltage Harmonic Filters

Nokian Capacitors' low-voltage harmonic filters were installed in August 2003. Technical specifications are as follows:

5th filter: Q50 = 400V 302KVAR x 2PCS

7th filter: Q50 = 400V 296KVAR x 1PCE

11th filter: Q50 = 400V 293KVAR x 1PCE

Conclusion:

Original values of both the harmonic voltages and harmonic currents exceeded the allowable maximum values stated in the national standards.

After the filters were installed, both harmonic voltages and harmonic currents met with the requirements of the national standards.

Original capacitor banks were often damaged due to the amplified harmonic currents.

After Nokian Capacitors' solution was adopted, the delivered harmonic filters for reactive power compensation and harmonic mitigation ran well.

Original capacitor banks without proper design resulted in resonances, magnifying harmonic currents and deteriorating the power quality.

After the filters were installed, 90% of harmonic currents were filtered and the power quality was improved.

Original capacitor banks for reactive power compensation often malfunctioned and caused poor power factor penalties since the original capacitor banks were out of service.

After the filters were installed, the power factor improved to P.F = 0.99 and the customer obtained an award on tariffs for reactive power compensation.



Benefits of the improvement project

	Before	After	Benefits
Fundamental current	1768 (A)	1150 (A)	618 (A) decreased
5th harmonic current	340 (A)	35 (A)	305 (A) decreased
7th harmonic current	54 (A)	16 (A)	38 (A) decreased
11th harmonic current	25 (A)	4 (A)	21 (A) decreased
Power factor	0.65	0.99	Tariff saved
Total harmonic voltage distortion ratio	5.8%	2.4%	Met with national standards
Total harmonic current distortion ratio	21.4%	4.7%	Met with national standards



Newest offices in São Paulo, Brisbane and Dubai



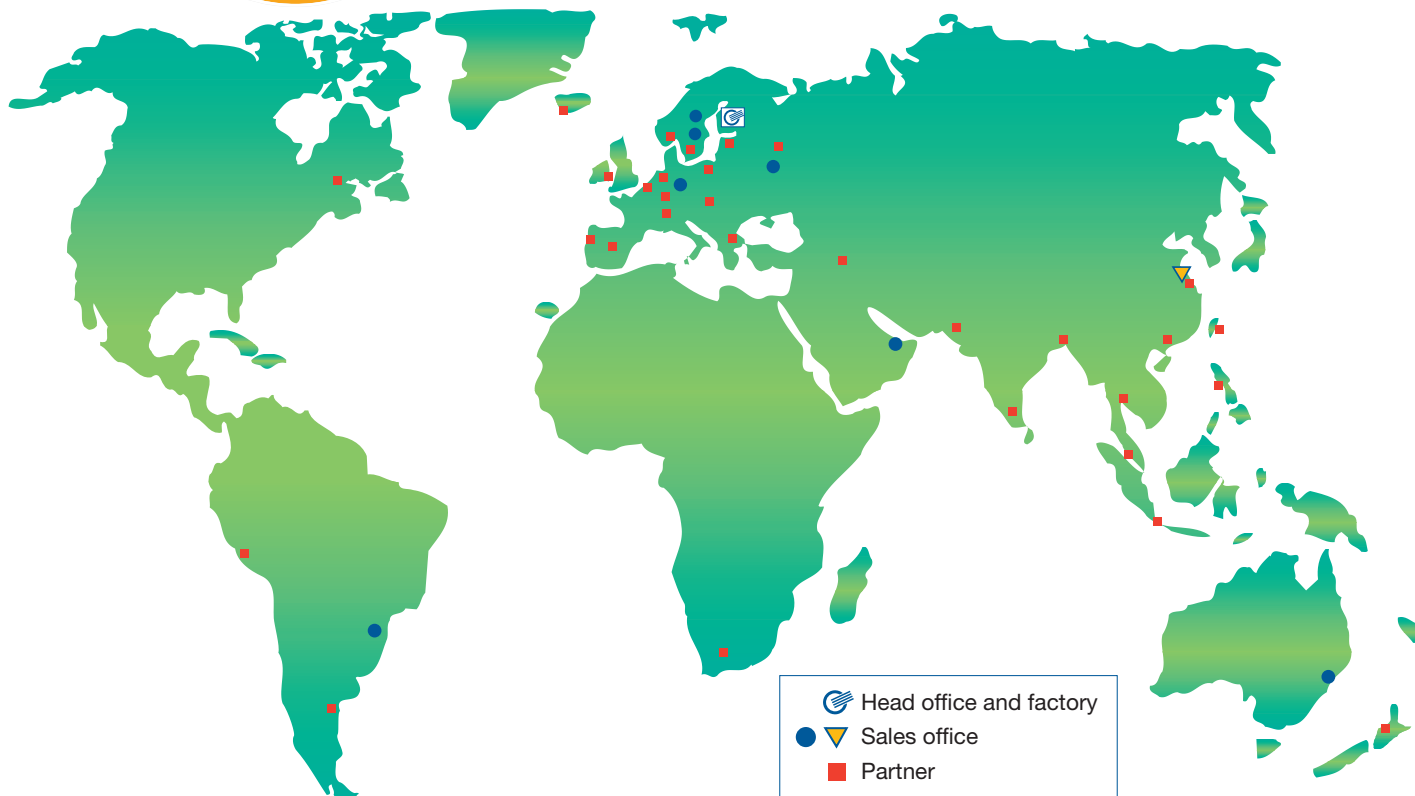
Nokian Capacitors has a total of 7 offices in 7 countries. A brand new office was opened in São Paulo, Brazil at the end of 2004. Within the last year we also opened offices in Brisbane, Australia, and Dubai in the United Arab Emirates.

In the last five years, our worldwide sales and distribution network has increased by a full 50 percent.

- We have succeeded in gaining a foothold in a number of new market areas, says Sales Director Risto Tuominen.
- Thanks to local presence, we are able to operate much closer to our customers, most of which are electrical power and distribution utilities or major electrical contractors. From the new offices we shall offer enhanced services by experts who are familiar with the local conditions and ways and have established contacts with local specialists, suppliers, etc.

All Nokian Capacitors' production plants are in Tampere, Finland.

- Our purpose is to increase manufacturing capacity in a way which supports the operation of our international network.



NOKIAN CAPACITORS INVESTS TO EXPAND MANUFACTURING FACILITIES

Leading-edge technology

Nokian Capacitors will expand its manufacturing plants and install new leading-edge technology in the course of 2005. The result of four years of engineering development, the new machinery and equipment will help streamline and accelerate the lead time of future contracts.

The new factory will be built beside the company's existing premises in Tampere. The new 3,500 square metres will expand the company's manufacturing capacity by 50 percent.



Highly automated production and state-of-the-art manufacturing technology requires outstanding expertise and solid technical know how.

- This was the major reason for our decision to ramp up production here in Finland. Our domestic country is able to provide us with a well-trained and qualified workforce, says Sales Director Risto Tuominen.

High demand continues

Tuominen says the decision to augment production was justified by the good results of the company's investments in sales growth and the continuing high level of demand.

- The decision to invest in growing production was made back in 2000. Now everything indicates that the high demand for our products will continue.

- The effort is focused on high voltage capabilities, and it will help us balance the production of capacitors and reactors at our existing plant. This enables us to serve customers with increasingly smooth project implementation and shorter delivery times.

The construction of the new plant will begin in March 2005 and production is scheduled to start at the end of the year.

Nokian Capacitors starts production in China as well. Nokian Capacitors China, a manufacturing unit concentrating on the assembly of low voltage capacitor banks, started operations in the beginning of 2005. Local production will strengthen the position of Nokian Capacitors in the rapidly growing Chinese market.