Solution to requirements for wind farm operators to provide grid-supporting functions

Knorr-Bremse PowerTech upgrades the 124 MW Penamacor / Sabugal wind park in Portugal.
Solution to requirements for wind farm operators to provide grid-supporting functions: Knorr-Bremse PowerTech delivers Reactive Current Converter for Wind Park Penamacor

Knorr-Bremse PowerTech delivered reactive current converters to a major wind farm operator, TECNEIRA – Tecnologias Energéticas S.A. The order is for 38 converters for installation in Suzlon S88 wind turbines at the 124 MW Penamacor/Sabugal wind park in Portugal. The converters will enable the wind farm to achieve compliance with modern feed-in regulations that are required in Portugal.

The increased use of renewable energy is increasingly a challenge to grid operators to maintain grid stability. A result is that power stations are now often required to provide more adaptable grid-supporting functions in the form of so-called “grid codes” or feed-in regulations.

Grid compatibility (Grid Codes) in the field of renewable energies

In Portugal the grid code „Portaria 596“ was published in 2010 and requires wind farm operators to retrofit wind turbines accordingly. Compliance can be achieved quickly and efficiently with PowerTech reactive current converters. Integrated directly into Suzlon S88 turbines, the converters enable continuous grid operation during voltage drops and maintain compliance with fault ride through regulations. The entire system, comprised of the S88 from Suzlon and the reactive current converter, has already received the relevant certification for grid compatibility from Germanischer Lloyd.
Knorr-Bremse PowerTech reactive current converters have been deployed in over 200 systems from various manufacturers worldwide. Most recently, PowerTech (formerly “PCS Power Converter Solutions”) supplied 66 Green Line 1000 units in 2013 to Suzlon Wind Energy South Africa (Pty) Ltd. for the East Cape Cookhouse Project in South Africa. The reactive current provided by the PowerTech converters played an important role in South Africa’s move toward modern power supply specifications that match stringent requirements in other parts of the world such as Europe.

Knorr-Bremse PowerTech provides reactive current converters for upgrades in two performance classes. They are suitable for both smaller and larger wind turbines up to 2500 A and consist of a pulsed IGBT power converter with a voltage link. If the grid is operating under nominal conditions, the converters remain in stand-by mode. If the voltage on the grid drops, the converters are activated and supply the required reactive current for up to six seconds. For the wind farm Penamacor/Sabugal in Portugal the commissioning is planned in 2016.

**PowerTech solutions for grid compensation**

The PowerTech technology supports not only the wind power industry but all industrial consumers of electric energy as well as network operators with intelligent solutions in the field of power line compensation. In stand-alone systems and through connecting renewable energy sources and storage systems to public power supply networks, the power converters of Knorr-Bremse make a valuable contributions to the clean and intelligent energy of tomorrow. For instance, processing machines are often bound by special grid conditions, while test equipment requires operation within special voltage or frequency limits. PowerTech converters are used to optimize each individual power supply meeting the need for flexibility and high reliability at the same time. The converters improve quality in electric energy distribution grids. At the same time, they fulfill a number of grid requirements including optimiz-
ing the line voltage quality and compensating for reactive power, harmonics and voltage flicker.

CUSTOMER BENEFITS

- Optimized grid quality and reduced load on equipment thanks to customer-specific active compensation systems
- Stabilization and support for public or industrial grids through active harmonics management
- Compliance with contractually specified power factor leads to reduced energy costs
- Reduced losses in transmission grids and distribution grids, as well as in industrial systems
- Ability to test symmetrical low voltage ride through in the PowerTech test facility