

Electromagnetic braking systems in wind turbines



INTORQ

setting the standard

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Exact and reliable holding in wind power plants

Our brakes have been in use for many years in wind power installations and have been doing their job reliably. The special requirements of this field of application are high reliability, long maintenance cycles, resistance to environmental influences and a tight braking-torque tolerance.

For pitch drives, we have developed stored-spring brakes as holding brakes that have to display a specific mode of emergency manner even after a failure. The brake casing is encapsulated or suitable for tachometer mounting.

In azimuth drives, brakes from our modular BFK458 series are used. They keep the turbine aligned in the wind. In the event of a fault, the brakes have to act as a friction clutch to enable the gondola to move with the wind.

In the offshore area, the requirements for corrosion protection and robustness are very high. Encapsulated version with special surface protection are used here.

Spring-applied brakes in pitch drives



INTORQ BFK460, suitable for fitting rotary transducers, enclosure IP65



INTORQ BFK461, closed design, enclosure IP 65

Brakes in azimuth drives



INTORQ BFK458, with fitted manual release



INTORQ BFK458, with chrome-plated armature plate

Example applications



INTORQ spring-applied brake on a pitch drive



INTORQ spring-applied brake on an azimuth drive



BFK460/BFK461 spring-applied brake – suitable for mounting in pitch drives

Features

- Braking torques 14-200 Nm (sizes 10-18)
- Coil voltages 24-310 V DC
- Enclosure corresponding to IP65
- Temperature range -20°C ... +40°C
- Corrosion-resistant thanks to zinc-coated housing and, if necessary, suitable for a further coating
- Designed for 100% operating time (OT)
- Temperature class F (155°)
- UL listed insulation system for electrical components (up to 250 V DC)
- RoHS-compliant

Versions

- Closed design
- Open design, suitable for fitting a rotary transducer
- Rotor with plastic sleeve
- Temperature range up to -40° (CCV)
- Partial discharge-free brake: control via pulse width modulation (PWM) possible
- Over-excitation and holding current reduction with bridge/half-wave rectifier
- Armature plate and flange in various corrosion-resistant designs





BFK458 spring-applied brakes – suitable for mounting in azimuth drives

Features

- Braking torques 14-200 Nm (sizes 10-18)
- Coil voltages 24-310 V DC
- Enclosure corresponding to IP54/IP55
- Temperature range -20°C ... +40°C
- Designed for 100% operating time (OT)
- Temperature class F (155°)
- CSA-CUS design
- RoHS-compliant

Versions

- Manual release
- Setting ring gauge for reducing the braking torque
- Microswitch for release control and wear monitoring
- Rotor with plastic sleeve
- Temperature range up to -40° (CCV)
- Can be designed for temporary continuous slip
- Partial discharge-free brake: control via pulse width modulation (PWM) possible
- Over-excitation and holding current reduction with bridge/half-wave rectifier
- Armature plate and flange in various corrosion-resistant designs





The rotor with plastic sleeve in more detail

The rotor with plastic sleeve offers numerous advantages when used in pitch and azimuth drives. The evolvent tooth profile, which has proven itself over several years, provides a stable rotor/hub connection. The plastic sleeve reduces the backlash and thereby increases the service life of the brake.

Properties and advantages

- Lower backlash power transmission between the shaft and rotor
- Service life extended thanks to the evolvent tooth profile and long length of the rotor neck
- Low wear between the rotor and hub due to reduced backlash
- Recommended for frequency inverter operation



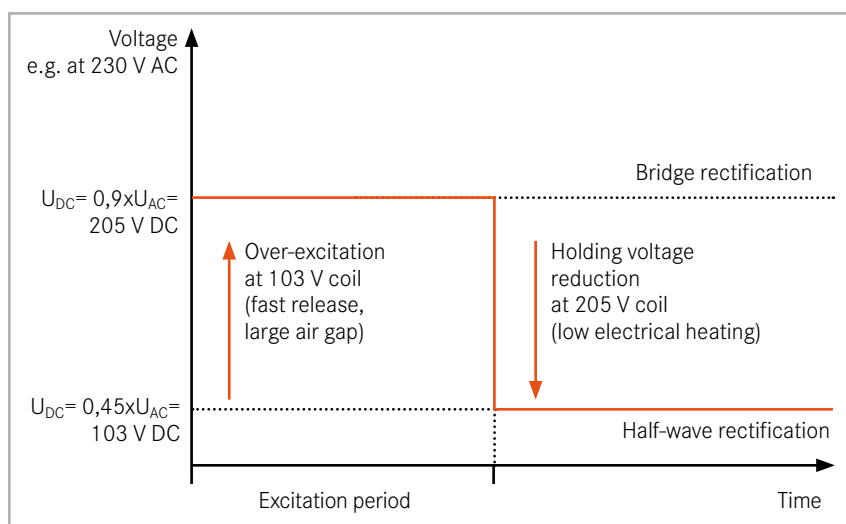
The bridge/half-wave rectifier in more detail



After a fixed period of time, the bridge/half-wave rectifiers switch over from bridge rectification to half-wave rectification. Depending on the design, over-excitation and/or holding current reduction, it is possible to shorten the switching times or reduce self-heating (power reduction).

The following image explains how the bridge/half-wave rectification functions and shows how the holding voltage reduction and over-excitation behaves when selecting a suitable coil voltage.

6-pole bridge/half-wave rectifier, functional principle



Pulse width modulation (PWM) in more detail

When stored-spring brakes are operated from the DC link of a frequency inverter with pulse width modulation, partial discharge can occur and damage the coil system.

We have modified the insulation system specially for this area of use and stored-spring brakes without partial discharge can be supplied as an option. The advantages of overexcitation and reduction of the holding current can be combined with each other in this case.



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INTORQ customers can reach us at any time and from anywhere in the world. Our Key Account Sales Team looks after key account customers and project business.

In addition, we co-operate with Lenze's global sales organisation. You can contact us via Lenze Service by calling the 24-hour helpline (008000 24 46177).

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