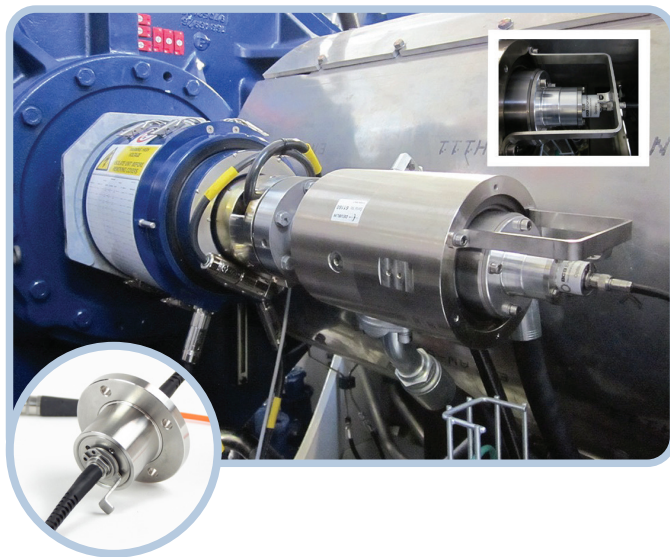


FIBRE OPTIC ROTARY JOINTS

FORJ For The Wind Industry

The fibre optic revolution has been here for a number of years offering high speed data transfer and superior security. As wind turbines get larger, the cost of downtime increases in lost generation. To enable predictive maintenance, it is common to use condition monitoring equipment to provide feedback loops on critical components in the hub such as pitch systems. The Fibre Optic Rotary Joint (FORJ) provides communication with this array of sensors and increased bandwidth and data security whilst preserving the same space envelope complementing the slip ring and rotating hydraulic union. This allows turbine OEMs to carry designs through new turbine versions to gain better economies of scale whilst still allowing an increase in data and communication requirements.



Advantages of Fibre Optic Rotary Joints vs Electrical Signal Slip Rings

- Higher bandwidth through wavelength division multiplexing
- Higher data rates due to multiplexing and low noise
- Fibre allows for longer circuit lengths without the need for repeaters and amplifiers
- Low noise operation – no noise created by electrical contacts
- Electromagnetically immune – fibre is invulnerable to Electromagnetic Interference (EMI) from neighbouring equipment and machinery
- Security – Impossible to intercept data

For prototype turbines with greater sensor arrays, such as in floating wind or new offshore behemoths, BGB's single mode (SM) and multimode (MM) FORJs offer affordability with flexibility when combined with multiplexing hardware. High optical performance ($RL > 27/30\text{dB}$ for MM/SM) is maintained even in FORJs without pigtailed, allowing the user to select application specific cables and terminations. The nature of fibre optic signal prevents electrical noise interference and ensure that the delicate signals coming from strain, control or accelerometer sensors are accurate and more reliable. Its IP68 rating and stainless-steel construction also makes it suitable for offshore wind applications.

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