

*Wind Application Bulletin*

## Hub Control

*Do you experience recurring problems and failures with your existing hub control slip rings? Costly downtime? Repeated repairs?*

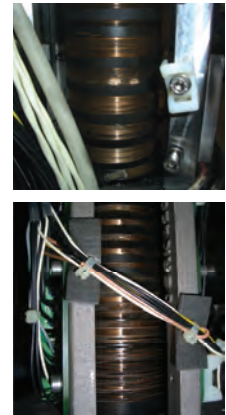
### Problems such as:

- Power section failures 50A@400V?
- Failures from lack of lubrication?
- High resistance connections resulting from inadequate contact from spring clips?

Experience has shown that the primary reasons for hub control slip ring failures are:

- Incorrect rating of wire in power section
- Use of spring clips in design
- Jumping of fingers from vibration
- Over or under lubrication

### Typical Failures:



### New Technology

Morgan AM&T has developed an advanced hybrid design that eliminates typical hub control slip ring failures. Our new design features:

- Soldered connections
- Oil and maintenance free for 5 years
- Hybrid design of brushes and gold wire
- Metal graphite brushes for power section
- 10 year lifetime

Additionally, these advanced systems feature an identical footprint for OEM retrofitting.



# Fiber Optics

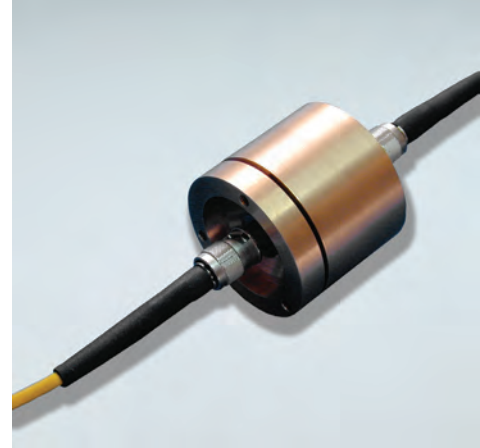
*Morgan AM&T launches new fiber optic technology for wind turbines.*

As the wind industry matures extremely robust technologies featuring fiber optics are becoming commercially viable. With this technological development we expect that the trend will be to use optical fiber optics extensively for measurement and control of blade pitch systems.

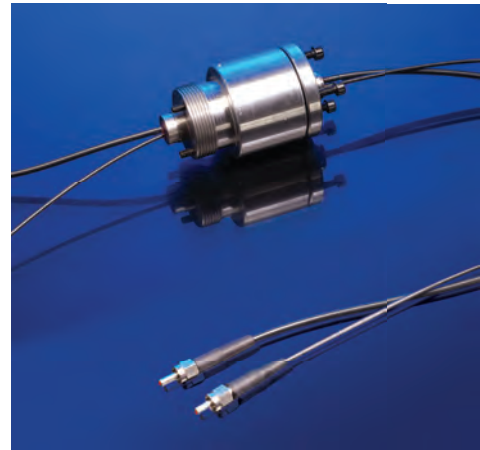
When it is time for you to transition to these technologies from the current brush and gold-wire solutions, Morgan Wind Technologies is well-positioned to continue to assist you with our latest technology advancement. Our single and multi-channel fiber optic transmitters, with a total attenuation as low as 3dB have been successfully applied in several industrial and military applications. These elements can be combined with electrical systems for contactless and interference free transfer of optical data signals.

## Benefits of the fiber optic system include:

- Contactless transmission
- Maintenance-free and wear-free for lifetime
- Interference free data transfer even under extreme conditions
- Can operate up to 1000 RPM
- Shock and vibration resistant
- Attenuation < 3dB
- Cross Talk < 30dB



Single Channel Fiber Optic Rotary Joint



Dual Channel Fiber Optic Rotary Joint

To discuss your specific requirements contact Hemen Dattani (864.901.3027).



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