SCHLEIFRING

wind turbine applications

: DATA SHEET

compact
standard
long life
multi-MW
innovation

Develop approaches to identify client needs

The sphere of wind turbine application requires an unparalleled level of precision and technical reliability. Particularly the rotating couplers are a key factor in the quality of the overall system.

We make a distinction between different fields of application. From the transmission of power e.g. to the pitch drive of the blades, through data from bus systems (Profibus, Fast Ethernet 100 Base Tx a. o.) to signals from the generator head to the rotor and lightning arrestor.

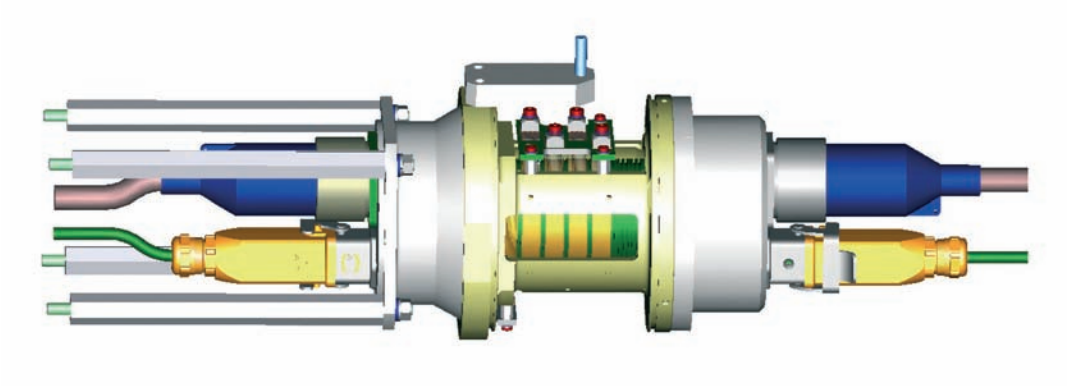
Approaching the wind energy specific demands SCHLEIFRING offers standardized technologies, which along with versatile transmission variations allow absolute reliable performance even under extreme temperature changes, shock, vibration.

Basically wind turbine slip rings are customized designs to respond to individual requests such as cable lengths, connector configuration, protection class, mounting or encoder integration.

Low power + data / compact

Compact Design

Slip ring systems for hydraulic pitch drive designed for supply power and data or low power requirements.



Options:
- Absolute or incremental encoder
- Heating elements for low temperature environment

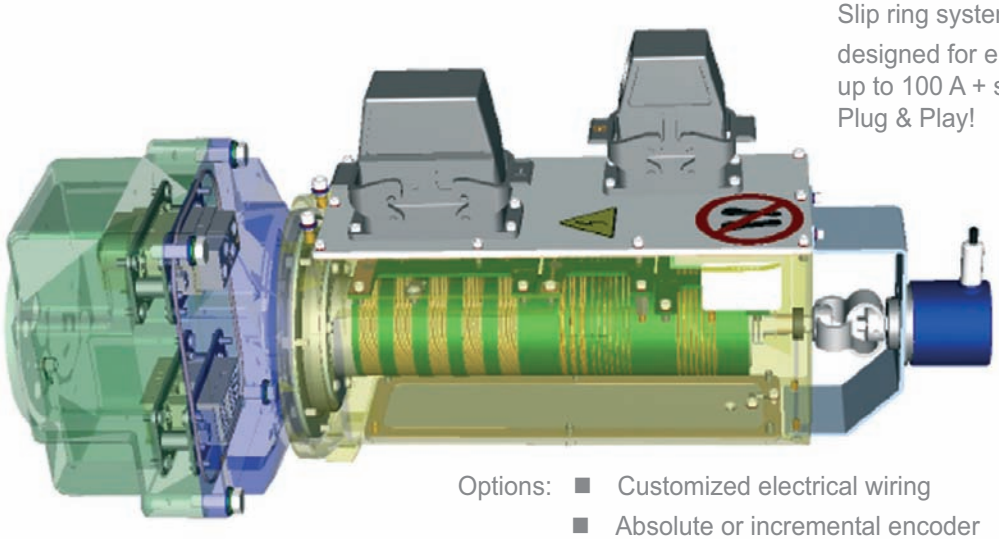
Wind turbines with hydraulic pitch drives require no high power supply. SCHLEIFRING provides compact custom designs with different connection elements (connectors or pigtails).
Mainly the required power comes to 30 A maximum.
For the transmission of signals and data only less than 20 rings are required.

- Compact and cost-saving design
- Power max. 30 A
- Signal and data transmission
- Gold wire technology
- Housing diameter <140 mm
- Optional connectors or pigtails
- IP54

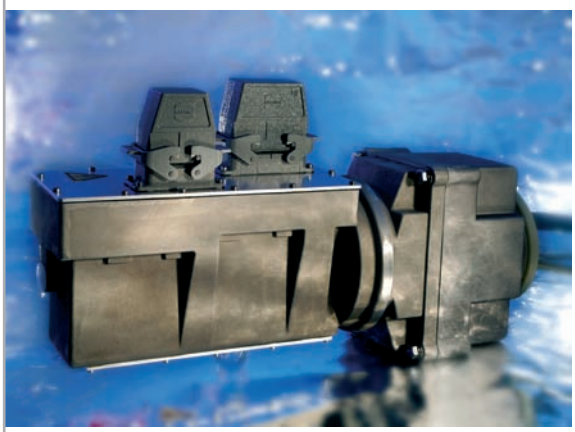
High power 100 A + data / standard

Standard Design

Slip ring system for wind tubines designed for electrical pitch drive up to 100 A + supply power + data. Plug & Play!



Options:
- Customized electrical wiring
- Absolute or incremental encoder
- Heating elements for low temperature environment



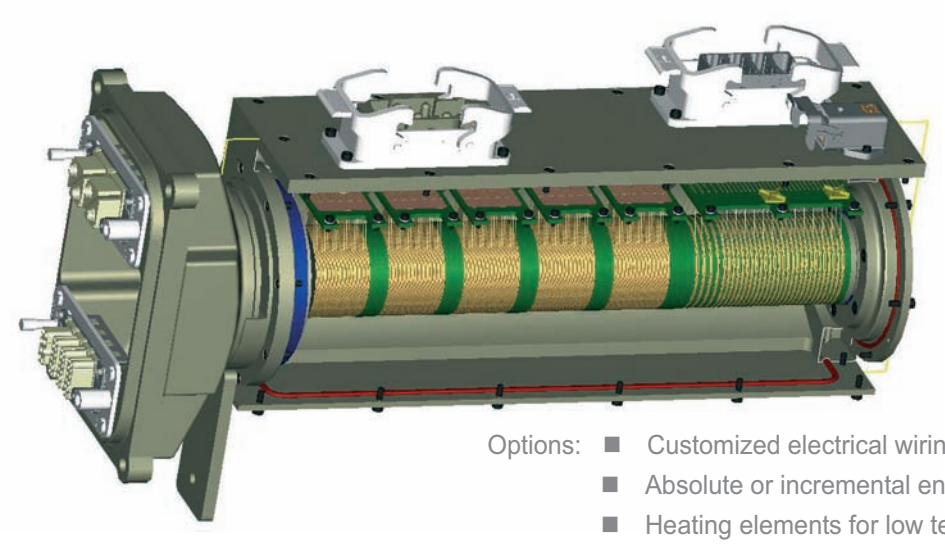
For wind turbines in the range of 0.75 to 2.5 MW SCHLEIFRING provides a standardized system consisting of a rugged aluminium enclosure in accordance with protection class IP65 and connectors on stationary and rotary plane for quick assembly and disassembly. A maintenance hatch at the bottom of the slip ring allows easy access even at cramped confines. The standard system is based on a modular concept and the client can select between various pitch power groups up to 100 A and a total number of 22 to 31 electrical ways for the pitch drive, auxiliary power, signals and communication. Proven gold wire technology is applied to guarantee adequate life and reliable operation.
Customized features such as flange dimensions, connectors and cables are available upon request.

Function	Standard I	Standard II
Pitch power	5 rings 400 V 50 A/ 60 A/ 80 A/ 100 A	5 rings 400 V 50 A/ 60 A/ 80 A/ 100 A
Supply / auxiliary power	3 rings 230 V/ 16 A	4 rings 230 V/ 16 A
Signals	7 rings 24 V/ 5 A	11 rings 24 V/ 5 A
Data	7 rings for bus systems up to 100 MBit/s	11 rings for bus systems up to 100 MBit/s

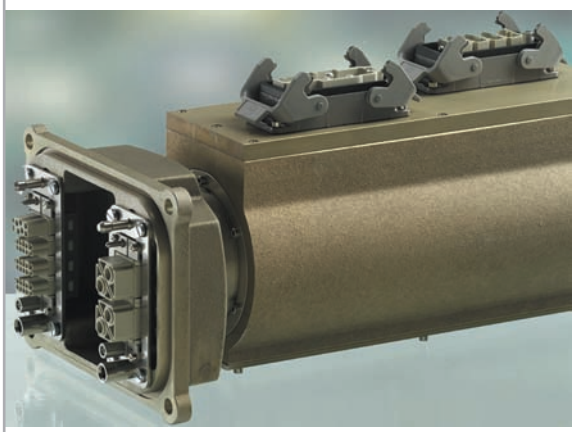
High power 100 A + data / long life

Long life Designs

Double track design for extended life



Options:
- Customized electrical wiring
- Absolute or incremental encoder
- Heating elements for low temperature environment

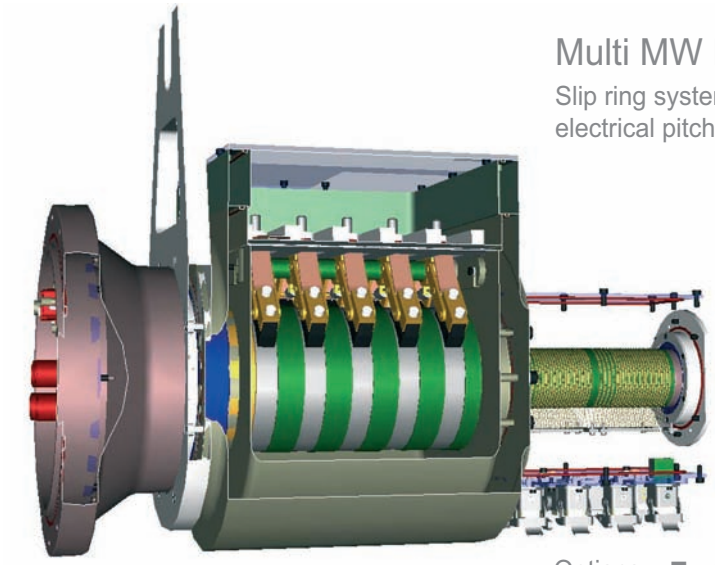


SCHLEIFRING was instantly responsive to the wind turbine manufacturer's demand for longer life. By optimizing special material configurations the latest generation of slip ring assemblies allows excellent operating life.

A **double track system** for extended operating life was designed particularly for wind turbines, and has the advantage that after the normal wear and tear, only the brush blocks need to be changed instead of the complete slip ring unit. This design contributes to a considerable reduction of maintenance costs.

- Power max. 100 A
- Signal and data transmission
- Standard gold wire technology
- Double track system for extended life
- Lifetime: up to 20 years or 140 million revolutions
- IP65

High power 250 A + data / multi MW



Multi MW Design

Slip ring system for wind tubines designed for
electrical pitch drive up to 250 A + supply power + data

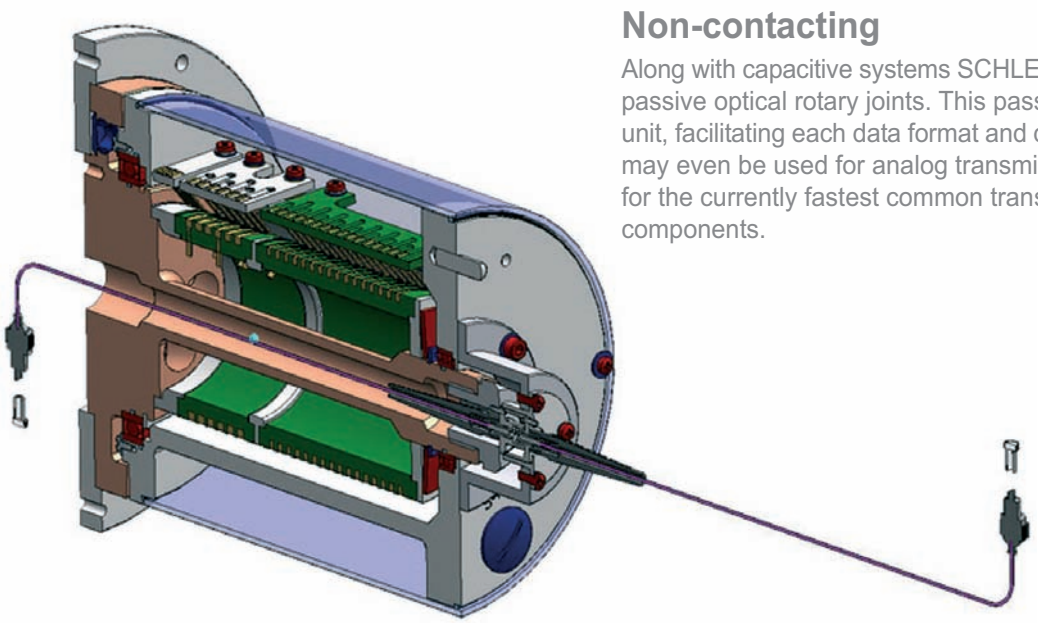
Options:
- Customized electrical wiring
- Absolute or incremental encoder
- Heating elements for low temperature environment

The future promises a continuing rise in capacities

The increasing share of wind energy claims the timely involvement of the off-shore utilisation. The reliability of these wind energy plants presents a great challenge.
In the latest 5-MW offshore wind turbine generation as well a compact and extremely rugged encoder integrated slip ring system made by SCHLEIIFRING serves as essential device for the transmission of power as well as electrical signals and data for the control of the overall rotor package. In particular the power supply of 250 A for the pitch drive meant a very special challenge due to the extremely limited installation space. A salt spray resistant design along with a special ring and contact configuration allows long life and back up and undisturbed operation of the wind turbine even under extreme environmental conditions like shock, vibration and change of temperature from -40 °C to +50 °C.

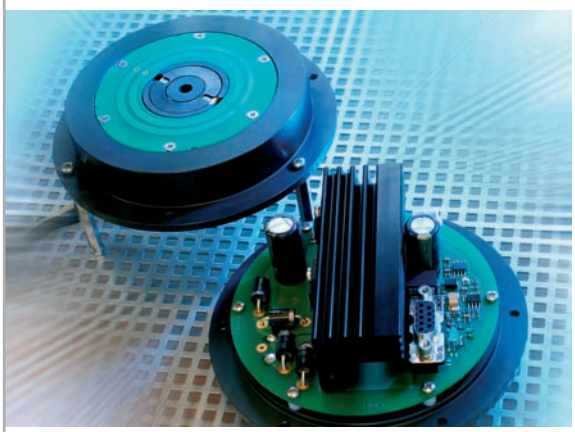
- Power transmission: carbon brushes on brass rings
- Signal and data transmission: standard gold wire technology
- Separate housings for the power and the signal unit allow easy maintenance
- IP67

Innovation



Non-contacting

Along with capacitive systems SCHLEIFRING provides passive optical rotary joints. This passive rotary joint unit, facilitating each data format and data protocol and may even be used for analog transmission, is suitable for the currently fastest common transmission components.



Although predominantly wind turbine systems utilizing precious metal sliding contact technology SCHLEIFRING exclusively offers non-contacting transmission technologies for high data rate transmission, including all common bus systems up to Gigabit Ethernet and EtherCAT.

Advantages of non-contacting technologies are: wear-resistance, high noise immunity combined with excellent EMC performance, high reliability and bit error rates of $<10^{-13}$.

- Wear-resistant
- Maintenance free
- High EMI and ESD immunity
- Data rates up to 10 GBit/s

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