



Military slip rings

„We are a family owned business.“

Military vehicles



KNDS

Slip rings



SCHLEIFRING 

Wheel balance systems



 **WEGMANN®**
automotive

Our brand name is our product.



Global footprint



1974

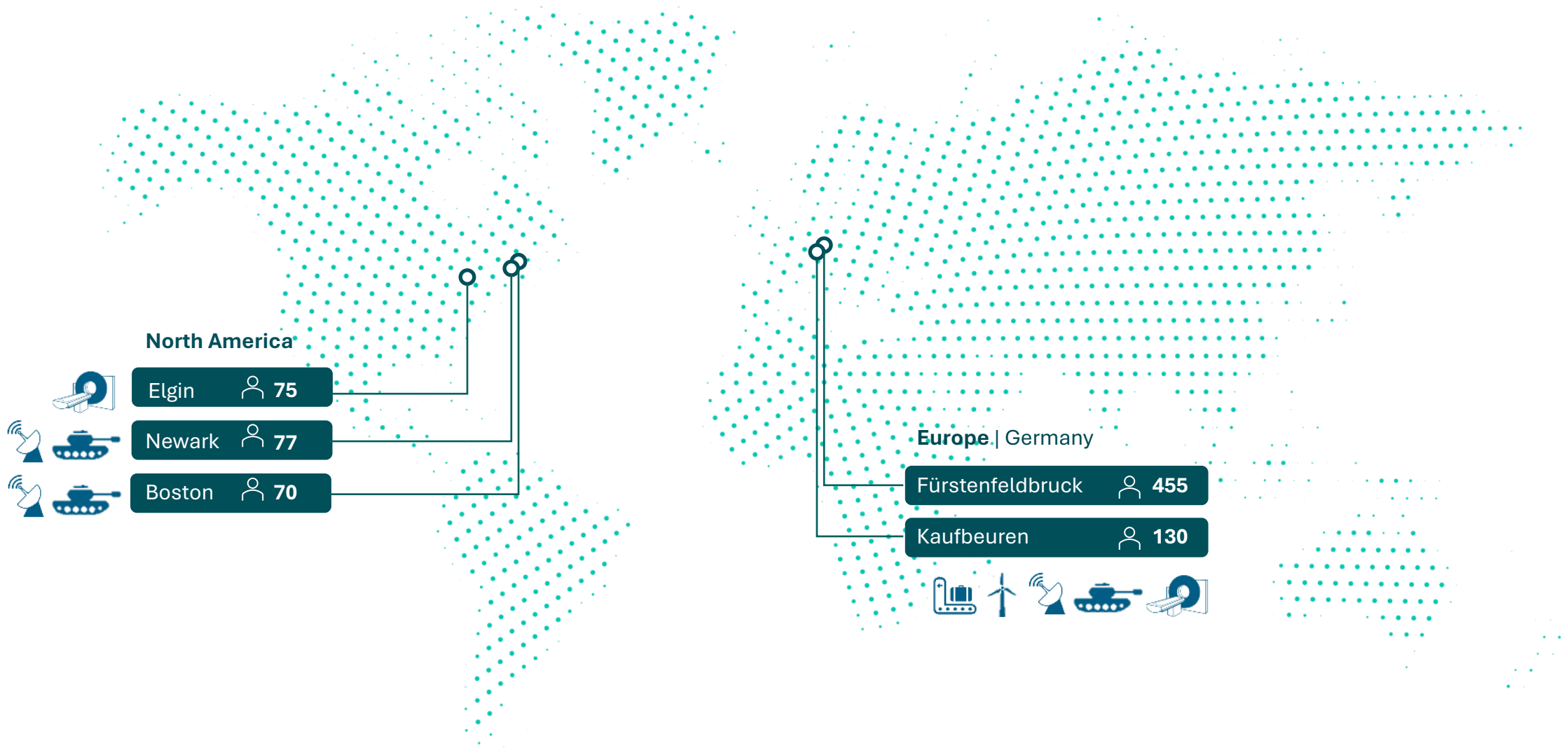
SCHLEIFRING Germany

2000

SCHLEIFRING USA

2020

Electro-Miniatures-Corp. USA
(since 1954)



SCHLEIFRING facts



800 employees

customized
slip rings

more than 6,000
individual solutions

260 patents

service

100% private
shareholder

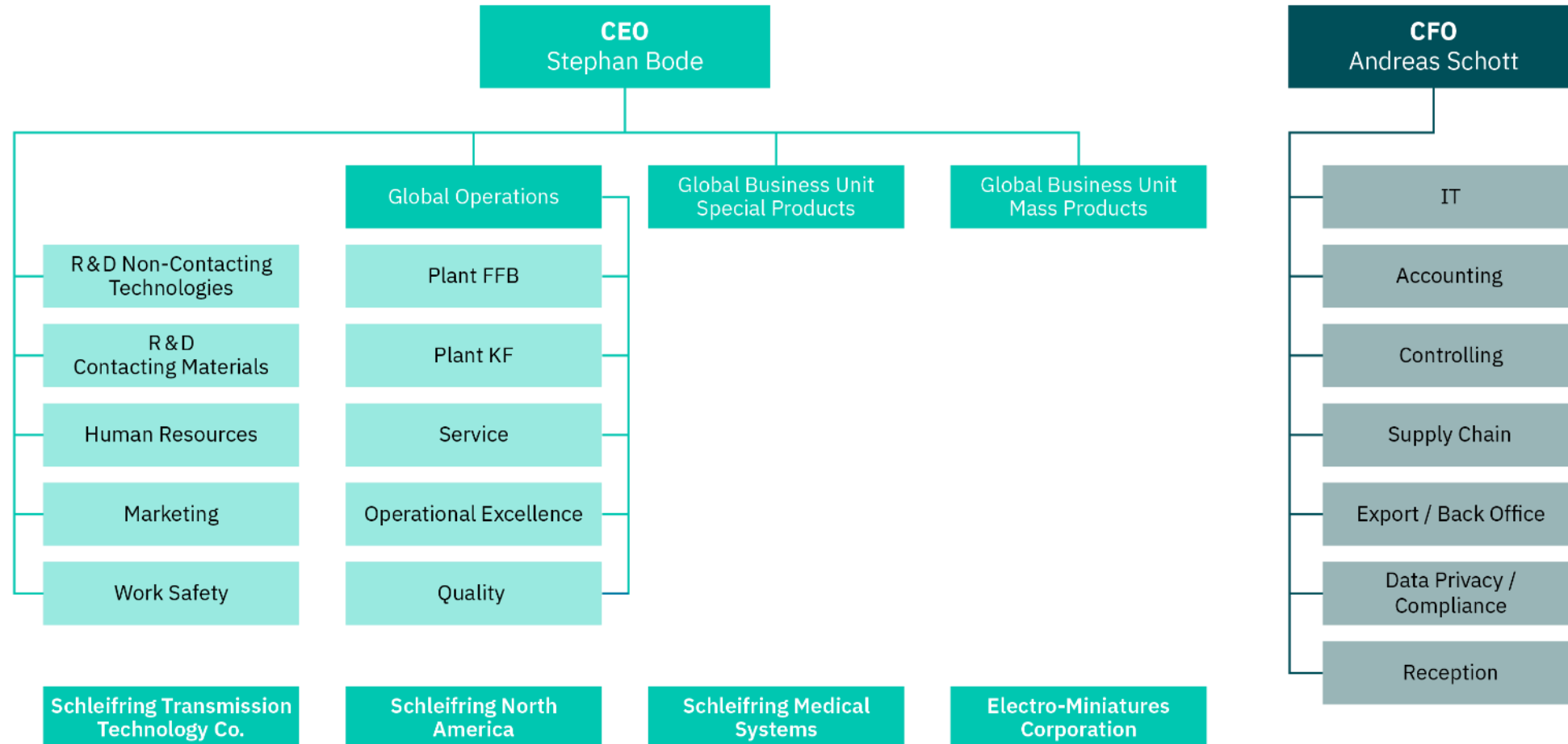


Global capabilities

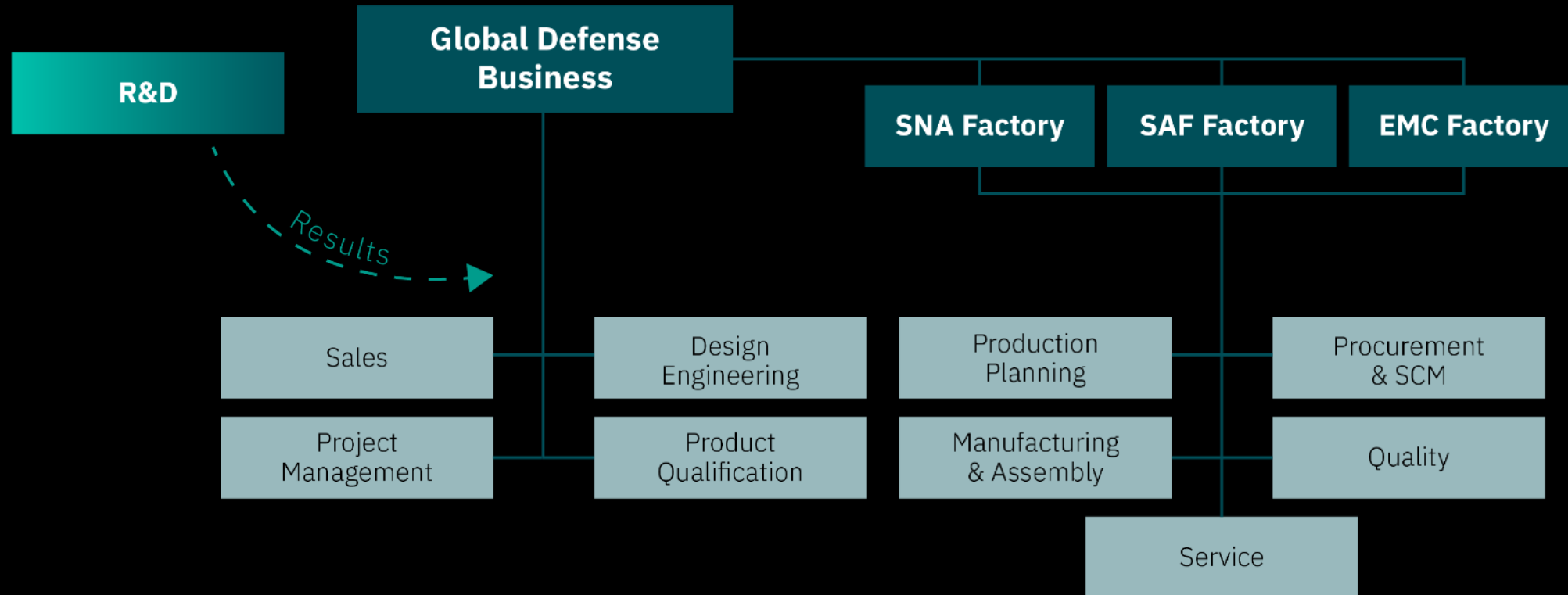


SCHLEIFRING GmbH <i>Headquarters</i>	SCHLEIFRING North America	Electro-Miniatures Corp.
Research & Development Project Management Design Engineering Qualification & Test Laboratories	Project Management Design Engineering Qualification & Test Laboratories	Project Management Design Engineering Qualification & Test Laboratories
Slip Ring and Gantry Production	Slip Ring & Miniature Slip Ring Production	Production of Space and Miniature Slip Rings
Global Service Center	Local Service	Local Service

Management board organization chart



Global defense organization



SNA = SCHLEIFRING North America
SAF = SCHLEIFRING (Headquarters Germany)
EMC = Electro-Miniatures Corp. (USA)

The background of the slide features a series of parallel, slightly curved diagonal lines in various shades of dark gray and black, creating a sense of depth and movement.

Applications

Radar systems

Hybrid slip rings are the most common solution for high performance radar systems

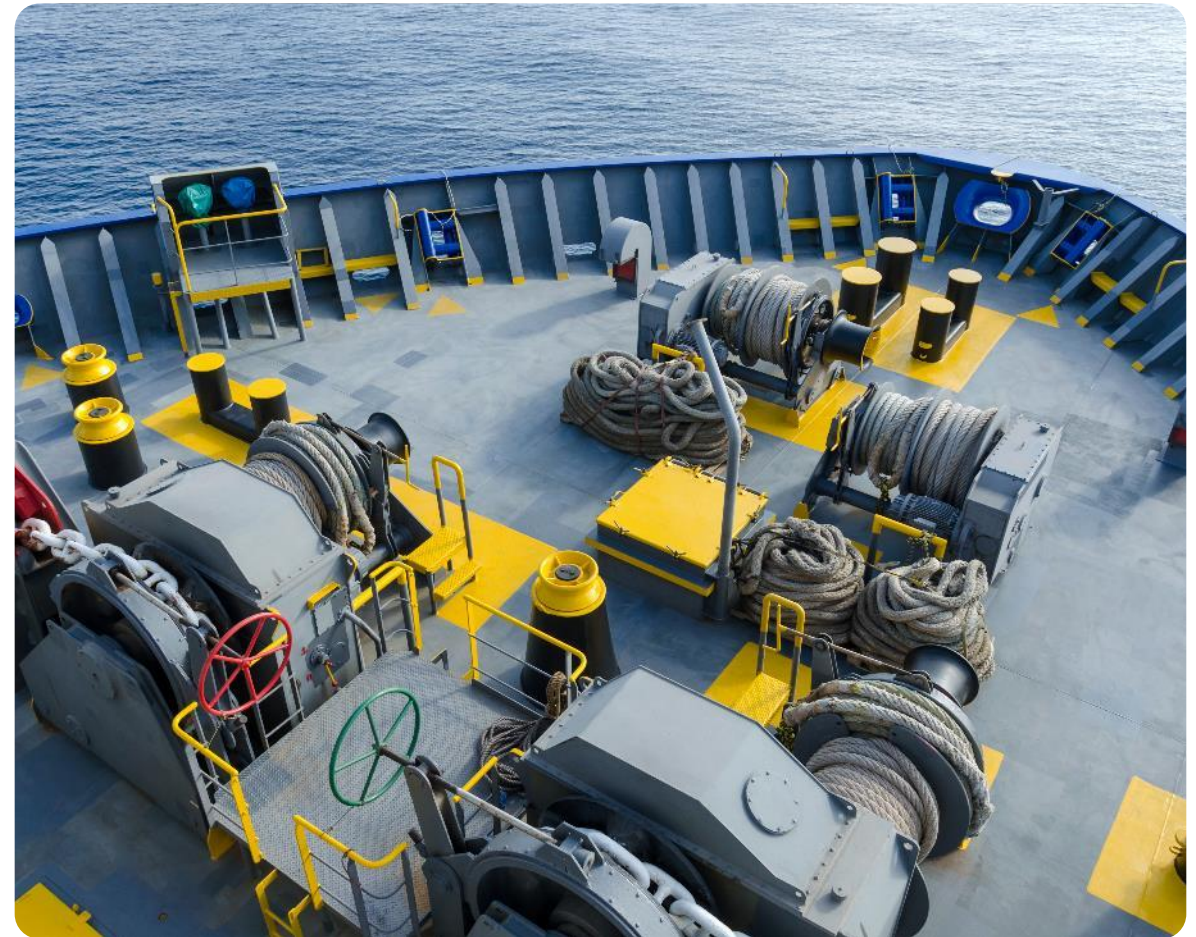
- Contacting slip ring system
- Integration of RF rotary joints
- Integration of optical rotary joints
- Integration of encoder
- Integration of fluid rotary joints
- Integration of all digital bus systems
- EMI/ RMI shielding
- Optimized lifetime and maintenance cycles
- Optional: condition monitoring system



Winches

Special designs and production techniques are essential to give ultimate performance to slip ring solutions under the environmental conditions specified for naval applications

- High voltage up to 4.000 V
- Customized harness design
- Contactless data transmission including fiber optical converters
- Protection level up to IP 68
- Salt water and corrosion resistant



Remote weapon stations



Compact slip ring designs are suitable for integration in remote weapon stations.

- Optimized for high acceleration
- Integration of encoders and fiber optical rotary joints
- Transmission of high data rates e.g. Gigabit Ethernet, HD-SDI
- High volume production

Turrets



Slip ring assemblies in vehicle tank turrets are used for transmission of high power combined with sensitive signal transmission.

- Power transmission up to 1000A nominal
- Gold-on-gold contacts for signal and data integrity
- EMI shielding
- High frequency coax channels
- Integration of resolvers, fiber optics, air channels

Electro optical systems

At the heart of these sophisticated systems all data, signals and power are passing through the slip ring unit.

- Operating temperature range -55° C to +85° C
- Altitude up to 15.000 m | 50.000 ft
- Compact and weight optimized designs
- Multiple contact technologies suited for the application
- High shock and vibration capabilities (e.g. according to MIL standards or DEF standards)
- EMI shielding & environmental sealing



Periscopes



Today's latest generation naval reconnaissance systems demand highest performance and reliability.

- Salt spray resistant assemblies
- Watertight up to IP 68 for submarines
- Operating under extreme EMI and vibration conditions
- Integration of rotary joint for cooling fluids and air
- Transmission of high speed video signals

Miniatures



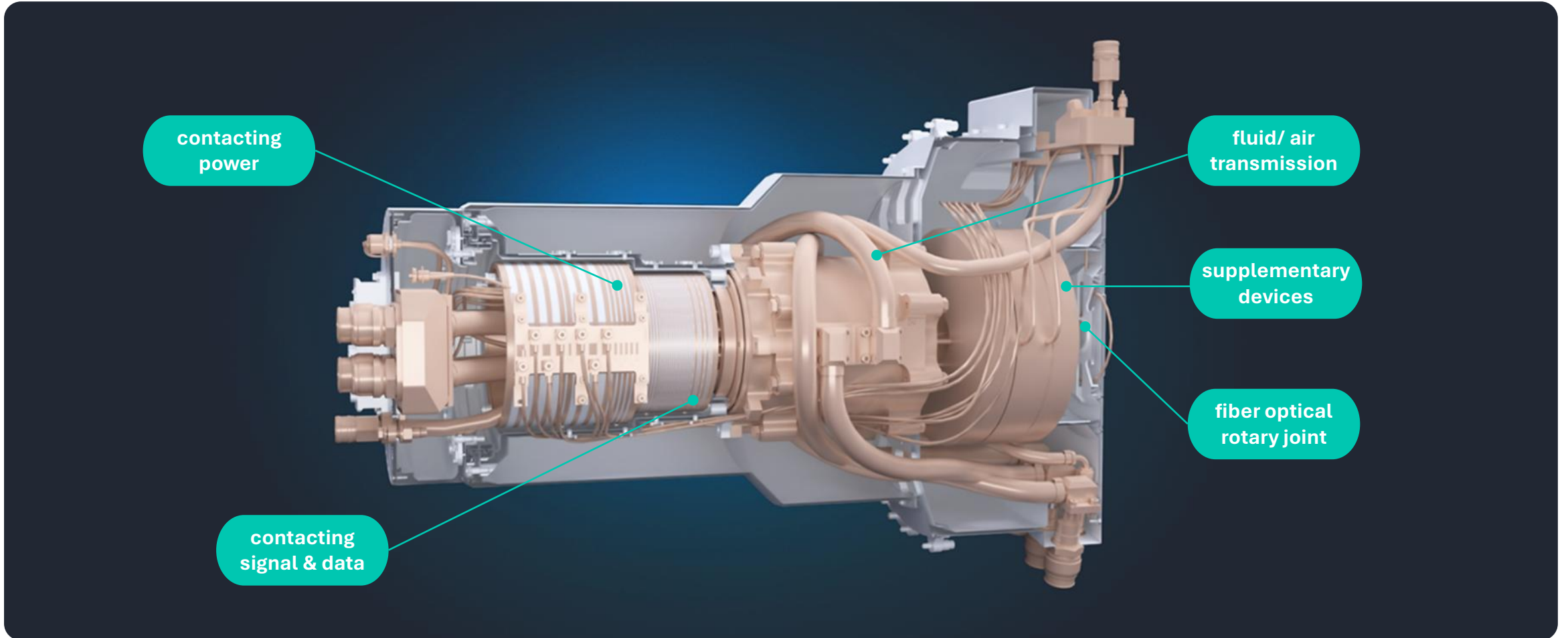
Miniature slip rings used in aircrafts, sat comms, electro-optical sensors, IR sensors, FLIRs, airborne radar.

- Transmission of high speed video signals
- Lightweight capsuled designs

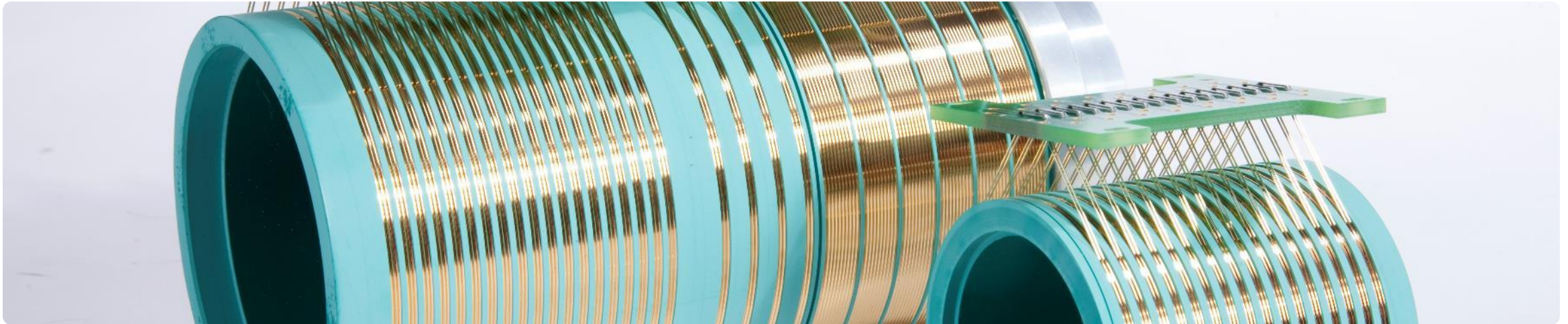


Transmission technologies

Inside the slip ring



Contacting technologies

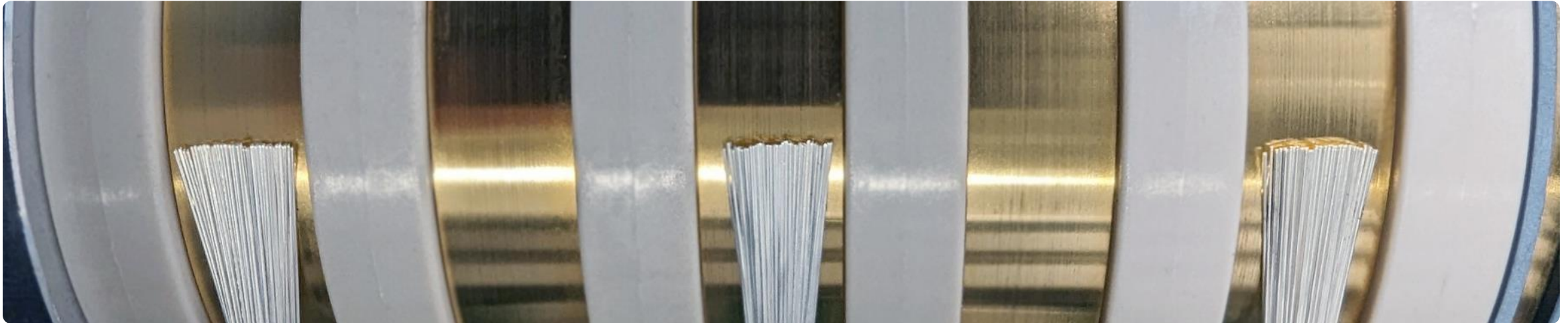


SCHLEIFRING's gold wire technology is proven for signal, data & power transmission:

Integration of RF channels

- Low electrical noise < 30 mOhm
- Current typically up to 120 A
- Long operational life up to 50 million revolutions
- High contact reliability
- Transmission of all common field bus systems

Contacting technologies



SCHLEIFRING's multifiber brush technology allows excellent results in signal, power and data transmission:

- Low electrical noise < 50 mOhm
- Current up to 1000 A
- Speed up to 1,5 m/s (higher speed possible)
- Long operational life > 50 million revolutions
- Transmission of all common signals and field bus systems
- Maintenance free
- High contact reliability

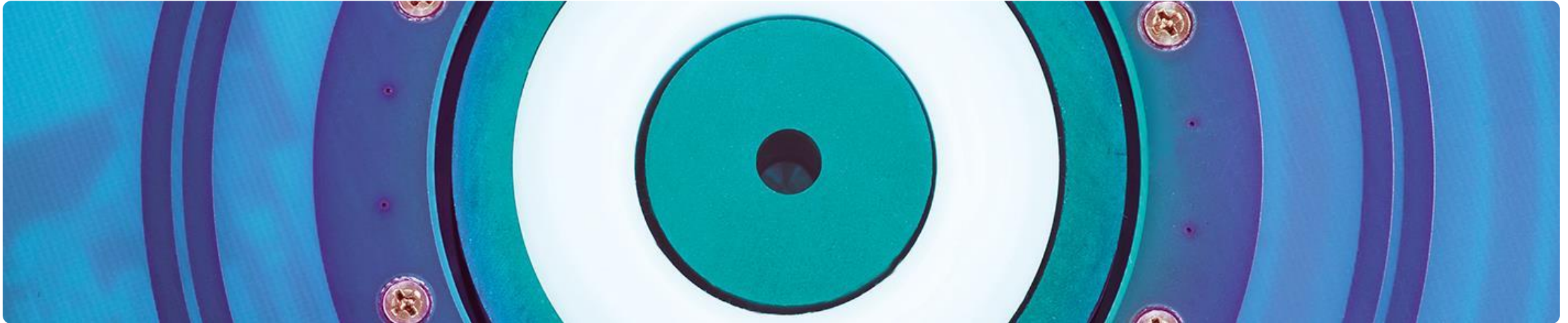
Contacting technologies



Carbon brushes are used for high power applications and long lifetime without additional lubrication. Carbon brush technology can be designed/customized in various types and sizes depending on:

- Low electrical noise < 30 mOhm
- Long operational life > 50 million revolutions
- High turning speed (typically up to 25 m/s)
- Current up to 1000A
- No additional liquid lubrication

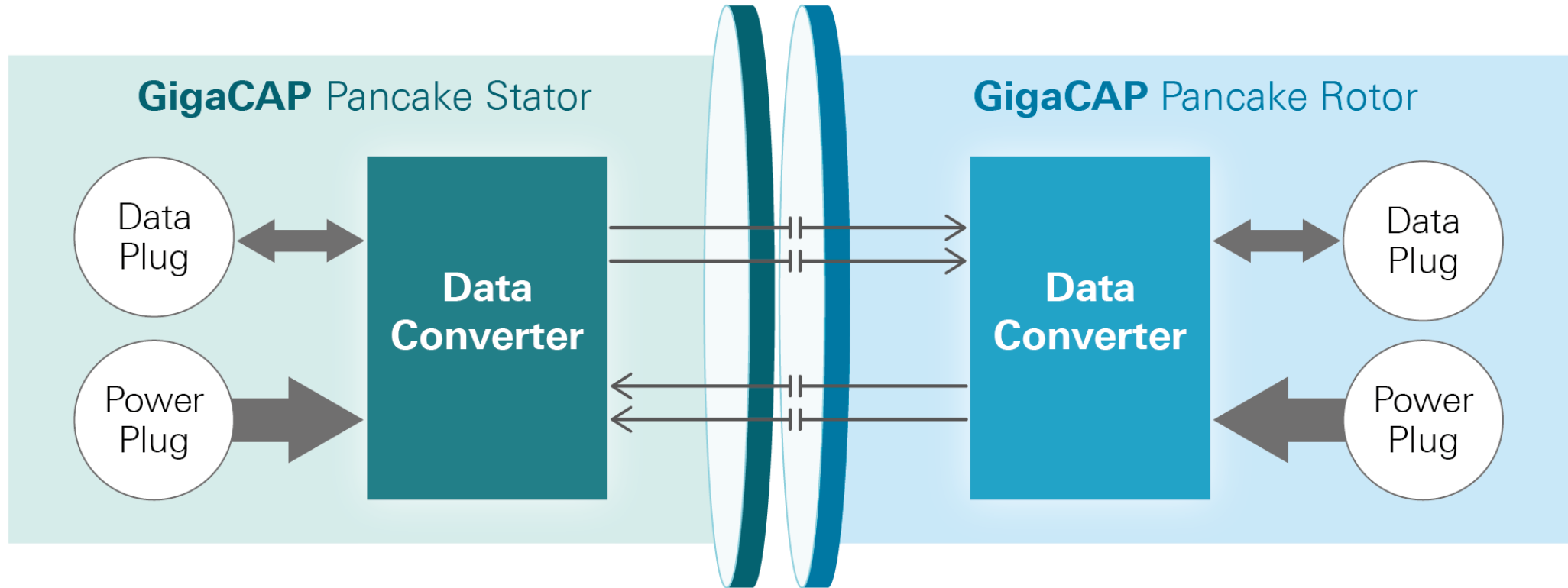
Contactless transmission



Contactless data link GigaCAP

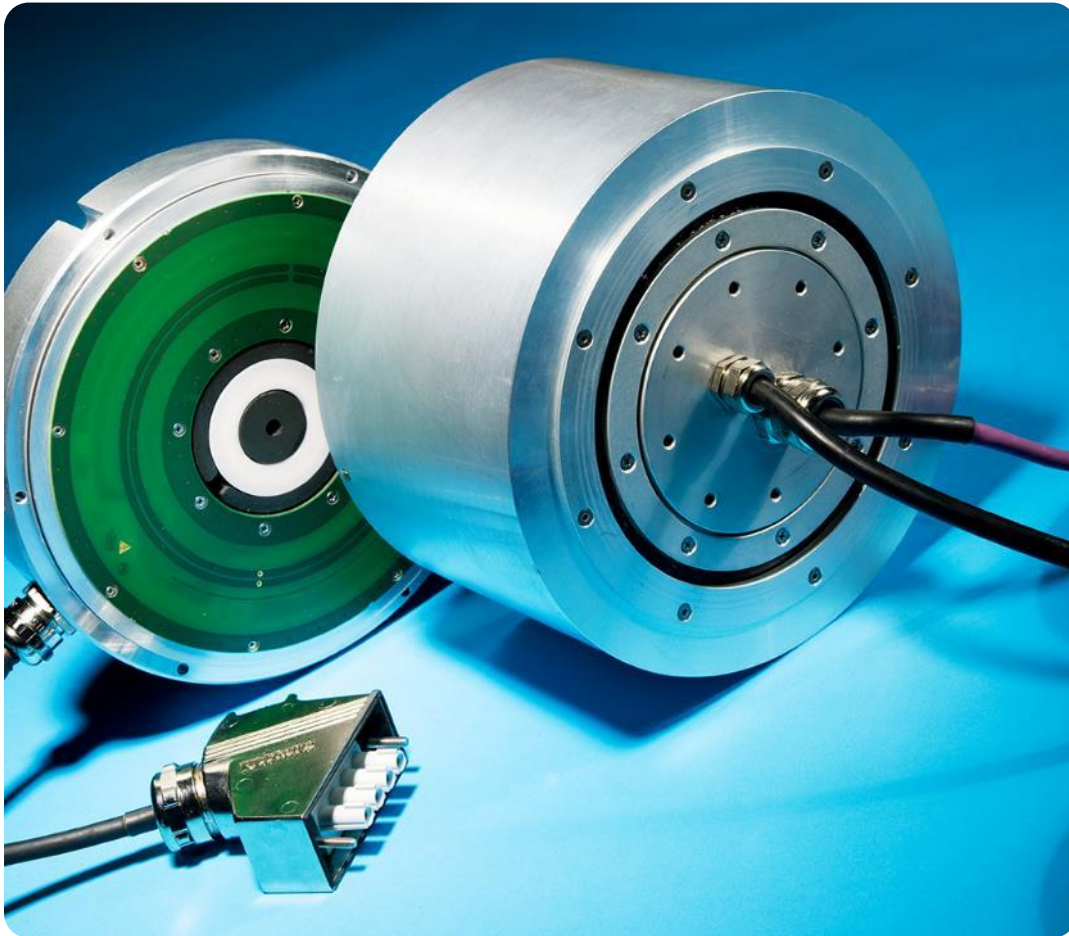
- Diameter: 70 to 1500 mm
- Data rate up to 10 Gbit/s
- Bit error rates of $<10^{-12}$
- High rotational speed
- Unidirectional or bidirectional
- High noise immunity combined with excellent EMC qualities
- Maintenance free and wear resistant
- Common data links such as: SMPTE, Ethernet and others
- Fiber or copper interface

Contactless transmission



Contactless data link GigaCAP

Contactless transmission

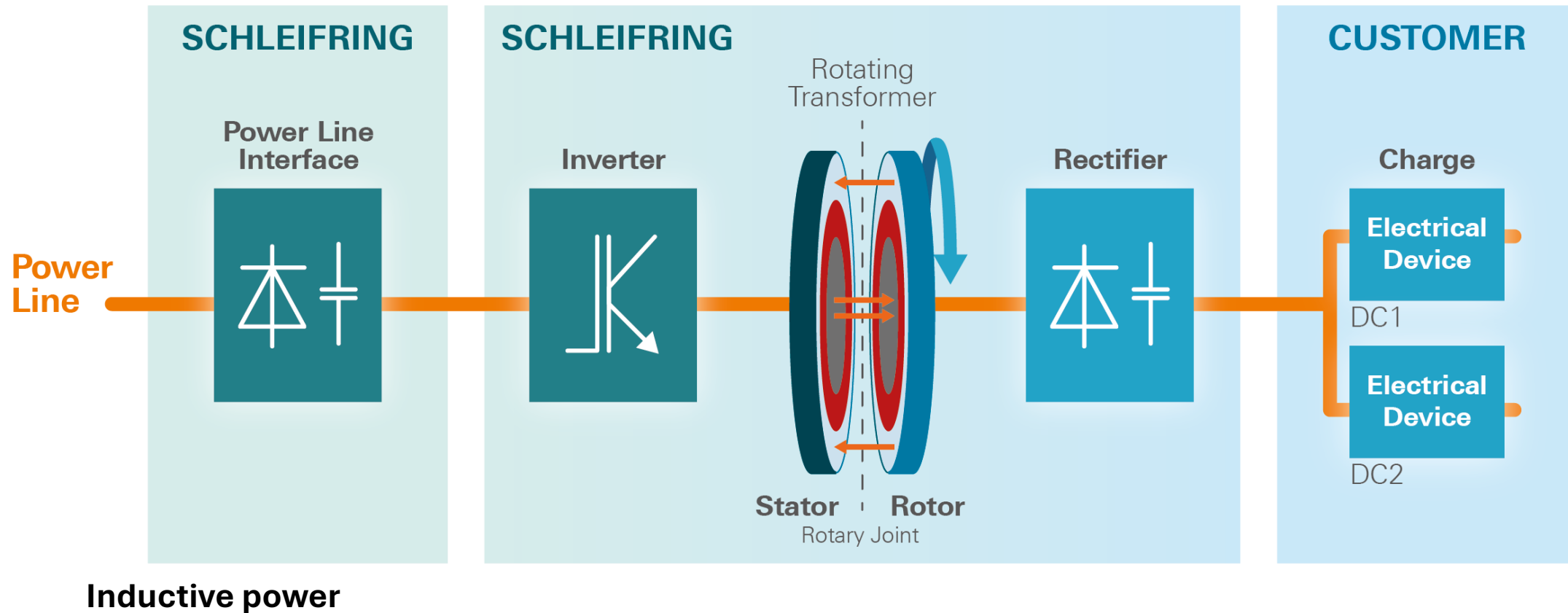


Inductive Power

In addition to contacting slip rings, contactless rotary joints are becoming more and more popular.

- Power range of 10 W to 2000 W
- High rotational speeds up to 20.000 rpm
- Power loss <5%
- Combination with contactless data transmission available

Contactless transmission



Optical transmission

Fiber optical rotary joints

FORJs ensure passive transmission of any kind of digital or analogue optical signals, independent of the data protocol.

- Unlimited data rates
- Temperature range: -55 °C to 85 °C
- Low insertion loss up to 2.0 dB
- Single-mode and multi-mode up to 60 channels
- Single channel Ø 20.0 mm | 12.000 rpm
- Multi channel Ø 12.5 mm | 150 rpm
- Multi channel Ø 60.0 mm | 100 rpm
- Unaffected by EMI



Fluid transmission



Fluid rotary joints

SCHLEIFRING offers many solutions of customer tailored fluid rotary joints.

- Transmission of cooling fluids and air
- Integration in hybrid slip rings assemblies
- Active leakage management
- Pressure up to 12 bar
- Flow rates up to 1600 l/min
- Lifetime > 30 Mio. revolutions

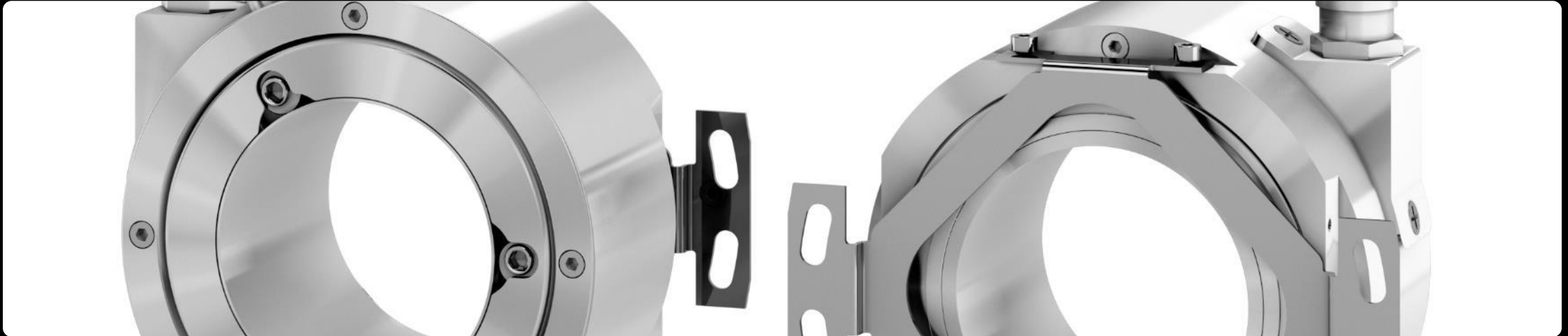
RF-Joints



Additional to almost every customized slip ring design we provide various radio frequency transmission solutions:

- Supplementary devices from L-Band to X-Band
- Integrated VHF
- Waveguides

	VHF		UHF		L	S		C	X		K	Q	V	W	
Frequency in GHz	0,2	0,25	0,5		1	2	3	4	6	8	10	20	40	60	100



Slip ring assemblies can be equipped with various angle measuring devices:

- Optical / capacitive
- Incremental / absolute
- Common protocol standards
- Reliable supply chain with established OEMs
- Ensuring system accuracy of slip ring assembly

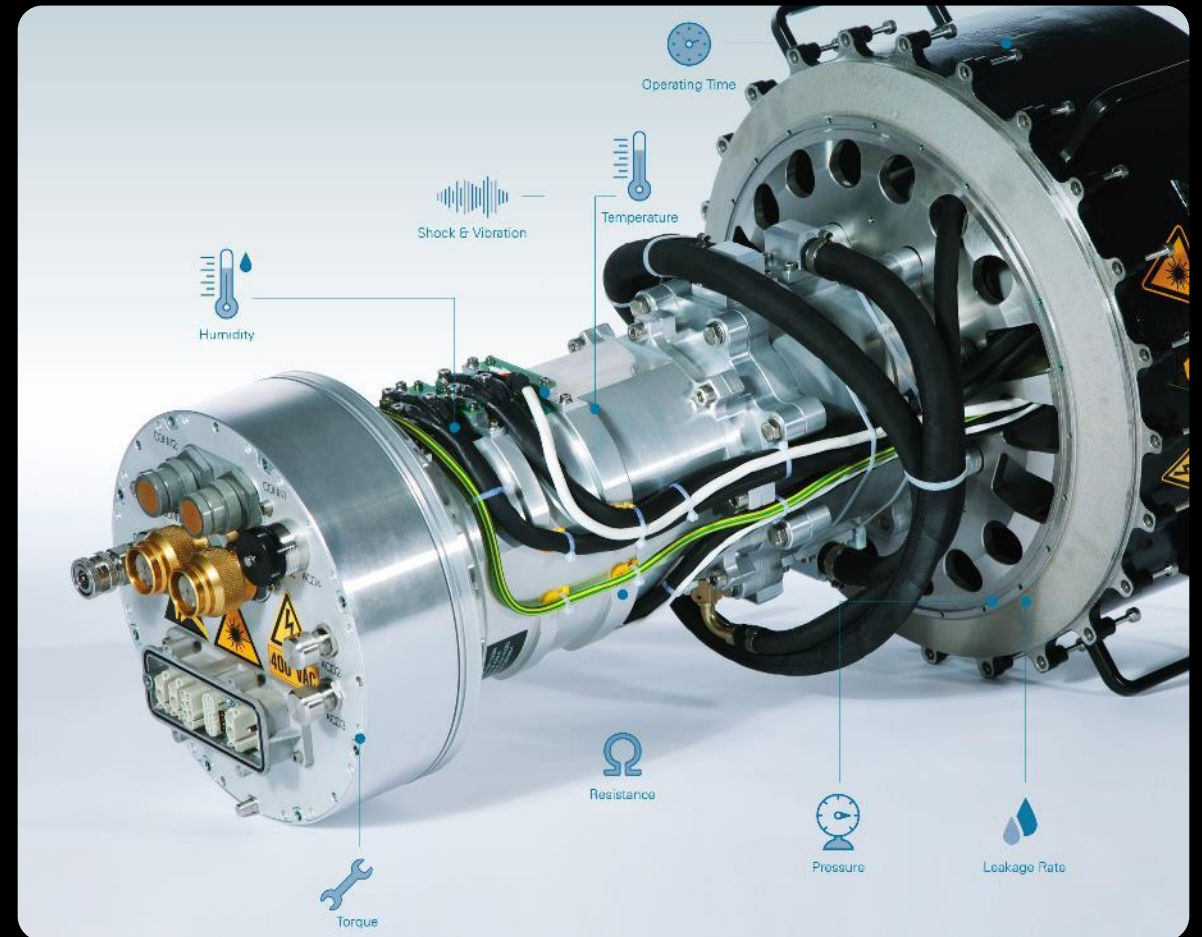
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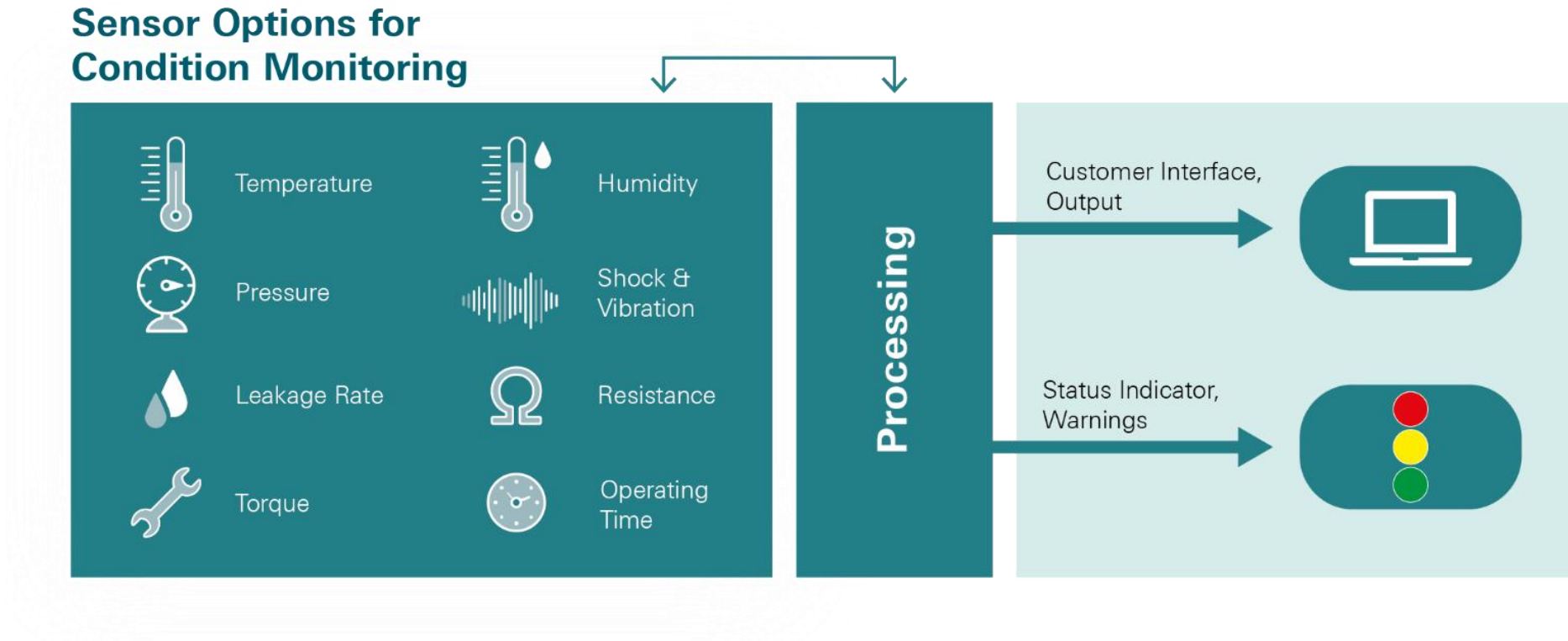
Condition monitoring

The product

The condition monitoring system for slip ring applications by SCHLEIFRING is an active system that provides data, reflecting the overall status of the slip ring unit.

It allows to analyze information about the environmental influences during operation due to the integration of versatile sensor data.





Real-time monitoring of system performance and predictive maintenance support.



Customer service

Service Agreement



SCHLEIFRING's dedicated service area: Headquarters Fürstenfeldbruck

- more than 600 square meters independent area - separated from prototype and series production
- incoming inspection, failure analysis and slip ring assembly
- service with fixed turn-around times and prices

Service tasks



Repair

Dedicated service technicians survey and repair units to ensure **fast and reliable service** to our customers.

Retrofitting

Older models in particular can benefit from being retrofitted. Our experts help you ensure your **slip ring is up-to-date**, replacing old components with **modern technologies**.

This allows you to get the most out of each slip ring – regardless of whether it's been in operation for 10, 20 or 40 years.

Service tasks

Maintenance

Proficient technical support and maintenance over the **entire service life** ensure that your slip rings always run on **state-of-the-art technology**.

Overhaul

In the overhaul process **all wear parts are renewed** – from the brush block to the media lines.
Afterwards, transmission will run just **like it did on day one**.



SCHLEIFRING

