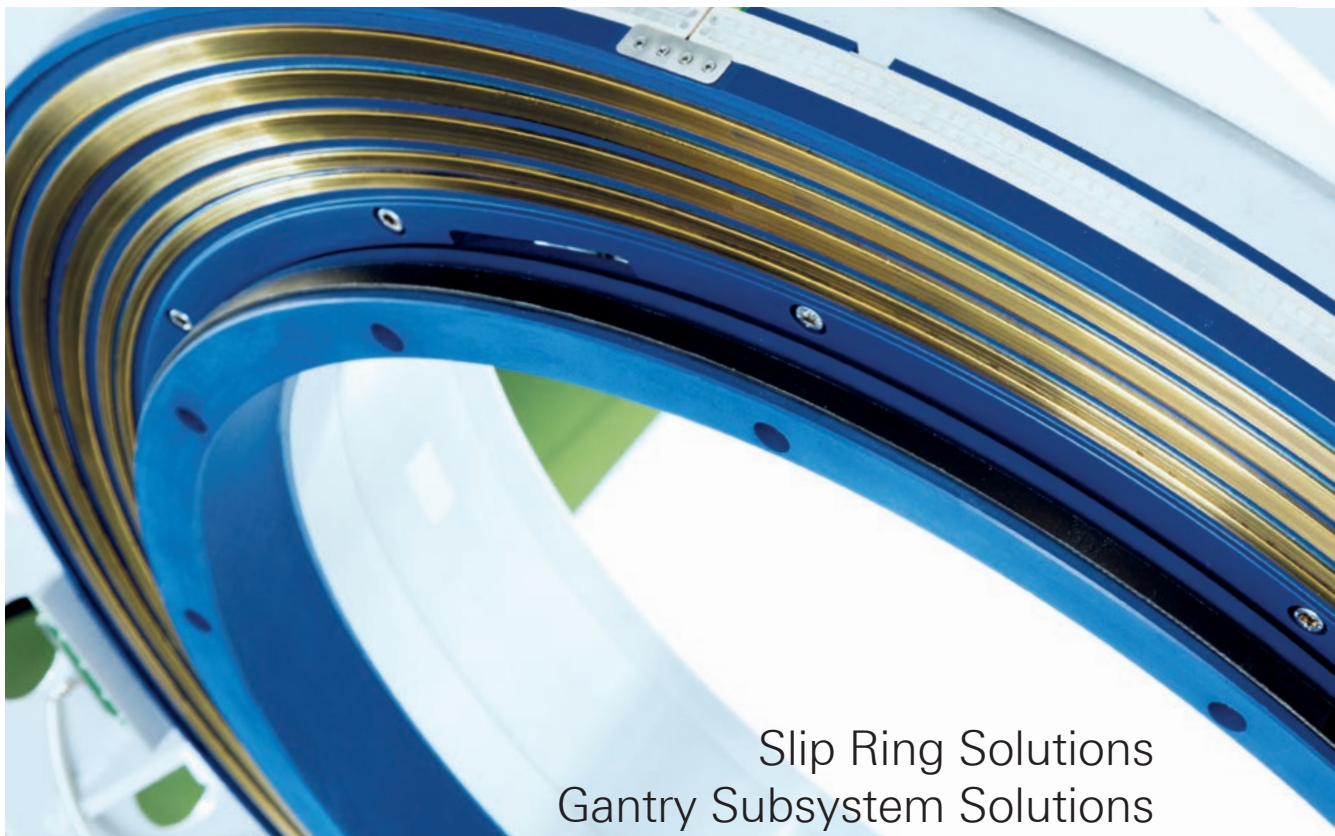




SCHLEIFRING

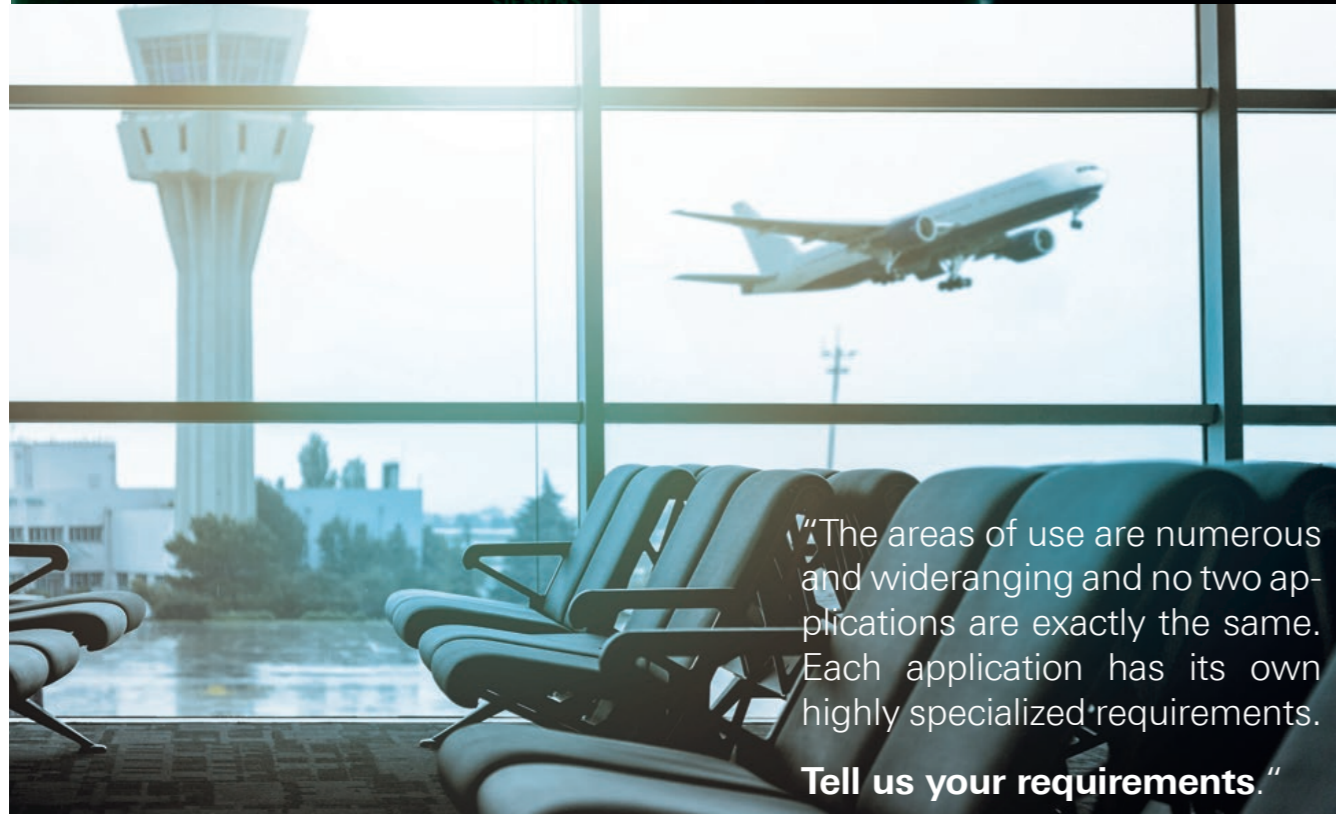
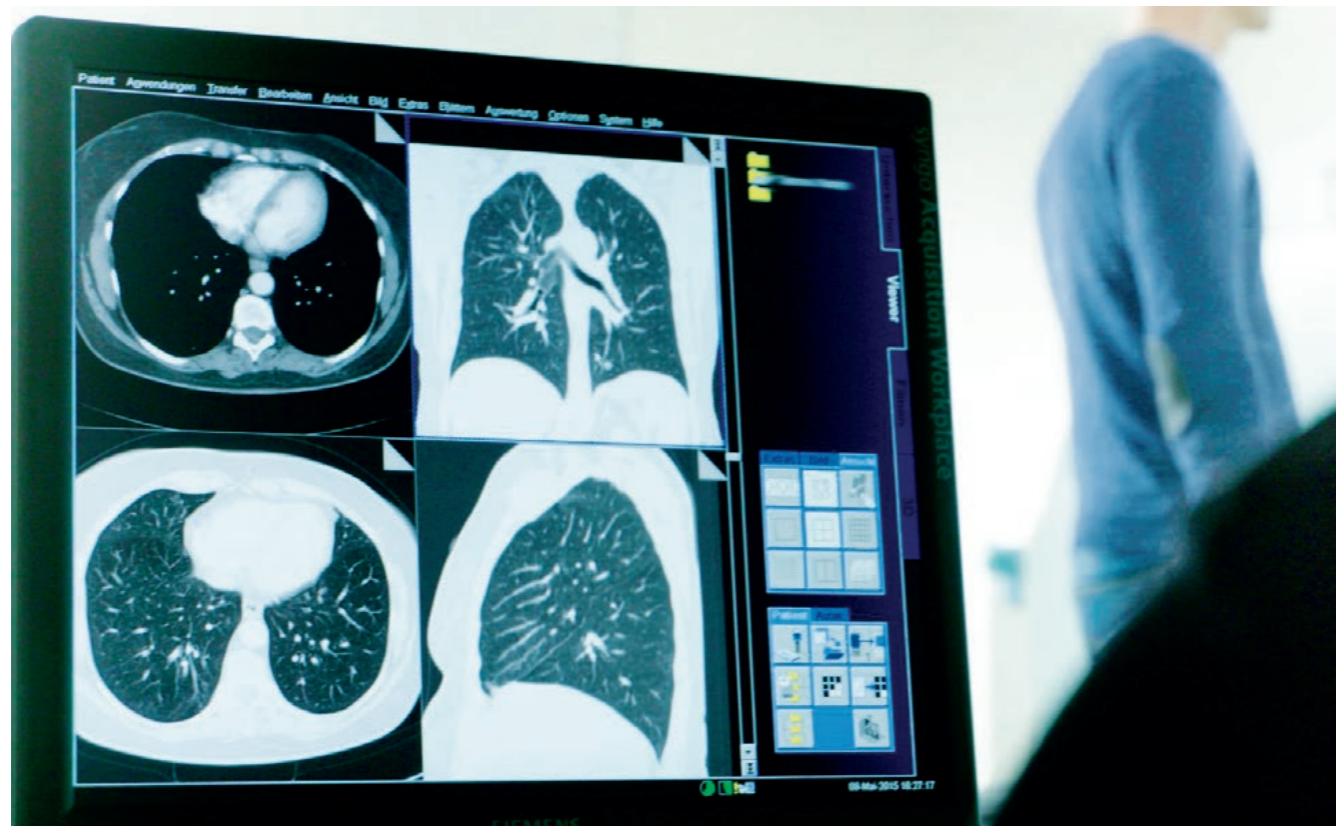


Slip Ring Solutions
Gantry Subsystem Solutions

CT Applications

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"The areas of use are numerous and wideranging and no two applications are exactly the same. Each application has its own highly specialized requirements.

Tell us your requirements."

About SCHLEIFRING

Company Name

Slip rings are our business. That is why we called our company SCHLEIFRING. This is the German word for slip ring.

Foundation

1974

Employees

More than 650 and we are growing steadily.

Research & Development

More than 15% of our employees work in R&D in 9 different laboratories.

Company Philosophy

This is what we stand for:

- highly innovation-based products
- sustainable quality
- fair competition

Certified Management System

We fulfill the requirements of DIN EN ISO 9001:2008

Patents

More than 230 in the last ten years. And the number is still increasing.

Corporate Video

Learn about all our miscellaneous applications in our corporate video and experience our technologies.



Worldwide Network

SCHLEIFRING GmbH, Germany

Headquarters and plant
Production plant
XRing Technologies GmbH

SCHLEIFRING Group worldwide

Schleifring North America, LLC
Schleifring Medical Systems, LLC
Schleifring Systems Ltd.
Schleifring Transmission Technology (Tianjin) Co. Ltd.



Fuerstenfeldbruck, Germany
Kaufbeuren, Germany
Fuerstenfeldbruck, Germany

Chelmsford, MA, USA
Elgin, IL, USA
Newbury, UK
Tianjin, China

SCHLEIFRING – Complete Product

Our Complete Package Adds to your Competitiveness

5. Enhance your supply chain with fast and direct communication

- State-of-the-art supply chain processes
- Tailored to the customer's needs
- Cost-oriented

The correct number of parts delivered at the right time to the right place – we are the right partner.

4. Rely on our support – including after-sales support

- Technical support worldwide
- EMC testing

Our team is equipped to solve unexpected issues as fast as possible worldwide.



1. Be the first to implement competitive technology

- Over 40 years of experience
- Highly skilled engineers
- In-house development
- Customized solutions

Our business principle is cutting-edge technology – the basis on which our projects are started.

2. Overcome engineering challenges

- Power, signal and data transmission
- Bearings and drive trains
- Individual product or fully integrated package

Based on the extensive experience of our engineers, we will develop a solution tailored to meet your individual requirements.

3. Count on high-quality production

- In-house manufacturing
- Innovative industrial processes
- Specialist engineering know-how

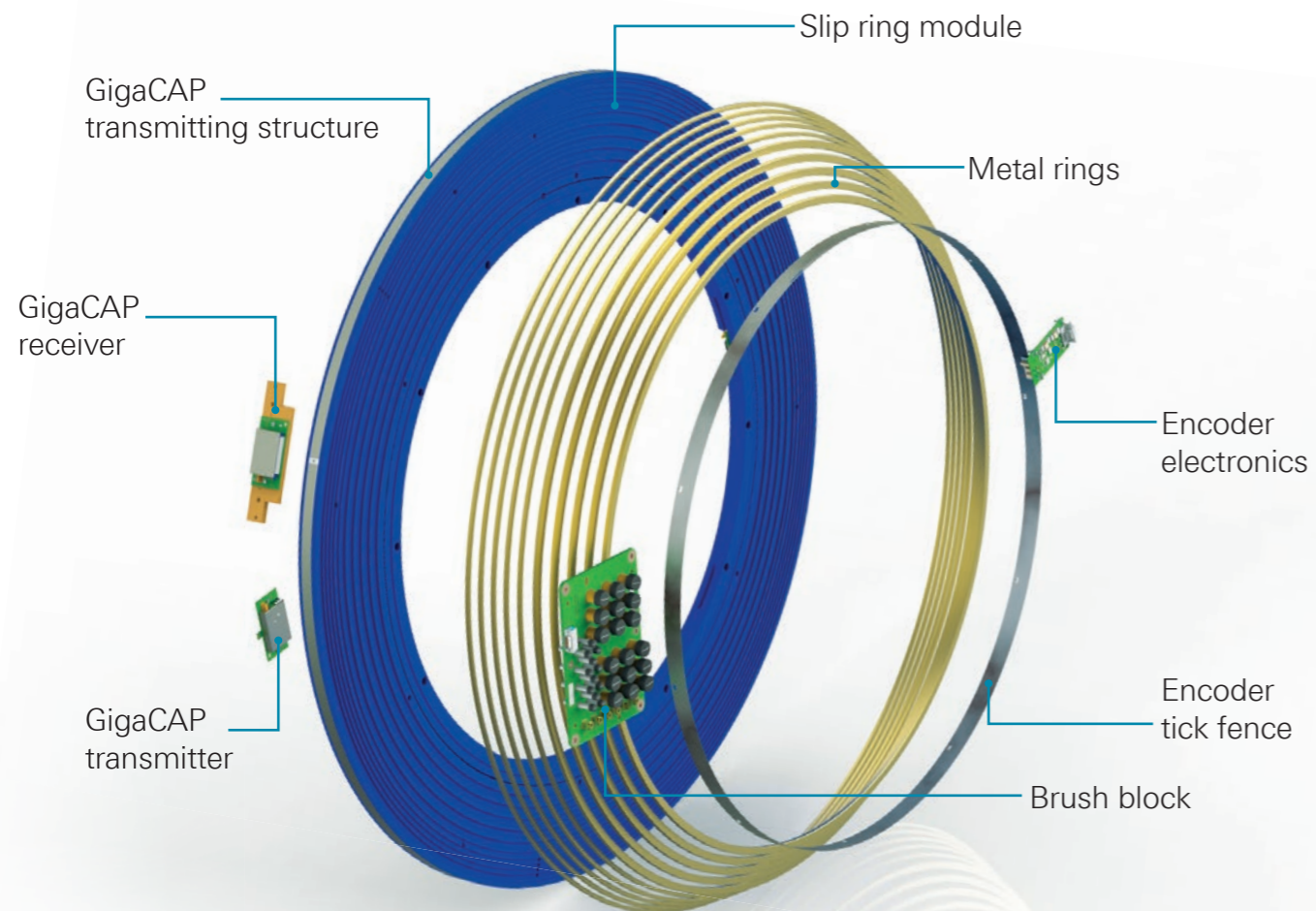
Rely on the highest quality and efficient production processes of the largest slip ring factory in the world.

Technology Overview

Our products range from slip rings to fully integrated gantry subsystems developed to fulfill your requirements. With state-of-the-art technologies, intelligent mechanical design and efficient manufacturing processes, we customize our solutions and deliver quality made in Germany.

Typical Slip Ring System Features Include

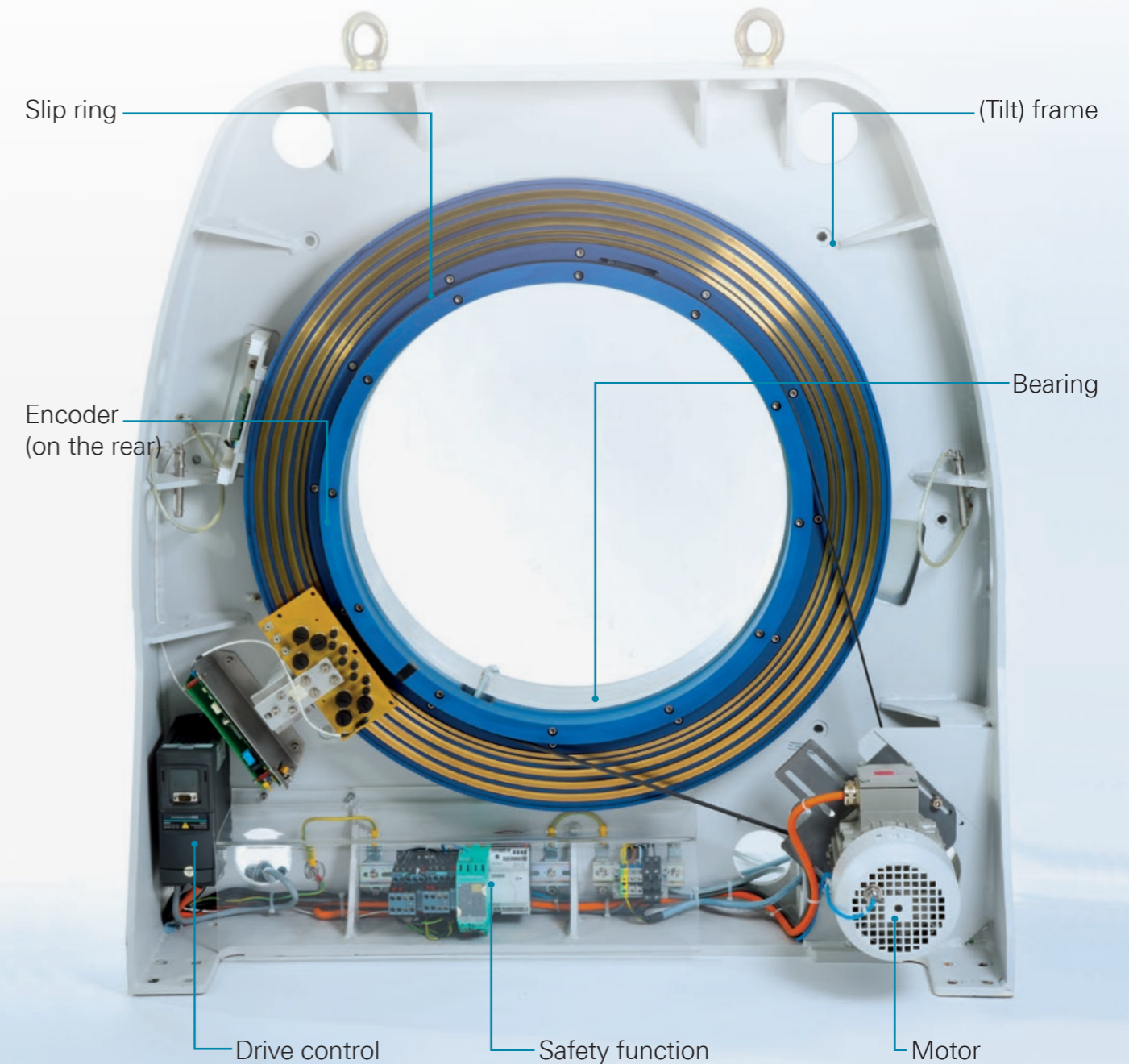
- Contacting slip ring with metal rings integrated into an isolating slip ring module and a brush block for contacting power and signal transmission
- GigaCAP data link for image data transmission with transmitting structure, transmitter and receiver
- Encoder with tick fence and pick-up electronics



Technology Overview

Typical Gantry Subsystem Features Include

- Basic frame structure – tilting or non-tilting
- Bearing – inner diameter chosen to suit your requirements
- Slip ring or contactless power transmission system with image data link and encoder
- Motor, drive control and safety function



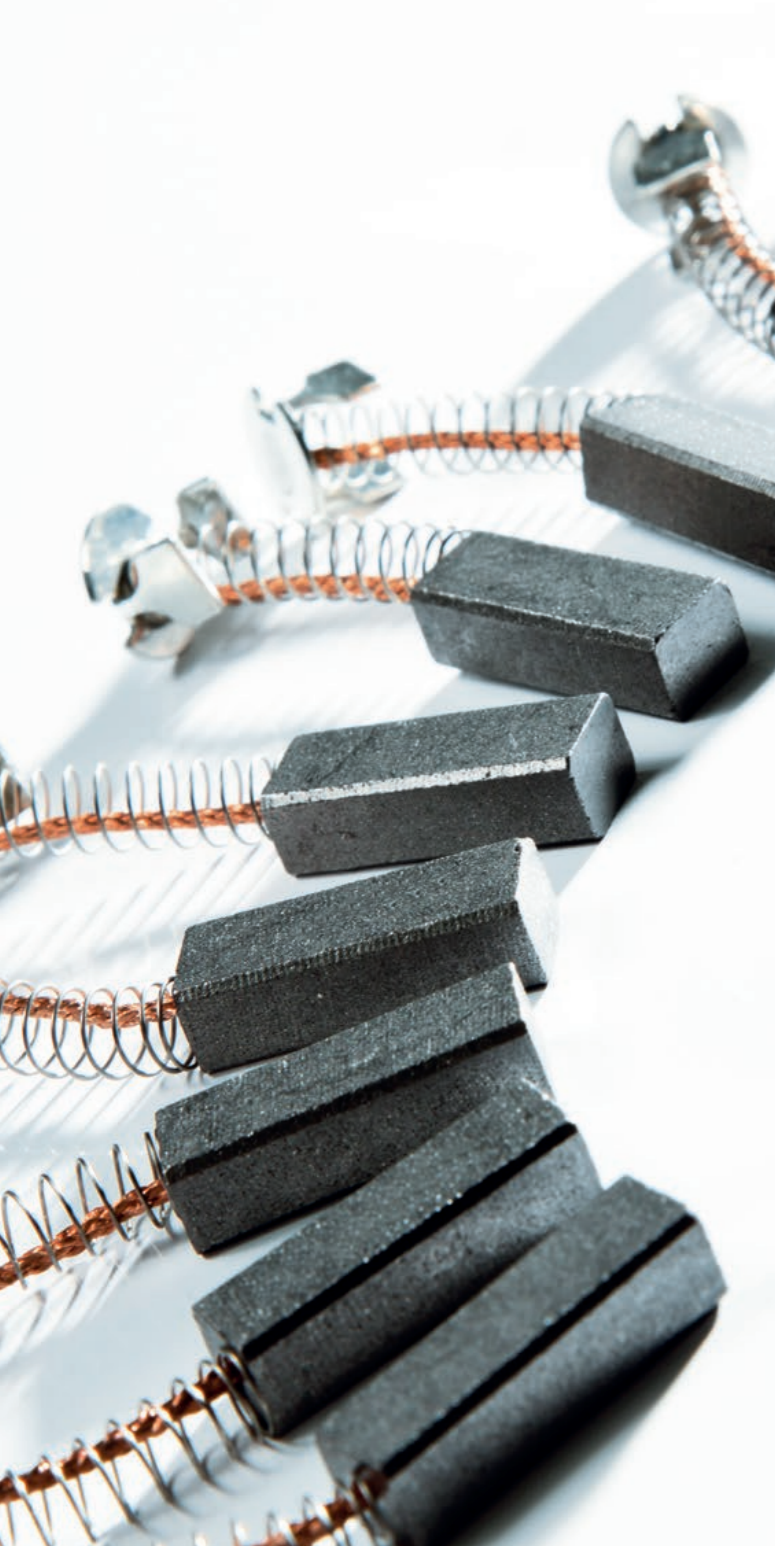
Power Transmission Contacting

Contacting Power Transmission via Brushes

Experience, expertise and continuous improvement are the basis of our cutting-edge contacting power transmission technology.

Metal-Graphite Brushes on Metal Rings

- Voltage range up to 1,000 V DC
- Currents up to 300 A
- Highest rotational speeds, which can even exceed 300 rpm
- 40 years of experience and successful operation in all environments



Power Transmission Contactless

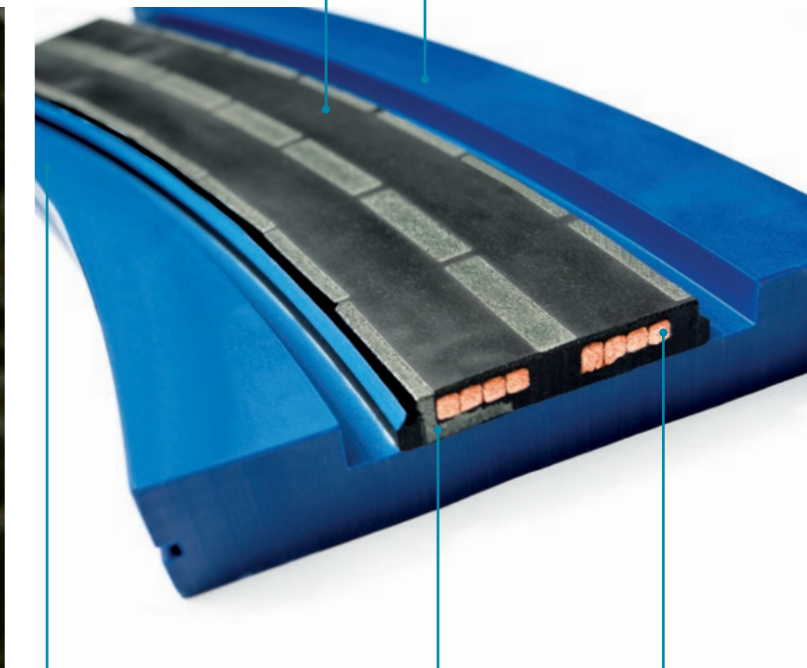
Contactless Power Transmission (CPT)

To meet the highest requirements on service life, rotational speed and integration, we developed the perfect solution. The SCHLEIFRING CPT.

- No wear
- Auxiliary power up to 10 kW
- Highest rotational speeds, which can even exceed 300 rpm
- Maintenance-free
- Longest service life



Casting compound — Slip ring module



GigaCAP transmitting structure

Ferrite cores

High-frequency strand

Signal & Data Transmission Contacting



Contacting Signal & Data Link

An experienced team of contacting-material experts is working on finding the perfect solution for your application – every day!

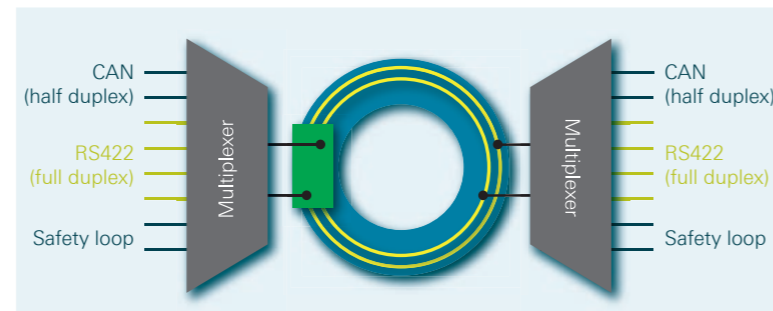
Metal-Graphite Brushes on Metal Rings

- Various data rates and protocols
- Bit error rate <math>< 10^{-9}</math>
- Long service life

Are you looking for more sophisticated solutions? We offer additional features to customize your signal and data transmission.

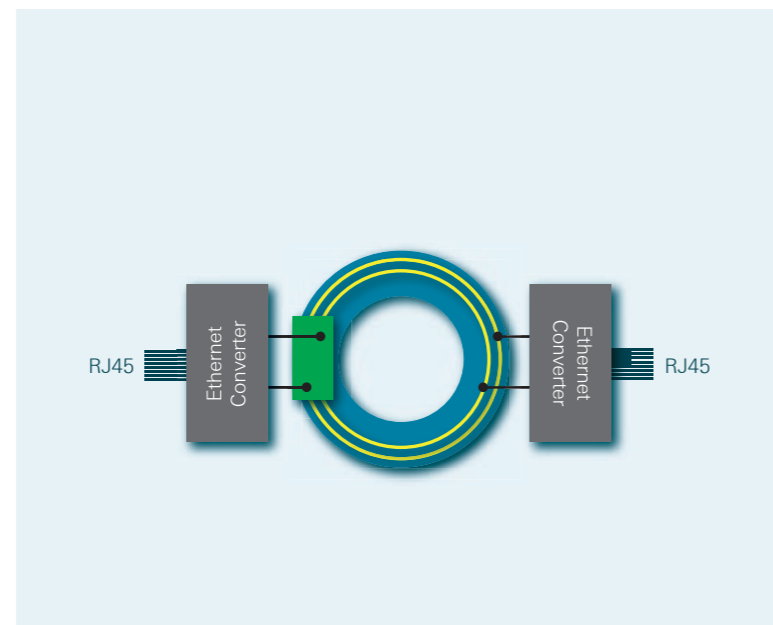
1. Our Multiplexer Technology for Field Buses

- Three buses across two tracks (CAN, RS422, safety loop)
- Data rate 250 kbit/s respectively 4 Mbit/s
- Reliable and proven standard technology



2.1. Ethernet – Low Latency

- Data rate 15 Mbit/s per two tracks
- Latency (RTD) <math>< 0.5</math> ms deterministic
- Forward-error correction enabling bit error rate of 10^{-11}
- Customer Interface Ethernet connector (RJ45), alternatively (Reduced) Media Independent Interface (RMII/ MII)



2.2. Ethernet – High Data Rate

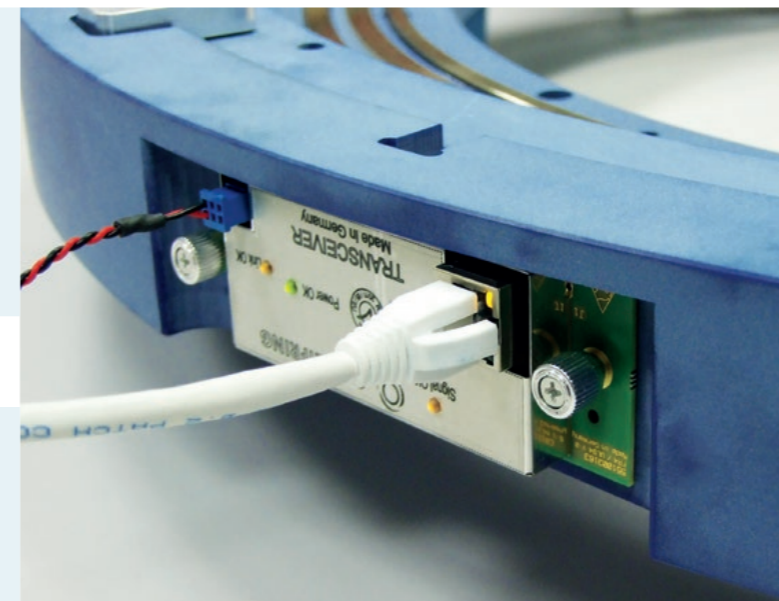
- Data rate 25 – 40 Mbit/s (full duplex on two tracks)
- Latency 1.5 – 3 ms
- Very high level of EMS robustness

Signal & Data Transmission Contactless

Capacitive Data Link GigaCAP

The world is getting faster every day.
– Keep pace using our GigaCAP technology.

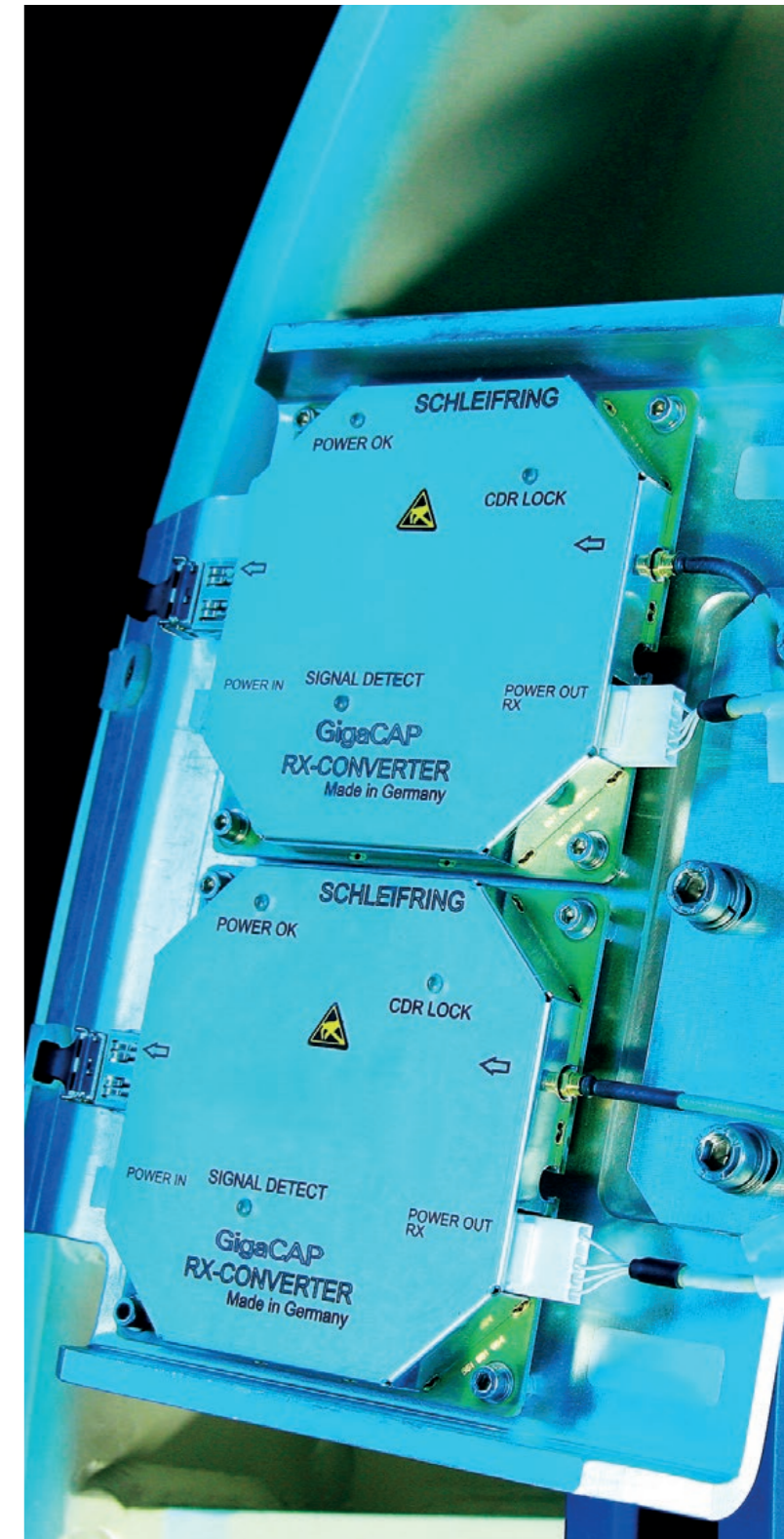
- No wear
- Data rate up to 10 Gbit/s per track
- Bit error rate <math>< 10^{-12}</math>
- Stackable tracks
- No rotational-speed limits
- Maintenance-free
- Longest service life
- Very robust capacitive technology (proven in hospitals, airports and outdoor applications)
- High compatibility (low emission level, high noise immunity)
- Customized integration



Gigabit Ethernet GigaCAP

Bidirectional contactless data transmission with standardized interface to your system.

- 1000Base-T, IEEE 802.3ab compliant
- Standard connection (RJ45)
- 2 x 1 Gbit/s bandwidth (full duplex)
- Low latency <math>< 30</math> μ s
- Cost-saving system architecture (customer system can be built with standard parts)
- Compact design
- Identical transceivers in rotor and stator
- All advantages of GigaCAP base technology

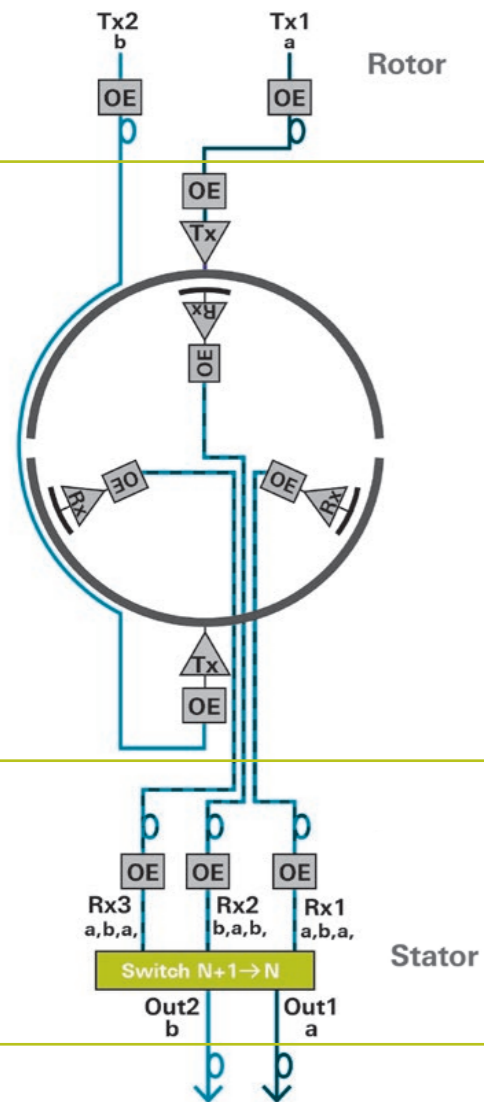


Signal & Data Transmission Contactless

Capacitive Data Link GigaCAP-HD

Are you looking for extremely high data rates on a compact footprint?

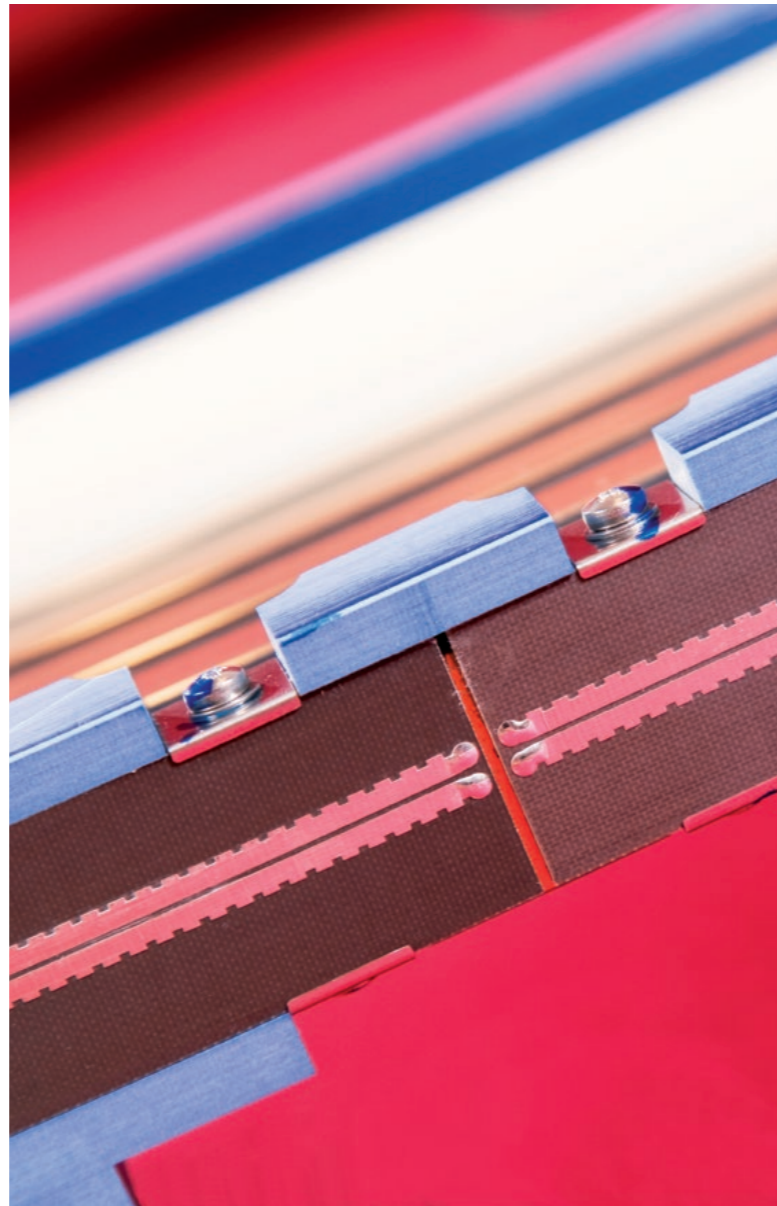
- Extremely high data rates of up to several hundred Gbit/s on a compact footprint
- Single segments up to 10 Gbit/s
- Up to ten segments in series
- Possibility of 64b66b coding
- Shorter transmitting structures – further improvement of EMC properties
- Scalable platform
- Upgrade possibilities
- Switch can be realized in hardware or in IP core



Customer interface rotor

Customer interface stator "FW switch"

Customer interface stator "HW switch"

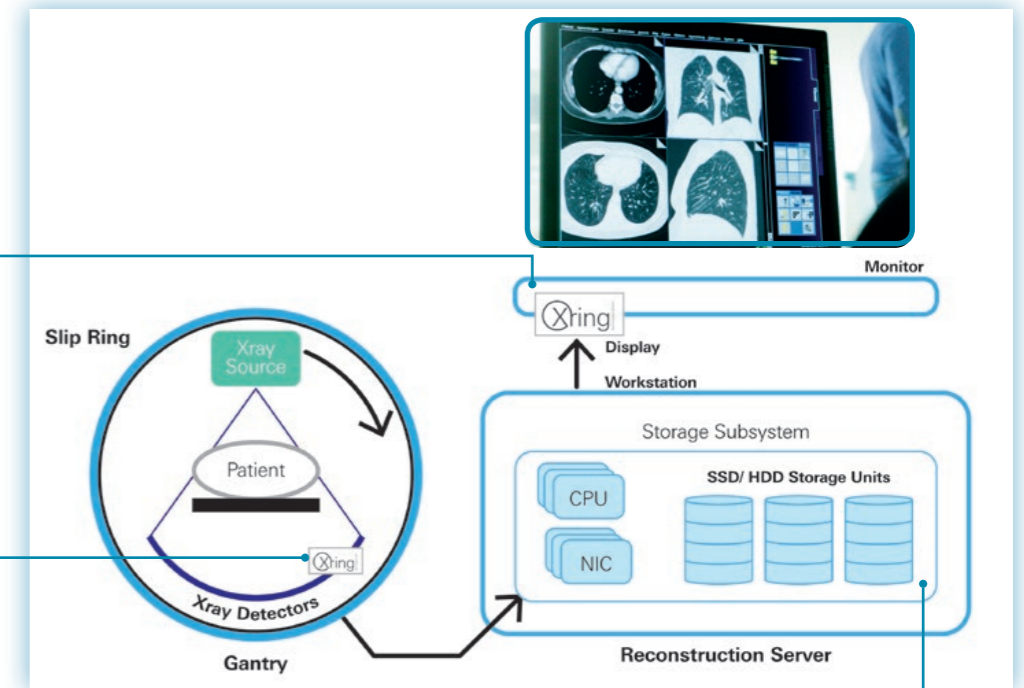


Signal & Data Transmission Contacting and Contactless

Xring decompressor in software or firmware (ideal location)

Xring compressor

Cost reduction by reducing throughput



Xring Technologies - Compression and FEC

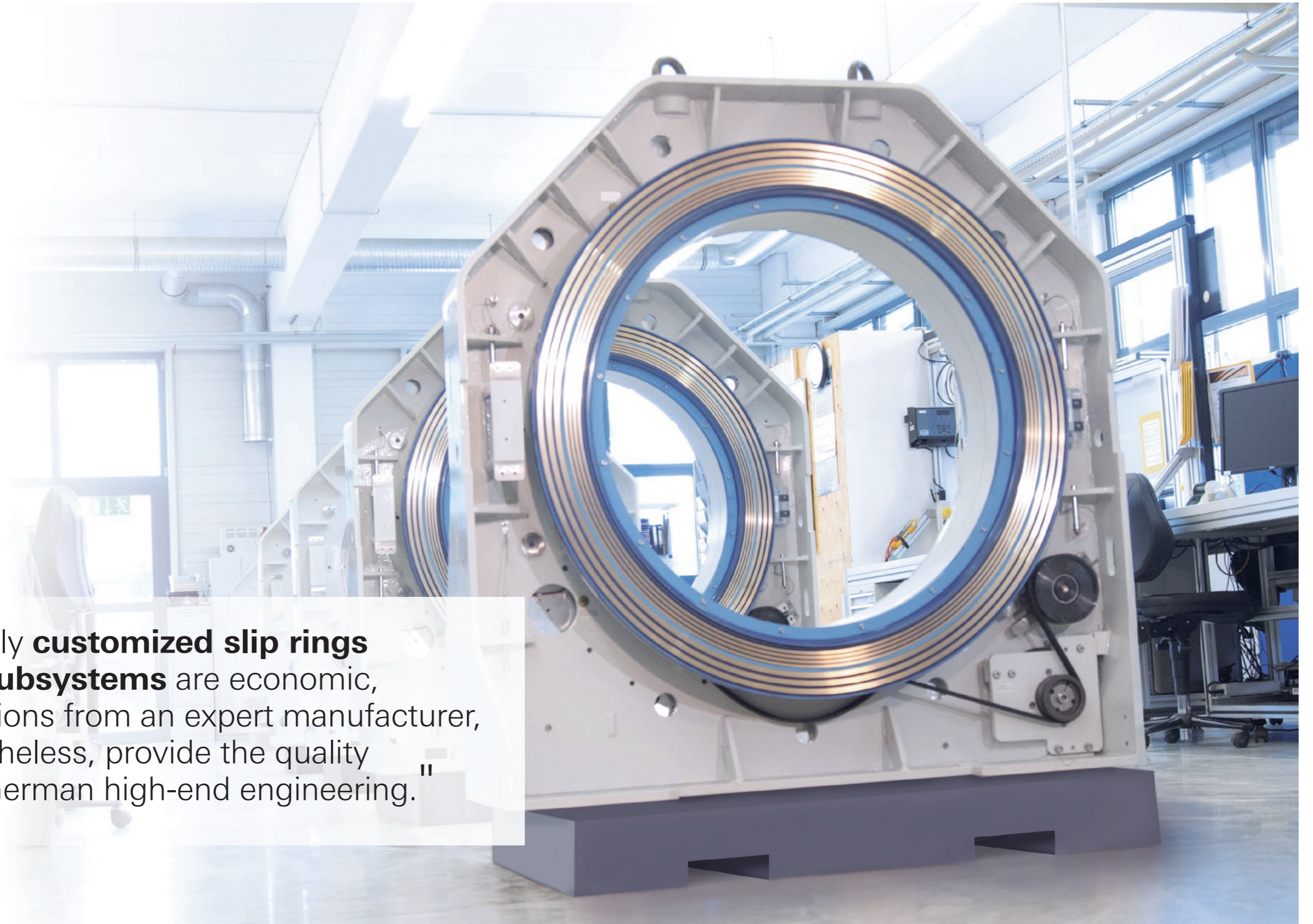
The demand for high data rates is increasing constantly, but what keeps system costs in check? Compression leads to reduced real-time memory bandwidth requirements and has the potential to reverse the increase in system costs.

- Lossless compression: typical ratios 1.8:1 – 2.2:1
- Lossy compression: typical ratios 3:1 – 8:1
- Easy to implement
- Easy to test: SW available for Linux and Windows
- Compression and decompression algorithm in FW and SW
- Reduce real-time storage bandwidth requirements and costs
- Forward error correction with minimal overhead (< 3%) resulting in bit error rate 10^{-28}
- Scalable platform
- Upgrade possibilities
- Patented technology

Fiber Optic Rotary Joints (FORJ)

- Inherently immune against EMI/ EMC
- Single-channel or multi-channel (up to 60)
- Different single-mode or multimode fiber types
- High rotational speeds
- Contactless high-speed data transmission > 10 Gbit/s





"Our individually **customized slip rings** and **gantry subsystems** are economic, efficient solutions from an expert manufacturer, which, nevertheless, provide the quality expected of German high-end engineering."

Gantry Subsystems



Fully Integrated Gantry Subsystems

A single fully integrated system tailor-made to meet your requirements.

Mechanical Design

- Gantry frame (tilt and non-tilt)
- Interfaces
- Bearing assembly
- Scanner disk
- Safety function

Drive System

- Belt drive with tensioning system
- Direct drive
- Safety functions
- Inverter
- Positioning mode
- Speed mode
- Complete layout

Slip Ring System

- Fully integrated and customized slip ring
- Encoder system

Our Service for you

- In-house gantry design and manufacture
- Assembly and testing of the complete gantry sub-system
- Design evaluation and optimization of existing designs

Gantry Subsystems

Encoder

- Physical principle: optical slot aperture (magnetic encoders available for special applications)
- Interface: digital quadrature output (tick A, tick B) with index pulse (home)
- Levels: TTL (5 V) or HTL (24 V)
- Resolution: typically 4 x 1,440 ticks/ revolution; ~0.06°
- Accuracy: typically < 0.1° absolute (integral) inaccuracy and < 0.02° relative (edge-to-edge) inaccuracy
- Multiplexed encoder

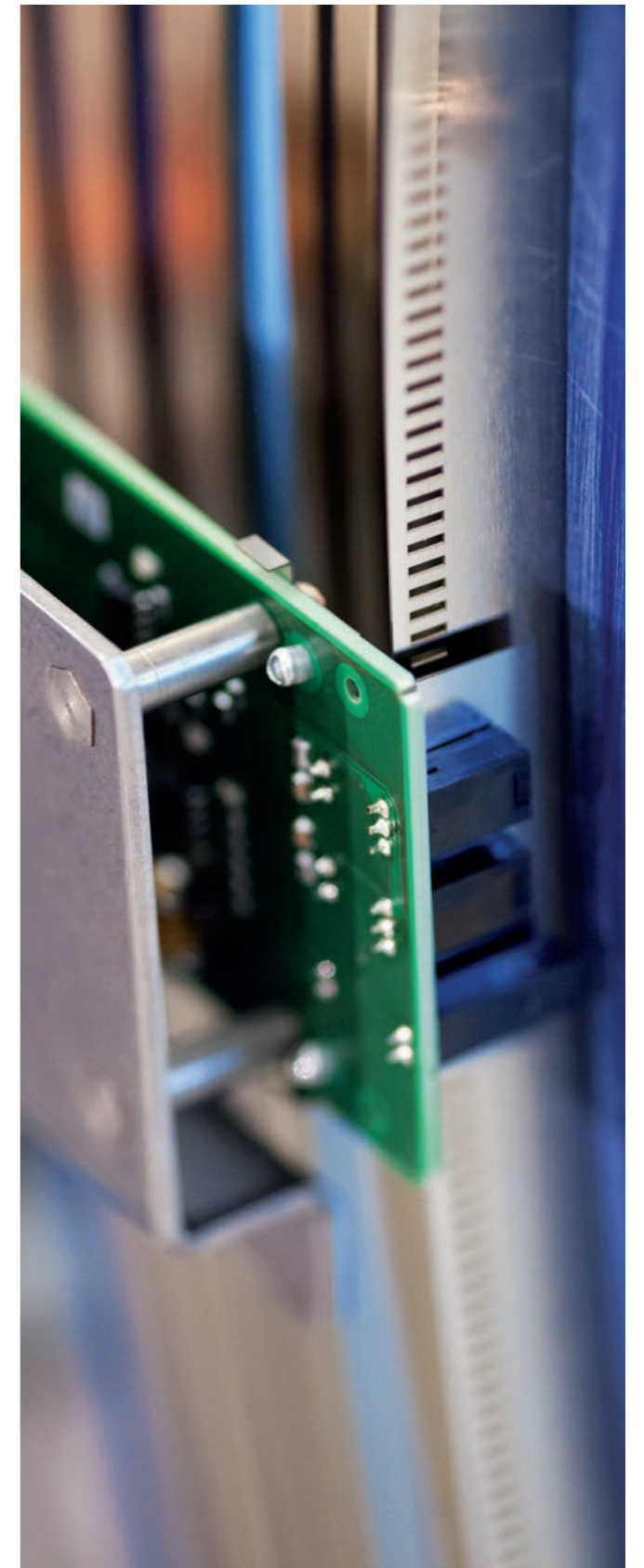


Safety Function

The gantry is designed to eliminate hazards and reduce risks through its design, e.g. by using safety factors, etc. Where this is not feasible, risk reduction is achieved by implementing safeguards and taking complementary protective measures.

Safety Functions

- Overspeed
- Standstill
- Emergency stop according to IEC 60204-1 and ISO 13849-1 or IEC 62061



Prototype development

Vibration analysis and balancing

Design of serial products

Optimization of existing designs

Local sourcing

FEM investigation

Worldwide service

Prototype and serial production

EMC testing and optimization

Spare parts management

Operator and field service training

Individual logistics

Some things run quietly in the background. But without them our world would be different. They work inconspicuously and dependably, and are indispensable for many demanding applications and products. They help ensure the correct diagnosis, assist in healing and help save lives.

Our slip ring systems and gantry subsystems are developed and built one at a time for each unique application. State-of-the-art engineering from Germany you can rely on.



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