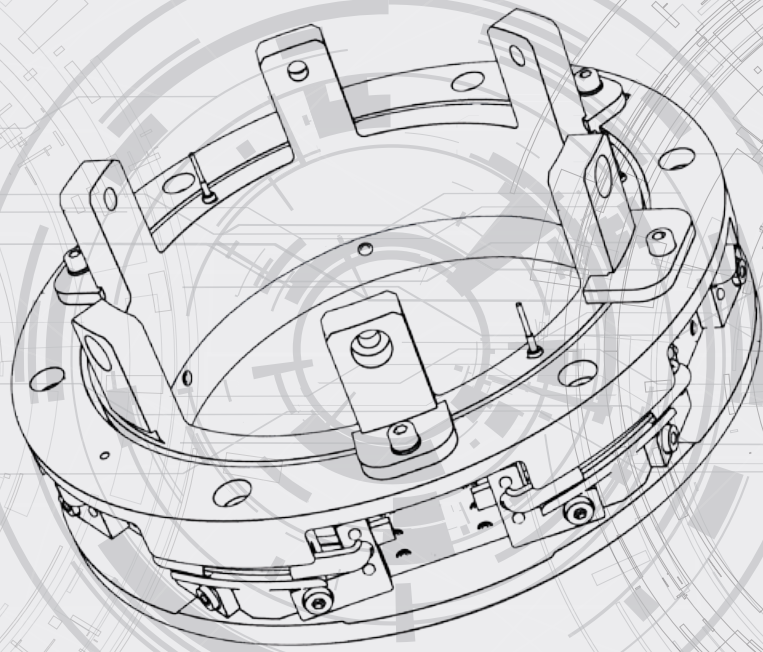
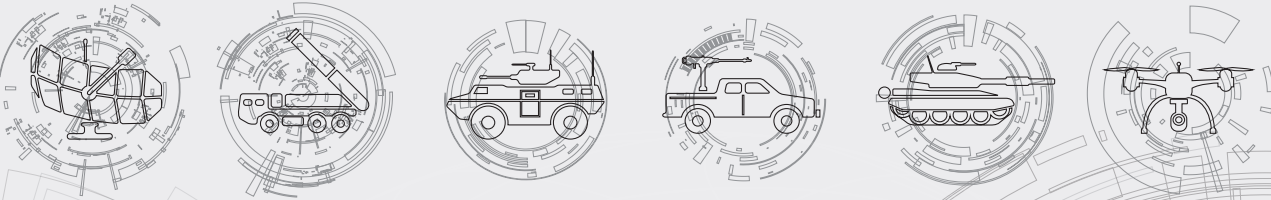




SLIP RING SOLUTIONS

DEFENCE AND SURVEILLANCE



Kraus®

Elektrotechnik



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Kraus Elektrotechnik was founded in 1955 and at present employs over 200 people within its group. As a successful family enterprise we carry a special responsibility for quality and service that you as our customer will profit from. Thanks to a large product range and close association with our affiliated companies EKR and Kraus Kunststofftechnik we can offer a 'one-stop' service. No matter if in serial production or manufactured individually according to your specification, every project will be diligently processed.

Our Team is permanently working on innovative technologies, constantly improving our components and making sure to always provide our customer with suitable solutions and state-of-the-art products. We provide a fast and reliable service and offer you our assistance wherever necessary. With our global agencies we are furthermore able to ensure efficient support for your international activities.

Moreover our company is certified according to DIN EN ISO 9001, IECEx and ATEX according to directive 2014/34/EU.



REMOTE WEAPON STATIONS

Remote Weapon Stations (RWS) have various systems and sights in need of transmitting power and signals to the rotatable platform.

KRAUS Elektrotechnik provides slip ring solutions for light as well as medium caliber weapons, adapted designs for land, naval or airborne applications, customized for each customer platform.

LAND, NAVAL AND AIRBORNE SYSTEMS



RINGMOUNTS

The rotation of a protected Ringmount is often supported by an electrical drive system using slip rings to distribute power and signals to a joystick.

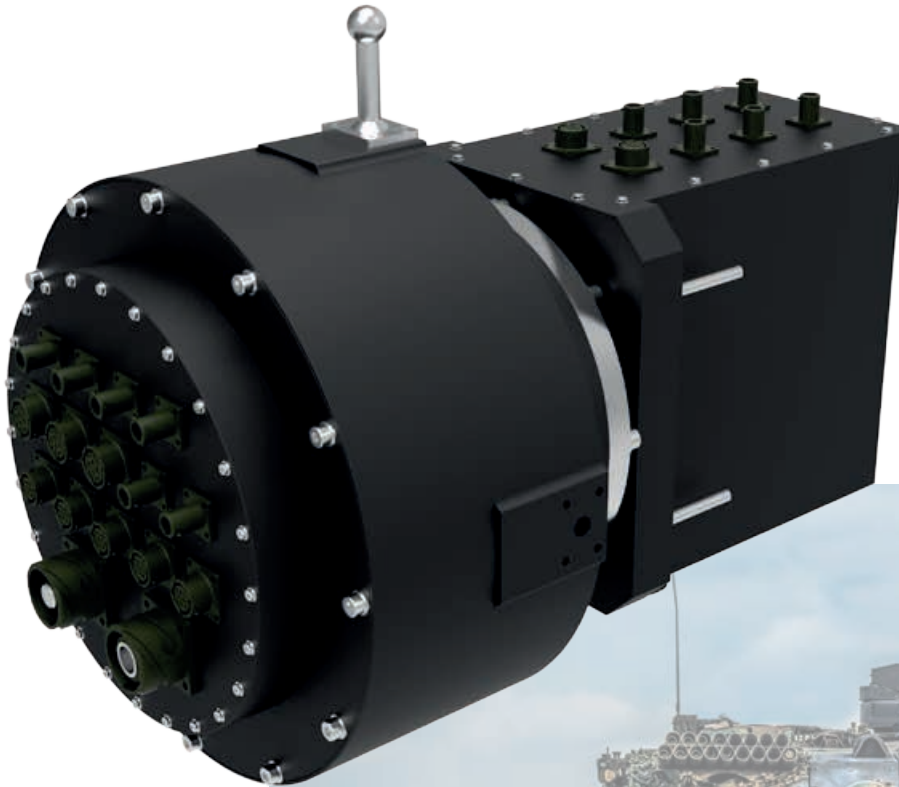
KRAUS Elektrotechnik provides large diameter slip ring systems for new and retrofitted platforms, transmitting the needed power and signals fulfilling harsh environmental requirements.

MANNED LAND SYSTEMS

TURRETS

Slip rings for turrets mounted on vehicles and/or tanks. KRAUS Elektrotechnik provides customized slip ring designs transmitting power and signals depending on the systems mounted on turrets.

The Systems are optimized to handle recoil as well as harsh environmental requirements.



LAND SYSTEMS

TURRETS

Slip rings for remotely controlled deck guns mounted on ships. Customized slip ring designs depending on applications such as anti-aircraft, littoral and conventional naval gun systems can be provided by KRAUS Elektrotechnik.

Optimized to handle recoil and resonance frequencies in ships.

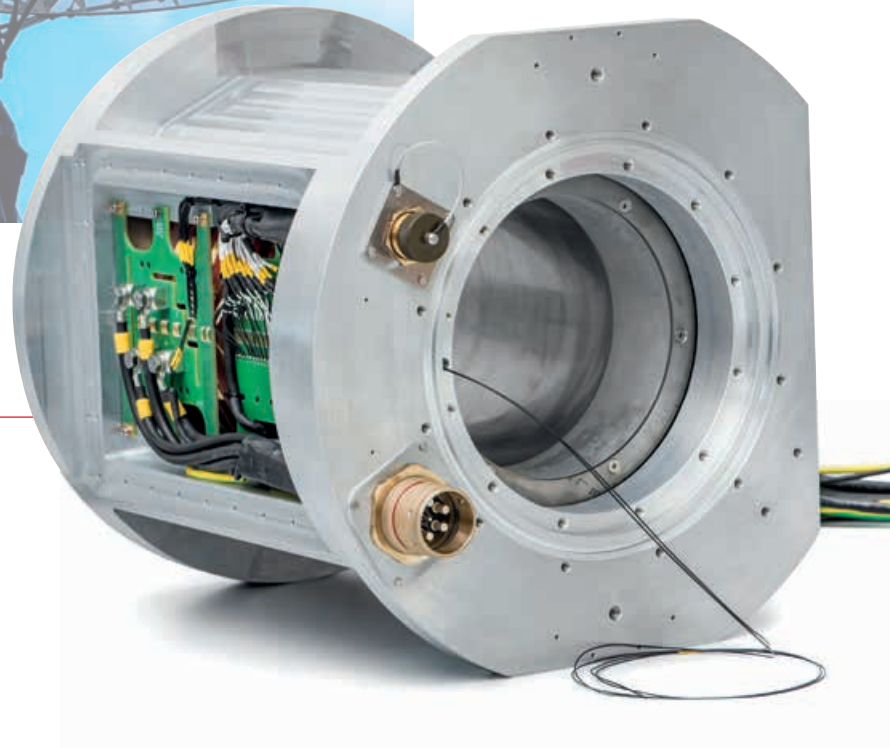




RADAR

Slip rings for radar applications such as traditional air traffic control, anti-missile defence and SatCom technology.

Viable with or without free center in module or pancake design. Our designs ensure an extended life time with long service intervals for systems in continuous 24/7 rotation.



LAND, NAVAL & AIRBORNE SYSTEMS

FLIR



Slip rings for stabilized platforms (pan/tilt & gimbals) on Land, Naval and Airborne Surveillance Systems usually used for observation, target identification and fire control. Kraus slip rings ensure a reliable transmission of power and signals in continuous rotation over one or several axis.

Optimized slip rings for transmitting signals for camera, sights, encoder, laser & infrared systems.



FORWARD LOOKING INFRARED



OPTRONIC SYSTEMS



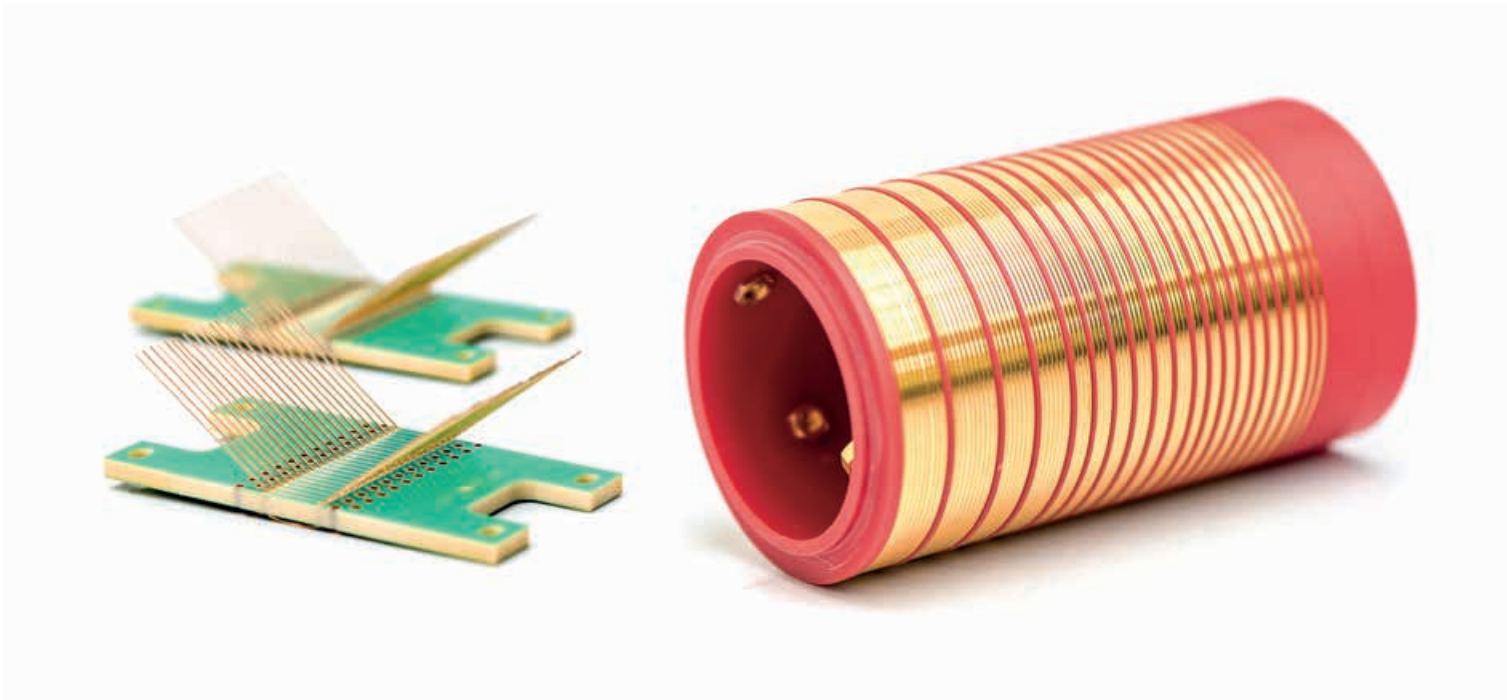
TECHNICAL CHARACTERISTICS

- Cast slip ring modules with gold wire contact technology
- Customized design
- Low contact noise (5 to 30 mOhm)
- Different kind of signal and power transfer
- Up to 100A
- HD-SDI, CAN, Profi Bus, RS422
- Ethernet and Gigabit Ethernet
- Digital transfer up to 1,5 Gbit/s
- Coaxial high frequency transfer 50 Ohm and 75 Ohm, low VSWR and Insertion loss
- IP level up to IP67
- Encoder/Resolver Signals
- High EMC protection

GROUND, NAVAL & AIRBOURNE SYSTEMS

CONTACTING TRANSMISSION TECHNOLOGY

A slip ring unit, which is based on contacting transmission technology, is transmitting power as well as data and signals from the stationary to the rotating part through sliding contacts. Those contacts can be of various types. In defence applications the most common type for signal transmission runs on gold wires that are sliding along tracks mounted on a cast module.



Cast modules

The modules are manufactured with the centrifugal casting technology, i.e. the modules with inserted tracks are molded with epoxy resin according to an accurate process.

After molding the modules are finish turned by lath. The process includes one or several V-shaped grooves turned into each track. The V-grooves' advantage lies in the increased tolerance to mechanical vibrations and shocks, as well as a reduced contact resistance.

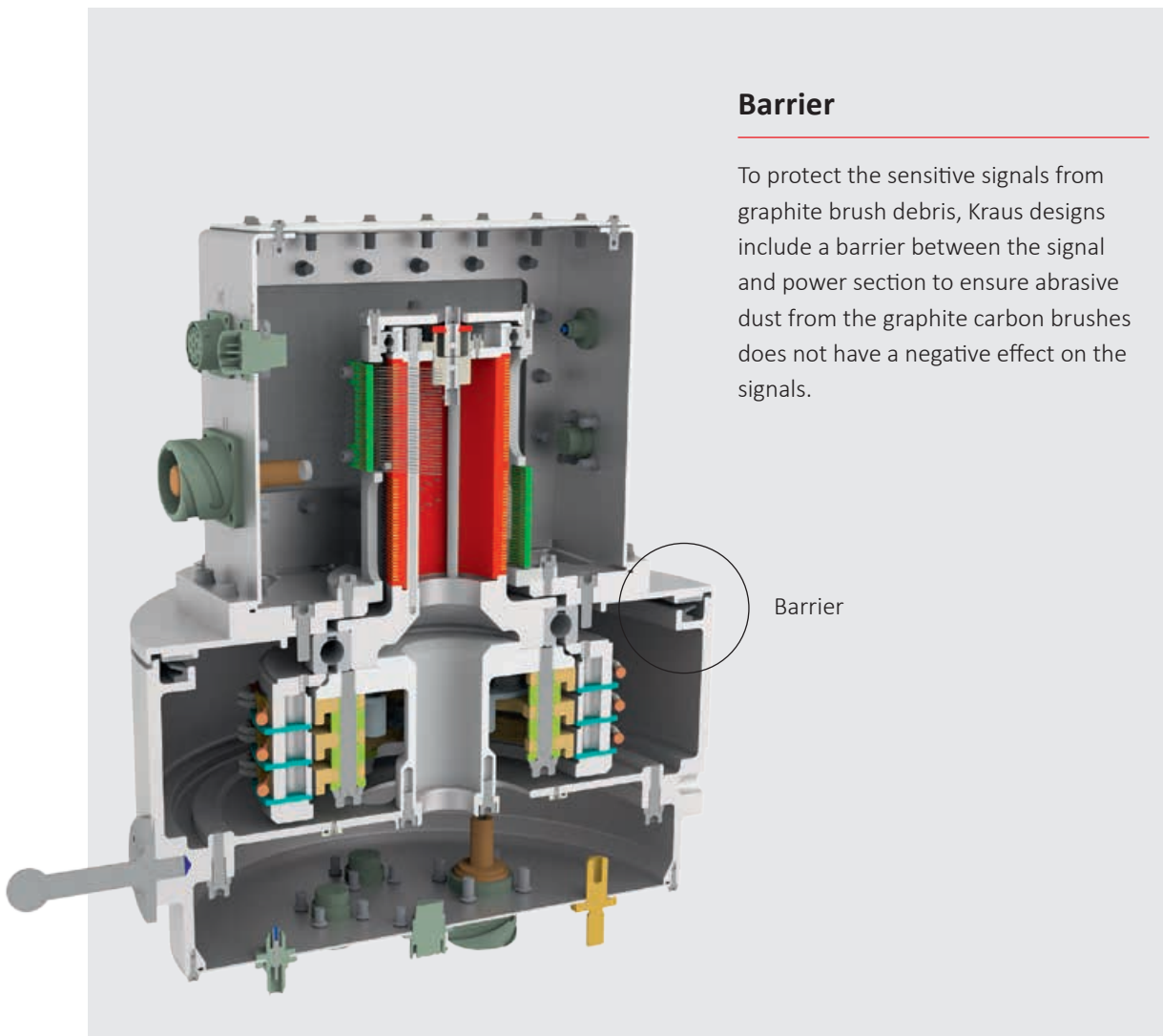
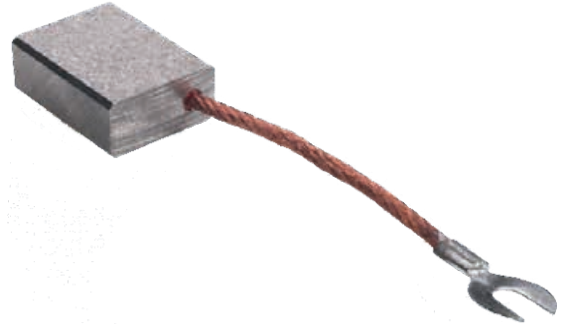
Special gold plating

When the tracks have been machined to the right tolerances, the module is electroplated; the choice of the electroplating process depends on the individual properties of the power or signal passing through as well as factors such as: transmission requirements, rotational speed, lifetime and cost.

For most defence applications gold-on-gold technology is used for the signal section. This means that the tracks have been electroplated according to a process including several layers. Cu + Ni and – the last layer – gold, due to its outstanding transmission properties. For the ideal transmission gold wires are used and slide in the V-shaped grooves of the module.

Graphite carbon brushes

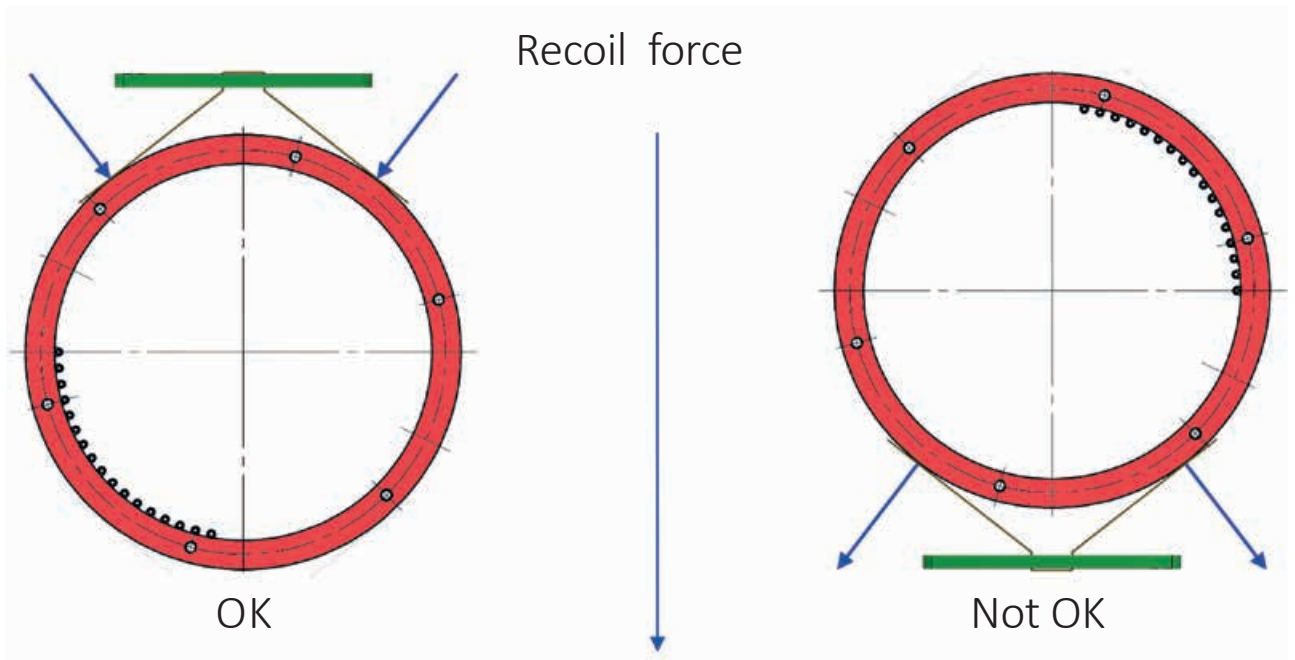
For higher currents the use of graphite brushes is more cost-efficient than the gold-on-gold technology. Depending on application, electrical/mechanical and environmental requirements the most suitable graphite brushes are used. Usually the brushes are comprised of copper graphite or silver graphite.



Brush alignment

In many defence applications the recoil generates shock forces on the system. To minimize the risk of contact loss and/or micro cuts the brush blocks of our products are designed to follow the turret's direction.

The brush blocks on the rotor side are directly connected to the turret. In our design the brush blocks are adjusted in the ideal position in reference to the turret to ensure best contact properties with the least influence of the recoil. Due to the position of the brush block and the ability to rotate along together with the turret, permanent contact between brushes and slip ring tracks is ensured.

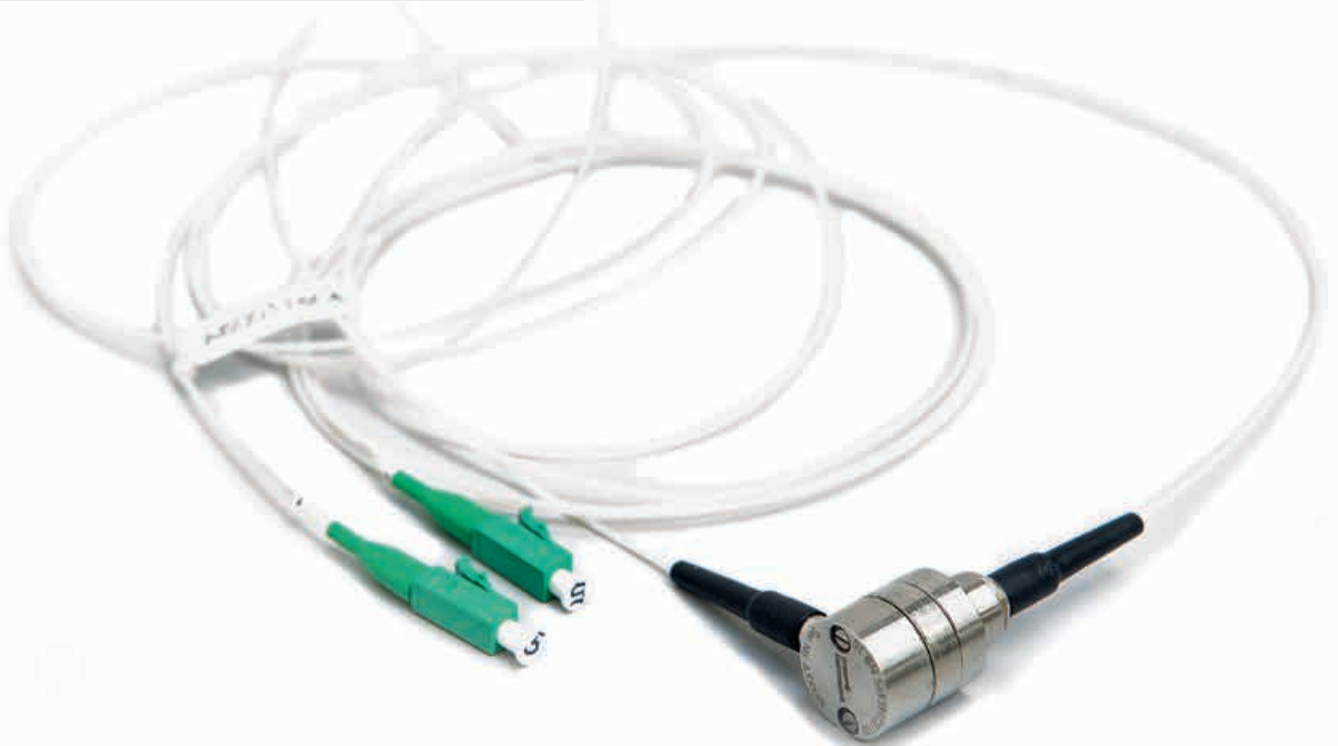
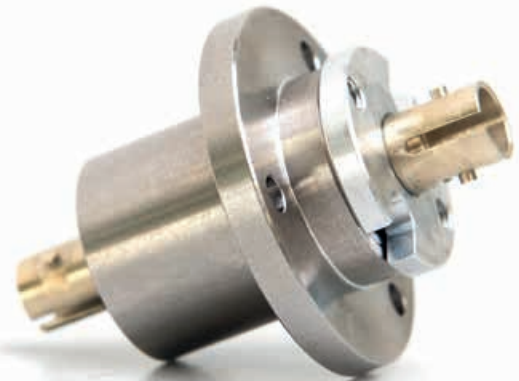


NON-CONTACTING TRANSMISSION TECHNOLOGY

Fiber Optic Rotary Joints (FORJs)

To transmit optical signals from a stationary to a rotating part FORJs are used. Both single mode (SM) and multi mode (MM) are available in single and multi-channel options. If more than two fibers are present in a system, multiplexing solutions can be offered upon request.

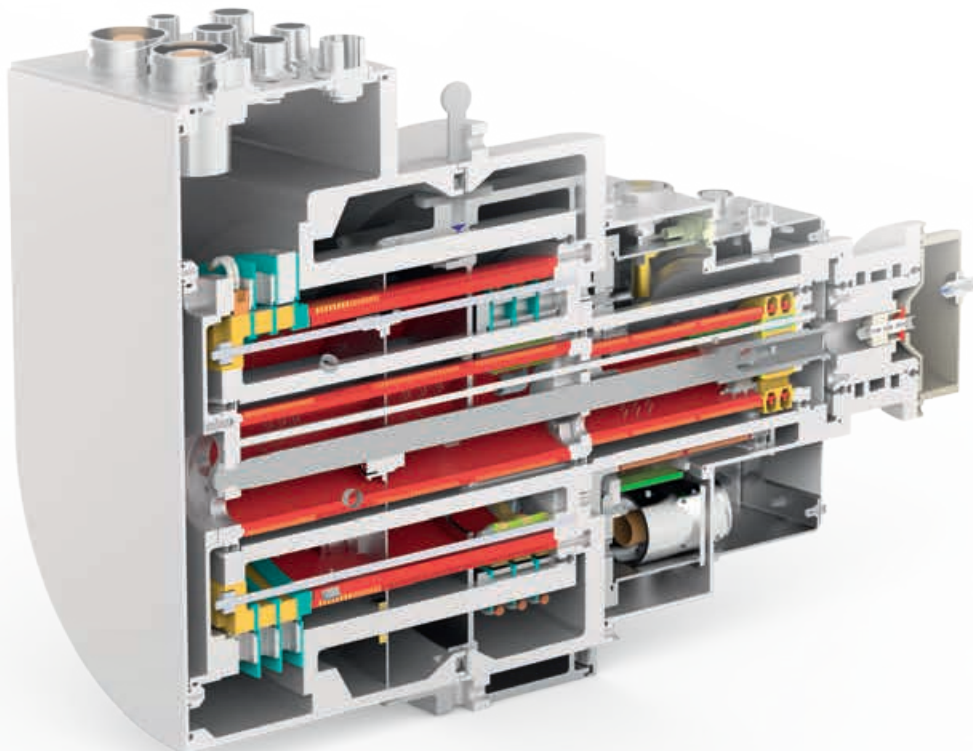
Number of channels:	1
Fiber Type:	Multi Mode G 62,5/125
Wave Length:	830 nm ... 1300 nm
Insertion Loss:	max. 4 dB
Operation Temperature:	-20°C ... +65°C
Rotation Speed:	500 r/min
Connector Type:	ST



COAXIAL DESIGN

In several defence applications space is scarce. Thus fitting all modules of a slip ring in line stacked onto each other is hardly viable.

In these cases a coaxial design can be used in which the modules are not arranged one after the other, but are fitted coaxially inside each other. This allows a shorter design, but increases the outer diameter.



In the example 2 layers of modules are coaxially fitted.

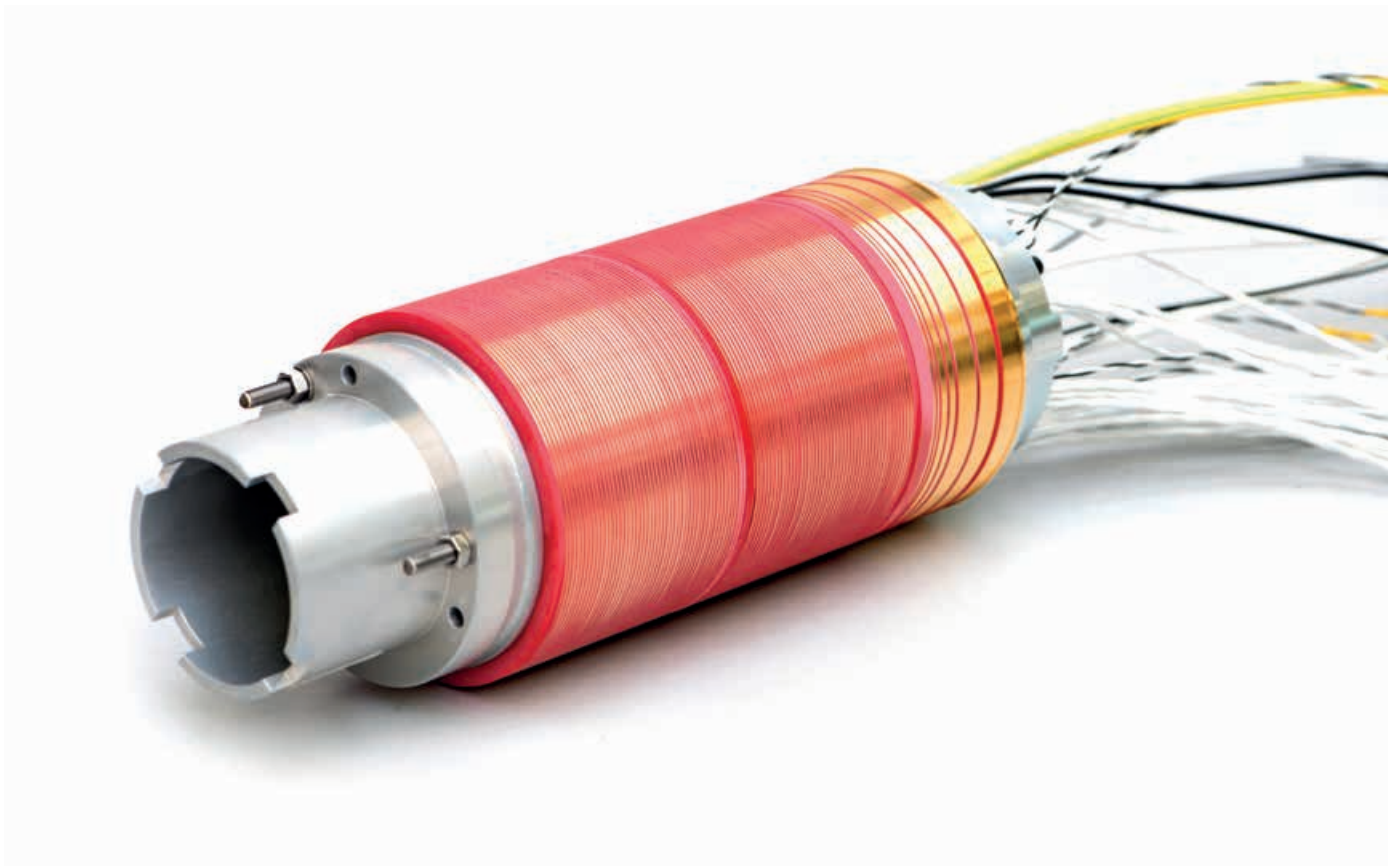
QUALIFICATION & SERVICE

Experience & Solutions

KRAUS Elektrotechnik has gained expertise in developing, manufacturing and qualifying slip rings over the last 60 years. We provide customized slip rings adapted to your individual application in both small and large series. We even offer more complex hybrid solutions combining technologies such as contacting, non-contacting, optic and media rotary joints. KRAUS Elektrotechnik is your reliable partner for civil and military high-tech slip ring systems.

UPGRADE & REFURBISHMENT

Kraus refurbishes and/or upgrades all types of rotary joints, slip rings, brush blocks, holders and related components to the latest technological standards of existing systems. With our broad technical expertise we use reverse engineering to redesign worn parts and prolong the life-time of your system with our technology.



www.kraus.com

We turn for you!



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Elektrotechnik

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