

SPINNER

Fiber Optic Rotary Joints



Standard and Customized FORJs
Up to 109 Channels – any Fiber Type

Edition G/2023

HIGH FREQUENCY PERFORMANCE WORLDWIDE
www.spinner-group.com



The SPINNER Group

For more than 75 years, the SPINNER Group has been setting new standards worldwide in high-frequency technology. Based in Munich with production facilities in Germany, Hungary and China, SPINNER currently has over 900 employees. Our international network of subsidiaries and distributors supports customers in over 40 countries.

SPINNER Rotating Solutions

SPINNER has become one of the leading manufacturers in **rotary joints** thanks to its innovative approach, technical expertise, and high standards of quality. Our products are used in **maritime applications (both above and below water), on land, in the air, and in space.**

Across all applications, the trend toward digitization and increasing data transmission rates is continuing. Our contactless modules for rotating systems deliver benefits whenever slip rings are inadequate due to large outer diameters and/or high data transmission rates.



INDUSTRIAL
AUTOMATION



WIND ENERGY



SATCOM



SUBSEA/OFFSHORE



SPACE



RADAR

SPINNER Fiber Optic Rotary Joints - FORJ

SPINNER is one of the world's leading producers of high-performance rotary joints. Fiber optic rotary joints (FORJ) in particular call for extremely exacting assembly of all optical and mechanical components in cleanroom environments. And SPINNER provides both from a single source.

We also supply combinations of fiber optic rotary joints with radio frequency (RF) rotary joints, contactless power transmission modules, slip rings, multi-media joints and

contactless data transmission. Our specialties also include integrated data and power transmission solutions with a small form factor.

Fiber Optic Rotary Joints: Key Features

A fiber-optic rotary joint (FORJ) is a component that transmits optical signals across a rotating interface. It creates a passive fiber link between a rotating part (called the rotor) and a stationary base (the stator).

FORJs are used in a wide variety of applications in fields ranging from wind power and cameras across medical technology and cable drums to radar systems. Most have a high-throughput data channel, although some applications, including medical equipment and sensors, use analog signals.

SPINNER is one of the world's leading manufacturers of high-performance rotary joints. Particularly for making top-quality fiber-optic rotary joints, first-rate optical and mechanical production environments are a must. SPINNER has both. This ensures consistently high-quality products that re-

quire no maintenance. Their individual components are made using high-precision machines and assembled and tested in our ISO class 7-compliant cleanroom.

SPINNER supplies products with up to 109 channels and all optical fiber types (single-mode, multimode, thick fibers, and special versions suitable for uses such as very tight bending radii). Our FORJs boast minimal reflection losses and high data transmission rates, and are immune to electromagnetic interference (EMI).

Customized Fiber Optic Rotary Joints

We also supply fiber-optic rotary joints in combination with high-frequency rotary joints, motors, and encoders. They are also available with contactless power transformers, slip rings, and rotary joints for transmitting media and data. Our fiber-optic rotary joints can also be flexibly modified and adapted to suit your needs. Our order codes unlock a wide range of versions.

We're also able to accommodate many other wishes:

- ✔ Retrofitting with mixed fibers (e.g. multimode and single-mode in the same device)
- ✔ Special fibers: POF, multimode step index, OM1, OM2, OM3, OM4, single-mode, double-clad, OS1, OS2, high-temperature, with a low bend radius
- ✔ Adapted fiber lengths
- ✔ 109 or more channels
- ✔ Wavelength range: 400 to 1650 nm
- ✔ Special designations (OEM)
- ✔ Modified flanges
- ✔ Mixed assemblies, e.g. with both multimode and single-mode fibers
- ✔ Premium versions to meet customer specifications (insertion loss, variation, rpm)
- ✔ Special incoming inspections of outsourced components, including measurement of specific parameters
- ✔ Pressure-compensation versions with up to eight channels
- ✔ I, L, U, and T types

SPINNER Fiber Optic Rotary Joints Portfolio



1 Channel FORJ



2 to 4 Channel FORJ



3 to 8 Channel FORJ



7 to 109 Channel FORJ



Pressure Compensated
Subsea Type



Large Core Fiber Optic
Rotary Joints

SPINNER FORJ Single-Channel

SPINNER FORJ 1.14, 1.14L and Premium Version 1.14P

The FORJ 1.14 (with an outer housing diameter of 14 mm), a member of SPINNER’s family of single-channel fiber-optic rotary joints (FORJ), features maximum performance in a minimum of space. It comes in two different versions, both classified with IP54 ingress protection.

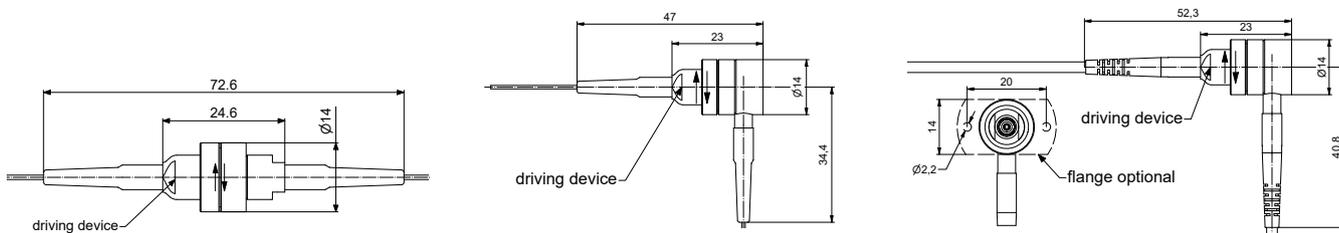


The **standard 1.14** is a workhorse characterized by its small form factor and robust design, making it an excellent choice for a wide range of industrial applications. For even greater flexibility, the FORJ can be used in combination with BiDi media converters for easy integration into existing Ethernet networks. SPINNER has dubbed these combinations “rotary data interfaces” (RoDi). The standard 1.14 version handles rotational speeds up to 3,000 rpm and can be equipped with our proprietary FLEXIFLANGES.

The **premium 1.14P** model, an enhancement of the standard FORJ 1.14, achieves rotational speeds of up to 20,000 rpm with the same dimensions and very low typical insertion

losses of less than 1.0 dB. It was primarily designed for medical and sensor applications that require high rotational speeds (e.g. for intravascular optical coherence tomography) and the ability to transmit low-level signals.

Based on the 1.14 the **1.14L-type**, features a fiber optic output at a 90° angle to the axis of rotation. Reliable optical components and high-precision production ensure exceptional reliability and a long service life. These solutions are ideal in installation situations with extremely limited space, such as cameras, LIDAR systems, civil and military optronic sights, and targeting systems.



SPINNER FORJ 1.14 with flange and 3 mm cable, FORJ 1.14 with 900µ buffer, FORJ 1.14L with 900µ buffer

SPINNER FORJ Single-Channel

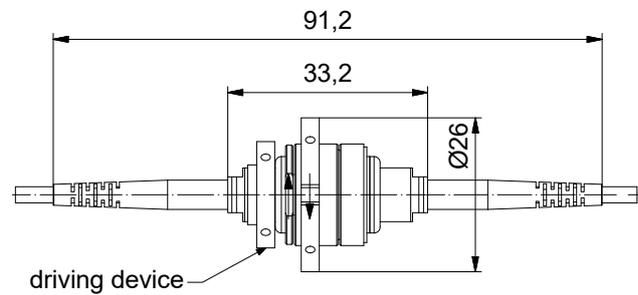
SPINNER FORJ 1.17

SPINNER has developed the single-channel fiber-optical rotary joint FORJ 1.17PC with pressure compensation for subsea applications down to 10,000 m below the surface.

Based on experience gained with the pressure-compensated 1.17PC, the 1.17 was adopted for the “above water” world, making it ideal for use in wet or dirty environments. Moreover, because it integrated the optimized optical system of the 1.14 there are no trade-offs in terms of optical performance. The 1.17 is made of saltwater-resistant tempered steel and delivers IP68 ingress protection thanks to an integrated rotary surface seal. Besides featuring exceptional

shock and vibration resistance, it is impervious to moisture in seawater environments.

The 1.17 with an outer housing diameter of 17 mm is ideally suited for use where it is exposed to the weather or in machines containing lubricant, and is therefore a popular choice for wind turbines, ships, and offshore applications.

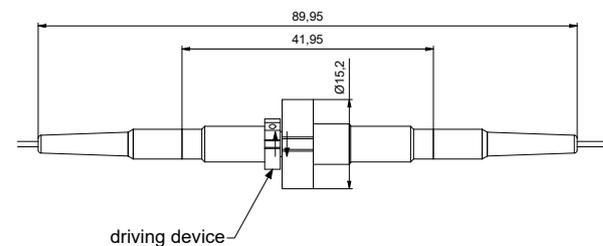


SPINNER FORJ 1.068

The SPINNER single-channel FORJ 1.068 – our smallest fiber optic rotary joint – boasts a diameter of only 6.8 mm, making it ideally suited for use in extremely tight conditions.

The FORJ 1.068 integrates the same optical system as the FORJ 1.14. Because it's filled with air instead of oil, it has an especially long service life and resists degradation. An at-

tached flange facilitates handling and attachment. It can also be retrofitted in existing systems as a FFF (form fit function) replacement.



SPINNER FORJ Single-Channel

Configure Your SPINNER FORJ Single-Channel:

Rotary Joint	Fiber Optic	Channel Count	Housing Type	Fiber Type	Con- nector / Polish C1	Con- nector / Polish C2	Length L1	Length L2	Fiber Protec- tion P1 / P2	Unique Id1	Unique Id2					
R	O	01	-	X	Z	-	XXX	ZZZ	-	XX	ZZ	-	XZ	-	X	Z
Ø 6.8 mm (1.068) IP50 Ø 14 mm (1.14) IP54 (Standard) Ø 14 mm (1.14L) IP54 Ø 17 mm (1.17) IP65 Ø 22 mm (1.22) IP65				P G H F E												
Single-mode E9 / 125 (Standard) Single-mode SMF28 Ultra Multi-mode G50/125 (Standard) Multi-mode G62.5/125				S U M N												
Connector Type C1 & C2																
Single Mode				Multi Mode												
Connector/Polish				Connector/Polish												
LC / APC (Standard)								LCA								
LC / UPC								LCU								
LC / PC				LC / PC				LCP								
FC / APC								FCA								
FC / UPC								FCU								
FC / PC				FC / PC (Standard)				FCP								
SC / APC								SCA								
SC / UPC								SCU								
SC / PC				SC / PC				SCP								
ST / UPC								STU								
ST / PC				ST / PC				STP								
Other connectors LSA, LuxCis, Molex, Special, Expanded Beam etc. unique id								OTH								
Length L1 in m [0.2 ... 4.5] (Standard 4.5m for 900µm, 1.5m for 3mm and 2mm)																
Length L2 in m [0.2 ... 4.5] (Standard 4.5m for 900µm, 1.5m for 3mm and 2mm)																
Fiber protective tube 900µm buffer				30mm bending radius (Standard)						1						
Fiber protective tube 3mm (kevlar/aramid armor)				30mm bending radius						3						
Fiber protective tube 2mm SMF28 Ultra				20mm bending radius						2						
Options Bare fiber only SMF28 Ultra Metallic sleeve				15mm bending radius						0 M						
1.14 premium version with lower IL and IL WOW				Unique identifier												
Customer specific unique identifier																

Example: FORJ 1.14 type with SMF28 Ultra, FC/APC and SC/UPC, 1 m length each side with Kevlar protection: RO01-GU-FCASCU-1010-22-**

SPINNER FORJ Single-Channel



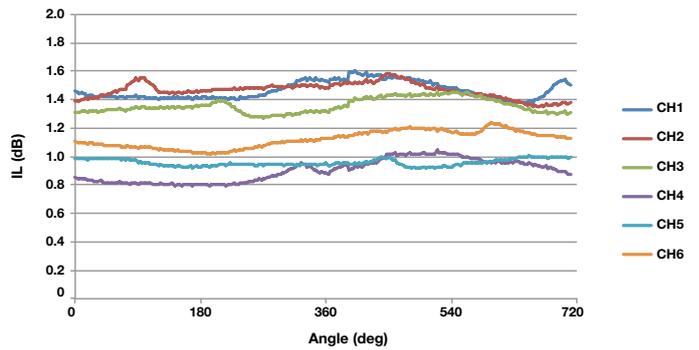
SPINNER FORJ Single-Channel Specifications for Single-Mode (SM) and Multi-Mode (MM) Fiber

SPINNER FORJ	1.068	1.14	1.14L	1.17
Max. insertion loss (dB)	1.5 (SM) 2.5 (MM)	1.5 (SM) 2.5 (MM)	3.0 (SM) 4.0 (MM)	1.5 (SM) 2.5 (MM)
Max. variation of insertion loss during rotation (dB)	1.0	1.0	1.0	1.0
Min. return loss (dB)	50 (SM) / 35 (MM)			
Wavelength	1310 nm / 1550 nm (SM) or 850 nm / 1300 nm (MM)			
Rotational speed	3,000 rpm	20,000 rpm	3,000 rpm	60 rpm
Weight (excl. connectors)	20 g	20 g	20 g	60 g
Torque	0.01 Nm	0.01 Nm	0.06 Nm	0.3 Nm
Degree of protection	IP50	IP54	IP54	IP68
Recommended temperature range	-40°C to +85°C			

SPINNER FORJ Multi-Channel

SPINNER multi-channel rotary joints use a dove prism to derotate images arriving via the input fiber for coupling with the output fiber. For up to 109 channels, SPINNER relies on discretely mounted collimators for the individual light propagation paths instead of an optical lens array.

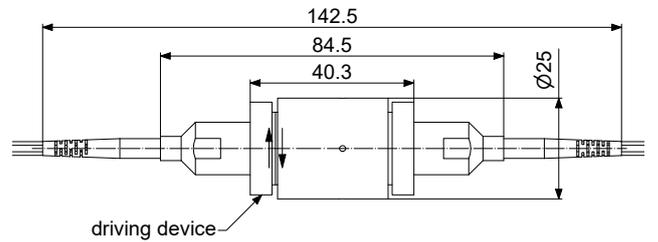
This technology makes it possible to individually adjust and optimize the insertion loss values of each optical fiber channel. The result is superior tracking performance of optical channels during rotation.



SPINNER FORJ x.25

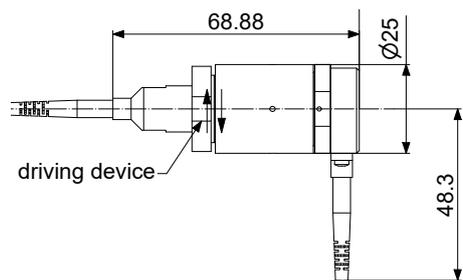
The two, three or four channels can be separately specified according to your needs. This ensures that the FORJ is optimally suited to the application at hand. For example, it is possible to have both single-mode and multimode channels on the same FORJ, thus providing a high degree of flexibility in all situations.

Thanks to SPINNER's proprietary alignment technology, the optical parameters of the channels can also be individually specified for optimal performance. The mechanical components can also be adjusted to meet your needs. At a lower ingress protection level of IP50, high rotational speeds up to 12,000 rpm are possible, while IP65 is for difficult environmental conditions.



SPINNER FORJ 2.25L

An absolute novelty and exclusively available from SPINNER is the L-shaped x.25. In this design, the fibers on the stator side exit the FORJ at a 90° angle to its rotational axis, thus leaving plenty of room at the top for additional instrumentation. This concept combines a small diameter with a short length, making it ideally suited for use in 4K or 8K cameras, for example. For 4 channels 4.25T the fibers are arranged in a T-shape.

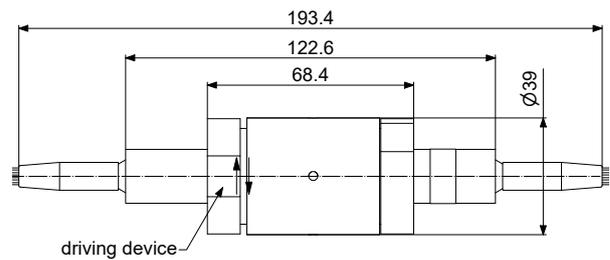


SPINNER FORJ Multi-Channel

SPINNER FORJ x.40

The x.40 type builds the bridge in the intermediate range of SPINNER's fiber optic rotary joint portfolio. With an outer diameter of 40 mm it lies between the small x.25 (Ø 25 mm) and the largest representative x.60 (Ø 60 mm). The x.40 can be equipped with up to eight independent channels.

As for all SPINNER FORJs, the proprietary active alignment procedure provides superior optical performance in a compact case. The strong in-house production depth of mechanical parts ensures efficient quality management complementing repeated optical tests during the assembly of a FORJ. This guarantees reliability and ideal performance.

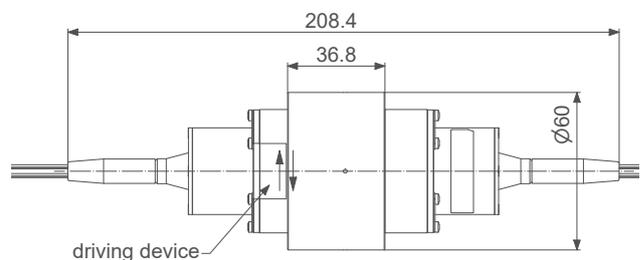


SPINNER FORJ x.60

The x.60 (fiber optic rotary joints with an outer diameter of 60 mm) accommodates the largest number of channels of all SPINNER fiber-optic rotary joints (FORJ). All of the up to 36 independent channels can be specified individually.

The optimized, high-precision, proprietary SPINNER collimator technology SCOT allows the use of singlemode or multimode channels or a mixture of both for a maximum of flexibility. Precise quality management ensures maximum performance and reliability during a long service life.

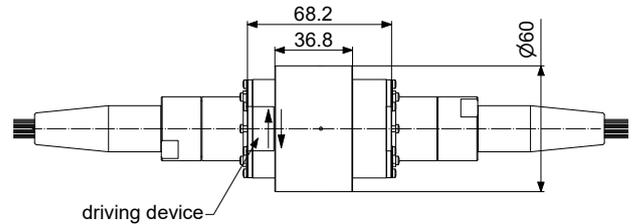
Premium versions with excellent IL values and IL WOW values are also available.



SPINNER FORJ Multi-Channel

SPINNER FORJ x.60 High Channel Count

Up to 109 channels single mode for stage applications, radar applications and offshore applications, very low IL values (more than 109 channels on request).



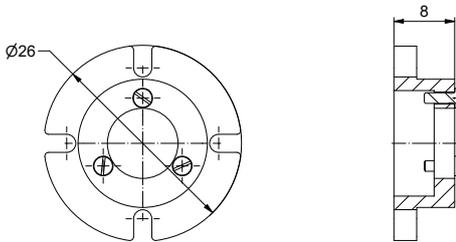
SPINNER FORJ Multi-Channel Specification with Discrete Lens Technology for Single-Mode (SM) and Multi-Mode (MM) Fiber

SPINNER FORJ	x.25	x.40	x.60	x.60	x.65
Channel count	2-4	3-8	7-36 (SM, MM & MIX)	16-109	2-8
Insertion loss max.	3.5 dB (SM) 3.5 dB (MM)	3.5 dB (SM) 3.5 dB (MM)	3.5 dB (SM) 3.5 dB (MM)	3.5 dB CH 16-32 4.5 dB CH 33-78 5.5 dB CH 79-109	3.5 dB (typ. 1.5 dB) CH 2-4 4.5 dB (typ. 2.5 dB) CH 5-8
Insertion loss variation over rotation max.		1.5 dB		2.5 dB (typ. 1.5 dB)	1.5 dB (typ. 0.75 dB)
Return loss		50 dB		40 dB (typ. 45 dB)	40 dB (typ. 45 dB)
Wavelength	1310 nm / 1550 nm (SM) or 850 nm / 1300 nm (MM)			1310 nm or 1550 nm	1310 nm / 1550 nm
Fiber type	Single-mode E9/125 or multi-mode 50/125 or 62.5/125			Single-mode E9/125	Single-mode E9/125
Rotation speed	1,000 rpm	1,000 rpm	150 rpm	150 rpm	60 rpm
Weight (excl. connectors)	250 g	700 g	1,500 g	1,500 g	3,000 g
Torque	0.08 Nm	0.15 Nm	0.15 Nm	0.15 Nm	1 Nm
Degree of protection	IP54, IP65	IP54, IP65	IP54, IP65	IP54, IP65	IP68 up to 4,500 m op. depth - up to 10,000 m on request, seawater resistant
Recommended temperature range	-40 °C to +85 °C				-10 °C to +75 °C

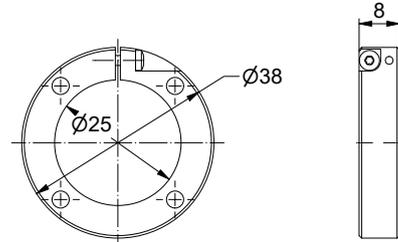
FORJ Accessories

Flexiflanges

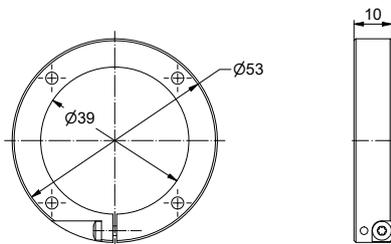
To facilitate installation and minimize the effect on your system, SPINNER provides customized FLEXIFLANGES according to your needs for each SPINNER FORJ type.



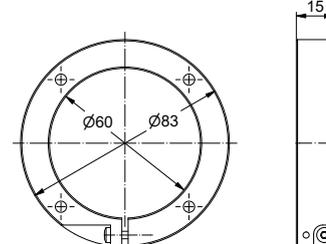
BN 549999C1402 for 1.14



BN 549999C2500 for x.25



BN 549999C4000 for x.40



BN 549999C6001 for x.60

Patch Cords and Couplers

To minimize sources of error, patch cords and couplers as well as special pins can be supplied with the FORJ. If desired, these can be tested and documented together with the FORJ.



SPINNER patch cords



SPINNER fiber optic harness



SPINNER coupler

SPINNER FORJ Multi-Channel

Configure your SPINNER FORJ Multi-Channel:

Rotary Joint	Fiber Optic	Channel Count	Housing Type	Fiber Type	Connector / Polish C1	Connector / Polish C2	Length L1	Length L2	Fiber Protection P1/P2	Unique Id1	Unique Id2					
R	O	XX	-	X	Z	-	XXX	ZZZ	-	XX	ZZ	-	XZ	-	X	Z
		Ø 25 mm (Type x.25) (02...04) Ø 40 mm (Type x.40) (02...08) Ø 60 mm (Type x.60) (04...36) Ø 60 mm (Type x.60) (16...109)														
		Type x.25 IP65 D IP54 K Type x.40 IP65 J IP54 C Type x.60 IP65 I IP54 B Type x.60 IP65 L IP54 M														
		Single-mode E9 / 125 S Single-mode SMF28 Ultra U Multi-mode G50/125 M Multi-mode G62.5/125 N														
		Connector Type C1 & C2 Single Mode Connector/Polish LC / APC (Standard) LC / UPC LC / PC FC / APC FC / UPC FC / PC SC / APC SC / UPC SC / PC ST / UPC ST / PC Other connectors LSA, LuxCis, Molex, Special, Expanded Beam etc. unique id		Multi Mode Connector/Polish LC / PC FC / PC (Standard) SC / PC ST / PC		LCA LCU LOP FCA FCU FCP SCA SCU SCP STU STP OTH										
		Length L1 in m [0.2 ... 4.5] (Standard 4.5m for 900µm, 1.5m for 3mm and 2mm)														
		Length L2 in m [0.2 ... 4.5] (Standard 4.5m for 900µm, 1.5m for 3mm and 2mm)														
		Fiber protective tube 900µ buffer Fiber protective tube 3mm (kevlar/aramid armor) Fiber protective tube 2mm SMF28 Ultra Options Bare fiber only SMF28 Ultra Metallic sleeve x.25p; x.40p; x.60p premium versions with lower values IL and IL WOW		30mm bending radius (Standard) 30mm bending radius 20mm bending radius 15mm bending radius Unique identifier												
		Customer specific unique identifier														

Example: FORJ 4.40 IP50 type with SMF28 Ultra, FC/APC and SC/UPC, 1 m length each side with Kevlar protection: RO04-CU-FCASCU-1010-22-**

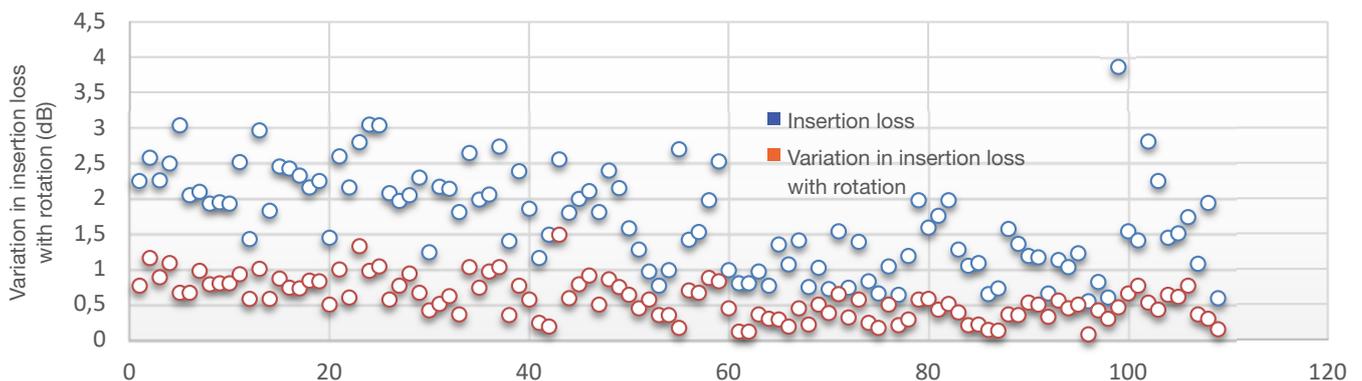
SPINNER FORJs for Offshore and FPSO



SPINNER FORJ Type x.60

SPINNER FORJs are completely passive and therefore feature a very high MTBF value while being highly stable and robust. As an OEM, SPINNER has supplied assemblies for multichannel applications in the floating production and storage offshore (FPSO) market since 2006. Especially for this sector, we have enhanced our tried-and-proven multichannel rotary couplings to support up to 109 channels, thus considerably surpassing the traditional ceiling of 52 channels.

Insertion Loss/Variation vs. Channels Tested on a 109 CH SLAT FORJ



FORJs for Subsea Applications - Down to 10,000 Meters



SPINNER FORJ 1.17pc for deepsea
down to 10,000 meters



SPINNER FORJ x.65pc
for use in deepsea applications

Developed for the harshest environments, the **SPINNER FORJ 1.17pc** is able to withstand strong vibrations and jolts, high humidity, and immersion in seawater. Its IP68-rated design meets the needs of offshore and underwater vehicles. For deepsea applications as far down as 4500 m, this single-channel fiber optic rotary joint comes is pressure compensated.

Intended for use under the very harshest environmental conditions, the pressure compensated **SPINNER FORJ x.65** is designed for the use in deepsea applications and withstands brutal vibrations and shocks, high humidity, and seawater. Its IP68-rated design meets the needs of offshore and military applications. Available for 2 to 8 channels in single-mode fiber configurations.

FORJs for Harbor, Port and Crane Applications



SPINNER FORJ x.40
3-8 channels

Like all SPINNER FORJ's, the **3-8 channel x.40** is a maintenance-free fiber optic rotary joint, which is robustly constructed and reliably transmits the data even under the heaviest loads.



SPINNER FORJ 1-14
with IP54 ingress protection

The **FORJ 1.14** (with an outer housing diameter of 14 mm), a member of SPINNER's family of single-channel fiber-optic rotary joints (FORJ), features maximum performance in a minimum of space. It comes in two different versions, both classified with IP54 ingress protection.

FORJs for Airborne and Military Radar Systems



SPINNER fiber optic harness



SPINNER FORJ x.25 for optronic systems



SPINNER 12 channel FORJ x.60 with X band waveguide and slip ring for radar applications

In ground-based, naval and mobile military radar systems, it copes with the massive data volumes sent between the rotating antenna and the processing unit in the control shelter. For these applications, SPINNER has combined a multi-channel FORJ with RF rotary joints, slip rings and rotary unions to deliver power and coolant to the antenna.

The low-profile, extremely lightweight SPINNER FORJ x.25 is designed for environments characterized by strong vibrations and shocks. This FORJ is typically integrated in

airborne targeting systems of UAVs, aircrafts, helicopters and optronic systems.

FORJs for Weather Radars



SPINNER FORJ 1.14L for helicopters and UAVs



SPINNER FORJ 1.14 with waveguides and slip ring for weather radars



SPINNER FORJ 1.14L with slip ring

For weather radar systems, SPINNER combines FORJs typically with single and dual channel RF rotary joints for frequency ranges in S-, C- and X-band.

For weather radar systems, SPINNER combines FORJs typically with single and dual channel RF rotary joints for frequency ranges in S-, C- and X-band. Where in current weather radar systems a slip ring transfers data to the

antenna, the SPINNER FORJ brings data rates of several Gbit/s with highest reliability to weather radar systems around the globe.

FORJs for Medical Applications

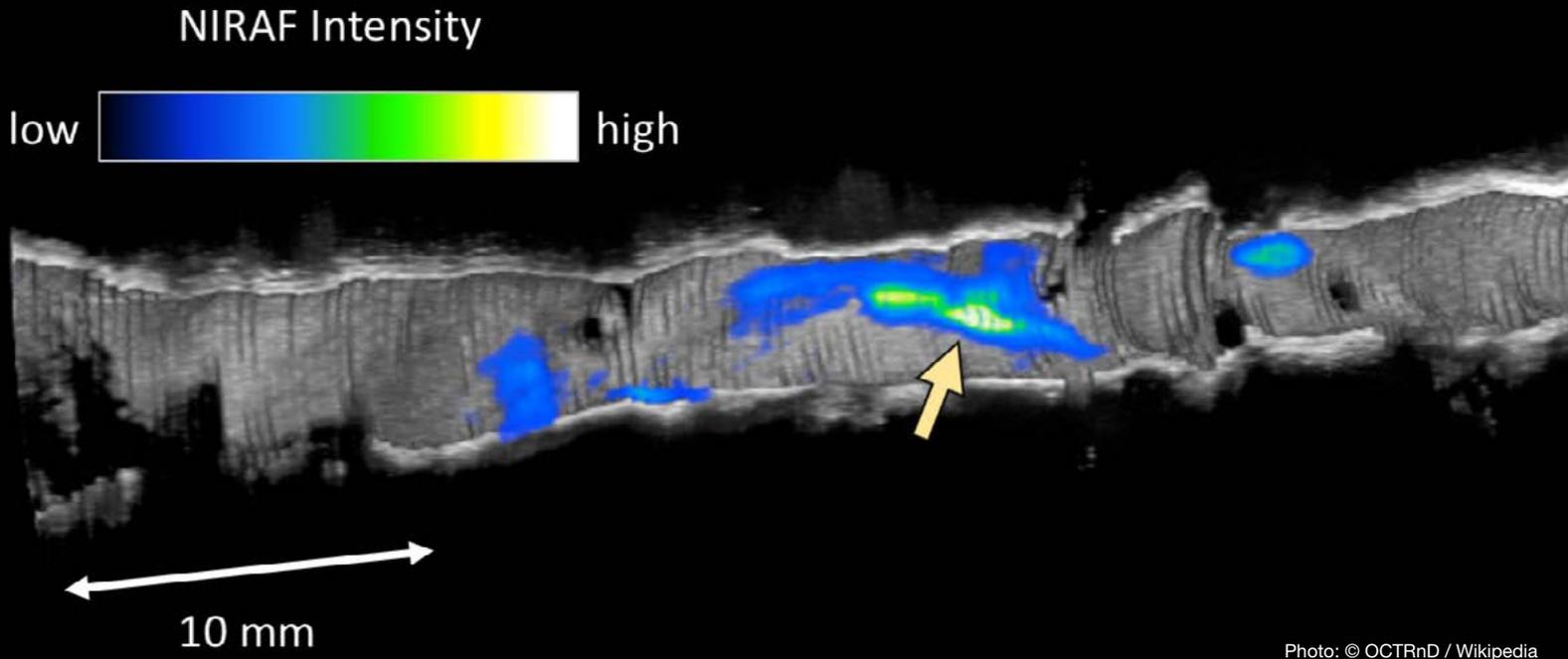


Photo: © OCTRnD / Wikipedia



Optimized version of SPINNER FORJ 1.14 for radial loads in high speed setups



SPINNER FORJ 1.14 version with pulley tested up to 30,000 rpm

Technological advances are driving innovations in medical technology. Higher-performance hardware is paving the way for new ways of examining patients, with Big Data contributing to more reliable findings. And fiber-optic rotary joints for signal transmission are enabling maximum data rates in conjunction with high reliability.

For special applications such as optical coherence tomography (OCT), SPINNER offers FORJs that are optimized for high rotational speeds up to 30,000 rpm and rapid acceleration. Robust mechanical designs ensure long product lives.

Fiber-optic rotary joints can also be made with customer-specific fibers. In particular, our manufacturing processes

allow combinations of single-mode and multimode fibers and/or thick-core fibers with core diameters of up to 1000 micrometers. This makes it possible to use a single fiber for multiple parallel functions, such as for transmitting excitation light in fluorescence or Raman spectroscopy, with a thick-core fiber for capturing the resulting signal.

FORJs for Wind Power Stations



Ethernet with SPINNER FORJ 1.17



SPINNER FORJ 1.17 for wind power stations



SPINNER FORJ 2.25

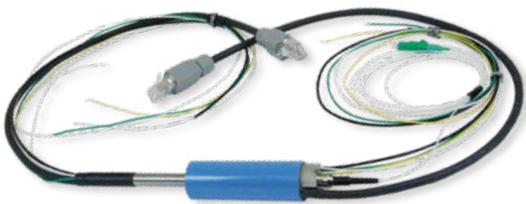
Today's wind turbines have to meet increasing demands with regard to energy yield, efficiency, and reliability. To meet them, the systems linking the rotor blades and the control electronics in the nacelle must transmit signals at ever-greater speeds. To optimize data transfer, SPINNER offers innovative solutions that have been specially developed to meet the requirements of the wind power market.

Day after day, wind turbines simply stop turning and power generation drops to zero, resulting in lost income. The possible causes vary greatly, but one of the principal ones is faulty transmission of data for pitch control, which sets the blades to the best angles for the wind to turn the rotor.

Data is normally transmitted via slip rings, but these are subject to wear. The result is eventual loss of dependability,

and down times for maintenance are inevitable. SPINNER's contactless couplers and fiber optic rotary joints, which now replace a part of the slip ring, take this into account and enable **fault-free data transmission in real time.**

FORJs for Camera Systems and Revolving Stages



SPINNER FORJ 1.14 with slip ring:
the perfect match for cable-suspended camera system



SPINNER FORJ 2.25 with slip ring for revolving stages
in theatres on ocean liners

SPINNER's miniature slip ring/FORJ combinations with diameters as small as 22 mm enable interference-free video data transmission in 4K and 8K quality, also with fast-moving images.

They are ideal for low-profile applications, since they ensure the critical minimum fiber bending radius and unit length.

This is why manufacturers of leading-edge cable-suspended camera systems rely on SPINNER.



FORJs for Industry and Automation



Photo: © ABB AG



SPINNER single-channel FORJ 1.14L



SPINNER 100 W contactless DC/DC converter with free inner diameter for FORJ



SPINNER 300 W contactless DC/DC converter with free inner diameter for FORJ

For long-term continuous applications that require DC power and high data throughput, SPINNER supplies a completely contactless rotary joint system.

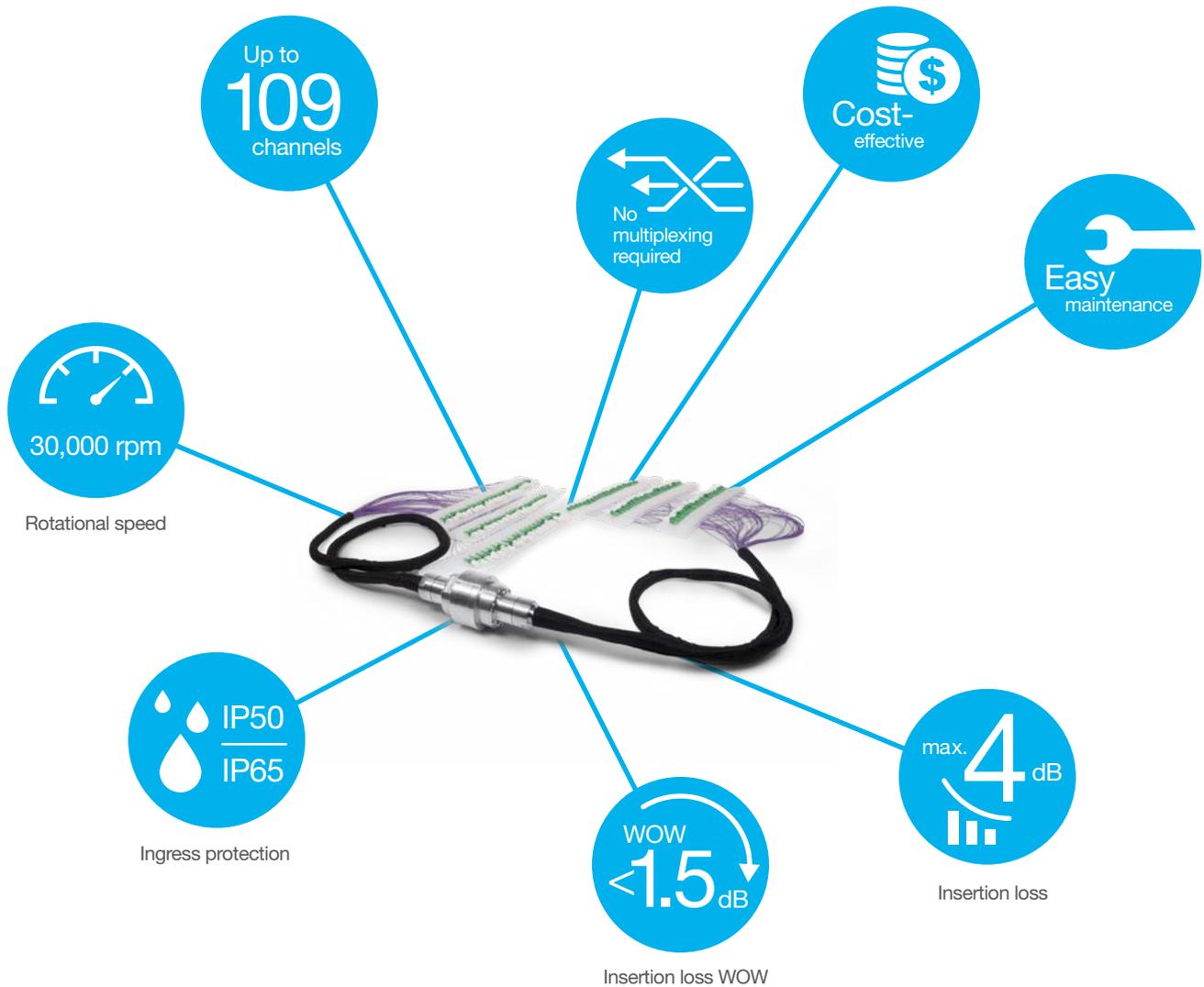
It achieves a very small form factor by integrating the fiber optic channels into the DC power module at rotational speeds up to 3000 rpms. This hybrid rotary joint is typically implemented in high-end imaging systems and industrial machining applications.

Thanks to wavelength division multiplexing (WDM) technologies, the fiber-optic channels provide maximum flexibility for communications protocols and data channels.

SPINNER supplies contactless DC/DC converters together with fiber optic rotary joints, e.g. the right-angled FORJ 1.14L, as a single unit.

SPINNER can also adapt the assembly for harsh environments by using FC/PC adapters instead of flying cables and ordinary FC/PC connectors. The nominal output voltage of this system is 24 V DC, but the technology used also lets it be flexibly modified for a higher or lower voltage or current.

Fiber Optic Rotary Joints – Core Features



Features and Benefits

- ✓ Up to 109 channels
- ✓ No multiplexing required
- ✓ Cost-effective
- ✓ Easy maintenance and high MTBF
- ✓ Ingress protection classes: IP50, IP65 (IP68 also available)
- ✓ Fiber types: single-mode (SM)
- ✓ Max. variation of insertion loss while rotating: < 1.5 dB
- ✓ Min. return loss: 45 dB (typ. 50 dB)
- ✓ Rotational speed: up to 30,000 rpm
- ✓ Wavelengths: 1310 nm and 1550 nm
- ✓ Weight (w/o connectors): 1.5 kg
- ✓ Low torque
- ✓ Recommended temperature range: -40°C to +85°C
- ✓ Crosstalk > 50 dB
- ✓ GigE with BER $\leq 1 \times 10^{-12}$
- ✓ Shock- and vibration-tested



HIGH FREQUENCY PERFORMANCE WORLDWIDE

SPINNER designs and builds cutting-edge radio frequency systems, setting performance and longevity standards for others to follow. The company's track record of innovation dates back to 1946, and many of today's mainstream products are rooted in SPINNER inventions.

Industry leaders continue to count on SPINNER's engineering excellence to drive down their costs of service and ownership with premium-quality, off-the-shelf products and custom solutions. Headquartered in Munich, Germany, the global frontrunner in RF components remains the first choice in simple-yet-smart RF solutions.

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