SPINNER || FIBER OPTIC ROTARY JOINTS




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High Frequency Performance Worldwide

www.spinner-group.com

FIBER OPTIC ROTARY JOINTS

SPINNER is one of the leading manufacturers for high performance rotary joints worldwide. In particular fiber optic rotary joints require a high quality optical and mechanical fabrication environment. This qualifies SPINNER as integral supplier for fiber optic rotary joints. We provide the precision mechanics and all the optical parts from a single source.

Beyond this, SPINNER can offer combinations of fiber optic rotary joints together with RF rotary joints, non-contacting power transmission modules, slip rings, media joints or non-contacting data transmission.

BENEFITS OF FIBER OPTIC CONNECTION

Digital data transmission:

- up to 40 Gbit/s per channel
- Wavelength Divison Multiplexing (WDM) allows transmission of multiple data channels over one fiber optic link
- high-grade configurability

Analogue signal transmission:

- high sensitivity
- short-haul systems

Fiber optic sensors:

- robust sensors in a widespread field of applications

EMI free signal transmission

- optical fiber technology offers an excellent solution to overcome EMI problems

Low weight components

- compared to conventional cabling by copper wires optical fibers reduce the system weight significantly

FIBER OPTIC CORE FEATURES

Optical performance parameter

- low insertion loss
- high return loss values
- low variation over rotation

Optical parameter tracking over rotation

- narrow insertion loss band across all channels of a multichannel fiber optic rotary joint

Fiber Type

- singlemode E9/125 µm
- multimode G50/125 µm (also G62.5/125 µm)
- specialized fibers possible e.g. for high temperature application or large core fibers

Environmental conditions

- IP code protection for harsh environmental applications
- high temperature capability for implementation in RF systems
- hydrostatic pressure capability for deep-sea applications

Connector type	Polish	Single-mode	Multi-mode	Description
FC	UPC	x		
FC / SC	APC	x		
FC / SC	PC		x	standard
LC	UPC / APC	x		standard
LC	PC		x	
SMA	PC		x	
E2000	APC	x		
E2000	PC		x	
MOLEX/LC	UPC	x		IP67 protection class
MOLEX/LC	PC		x	
LuxCis	APC / UPC	x		rough environmental conditions
LuxCis	PC		x	
Stratos S900	N/A	x	x	

SINGLE CHANNEL FIBER OPTIC ROTARY JOINTS

The SPINNER single channel family covers a wide spectrum of rotary joint designs for various industrial and military applications.

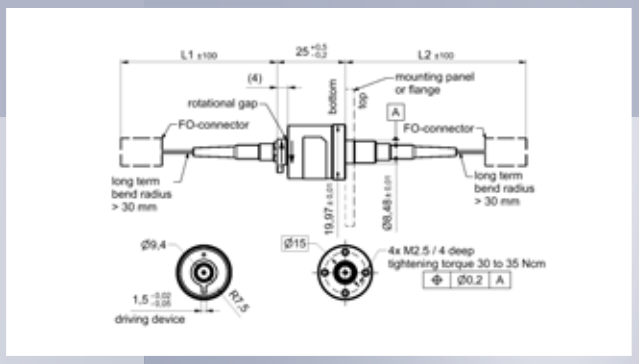
BN 549397 presents an extremely well performing fiber optic rotary joint with superior insertion loss values of ≤ 1.0 dB. The design allows flexible adjustments of connector type, fiber type and fiber length, based on customer requirements. The identical rotary joint housing type is applied in **BN 549397C0106** that is designed for extreme temperature applications from -55 °C … +95 °C.

Beyond the standard fiber optic rotary joint pick-tail designs, we provide **BN 529013** with integrated F-SMA-f connectors for direct fiber connectivity.

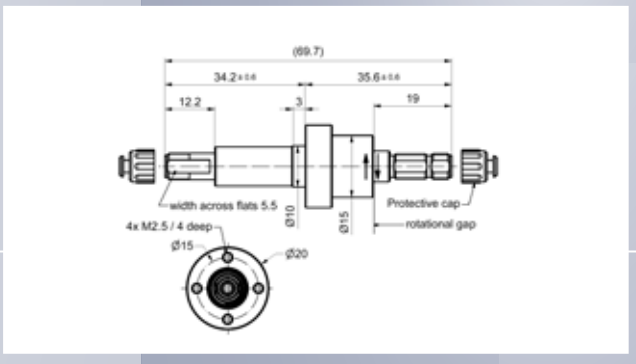
Our latest members in the single channel family are **BN 549392** and **BN 549382** for single- and multimode applications. With these designs SPINNER is addressing industrial applications, demanding high lifetime paired with excellent insertion loss performance.

Part number	BN 549397	BN 549397C0106	BN 529013	BN 549392	BN 549382
Type	singlemode	singlemode	multimode	singlemode	multimode
Connector type	LC/APC	LC/APC	F-SMA-f	LC/APC	FC/PC
Fiber type	E9/125	E9/125	G50/125	E9/125	G50/125 or G62.5/125
Wavelength [nm]	1310 / 1550	1310 / 1550	850 / 1550	1310 / 1550	850 / 1300
Return loss, min.	55 dB	50 dB	N/A	50 dB	N/A
Insertion loss, max.	1.0 dB	3.0 dB	2.0 dB	1.5 dB	1.5 dB
Insertion loss, WOW max.	0.5 dB	1.0 dB	1.0 dB	1.0 dB	0.5 dB
IP protection level	IP62	IP62	IP63	IP54	IP54
Ambient temperature range	-40 °C ... +85 °C	-55 °C ... +95 °C	-40 °C ... +85 °C	-40 °C ... +85 °C	-40 °C ... +85 °C
Housing type	1	1	2	3	3

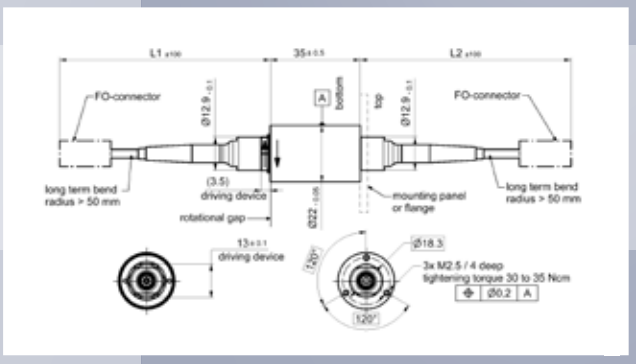
Housing type 1



Housing type 2



Housing type 3



DUAL CHANNEL FIBER OPTIC ROTARY JOINTS

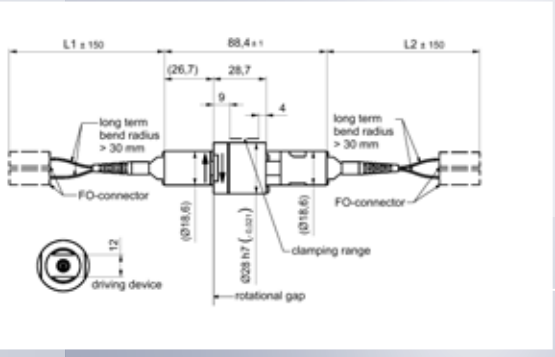
With the new dual channel fiber optic rotary joint **BN 549761** SPINNER meets the demand for a pure two channel single-mode rotary joint. The patented mechanics give a market leading compactness with a total length of just less than 90 mm and an outer diameter of only 28 mm with the resulting overall weight of less than 230 g. Moreover, we provide this rotary joint design as a multimode configuration **BN 549762**

The highly modular design approach allows customer specific flange modifications, connector types, fiber lengths and even the combined assembly of singlemode and multimode fibers. The dual channel fiber optic rotary joint has typically superior insertion loss values in the range of 3 dB ±0.75 dB WOW and can be applied under rough temperature, vibration and shock conditions.

This optical rotary joint is the smallest available globally with two singlemode channels. With our patented design this proves that SPINNER is a world leader in innovative optical design.

Part number	BN 549761	BN 549762
Type	singlemode	multimode
Connector type	LC/APC	FC/PC
Fiber type	E9/125	G50/125 or G62.5/125
Wavelength [nm]	1310 / 1550	850 / 1300
Return loss, min.	50 dB	N/A
Insertion loss, max.	4.5 dB	4.5 dB
Insertion loss, WOW max.	1.5 dB	1.5 dB
IP protection level	IP50	IP50
Ambient temperature range	-40 °C ... +85 °C	-40 °C ... +85 °C
Housing type	1	1

Housing type 1

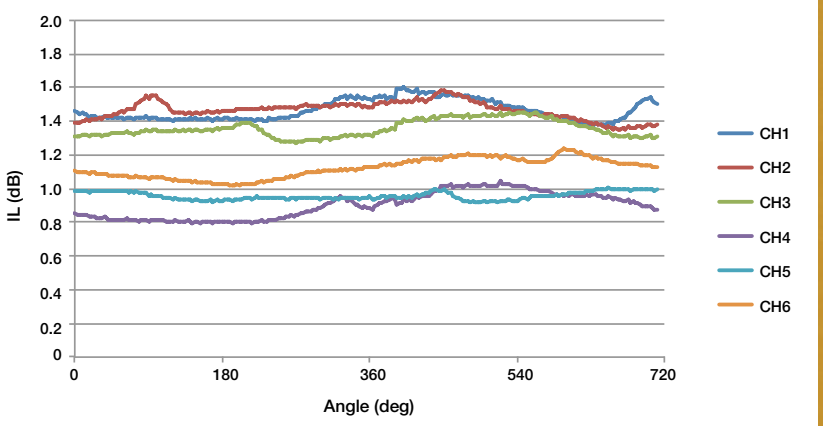


MULTICHANNEL FIBER OPTIC ROTARY JOINTS

SPINNER's multichannel family is divided into two different housing types in order to provide the most compact solutions. The smallest solution can be flexibly assembled from 3 up to 6 fibers in singlemode **BN 549599**, multimode **BN 549760** or mixed fiber configuration. This is the most compact design available worldwide in its class – comes with an outer diameter of only 39.5 mm.

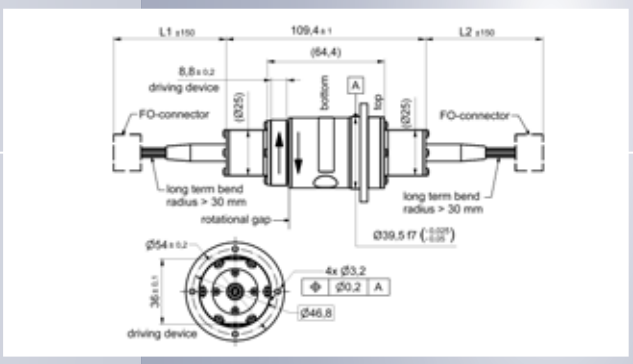
Beyond this, **BN 549758** and **BN 549748** covers the full range of multi-channel rotary joints from 7 up to 20 channels, again in singlemode and multimode fiber configuration.

The multichannel rotary joints use a dove prism for de-rotating an image of the input fiber to allow coupling to the output fiber. On each single light propagation path SPINNER relies on discrete mounted collimators rather than applying an optical lense array. This technology allows individual adjustment and optimization of each optical fiber channel and results in superior optical parameter tracking performance amongst optical channels tailored as shown in the insertion loss tracking diagram below.

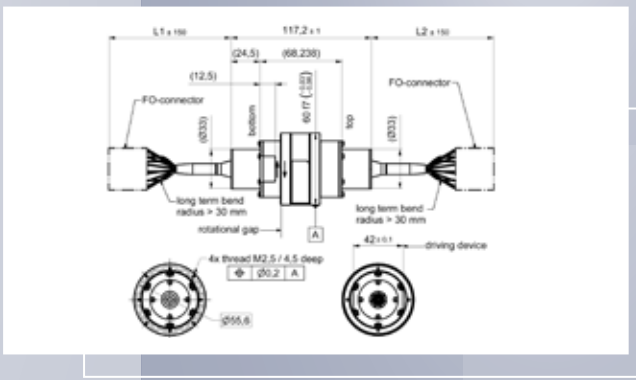


Part number	BN 549599	BN 549760	BN 549758	BN 549748
Type	singlemode	multimode	singlemode	multimode
Channel count	≤ 6	≤ 6	≤ 20	≤ 20
Connector type	LC/APC	FC/PC	LC/APC	FC/PC
Fiber type	E9/125	G50/125 or G62.5/125	E9/125	G50/125 or G62.5/125
Wavelength [nm]	1310/1550	850/1300	1310/1550	850/1300
Return loss, min.	50 dB	N/A	50 dB	N/A
Insertion loss, max.	3.5 dB	3.5 dB	3.5 dB	3.5 dB
Insertion loss, WOW max.	1.5 dB	1.5 dB	1.5 dB	1.5 dB
IP protection level	IP50	IP50	IP50	IP50
Ambient temperature range	-40 °C ... +85 °C	-40 °C ... +85 °C	-40 °C ... +85 °C	-40 °C ... +85 °C
Housing type	1	1	2	2

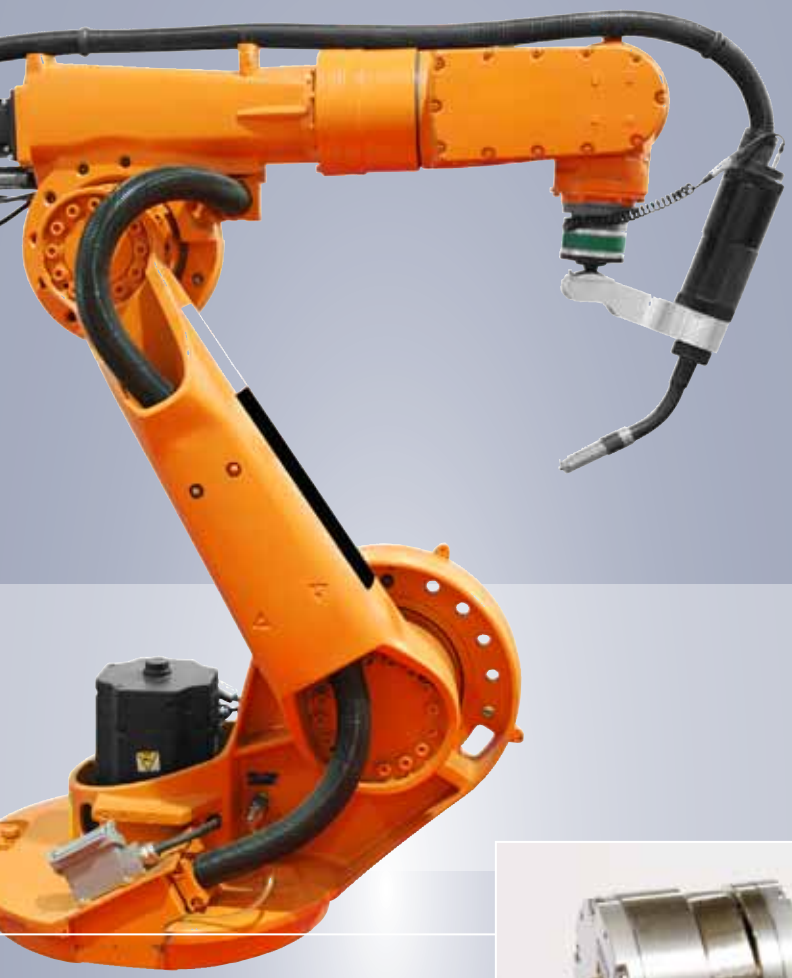
Housing type 1



Housing type 2

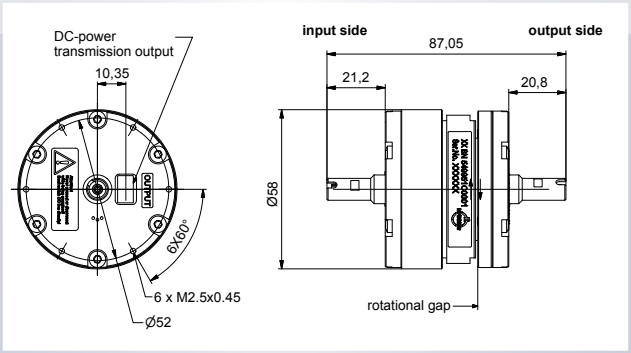


APPLICATION | SINGLE CHANNEL FORJ + CONTACTLESS DC



For 24/7 long lifetime applications that require DC power and a high data throughput, SPINNER provides a fully non-contacting rotary joint system. With a compact form factor integrating the fibre optic channels into the DC Power module with rotation velocities up to 3000 rpms. This hybrid rotary joint in typically implemented into high end imaging systems and industrial machining applications.

The fibre optic transmission channel provide the highest flexibility with communications protocols and data channels enabled by wavelength division multiplexing (WDM) technologies. As an additional advantage of the new system, SPINNER has implemented FC/PC – adapters instead of flying cables. This allows ease of integration in rough environments without handling of sensitive optical fibers and possibility to choose connecting fiber types.
The nominal output voltage of this system is 24 V DC, however the applied technology allows flexible adoption to higher or lower voltage and current.



Fiber optic channel characteristics	
Interface type / material	FC/PC - adapter / copper alloy
Fiber type	E9/125 singlemode
Wavelength [nm]	1310 / 1550
Return loss, min. / typ.	30 dB / 37 dB
Insertion loss, max.	8 dB
Insertion loss, WOW max.	3 dB
Optical power, max.	200 mW / 23 dBm

DC Power transmission channel characteristics	
Input voltage	21.6 to 27.6 V DC
Output voltage	24 V DC ±3 %
Output current, continuous	1.5 A

In the field of optogenetics, light is applied at different wavelengths to light-sensitive proteins in order to modify cell or tissue performance. With research conducted on freely moving mammals, the corresponding light output is applied in-situ via a glass fiber. To ensure that the freedom of movement is not limited, rotary joints are the optimum solution.

As an established supplier to the world of medical technology, for this application, SPINNER provides a robust, cost-effective and easy-to-use rotary joint with F-SMA or FC/PC connections for large core fibers with a core diameter starting from 200µm – **BN 549706**.
This rotary joint stands out due to its small operating torque and small insertion loss variation during rotation. Due to the design as a coupling joint a maximum configurability is possible, which means the user is themselves able to decide on which optical fiber type is used. The rapid changing of the fiber cable also enables the rapid changing of the test subject, as well as being able to continue to use the rotary joint with a different fiber standard at a later point in time.

Part number	**BN 549706**
Interface type / material	F-SMA-f / cooper alloy
Wavelength [nm]	400 - 2000 (depends on used fiber)
Insertion loss, max.	2.0 dB (with 200 µm core fiber patch cables)
Insertion loss, WOW max.	0.5 dB (with 200 µm core fiber patch cables)
Ambient temperature range operation	-32 °C ... +71 °C
Ambient temperature range storage	-40 °C ... +85 °C

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