SPINNER
Rotating Solutions

Contactless Data & Power Transmission

Edition C/2015

ETHERNET POWERLINK

HIGH FREQUENCY PERFORMANCE WORLDWIDE

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SPINNER

Contactless Data & Power Transmission

For more than 65 years, SPINNER Group has been setting new standards worldwide in high frequency technology with its products. SPINNER has become one of the leading manufacturers in rotary joints due to our innovative approach, technical expertise and quality standards.

The products are used in maritime applications (above and below water), on land, in the air and space. In all applications, the trend towards digitization and ever increasing data rates is continuing.

The contactless data transmission modules for rotating systems are used, among other things, wherever safe data transmission by means of slip rings is no longer ensured, due to large outer diameters of the system and higher data rates.

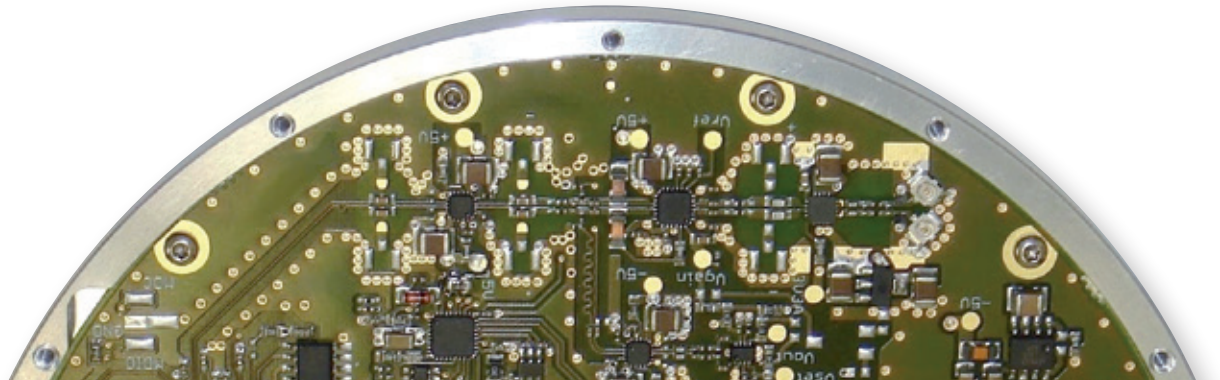
Applications:

- Wind Power
- Robotic Systems
- Packaging Solutions
- Non Destructive Material Testing
- Civil and Military Radar Systems
- Optical Surveillance Systems

Key Features:

- Automatic recognition of the bus speed for Ethernet-based protocols up to a net data rate of 1 Gbit/s, BER lower than 1×10^{-12}
- Multi-channel design available, also simultaneous transmission of other bus protocols possible in parallel to Powerlink
- Various protocols supported: Powerlink, EtherCAT 100 Mbit/s, Profinet A+B, Bluecom, CAN. (Profinet IRT, Drive-Cliq, RS-485, RS-422 – available upon request).
- Maximum immunity to interference thanks to the enclosed design, no WiFi
- Operation independent of the rotational speed and direction of rotation from 0 to 4,500 r/min with constant transmission quality; ready for use directly after the system has been switched on
- Maximum reliability and service life through maintenance-free operation without abrasion
- Modules with free inner diameters of up to 300 mm available
- Combinations with contactless power transmission of up to 300 W at 24 V DC available

SPINNER can customize solutions to suit specific conditions; do not hesitate to contact us to discuss your needs!



As is now standard in many areas of technology, Ethernet is used as a standard interface for data transmission and SPINNER has developed a contactless coupler (also referred to as a module) that can be provided with different inner diameters.

In contrast to transmission by means of a traditional slip ring, the Ethernet module also supports Gigabit Ethernet irrespective of the dimensions, while the correct standard is detected and transmitted automatically (10 Base-T (10 Mbit/s) or Fast Ethernet (100 Mbit/s) or Gigabit Ethernet (1 Gbit/s) – i.e. Plug and Play.

Without requiring any adjustments, the data transmitter is fully compatible with Profinet (class A + B); a version with CAN bus (repeater mode up to 500 Kbit/s) is also available.

The mechanical system has been designed in such a way that one or two transmission modules can be incorporated, also in combination with the DC/DC converter described below. The converter has been designed so that more than 50 watts with 24 V output voltage are still available to the user in addition to the rotor's own power supply.

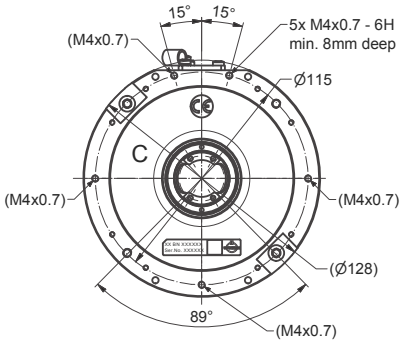
Ordering Number Nomenclatura:

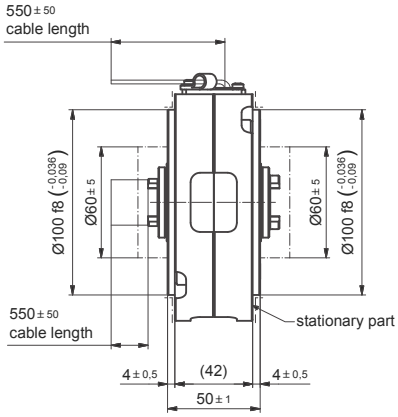
636699C 0 0 0 1

Mechanical Type
Customized version 0 = Spinner standard portfolio
Additional design modification 0 = all dimensions according to 636699C00YY-0E
Transmission type on “Slot A”: 0 = None 1 = 1000BASE-T Ethernet / Powerlink Channel 2 = 2x 100BASE-TX Ethernet-Channel 3 = CAN-Channel 4 = Profinet IRT (100 Mbit)* 5 = EtherCAT 6 = RS 485*
Transmission type on “Slot B”: 0 = None 1 = 1000BASE-T Ethernet / Powerlink Channel 2 = 2x 100BASE-TX Ethernet-Channel 3 = CAN-Channel 4 = Profinet IRT (100 Mbit)* 5 = EtherCAT 6 = RS 485*

*Optional

Data Transmission Module





Technical Data for Data Transmission Module BN 636699:

Supported Ethernet standards	10BASE-T (IEEE802.3 Clause 14) 100BASE-TX (IEEE802.3 Clause 25) 1000BASE-T (IEEE802.3 Clause 40) Auto negotiation provided to select Ethernet-Standard and full/half duplex mode automatically
Frame loss ratio according to RFC2544 / BER	≤ 1 x 10^{-9} / BER ≤ 1 x 10^{-12}
Supply voltage stator / rotor	24 V
Data interface connector	4 shielded twisted pairs at rotor and stator side for each channel, AWG28
Rotating speed max. / Optional	600 rpm / 4500 rpm
Life time, min.	200 x 10^{6} revolutions
MTBF	300 000 h
Torque max.	0.5 Nm
Case material	aluminum alloy
Case surface finish	painted black (RAL 9005)
Ambient temperature range	- 30 °C to +71 °C
Weight, approx.	1.5 Kg

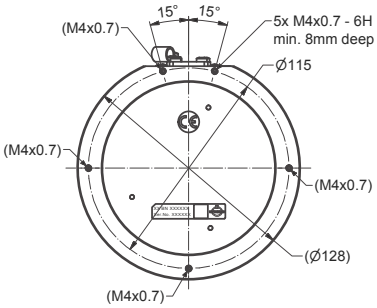
Power Transmission Module

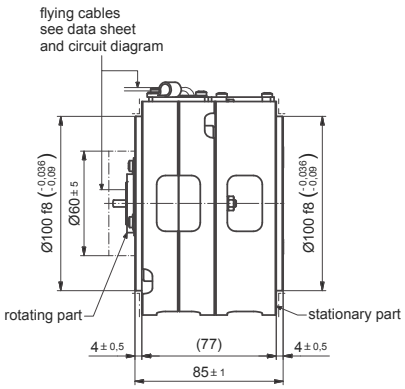
SPINNER's contactless power transmission system is a rotationally symmetric system for contactless transmission of electrical energy. This transmission system is used for the DC voltage supply of control systems, sensors or other consumers on rotating shafts.

The functioning of the transmission system corresponds to that of a galvanically isolated DC voltage transmitter. It keeps the output voltage nearly constant regardless of the load and over a wide input voltage range. The output has a short-circuit-proof and open-circuit-proof design. A major advantage is the presence of a hollow shaft, which means that combinations with optical single-channel or multi-channel rotary joints are possible for data transmission.

This DC/DC converter meets all standards common in the industry with respect to safety, interference immunity and emitted interference.

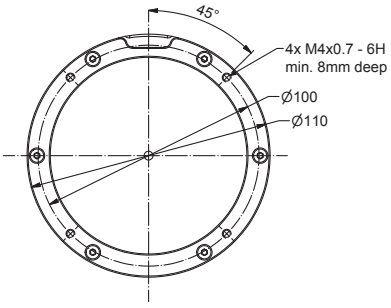
Combination of Ethernet and Power Module BN 636684C0001 (1Gbit/s Ethernet,DC/DC converter 24 V DC 100 W):

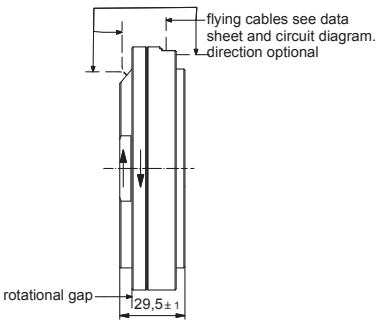




Technical Data for Standalone Module DC/DC Converter BN 636688:

Input voltage	21.6 V - 28.0 V DC
Output voltage	24 V DC ± 3%
Output current nominal	4 A
Output ripple, max.	80 mV
Efficiency, typ.	85% @ full load
Rotating speed, max. / Optional up to	600 rpm / 1500 rpm
Life time, min.	200 x 10^6 revolutions
MTBF	300.000 h
Standards	DIN EN 55022 DIN EN 61000-4-2 DIN EN 61000-4-3 DIN EN 61000-4-4 DIN EN 61000-4-6
EU Directive	EMC Directive 2004/108/EC





Application – Civil and Military Radar Systems

In the radar technology sector, the trend towards installing active components directly on the antenna is continuing.

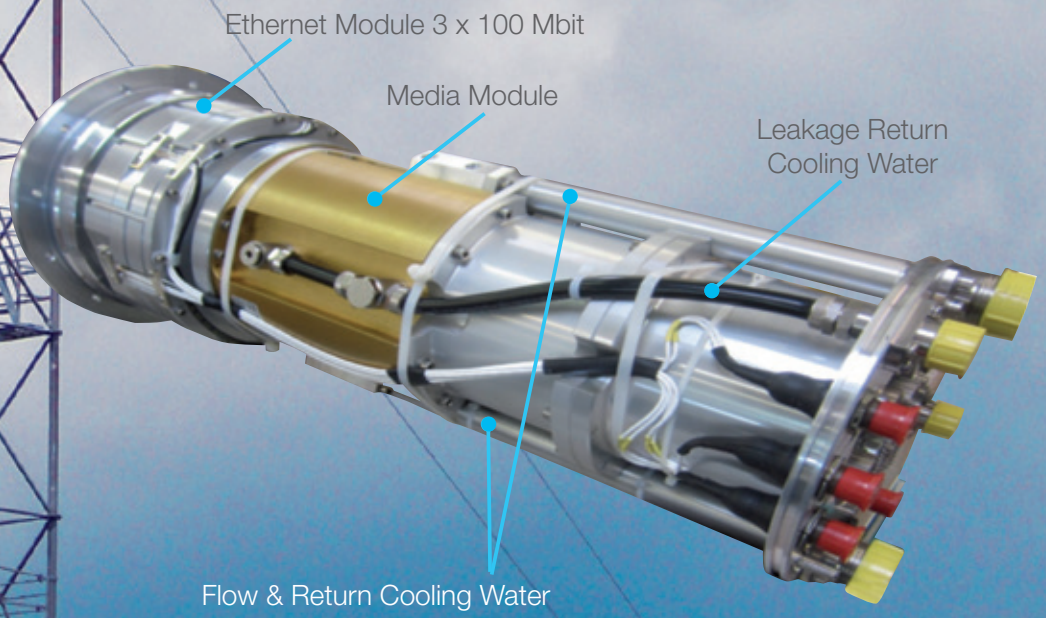
The radical reduction in cabling saves weight and increases the efficiency of the system. However, ever increasing amounts of data with high transmission rates also require demanding digital data transmission solutions.

For radar rotary joints, this means that traditional HF modules for the different frequency bands are replaced by diverse media couplers, power current and signal transmission paths.

Transmission amplifiers, now installed on the rotatable part of the radar antenna, require media couplers to create a cooling circuit in order to ensure cooling. Power current is traditionally supplied by means of a slip ring.

The electrical signals to and from the active antenna equipment are no longer transmitted by a contacting slip ring but via a multi-channel fiber optical rotary joint or means of a contactless coupler.

As the newly developed, contactless modules can be provided with virtually any inner diameter, all conceivable versions of hybrid rotary joints are possible.



This hybrid rotary joint does not include any traditional RF rotary joint. Various contactless data transmission systems are used to control the radar transceivers on the rotating platform.

Application – Optical Surveillance Systems

Since 2013, SPINNER has been delivering a completely contactless rotary joint system, consisting of a DC power transmission module and an optical channel.

In this system, the optical channel was highly integrated into the DC power module, resulting in an extremely compact form factor with permissible rotational speeds of up to 3,000 rpm.

The nominal output voltage of the contactless power transmitter is 12 V, however, the technology applied allows adjustment to higher output voltages such as 24 V (industry standard).

360° Camera System

Application – Wind Power

In wind power stations, digital, contactless transmission systems can also contribute to increased reliability. In order to control and monitor wind power stations, BUS systems such as Ethernet, Profinet and CAN are used. These signals are currently transmitted by means of slip rings.

Due to the natural wear of the slip rings, down-times for maintenance purposes are inevitable. SPINNER's contactless data transmitters for common BUS systems help to minimize down-times and reduce operating & maintenance costs.

Similar compact, digital data transmission units for Ethernet 1 Gbit and CAN are currently produced and delivered for use in wind power stations.
A combination with a FORJ rotary joint is also possible.

HIGH FREQUENCY PERFORMANCE WORLDWIDE

SPINNER designs and builds cutting-edge radio frequency components, 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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