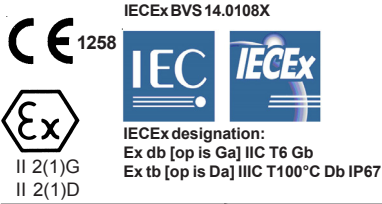
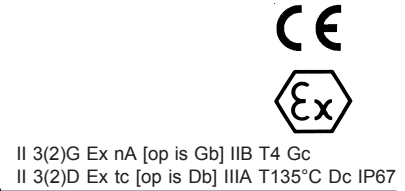


Rotation Speed Control Sensors series RSS/RSO/RSN/RSD-LTD-POF(-OP)

RSD-LTD-POF-OP Housing M30 RSN-LTD-POF-OP



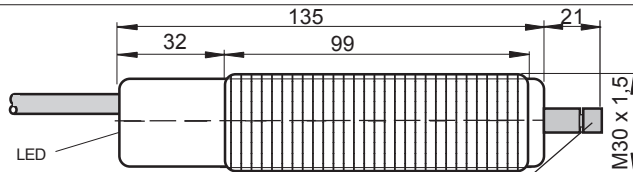
- Suitable for plastic optical fibres (POF)
- Laser-emitter, red light 650nm
- Type RSD: ATEX and IECEx certified
- Type RSD: For use in Ex Zones (0), 1, 2, (20), 21, 22
Optical radiation can operate into Ex Zone 0, 1, 2, 20, 21, 22
- Type RSN: For use in Ex Zones (1), 2, (21), 22
Optical radiation can operate into Ex Zone 1, 2, 21, 22
- Type RSO: Not for use inside Ex Zones
Optical radiation can operate into Ex Zone 1, 2, 21, 22
- Speed control up to 100'000 RPM
- Very high reliability (EMC)



Technical Data	Type	RSS-LTD-POF	RSO-LTD-POF	RSN-LTD-POF-OP	RSD-LTD-POF-OP
Type of Ex protection, Gas, according to 2014/34/EU		NONE	II (3)G [Ex op is IIB T4 Gc]	II 3(2)G Ex nA [op is Gb] IIB T4 Gc	II 2(1)G Ex db [op is Ga] IIC T6 Gb
Type of Ex protection, Dust, according to 2014/34/EU		NONE	NONE	II 3(2)D Ex tc [op is Db] IIIA T135°C Dc IP67	II 2(1)D Ex tb [op is Da] IIIC T100°C Db IP67
For use in Ex Zones		Not for Ex zones	(1), (2), (21), (22)	(1), 2, (21), 22	(0), 1, 2, (20), 21, 22
Laser class			Class II, 650nm visible red, Po <= 1mW		
Maximum optical irradiance		NOT LIMITED	<=5mW/mm ²	<=5mW/mm ²	<=5mW/mm ²
Maximum radiated optical power		NOT LIMITED	< 35mW	< 35mW	< 15mW
Switching frequency			0,01kHz - 10kHz ^{Note1}		
Rise time			<= 1us		
Power up delay time			<= 2sec		
Supply voltage			24VDC +/-15%		
Absolute maximum input voltage Um			30VDC		
Current consumption			60mA		
Power dissipation			maximum 1.58W		
Output			1 x Push-Pull, short circuit protected, maximum 10mA		
Output impedance			max. 50Ω		
Housing			M30, brass, nickel plated		
Enclosure rating at EN 60529		IP 65	IP 65	IP 67	IP 67
Vibration shock resistance			Vibration: 30g over 20Hz to 2kHz. Shock: 100g for 3ms		
Ambient working temperature range Tamb			0°C up to +50°C		
Storage temperature range			-40°C up to +70°C		
Electrical connection, type			Cable, 3+PE x 0,5mm ² , shielded, jacket TPU, suitable for drag chains		
Electrical connection, length in meters		3m	3m	3m	10m
Connection, RSS/O/N-LTD-(OP)-S099		Socket, M12, 5 terminals, Type Lumberg RSF 5			--
POF connection		Easy connection of plastic optical fibres, D = 2.2mm/1mm, no tools required.			
Optical fibre connection, RSN/RSD-LTD-POF-OP-S206		Connection for Matrix optical fibres, core-diameter: 1.0mm up to 4.0mm			
Accessories, included all types		- 2x Nuts M30 - 2x Dust protection cap for POF-connector.			
Accessories, type RSS/O/N-LTD-POF(-OP)-S099, included		- 1x Safety lock device, mount at the cable connection, for locking the connection. (black synthetic device) - 1x Warning plate "WARNING - Explosion Hazard - Do Not Disconnect While Circuit Is Live Unless Area Is Known To Be Non-Hazardous", self-sealing, for gluing on the cable connector. - 1x Protection cap for the sensor connector.			
Accessories, RSS/O/N-LTD-POF(-OP)-S099, not included		- Single ended cordset, straight type: RKTS 5-298/xx or right angle type: RKWTH 5-298/xx			
Accessories, all types, not included		- Different types of optical fibres or Matrix optical fibre (for RSN/RSD-LTD-POF-OP-S206), on request.			
Options		- RSS/RSN-LTD-POF(-OP)-S099: - Socket M12: Lumberg RSF 5, 5 terminals. - RSx-LTD-POF(-OP)-S158: - Current loop output, 4mA up to 20mA, type PNP. - RSD-LTD-POF-OP-S203: - Reduced sensitivity and anti-kink POF fitting. - RSx-LTD-POF(-OP)-S206: - Reduced sensitivity and connector for Matrix optical fibres. - RSO-LTD-R01: - Special device with cable connection. - RSO-LTD-R01-S099: - Special device with Socket M12.			
Output Function:					
Ex related designations:	CE 1258 Type RSD-LTD-POF-OP: II 2(1)G Ex db [op is Ga] IIC T6 Gb II 2(1)D Ex tb [op is Da] IIIC T100°C Db IP67		Electrical data according to the chart ATEX certification no: BVS 10 ATEX E 130 X & IECEx certification no: IECEx BVS 14.0108X Declaration by manufacturer according to the ATEX directive 2014/34/EU		
	Type RSN-LTD-POF-OP: II 3(2)G Ex nA [op is Gb] IIB T4 Gc II 3(2)D Ex tc [op is Db] IIIA T135°C Dc IP67		Declaration by manufacturer according to 2014/34/EU Numerals 5 to 8 of the serial number (year/ calendar week)		
	Type RSO-LTD-POF: Tamb: 0°C < Tamb < +50°C (X designation of the certification number: Fibre optics must only be applied with sensors with certificated limited optical power)		Date of production: Declaration by manufacturer according to 2014/34/EU Numerals 5 to 8 of the serial number (year/ calendar week)		

Note 1: The real reachable switching/rotary frequency is dependent on the condition and type of the marking disc (2 or 4 sectioning) and the careful preparation of the optical fibres.

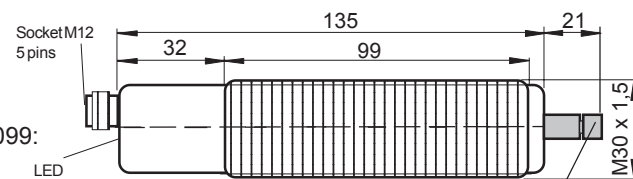
Dimensions and connection layout
RSD-LTD-POF-OP:
RSN-LTD-POF-OP:
RSS-LTD-POF:



Connection layout:
1 +24VDC
2 0V
3 Output
white Cable shield
yellow-green PE

2 x POF-Adapter (RSD-LTD-POF-OP-S203): With anti-kink POF fitting

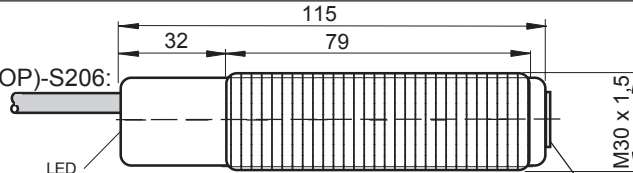
Dimensions and connection layout
RSS-LTD-POF-S099
RSO-LTD-POF-S099
RSN-LTD-POF-OP-S099:



Connection layout:
1/brown +24VDC
2/white NC
3/blue 0V
4/black Output
5/grey PE

2 x POF-Adaptor

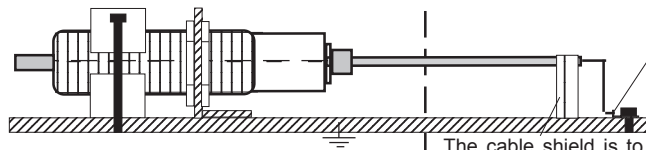
Dimensions and connection layout
RSS/RSN-LTD-POF(-OP)-S206:



Connection layout:
1 +24VDC
2 0V
3 Output
white Cable shield
yellow-green PE

RSS/RSN/RSD-LTD-POF(-OP)-S206: Without 2 x POF-Adaptor but standard Matrix-optical-fibre connector instead.

Equipotential bonding prescriptions:



The end of the cable must be connected outside the hazardous location. Check the reliable, noncorrosive holding of the protection earth connection.

The cable shield is to connect to PE in a wide area.

Operating Manual, EC/EU-Declaration of Conformity:

Operating Manual

Ex protection

It is necessary to take into consideration the valid international and national rules and regulations (EN 60079-14). The maximum input voltage $U_m=30VDC$ must not be exceeded. The local equipotential bonding have to be done. The protective earth (PE) terminal is solid connected with the housing. The cable have to be protected against damages. To connect cables inside hazardous locations only use certificated Ex housings. All cable terminals must be connected outside hazardous locations. Use only original manufactured fibre optics and additional optical lenses, other additional optical lenses are not allowed in hazardous locations.

Type RSD-LTD-POF-OP: For use in Ex zones 1, 2, 21, 22. The limited optical radiation can operate into hazardous locations 0 and 20 over certified fibre optics or through a viewing glass.

Type RSN-LTD-POF-OP: Only for use in Ex zones 2, 22. The limited optical radiation can operate into hazardous locations 1 or 21 over certificated fibre optics or through a viewing glass.

Type RSN-LTD-POF-OP-S099: Only for use in Ex zones 2, 22. The limited optical radiation can operate into hazardous locations 1 or 21 over certificated fibre optics or through a viewing glass. Do not separate the connector when the supply voltage is connected to the cable. When installing the sensor, the safety lock device must be fitted at the cable connector. The additional adhesive warning label must be fixed to the connector housing at the connection cable. Lumberg cordsets RKT5 5-298/xx (Straight type) or RKWTH 5-298/xx (Right angle type) are allowed ONLY. It is necessary to take into consideration the mounting prescription of the connector manufacturer. In dusty locations, the socket protection cap must be fitted, when the connection cable is not connected.

Type RSO-LTD-POF(-S099): The sensor must be installed out of the explosion risk area. The limited optical radiation can operate into hazardous location 1, 2, 21 and 22.

General mounting prescriptions

Do not exceed the maximum ratings. The electrical connections must be exactly as shown in the connection diagram. The cable shield must be connected short. The cable shield should be connected to the protection earth, large-surfaced. Connection cables must not be installed parallel to high voltage cables.

Function

The sensor can only be used with connected fibre optics. Light reflection alterations, generated by the turning marking disc of the spraying apparatus, will be amplified and formed. If the frequency falls below the minimum permissible frequency, the output can show any state. Due to the high sensitivity of the device, the output can show any output frequencies caused by the finest vibrations or shocks of the connected POF when the turbine is at a standstill.

Using the fibre optics

The sensor must be operated with POF plastic optical fibers with an outer diameter of 2.2 mm and a core diameter of 1 mm. No optical fibers longer than 5m should be used. The POFs to be used must be carefully cut to size using a cutter or an appropriate professional cutter. Insert the prepared POFs firmly into the POF connections and tighten the knurled nut. It should be noted that POFs with only one core fiber have different attenuation values when bent.

The maximum possible length of the connected POF depends on its type, structure and installation. The functional reliability of the sensor is given by the condition of the marking disc and the careful preparation of the optical fibres. The fibre optics must not be buckled or laid with a small radius. Buckled or bad laid fibre optics results in a strong decrease of performance. Avoid decreasing performance and failures caused by wear, by a functional mounting of the fibre optics.

Types RSN/RSD-LTD-OP-S206 can only be operated with Matrix optical fibres.

Maintenance

Protect the fibre optic adaptor of the sensor and the optical fibres against pollution. If the fibre optic adaptor is contaminated, clean with alcohol. Do not use aggressive solvents. Plastic optical fibres can be destroyed by strong solvents. Equipment must only be repaired or serviced by the manufacturer.

Safety regulations for class 2 laser devices

By the installation, the going into operation and the application, it is necessary to take into consideration the valid rule EN 60825-1/-2 (Parts 12.5.1/12.6.2). Laser Class 2 without connected fibre optics. Do not stare into the beam!

General safety instructions

Types RSO-LTD-POF / RSO-LTD-POF-S099: Warning - May only be installed outside hazardous areas.

Types RSN-LTD-POF-OP-S099: WARNING - EXPLOSION HAZARD - WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES. DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS. The mounting of the sensor in dusty locations without fixed cordset or protection cap results in a high ignition risk.

The sensors must not be used for Accident-Prevention! In worst case the output can change to any state! When installing and operating with the sensor, it is necessary to take into consideration the relevant international and other national regulations: EN 60079-14, single directive 2014/30/EU.

The sensor and the fibre optic meets the requirements of:

EN IEC 60079-0:2018, IEC 60079-1:2014, IEC 60079-15:2010, IEC 60079-28:2015, IEC 60079-31:2013, EN 60529:2014, EN 61000-4-2 to EN 61000-4-6, EN 61000-6-1/-2, EN 61000-6-4. ATEX Directive: 2014/34/EU, Machine Directive: 2006/42/EG, EMV Directive: 2014/30/EU, RoHS: 2011/65/EG.

General Notes, disposal

We reserve the right to modify our equipment. Our equipment is designed such way, that it has the least possible adverse effect on the environment. It neither emit or contain any damaging or siliconized substances and use a minimum of energy and resources. No longer usable or irreparable units must be disposed of in accordance with local waste disposal regulations.

EC/EU-Declaration of conformity

RSD-LTD-POF-OP(-S**): IECEx certification 14.0108X and ATEX certification No.: BVS 10 ATEX E130 X.

RSN-LTD-POF-OP(-S099/S206), RSO-LTD-POF(-S099): ATEX Declaration by manufacturer according to ATEX directive 2014/34/EU. ATEX certification of quality type production of Ex devices in accordance to the ATEX directive 2014/34/EU, CE 1258, Eurofins. Certification No: SEV 21 ATEX 4580, QAR No. CH/SEV/QAR21.0009. The conformity of the devices with the EC standards and directives and the EC-type examination certificate and the observation of the Quality Safety System ISO 9001:2015 with the ATEX module "Production" declares:

Pablo Ledergerber, Matrix Elektronik AG

RSD-LTD-POF-OP-IECEX_e4/2025-04-23/MIP

Tippkemper - Matrix GmbH
Meegerer Str. 43 D-51491 Overath
Tel.: +49 2206 9566-0 Fax -19
info@tippkemper-matrix.com

Matrix Elektronik AG (Manufacturer)
Kirchweg 24, CH-5420 Ehrendingen
Tel.: +41 56 20400-20 Fax -29
info@matrix-elektronik.com