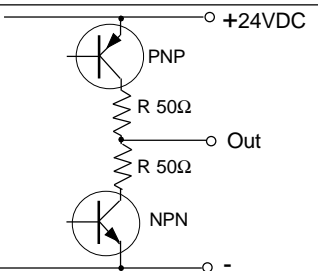
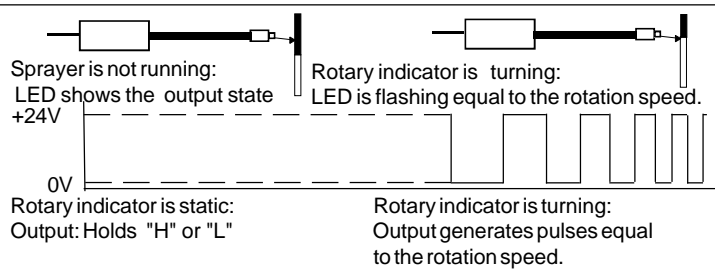


## Original Operating Manual: Rotation Speed Control Sensor type IRN-LTD-OP-S230 Housing M30



II 2G Ex nA op is IIB T4 Gc

- Well applicable with plastic and glass fibre optics
- Laser-emitter, red light 650nm
- Applicable in Ex Zone 2
- Speed control up to 100'000 RPM
- Very high reliability (EMC)

Technical Data	Type	IRN-LTD-OP-S230
Type of Ex protection, Gas, at 94/9/EG		II 3(2)G Ex nA
Type of Ex protection, Dust, at 94/9/EG		NONE
Applicable in Ex Zone		2
Laser class		Class II, 650nm visible red, Po <= 1mW
Maximum radiant intensity		<=5mW/mm <sup>2</sup>
Maximum radiant power		< 35mW
Switching frequency		0,1kHz - 10kHz <sup>Note1</sup>
Rise time		<= 2us
Power up delay time		2sec
Supply voltage		24VDC +-10%
Absolute maximum input voltage Um		30VDC
Current consumption		60mA
Power dissipation		maximum 1.68W
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
Vibration shock resistance		Vibration: 30g over 20Hz to 2kHz. Shock: 100g for 3ms
Working temperature range T <sub>amb</sub>		0°C < T <sub>amb</sub> < +50°C
Ambient illumination		only for using in enclosed ambients
Electrical connection		Socket M12, 5 terminals
Optical fibre connection		Matrix connection, applicable with the series PA and PV
Accessories, included		- 2x Nuts M30 - 1x Safety lock device, mount at the cable connection, for locking the connection. (black synthetic device) - 1x Warning plate "Do not separate when supply voltage connected", self-sealing, for gluing on the cable connector. - 1x Protection cap for the sensor connector.
Accessories, not included		- Single ended cordset, straight type: RKTS 5-298/xx or right angle type: RKWTH 5-298/xx, Lumberg M12/5P - Different types of optical fibres, on demand - Fast fixing adapter for POF
Options		--
Output Function:		 <p>                     Sprayer is not running:                      LED shows the output state +24V                      Rotary indicator is turning:                      LED is flashing equal to the rotation speed.                 </p> <p>                     Rotary indicator is static:                      Output: Holds "H" or "L"                 </p> <p>                     Rotary indicator is turning:                      Output generates pulses equal to the rotation speed.                 </p>

ATEX related designations:

CE

Type IRN-LTD-OP-S230:

 T<sub>amb</sub>: 0°C < T<sub>amb</sub> < +50°C

(X designation of the certification number: Fibre optics must only be applied with sensors with certificated limited optical power)



Manufacturer with address

II 3G Ex nA op is IIB T4 Gc

Date of production:

Electrical data according to the chart

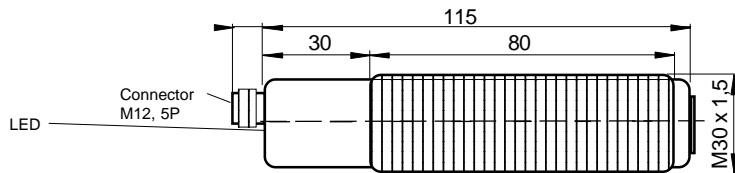
Declaration by manufacturer at 94/9/EC

Numerals 5 to 8 of the serial number (Year/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 working up of the optical fibres.

IRN-LTD-OP-S230\_e1/2014-03-19/HB

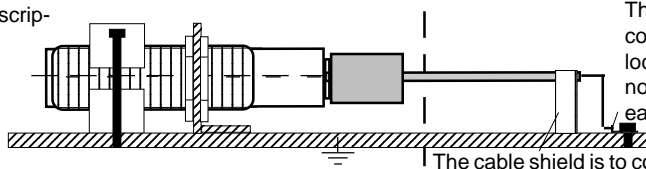
Dimensions and connection layout IRN-LTD-OP-S230:



Wiring (socket M12):

1/brown	+24VDC
2/white	NC
3/blue	0V
4/black	Output
5/grey	FE

Equipotential Bonding prescription:



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 - Declaration of Conformity:**

**Operating Manual:**

**Ex protection:**

General prescriptions:

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: IRN-LTD-OP-S230: Only applicable in Ex zone 2. The limited optical radiation can operate into hazardous location 2.

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 RKTS 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.

**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 IRN-LTD-OP-S230 can only be used with connected fibre optics. Laser light reflection alterations, generated by the marking disc of the spraying apparatus, will be amplified and formed. At lower then minimum frequency the output can shows any state. Because the device has a really high sensitivity, the output can show any different frequencies at standstill of the sprayer, this signals will be generated by small vibrations or concussions of the fibre optics.

**Using the fibre optics**

The sensor IRN-LTD-OP-S230 must not go into operation without mounted fibre optics. The fibre optics must be handled careful. The functional safety of the sensor is given by the condition of the marking disc and the careful working up of the optical fibres. The fibre optics must not be buckled or laid with a small radius. Buckled or bad laid fibre optics results to a strong decrease of performance. Avoid performance decreasing and failures caused by wear, by a functional mounting of the fibre optics.

**Maintenance**

Protect the fibre optic adaptor of the sensor and the optical fibres against pollution. If the fibre optic adapter 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 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**

IRN-LTD-OP-S230: "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 1999/92/EC.

The sensor and the fibre optic are conform to the following standards:

EN 60079-0:2009, EN 60079-15:2010, EN 60079-28:2007, EN 60825-1:2006, EN 60825-2:2004; EN 60529; EN 61000-4-2 to EN 61000-4-6, EN 61000-6-1/-2, EN 61000-6-4. Ex protection: 94/9/EC (ATEX 100a), Machine directive: 2006/42/EC, EMC: 2004/108/EC, RoHS: 2011/65/EC.

**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-Declaration of conformity**

ATEX declaration by manufacturer at 94/9/EC ATEX certification of quality type production of Ex devices at the directive 94/9/EC, CE 0158. Certification No: BVS 12 ATEX ZQS/E118. 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 9001:2008 with the ATEX module "Production", declares:

Hans Bracher, Matrix Elektronik AG

IRN-LTD-OP-S230\_e1/2014-03-19/HB

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