

**Original operating manual:**
**Photoelectric proximity switch IRS/IRN/IRD-\*\*\*-OF\*/OV\*(-OP)**
**IRD-\*\*\*-OFF/OFN/OPI/ONI/OVP/OVN/OVX/OFX-OP**
**Housing M30**
**IRN-\*\*\*-OFF/OFN/OPI/ONI/OVP/OVN/OVX/OFX-OP**

 II 2(1)G  
II 2(1)D

 IECEx markings  
Ex d [op is Ga] IIC T6 Gb  
Ex tb [op is Da] IIIB T100°C Db IP67

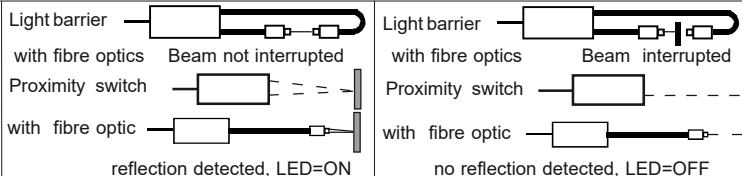
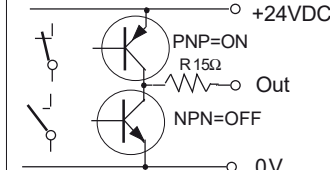
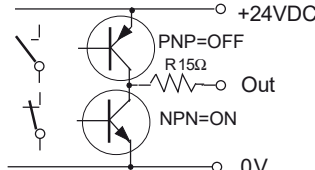
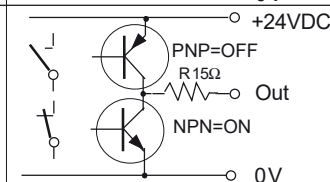
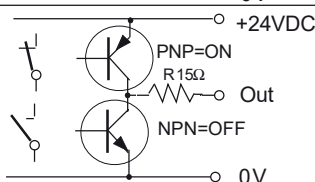
- Also for using with certificated fibre optics
- IRD: ATEX and IECEx certificated
- Types IRD: For use in Ex Zones (0), 1, 2, (20), 21, 22 optical radiation can operate into Ex Zones 0, 20
- Types IRN: For use in Ex Zones (1), 2, (21), 22 optical radiation can operate into Ex Zones 1, 21
- Robust sensor for industrial applications



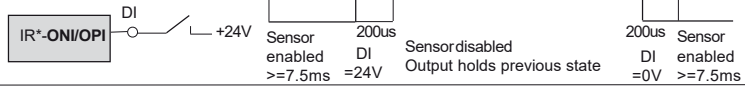
ATEX designation:

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

Technical Data	Type		
	IRS-***-OFF/OFN	IRN-***-OFN/OFN-OP	IRD-***-OFN/OFN-OP
Range (on white paper A4, 80g)	*** = output function PNP / OFN = output function NPN *** = Range in dm 002/004/010/015/020/025/030. 0.2m to 3m		
Type of Ex protection, Gas, according to directive 2014/34/EU	NONE	II 3(2)G Ex nA [op is Gb] IIB T4 Gc	II 2(1)G Ex d [op is Ga] IIC T6 Gb
Type of Ex protection, Dust, according to directive 2014/34/EU	NONE	II 3(2)D Ex tc [op is Db] IIIA T135°C Dc IP67	II 2(1)D Ex tb [op is Da] IIIB T100°C Db IP67
For use in Ex Zones	Not for Ex zones	Zones (1), 2, (21), 22	Zones (0), 1, 2, (20), 21, 22
Maximum radiant intensity	NOT LIMITED	<=5mW/mm <sup>2</sup>	<=5mW/mm <sup>2</sup>
Maximum radiant power	NOT LIMITED	<=35mW	<=15mW
Light source	Infrared 870nm		
Optical angle (at nominal range)	appr. 10°		
Response time	5ms (1ms, on request)		
Power up delay time	500ms		
Supply voltage	24 VDC +/-10%		
Absolute maximum supply voltage	Um = 30VDC		
Current consumption	maximum 60mA		
Maximum power dissipation	1.68W		
Output	Push-Pull, 100mA, short circuit protected		
Input, only types IR*-***-ONI/OPI(-OP) (Disable Input)	PNP compatible, Ri 10kΩ		
Housing	M30, yellow brass, type Ms58, nickel plated		
Enclosure rating, according to EN 60529	IP54	IP67	IP67
Working temperature range Tamb	-20°C < up to < +50°C		
Storage temperature range	-30°C ... +70°C		
Shock and vibrating resistance	Vibration: 30g over 20Hz to 2kHz. Shock:50g for each direction (X, Y, Z)		
Pollution degree, according to EN 60664-1:2007	4		
Device designation, according to EN 60947-5-2	R3A30AP1		
Electrical connection cable	3+PE x 0.5mm <sup>2</sup> , shielded, TPU, leads numbering marked, length: 3m		
Electrical connection cable, types IR*-***-ONI/OPI(-OP)	4+PE x 0.5mm <sup>2</sup> , shielded, TPU, leads numbering marked, length: 3m		
Socket for types IRS/IRN-***-OP-S099/S244	Socket M12, Lumberg type RSF, 5 terminals		
Accessories, all types	- 2 nuts M30 (optional 1 clamp on demand)		
Accessories, types IRN/IRD-***-OP(-S***)	- 1x Spare safety screw with packing ring for potentiometer sealing		
Accessories, only type IRN-***-OP-S099/S244	- 1x Safety lock device, mount at the cable connection, for locking the connection. (black synthetic device)		
	- 1x Warning plate "Do not open/close when supply voltage connected", self-sealing, for gluing on the cable connector.		
	- 1x Protection cap for the sensor socket.		
Accessories, optional for the types IR*(-OP)-S099/S244	- Single ended cordset, types RKTS 5-298/xx or RKWTH 5-298/xx, Lumberg		
Accessories, not included, only IRS-002/004-OP-S125	- Spare safety screw with packing ring for potentiometer sealing		
Options	Up to 100m, on request		
- IR*-***-OFX(-OP):	With output function selection by changing the supply voltage polarity		
- IR*-***-OPI(-OP):	Output function PNP, with emitter disable input "DI"		
- IR*-***-ONI(-OP):	Output function NPN, with emitter disable input "DI"		
- IR*-***-OVP(-OP):	Output function PNP, with additional pollution indication output "VA"		
- IR*-***-OVN(-OP):	Output function NPN, With additional pollution indication output "VA"		
- IR*-***-OVX(-OP):	With output function selection by changing the supply voltage polarity and with additional pollution indication output "VA"		
- IR*-001-OFN(-OP):	Output function PNP, for near range applications		
- IRD-010-OP-OP-S086:	Switching frequency: 1.5kHz, with special high flexible, oil resistant cable for trailing, length: 10m		
- IRD-004-OP-OP-S095:	With mounted optic, type: AD-4-W 15 / Cable length: 6m		
- IRD-004-OP-OP-S097:	Response time:150us / Cable length: 5m		
- IRS/IRN-***(-OP)-S099:	Socket M12, Lumberg RSF 5, 5 pins		
- IRD-025-OP-OP-S101:	Response time:1ms/500Hz, Cable: 10m, Ölflex, special high flexible for trailing		
- IRS-***-S107:	Maximum ambient temperature: +80°C		
- IRS-002/004-OP-S125:	Potentiometer with dust proof screwing. (IRS-002-OP-S125: Range = 180mm+5%)		
- IR*-***-OP-S149:	Cable TPU, for drag chain applications		
- IRN-010-OP-OP-S244:	Socket M12, Lumberg RSF 5 (5 pins). Optical radiation can operate into Ex zones 0 and 20. ATEX: II 3(1)G Ex nA [op is Ga] IIB T4 Gc, II 3(1)D Ex tc [op is Da] IIIA T135°C Dc IP67.		
	With output function selection by changing the supply voltage polarity		
- IR*-***-OP-S268:	1kHz switching frequency		
- IR*-002-***-OP-S269:	10kHz switching frequency		
- IRS/IRN-002-OP-OP-S270:	Socket M12, Lumberg RSF 5, 5 pins, response time: 500us		
- IR*-002-***-OP-S271:	With wide optical angle 22°		
- IRS-***-S274:	Maximum ambient temperature: +100°C		

**Function and LED display**

 IRS/IRN/IRD-\*\*\*-OFN/OVN/ONI(-OP)(-S\*\*\*)  
Output low side switching (NPN)

 IRS/IRN/IRD-\*\*\*-OFX/OVX(-OP)(-S\*\*\*)  
at reversed connection of the supply voltage.  
(Lead 1 / Pin 1 = 0V, lead 2 / Pin 3 = +24VDC)

 IRS/IRN/IRD-\*\*\*-OFF/OVP/OPI(-OP)(-S\*\*\*)  
Output high side switching (PNP)  
  
 IRS/IRN/IRD-\*\*\*-OFX/OVX(-OP)(-S\*\*\*)  
at standard connection of the supply voltage.  
(Lead 1 / Pin 1 = +24VDC, lead 2 / Pin 3 = 0V)

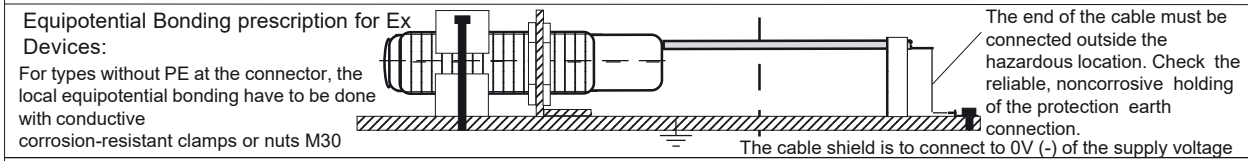
IR\*-\*\*\*-ONI/OPI(-OP) (with optional Disable Input)  
 Uin: 18V-28VDC, DI=+24V=Disable  
 Response time: <=200us  
 Hold time: >=7.5ms, DI = 0V=Enable



Dimensions	30	115	80		
Connection layout					
IRN/IRD-***-OP				+24VDC	1
IRS-***-OP-S125				0V	2
IRS-***-O*-S274:				Output	3
				DI or VA	4
				PE	yellow-green

Dimensions	13	30	IRS=85 / IRN=115		
Connection layout					
IRS/IRN-***-(-OP)-S099/244:					
				1/brown	+24VDC
				2/white	NC
				3/blue	0V
				4/black	Output
				5/grey	PE

Dimensions	30	85	50		
Connection layout					
IRS-***-***:				+24VDC	1
				0V	2
				Output	3
				DI or VA	4
				PE	yellow-green



**Ex related markings:**  
 CE 1258  
 Type IRD-\*\*\*-OP: II 2(1)G Ex d [op is Ga] IIC T6 Gb  
 Type IRN-\*\*\*-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  
 Tamb: -20°C up to +50°C  
 (X designation of the certification number: Fibre optics must only be applied with sensors with certificated limited optical power)

**Operating Manual, EC-/EU-Declaration of Conformity:**

**Operating Manual:**  
 Ex protection:  
 General prescriptions for all Ex devices:  
 It is necessary to take into consideration the valid international and national rules and regulations (EN 60079-14). The maximum input voltage Um=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 IRD-\*\*\*-OP(-S\*\*): Applicable in Ex zones 1, 2, 21, 22. The limited optical radiation can operate into hazardous locations 0 or 20 over certificated fibre optics or through a viewing glass.  
 Type IRN-\*\*\*-OP(-S\*\*): Only applicable 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 IRN-\*\*\*-OP-S099: Only applicable 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 IRN-010-OP-S244: Only applicable in Ex zones 2, 22. The limited optical radiation can operate into hazardous locations 0 or 20 over certificated fibre optics or through a viewing glass.  
 Types IRN-\*\*\*-OP-S099 & IRN-010-OP-S244:  
 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.

be controlled in a short reaction time. If only one sensor is activated in the same time, a mutual influence is precluded.  
 DI= 0V or not connected = emitter enabled  
 DI= High (24VDC) = emitter disabled  
 For a correct function the sensor must be enabled for at minimum >= 7.5ms (DI=0V). If the DI input will be disabled, the outputs holds the previous output status from the last enabled time. The DI input is PNP compatible.  
**Optical range**  
 The nominal range for the types IR\*-002/004/010/015/020 is defined on white paper A4, 80g. The nominal range for the types IR\*-025/030 is defined on white paper 1m<sup>2</sup>, 80g. The range will be influenced by the color, kind of surface and shape of the object.  
**Fibre optics**  
 For efficiently detection solutions look for our multiple program of fibre optics, also for high temperature areas. Fibre optics for Ex zones must only be driven by sensors series IRN and IRD.  
**Maintenance**  
 Protect the sensor and the optional fibre optics against pollution. If the fibre optics or the sensor lenses are contaminated, clean with alcohol. Do not use aggressive solvents. Optical fibres can be destroyed by strong solvents. Equipment must only be repaired or serviced by the manufacturer.  
**General safety instructions**  
 Series IRN-\*\*\*-OP-S099/S244: "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.

**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 IR\*-\*\*\*-OFN/OP/ONI/OPI(-OP)**  
 The sensor works basically as proximity switch on diffuse optical reflections. If the sensor detects reflected light, the LED shows red and the output switches on +24VDC (P types) or 0V (N types). If no reflected light will be recognized, the output switches to 0V (P types) or +24VDC (N types). The push-pull output allows to connect the load to +24VDC or 0V.  
**Function IRD-025-OFN-OP-S101**  
 The sensor works basically as proximity switch on diffuse optical reflections. If the sensor detects reflected light, the LED shows red and the output switches on 0V. If no reflected light will be recognized, the output switches to +24VDC. The push-pull output allows to connect the load to +24VDC or 0V. By changing the polarity of the supply voltage, the output function will be inverted.  
**Optional pollution indication output "VA", series IR\*-\*\*\*-OV\*(-OP)**  
 The VA output will be activated by polluted lenses or reduced optical input signal. If only reduced optical input signal will be detected, the LED shows yellow and the pollution indication output will be activated. If no light can be detected both outputs are switched OFF and the LED shows red. If strong light is detected only the standard output is switched ON, the pollution indication output is switched OFF and the LED shows green.  
**Sensors with disable input "DI", types IR\*-\*\*\*-OPI/ONI(-OP):**  
 If several sensors are installed close to another, it is necessary to use sensors with disable input. By using the disable input DI, each sensor can

**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:**  
 The sensor and the fibre optic are conform to the following standards: 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. IECEx certification, types IRD: Certification number: BVS 14.0108X. ATEX certification, types IRD: II 2(1)G Ex d [op is Ga] IIC T6 Gb, II 2(1)D Ex tb [op is Da] IIB T100°C Db IP67. EC-Certification No. BVS 10 ATEX E 130 X, DEKRA Test & Certification GmbH, Zertifizierungsstelle, Carl-Beyling-Haus, Dinendahlstrasse 9, D-44809 Bochum, Ident number: 0158. ATEX certification, types IRN: II 3(2)G Ex nA [op is Gb] IIB T4 Gb, II 3(2)D Ex tc [op is Db] IIIA T135°C Dc IP67. Declaration by manufacturer at 2014/34/EU and test report No. BVS PP 10-2233 EG, for Ex op is. ATEX certification of quality type production of Ex devices at the directive 2014/34/EU, CE 1258, Eurofins. Certification No: SEV 21 ATEX 4580. 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

IRD-xxx-OFX-OP-IECEX\_e10/2023-05-15/MP

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