ISO 9001:2008 / ATEX

Photoelectric Proximity Switch IRS/IRN/IRD-**N/P(-OP)

IRD-N/P-OP**

CE 0158 Ex

II 2(1)G Ex d [op is Ga] IIC T6 Gb
II 2(1)D Ex tb [op is Da] IIIB T100°C Db IP67

- Also for using with fibre optics
- Type IRD, for use in ex zones (0), 1, 2, (20), 21, 22
  Optical radiation can operate into Ex Zones 0, 20
- Type IRN, for use in ex zones (1), 2, (21), 22
- Robust sensor for industrial applications
  Optical radiation can operate into Ex Zones 1, 21

IRN-N/P-OP**

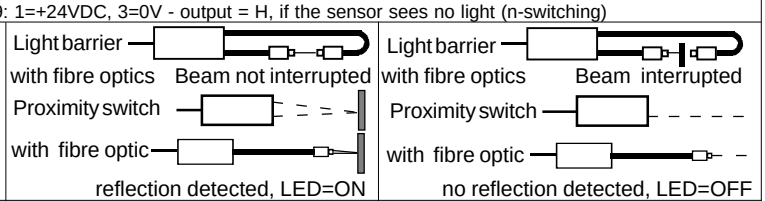
CE Ex

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

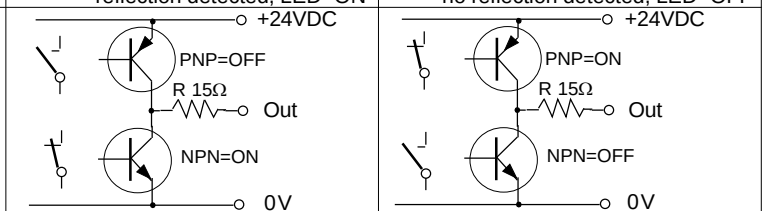
Technical Data \ Type	IRS-U-2/4/10/15/20/25/30N/P	IRN-2/4/10/15/20/25/30N/P-OP	IRD-2/4/10/15/20/25/30N/P-OP
Type of Ex protection, Gas, according to 2014/34/EU	NONE	II 3(2)G Ex nA [op is Gb] IIB T4 Gc	II 2(1)G Ex d [op is Ga] IIC T6 Gb
Type of Ex protection, Dust, according to 2014/34/EU	NONE	II 3(2)D Ex tc [op is Db] IIIA	II 2(1)D Ex tb [op is Da] IIIB
		T135°C Dc IP67	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/mm²	<=5mW/mm²
Maximum radiant power	NOT LIMITED	< 35mW	< 15mW
Range (on white paper A4,80g)	0.2m to 3m (Designations 2, 4, 10, 15, 20, 25, 30)		
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 +-15%		
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*-**-**DI** (Disable Input)	PNP compatible, Ri 10kΩ		
Housing	M30, yellow brass, type Ms58, nickel plated		
Enclosure rating at EN 60529	IP 54	IP 67	IP67
Working temperature range T_{amb}	-20°C < T_{amb} < +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)		
Electrical connection cable	3+PE x 0.5mm², shielded, TPU, leads numbering marked, length: 3m		
Electrical connection cable, types IR.-..-**DI**(-OP)	4+PE x 0.5mm², shielded, TPU, leads numbering marked, length: 3m		
Socket for types IRS/IRN-**-S099	Socket M12, Lumberg type RSF, 5 terminals		
Accessories, all types	- 2 nuts M30 (optional 1 clamp on demand)		
Accessories, types IRD-.. + IRN-**-OP	- 1x Spare safety screw with packing ring for potentiometer sealing		
Accessories, only type IRN-**-OP-S099	- 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 S099	- Single ended cordset, types RKTS 5-298/xx or RKWTH 5-298/xx,Lumberg		
Accessories, not included, only IRS-U-**-S125	- Spare safety screw with packing ring for potentiometer sealing		

Options
- Cable length: Up to 100m, on request
- IR*-**-**DI:** With emitter disable input DI
- IR*-2/4/10(-OP)-**1kHz:** 1kHz switching frequency
- IR*-**1N**(-OP): For near range applications
- IR*-2-**W**(-OP): With wide optical angle 22°
- IR*-2-**10kHz**(-OP): 10kHz switching frequency
- IRD-10P-OP **S086**: Switching frequency: **1.5kHz**, with special high flexible, oil resistant cable for trailing, length: 10m
- IRD-4P-OP-**S095**: With mounted optic, type: AD-4-W 15 / Cable length: 6m
- IRD-4P-OP-**S097**: Response time:150us / Cable length: 5m
- IRS/IRN-**-**S099**: Socket M12, Lumberg RSF 5 , 5 terminals
- IRS/IRN-2P(-OP)-**S099/1kHz**: Socket M12, Lumberg RSF 5 , 5 terminals, response time: 500us
- IRD-25N-OP-**S101**: Response time:1ms/500Hz / Cable: 10m , Ölflex, special high flexible for trailing
- IRS-U-2P/4P-**S125**: Potentiometer with dust proof screwing. (IRS-U-2P S125: Range = 180mm+-5%)
- IR*-**N/P/NP(-OP)-**S149**: Special cable TPU (black), for drag chain applications
- IRS/IRN/IRD-**N/P(-OP)-**VA:** With additional pollution indication output
- IRS/IRN/IRD-****NP**(-OP): With output function selection by changing the supply voltage polarity. At standard connection of the supply voltage: 1=+24VDC, 2=0V or devices *-S099: 1=+24VDC, 3=0V - output = H, if the sensor sees no light (n-switching)

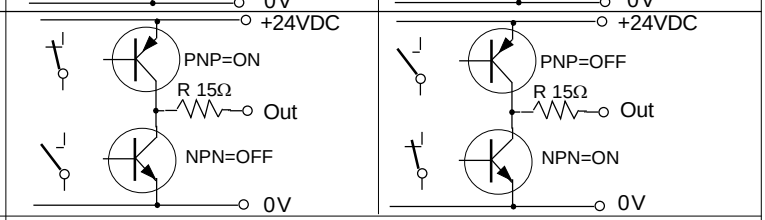
Function and LED display



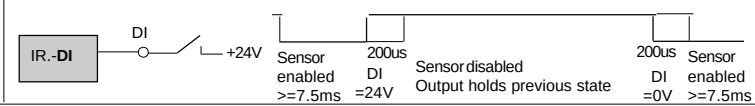
IRS-N/IRN-**N-OP IRD-**N-OP**
Output low side switching (NPN)



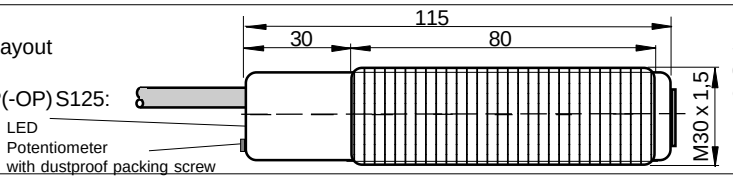
IRS-P/IRN-**P-OP IRD-**P-OP**
Output high side switching (PNP)



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

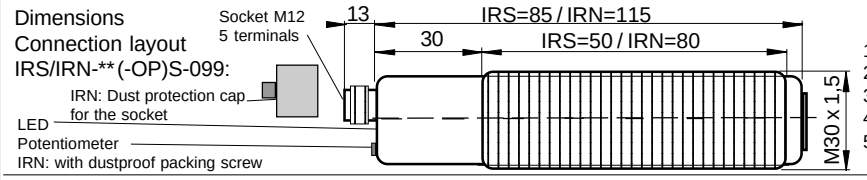


Dimensions
Connection layout
IRN/IRD-**
IRS-U-2P/4P(-OP) S125:



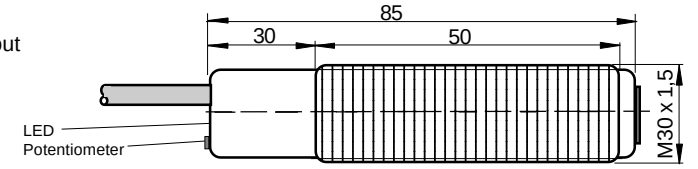
	IRN/IRD-..	IRN/IRD-.-DI/VA
+24VDC	1	1
0V	2	2
Output	3	3
DI	4(S101=NC)	4
PE	yellow-green	yellow-green

Dimensions
Connection layout
IRS/IRN-**(-OP)S-099:



	IRN-**-S99	IRN**-DI/VA S99
1/brown	+24VDC	+24VDC
2/white	NC	DI or VA
3/blue	0V	0V
4/black	Output	Output
5/grey	PE	PE

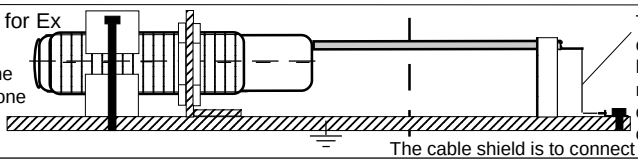
Dimensions
Connection layout
IRS-**:



	IRS-**	IRS-**-DI
+24VDC	1/brown	1/brown
0V	2/blue/grey	2/blue
Output	3/black	3/black
DI / VA	--	4/grey
PE	yellow-green	yellow-green or at the housing

Equipotential Bonding prescription for Ex Devices:

For types without PE at the connector, the local equipotential bonding have to be done with conductive corrosion-resistant clamps or nuts M30



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 0V (-) of the supply voltage

ATEX related designations:

CE 0158	Manufacturer with address	Electrical data according to the chart
Type IRD-**-OP:	II 2(1)G Ex d [op is Ga] IIC T6 Gb	EC certification number: BVS 10 ATEX E 130 X DEKRA
	II 2(1)D Ex tb [op is Da] IIIB T100°C Db IP67	EC certification number: BVS 10 ATEX E 130 X DEKRA
Type IRN-**-OP:	II 3(2)G Ex nA [op is Gb] IIB T4 Gc	Declaration by manufacturer, according to 21014/34/EU
	II 3(2)D Ex tc [op is Db] IIIA T135°C Dc IP67	Declaration by manufacturer, according to 21014/34/EU
T_{amb}: 0°C < T_{amb} < +50°C	Date of production:	Numerals 5 to 8 of the serial number (Year/Week)

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

Operating Manual / 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-**N/P-OP: 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-**N/P-OP: 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-**N/P-OP: S99: 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. 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 IR*-N/P(-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-25N-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 , series "VA"

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, types IR*--**-DI:**

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 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*-2/4/10/15/20 is defined on white paper A4, 80g. The nominal range for the types IR*-25/30 is defined on white paper 1m², 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-**N/P-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 1999/92/EC.

The sensor and the fibre optic are conform to the following standards: EN 60079-0:2012 + A11:2013, EN 60079-1:2007, EN 60079-15:2010, EN 60079-28:2007, EN 60079-31:2010, 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. ATEX directive: 2014/34/EU, Machine directive: 2006/42/EC, EMC directive: 2014/30/EU, RoHS: 2011/65/EU.

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.

EU-Declaration of conformity

Model IRD: EC-Certification No. BVS 10 ATEX E 130 X. DEKRA.

Model IRN: ATEX declaration by manufacturer at 2014/34/EU. ATEX certification of quality type production of Ex devices at the directive 2014/34/EU, CE 0158. Certification No: BVS 15 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

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