Tippkemper®

ISO 9001:2008 / ATEX

MATRIX elektronik ag

Photoelectric Sensor with Analog Output IRS/IRN/IRD-10A/-I(-GD)

IRN-10A/-I/I4-GD

CE

Ex II 3G Ex nA IIB T4 Gc
II 3D Ex tb IIIB T135°C Dc IP67

Housing M30

- With voltage or current loop output available
- Applicable for range measurement or position detection
- Also applicable with different types of fibre optics, also as light barrier
- Type IRD applicable in Ex Zones 1, 2, 21, 22
- Type IRN applicable in Ex Zones 2, 22

IRD-10A/-I/I4-GD

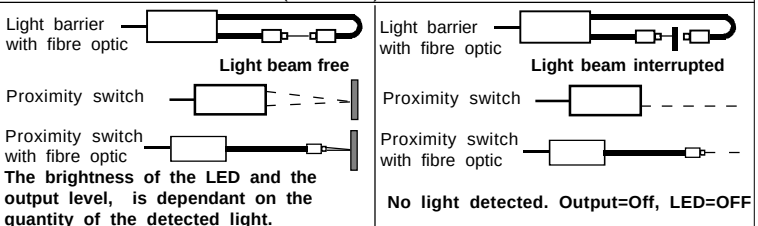
CE 0158

Ex II 2G Ex d IIC T6 Gb
II 2D Ex tb IIIB T90°C Db IP67

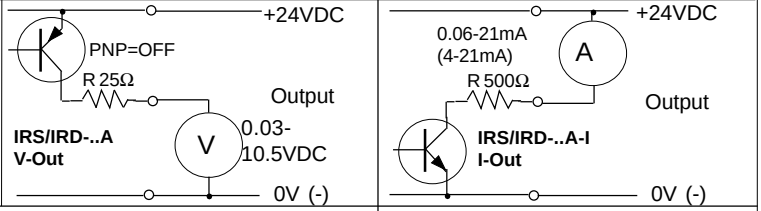
Technical data / Type V-Out / Type I-Out	IRS-U-10A IRS-U-10A-I/I4	IRN-10A-GD IRN-10A-I/I4-GD	IRD-10A-GD IRD-10A-I/I4-GD
Type of Ex protection Gas, at 94/9/EG	none	II 3G Ex nA IIB T4 Gc	II 2G Ex d IIC T6 Gb
Type of Ex protection Dust, at 94/9/EG	none	II 3D Ex tb IIIB T135°C Dc IP67	II 2D Ex tb IIIB T90°C Db IP67
Applicable in Ex Zones	none	2, 22	1, 2, 21, 22
Output signal range, voltage	0.03VDC - 10.5VDC(Ripple:<20mV)		
Output signal range, current	0.06mA - 21mA (Ripple:<40uA), (4mA - 21mA optional)		
Voltage output, nominal range, on white paper. A4. 80g	5VDC output voltage at a distance of 100cm, adjustable		
Current output, nominal range, on white paper. A4. 80g	10mA output current at a distance of 100cm, adjustable		
Light source	Infrared 870nm		
Optical Beam pattern	appr.10°		
Response time	5ms		
Supply voltage	24 VDC (20 to 28VDC)		
Current consumption	50mA		
Maximum power dissipation	1.5W		
Output type, voltage, IR.(-U)-10A	PNP, output impedance appr. 25Ω, RLoad: 2kΩ to 1MΩ		
Output type, current, IR.(-U)-10-AI	NPN, output impedance appr. 500Ω, RLoad: 0Ω to 100Ω		
Input, only types IR.-..-**DI** (Disable input)	PNP compatible, Ri 10kΩ		
Housing	M30, brass, nickel plated		
Enclosure rating, at EN 60529	IP 54	IP 67	IP67
Vibration and shock resistance	Vibration: 30g over 20Hz to 2kHz. Shock: 100g for 3ms		
Working temperature range TAmb	-20°C < TAmb < +60°C	-20°C < TAmb < +50°C	-20°C < TAmb < +50°C
Connection cable	3+PE x 0,5mm² , shielded, TPE, oil resistant, Length: 3m		
Connection cable, types IR.-..-**DI**	4+PE x 0,5mm² , shielded, TPE, oil resistant, Length: 3m		
Socket, types IRS/IRN-.. S96/S99	Lumberg, M12 male receptacle, type RSF 5 contacts		
Accessories, all types	- 2 nuts M30 (or 1 clamp on request)		
Accessories, types IRN/IRD-..-GD	- 1x Spare safety screw with packing ring for potentiometer sealing		
Accessories, types IRN-..-GD S96/S99	- 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 cord set. - 1x Protection cap for the sensor socket.		
Accessories, not included, only for IRS/IRN-.. S96/S99	- Cordset Lumberg RKTS 5-298/xx or RKWTH 5-298/xx		
Options:	- IR.-..-**DI** (with disable input) - IR.-..A-**I4**: Sensors with current output 4 - 20mA - Cable length up to 100m, on request - IRN/IRD-10A-**OP**: With limited optical radiant power at EN 60079-28. 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 -IRS-U-10A/**MT**: With 10 turns special potentiometer -IRS/IRN-.-10A.**S96**: Socket M12, 5 terminals, at cable 200mm -IRS/IRN-.-10A.**S99**: Socket M12, 5 terminals -IRS-A-10A.. **S140**: Enclosure rating: IP 65 -IRS-U-10A.. **S135**: With external potentiometer at cable 2xAWG24, length: 3m. Must not be connected at supply voltage without mounted external potentiometer. -IRS-U-10A... **S193**: Replacement for series IRS-U-10A/I-GF, for applications with fibre optics series ....Y1.... (Special adoption)		

ATEX related designations:
CE 0158 — Manufacturer with address — Electrical data according to the chart
Type IRD-..-GD: Ex II 2G Ex d IIC T6 Gb, II 2D Ex tb IIIB T90°C Db IP67 — EC certification number: BVS 10 ATEX E 130 X
Type IRN-..-GD: Ex II 3G Ex nA IIB T4 Gc, II 3D Ex tb IIIB T135°C Dc IP67 — Declaration by manufacturer at 94/9/EC
TA: -20°C < TAmb < +50°C — Date of construction: Numeral 5 to 8 of the serial number (Week/Year)

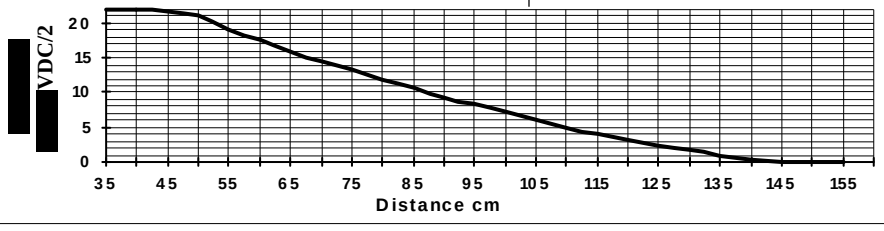
Function and LED indication



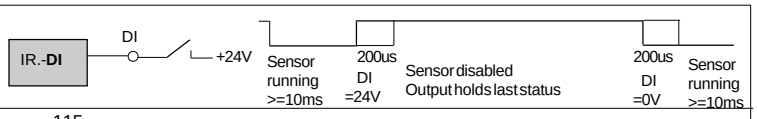
Wiring and connection



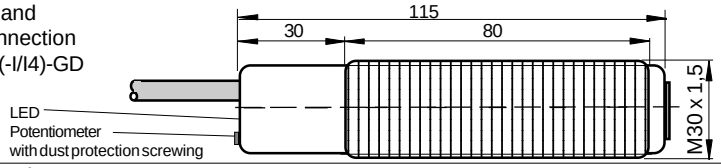
Output diagram
(measured on white paper, 80g, 20cmx30cm)
Potentiometer on MAXIMUM



IR.-10A-**DI** (Connection disable input DI)
Uin: 18V-28VDC,DI=+24V=Inactive
Reaction time: <=200us
Hold timet: >=10ms, DI = 0V=Aktiv

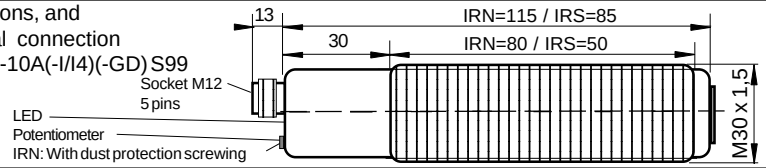


Dimensions, and electrical connection IRN/IRD-10A(-I/I4)-GD



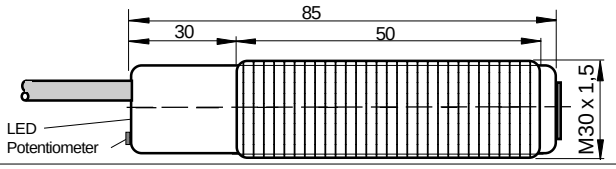
	IRN/IRD-..	IRN/IRD-..-DI
+24VDC	1	1
0V	2	2
Output	3	3
DI	--	4
PE	yellow-green	yellow-green

Dimensions, and electrical connection IRS/IRN-10A(-I/I4)(-GD) S99



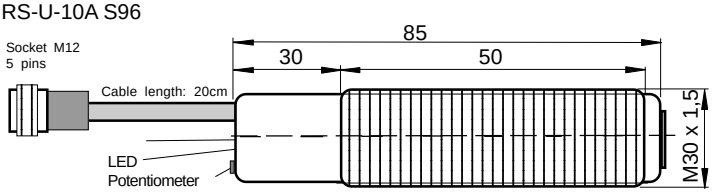
	IR.-.. S99	IR.-..-DI S99
1/brown	+24VDC	+24VDC
2/white	NC	DI
3/blue	0V	0V
4/black	Output	Output
5/grey	PE	PE

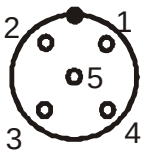
Dimensions, and electrical connection IRS-U-10A(-I/I4)



	IRS-..	IRS-..-DI
+24VDC	1	1
0V	2	2
Output	3	3
DI	--	4
PE	yellow-green	yellow-green

Dimensions IRS-U-10A S96

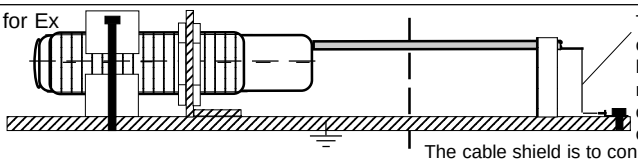




Connection:

+24VDC	1
Output	2
0V	3
DI(optional)	4
PE	5

Equipotential bonding prescription for Ex devices:



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

Operating Manual / EC - Declaration of Conformity:

Installation prescriptions for hazardous locations
It is necessary to take into consideration the valid international and national rules and regulations (EN 60079-14). The local equipotential bonding have to be done. The protective earth (PE) is solid connected with the housing. The cable have to be installed and protected against damages. The cable with termination fittings, or in cable tray systems and installed in a manner to avoid tensile stress at the termination fittings. To connect cables inside hazardous locations only use certificated Ex housings. All cable terminals must be connected outside hazardous locations. Other then original manufacturer, additional optical lenses are not allowed in hazardous locations. In Ex zones 21 and 22, do not operate the sensors without fixed dustproof sealing crew. After adjust the potentiometer, the dustproof sealing crew with undamaged packing ring, must be screwed down. Damaged or lost screws or packing rings must be replaced.
Type IRD-10A(-I/I4)-GD: Only applicable in Ex Zones 1, 2 and 21, 22.
Type IRN-10A(-I/I4)-GD: Only applicable for the Ex zones 2 and 22.
The maximum input voltage Um=30VDC must not be exceeded.
Type IRN-10A(-I/I4)-GD S96/S99: Only applicable for the Ex zones 2 and 22. 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) 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 protection cap for the sensor socket must be fitted, when no connection cable is connected. The maximum input voltage Um=30VDC must not be exceeded.

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
Corresponding to the quantity of detected light, the output of the sensor generates an analog output signal. Without fibre optics or with fibres 2 in 1 type, the sensor is applicable as relative distance detection device, for turbidity measurement based on reflective measurement, or similar applications. With 2-2 type fibres, function as light barrier, for different measurement methods. Dependent on the selected type, the output generates a voltage signal from 0.03V to 10.5VDC or a current loop, 0.06 or 4mA to 21mA. Please check the permissible load for the two different types of outputs. For best measurement results the sensor cab be adjusted by the potentiometer.

Nominal range
The nominal range is defined as function "distance measurement" on white paper. At the nominal distance the output level shows the middle of the output range. The real output level is depended on the color, the form, the dimension, and the surface finish of the object.

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. The response time of the DI-input is 200us.
DI= 0V or not connected = emitter enabled
DI= High (24VDC) = emitter disabled
For a correct function the sensor must be enabled for at minimum >= 10ms (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.

Fibre optics
For efficiently detection solutions look for our multiple program of fibre optics, also for high temperature areas.

Maintenance
Protect the sensor and the 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:
"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, ATEX 118a, single directive 1999/92/EC.
The sensor and the fibre optic are conform to the following standards: EN 60079-0:2009, EN 60079-1:2007, EN 60079-15:2010, 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. Ex protection: 94/9/EC (ATEX 100a), Machine directive: 2006/42/EC, EMC: 2004/108/EC, RoHS: 2002/95/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
Model IRD: EC-Certification No. BVS 10 ATEX E 130 X. DEKRA.
Model IRN: Declaration by manufacturer at 94/9/EC
ATEX certification of quality type production of Ex devices at the directive 94/9/EC Certification No: BVS 03 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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