

# Photoelectric Proximity Switch IRS/IRN/IRD

## Housing M30

IRD-..



- Also for using with fibre optics
- Type IRD, applicable in ex zones 1 and 20, 21
- Type IRN, applicable in ex zones 2 and 22
- Robust sensor for industrial applications

IRN-...-GD



Technical Data	Type	IRS-U- 2/4/10/15/25/30N/P	IRN- 2/4/10/15/25/30N/P-GD	IRD- 2/4/10/15/25/30N/P(-GD)
Type of ex protection		none	EEx nA II T6	EEx d IIC T6
Applicable in ex zones		none	Zones 2, 22	Zones 1, 2, 20/21, 22
Category		--	II 3 G, II 3 D IP67 T90°C	II 2 G, II 1/2 D IP67 T90°C
Range (on white paper A4,80g)		0.2m to 3m (Designations 2, 4, 10, 25, 30)		
Light source		Infrared 880nm		
Beam pattern (at nominal range)		appr. 12°		
Response time		5ms		
Supply voltage		24 VDC (20 to 28VDC)		
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		
Protection rating at EN 60529		IP 54	IP 67	IP67
Ambient temperature range TA		-20°C < TA < +50°C		
Electrical connection		Cable, 3+PE x 0,5mm <sup>2</sup> + Shield / L=3m		
Electrical connection, types IR-...-DI		Cable, 4 x AWG24 (0,2mm <sup>2</sup> ) + Shield / L=3m, PE at the housing		
Socket for types IRS/IRN-... S99		Socket M12, Lumberg type RSF, 5 terminals		
Accessories, all types		- 2 nuts M30 (optional 1 clamp on demand)		
Accessories, types IRD-... + IRN-...-GD		- 1x Spare safety screw with packing ring for potentiometer sealing		
Accessories, only type IRN-...-GD S99		- 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 only type IRN-...-GD S99		- Single ended cordset, straight type: RKTS 5-298/xx or right angle type: RKWTH 5-298/xx, Lumberg M12/5P		
Options		- IR-...-DI (with emitter disable input) - IRD-10P <b>S86</b> , switching frequency: <b>1.5kHz</b> , with special high flexible, oil resistant cable for trailing, length: 10m - IR-2-W (with wide beam pattern 22°) - IR-2-10kHz (10kHz switching frequency) - Cable length up to 100m - IRD-4P <b>S95</b> : With premounted optic, type: AD-4-W 15 / Cable length: 6m - IRD-4P <b>S97</b> : Response time:150us / Cable length: 5m - IRS/IRN-...-XC(-GD) <b>S99</b> : Connector: M12, Lumberg, 5 terminals - IRD-25N-G <b>S101</b> : Response Time:1ms/500Hz / Cable: 10m, Ölflex, special high flexible for trailing - IRS-U-2P/4P <b>S125</b> : Potentiometer with dust proof screwing. (IRS-U-2P S125: Range = 180mm+5%)		
Function and LED display		Light barrier  Beam not interrupted Proximity switch  reflection detected, LED=ON	Light barrier  Beam interrupted Proximity switch  no reflection detected, LED=OFF	
IRS-..N / IRN-..N IRD-..N Output low side switching (NPN) Connection layout: 1 / brown = + 2 / blue = - 3 / black = Output 4 / grey = Disable-input (only -DI) yellow-green = PE white/blank = Cable shield				
IRS-..P / IRN-..P IRD-..P Output high side switching (PNP) Connection layout: 1 / brown = + 2 / blue = - 3 / black = Output 4 / grey = Disable-input (only -DI) yellow-green = PE white/blank = Cable shield				
IR-...-DI (with optional Disable Input) Uin: 18V-28VDC, DI=+24V=Disable Response time: <=200us Hold time: >=7.5ms, DI = 0V=Enable				
ATEX related designations		CE 0158 Device type IRD: II 2 G, II 1/2D IP67 T90°C / IRN: II 3 G, II 3 D IP67 T90°C Certification number, series IRD:  DMT 99 ATEX E 056 TA: -20° < TA < 50° Electrical data according to the chart Date of construction: Numeral 4 to 7 of the serial number		

Dimensions  
Connection layout  
IRN/IRD-..  
IRS-U-2P/4P S125:

+24VDC	1	IRN/IRD-..	IRN/IRD-...-DI
0V	2		brown
Output	3		blue
DI	4(S101=NC)		black
PE			grey
			yellow-green at the housing

Dimensions  
Connection layout  
IRS/IRN-.. S99:

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

Dimensions  
Connection layout  
IRS-...:

+24VDC	brown	IRS-..	IRS-...-DI
0V	blue		blue
Output	black		black
DI	--		grey
PE	yellow-green		at the housing

Dimensions  
Connection layout  
IRS-.. Socket M18:

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

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

**Ex protection:**  
**General regulations for all types of Ex devices:**  
It is necessary to take into consideration the valid international and national rules and regulations. The maximum rated supply voltage  $U_m = 30VDC$  must not be exceeded. 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 e housings. All cable terminals must be connected outside hazardous locations. Other than original manufacturer, additional optical lenses are not allowed in hazardous locations. In Ex zones 20/21 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.  
**Types: IRD-..** are applicable in Ex zones 1, 2 and 20/21, 22. For the zones 20/21 only the front part (optical lens) can be mounted inside the zone 20. The rear part with the cable must be in the zone 21.  
**Types: IRN-..-GD** are applicable in Ex zones 2 and 22.  
**Types: IRN-..-GD S99** are only applicable in Ex zones 2 & 22 hazardous locations. 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 RKT5-298/xx (Straight type) RKTW/RKWT5-298/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 socket 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**  
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 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.  
**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  $\geq 7.5ms$  (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 is defined on white paper A4, 80g. The nominal range for the types IR-25/30 is defined on white paper 1m-2, 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 0 and 20 must only be driven by ATEX approved sensors with limited optical output power at **DMT 99 ATEX 056/N5!**  
**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.  
**Safety Informations**  
The sensors types IRS/IRN/IRD-.. must not be used for Accident-Prevention! In worst case of disturbance, the output can show any state. When installing and operating with the sensor, it is necessary to take into consideration the relevant international and other national regulations. ATEX118a, EX-RL(BGR104), ElexV, TrbF, TRD, UVV, BetrSichV(ATEX137), Einzel-RL 1999/92/EG.  
Standards met:  
- EN 50014, EN 50281-1-1, IRD: EN 50018, IRN: EN 50021;  
- EN 61000-4-2 to EN 61000-4-6, EN 61000-6-1/-2, EN 61000-6-4; EN 60529  
- Ex protection: 94/9/EG (ATEX 100a)  
- Machine directive: 98/37/EG  
- Low voltage directive: 73/23/EWG, 93/68/EWG  
- EMC: 89/336/EWG, 91/263/EWG, 92/31/EWG, 93/68/EWG  
- Tech. File Rev.: EXD\_NA5A:2003  
**General Notes**  
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.  
**Declaration of Conformity:**  
**Approvals: DMT 99 ATEX E 056/N1/N4/N5**  
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 with the "Production", declares:  
  
Hans Bracher, Matrix Elektronik AG