Tippkemper®

ISO 9001:2008 / ATEX

MATRIX elektronik ag

Photoelectric Proximity Switch IRS/IRN/IRD-15N/P S157 / S160 / S180

IRD-..

CE 0158

Ex **II 2G Ex d IIC T6**
II 1/2D Ex tD A20/A21 IP67 T90°C

Housing M30

- 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

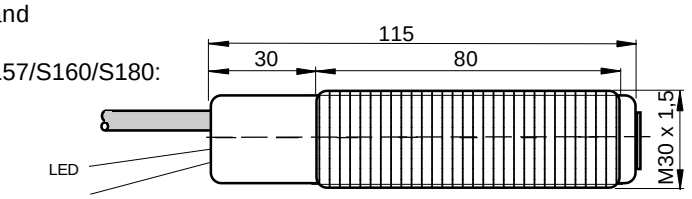
IRN-..-GD

CE

Ex **II 3G Ex nA IIB T4**
II 3D Ex tD A22 IP67 T135°C

Technical Data \ Type	IRS-U-15N/P S160 IRS-U-15N/P S157/S180	IRN-15N/P-GD S160 IRN-15N/P-GD S157/S180	IRD-15N/P-GD S160 IRD-15N/P-GD S157/S180
Type of Ex protection, Gas, at 94/9/EG	none	II 3G Ex nA IIB T4	II 2G Ex d IIC T6
Type of Ex protection, Dust, at 94/9/EG	none	II 3D Ex tD A22 IP67 T135°C	II 1/2D Ex tD A20/A21 IP67 T90°C
Applicable in Ex Zones	--	Zones 2 and 22	Zones 1,2 and 20/21,22
Range (on white paper A4,80g)	1.5m		
Light source	Infrared 880nm		
Beam pattern (at nominal range)	appr. 12°		
Response time	0.5ms / 1kHz		
Supply voltage	24 VDC (20 to 28VDC), absolute maximum 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 TA	-20°C < TA < +50°C		
Electrical connection	Socket M12, Lumberg RSF 8, 8 terminals		8 x 0.5mm², LiYCY, L= 5m
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 types IRN-15N/P-GD S160/S157/S180	- 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 IRS and IRN	- Single ended cordset, Lumberg RKTS 8-298/xx or RKWTH 8-298/xx		
Options	- IR.-..-**DI:** With emitter disable input - IR.-..-**VA:** With pollution indication output and 3-colour LED - IR.-..-**S157:** Multiturn potentiometer fixed at the device - IR.-..-**S160:** External multiturn potentiometer - IR.-..-**S180:** Multiturn potentiometer fixed at the device and reduced hysteresis (3%)		
Connection of the external potentiometer: (Only S160)	P ext. = max. 1kΩ Terminal Pot A Terminal Pot B(-) SENSOR MUST NOT BE DRIVEN WITHOUT WIRED EXTERNAL POTENTIOM-ETER!		
Function and LED display	Light barrier with fibre optics Beam not interrupted Proximity switch with fibre optic reflection detected, LED=ON	Light barrier with fibre optics Beam interrupted Proximity switch with fibre optic no reflection detected, LED=OFF	
IRS-.**N** / IRN-.**N** IRD-.**N** Output low side switching (NPN)	+20-28VDC 1/white PNP=OFF R 15Ω Out 3/green NPN=ON - 2/brown	+20-28VDC 1/white PNP=ON R 15Ω Out 3/green NPN=OFF - 2/brown	
IRS-.**P** / IRN-.**P** IRD-.**P** Output high side switching (PNP)	+20-28VDC 1/white PNP=ON R 15Ω Out 3/green NPN=OFF - 2/brown	+20-28VDC 1/white PNP=OFF R 15Ω Out 3/green NPN=ON - 2/brown	
IR.-.**-DI** (with optional Disable Input) Uin: 18V-28VDC,DI=+24V=Disable Response time: <=200us Hold time: >=7.5ms, DI = 0V=Enable	IR.-**DI** DI +24V Sensor enabled >=7.5ms 200us DI =24V Sensor disabled Output holds previous state 200us DI =0V Sensor enabled >=7.5ms		
ATEX related designations	CE 0158 Device type IRD: Device type IRN: Series IRD: Series IRN: TA: -20°C < TA < +50°C Date of construction: Numeral 4 to 7 of the serial number	Manufacturer with address II 2G Ex d IIC T6, II 1/2D Ex tD A20/A21 IP67 T90°C II 3G Ex nA IIB T4, II 3D Ex tD A22 IP67 T135°C DMT 99 ATEX E 056 Declaration by manufacturer at 94/9/EC Electrical data according to the chart	

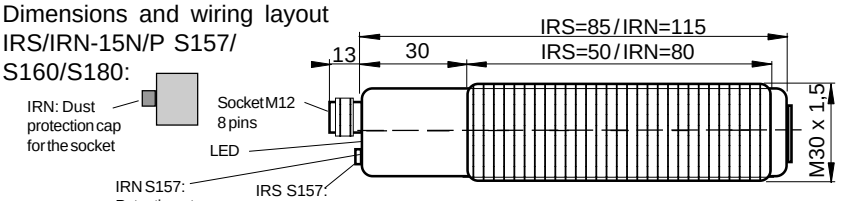
Dimensions and wiring layout IRD-15N/P S157/S160/S180:



S157: Potentiometer with dust protection screwing

S160	IRD-15.	IRD-15.-DI	S157
+24VDC	1	white	24VDC
0V	2	brown	0V
Output	3	green	Out
VA-OUT, optional	4	yellow	VA
Pot A	5	grey	NC
Pot B	6	pink	NC
DI, optional	-	blue	DI
PE	yel-grn	red	PE

Dimensions and wiring layout IRS/IRN-15N/P S157/ S160/S180:

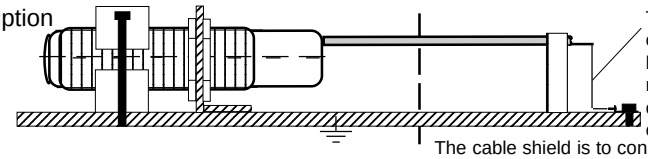


The functions DI and VA are optional.

	IRS/IRN-15.	IRS/IRN-15.-DI
1/white	+24VDC	+24VDC
2/brown	0V	0V
3/green	Output	Output
4/yellow	VA-Output	VA-Output
5/grey	Pot A (S 160)	Pot A (S 160)
6/pink	Pot B (S 160)	Pot B (S 160)
7/blue	NC	DI-Input
8/red	PE	PE

S157: Pins 5 + 6 = NC

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:

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 Um = 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 then 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 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 RKTS 8-298/xx (Straight type) RKTW/RKWTH 8-298/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.

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.

Optical power adjustment by the external potentiometer 1kΩ, only S160:

With the potentiometer the sensor can be adapted at different requirements. THE SENSOR MUST NOT BE CONNECTED AT THE SUPPLY VOLTAGE WITHOUT WIRED EXTERNAL POTENTIOMETER! THE MAXIMUM VALUE OF THE EXTERNAL POTENTIOMETER MUST BE EQUAL OR LESS THEN 1kΩ. The terminal Pot B is internal connected at 0V. The series S157 is provided with a fixed at the sensor mounted potentiometer.

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 is defined on white paper A4, 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.

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 dismounting of the connector safety lock device while the supply voltage is connected is hazardous! The mounting of the sensor in dusty locations without fixed cordset or protection cap results in a high ignition risk. 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 60079-0:2004, EN 60079-1:2004, EN 60079-15, EN 60079-28:2007, EN 60241-0:2004, EN 61241-1:2004;
- EN 60529:2000, EN 60950-1:2006;
- 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: 98/37/EC
- RoHS: 2002/95/EC
- 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.: AN-MAT-08-EX-E056

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.

CE Declaration of Conformity

Certification, series IRD-..: DMT 99 ATEX E 056

Certification, series IRN-..: Declaration of conformity by manufacturer at 94/9/EC. Tech File No: AN-MAT-08-EX-E056.

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:

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