ISO 9001:2015 / ATEX

Original operating manual
Reflective light barriers series ISD/ISN/RLR-2XC-IDX(-OP)

ISD-2XC-IDX-OP — Housing M30 — ISN-2XC-IDX-OP

0158

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

IECEx BVS 14.0108X

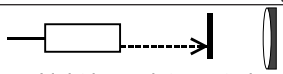
IECEx designation
Ex d [op is Ga] IIC T6 Gb
Ex tb [op is Da] IIIB T100°C Db IP67

- With TEACH-IN function
- Types ISD: ATEX and IECEx certificated
- Types ISD: For use in Ex Zones 1, 2, 21, 22, optical radiation can operate into Ex Zones 0 and 20
- Types ISN: For use in Ex Zones 2, 22
- Function largely independent from ambient contaminations

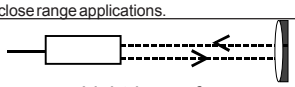
ATEX designation:
II 3G Ex nA op is IIB T4 Gc, II 3D Ex tc op is IIIA T135°C Dc IP67

Technical data \ Type	ISD-2XC-IDX-OP	ISN-2XC-IDX-OP	RLR-2XC-IDX
Type of Ex protection Gas, according to the ATEX directive 2014/34/EU	II 2(1)G Ex d [op is Ga] IIC T6 Gb	II 3G Ex nA op is IIB T4 Gc	NONE
Type of Ex protection Dust, according to the ATEX directive 2014/34/EU	II 2(1)D Ex tb [op is Da] IIIB T100°C Db IP67	II 3D Ex tc op is IIIA T135°C Dc IP67	NONE
For use in Ex Zones	Zones (0),1,2 and (20),21,22	Zones 2 and 22	NONE
Range, nominal Note 1	2m, with Reflector D=83mm		
Potentiometer for fine adjust	yes		
Response time	7.5ms		
Minimum required time for TEACH-IN	200ms		
Power up delay time	500ms		
Light source	visible red, 623nm		
Optical aperture angel	appr.12°		
Maximum optical radiant power	<=15mW	<=35mW	not limited
Maximum optical radiant intensity	<=5mW/mm²	<=5mW/mm²	not limited
Nominal supply voltage	24VDC +-15%		
Absolute maximum supply voltage	Um = 30VDC		
Current consumption	50mA		
Power dissipation	1.68W		
Output, type	Push-Pull type output		
Output, maximum load	max. 100mA, short circuit protected		
Output impedance	appr.15Ω		
Input, DI (Disable Input)	PNP compatible, Ri 10kΩ		
Input, TEACH-IN	PNP compatible, Ri 10kΩ		
Housing, brass Ms58, nickel plated	M30x150mm		M30x100mm
Enclosure rating, according to EN 60529	IP67		IP54
Working temperature range Tamb	-20°C < Tamb < +60°C		-10°C < Tamb < +60°C
Storage temperature range	-20°C ... +70°C		
Relative humidity	15% ... 80%, noncondensing		
Vibration and shock resistance	Vibration: 30g over 20Hz to 2kHz. Shock: 100g for 3ms		
Pollution degree, according to EN 60664-1:2007	4		
Device designation, according to EN 60947-5-2	***-2XC-IDX(-OP): R3A30CP1, ***-2XC-IDX(-OP)-S099: R3A30CP2		
Connection cable	5+PE x 0,5mm², TPU, shielded, for trailing, halogen-free, oil resistant, length:3m		
Connector. Types ISN/RLR-2XC-IDX(-OP)-S099	--	M12, Lumberg RSF 8, 8-pin, male	
Accessories included, all types	- 2 nuts M30 (or 1 clamp on request)		
Accessories, included, only types ISN/ISD-2XC-IDX-OP	- 1x Spare safety screw with packing ring for potentiometer sealing		
Accessories, included, only types ISN-2XC-IDX-OP-S099/S236	- 1x Safety lock device, mount at the cable connection, for locking the connection. (black synthetic device) - 1x Warning label "Do not disconnect.", self-sealing, for gluing on the cable connector, - 1x Dust protection cap		
Accessories, RLR/ISN-2XC-IDX(-OP)-S099/S236, not included	- Cordset wit female plug, Lumberg M12/8P, straight type: RKTS 8-184/xx, 8-299/..M or right angel type: RKWTH 8-184/xx , 8-299/..M		
Accessories, not included	- Reflector, type D=83mm or 50x100mm LHF - Deflector, 90° for M30, type "U-90"		
Options	- Cable length: Up to 100m, on request - ISD-2XC-IDX-OP-**S047**: Preliminary. Dust Ex: Ex tb [op is Da] III**C** T100°C Db IP67 - RLR/ISN-2XC-IDX(-OP)-**S099**: With male connector M12, Lumberg RSFM 8, 8-pin - RLR/ISN-2XC-IDX(-OP)-**S107**: Extended temperature range: -20°C up to +80°C - RLR/ISN/ISD-2XC-IDX(-OP)-**S191**: TEACH-IN serves output - ISN-2XC-IDX(-OP)-**S236**: II 3D Ex tc op is IIIC T135°C Dc IP67/II 3G Ex nA op is IIC T4 Gc & connector M12, wiring layout same as ***-S099. specially for close range applications.		

Function
Output and LED indication



Light beam interrupted



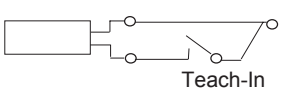
Light beam free

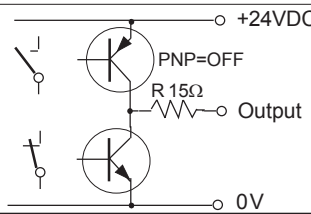
TEACH-IN: LED indication

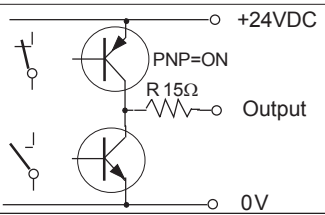
LED	TEACH-IN	In normal operation
LED shows red	During activated TEACH-IN function: No valid reference data measured. Output not served. Optional S191: Output = OFF.	Actual measured value is greater or less then the reference value, including the tolerance, determinately by the potentiometer. Output = OFF
LED shows green	During activated TEACH-IN function: Valid reference data measured and stored. Output not served. Optional S191: Output = ON.	Actual measured value equal to the reference value, within the determinately tolerance. Output = ON.
LED shows yellow	--	No valid TEACH-IN done. Output remains switched OFF.

Output function in normal operation, LED indication:	LED = RED	LED = GREEN

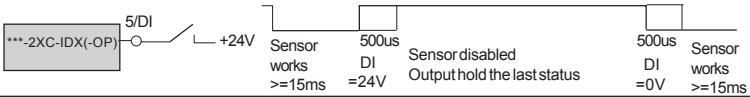
Wiring for "Teach-In"







***-2XC-IDX(-OP): Input **DI** (Disable-Input)
Uin: 24VDC, DI=+24V=Inactive
Response time: <=500us
Hold time: >=15ms, DI = 0V=Active

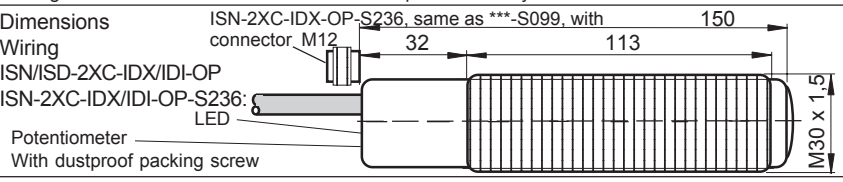


Note 1: The nominal range is determinated with a reflector diameter D=83mm.
With reflectors type: 50x100mm LHF a significantly higher operating range can be achieved.

ATEX/IECEx RELATED MARKINGS CE 0158 Manufacturer with address

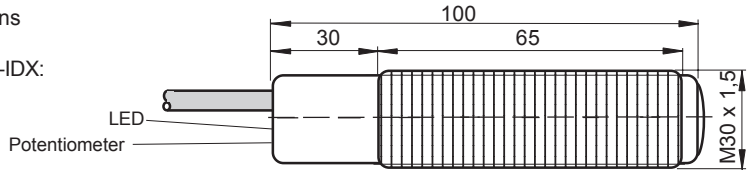
Type ISD: Ⓔx II 2(1)G Ex d [op is Ga] IIC T6 Gb,II 2(1)D Ex tb [op is Da] IIIB T100°C Db IP67
Type ISN: Ⓔx II 3G Ex nA op is IIB T4 Gc, II 3D Ex tc op is IIIA T135°C Dc IP67
Type ISN-*S236:II 3G Ex nA op is IIC T4 Gc, II 3D Ex tc op is IIIC T135°C Dc IP67
Type ISD: EC-type examination certification No. BVS 10 ATEX E130 X DEKRA
Type ISD: IECEx certification No. IECEx 14.0108X
Type ISN: ATEX Declaration by manufacturer According to the ATEX directive 2014/34/EU
T_{amb}: -20°C < T_{amb} < +60°C Electical dat according to the chart
Date of production: Numerals 5 to 8 of the serial number (year / calendar week)
(X designation of the certification number: Fibre optics must only be used with sensors with certificated limited optical power)

Dimensions
Wiring
ISN/ISD-2XC-IDX/IDI-OP
ISN-2XC-IDX/IDI-OP-S236:



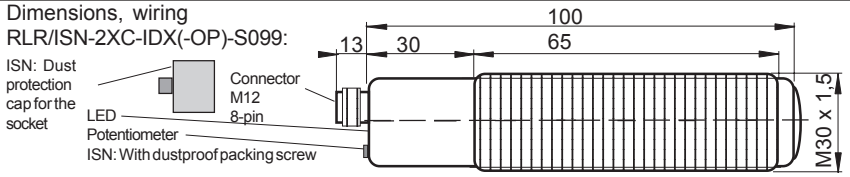
1	+24VDC
2	Input TEACH-IN
3	0V
4	Output
5	Input DI
(6	NC, if present)
green-yellow	PE

Dimensions
Wiring
RLR-2XC-IDX:



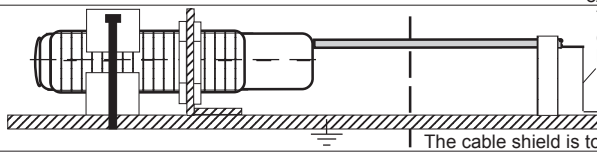
1	+24VDC
2	Input TEACH-IN
3	0V
4	Output
5	Input DI
(6	NC, if present)
green-yellow	PE

Dimensions, wiring
RLR/ISN-2XC-IDX(-OP)-S099:



1/white	+24VDC
2/brown	0V
3/green	Output
4/yellow	Input TEACH-IN
5/grey	Input DI
6/pink	NC
7/blue	NC
8/red	PE

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 in a wide area.

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

Mounting prescriptions
Specially for Ex Protection:
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) is solid connected with the housing and the cable shielding. 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. Additional optical lenses are not allowed in hazardous locations. In dust Ex zones, 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.
ISD-2XC-IDX-OP-S***: Only for use in Ex zones 1, 2, 21, 22. The limited optical radiation can operate into Ex zones 0 or 20.
ISN-2XC-IDX-OP-S***:** Only for use in Ex zones 2, 22.
ISN-2XC-IDX-OP-S099/S236: Only for use in Ex zones 2, 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 8-184/xx, RKTS 8-299/..M (Straight type) or RKWTH 8-184/xx, RKWTH 8-299/..M (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.
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. Since the angle of beam spread is relatively small, the sensor and the reflector have to be mounted stable and vibration-free.
Function
The sensor can only be operated with a reflector (triplex mirror). Only 2 times broken light beams will be detected. The sensor works basically as light barrier on reflective mirrors. If the sensor detects reflected light, the output switches to +24VDC and the LED shows green. If no reflected light will be recognized, the LED shows red, the output switches to 0V. The nominal range is determinated with a round reflector, diameter 83mm. Other reflectors leads to different ranges. The load on the output can be connected to 0V or +24V.
TEACH-IN function
Because the sensor compares a memorized reference value with a actual measure value, first a reference value must be memorized. The reference value will be picked-up by the TEACH-IN function and memorized in an EEPROM. (Data holding >= 5 years). TEACH-IN is activated by a +24VDC pulse. With the potentiometer, the tolerance range for the permitted deviation can be adjusted. (Left turn = small tolerance; right turn = great tolerance). The potentiometer has no influence to the range of the sensor.
TEACH-IN procedure
Turn the potentiometer to the right side (great tolerance). Adjust the sensor to the reflector, The light beam between sensor and reflector must be free.
Activate TEACH-IN. During activated TEACH-IN the LED must show green. If the LED shows red, no valid value is measured. The output will be not served. For the devices RLR/ISN/ISD-2XC-IDX-S191: The output is switched ON, if a valid value is measured. If no correct TEACH-IN is possible, the output is switched OFF.

LED red: No valid reference value picked-up. Sensor or reflector strong polluted, light barrier bad aligned or distance between sensor and reflector to short or to long. Only S191: The output is switched OFF.
LED green: Valid measure value picked-up and memorized. Only S191: The output will be switched to +24VDC during TEACH-IN.
LED yellow: If the LED shows yellow after the TEACH-IN procedure, the procedure is not correctly closed. Optimize the measurement setup and repeat the TEACH-IN procedure.

Normal operation:
If the sensor not recognize the difference between the reference value to the actual measure value turn the potentiometer to the left side or optimize the measure setup.
LED green: Actual measure value equal to the reference value with adjusted tolerance
Output = ON.
LED red: Actual measure value is out of the permitted range. (The permissible tolerance range can be adjusted by the potentiometer).
Output = OFF.
LED yellow: No valid TEACH-IN performed. Repeat the TEACH-IN procedure.
Disable-Input "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 (Response time: 500us). 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 >= 15ms (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.
X-Function (Reversal function of the output)
By reversal connection of the supply voltage, the output function can be inverted. The LED doesn't change the function. (Wire 1 = 0V / Wire 3 = +24VDC). Only types S191: The output function during TEACH-IN is not influenced.
Maintenance
Protect the sensor and the reflector against strong pollution. The adjustment of the Teach-In must be repeated at regular intervals, depending on use, after several days or at the latest approximative six months. If the reflector or the sensor lenses are contaminated, clean with alcohol. Do not use aggressive solvents. Reflectors can be destroyed by strong solvents. Equipment must only be repaired or serviced by the manufacturer.
General safety instructions
Types ISN-2XC-IDX-OP-S099/S236 : "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 light barriers 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. 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 sensors are conform to the following standards:
IEC/EN 60079-0:2012 + A11:2013, IEC/EN 60079-1:2007, EN 60079-15:2010, IEC/EN 60079-28:2007, IEC/EN 60079-31:2010, EN 60529:2014, EN 60950-1:2006; 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 directive: 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.
EC-/EU-Declaration of conformity:
IECEx certification, types ISD: Ex d [op is Ga] IIC T6 Gb, Ex tb [op is Da] IIIB T100°C Db IP67. Certification No. IECEx BVS 14.0108X.
http://iecex.iec.ch/iecex/iecexweb.nsf/0/FE79714C0BAEF6F5C1257D7E0044F6A9?opendocument
ATEX certification, types ISD: 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. Certification No. BVS 10 ATEX E 130 X, DEKRA EXAM GmbH, Zertifizierungsstelle, Carl-Beyling-Haus, Dinendahlstrasse 9, D-44809 Bochum, ident number: 0158.
ATEX certification, types ISN: II 3G Ex nA op is IIB T4 Gc, II 3D Ex tc op is IIIA T135°C Dc IP67. ATEX declaration by manufacturer in accordance to the ATEX directive 2014/34/EU. ATEX certification of quality type production of Ex devices in accordance to the directive 2014/34/EU, CE 0158. Certification No: BVS 15 ATEX ZQS / E118, QAR No. DE/BVS/QAR13.0004/01. 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

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