Tippkemper®

ISO 9001:2015 / ATEX MATRIX elektronik ag

Original Operating Manual:

Light Barriers series IRL/ILN/ILD-201-SIR/SDI/EFP(-OP)-SIL2

ILD-201-SIR/EFP-OP-SIL2

CE 1258

Ex

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

IECEx BVS 14.0108X

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

Housing M30

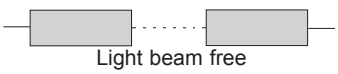
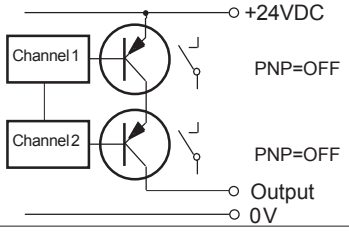
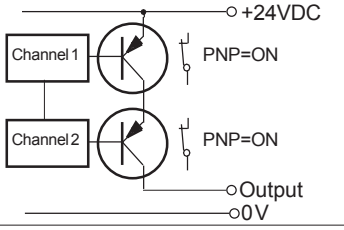
- High penetration capacity in polluted areas.
- Optimal alignment by status visualization trough receiver optic
- Series ILD: ATEX and IECEx certified
- ILD: For use in Ex zones (0), 1, 2, (20), 21, 22 optical radiation can operate into Ex Zones 0, 20
- ILN: For use in Ex zones 2, 22
- Robust light barrier for industrial applications

ILN-201-SIR/EFP-OP-SIL2

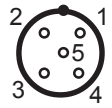
CE

Ex

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

Technical Data / Type designation emitter	IRL-201-SIR-SIL2	ILN-201-SIR-OP-SIL2	ILD-201-SIR-OP-SIL2
Technical Data / Type designation receiver	IRL-201-EFP-SIL2	ILN-201-EFP-OP-SIL2	ILD-201-EFP-OP-SIL2
Type of Ex protection Gas, in accordance with 2014/34/EU	NONE	II 3G Ex nA op is IIB T4 Gc	II 2(1)G Ex d [op is Ga] IIC T6 Gb
Type of Ex protection Dust, in accordance with 2014/34/EU	NONE	II 3D Ex tc op is IIIA T135°C Dc IP67	II 2(1)D Ex tb [op is Da] IIIB T100°C Db IP67
For use in Ex zones	NONE	Zones 2, 22	Zones (0), 1, 2, (20), 21, 22
Performance Level (PL)	PL C, according to EN 13849-1		
Safety Integrity Level (SIL)	SIL 2, according to EN 61508		
Mean probability of a dangerous failure per hour PFHd	2.06×10^{-6}, at 13849-1 (without PELV power supply)		
Sensing range	120m		
Minimum detectable object size	22mm (avoid mirror effects)		
Light source	Infrared 870nm		
Maximum radiant intensity	NOT LIMITED	<=5mWm²	<=5mWm²
Maximum radiant power	NOT LIMITED	< 35mW	< 15mW
Directional angle (at a distance of 10m)	Emitter: appr.8° / Receiver: appr.12°		
Response time	5ms (Switch off time)		
Power up delay time	300ms		
Supply voltage	24 VDC +-10% (Power supply type PELV at EN 60204, item 6.4.2)		
Absolute maximum supply voltage Um	30VDC		
Current consumption, emitter	25mA		
Current consumption, receiver	40mA		
Maximum power dissipation	Emitter: max. 0.7W / Receiver: 1.1W		
Output	PNP type, double guided, 100mA, short circuit protected		
Permissible line resistance between device and load	10R		
Pollution indication output "VA"	PNP type, single guided, 100mA, short circuit protected		
Housing	M30, brass Ms 58, nickel plated		
Enclosure rating, in accordance with EN 60529	IP 65	IP 67	IP67
Ambient working temperature range Tamb	-20°C up to +50°C		
Storage temperature range	-20°C ... +70°C		
Relative humidity	15% ... 90%, noncondensing		
Vibration and shock resistance	Vibration: 30g over 20Hz to 2kHz. Shock: 100g for 3ms		
Pollution degree, in accordance with EN 60664-1:2007	4		
Device designation, in accordance with EN 60947-5-2	IRL/ILN/ILD-201-SIR/EFP(-OP): T3A30BP1 / IRL/ILN-201-SIR/EFP(-OP)-S099: T3A30BP2		
Connection cable	TPU insulation, AWM 20236, 2/3/4+PE x 0.5mm², shielded, leads numbering marked, oil resistant cable for trailing, length: 10m		
Socket M12, only types IRL/ILN-201-(OP)SIL2-S099	Socket , Lumberg RSFM 5, 5 pins		
Accessories, all types, included	- 4x nuts M30 (or optional 2x clamps, on request)		
Accessories, only ILN-201-***-SIL2--S099, included	- 1x Safety lock device, mount at the cable connection, for locking the connection. - 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, only ILN-201-***-SIL2-S099, not included	- Single ended cordset, types RKTS 5-298/xx or RKWTH 5-298/xx, Lumberg		
Accessories, not included	- M35 thread adapter with glass disk, locknut included		
Options	- IRL/ILN/ILD-201-SIR/EFP(-OP)-SIL2-**S094**: Lenses special luted - IRL/ILN-201-SIR/EFP(-OP)-SIL2-**S099**: With socket M12, 5 pins - ILD-201-SIR/EFP(-OP)-SIL2-**S265**: With premounted tube M35 with glass plate - IRL/ILN/ILD-201-**SDI**(-OP)-SIL2: Emitter with disable input DI - Cable length: Up to 100m, on request		
LED display and output function	 Light beam interrupted LED's shows red		 Light beam free LED's shows yellow or green
Output function and wiring diagram (cable): Receiver: 1: = +24VDC; 2: = 0V; 3: = Output; 4: = Pollution indication output "VA" Emitter: 1: = +24VDC; 2: = 0V; 3: = SDI, optional (Cable shields, connect to PE) For socket types, see on page 2 of this operating manual			
Function pollution indication output "VA"	Output VA =24V if LED's shows yellow		
Alignment and controlling by LED display (Status visualization trough receiver optic and LED at the rearside of the receiver)	LED red: Light beam interrupted / not aligned LED yellow: Polluted lenses / bad aligned LED green: Light beam free / well aligned		Visible red light source through the emitter lens
Ex related markings	CE 1258 Types ILD: Ex d [op is Ga] IIC T6 Gb, Types ILN: II 3G Ex nA op is IIB T4 Gc, Types ILD: ATEX certification Types ILD: IECEx certification Types ILN: ATEX declaration by manufacturer Tamb: -20°C < Tamb < +50°C	Ex	Manufacturer with address Ex tb [op is Da] IIIB T100°C Db IP67 II 3D Ex tc op is IIIA T135°C Dc IP67 No: BVS 10 ATEX E130 X DEKRA IECEx BVS 14.0108X in accordance with the ATEX directive 2014/34/EU Electrical data according to the table "Technical data"
	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)		

Wiring IRL/ILN-201-SIR/SDI/EFP(-OP)-SIL2-S099:

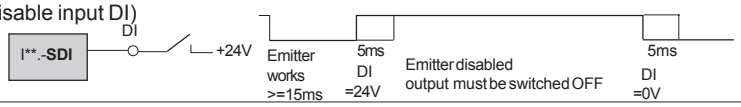


M12
Lumberg RSF 5, male socket

	Receiver:	Emitter:	
	1/brown	+24VDC	+24VDC
	2/white	Pollution indication output	SDI (Disable input)
	3/blue	0V	0V
	4/black	Output	NC
	5/grey	PE	PE

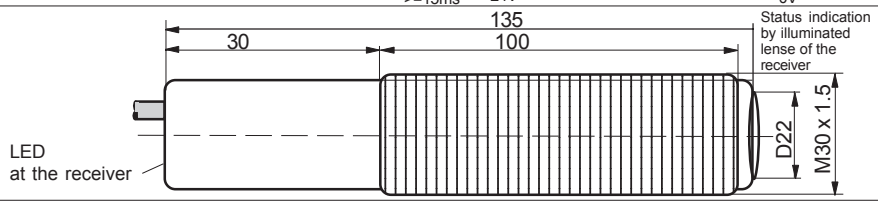
ILD/IRL-201-SDI(-OP)-SIL2 (Emitter with optional disable input DI)

Uin: DI=+24V=disabled / 0V=enabled
Response time: <=5ms
Hold time: >=15ms



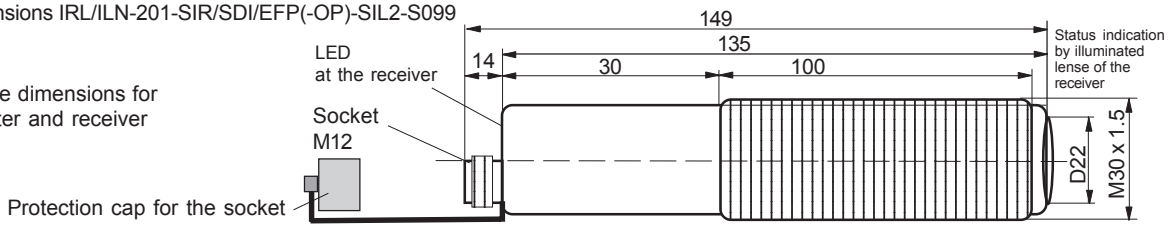
Dimensions
IRL/ILN/ILD-201-SIR/SDI(-OP)-SIL2,
IRL/ILN/ILD-201-EFP-OP-SIL2

Same dimensions for emitter and receiver

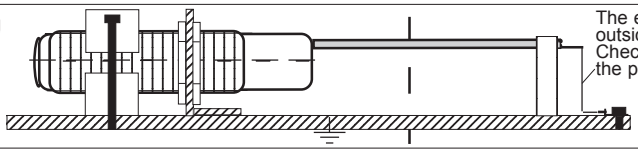


Dimensions IRL/ILN-201-SIR/SDI/EFP(-OP)-SIL2-S099

Same dimensions for emitter and receiver



Safe equipotential Bonding for Ex Devices:



The end of the cable must be connected outside the hazardous locations. Check the reliable, noncorrosive holding of the protection earth connection.

The cable shield is to connect to PE in a wide area.

Operating Manual, EU - Declaration of Conformity:

Correct use
The barrier is a non-separating protective device at machinery directive 2006/42/EC. It must not be possible to start the machinery/system as long as personnel are within the hazardous area. The double guided output is only switched ON, when the light beam is not interrupted. The light barriers are composed of an emitter and a receiver device only of the same type. The types must not be mixed. The light barriers must only be operated with post-switched emergency-stop devices or programmable safety devices. All relevant standards and directives for the complete system or machinery, for performance level Plc, at EN ISO 13849-1, must be observed. The applicant is responsible to realize a restart interlock at the machinery if requisite. This can be realized with a with an external equipment. All warranty claims against Matrix Elektronik AG are forfeited in the case of any other use, or alterations being made to the system – even as part of their mounting or installation.

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. 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. Use only original manufactured fibre optics and additional optical lenses, other additional optical lenses are not allowed in hazardous locations.

Emitter: ILD-201-SIR/SID-OP-SIL2, Receiver: ILD-201-EFP-OP-SIL2: 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.

Emitter: ILN-201-SIR/SID-OP-SIL2, Receiver: ILN-201-EFP-OP-SIL2: Applicable in only Ex zones 2, 22.

Emitter: ILN-201-SIR/SID-OP-SIL2-S099, Receiver: ILN-201-EFP-OP-SIL2-S099: Applicable in only Ex zones 2, 22. WARNING! 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:
If the light beam is not interrupted, the 2 PNP output transistors switches the output to ON (+24V). If the light beam is interrupted or the internal function is disrupted both otput tranistors switches the output OFF. The load must be connected between the output and 0V.

Pollution indication output VA:
The VA output will be activated by polluted lenses or a bad alignment. If the lenses are polluted, the LED shows yellow and the VA output switches to ON (+24V). This function gives the possibility to recognize pollutions in a short time.

"SDI" disable input for testing and arrangement of light barriers, types IRL/ILN/ILD-201-SDI(-OP)-SIL2 (optional):
The disable input "SDI" can well be used for testing the light barrier. If the SDI input is active, the output must be shut-off in a short time.
If several light barriers are installed close to another, it is necessary to use light barriers with emitters with disable input. By using the disable input DI, each emitter can be controlled in a short reaction time. If only one emitter is activated in the same time, a mutual influence is precluded.

DI= 0V or not connected = emitter enabled
DI= High (24VDC) = emitter disabled

The Disable Input SDI (DI) must be activated for >= 15ms. The DI input is PNP compatible. The Emitter-Disable-Input DI can also be used for testing the associated receiver. By a short-time shut-off of the emitter, the switching off of the receiver output and with it the correct function of the receiver will be checked.

Alignment of the Light Barrier:
The three color indication in the receiver optic allows an optimal alignment.
1. The emitter must be aligned this way, that the emitter lens is fully illuminated (By watching from the receiver at the emitter).
2. The receiver should be moved, until the LED (from the receiver) shows "green". Search the middle of the green range.

Maintenance:
No special maintenance is required. If the lenses becomes dirty, they should be cleaned with a non-aggressive solvents. Equipment must only be repaired by the manufacturer.

General safety instructions:
The operating manual provide the machine manufacturer's or machine operator's technical personnel instructions on the safe mounting, configuration, electrical installation, commissioning, and on the operation and maintenance of the light barrier. Please read the operating instructions carefully.Types: ILN-201-SIR/SID-OP-SIL2-S099, ILN-201-EFP-OP-SIL2-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. In worst case of breakdown, 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 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 13849-1:2008, EN 61508-3:2010, EN 61326-3:2008, EN 60204-1:2005, 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.

EU-Declaration of conformity:
IECEx certification, types ILD: Ex d [op is Ga] IIC T6 Gb, Ex tb [op is Da] IIIB T100°C Db IP67. Certification No. IECEx BVS 14.0108X.
ATEX certification, types ILD: 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, Kennnummer: 0158.
ATEX certification, types ILN: II 3G Ex d 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 ATEX directive 2014/34/EU, CE 1258. Certification No: SEV 21 ATEX 4580. 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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ILD-201-OP-SIL2-IECEX_e6/2022-11-10/MP