

Original operating manual:
Light barriers series IRL/ILN/ILD-235-S(-OP), IRL/ILN/ILD-235-E**(-OP)**
ILD-235-S/E**-OP**
Housing M30
ILN-235-S/E**-OP**

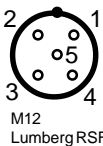
 IECEx marking:
 Ex d [op is Ga] IIC T6 Gb
 Ex tb [op is Da] IIIB T100°C Db IP67

- Emitter with 2 different light sources
- Very High penetration capacity in polluted areas
- Optimal alignment by visualization of the status through the receiver optic and visible red light of the transmitter
- With integrated pollution indication output "VA"
- Series ILD: IECEx certificated
- ILD: For using in Ex zones (0), 1, 2, (20), 21, 22 optical radiation can operate into Ex Zones 0, 20
- Series ILN: ATEX certificated
- ILN: For using in Ex zones 2, 22
- Robust light barriers for industrial applications


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

Type designation emitter	IRL-235-S**-S***	ILN-235-S**-OP-S***	ILD-235-S**-OP-S***
Type designation receiver	IRL-235-E**-S***	ILN-235-E**-OP-S***	ILD-235-E**-OP-S***
Technical data	(S***: Additional designations for options)		
Additional designations for the emitters	S**= SHS=High speed emitter, SDI=High speed emitter with disable input "DI", STA/STB/STC/STD= Emitters with different emitter frequencies, A to D		
Additional designations for the receivers	E**= EHS=High speed receiver, ETA/ETB/ETC/ETD= Receivers for emitters types A to D		
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 using in Ex zones	NONE	Zones 2, 22	Zones (0), 1, 2, (20), 21, 22
Optical sensing distance	200m		
Minimum detectable object size	22mm (Avoid deflections on reflective surfaces)		
Light source	Infrared 870nm and visible red light 623nm		
Maximum optical irradiance	NOT LIMITED	<=5mWm ²	<=5mWm ²
Maximum optical radiant power	NOT LIMITED	< 35mW	< 15mW
Optical aperture angle (Distance 10m)	Emitter: approx.40° / Receiver: approx.12°		
Turn OFF delay time, types *TA*/TB*/TC*/TD, A to D	30ms (If a receiver is influenced by other emitters, TOFF may increase up to 400ms)		
Turn OFF delay time, types SHS/EHS (high speed)	1ms		
Turn ON delay time, types *TA*/TB*/TC*/TD, A to D	400ms		
Turn ON delay time, types SHS/EHS (high speed)	5ms		
Power up delay time	500ms		
Supply voltage	24VDC +10%		
Maximum permissible voltage Um	30VDC		
Current consumption, emitter	20mA up to 60mA		
Current consumption, receiver	50mA (without load current)		
Maximum power dissipation	Emitter: 1.6W / Receiver: 1.3W		
Output type	PNP, 100mA, short circuit protected		
Pollution indication output "VA"	PNP, 100mA, short circuit protected		
Emitter disable input, only types I.-235-SDI(-OP)	PNP compatible		
Housing	M30, brass, nickel plated		
Enclosure rating, in accordance with EN 60529	IP 65	IP 67	IP67
Working ambient temperature range T _{amb}	-20°C up to +50°C		
Storage temperature range	-20°C ... +70°C		
Relative humidity	15% ... 80%		
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-235-***(-OP): T3A30BP1 / IRL/ILN-235-***(-OP)-S099: T3A30BP2		
Connection cable	2/3/4 + PE x 0.5mm ² , TPU, shielded, leads numbering marked, drag chain suitable		
Cable length	5m	10m	10m
Socket, types IRL/ILN-235-***(-OP)-S099	Socket M12, Lumberg RSF 5, 5-contacts		
Accessories, all types, included	- 4x Nuts M30 (or 2x clamps, on request)		
Accessories, only types ILN-235-***-S099, included	- 2x Safety lock device, mount at the cable connection, for locking the connection - 2x Warning plate "Do not open/close when supply voltage connected" - 2x Dust protection cap for the sensor socket		
Accessories, only types IRL/ILN-235-***-S099, not included	- Cord set M12, types Lumberg RKT5 5-298/xx (straight) or RKWTH 5-298/xx (angled)		
Options	-IRL/ILN/ILD-235-***(-OP)-S009: Adjustable emitter power by potentiometer -IRL/ILN-235-***(-OP)-S099: Socket M12, 5-contacts -IRL-235-***-S109: Ambient temperature range -20°C up to 100°C -IRL-235-***-S147: Special gluing of the lenses -IRL-235-***-S148: Special gluing of the lenses, cable sheath TPU -IRL-235-***-S153: Ambient temperature range: -20°C to +100°C, response time: 20ms, with DI-Function. -ILD-235-***-OP-S156: Temperature range: -30°C up to +50°C, cable type Ölflex 810CP, length: 5m -IRL/ILN-235-***-S300: Housing special steel 1.4404 (316L) and special gluing of the lenses, cable sheath TPU -IRL/ILN/ILD-235-SDI(-OP): Emitter with disable input "DI" -IRL-235-***-GF: With fibre optic adaption. -Cable length: Up to 100m on request		
LED display and output function			
Output and connection assignments			
Receiver:	1: = +24VDC	2: = 0V	3: = Output
Emitter:	1: = +24VDC	2: = 0V	3: = SDI/DI, optional
4: = Pollution indication output	Connect the cable shield to PE		
Wiring for the socket types: See page 2			
Pollution indication output "VA"	VA-Out = 0V		
Alignments and LED display (Through the lens and at the rearside of the receiver)	LED red: Light beam interrupted	LED yellow: Lenses polluted	LED green: Light beam free
	/ not aligned	/ bad aligned	/ well aligned

Connection assignment, types IRL/ILN-235-***(-OP)-S099:



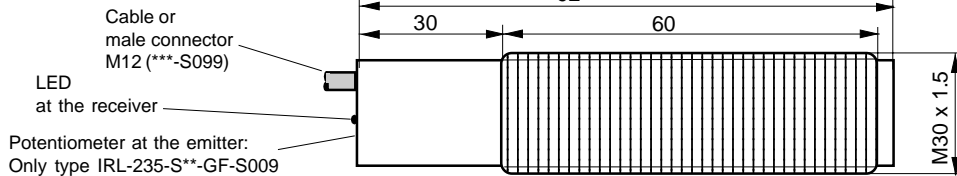
Receiver:

- 1 +24VDC
- 2 Pollution indication output "VA"
- 3 0V
- 4 Output
- 5 PE

Emitter:

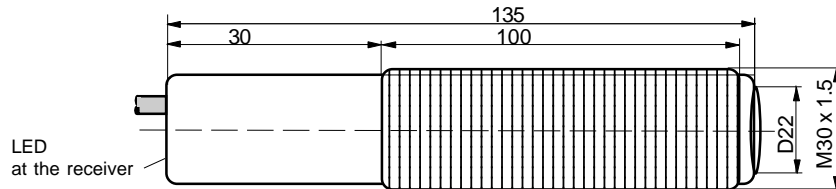
- +24VDC
- Emitter disable input SDI/DI, optional
- 0V
- NC
- PE

Dimensions IRL-235-***-GF



Dimensions IRL/ILN/ILD-235-***(-OP)-S***, IRL/ILN/ILD-235-***(-OP)-S***

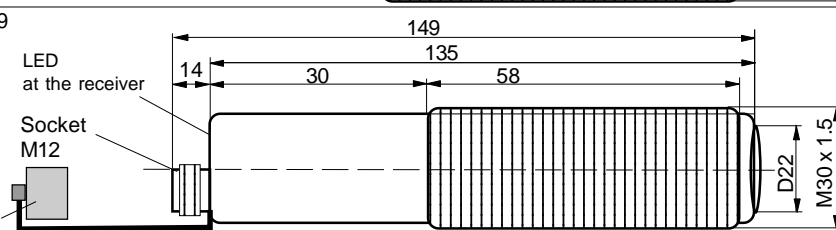
Same dimensions for emitter and receiver



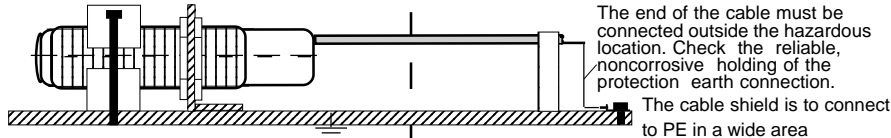
Dimension IRL/ILN-235-***(-OP)-S099

Same dimensions for emitter and receiver

Dust protection cap for the socket



Equipotential bonding prescription:



EX related markings CE 0158

Electrical data according to the table "Technical data"

Manufacturer with address

Types ILD: Ex d [op is Ga] IIC T6 Gb, Ex tb [op is Da] IIIB T100°C Db IP67 IECEx Certification No. IECEx BVS 14.0108X ATEX Certification No. BVS 10ATEX E130 X DEKRA
 Types ILN: II 3G Ex nA op is IIB T4 Gc, II 3D Ex tc op is IIIA T135°C Dc IP67 ATEX declaration by manufacturer
 Tamb: -20°C up to +50°C 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)

Operating manual / EU-declaration of conformity:

Mounting prescriptions:

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 $U_m=30VDC$ 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. 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.

Emitters ILD-235-SHS/SDI/STA/STB/STC/STD-OP-S***, Receivers ILD-235-EHS/ETA/ETB/ETC/ETD-OP-S***:

Only applicable in Ex zones 1, 2, 21, 22. The limited optical radiation can operate into hazardous locations 0 or 20.

Emitters ILN-235-SHS/SDI/STA/STB/STC/STD-OP-S***, Receivers ILN-235-EHS/ETA/ETB/ETC/ETD-OP-S***:

Only applicable in Ex zones 2, 22.

Emitters IRL-235-SHS/SDI/STA/STB/STC/STD-OP-S099, Receivers IRL-235-EHS/ETA/ETB/ETC/ETD-OP-S099:

Only applicable 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 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 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.

Arrangement of light barriers, types I -235-TA/TB/TC/TD, types A to D:** If several light barriers are installed close to another, it is necessary to use light barriers with different emitter frequencies (Types A to D). Light barriers with different emitter frequencies have no influence on each other. Precaution: If a receiver is influenced by other emitters of an other type, TOFF may increase from 30ms up to 400ms.

The high speed light barrier type -HS and the high temperature light barrier type IRL-235-S153, can not be combined with light barriers types A to D. To avoid interference effects, all emitters should be installed at the same side and all receivers at the other side. For indoor applications the background should be protected against clutters, by using light absorbing materials.

Arrangement of light barriers, types I -235-SDI/EHS, function "DI":**

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 DI must be activated for $\geq 10ms$. 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.

Function pollution indication output "VA":

Only when the receiver LED's shows yellow, the pollution indication output VA switches to +24VDC. (Light barrier bad aligned, or lenses polluted or other impairments). If the receiver LED's shows green or red, the output VA is switched to 0V. This function gives the possibility to a fast reaction at polluted lenses.

Mechanical mounting prescriptions

Mount the light barriers free from vibrations and shocks. If it is practicable, protect the lenses from contamination.

Alignment of the light barrier:

The three color indication trough 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

Types ILN-235-***-OP-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. 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 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.

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.

<http://iecex.iec.ch/iecex/iecexweb.nsf/0FE79714C0BAEF6F5C1257D7E0044F6A9?opendocument>

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, IdentNo. CE 0158.

ATEX certification, types ILN: 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 ATEX directive 2014/34/EU, CE 0158. Certification No: BVS 15 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

ILD-235-xxx-OP-IECEX_e4.2017-07-27/HB

Tippkemper - Matrix GmbH
 Meeger Str. 43 D-51491 Overath
 Tel.: +49 2206 9566-0 Fax -19
 info@tippkemper-matrix.com

Matrix Elektronik AG (Manufacturer)
 Kirchweg 24 CH-5420 Ehrendingen
 Tel.: +41 56 20400-20 Fax -29
 info@matrix-elektronik.com