Tippkemper®

ISO 9001:2008 ATEX

MATRIX elektronik ag

High Density Light Barriers IRL-235.-S/E / ILN-235.-S/E-OP / ILD-235.-S/E-OP

ILD-235.-S/E-OP

CE 0158

Ex

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

- Emitter with 2 different light sources
- Very High penetration capacity in polluted areas.
- Optimal alignment by visualization by LED into receiver optic and visible red light of the transmitter
- Types A to D with 4 different emitter frequencies
- Type HS with emitter disable input
- Series ILD: Applicable in Ex-Zones (0), 1, 2, (20), 21, 22
  Optical radiation can operate into Ex Zones 0, 20
- Series ILN: Applicable in Ex-Zones (1), 2, (21), 22
  Optical radiation can operate into Ex Zones 1, 21

ILN-235.-S/E-OP

CE 0158

Ex

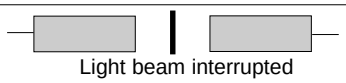
II 3(2)G Ex nA [op is Gb] IIB T4 Gc
II 3(2)D Ex tc [op is Db] IIIA T135°C Dc IP67

Technical Data / Type	IRL-235.-S/E(-VA)(-DI)	ILN-235.-S/E(-VA)(-DI)-OP	ILD-235.-S/E(-VA)(-DI)-OP
Designation Emitter + Receiver	Ixx-235.-**S** = Emitter / Ixx-235.-**E** = Receiver		
Designation, combined applicable barriers	Ixx-235**A to D**-S/E = Light barriers with different emitter frequencies		
Designation, high speed light barriers	Ixx-235**HS**-S/E = Barrier with disable input and short response time		
Type of ex protection Gas, at 94/9/EC	NONE	II 3(2)G Ex nA [op is Gb] IIB T4 Gc	II 2(1)G Ex d [op is Ga] IIC T6 Gb
Type of ex protection Dust, at 94/9/EC	NONE	II 3(2)D Ex tc [op is Db] IIIA T135°C Dc IP67	II 2(1)D Ex tb [op is Da] IIIB T100°C Db IP67
Applicable in Ex zones	NONE	2(1), 22(21)	1(0),21(20)
Sensing range	200m		
Minimum detectable object size	22mm (avoid mirror effects)		
Light source	Infrared 870nm and red light 623nm		
Maximum radiant power	NOT LIMITED	<=35mW	<=15mW
Maximum radiant intensity	NOT LIMITED	<=5mW/mm²	<=5mW/mm²
Directional angle (at a distance of 10m)	Emitter: appr.40° / Receiver: appr.7°		
Turn OFF delay TOFF, types A to D	30ms Note 1		
Turn OFF delay TOFF, type HS	1ms		
Turn ON delay TON, types A to D	400ms		
Turn ON delay TON, type HS	5ms		
Supply voltage	24 VDC +-15%		
Absolute maximum supply voltage Um	30VDC		
Current consumption, emitter	20mA (Type HS = 60mA)		
Current consumption, receiver	50mA		
Maximum power dissipation	Emitter: 1.68W / Receiver: 1.4W		
Output	PNP, 100mA, short circuit protected		
Pollution indication output "VA", optional	PNP, 100mA, short circuit protected		
Emitter disable input, only type I..-235HS-S-**DI**	PNP compatible		
Housing	M30, brass, nickel plated		
Enclosure rating, at EN 60529 Note 3	IP 65	IP67	IP67
Ambient working temperature range T_{amb} Note 2	-20°C < T_{amb} < +60°C	-20°C < T_{amb} < +50°C	-20°C < T_{amb} < +50°C
Storage temperature range	-20°C ... +70°C		
Vibration and shock resistance	Vibration: 30g over 20Hz to 2kHz. Shock: 100g for 3ms		
Connection cable	TPU insulation, AWM 20236, 2/3/4+PE x 0.5mm², shielded, leads numbering marked, oil resistant cable for trailing		
Cable length	5m	10m	10m
Socket M12, only types IRL/ILN-235.-S/E(-OP) **S99**	M12 RSF 5, 5 pins	M12 RSF 5, 5 pins	--
Accessories	4 nuts M30 or optional 2 clamps		
Accessories, only type ILN-235.-S/E-OP 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 for the types S99	- Single ended cordset, types RKTS 5-298/xx or RKWTH 5-298/xx, Lumberg		

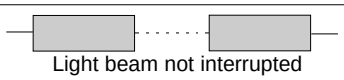
Options: Cable length up to 100m, on request.

- Types I..-235.-E-**VA**(-OP): With integrated pollution indication output, PNP type.
- Typ IRL-235.-S/E **GF**: For fibre optics connection, without optic D=52mm, can only be used with fibre optics.
- Types I..-235.-S-(-OP) **S9**: Adjustable emitter power. Potentiometer at the emitter.
- Typ IRL/ILN-235.-S/E(-OP) **S99**: With Socket M12, 5 terminals.
- Typ IRL-235.-S/E **S109**: Working temperature range: -20°C to +100°C.
- Typ IRL-239.-S/E **S147**: Lenses special luted.
- Typ IRL-239.-S/E **S148**: Lenses special luted and special cable type TPU.
- Typ IRL-239LS-S/E **S153**: Working temperature range: -20°C to +100°C. Response time: 20ms. With DI-Function.
- Typ ILD-239.-S/E-OP **S156**: Working temperature range: -30°C to +50°C.

LED indication
Principle function



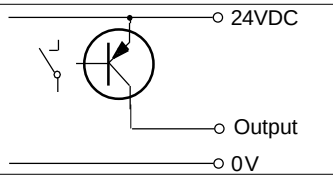
Light beam interrupted
LED's shows red

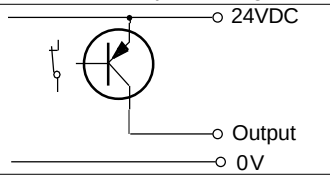


Light beam not interrupted
LED's shows yellow or green

Output function and wiring diagram (cable):
For socket types, see page 2

Receiver:		Emitter:	
1	= +24VDC	1	= +24VDC
2	= 0V	2	= 0V
3	= Output	3	= DI (N3)
4	= VA-Output (Cable shields, connect to PE)		





Alignment and controlling by LED display:

LED red: Light beam interrupted / not aligned
LED yellow: polluted lenses / badly aligned
LED green: Light beam free / well aligned
visible flushing red light source of the emitter lens

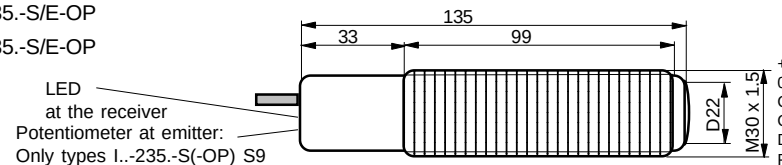
ATEX RELATED MARKINGS:

CE 0158
Device: Ex ILD: II 2(1)G Ex d [op is Ga] IIC T6 Gb,
Device: ILN: II 3(2)G Ex nA [op is Gb] IIB T4 Gc,
Type ILD: EC-Type-Examination
Type ILN: ATEX declaration by manufacturer and EC-Type-Examination
Tamb: -20°C < Tamb < +50°C
Date of production:

Manufacturer with address
II 2(1)D Ex tb [op is Da] IIIB T100°C Db IP67
II 3(2)D Ex tc [op is Db] IIIA T135°C Dc IP67
No: BVS 10 ATEX E130 X
at 94/9/EC
No: BVS 10 ATEX E130 X
Electrical data according to the chart
Numerals 5 to 8 of the serial number (Year/Week)

Note 1: If a receiver is influenced by other emitters, TOFF may increase up to 400ms.
Note 2: On temperatures less the +5°C, the cable must not be agitated.
Note 3: Only type IR.-235HS-(-OP)-S-DI

Dimensions:
IRL-235.-S/E (-GF)
ILN-235.-S/E-OP
ILD-235.-S/E-OP

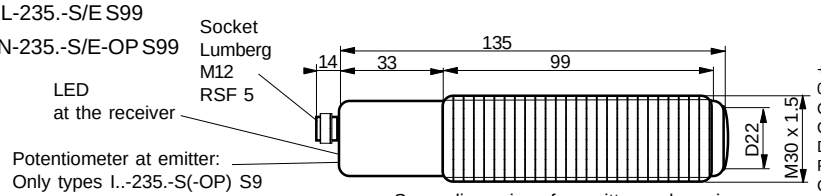


Same dimensions for emitter end receiver

Wiring:

	IRL-235.-S ILN-235.-S-OP ILD-235.-S-OP Emitter:	IRL-235.-E ILN-235.-E-OP ILD-235.-E-OP Receiver:
+24VDC	1	1
0V	2	2
Output	--	3
Output VA	--	4
DI Input	3	--
PE	yellow-green	yellow-green
Cable shield	white	white

Dimensions:
IRL-235.-S/E S99
ILN-235.-S/E-OP S99

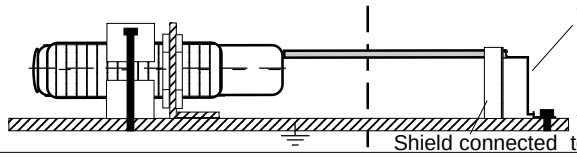


Same dimensions for emitter end receiver

Wiring:

	IRL-235.-S S99 ILN-235.-S-OP S99 Emitter:	IRL-235.-E S99 ILN-235.-E-OP S99 Receiver:
+24VDC	1/brown	1/brown
0V	3/blue	3/blue
Output	--	4/black
Output VA	--	2/white
DI Input	4/black	--
PE	5/grey	5/grey
Cable shield	at the socket housing	

Equipotential Bonding
for Ex Devices:



Operating Manual, EC - Declaration of Conformity:

Installation prescriptions for Ex hazardous locations

Ex protection:

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.

Types: ILD-235.-S/E(-VA/-DI)-OP: Applicable in Ex zones 1, 2, 21, 22. The limited optical radiation can operate into hazardous locations 0 or 20 through a certificated viewing glass.

Types: ILN-235.-S/E(-VA/-DI)-OP: Only applicable in Ex zones 2, 22. The limited optical radiation can operate into hazardous locations 1 or 21 through a certificated viewing glass.

Types: ILN-235.-S/E(-VA/-DI)-OP S99: Only applicable in Ex zones 2, 22. The limited optical radiation can operate into hazardous locations 1 or 21 through a certificated viewing glass. 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.

Arrangement of light barriers , types I..-235A 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 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..235HS-S-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 >= 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:

If the light beam is not interrupted the output switches to ON (+24V). If the light beam is interrupted the output switches to OFF. The light barrier IRL/ ILN/ILD-235 works with two different light sources, visible red light and infrared. The high density and the two different wavelengths gives a high penetration capacity at a heavy polluted ambiance. The load (Relay or other loads) must be connected at " - " (minus).

Pollution indication output "VA" (optional):

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.

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:

Series ILN-235.-S/E(-VA/-DI)-OP S99: "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. The sensors are conform to the following standards: EN 60079-0:2009, EN 60079-1:2007, EN 60079-15:2010, EN 60079-28:2007, EN 60079-31:2010, EN 60825-1:2006, EN 60825-2:2004; EN 60529; 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: 2006/42/EC, EMC: 2004/108/EC, RoHS: 2002/95/EC.

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-Declaration of conformity:

ATEX, Model 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, Notified Body: DEKRA EXAM GmbH, Carl-Beyling-Haus, Dinendahlstrasse 9, D-44809 Bochum, CE 0158.

ATEX, Model ILN: II 3(2)G Ex nA [op is Gb] IIB T4 Gc, II 3(2)D Ex tc [op is Db] IIIA T135°C Dc IP67. ATEX declaration by manufacturer at 94/9/EC and EC type certification for optical radiant power. ATEX certification of quality type production of Ex devices at the directive 94/9/EC, CE 0158. 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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