

High Density Light Barriers LBS-235.-S/E / LBN-235.-S/EGD / LBD-235.-S/E-GD

LBD-235.-S/E-VA-GD



II 2G Ex d IIC T6 Gb
II 2D Ex tb IIIB T90°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 LBD: Applicable in Ex-Zones 1, 2, 21, 22
- Series LBN: Applicable in Ex-Zones 2, 22

Housing M18

LBN-235.-S/E-VA-GD

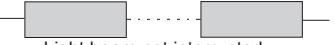
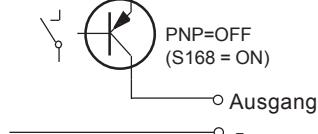
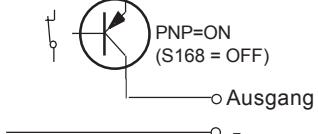


II 3G Ex nA IIB T4 Gc
II 3D Ex tc IIIA T135°C Dc IP67

Technical data	Series	LBS-235.-S/E-VA-(DI)	LBN-235.-S/E-VA-(DI)-GD	LBD-235.-S/E-VA-(DI)-GD
Designation Emitter + Receiver		LBx-235.-S = Emitter / LBx-235.-E = Receiver		
Designation, combined applicable barriers		LBx-235A to D-S/E = Light barriers with different emitter frequencies		
Designation, high speed barrier		LBx-235HS-S/E = Barrier with disable input and short response time		
Type of ex protection Gas, at 94/9/EC	none	II 3G Ex nA IIB T4 Gc	II 2G Ex d IIC T6 Gc	
Type of ex protection Dust, at 94/9/EC	none	II 3D Ex tc IIIA T135°C Dc IP67	II 2D Ex tb IIIB T135°C Dc IP67	
Applicable in Ex zones	none	2, 22		1, 2, 21, 22
Range		>200m		
Minimum detectable object size		12mm (avoid mirror effects)		
Light source		Infrared 870nm and red light 630nm		
Directional angle (at a distance of 10m)		Emitter: appr. 30° / Receiver: appr. 25°		
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%		
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		
Electrical input, only type LBx-235HS-S-DI		Disable input, PNP compatible		
Housing		M18, brass, nickel plated		
Vibration and shock resistance		Vibration: 30g over 20Hz to 2kHz. Shock: 100g for 3ms		
Working temperature range T _{amb} ^{Note 1}	-20°C < T _{amb} < +60°C	-20°C < T _{amb} < +50°C		
Storage temperature range		-30°C ... +80°C		
Connection cable, shielded ^{Note 2}	Special PVC/PVC 4 x AWG24/0.25mm ² , L=5m	Special PVC/PVC 4 x AWG24/0.25mm ² , L=10m		
Socket M12, only LBx-235.-S/E-(GD)MS99/212	RSFM 5, 5 pins	RSFM 5, 5 pins	--	
Cord set 10cm, M12, only LBx-235.-S/E-(GD)M S96	RSTS 5-298, 5 pins	RSTS 5-298, 5 pins	--	
Accessories, included all types	- 4 nuts M18 or optional 2 clamps			
Accessories, not included all types	- Aperture tube 8mm. Type: "Tubus M18/90/8"			
Accessories, only LBN-235.-S/E-GDMS96/99/S212	- 2x Safety lock device, mount at the cable connection, for locking the connection. (black synthetic device) - 2x Warning plate "WARNING - Explosion Hazard - Do Not Disconnect While Circuit Is Live Unless Area Is Known To Be Non-Hazardous", self-sealing, for gluing on the cable connector. - 2x Protection caps for the sensor sockets.			
Accessories, optional, only LBx-235.-S/E-(GD)-S96/99/S212	- Cord set with connector M12. Straight type: RKTS 5-299/..M or right angle type: RKWTH 5-299/..M, Lumberg M12/5P			

Options

- Cable length: Up to 100m, on request.
- LBS/LBN/LBD-235HS-S-DI(-GD): Emitter with disable input
- LBS/LBN/LBD-235HS-S/E(-GD): Response time 0.5ms, on request.
- LBS/LBN-235.-S/E-(GD)-S96: Cable length 10cm, with socket M12, 5 Pins, Lumberg type RSTS 5-298.
- LBS/LBN-235.-S/E-(GD)-S99: Socket M12: Lumberg RSFM 5, 5 Pins.
- LBS/LBN/LBD-235.-S/E-(GD)-S116: Cable: TPU, 3/4/5 x 0.5mm², shielded, leads numbering marked, resistant to solvents, for drag chain use.
- LBS/LBN/LBD-235.-S/E-(GD)-S168: With inverted output function, Dark=ON
- LBS/LBN-235-HS-S/E-(DI)-(VA)-S212: Housing tube material: Stainless steel, 1.4305 (without screwing), socket M12, emitter with disable input "DI", receiver with pollution indication output "VA".
- LBD-235.-S/E -OP: Limited optical radiant power at EN 60079-28. 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.
- LBN-235.-S/E -OP: Limited optical radiant power at EN 60079-28. II 3G Ex nA op is IIB T4 Gc, II 3D Ex tc op is IIIA T135°C Dc IP67.

LED Indication Function	  Light beam interrupted LED's shows red	 Light beam not interrupted LED's shows yellow or green
Output function Wiring diagram at the rear side of this data sheet	 PNP=OFF (S168 = ON)	 PNP=ON (S168 = OFF)
Pollution indication output VA	PNP = OFF	PNP=ON, if LED=yellow
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	

ATEX related designations

CE 0158

Manufacturer with address

Electrical data, according to the charts

Types LBD-235.-...-GD: II 2G Ex d IIC T6 Gb, II 2D Ex tb IIIB T90°C Db IP67 EC-Type Examination Certificate: BVS 10 ATEX E130 X
Types LBN-235.-...-GD(S96/99/212): II 3G Ex nA IIB T4 Gc, II 3D Ex tc IIIA T135°C Dc IP67 Declaration by manufacturer at 94/9/EC

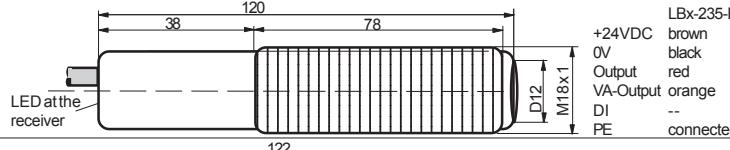
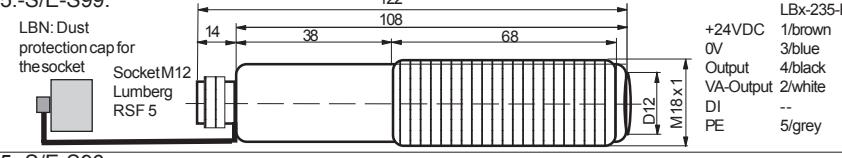
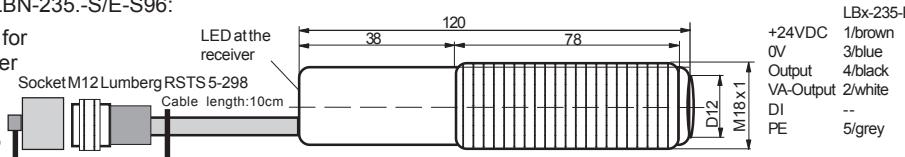
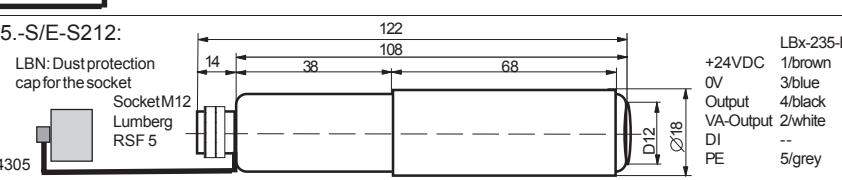
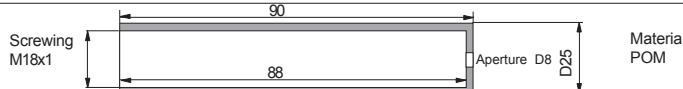
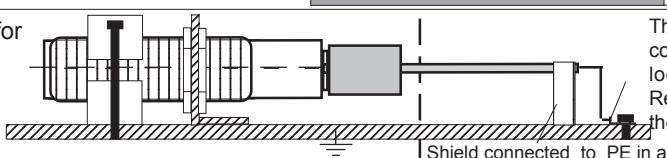
Tamb: -20°C < Tamb < +50°C

Date of production: Numerals 5 to 8 of the serial number (Year/Week)

(X designation of the certification number: Fibre optics must only be applied with sensors with certificated limited optical power)

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

Dimensions LBS/LBN/LBD-235.-SE: Same dimensions for emitter and receiver		LBx-235-E +24VDC 0V Output VA-Output DI PE	LBx-235-S brown black red orange -- connected to housing
Dimensions LBS/LBN-235.-S/E-S99: Same dimensions for emitter and receiver		LBx-235-E +24VDC 0V Output VA-Output DI PE	LBx-235-S 1/brown 3/blue 4/black 2/white 5/grey
Dimensions LBS/LBN-235.-S/E-S96: Same dimensions for emitter and receiver		LBx-235-E +24VDC 0V Output VA-Output DI PE	LBx-235-S 1/brown 3/blue 4/black 2/white 5/grey
Dimensions LBS/LBN-235.-S/E-S212: Same dimensions for emitter and receiver		LBx-235-E +24VDC 0V Output VA-Output DI PE	LBx-235-S 1/brown 3/blue 4/black 2/white 5/grey
Dimensions: Tubus M18/90/8: (Optional accessory for reduction the directional angle)			Material: POM
Equipotential Bonding for Ex Devices: LBN and LBD:		The end of the cable must be connected outside the hazardous locations. Reliable, noncorrosive holding of the protection earth connection. Shield connected to PE in a wide area	

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 (EN 60079-14). The maximum rated supply 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. At devices without PE terminal, the local equipotential bonding have to be done with conductive corrosion-resistant clamps or nuts M18 over 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 housings. All cable terminals must be connected outside hazardous locations. Other then original manufacturer, additional optical lenses are not allowed in hazardous locations.

Type LBD-235.-S/E-GD: ONLY applicable in Ex zones 1, 2 and 21, 22.

Type LBD-235.-S/E-GD: ONLY applicable in Ex zones 2 and 22.

Type LBN-235.-S/E-GD-S96/S99/S212: ONLY applicable in Ex zone 2 and 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 5-298/xx (Straight type), RKW5 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 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.

Arrangement of light barriers , types LBx-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 up to 400ms.

The high speed light barrier type-HS, can not be combined with light barriers types A to D.

Arrangement of light barriers , type LBx-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 $\geq 10ms$.
The DI input is PNP compatible.

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 LBx-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 ambience. The load (Relay or other loads) must be connected at "-" (minus). Because the emitters has a very high optical power, it's to avoid mirroring effects at the background, when not all receivers are located at the same side.

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.

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

Types LBN-235.-S/E-GD-S96/S99/S212: "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 emitter and receiver in dusty locations without fixed cordsets or protection caps 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 sensor and the fibre optic are conform to the following standards:

EN 60079-0:2009, EN 60079-1:2007, EN 60079-15:2010, 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: 2011/65/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

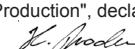
Models LBD:

EC-Type Examination Certificate No. BVS 10 ATEX E 130 X. DEKRA.

Models LBN:

ATEX declaration by manufacturer at 94/9/EC.

ATEX certification of quality type production of Ex devices at the directive 94/9/EC, CE 0158. Certification No: BVS 12 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

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

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