

Original Operating Manual: Light Barriers series LB*-20-S/E, Housing M18

LBD-20-S/E-OP

- Range 20m, short response time
- Optimal alignment by visualization by LED at the rearside of the receiver
- With optional emitter disable input "DI"
- With optional pollution indication output "VA"
- Series LBD-20-S/E-OP: Applicable in Ex-Zones 1, 2, 21, 22

LBN-20-S/E-OP



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

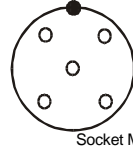
• Series LBN-20-S/E-OP: Applicable in Ex-Zones 0, 20
Optical radiation can operate into Ex Zones 0, 20
Applicable in Ex-Zones 2, 22
Optical radiation can operate into Ex Zones 1, 21

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	LBS-20-S/E-(VA)-(DI)	LBN-20-S/E-(VA)-(DI)-OP	LBD-20-S/E-(VA)-(DI)-OP
Designation for emitter and receiver		LB*-20-S = Emitter / LB*-20-E = Receiver		
Receiver with pollution indication output VA		LB*-20-E-VA(-OP)		
Emitter with disable input DI		LB*-20-S-DI(-OP)		
Type of Ex protection Gas, according to 2014/34/EU	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, according to 2014/34/EU	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	(1), 2, (21), 22	(0), 1, 2, (20), 21, 22	
Range		20m		
Minimum detectable object size		12mm (avoid mirror effects)		
Light source		Infrared 870nm		
Maximum radiant power	NOT LIMITED	<=35mW	<=15mW	
Maximum radiant intensity	NOT LIMITED	<=5mW/mm ²	<=5mW/mm ²	
Directional angle (Distance 10m)		Emitter: appr. 17° / Receiver: a. 15°		
Response time		5ms		
Power up delay time		500ms		
Supply voltage		24 VDC +-10%		
Absolute maximum voltage Um		30VDC		
Current consumption, emitter		28mA		
Current consumption, receiver (without load current)		40mA		
Maximum power dissipation		Emitter: 0.79W / Receiver: 1.4W		
Output		PNP, 100mA, short circuit protected		
Optional pollution indication output VA		PNP, 100mA, short circuit protected		
Output impedance		max.50Ω		
Input, only types LB*-20-S-DI(-OP)		Emitter disable input DI, PNP compatible		
Status indication		3-color LED, at the rearside of the receiver		
Housing		M18, brass Ms58, nickel plated		
Enclosure rating, according to EN 60529	IP 65	IP67		
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		-40°C +70°C		
Connection cable, shielded		Special PVC/PVC, 2/3/4 x AWG24/0.25mm ²		
Cable length	5m	10m		
Socket M12, only LB*-20(-OP)-S099	RFSM 5, 5 pins	RFSM 5, 5 pins	--	
Cord set 10cm, M12, only LB*-20(-OP)-S096/S170	RSTS 5-298, 5 pins	RSTS 5-298, 5 pins	--	
Accessories	- 4 nuts M18 or optional 2 clamps			
Accessories, only LBN-20-S/E-OP-S096/099/S170	- 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 cap for the sensor socket.			
Accessories, optional, only LB*-20-S/E(-OP)-S096/S099/S170	- Cord set with connector M12. Straight type: RKTS 5-186/xx, 5-299/..M or right angle type: RKWTH 5-186/xx, 5-299/..M, Lumberg M12/5P			
Options	Cable length up to 100m, on request. Response time 1ms, on request.			
- LB*-20-E-VA(-OP):	Receiver with pollution indication output "VA".			
- LB*-20-S-DI(-OP):	Emitter with disable input "DI".			
- LBS/LBN-20-S/E(-OP)-S009:	With potentiometer at the emitter for power adjustment.			
- LBS/LBN-20-S/E(-OP)-S096:	Cable length 10cm, with socket M12/5 Pins, Lumberg type RSTS 5-298.			
- LBS/LBN-20-S/E(-OP)-S099:	Socket M12: Lumberg RSF 5, 5 Pins.			
- LB*-20-S/E(-OP)-S112:	Cable: TPU, 3/4/5 x 0.5mm ² , shielded, leads numbering marked, resistant to solvents, for drag chain use, L: 10m.			
- LB*-20-S/E(-OP)-S116:	Cable: TPU, 3/4/5 x 0.5mm ² , shielded, leads numbering marked, resistant to solvents, for drag chain use.			
- LBS/LBN-20-S/E(-OP)-S170:	Cable length 10cm, with socket M12/5 Pins, Lumberg type RSTS 5-298. With potentiometer at the emitter for power adjustment.			
- LB*-20-E(-OP)-S179:	Reversed switching function, dark switching.			
- LB*-20-S/E(-OP)-S183:	Cable: TPU, 3/4/5 x 0.5mm ² , shielded, leads numbering marked, resistant to solvents, for drag chain use, L: 3m.			
- Aperture tube 8mm.	Type: "Tubus M18/90/8"			
LED indication and function	<p>Light beam interrupted LED shows RED</p>		<p>Light beam free LED shows YELLOW or GREEN</p>	
Output function	<p>PNP=OFF</p>		<p>PNP=ON, if LED=yellow</p>	
Wiring diagram at the rearside of this data sheet	<p>+24VDC Output 0V</p>		<p>+24VDC Output 0V</p>	
Pollution indication output, LB*-20-E-VA(-OP)				
Alignment and LED indication (LED at the rearside of the receiver)	<p>LED RED: Light beam interrupted or light barrier bad aligned. LED YELLOW: Lenses polluted or light barrier bad aligned. LED GREEN: Light beam free, light barrier well aligned.</p>			
ATEX related designations:	<p>Manufacturer with address</p> <p>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 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</p>		<p>Electrical data, according to the charts CE 0158 EC-Type Examination Certificate: BVS 10ATEX E130 X EC-Type Examination Certificate: BVS 10ATEX E130 X Declaration by manufacturer, according to the ATEX directive 2014/34/EU Declaration by manufacturer, according to the ATEX directive 2014/34/EU Numerals 5 to 8 of the serial number (year /calendar week)</p>	
Types LBD-20(-)**-OP:				
Types LBN-20(-)**-OP(-S96/99/170):				
Tamb: 0°C < Tamb < +50°C				
(X designation of the certification number: Fibre optics must only be applied with sensors with certificated limited optical power)				
Note 1: At ambient temperatures less then -5°C, the cable must not be agitated.				

LBx-20-OP_e5/2017-08-16/HB

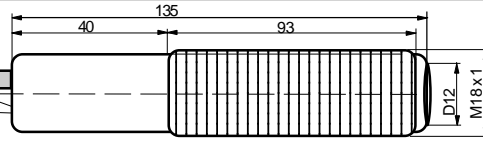
Wiring, cable:		Receiver:		Emitter:		Socket, only LBS/LBN-**-S096/S099/S170:	
Standard cable:	Special cable:	+24VDC	+24VDC	+24VDC	+24VDC	Receiver:	Emitter:
brown	1	0V	0V	0V	0V	+24VDC	+24VDC
black	2	Output	DI (optional)	DI (optional)	DI (optional)	Output VA	DI (optional)
red	3	Output VA (optional)	--	--	--	0V	0V
orange	4	PE/PA	PE/PA	PE/PA	PE/PA	Output	NC
at the housing	green-yellow	Cable shield	Cable shield	Cable shield	Cable shield	PE/PA	PE/PA
white	white						



Dimensions: LBS/LBN/LBD-20-S/E(-OP):

Same dimensions for receiver and emitter

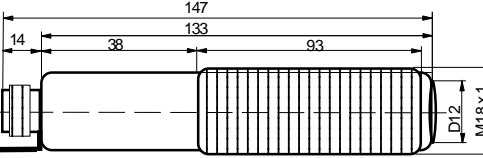
LED at the receiver
S009:
Emitter with potentiometer



Dimensions: LBS/LBN-20-S/E(-OP)-S099:

Same dimensions for receiver and emitter

LBN:
Dust protection cap for the socket
Socket Lumberg M12 RSFM 5

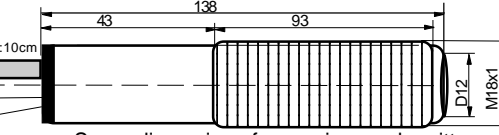


Dimensions: LBS/LBN-20-S/E(-OP)-S096/S170:

LBN:
Dust protection cap for the socket

Connection cable with socket M12. Lumberg RSTS 5-298

Cable length: 10cm
LED
S009/S170:
Emitter with potentiometer



Same dimensions for receiver and emitter

Dimensions: Aperture tube: Tubus M18/90/8-VA:
(Accessory optional for reduction of the optical beam angle)

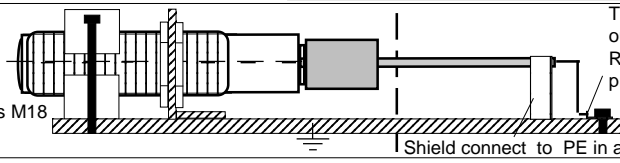
Screwing M18x1



Material: V2A

Equipotential Bonding for Ex Devices LBN and LBD:

The local equipotential bonding have to be done with conductive corrosion-resistant clamps or nuts M18



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

Shield connect to PE in a wide area

Operating Manual, EU-/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 than original manufacturer, additional optical lenses are not allowed in hazardous locations.

Type LBD-20-S/E-OP: ONLY applicable in Ex zones 1, 2 and 21, 22. The limited optical radiation can operate into hazardous locations 0 or 20 through a certificated viewing glass.

Type LBD-20-S/E-OP: ONLY applicable in Ex zones 2 and 22. The limited optical radiation can operate into hazardous locations 1 or 21 through a certificated viewing glass.

Type LBN-20-S/E-OP-S009/S096/S099/S170: ONLY applicable in Ex zone 2 and 22 hazardous locations. 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 RSTS 5-298/xx (Straight type), 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 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.

Function:

If the light beam is not interrupted the output switches to ON (+24V). If the light beam is interrupted the output switches OFF. The load must be connected between the output and 0V.

Function, devices LB*-20-E(-OP)-S179:

If the light beam is not interrupted the output switches to OFF. If the light beam is interrupted the output switches to ON (+24VDC). The load must be connected between the output and 0V.

Optional pollution indication output "VA", only LB*-20-E-OP-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.

Arrangement of light barriers, only types LB*-20-S-DI(-OP):

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 $\geq 7ms$.

The DI input is PNP compatible.

LBS/LBN-20-S(-OP)-S009:

With the potentiometer at the emitter the optimal optical power can be adjusted.

Alignment of the Light Barrier:

The three color indication at the receiver allows an optimal alignment.

1. The emitter beam must hit the receiver lens in an angle near to 90°.
2. The receiver should be moved, until the LED (from the receiver) shows "green". Search the middle of the green range. If the receiver LED shows yellow, the light barrier is bad aligned, or the lenses are polluted.

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-20-S/E-OP-S096/S099/S170: "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. 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 sensor and the fibre optic are conform to the following standards:

EN 60079-0:2012 + A11:2013, 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 60529:2014; 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-/EC-Declaration of conformity:

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

Models LBN: ATEX declaration by manufacturer, according to the ATEX directive 2014/34/EU.

ATEX certification of quality type production of Ex devices according 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

LBx-20-OP_e5/2017-08-16/HB

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