

Operating manual: LBD-DFZ-ERE-OP Photoelectric Light Barrier



IECEx BVS 14.0108X


 Ex db [op is Ga] IIC T6 Gb
Ex tb [op is Da] IIIC T100°C Db

- Robust light barrier for industrial applications
- (Emitter Only) Visible red light inside front optic
- (Receiver Only) Alignment aid by 3-color LED at the rearside.

Type designation code

LBD-	Distance	Type	Output Type	-	Signal Frequency	Connection Cable	Options	-OP
	C 10m	A Emitter (Laser, DI)	C PNP		A Channel A	A TPU, 3m	D State visualization by LED inside front optic	
	D 20m	B Emitter (Infrared)	Z None		B Channel B	B TPU, 5m	E Visible red light inside front optic	
	E 50m	E Emitter (Laser)			C Channel C	C TPU, 10m	Z None	
	F 100m	F Emitter (Infrared, DI)			D Channel D	P PVC, 3m		
	G 120m	L Receiver			E HS (High Speed)	Q PVC, 5m		
	H 200m	M Receiver (VA)			F 100Hz	R PVC, 10m		
		N Receiver (Inverted Output)				S PVC, 20m		

Technical Data	LBD-DFZ-ERE-OP								
Gas Ex protection designation	II 2(1)G Ex db [op is Ga] IIC T6 Gb								
Dust Ex protection designation	II 2(1)D Ex tb [op is Da] IIIC T100°C Db								
For use in Ex Zones	Zones (0), 1, 2, (20), 21, 22								
Light Source	Infrared 870nm								
Measuring range	20m								
Min. recognizable object size	12mm (Avoid deflections on reflective surfaces)								
Maximum optical radiant power	<= 15mW								
Maximum optical radiant intensity	<= 5mW/mm ²								
Optical aperture angle	approx. 17°								
Pollution degree	4, according to EN 60664-1:2007								
Supply voltage, Ue	24VDC ± 10%								
Absolute maximum supply voltage, Um	30VDC								
Current consumption	28mA								
Maximum power dissipation	0.79W								
Input function	(LB*-A/F*-*-OP) Disable Input, PNP compatible								
Power up delay time	500ms								
Housing	M18								
Enclosure rating	IP67								
Ambient working temperature range, Tamb	-20°C up to +50°C								
Storage temperature range	-20°C up to +70°C								
Relative humidity	15% ... 90%, noncondensing								
Connection cable	PVC cable shielded black 3xAWG24, Length: 10m								
Accessories	Included								
	• 4x Nuts M18 (or 2x Clamps on request)								
Options	LBx-*N*-*-OP Inverted output function, dark switching								
	LBx-*M*-*-OP With pollution indication output "VA"								
	LBx-*D*-*-OP (Receiver Only) State visualization by LED inside front optic								
	LBx-*E*-*-OP (Emitter Only) Visible red light inside front optic								
Function and LED Indication	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Light beam interrupted LED shows red</p> </div> <div style="text-align: center;"> <p>Light beam not interrupted LED shows yellow or green</p> </div> </div>								
Alignment and Controlling by LED Display (At the rearside of the receiver).	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>LED color</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>red</td> <td>light beam interrupted or not aligned</td> </tr> <tr> <td>yellow</td> <td>polluted lenses or badly aligned</td> </tr> <tr> <td>green</td> <td>light beam free and well aligned</td> </tr> </tbody> </table>	LED color	Meaning	red	light beam interrupted or not aligned	yellow	polluted lenses or badly aligned	green	light beam free and well aligned
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LBD-DFZ-ERE-OP_e1/2025-09-23/MIP

Wiring Diagram	LB*-*L/N*-*OP	LB*-*M*-*OP	LB*-*B/E*-*OP	LB*-*A/F*-*OP
	24VDC	24VDC	24VDC	24VDC
	brown	0V	0V	0V
	black	OUT	OUT	DI
	red	–	–	–
orange	–	VA	–	–
white	Cable shield	Cable shield	Cable shield	Cable shield

Dimensions	
Safe equipotential bonding for Ex devices	

Operating Manual / EC-/EU-declaration of conformity

Installation prescriptions for Ex hazardous locations

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) 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.
 LBD-DFZ-ERE-OP: Applicable in Ex zones 1, 2, 21 and 22. The limited optical radiation can operate into hazardous locations (0) and (20) through a certificated viewing glass.

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. During electrical installation, the power must be disconnected from the device.

General function

The light barriers can be used e.g. for the detection of objects (bottles, cans, etc.) on a conveyor belt. This light barrier consists of a transmitter and a receiver. When both the transmitter and the receiver are correctly positioned and the light beam from the transmitter is not interrupted by an object, the receiver will show green on the indicator LED and the output is switched on. If the light beam is interrupted by an object, then the indicator LED shows red and the output is switched off.

Arrangement of light barriers, types LB*-*A/B/C/D-OP**

If several light barriers are installed close to another, it is necessary to use light barriers with different emitter frequencies (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 another type, TOFF may increase from 30ms up to 400ms. High speed light barriers and high temperature light barriers cannot be combined with frequency light barriers 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 LB*-*E-OP**

If several light barriers are installed close to another, it is necessary to use light barrier emitters with the optional 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 $\geq 15ms$. 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

- Align transmitter with receiver.
- The 3-color status display at the back of the receiver enables optimum alignment of the receiver. Align receiver so that the receiver LED shows "green". Look for the center of the green area. If the LED lights up yellow, the light barrier is not optimally aligned or the lenses are dirty.

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 LBD-DFZ-ERE-OP light barriers must not be used for accident protection. In the case of a malfunction, the output can have any state. During installation, operation and maintenance, it is mandatory to meet the relevant EU and national regulations and directives, especially with regard to explosion protection: EN 60079-14, Directives 1999/92/EC and 2014/34/EU.

General notes, disposal

We reserve the right to modify our products. Our products are designed in such a way, that it has the least possible adverse effect on the environment. It neither emits or contains 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.

Special usage conditions

The widths and gaps of the flameproof joints of this apparatus are not identical with the respective minimum or maximum values required by Table 2 and 3 of IEC 60079-1:2014. Information on the dimensions are to be obtained from the manufacturer. Access to the enclosure is prevented by adhesion. Repair works of the enclosure and thus of the parts forming the flameproof joint can only be carried out by the manufacturer. The instructions contain relevant hints.

EU-Declaration of Conformity

The product meets the requirements of the following standards and directives: EN IEC 60079-0:2018, IEC 60079-1:2014, IEC 60079-15:2010, IEC 60079-28:2015, IEC 60079-31:2013, 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

ATEX/IECEx-Designation:

Gas: II 2(1)G Ex db [op is Ga] IIC T6 Gb
 Dust: II 2(1)D Ex tb [op is Da] IIIC T100°C Db
 ATEX EU-type examination certificate No.: BVS 10 ATEX E 130 X
 IECEx CoC No.: IECEx BVS 14.0108X
 Ex CB IECEx: DEKRA Testing and Certification GmbH, Carl-Beyling-Haus, Dinen-dahlstrasse 9, D-44809 Bochum, Ident number: 0158.
 ATEX certification of quality management system, type production of Ex devices, in accordance to the directive 2014/34/EU:

Certification No.: SEV 21 ATEX 4580, QAR No.: CH/SEV/QAR21.0009, CB: Eurofins Electric & Electronic Product Testing AG, Luppenstrasse 3, CH-8320 Fehraltorf CE 1258.

Pablo Ledergerber, Matrix Elektronik AG, is authorized to generation of documentation. The conformity of the devices with all used standards and directives and the EC-type examination certificate and the observation of the Quality Management System ISO 9001:2015, declares:

Ehrendingen, 23.9.2025

Pablo Ledergerber, Matrix Elektronik AG

LBD-DFZ-ERE-OP_e1/2025-09-23/MMP

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