Elevator light grid

AL2109-P-1820/40b/49/143

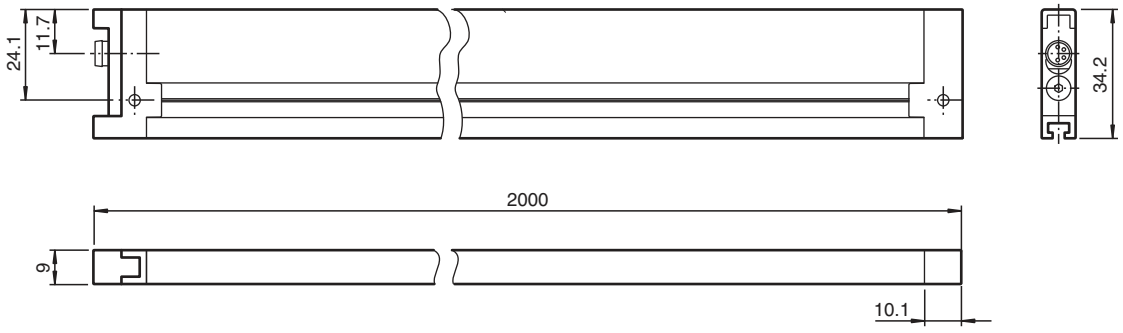
- Low-profile, high resolution light grid for monitoring locking edges on elevators and accesses
- Thru-beam light grid with integrated controller
- In accord with EN81-70 and EN12015/16
- Dense monitoring field with up to 135 beams ensures that small objects are detected
- Object detection up to distance of zero
- Automatic beam crossing and beam suppression
- Insensitive to reflection and ambient light

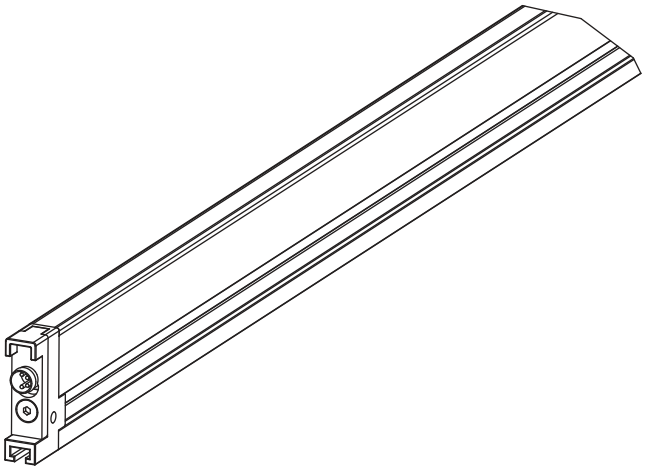
High-resolution light grid for detecting people and objects, set comprising emitter and receiver, field height: 1800 mm, light/dark on, 1 NPN output and 1 PNP output, M8 plug

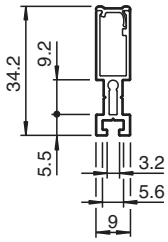
Function

The AL2109 elevator light grid is used to protect elevator doors or for passenger monitoring and access control. Its special features include its dynamic beam crossover with up to 135 active sensors, object detection down to nearly zero millimeters and an ambient light limit greater than 100,000 Lux. The evaluation electronics and the power supply are completely integrated into the emitter and receiver element, so that no external equipment is necessary for operation. The system offers flexible mounting options and meets the newest standards in accordance with EN 81-70 and EN 12016.

Dimensions







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Technical Data

General specifications		
Effective detection range		0 ... 3500 mm
Threshold detection range		3500 mm
Light source		IRED
Light type		modulated infrared light , 950 nm
Field height		1800 mm
Beam crossover		automatic, 3x/5x/7x (depending on distance between transmitter/receiver)
Beam blanking		Defective beams are faded out after 60 s. Deactivation of the light grid upon failure of 2 adjacent beams or more than 50 % of all beams
Beam spacing		90 mm
Number of beams		61 ... 135 (dynamic)
Opening angle		Emitter: < 20 ° , Receiver: < 6 °
Ambient light limit		> 100000 Lux
Accessories provided		2 connecting cable , length 5 m (15 ft)
Functional safety related parameters		
$MTTF_d$		180 a
Mission Time (T_M)		20 a
Diagnostic Coverage (DC)		0 %
Indicators/operating means		
Function indicator		LED red (in receiver): Illuminates after connecting operating power, out when object is detected, flashes in case of permanent interruption of 2 neighbouring beams
Electrical specifications		
Operating voltage	U_B	11 ... 30 V DC
Ripple		10 %
No-load supply current	I_0	< 180 mA
Output		
Switching type		light/dark on selectable programmable
Signal output		1 PNP and 1 NPN, short-circuit protected
Switching voltage		max. 30 V DC
Switching current		100 mA
Switching frequency	f	< 3 Hz
Response time		< 100 ms
Conformity		
Product standard		EN 60947-5-2
Compliance with standards and directives		
Standard conformity		
Standards		EN 81-70:2003-05 EN 81-70/A1:2004-12 EN 81-1+A3:2009-12; Chapter 7.5.2.1.1.3 Taking into account object detection in accordance with the datasheet specification for the monitoring field.
Approvals and certificates		
UL approval		cULus Listed
CCC approval		CCC approval / marking not required for products rated ≤36 V
Ambient conditions		
Ambient temperature		-20 ... 60 °C (-4 ... 140 °F)
Storage temperature		-20 ... 65 °C (-4 ... 149 °F)
Mechanical specifications		
Profile width		9 mm
Degree of protection		IP54
Connection		M8 x 1 connector, 4-pin
Material		
Housing		Aluminum
Optical face		plastic
Mass		2000 g (device)
Dimensions		

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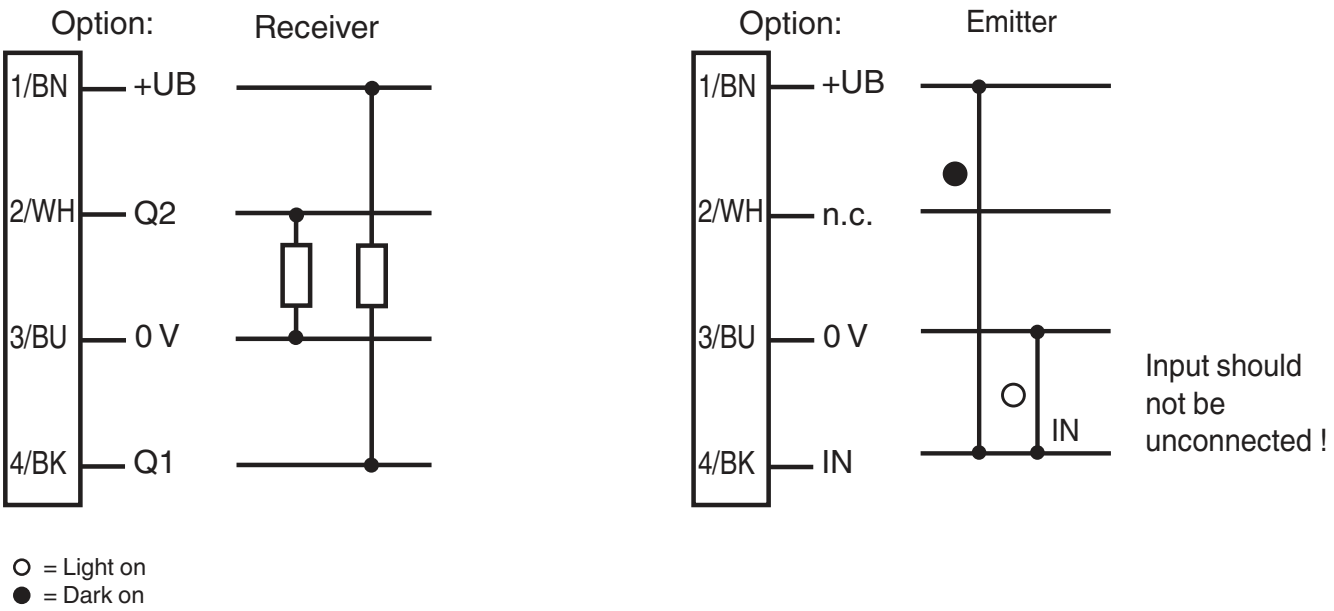
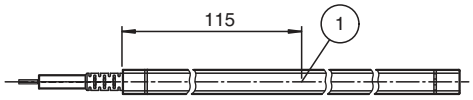
Width		9 mm
Depth		34 mm
Length		2000 mm

Connection Assignment



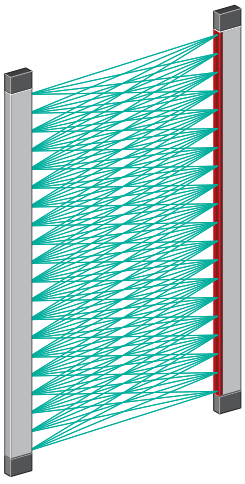
○ = Light on
● = Dark on

Assembly



1	LED display

Application



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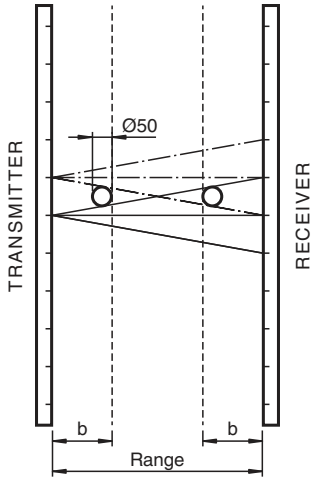
Monitoring field

Object detection



Range [mm]	b [mm]
100	38
200	64
300	88
400	64
500	76
600	88
700	72
800	80
900	88
1000	96
1500	134
2000	171
2500	209
3000	246
3500	283

LED Indicators

The red LED in the upper end of the receiver lights up continuously when the operating voltage is applied. The light grid is then ready for operation.

When an object is detected, the red LED goes out until the light beams are unobstructed again.

The AL2109 elevator light grid features a beam suppression system. If one of the 21 emitters or receivers is covered on a sustained basis (e.g. by dirt or other contaminants), the beam in question is removed from the evaluation after 60 seconds, and the light grid remains ready for operation. The light grid is deactivated if 2 adjacent beams or more than half of all the beams fail; in this case, the red LED flashes.

Operating Modes

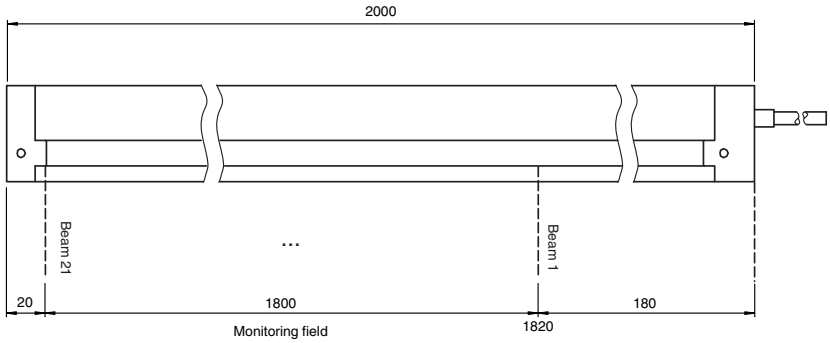
Light/dark ON:

Light ON means that the outputs are active if none of the light beams are broken. In dark ON mode, the outputs are active in every instance of an object being detected. This function can be selected via the light/dark ON input (IN) on the emitter. Do not leave the input in a non-wired state.

+UB on switching input IN: dark ON

0V on switching input IN: light ON

Monitoring field



Function Principle

The AL2109 light grid is used for access monitoring on elevators. The device consists of an emitter and receiver unit. The evaluation electronics and power supply are integrated into the devices. No additional external components are required for operation.

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By default, the light grid automatically switches between 7-way, 5-way and 3-way crossovers. If the distance is more than 0.8 m between the emitter and receiver, the light grid selects the "7-way crossover" operating mode. Every receiver evaluates the beams of 7 emitters in this mode. 7-way crossover thus increases the resolution to 135 beams.

Application

- Secure and complete monitoring of elevator doors
- Monitoring of access systems and entrances
- Access control

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