

## Elevator light grid

AL2109-P-1820/25/49/76a/143



- Low-profile, high resolution light grid for monitoring locking edges on elevators and accesses
- In accord with EN81-20 and EN81-70
- Dense monitoring field with up to 135 beams ensures that small objects are detected
- Object detection up to distance of zero
- Automatic beam crossing
- Test input
- Insensitive to reflection and ambient light

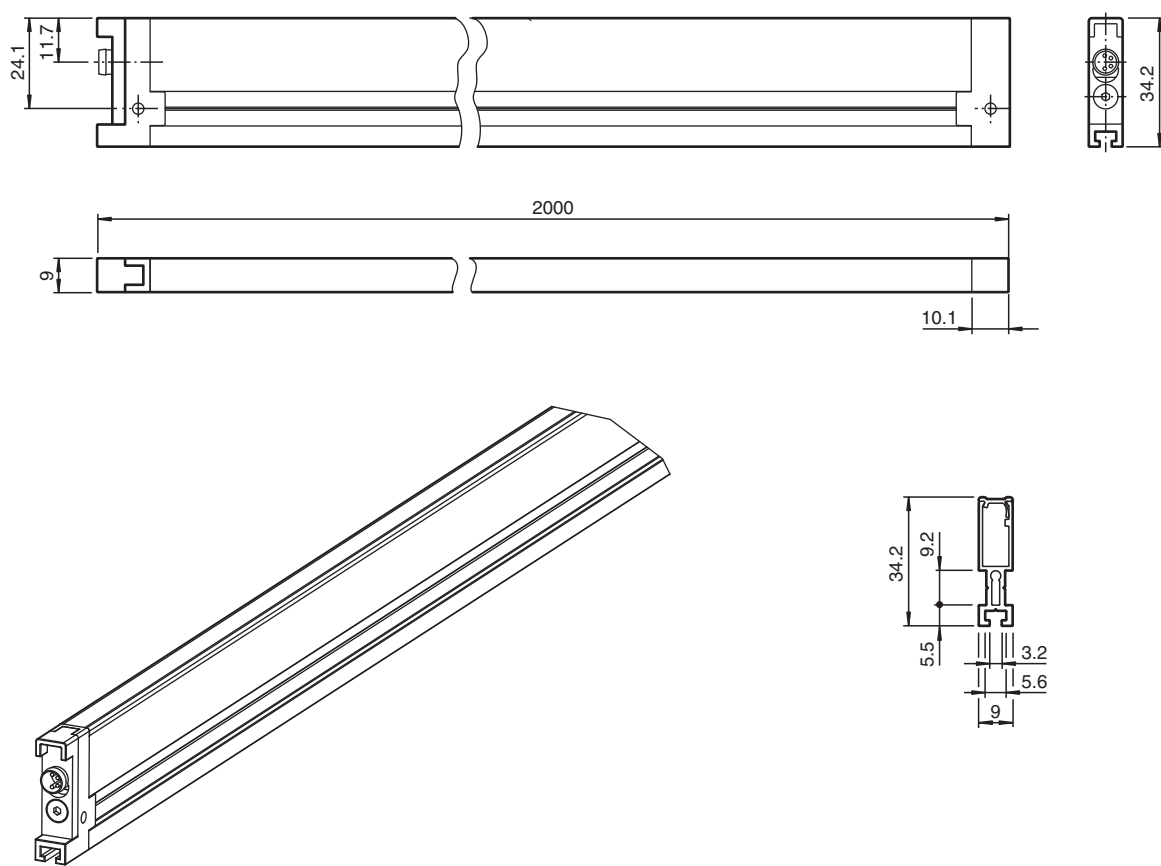
High-resolution light grid for detecting people and objects, set comprising emitter and receiver, field height: 1800 mm, light/dark on, 1 NPN output and 1 PNP output, M8 plug



### 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 81-20 and EN 81-70.

## Dimensions



## 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 spacing              | 90 mm                                                                    |
| Number of beams           | 61 ... 135 (dynamic)                                                     |
| Angle of divergence       | Emitter: < 20 ° , Receiver: < 6 °                                        |
| Ambient light limit       | > 100000 Lux                                                             |
| Accessories provided      | 2 connecting cable , length 5 m (15 ft)                                  |

### Functional safety related parameters

|                                |       |
|--------------------------------|-------|
| MTTF <sub>d</sub>              | 180 a |
| Mission Time (T <sub>M</sub> ) | 20 a  |
| Diagnostic Coverage (DC)       | 0 %   |

### Indicators/operating means

|                    |                                                                                                          |
|--------------------|----------------------------------------------------------------------------------------------------------|
| Function indicator | LED red (in receiver): Illuminates after connecting operating power, goes out when an object is detected |
|--------------------|----------------------------------------------------------------------------------------------------------|

### Electrical specifications

|                        |                |                |
|------------------------|----------------|----------------|
| Operating voltage      | U <sub>B</sub> | 11 ... 30 V DC |
| Ripple                 |                | 10 %           |
| No-load supply current | I <sub>0</sub> | < 180 mA       |

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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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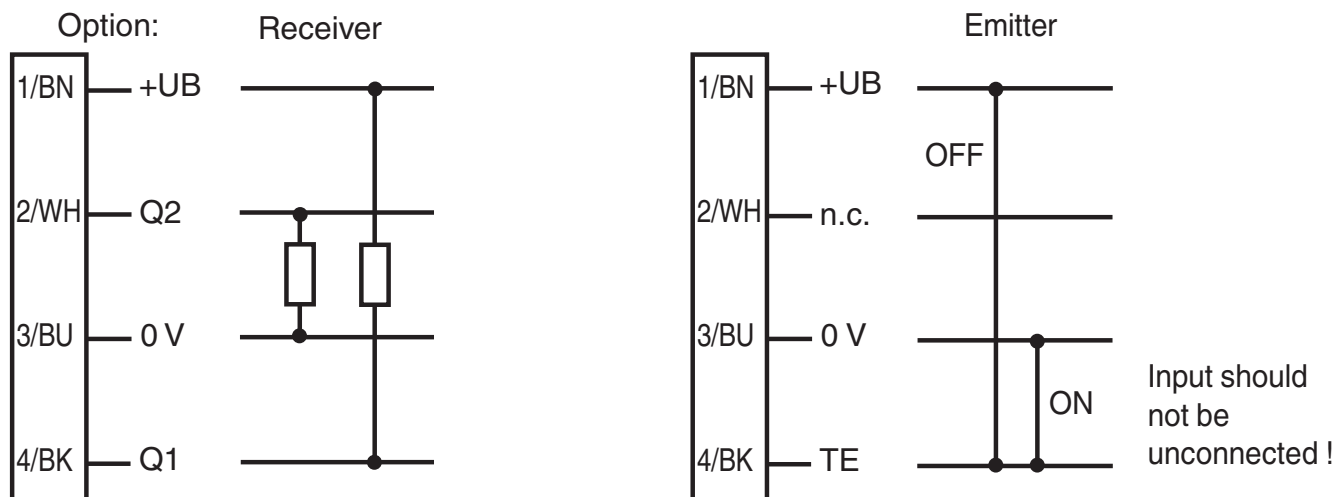
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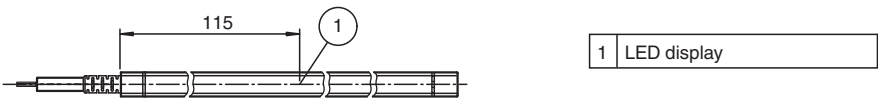
## Technical Data

|                                                 |                                                                                                                                                                                        |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Input</b>                                    |                                                                                                                                                                                        |
| Test input                                      | Test: Operating voltage , Operating mode 0 V                                                                                                                                           |
| <b>Output</b>                                   |                                                                                                                                                                                        |
| Switching type                                  | light on                                                                                                                                                                               |
| 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                                                                                                                                                                               |
| <b>Compliance with standards and directives</b> |                                                                                                                                                                                        |
| Directive conformity                            |                                                                                                                                                                                        |
| EMC Directive 2004/108/EC                       | EN 12015:2014 EN 12016:2013                                                                                                                                                            |
| Standard conformity                             |                                                                                                                                                                                        |
| Product standard                                | EN 60947-5-2:2007 EN 60947-5-2/A1:2012 IEC 60947-5-2 Edition 3.1:2012-09                                                                                                               |
| Standards                                       | EN 81-70:2003-05 EN 81-70/A1:2004-12 EN 81-20:2014; Section 5.3.6.2.2.1 Taking into account object detection in accordance with the data sheet specification for the monitoring field. |
| <b>Approvals and certificates</b>               |                                                                                                                                                                                        |
| UL approval                                     | E310569 , cULus Listed , class 2 power supply , max. ambient temperature 60 °C                                                                                                         |
| CCC approval                                    | CCC approval / marking not required for products rated ≤36 V                                                                                                                           |
| <b>Ambient conditions</b>                       |                                                                                                                                                                                        |
| Ambient temperature                             | -20 ... 60 °C (-4 ... 140 °F)                                                                                                                                                          |
| Storage temperature                             | -20 ... 65 °C (-4 ... 149 °F)                                                                                                                                                          |
| <b>Mechanical specifications</b>                |                                                                                                                                                                                        |
| Degree of protection                            | IP54                                                                                                                                                                                   |
| Connection                                      | M8 x 1 connector, 4-pin                                                                                                                                                                |
| Material                                        |                                                                                                                                                                                        |
| Housing                                         | aluminum                                                                                                                                                                               |
| Optical face                                    | plastic                                                                                                                                                                                |
| Mass                                            | 2000 g (device)                                                                                                                                                                        |

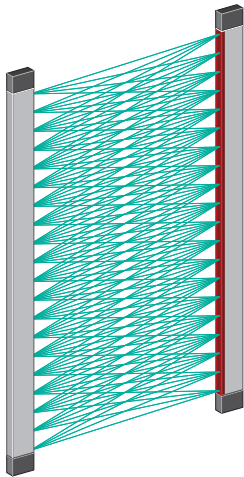
## Connection Assignment



Assembly



Application



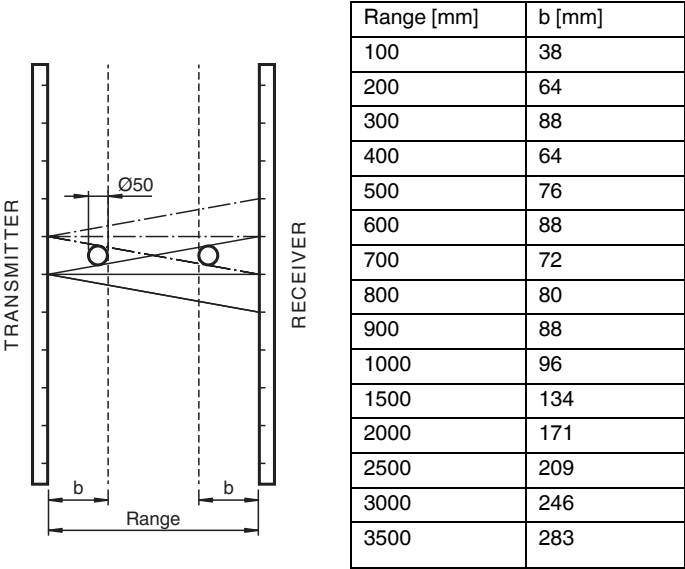
Accessories

|                                                                                     |                                       |                                  |
|-------------------------------------------------------------------------------------|---------------------------------------|----------------------------------|
|  | <b>Mounting Set AL2109 back board</b> | Mounting aid                     |
|  | <b>Mounting Set AL2109 extension</b>  | Mounting aid                     |
|  | <b>Mounting Set AL2109 lateral</b>    | Mounting aid                     |
|  | <b>PS1/31</b>                         | Power supply/Power supply module |

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Monitoring field

Object detection



Accessories

Other suitable accessories can be found at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com)

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.

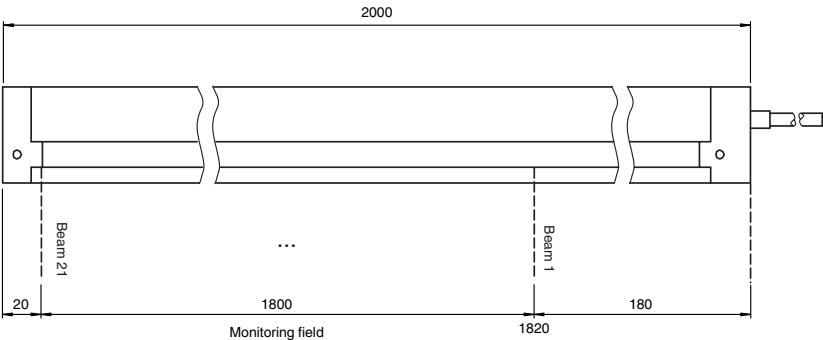
Test input

When +UB is applied to the test input, the light beams used for detection are switched off; in other words, the outputs on the light grid behave as if detecting an object.



To eliminate faults reliably (EMC-related faults, interference), the test input must never be left in an unconnected state! If the test input is not required, it should be connected to 0 V.

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