

FIRERAY3000 Linear beam detector



- ▶ Monitoring range of 5 m to 120 m
- ▶ Up to 2 detectors per system controller
- ▶ Two pairs of fire and fault relays (one per detector)
- ▶ Integral LASER alignment
- ▶ Self-alignment during operation
- ▶ Remote control unit at eye level for easy installation and programming
- ▶ Automatic compensation for contamination
- ▶ Control unit with LED and LCD displaying - various operating states
- ▶ Adjustable alarm thresholds
- ▶ Building shift compensation

The Fireray3000 Linear beam detector is for the detection of light and dark smoke across an area of 5 m to 120 m.

Preferred areas of application are very large and high halls, e. g. airplane hangars, factory buildings and similar buildings where the use of point detectors are not possible.

Functions

The transmitter transmits an invisible infrared light beam bundled through a lens to the receiver.

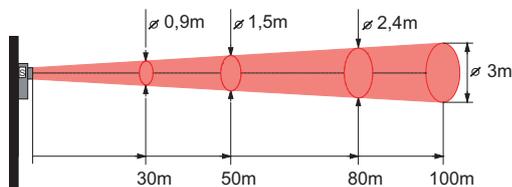


Fig. 1: Beam detection

At a maximum distance of 100 m the core diameter of the light beam is 3 m. The core diameter is the area of the conical IR beam in which orderly operation of the system is possible.

If smoke interrupts the beam, the signal in the receiver is attenuated depending on the thickness of the smoke. If an attenuation according to the set threshold lasts longer than 5 s, an alarm is triggered.

The alarm threshold can be set to 25% or 35% or 50% with the use of prisms.

Slow changes (e. g. contamination of the optical system) do not cause false alarms; instead, they are balanced out by an automatic gain control. Here the current state of the system is compared with a reference value and adjusted stepwise in case of deviations greater than 7%. By default, the comparison is done every 1.5 hours.

With a comp switch, manual or automatic alarm reset can be selected.

Certifications and approvals

Region	Regulatory compliance/quality marks	
Europe	CPR	0786-CPR-21162 Fireray3000
Germany	VdS	G 212034 Fireray3000
Europe	CE	Fireray3000

Installation/configuration notes

General installation/configuration notes

- A FLM-420/4-CON Conventional Interface Module is required for connection of the Fireray3000 to the LSN.

- Between the transmitter and receiver there must be a constant visual connection, which may not be interrupted by movable objects (e. g. overhead crane).
- The mounting surfaces for the transmitter and receiver must be stable and free of vibration. Installation on metal surfaces should be avoided since they expand and contract in case of temperature fluctuations.
- When installing the receiver, be sure that the direct penetration of sunlight or other light into the optical system is avoided. Normal environmental light has no influence on the receiver.
- The control unit must be installed in an area that is easy to reach. A screened cable must be used. The maximum cable length of 100 m to the receiver may not be exceeded.

Heat accumulation under roof surfaces can prevent the travel of climbing smoke to the ceiling. The detector must therefore be mounted below an expected heat accumulation. This can mean that the benchmark values for D_L specified in the table must be exceeded.

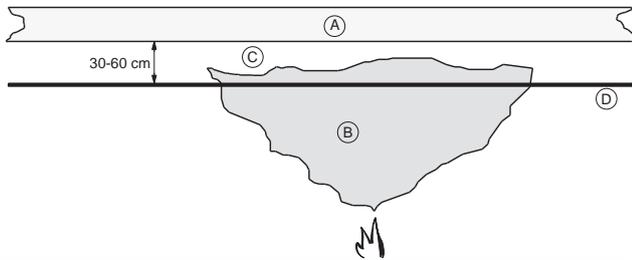


Fig. 2: installation_for_smoke_plume

Pos.	Description
A	Ceiling
B	Mushroom cloud
C	Heat accumulation
D	IR beam

- Since the smoke from a fire does not simply rise straight up, but rather spreads like a mushroom cloud (depending on air current and accumulation), the monitoring range is much greater than the diameter of the IR beam.
- The lateral detection on either side of the beam is 7.5 m.
- Country-specific Standards and guidelines on planning must be observed.

Detector arrangement

The detectors must be arranged according to the following distances:

- X1 Distance from the ceiling 0.3 m to 0.6 m
- X2 Horizontal distance detector/wall min. 0.5 m
- X3 Horizontal distance between two detectors under gable roofs

Example: Gable roof, 10° roof pitch

$$X3 = 7.5 \text{ m} + (7.5 \text{ m} \times 10\%)$$

$$X3 = 7.5 \text{ m} + 0.75 \text{ m}$$

$$X3 = 8.25 \text{ m}$$

- The maximum distance between two detectors with parallel IR beams is 15 m.
- The centre line of the monitoring beam may not be closer than 0.5 m to walls, furniture or stored goods.
- The receivers allow an angle deviation of up to 5° from the centre line without causing a weakening of the signal.

Positioning the detectors on flat ceilings

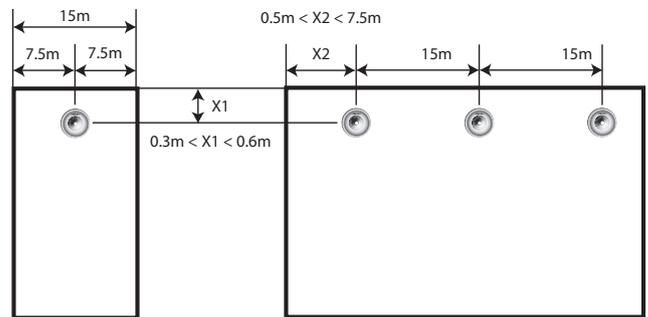


Fig. 3: Mounting flat ceiling

Positioning the detectors under a gable roof

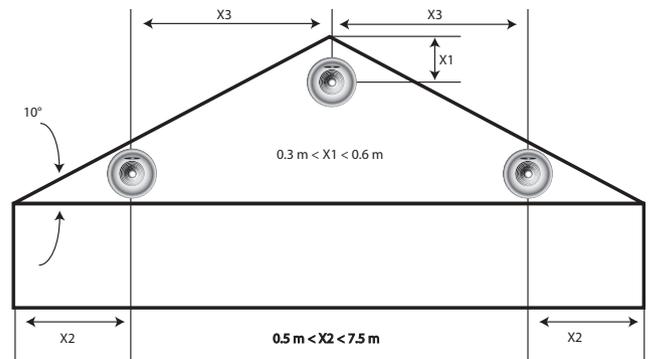


Fig. 4: Mounting gable roof

Positioning the detectors under a shed roof

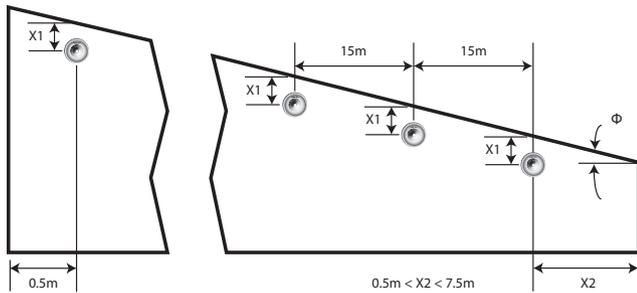


Fig. 5: Mounting shed roof

Detector arrangement in accordance with VdS/VDE

- The number of light beam smoke detectors must be selected according to the maximum monitoring area A listed in the table and which must not be exceeded (meets VdS 2095 and DIN VDE 0833-2).

Room height RH	X2	A	X1 at $\alpha < 20^\circ$	X1 at $\alpha > 20^\circ$
Up to 6 m	6 m	1200 m ²	0.3 m to 0.5 m	0.3 m to 0.5 m
6 m to 12 m	6,5 m	1300 m ²	0.4 m to 0.7 m	0.4 m to 0.9 m
12 m to 16 m ^{*)**}	7 m ^{*)}	1400 m ^{2**}	0.6 m to 0.9 m ^{**}	0.8 m to 1.2 m ^{**}

X2 = greatest permissible horizontal distance of any point of the ceiling to the next-closest beam
 A = maximum monitoring area per detector (= double the product of the greatest horizontal distance DH and the highest allowable distance between transmitter and receiver)

X1 = distance between the detector and the ceiling
 α = angle which the roof/ceiling pitch forms with the horizontal; if a roof has different pitches (e. g. sheds), use the smallest pitch.

* With a room height of more than 12 m, it is recommended that you provide a second monitoring level on which the detectors are arranged offset to the first monitoring level

** Depends on use and environmental conditions (e. g. quick fire and spread of smoke)

- Depending on the roof construction (flat, tilted or gable), the detectors and receiver must be arranged according to the roof pitch α and the room height RH so that the light beam runs along the roof in a distance DL (see table).

Parts included

Quantity	Component
1	Control Unit, Fireray3000 Linear Smoke Detector
1	Infrared transmitter

Quantity	Component
1	Infrared receiver

Technical specifications

Electrical

Operating voltage	12 V DC to 36 V DC ($\pm 10\%$)
Current consumption	
• Control Unit in standby (with 1 or 2 receivers)	14 mA @ 36 V DC
• Transmitter in standby	8 mA @ 36 V DC
Reset control by power disruption	> 20 s
Fire and fault relay (contact load)	Resistive VFCO 2 A @ 30 V

Mechanics

LED indicators:	
• Control Unit	Red = Fire Amber = Fault Green = System OK
• Receiver	Red = Fire Alignment LEDs for single person alignment
Dimensions (W x H x D)	
• Transmitter & Receiver	78 x 77 x 161 mm
• Control unit	203 x 124 x 72 mm
Housing	
• Color	Light gray/black
• Material	C6600, non-flammable
Weight	
• Detector	500 g
• Prism reflector	100 g
• Control unit	1000 g

Environmental conditions

Protection class as per EN 60529	IP 54
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Permissible operating temperature	-10 °C to 55°C
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Planning

Permissible distance transmitter-receiver	Min. 5 m - max. 100 m
Connectable detectors per system controller	2 Transmitter and 2 Receiver

Special features

Optical wavelength	850 nm
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Ordering information

FIRERAY3000 Linear beam detector

End-to-End Linear Smoke Detector for ranges between 5 m - 120 m

Order number **FIRERAY3000 | F.01U.290.195**

Accessories

FIRERAY3000-HD Linear beam detector head

Additional detector head

Order number **FIRERAY3000-HD | F.01U.290.196**

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