



FRAY5000-EN Linear Smoke Detector



- ▶ **Extended monitoring range**
- ▶ **Up to 4 detectors per system controller**
- ▶ **Transmitter and receiver integrated into a compact housing**
- ▶ **Electronic and optical feature for detector alignment and self-alignment during operation**
- ▶ **Remote control unit at eye level for easy installation and programming**
- ▶ **Automatic contamination compensation**
- ▶ **Control unit with LED and LCD displaying - various operating states**
- ▶ **Adjustable alarm thresholds**
- ▶ **Building shift compensation**

The FRAY5000-EN Linear Smoke Detector covers distances between 8 m and 100 m. A reflective prism allows for the accurate detection of smoke particles within the given distance range.

For ranges between 8 m and 50 m, one prism is sufficient. For ranges between 50 m and 100 m, four prisms are required. The additional prisms are included in the FRAY5000-LR-Kit Long Range Kit.

Key application areas are large halls such as historical buildings, churches, museums, shopping centers, factory halls, warehouses, etc.

The FRAY5000-EN Linear Smoke Detector is suitable for use in areas where point-type detectors are not effective

The FRAY5000-EN Linear Smoke Detector can be upgraded with three FRAY5000-HEAD-EN Detector Heads. The system controller can control up to four detectors. Each head can be programmed separately.

Functions

The transmitter emits an invisible infrared light beam (850 nm) that is focused through a lens. The light beam is reflected by the prism mounted opposite and returned to the transmitter/receiver combination.

If the IR beam is obscured by smoke and the signal received drops below the selected threshold (standard 10 s, adjustable), the detector triggers a fire alarm and the alarm relay closes.

The sensitivity can be adjusted according to the environmental conditions. The default settings of 25% (sensitive), 35% and 50% (non-sensitive) can be changed in steps of 1%. Each detector can be adjusted individually. The standard setting is 35%.

The alarm relay can be set to auto-reset or latched mode. The LEDs indicate three different operating states:

- Alarm
- Fault
- Operation

You can control and set all parameters via the system controller and LCD display for each FRAY5000-EN Detector Head.

Slow changes in the operating states (e. g. component aging, optics contamination, etc.) do not cause false alarms, but are compensated by the automatic gain control. Every 15 minutes, the system state is compared with a default reference value and in the case of a deviation, is corrected automatically to 0.17 dB/h. If the compensation limit is reached, "Fault" the fault signal is indicated.

If the IR beam is obscured within 2 s and the obscuration is more than 87% and lasts for 10 seconds and above (operator changeable), the fault relay switches. Faults may be caused by an obstacle in the beam path, by the covering of the reflector, etc. As soon as the fault cause is removed, the fault relay is cleared and after 5 s, the detector is automatically reset to standard operation. The fire panel must be reset separately.

The system has an alarm output, which is a relay with a potential-free change-over contact.

Certifications and Approvals

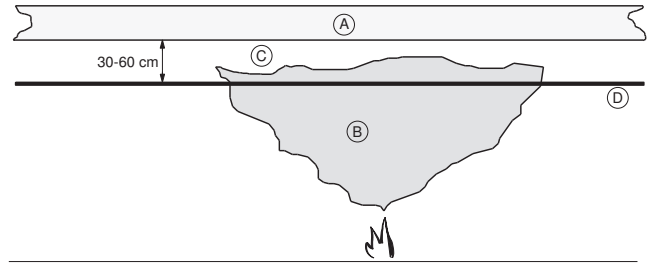
Comply with:

- EN54-12:2002

Region	Certification	
Germany	VdS	G 208017 FRAY5000-EN
Switzerland	VKF	AEAI 19202 Fireray 5000
Europe	CE	FRAY5000-EN
	CPD	0832-CPD-0565 FRAY5000-EN
Belgium	BOSEC	TCC2-K803/b FRAY5000-HEAD-EN
Great Britain	BRE	831a/04 FRAY5000-EN
USA	FM	3037125 Fireray 5000
Sweden	INTYG	08-722 FRAY5000-EN

Installation/Configuration Notes

- For connection to the LSN, one FLM-420/4-CON Conventional Interface Module is required.
- For direct connection to the FPA-5000, one CZM 0004 A module is required.
- The line of sight between the detector and the reflector always has to be clear and may not be interfered by moving objects (e. g. overhead crane).
- Heat accumulation under the roof may prevent smoke from rising up to the ceiling. Thus, the detector must be mounted below the expected heat accumulation. Accordingly, the benchmark values for X1 specified in the table have to be exceeded.
- The mounting surface for the detector must be firm and vibration-free. Metal supports that may be affected by heat or cold are unsuitable for the installation.
- The detector and the reflector are usually installed at the same height and aligned with one another. The wide angle of the IR beam allows for an easy adjustment and for a reliable long-term stability.
- The detector must be mounted in a position where the detector's optical system is not exposed to direct sunlight or artificial light. Normal ambient light has no influence on the IR beam and the analysis



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

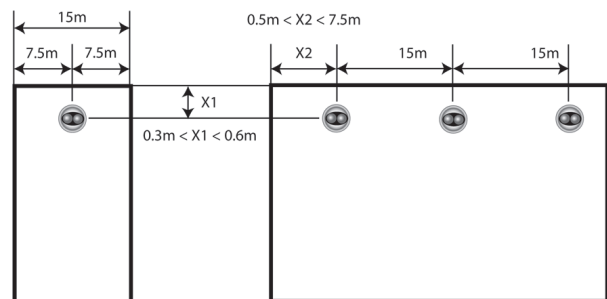
$$X3 = 7.5 \text{ m} + (7.5 \text{ m} \times 10\%)$$

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

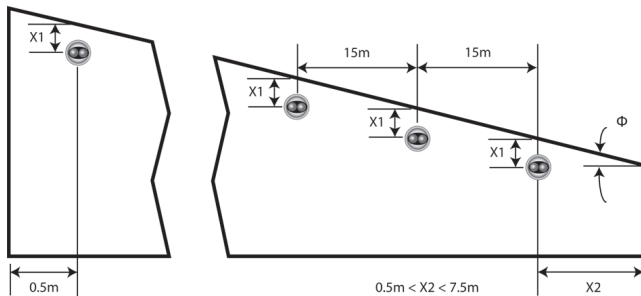
$$X3 = 8.25 \text{ m}$$

- 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 reflectors allow an angle deviation of up to 5° from the centre line without causing a weakening of the signal..

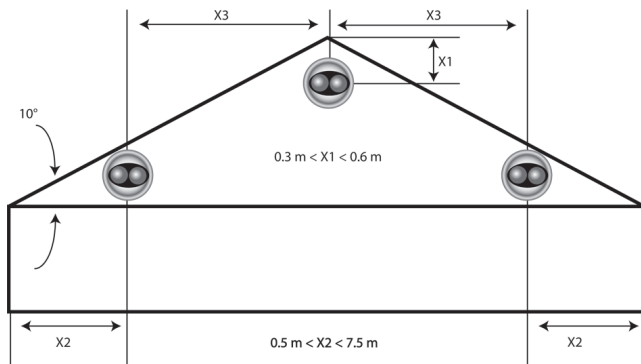
Positioning the detectors on flat ceilings



Positioning the detectors under a shed roof



Positioning the detectors under a gable 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 detector/reflector distance)

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 reflectors 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

Qty. Components

- | | |
|---|--|
| 1 | FRAY5000-EN Linear Smoke Detector: compact device with integrated transmitter and receiver |
| 1 | Reflective prism |
| 1 | Control unit |
| 1 | Installation kit |

Technical Specifications

Electrical

Operating voltage 14 V DC to 28 V DC

Current consumption

• In standby (1 detector) ≤ 12 mA @ 28 V DC

• In standby for each additional detector ≤ 2.2 mA @ 28 V DC

• In alarm/fault (with 1-4 detectors) ≤ 52 mA @ 28 V DC

Reset control by power disruption > 5 s

Alarm relay (contact load) 100 mA @ 36 V

Fault relay (contact load) 100 mA @ 36 V

Mechanics

LED indicators for

• Alarm Flashes red every 10 s

• Fault Flashes yellow every 10 s

• Operation Flashes green every 10 s s

Dimensions (W x H x D)

• Detector 135 x 135 x 135 mm

• Prism reflector 100 x 100 x 10 mm

• Control unit 200 x 235 x 81 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

Permissible operating temperature -10°C to 50°C

Planning

Permissible distance detector-reflector	Min. 8 m – max. 50 m
•with FRay5000-LR-Kit Long Range Kit	Min. 50 m – max. 100 m
Lateral detection (on either sides of the light beam)	Max. 7.5 m (heed local guidelines!)
Connectable detectors per system controller	1 to 4

Special features

Optical wavelength	850 nm
Tolerance of the axial deviation	
• Detector	± 0.3°
• Reflective prism	± 5.0°

Ordering Information

FRAY5000-EN Linear Smoke Detector with one Detector Head, retro-operation, with building shift compensation, range 8 m - 50 m	FRAY5000-EN
---	--------------------

FRAY5000-HEAD-EN Detector Head additional Detector Head	FRAY5000-HEAD-EN
---	-------------------------

Accessories

FRAY5000-1PRISM Prism Plate for 1 prism Prism Plate for 1 prism for use with FRAY5000-BR Universal Bracket Accessory for Fireray 5000 (not included).	FRAY5000-1PRISM
---	------------------------

FRAY5000-4PRISM Prism Plate for 4 prism Prism Plate for 4 prisms for use with FRAY5000-BR Universal Bracket Accessory for Fireray 5000 (not included).	FRAY5000-4PRISM
--	------------------------

FRAY5000-BR Universal Bracket Accessory for FRay5000 Universal Bracket for use with Fireray 5000 detector head or FRAY5000-4PRISM Prism Plate for 4 prism or FRAY5000-1PRISM Prism Plate for 1 prism.	FRAY5000-BR
--	--------------------

FRay5000-LR-Kit Long Range Kit 3 additional prisms for ranges between 164 ft and 328 ft (50 m and 100 m).	FRay5000-LR-Kit
--	------------------------

Americas:
Bosch Security Systems, Inc.
130 Perinton Parkway
Fairport, New York, 14450, USA
Phone: +1 800 289 0096
Fax: +1 585 223 9180
security.sales@us.bosch.com
www.boschsecurity.us

Europe, Middle East, Africa:
Bosch Security Systems B.V.
P.O. Box 80002
5600 JB Eindhoven, The Netherlands
Phone: +31 40 2577 284
Fax: +31 40 2577 330
emea.securitysystems@bosch.com
www.boschsecurity.com

Asia-Pacific:
Robert Bosch (SEA) Pte Ltd, Security Systems
11 Bishan Street 21
Singapore 573943
Phone: +65 6258 5511
Fax: +65 6571 2698
apr.securitysystems@bosch.com
www.boschsecurity.com

Represented by