fireray®

# Specialist beam smoke detection

**Protecting lives. Protecting assets. Protecting property.**

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## Contents



# Welcome to FFE

FFE is a global innovator in the design and manufacture of **specialist fire detection solutions**. We exist to ensure that all lives and livelihoods are protected from fire, even in the most challenging environments.

Established in 1974, FFE has been a trusted provider of specialist fire detection solutions for over 50 years, protecting lives, assets and property around the world. Our products, designed and manufactured in the UK, and our solutions are synonymous with quality, reliability and innovation, reflecting decades of experience and a deep commitment to excellence.

Building on this foundation, our product range consists of the Fireray series, which offers quick, accurate, and dependable beam smoke detection for large indoor spaces. The Talentum range provides fast flame detection in industries where early intervention is critical. Additionally, the Proreact range delivers reliable Linear Heat Detection, ensuring continuous fire protection in various environments. We are continually expanding our product portfolio to meet evolving fire safety needs.

We believe that fire safety is not just about products; it is about expertise, dedication and continuous innovation. With our entire team operating under one roof, we take pride in being experts in fire detection, giving you the highest level of support and technical expertise. Whether your application is common or highly specialised, we are committed to providing you with the most advanced and effective fire safety solutions and complete peace of mind.

**Protecting lives.**
**Protecting assets.**
**Protecting property.**

# Fireray beam smoke detectors

## Optimum beam smoke detection for wide areas and large spaces.

**Key features**

The low level controller allows remote access for maintenance and testing when beams are situated high-up

Compensates for building movement or lens contamination by readjusting the beam to achieve the correct received signal during its installed lifetime

Prevents nuisance alarms from sunlight by actively cancelling the ambient light and only indicating a fault condition when the cancellation capacity is exceeded

An additional condensation heater prevents condensation forming on optical surfaces for areas with changing temperature and humidity

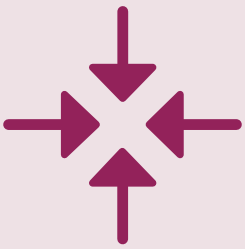
Considerable savings in installation and cost

**Why use Fireray?**

Beam smoke detectors are the wide area smoke detection technology of choice. With accurate coverage of up to 1800m², Fireray is also quick to install and easy to maintain, making it the perfect choice for a wide range of challenging applications, such as large atriums, public spaces and historic buildings.

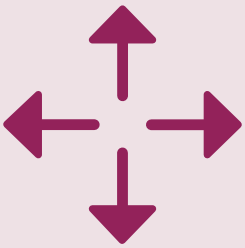
**How does Fireray work?**

A beam smoke detector works by sending an invisible infra-red (IR) beam of light across the area being protected that the receiver then measures. If smoke is present in the air, this obscures or blocks the light received by the receiver. When enough smoke is in the air, the IR light level will drop below a set level, which then triggers an alarm condition.



**Auto-alignment**
Ensures precise alignment of the detector and the reflector in the optical path

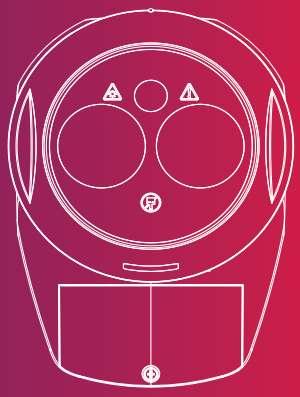
**Integrated visible laser**
Ease of installation when aligning beams from a distance



**Protects large spaces**
Excels at detecting smoke over large areas in wide indoor spaces

**Light cancellation technology™**
Minimises false alarms where reflective surfaces or direct sunlight are present

# The Fireray range

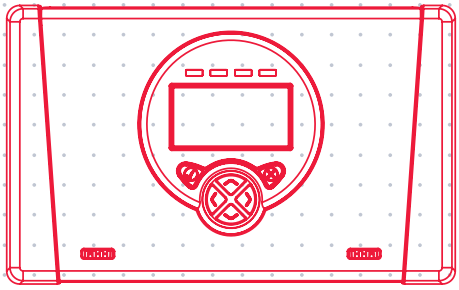


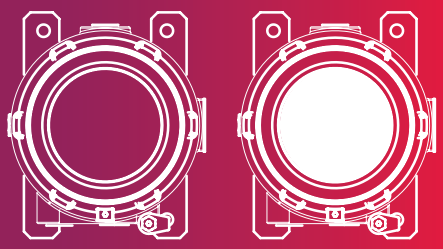
## Fireray One

The motorised beam detector that aligns itself

## Fireray Hub Reflective

FFE's latest optical beam smoke detector





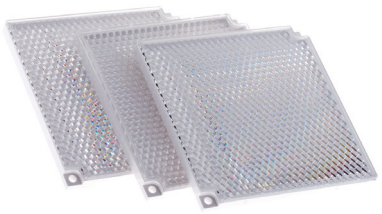
## Fireray 3000

End-to-end beam smoke detector with an explosion proof variant

# Specialist beam smoke detection

## Fireray One

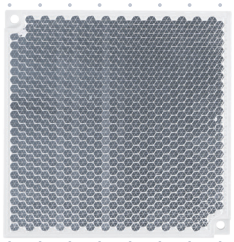
### EN: 6010-100; UL: 6010-300



With no specialist tools or knowledge needed for installation and operation, the Fireray One is a standalone beam detector that prioritises ease of installation. Incorporating auto-alignment at the flick of a switch, it aligns eight times faster than previous detectors and everything can be done by just one person, saving time and money on-site.

| Key features |
|---|
| **Light Cancellation Technology™** compensates for sunlight and artificial light sources helping to reduce false alarms |
| **Auto-Alignment™** Ability to self-align in just two minutes or less |
| **Building Movement Tracking™** continuously maintains alignment when buildings settle or flex due to temperature variations |
| Integrated user interface |
| Contamination compensation corrects gradual build-up of dust on optics |
| Easy to clean and maintain without affecting alignment |
| Low power consumption; can be powered from the loop |
| Prevent interference between beams with dynamic beam phasing; install beams facing each other or in irregular configurations |
| Operating range up to 50 m (164 ft) or 120 m (394 ft) with the Long Range Kit |

| Applications |
|---|
| Aircraft hangars |
| Chemical processing and storage facilities |
| Education and heritage buildings |
| Glass atria in hotels and retail complexes |
| Industrial units and warehousing |



# Fireray Hub Reflective

## EN: 6020-100

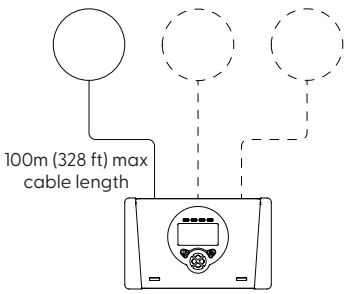
With built-in laser and auto-alignment, the Fireray Hub Reflective is easy to install and automatically compensates for environmental effects such as dust, sunlight and building movement to keep false alarms and faults to a minimum.
The system is fully customisable with both the alarm thresholds (sensitivity) and delay to alarm/fault being controlled from the ground level system controller.

| Key features |
|---|
| **Light Cancellation Technology™** compensates for sunlight and artificial light sources helping to reduce false alarms |
| **Auto-Alignment™** Ability to self-align in just two minutes or less |
| **Building Movement Tracking™** continuously maintains alignment when buildings settle or flex due to temperature variations |
| Low-level controller – easily control alignment, backlit for ease of use, even in dark areas |
| Read fire and fault errors (up to 128 per detector) with time and date stamps, from the ground |
| Wiring in Network and Parallel mode for flexible installation |
| Connect to up to three detector heads with independent fire and fault signals for each detector |
| Check system operation by initiating alarm tests using the low-level controller |
| Easily diagnose system faults using the event log with date and time stamp |

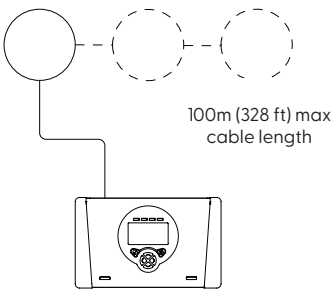
| Applications |
|---|
| Aircraft hangars |
| Education and heritage buildings |
| Glass atria in hotels and retail complexes |
| Industrial units and warehousing |
| Sports facilities |
| Storage facilities |

**Wiring configurations**
The Fireray Reflective Parallel and Network modes

**Parallel mode**




**Network mode**



# Specialist beam smoke detection

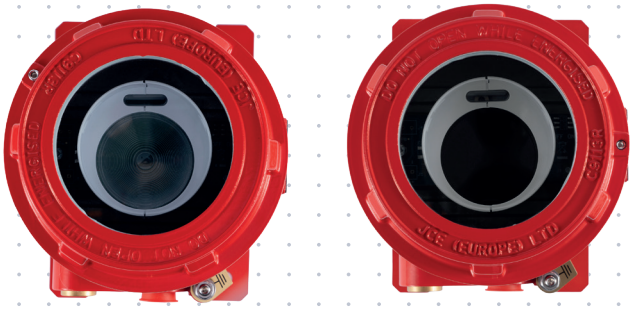
## Fireray 3000

### EN: 3000-101; UL: 3000-103

The Fireray 3000 is our solution to the most technically challenged installation enviroments. The system uses a paired set of transmitter/receiver heads to cover the protected area. The transmitter emits a narrow beam of infra-red (IR) light to monitor for smoke, controlled by a compact low level controller. Both detector heads have integral thumbwheels for ease of alignment by a single engineer.

| Key features |
|---|
| **Light Cancellation Technology™** compensates for sunlight and artificial light sources helping to reduce false alarms |
| Integral laser alignment in receiver |
| 2-wire interface between controller and receiver |
| Single and twin detector options |
| Separate fire and fault relays per detector |
| Low level controller with LCD display |
| Programmable sensitivity and fire threshold |
| Contamination compensation |
| First-fix design for transmitter, receiver and controller |
| Multiple cable gland knockouts for ease of wiring |
| Optional transmitter powering from controller |
| Range 5 m to 120 m (16½ ft to 393 ft), configurable per set of detectors |

| Applications |
|---|
| Aircraft hangars |
| Chemical processing and storage facilities |
| Education and heritage buildings |
| Glass atria in hotels and retail complexes |
| Industrial units and warehousing |



# Fireray 3000 Ex d
## EN: 3000-115

The Fireray 3000 Ex d is designed for large enclosures with potentially explosive atmospheres, such as oil rigs, refineries and ordnance stores. It provides an early warning of smouldering or strongly smoke-generative fires, which may not be picked up by flame detectors and comprises an infra-red transmitter and receiver, both of which are ATEX-certified for use in group 2 hazardous areas.

| Key features |
|---|
| **Light Cancellation Technology™** compensates for sunlight and artificial light sources helping to reduce false alarms |
| Integral laser alignment in receiver |
| 2-wire interface between controller and receiver |
| Allows for 2 detectors per system controller |
| Separate transmitter and receiver unit certified to Ex d |
| Remote/low level controller with LCD display (Safe Area) |
| Programmable sensitivity and fire/fault delay |
| Contamination compensation for dust and building movement |
| Multiple cable gland knockouts for ease of wiring |
| Transmitter can be powered from controller |
| Complies with ATEX and EN54:12 |
| Range 10 m to 80 m (33 ft to 262 ft), configurable per set of detectors |

| Applications |
|---|
| Aircraft hangars |
| Chemical processing and storage facilities |
| Dusty environments |
| Flour mills |
| Ordinance stores |
| Petrochemical installations |

# Fireray accessories

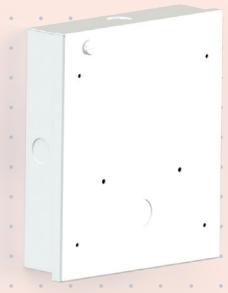
To complement your Fireray installation, we offer a comprehensive range of accessories and tools to protect and maintain your specialist application.

## All Fireray detectors

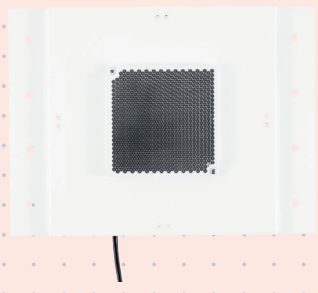
Fireray Reflective Detector Adjustment Bracket
PN: 1170-000

## Fireray One and Fireray Hub Reflective

Fireray One Protective Cage
PN: 1100-000



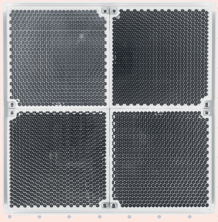
Fireray One Back Box
PN: 1260-000



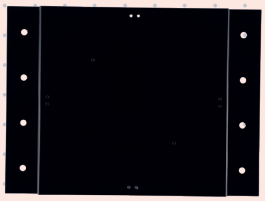
Fireray Prism Heater
PN: 1090-000

Fireray One Anti-Condensation Heater PN: 1060-000

## Reflector accessories



Fireray 4 Reflector Adjustment Bracket PN: 1050-000



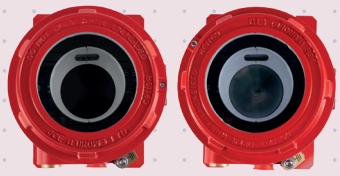
Fireray Reflector Wall Bracket PN: 1031-000

## Fireray 3000 and Fireray 3000 Ex d

Fireray 3000 Anti-Condensation Heater PN: 3000-204

Fireray 3000 Flush Mount Plate PN: 3000-202

Fireray Protective Wire Cage PN: 1000-019



Fireray 3000 Ex d Detector Pack PN: 3000-026

# Technical specifications

| | Fireray One |
|---|---|
| | [EN]: 6010-100 [UL]: 6010-300 |
| **MECHANICAL SPECIFICATION** | |
| Dimensions | Detector: 181(h) x 130(w) x 134(d) mm (7"(h) x 5"(w) x 5¼"(d))<br>Single Reflector: 100(h) x 100(w) x 9(d) mm (4"(h) x 4"(w) x ½"(d))<br>Four Reflectors: 200(h) x 200(w) x 9(d) mm (8"(h) x 8"(w) x ½"(d)) |
| Weight | Detector: 0.7 kg (1½ lb); Reflector: 0.1 kg (¼ lb) |
| Operation range | 5 m to 50 m (16½ ft to 164 ft) from Detector to Reflector (Prism)<br>50 m to 120 m (164 ft to 394 ft) with Reflective Long Range Kit |
| Beam path clearance | 1 m (3¼ ft) in diameter from centre line between Detector & Reflector (Prism) |
| Optical wavelength – smoke detection | 850 nm |
| Signal output | Individual alarm & fault relays (VFCO) 2 A @ 30 Vdc |
| Cable gauge and type | 2 core, dedicated, 0.5 to 1.6 mm ( $^{1}/_{100}$" to $^{6}/_{100}$") (24 to 14 AWG). System compatible with fireproof and non-fireproof cable meeting local installation standards |
| Cable entry | 3 knock-out locations capable of accepting M20, ½" or ¾" glands<br>4 drill-out locations capable of accepting glands up to 21 mm (¾") diameter |
| **ELECTRICAL SPECIFICATION** | |
| Operating voltage | 14 to 36 Vdc |
| Operating current all operational modes | 5 mA to 33 mA (constant) |
| Contact voltage – fire & fault relays (VFCO) | VFCO, 2 A at 30 Vdc resistive |
| Contact current – fire & fault relays (VFCO) | 10 mA at 20 mV (min) 1 A at 30 Vdc (max) |
| **PROGRAMMABLE USER SETTINGS** | |
| Alarm response threshold levels | 25% / 1.25 dB – Fastest response to smoke. 35% / 1.87 dB – Default value<br>55% / 3.46 dB – High immunity to false alarms, slow response to smoke<br>85% / 8.23 dB – Highest immunity to false alarms, slowest response to smoke<br>Configured via the integrated user interface |
| Delay to alarm/fault | 10 seconds for momentary partial obstruction of the beam path |
| **USER FEATURES** | |
| Alignment aid/tool | Laser |
| System status indication | LED: Green = normal condition; Red = alarm condition; Amber = fault condition |
| **ENVIRONMENTAL SPECIFICATIONS** | |
| Operating temperature | -20°C to +55°C (-4°F to +131°F) |
| Storage temperature | -40°C to +85°C (-40°F to +185°F) |
| Relative humidity (non-condensing) | 0 to 93% |
| IP rating | IP55 |
| Housing flammability rating | UL94 V0 |
| **OPTICAL SPECIFICATIONS** | |
| Faultlevel/rapidobscuration(Δ≤2seconds) | ≥85% |
| Maximum angular alignment range | ±4.5° – Detector (±70° with adjustment bracket accessory) |
| Maximum angular misalignment | ±0.5° – Detector |
| Maximum angular misalignment of Reflector (Prism) | ±5° |

## Ripon Cathedral

Fireray One beam smoke detectors were installed at Ripon Cathedral, UK, providing discreet high-level smoke detection. Their automated alignment and colour-matched covers ensure reliable fire protection without disrupting the historic architecture, safeguarding this Grade I listed building.

# Technical specifications

| | Fireray Hub Reflective |
|---|---|
| | [EN]: 6020-100 |
| **MECHANICAL SPECIFICATION** | |
| Dimensions | System Controller: 170(h) x 274(w) x 73(d) mm (6¾"(h) x 10¾"(w) x 2¾"(d)); Detector: 131(h) x 134(w) x 131(d) mm (5¼"(h) x 5¼"(w) x 5¼"(d)); Single reflector 100(h) x 100(w) x 9(d) mm (4"(h) x 4"(w) x ½"(d)); Four reflectors 200(h) x 200(w) x 9(d) mm (8"(h) x 8"(w) x ½"(d)) |
| Weight | Controller: 1.05 kg (2¼ lb); Detector: 0.57 kg (1¼ lb); Reflector: 0.06 kg (¼ lb) |
| Operation range | 0 to 50 m (0 ft to 164 ft)<br>0 to 120 m (0 ft to 394 ft) with Reflective Long Range Kit |
| Beam path clearance | 1 m (3¼ ft) diameter from centre line between Reflective Detector & Reflector |
| Optical wavelength – smoke detection | 850 nm near infrared (invisible) |
| Signal output | Individual Alarm & Fault relays (VFCO) 100 mA @ 36 Vdc for each detector |
| Cable gauge and type | 2 core, dedicated, 0.5 to 1.6 mm ( 1/100" to 6/100") (24 to 14 AWG). System compatible with fireproof and non-fireproof cable meeting local installation standards |
| Cable entry | 3 knockout locations for M20, ½" or ¾" glands<br>5 drill-out locations for glands up to 21 mm (¾") diameter |
| **ELECTRICAL SPECIFICATION** | |
| Operating voltage | 14 to 36 Vdc to the Fireray Reflective |
| Operating current all operational modes | 5 mA to 17.5 mA depending on number and type of detectors connected |
| Contact voltage – fire & fault relays (VFCO) | 36 Vdc |
| Contact current – fire & fault relays (VFCO) | 1 A |
| **PROGRAMMABLE USER SETTINGS** | |
| Alarm response threshold levels | 10 to 60% (0.45 to 3.98 dB) in 1% (0.05 dB) increments<br>Default 35% (1.87 dB) |
| Delay to alarm/fault | 2 to 30 seconds in 1 second increments for momentary partial obstruction of the beam path. Default 10 seconds |
| **USER FEATURES** | |
| Alignment aid/tool | Laser |
| System status indication | LED: Green = normal condition; Red = alarm condition; Amber = fault condition |
| **ENVIRONMENTAL SPECIFICATIONS** | |
| Operating temperature | -20°C to +55°C (-4°F to +131°F) |
| Storage temperature | -40°C to +85°C (-40°F to +185°F) |
| Relative humidity (non-condensing) | 0 to 93% |
| IP rating | The Fireray Reflective – IP65; Reflective Detector – IP55 |
| Housing flammability rating | UL94 V0 polycarbonate |
| **OPTICAL SPECIFICATIONS** | |
| Faultlevel/rapidobscuration(Δ≤2seconds) | >85% in <2 seconds |
| Maximum angular alignment range | ±4.5° – Detector (±70° with adjustment bracket accessory) |
| Maximum angular misalignment | ±0.5° – Detector |
| Maximum angular misalignment of Reflector (Prism) | ±0.5° |

# Technical specifications

| | Fireray 3000 |
|---|---|
| | [EN]: 3000-101 [UL]: 3000-103 |
| **MECHANICAL SPECIFICATION** | |
| Dimensions | System Controller: 124(h) x 203(w) x 71.5(d) mm (5"(h) x 8"(w) x 2¾"(d))<br>Transmitter & Receiver: 77(h) x 78(w) x 161(d) mm (3"(h) x 3"(w) x 6¼"(d)) |
| Weight | System Controller: 606 g (1¼ lb); Transmitter & Receiver: 207 g (½ lb) |
| Operation range | 5 - 120 m (16½ - 393 ft) from Transmitter & Receiver |
| Beam path clearance | 60 cm (2 ft) in diameter from centre line between Transmitter & Receiver |
| Optical wavelength – smoke detection | 850 nm |
| Signal output | Individual alarm & fault relays (VFCO) 2 A @ 30 Vdc |
| Cable gauge and type | 2 core, dedicated, 0.5 - 1.6 mm ( 1/100 - 6/100") (24 - 14 AWG) 100 m (328 ft) in length from System Controller to Detector |
| Cable entry | 10 x 20 mm(¾") cable gland knock-outs on System Controller |
| **ELECTRICAL SPECIFICATION** | |
| Operating voltage | 12 to 36 Vdc +/- 10% |
| Operating current all operational modes | 14 mA (constant) with 1 or 2 Receivers 8 mA per Transmitter |
| Contact voltage – fire & fault relays (VFCO) | VFCO, 2 A at 30 Vdc resistive |
| Contact current – fire & fault relays (VFCO) | 10 mA at 20 mV (min) 1 A at 30 Vdc (max) |
| **PROGRAMMABLE USER SETTINGS** | |
| Alarm response threshold levels | 1 min (min) 5 min (avg) 59 min (max) – Laser time-out<br>5% (min) 60% (avg) – Response sensitivity/threshold |
| Delay to alarm/fault | 10 seconds (default); 2 seconds (min); 30 seconds (max) |
| **USER FEATURES** | |
| Alignment aid/tool | Laser |
| System status indication | Red LED = fire (control unit); Amber LED = fault (control unit); Green LED = system OK (control unit) |
| **ENVIRONMENTAL SPECIFICATIONS** | |
| Operating temperature | UL -20°C to +55°C (-4°F to +131°F) EN54 -10°C to +55°C (+14°F to +131°F) |
| Storage temperature | -40°C to +85°C (-40°F to +185°F) |
| Relative humidity (non-condensing) | 0 to 93% |
| IP rating | IP54 (Controller) |
| Housing flammability rating | UL94 V2 PC |
| **OPTICAL SPECIFICATIONS** | |
| Faultlevel/rapidobscuration(Δ≤2seconds) | ≥85% |
| Maximum angular alignment range | ±10° – Receiver and Transmitter |
| Maximum angular misalignment | ±0.7° – Transmitter; ±2.5° – Receiver |

## Serpentine Sackler Gallery

Fireray 3000 beam smoke detectors were installed at the Serpentine Sackler Gallery in London, UK, protecting both the 19th-century brick structure and modern design. Their light cancellation technology ensures reliable performance under bright skylights, providing discreet, effective fire protection in this iconic space.

# Technical specifications

| | Fireray 3000 Ex d |
|---|---|
| | [ATEX]: 3000-115 |
| **MECHANICAL SPECIFICATION** | |
| Dimensions | System Controller: 124(h) x 203(w) x 71.5(d) mm (5"(h) x 8"(w) x 2¾"(d))<br>Transmitter & Receiver: 172(h) x 149(w) x 190(d) mm (6¾"(h) x 6"(w) x 7½"(d)) |
| Weight | System Controller: 606 g (1¼ lb); Transmitter & Receiver: 3.7 kg (8¼ lb) |
| Operation range | 10 - 80 m (33 - 262 ft) from Transmitter & Receiver |
| Beam path clearance | 60 cm (2 ft) in diameter from centre line between Transmitter & Receiver |
| Optical wavelength – smoke detection | 850 nm |
| Signal output | Individual alarm & fault relays (VFCO) 2 A @ 30 Vdc |
| Cable gauge and type | 2 core, dedicated, 0.5 - 1.6 mm (1/100 - 6/100") (24- 14 AWG) 100 m(328 ft) in length from System Controller to Detector |
| Cable entry | 10 x 20 mm (¾") cable gland knock-outs on System Controller |
| **ELECTRICAL SPECIFICATION** | |
| Operating voltage | 12 to 36 Vdc +/- 10% |
| Operating current all operational modes | 14 mA (constant) with 1 or 2 Receivers 8 mA per Transmitter |
| Contact voltage – fire & fault relays (VFCO) | VFCO, 2 A at 30 Vdc resistive |
| Contact current – fire & fault relays (VFCO) | 10 mA at 20 mV (min) 1 A at 30 Vdc (max) |
| **PROGRAMMABLE USER SETTINGS** | |
| Alarm response threshold levels | 1 min (min) 5 min (avg) 59 min (max) – Laser time-out<br>25% (min) 35% (avg) 60% (max) – Response sensitivity/threshold |
| Delay to alarm/fault | 10 seconds (default); 2 seconds (min); 30 seconds (max) |
| **USER FEATURES** | |
| Alignment aid/tool | Laser |
| System status indication | Red LED = fire (control unit); Amber LED = fault (control unit); Green LED = system OK (control unit) |
| **ENVIRONMENTAL SPECIFICATIONS** | |
| Operating temperature | -10°C to +55°C (+14°F to +131°F) |
| Storage temperature | -40°C to +85°C (-40°F to +185°F) |
| Relative humidity (non-condensing) | 0 to 93% |
| IP rating | IP54 (Controller); IP66 (Transmitter/Receiver) |
| Housing flammability rating | UL94 V2 PC |
| **OPTICAL SPECIFICATIONS** | |
| Faultlevel/rapidobscuration(Δ≤2seconds) | ≥85% |
| Maximum angular alignment range | ±10° – Receiver and Transmitter |
| Maximum angular misalignment | ±0.7° – Transmitter; ±2.5° – Receiver |

# Protecting lives around the world


**1**
**VELODROME, UK**
Derby Velodrome has been fitted with nine Fireray Beam Smoke Detectors as part of its fire protection system. They provide wide area detection and are used when it is impractical, inappropriate or not cost effective to use traditional point-type detectors. They are ideally suited to large arenas with high ceilings, such as the Derby Velodrome, as they enable coverage of a large area at minimal cost.

**2**
**WINDSOR CASTLE, UK**
The longest-occupied palace in Europe and one of the most visited tourist attractions in England is being protected by 18 of FFE's Fireray beam smoke detectors. They are installed throughout the palace, from banqueting rooms, atria and kitchens to hallways, stairwells and staff accommodation.


## Installations

- Barclays Center Arena, **USA**
- Van Andel Arena, **USA**
- Hyundai Corporate Offices, **USA**
- Detroit Wastewater Treatment Plant, **USA**
- Pathé Arena, **Netherlands**
- Wroclaw Airport, **Poland**
- Vienna City Hall, **Austria**
- Budapest Central Wastewater Treatment Plant, **Hungary**
- Parliament of Republic of Macedonia, **Macedonia**
- Socotab Tobacco Warehouse, **Bulgaria**
- Worcester Cathedral, **UK**
- Portsmouth Historic Dockyard, **UK**
- National Portrait Gallery, **UK**
- Blenheim Place, Oxfordshire, **UK**
- Doha International Airport, **Qatar**
- Dubai International Airport, **Dubai, UAE**
- WASSIT power station, **Iran**
- Shree Swaminarayan Temple, **Malaysia**
- Longtan Hydropower Station, **China**

**3**

### COPENHAGEN HOSPITAL, DENMARK

One of Copenhagen's leading hospitals has been fitted with four Fireray Beam Smoke Detectors as part of its fire protection system. Serving nearly half a million patients, the hospital has grown in size over the last few years. The detectors were selected as the ideal choice to protect the building in the most efficient way.

**4**

### ZOO NEGARA, MALAYSIA

Zoo Negara's panda enclosure in Kuala Lumpur has installed FFE's Fireray beam smoke detectors in the panda enclosure and viewing area. The detectors are designed to trigger a smoke spill fan in the event of a fire. Because of the atrium's high ceiling, conventional smoke detectors were not suitable for this installation – a sprinkler system was also not an option due to their slower response times. Beam detectors were therefore best for this installation due to their extremely fast response times.

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