



Optical Beam Smoke Detector

FIRERAY 2000



Overview

The Fireray 2000 is a projected beam smoke detector designed to detect smoke in a large volume. The system is comprised of three pieces, a transmitter head, a receiver head, and a control box. The transmitter projects a modulated infrared light beam to the receiver. At the receiver, the signal is sent to the controller, where it is analyzed. If there is smoke in the beam path, the receiver's signal is reduced by a level proportional to the density of the smoke. When the signal strength is reduced to a level between the obscuration threshold and 93% for more than 8 to 10 seconds, the fire alarm output relay is activated. The alarm obscuration threshold may be set at 25%, 35% or 50% obscuration, depending on the application. Reduction in signal strength below 93% is indicated as a fault condition.

The controller is designed to mount near ground level where it is convenient for maintenance. The controller is powered by the fire alarm control panel (FACP) and returns both alarm and trouble signals to the FACP via relay contacts. The controller features an automatic gain control that automatically compensates for component aging, and dirt on the optical surfaces. The optional installation aid is used to quickly align the beam and a test card is supplied with each controller to perform functional tests.

Standard Features

- Coverage up to 330 ft (100m) x 50 ft (15.24m) - 16,000 ft² (1,524 m²)
- Use with prism reflectors
- Supervised
- Automatic gain control
- Alarm and trouble contacts
- Controls located at convenient level
- Wide beam angle simplifies alignment and provides stability
- Low current consumption

Application

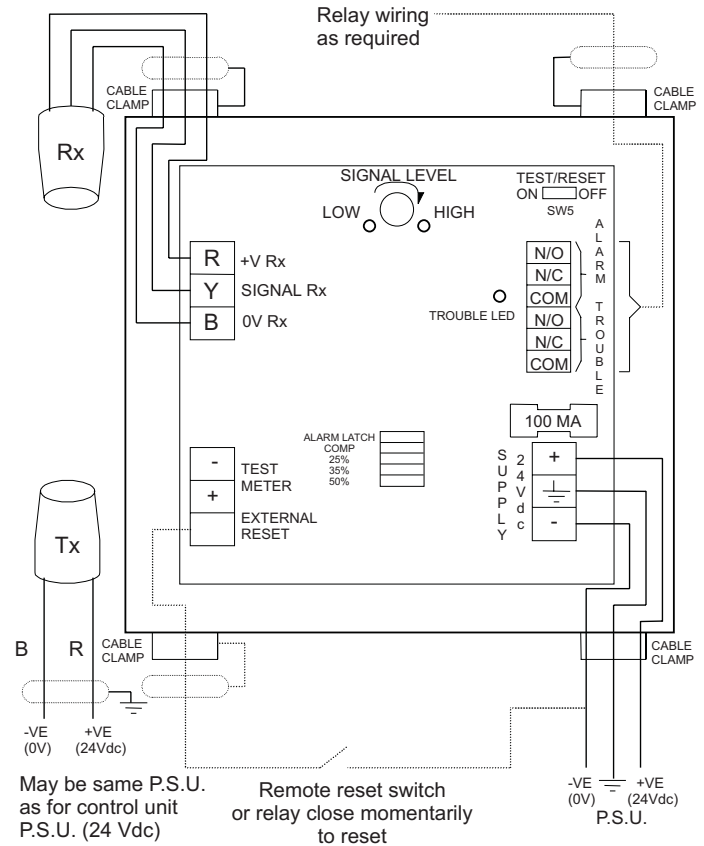
Projected beam smoke detectors are ideal for large volume applications such as atria, warehouses, factories, churches, power stations, and industrial plants. Detection time depends on a number of factors including the location of the detectors within the protected area, the volume of smoke produced by the fire, roof construction and the ventilation arrangements.

For flat ceiling applications, smoke typically makes its way into the detection beam from the point on the ceiling directly above the fire due to air currents and heat layering effects. At the maximum range of 330 ft (100m) the diameter of the beam is approximately 10 ft (3m). For reliable detection, the maximum distance either side of the beam axis has been determined to be 25 ft (7.6m). Using this spacing yields a maximum total coverage area of 16,500 square feet (1,524m²). Smoke layering is overcome by mounting detectors such that the beam is below the heat layer and projecting into the smoke layer. For flat ceiling applications the system is designed to be mounted approximately 19 inches (482mm) below and parallel to the roof or ceiling. Detection time is increased in buildings with peaked roofs should a fire occur at the fringes of the protected area. No more than approximately 10 ft (3m) of the beam path should be within 19 in (482mm) of any wall or partition and the centerline of the beam.

When access to the opposite wall is restricted or where wiring is difficult, the transmitter may be installed adjacent to the receiver. A prism is then mounted on a far wall and used to reflect the signal from the transmitter back to the receiver. When prisms are used, maximum beam length is reduced as shown in the specification table.

Typical Wiring

Shielded cable recommended for all wiring.
The control unit must be grounded to the power supply.
Terminate shields outside the control cabinet at the cable clamp. Do NOT let shields enter the cabinet.
Use metal junction boxes only, no plastic boxes permitted.



Specifications

Controller

Power Requirements		
Standby	8.5 mA	
Alarm	14.5 mA	
Output Relays		
Alarm	Form C rated 0.5 A @ 30 Vdc	
Trouble	Form C rated 0.5 A @ 30 Vdc	
LED Indicators		
	Alarm	Signal High Signal Low Fault
Reset		
	Configurable, manual or automatic	
Dimensions (HxWxD)		
	10.5 in (260 mm) x 8.5 in (210 mm) x 3.5 in (89 mm)	
Weight		
	5 lb (2.25 kg)	
Operating Environment		
Temperature	32 °F to 100 °F (0 °C to 38 °C)	
Humidity	93%RH, Non-condensing	

Detector Heads

Beam		
Width	25 ft (7.62 m) either side of transmitter centerline	
Length	33 ft (10 m) to 330 ft (100 m)	
Alarm Threshold		
	25%, 35%, or 50% obscuration	
Wiring Requirements		
Transmitter	2 conductor twisted-shielded, 18 AWG (0.75 mm ²)	
Receiver	3 conductor twisted-shielded, 18 AWG (0.75 mm ²), 330 ft (100 m) max.	
Power Requirements		
Transmitter	5 mA @ 24 Vdc	
Receiver	Nominal Supplied by controller	
Dimensions (HxWxD) with Bracket		
	3.75 in (95 mm) x 3.25 in (83 mm) x 4 in (101 mm)	
Weight with Bracket		
	14 oz (400 g)	
Environment		
Temperature	32 °F to 100 °F (0 °C to 38 °C)	
Humidity	93%RH, Non-condensing	
Beam Ranges using Prism(s)		
1 Prism	6.5 ft (1.98 m) to 82 ft (25 m)	
4 Prisms in a square	82 ft (25 m) to 115 ft (35 m)	
6 Prisms in a rectangle	115 ft (35 m) to 148 ft (45 m)	
Construction		
	Zinc Alloy housing finished in white enamel	
Prism Dimensions (HxWxD)		
	4 in (100 mm) x 4 in (100mm) x 5/16 in (9 mm)	

Ordering Information

Model	Description	Ship Wt., lb (kg)
22310-18-01	Beam Smoke Detector Controller with Heads	8.5 (3.9)
0201-01-A	Beam Alignment Aid	1 (.45)
23901-00	Prism - Beam Detector	0.3 (.14)



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