

MINERVA

FIRERAY 2000 Optical Beam Smoke Detector



Fire systems

Features

- Range 5 metres to 100 metres
- Area coverage up to 1400 m²
- Selectable sensitivity
- Self-check and automatic compensation
- Manual or automatic reset
- Optional MINERVA loop-powered interface module (LPBD520)
- Suitable for both conventional and addressable fire systems
- Fire / fault interface to MINERVA controller
- Low current consumption
- Flexible system design options
- Robust metal construction
- Designed to conform to BS5839 Part 5

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General Information

The FIRERAY 2000 is an active infra-red smoke detector. The system comprises of three base elements, i.e. a transmitter, receiver, and Control Unit. Analysis of the modulated infra-red beam by the Control Unit determines whether smoke is present, and if so generates an alarm signal.

The FIRERAY 2000 units can, optionally, be powered directly from a MINERVA loop using the LPBD520 Loop Powered Beam Detector Module. This can significantly reduce wiring costs.

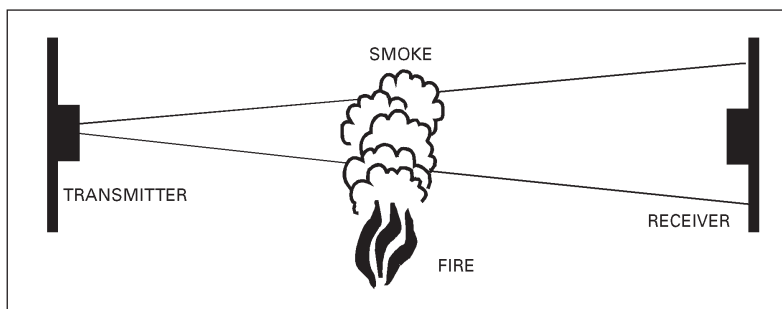
The FIRERAY 2000 system with its improved design, compact transmitter and receiver is ideal for use in aesthetically designed areas or where ornate and historic ceilings make the use of point-type detection impractical.

Application

The FIRERAY 2000 beam-type fire detector is specifically designed for use in large open-type interiors such as warehouses, manufacturing plants, aircraft hangars and workshops, where the installation and servicing of point-type detectors may be difficult or impractical. Other common areas where beam detectors are used include power stations, hotel lobbies and shopping malls.

The system can also be used to protect large areas such as art galleries, cathedrals and churches where, due to ornate and historic ceiling construction, it is not possible to install point-type detectors. It offers unobtrusive transmitter/receiver units with a separately boxed Control Unit, thereby not damaging the aesthetics of the building whilst providing an effective fire detection system.

The introduction of the Loop Powered Beam Detector module will also reduce the disruption and cost of having to install additional power supplies, or long cable runs between beam units.



Technical Information

Principle of Operation

The beam-type fire detector projects a modulated infra-red light beam from the transmitter to the receiver unit. The received signal is analysed and, in the event of smoke being present for a pre-determined period of time, the alarm condition is activated.

A single FIRERAY 2000 beam can cover a large, open area of up to 100m in length and up to 14m wide, giving an effective protection area of up to 1400sq m.

Smoke Detection

When smoke is present in the beam, the signal received is reduced to a level determined by the density of the smoke. In the event of the smoke reducing the signal strength between the specified alarm threshold and 93% obscuration for a period between 5-10 seconds, the fire alarm output is activated. Three alarm thresholds can be selected - 25% (1.25dB), 35% (1.87dB), or 50% (3.0 dB).

Auto Reset

Approximately 5 seconds after a fault condition is indicated, the receiver automatically resets if the fault is no longer present.

Automatic Gain Control (AGC)

Long term degradation of signal strength by component ageing or build-up of dirt on optical surfaces will not generate an alarm because of compensation provided by the AGC circuit. This operates by comparing the received signal against a standard at predetermined time intervals. Differences of more than 7% are corrected by the automatic selection of gain stages.

Fault Indication

In the event of a power failure at the transmitter, or if the signal is reduced by more than 93% for a period in excess of 5 seconds, then the fault alarm is activated. This condition inhibits the fire alarm until the signal is restored. The alignment/fault lamp on the receiver door flashes indicating the 'fault' condition.

Controller Interface

The FIRERAY 2000 beam units can be used with any of the ADT Fire & Security conventional or addressable fire controllers.

When using the detectors with the conventional controllers the FIRERAY 2000 must be supplied with a separate 24V dc power supply.

When using the FIRERAY 2000 system with a ADT Fire & Security addressable controller it is now possible to power both the analyser unit and the detectors from the MINERVA loop itself. This can be done using the Loop Powered Beam Detector module (LPBD520).

Loop Powered Beam Detector Module LPBD520

The LPBD520 can be configured in a number of different ways depending upon the application. These applications are described below and shown diagrammatically on the opposite page.

1. Single LPBD520

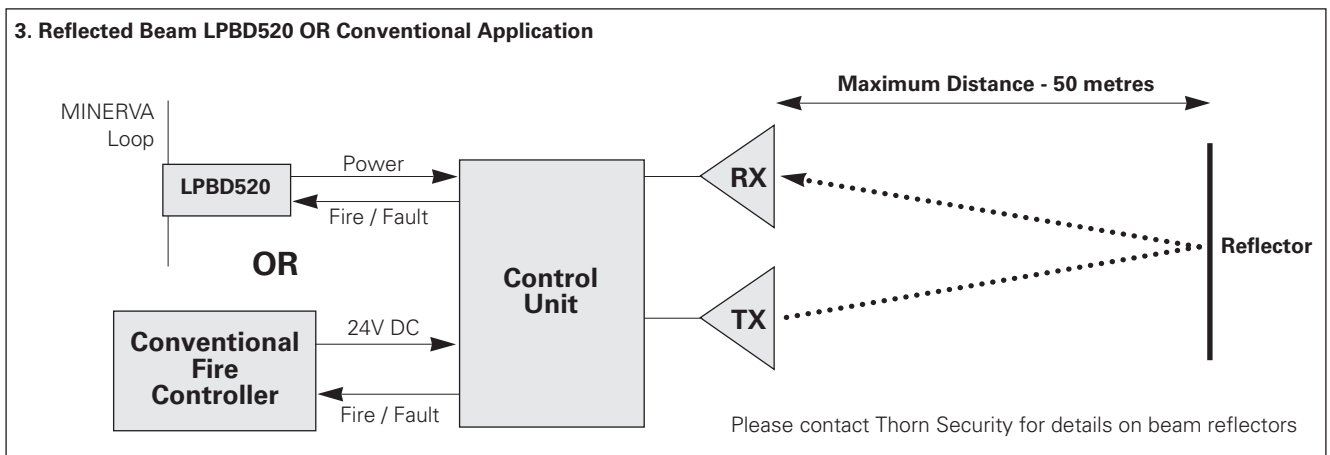
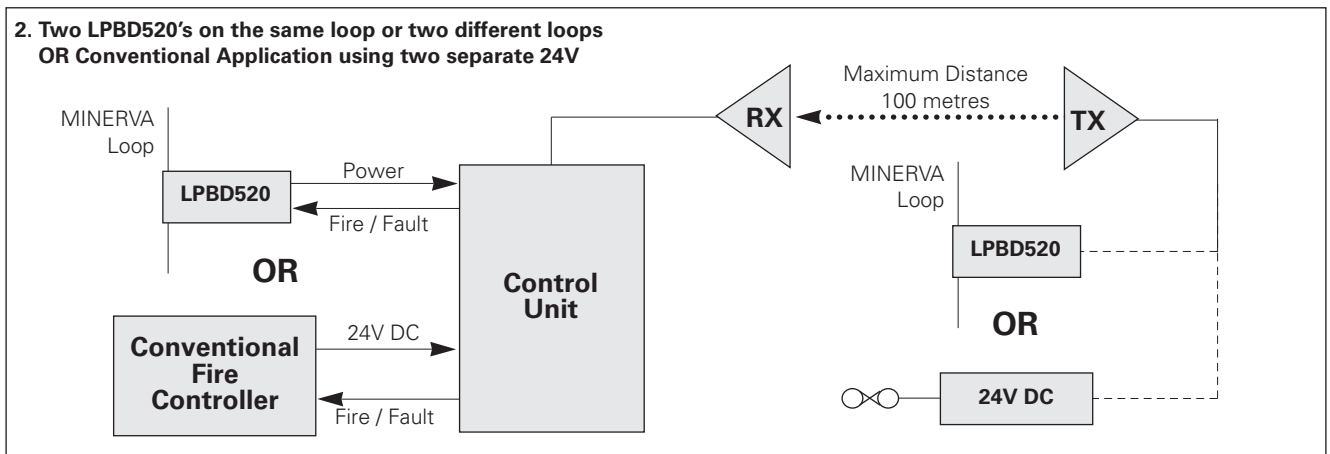
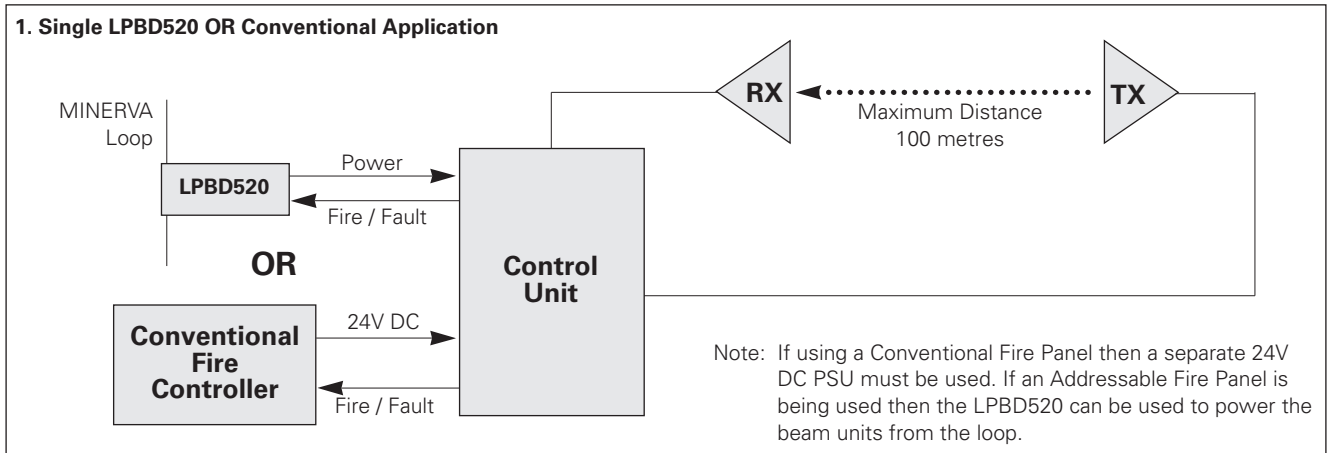
This configuration uses a single LPBD520 module to power the complete FIRERAY 2000 system, i.e. power is supplied to the transmitter, receiver, and Control Unit.

2. Two LPBD520's

This configuration uses two LPBD520 modules, one to power the FIRERAY 2000 receiver and Control Unit and the second to independently supply power to the transmitter unit. The LPBD520's can be situated on different parts of the same loop, or can be on completely different loops.

3. Single LPBD520 Reflected Beam

This configuration uses a single LPBD520 module to power the complete FIRERAY 2000 system. In this case both the transmitter and receiver units are situated close together and the signal from the transmitter is reflected back from the opposite site of the monitored area to the receiver.



Installation

Areas of Protection

It is possible for the beam to pass through holes in walls but the holes must be at least 20cms or the diameter of the beam at the point along the beam path. The structure on which the receiver and transmitter are mounted must be rigid. The system is well suited to protect areas where there are long spans with high ceilings i.e. warehouses, factories, workshops, or cable tunnels where access is only possible to either end.

1 Beams Installed in the Apex of a Pitched or North Light Roof

Where Beam-type detectors are installed in the apex of a pitched or north light roof, the width of the area protected by the beam can be increased.

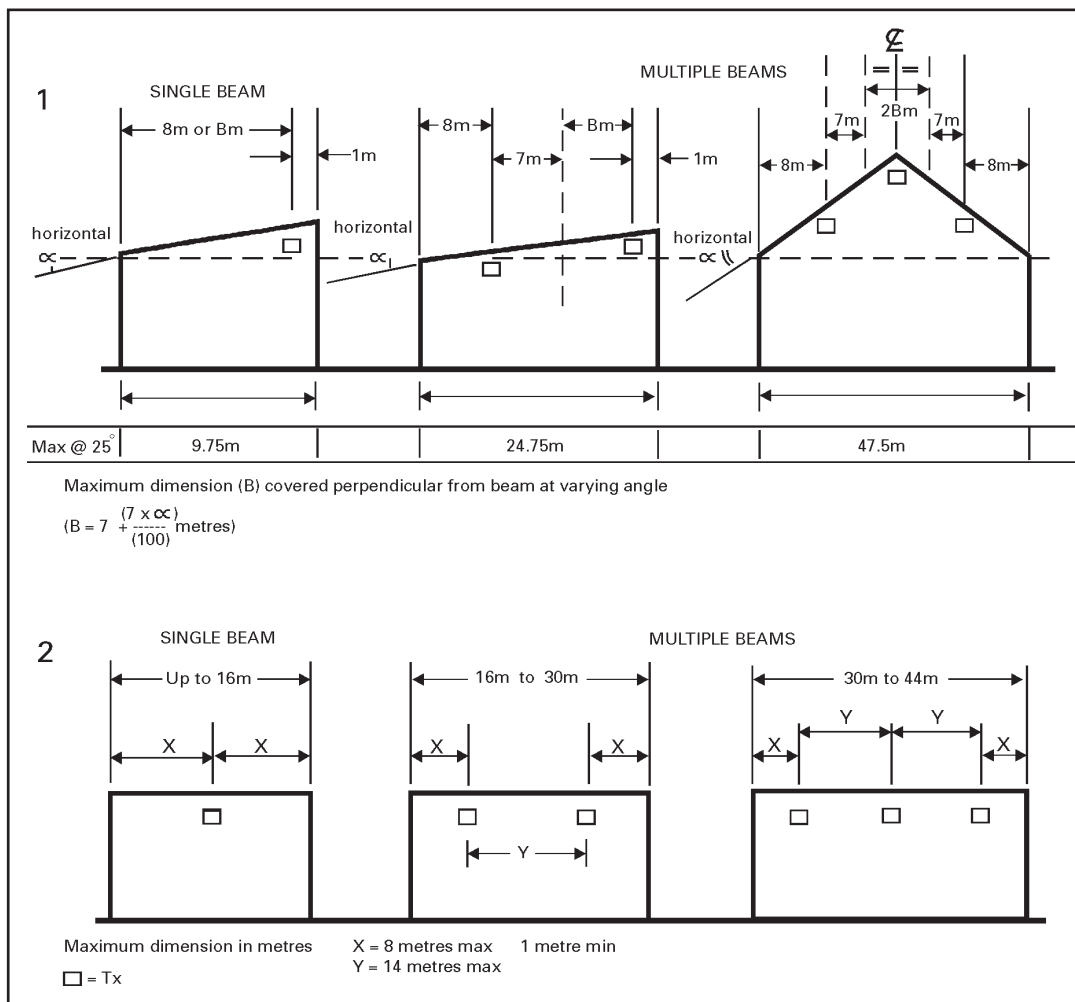
The beam width in flat areas is 14 metres and this dimension can be increased by 1% for each degree of slope up to a maximum increase of 25% at 25 degrees increased slope from the horizontal.

N.B. The relaxation only applies to the beam mounted in the apex.

2. Beams Installed Under a Flat Roof

For areas under a flat horizontal ceiling (less than 3.5 deg. from the horizontal) the maximum distance from any adjacent parallel wall or partition must not exceed 8 metres when measured perpendicular to the beam on the plan view.

In open areas, the maximum permitted distance between parallel adjacent beam smoke detectors is 14 metres when measured perpendicular to the beam on the plan view.



Technical Information

Mechanical

	Dimensions (mm)			Weight (Kg)
	Height	Width	Depth	
Transmitter / Receiver	95	75	115	0.4
Control Unit	260	210	80	2.25
LPBD520	87	148	14	0.1

Electrical

Voltage range -	FIRERAY 2000	+11.5 to + 28V dc
	LPBD520	28 V Loop Power
FIRERAY 2000 Quiescent Current		< 13 mA
FIRERAY 2000 Alarm Current		< 20 mA

Environmental

Operating Temp Range - FIRERAY	-10°C to +55°C
LPBD520	-20°C to +70°C
Humidity	up to 95% RH
(FIRERAY 2000 & LPBD520)	(Non-Condensing)
FIRERAY 2000 Enclosure	IP54

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