Beam Detection Systems
Application Guide

Advanced ideas. Advanced Solutions

SYSTEM SENSOR®

CONTENTS

Note: This document is based on the recommendations of BS5839 Part 1: 2002. It is intended only as a guide to the application of fire detection systems.

Reference must be made to relevant national and local standards and manufacturer's recommendations.

FOREWORD

The purpose of this guide is to provide information on the proper utilization of beam smoke detectors in life-safety and property protection applications. This guide briefly summarizes the principles of operation of projected beam smoke detectors, their design requirements, and practical applications for their use as a component of an automatic fire alarm system.

Beam smoke detectors can be important components of a well-designed automatic fire alarm system. Their unique capabilities enable beam smoke detectors to overcome many of the problems and limitations of point detectors in some applications. This guide was developed to help the fire alarm system designer gain an understanding of the beam smoke detector's capabilities and limitations, and how they differ from point detectors.

Please note that this document is intended only as a general guide to the application of beam detectors. Reference should always be made to the detector manufacturer's installation requirements and instructions, and to local standards, for example in the UK BS5839 part 1.

1. GLOSSARY OF TERMS

ANNUNCIATOR

A device, which gives a visible or audible indication of the condition or status of a detector or module, Usually Normal (Standby), Fault, or Fire Alarm.

DRIFT COMPENSATION

Compensation made by a detector for signal degradation due to a build up of dust and dirt over time. Rate of compensation is limited to ensure that the detector is still sensitive to slow, smouldering fires.

BEAM SMOKE DETECTOR (PROJECTED BEAM SMOKE DETECTOR)

A fire detector, which uses a beam of light (usually invisible) projected across an area to monitor for smoke emitted by an incipient fire.

There are two basic types of beam detector:

- End to End: Transmitter and receiver are mounted at either end of the protected area.
- Reflective: Transmitter and receiver are mounted in the same housing, and the beam is directed at a specially designed reflector, mounted at the opposite end of the protected area.

BEAM RANGE

The beam range is the total distance between the beam transmitter and receiver for end-to-end type detectors, and transmitter / receiver to reflector for reflective type detectors.

DETECTOR COVERAGE

Detector coverage is the area in which a fire detector is considered to effectively sense an incipient fire. This area is defined by local and national codes.

OBSCURATION

Obscuration is the amount by which a beam of light is reduced by the presence of particles in the beam path, normally expressed as a percentage or as dB attenuation.

RECEIVER

The device, in a projected beam smoke detector system, which monitors the signal level of the light received after it has passed through the protected area.

SENSITIVITY

The ability of a smoke detector to respond to a given level of smoke.

POINT DETECTOR

A device, which senses an incipient fire at a single location, most commonly using optical or ionisation smoke detection or heat detection. The area of coverage of a point detector is defined in local or national standards.

STRATIFICATION

The effect which occurs when smoke, which is hotter than the surrounding air, rises until equal to the temperature of the surrounding air, causing the smoke to stop rising.

TRANSMITTER (PROJECTOR)

The transmitter, or projector is the section of a Projected Beam Smoke Detector that emits the light beam.

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2. PRINCIPLES OF OPERATION

There are two basic types of projected light beam detectors, both of which operate on the principle of light obscuration: a light beam is projected across the area to be protected, and is monitored for obscuration due to smoke (See figure 1). There are two basic types:

An End-to-End type detector has separate transmitter and receiver units, mounted at either end of the area to be protected. A beam of infrared light is projected from the transmitter towards the receiver, and the signal strength received is monitored.

End-to End type detectors require power to be supplied both to the transmitter and the receiver ends of the detector. This leads to longer wiring runs, and thus greater installation costs than the reflective type device.

Reflective or Single-Ended type detectors have all the electronics, including the transmitter and receiver mounted in the same housing. The beam is transmitted towards a specially designed reflector mounted at the far end of the area to be protected, and the receiver monitors the attenuation of the returned signal.

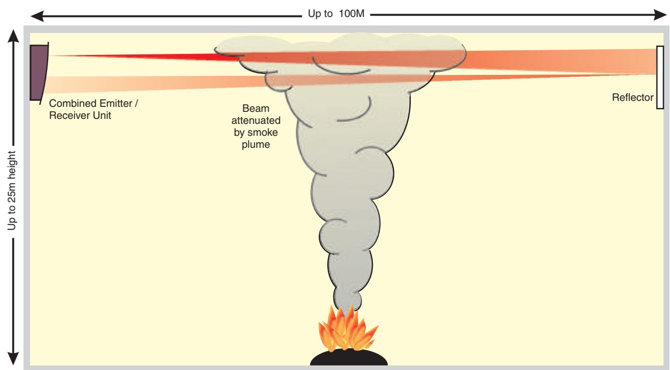

Figure 1: Operation of Reflective Type Optical Beam Smoke Detector

The detector is typically calibrated to a number of preset sensitivity levels based on the attenuation of the beam seen by the receiver. The sensitivity setting is selected based on the beam range and site environment.

Unlike point type optical smoke detectors, the response of beam smoke detectors is generally less sensitive to the type and colour of smoke. Therefore, a beam smoke detector may be well suited to applications unsuitable for point optical smoke detectors, such as applications where the anticipated fire would produce black smoke. Beam smoke detectors do however require visible smoke and therefore may not be as sensitive as ion detectors in some applications.

Since the sudden and total obscuration of the light beam is not a typical smoke signature, the detector will normally see this as a fault condition, rather than an alarm. This minimizes the possibility of an unwanted alarm due to the blockage of the beam by a solid object, such as a sign or ladder, being inadvertently placed in the beam path. This “beam blocked” fault threshold will typically be set by the manufacturer at a sensitivity level exceeding 7 to 10dB.

Very small, slow changes in the quality of the light source also are not typical of a smoke signature. These changes may occur because of environmental conditions such as dust and dirt accumulation on the transmitter and / or receiver’s optical assemblies. These changes are typically compensated for by automatic drift compensation. When the detector is first turned on and put through its setup program, it assumes the light signal level at that time as a reference point for a normal condition. As the quality of the light signal degrades over time, due to dust build up, the detector will compensate for this change. The rate of compensation is limited to insure that the detector will still be sensitive to slow or smouldering fires. When the detector can no longer compensate for the loss of signal (as with an excessive accumulation of dirt) the detector will signal a trouble condition.

ACCESSORIES

Accessories to the beam smoke detector may include remote annunciators, remote test stations which allow for the periodic electronic testing of the detector, and filters used as a “go / no go” test of the detector’s proper calibration. Intelligent fire alarm systems can give the beam smoke detector a discrete address to provide better indication of the fire location. Conventional systems may also indicate alarms and faults through the use of relays.

PROPER APPLICATION

Like point smoke detectors, beam smoke detectors are inappropriate for outdoor applications. Environmental conditions such as temperature extremes, rain, snow, sleet, fog, and dew can interfere with the proper operation of the detector and cause nuisance alarms. In addition, outdoor conditions make smoke behaviour impossible to predict and thus will affect the detector’s response to a fire.

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3. COMPARISONS BETWEEN BEAM DETECTORS AND POINT DETECTORS

It is important that the fire system designer understands and gives full consideration to the differences in the principles of operation of point and beam smoke detectors.

COVERAGE

According to BS5839 part 1, a point smoke detector has a maximum radius of coverage of 7.5m. For a simple spacing plan as demonstrated in figure 2a, this translates to a maximum distance between detectors of 10.5m. Careful manipulation of the detector layout, as in figure 2b can reduce the number of point detectors required to cover a given area, however to cover large areas, many point detectors will be required.

For beam Smoke detectors, BS5839 part 1 allows a maximum range of 100m, and coverage of 7.5m either side of the beam, thus giving theoretical area coverage of 1500m² (Figure 2c), an area which normally would require sixteen or more point smoke detectors to cover as in Figure 2b. Reducing the number of devices used will lower installation and maintenance costs. Manufacturer's recommendations and other factors, such as room geometry, may impose practical reductions of this maximum coverage; however even with these reductions beam smoke detectors can cover an area that would require a dozen or more point detectors.

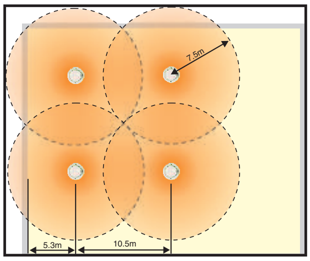

Figure 2a: Maximum Area Coverage for Point Detectors

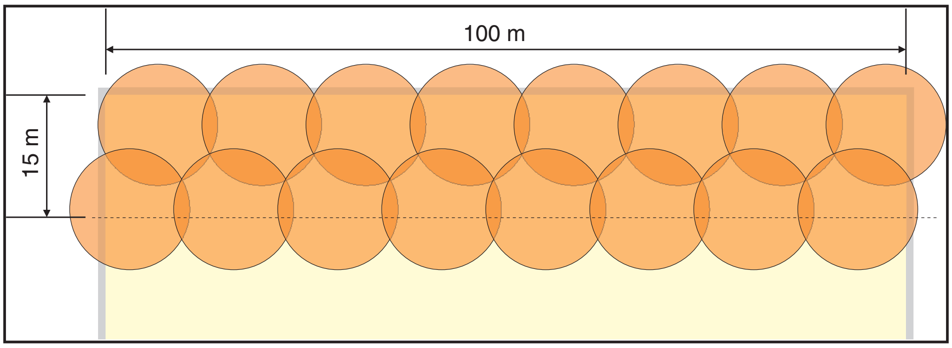

Figure 2b: Point detector coverage over beam detector maximum area.

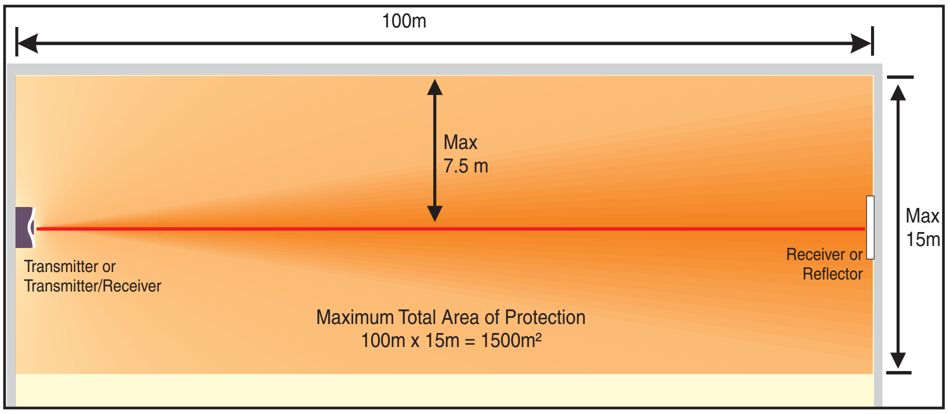

Figure 2c: Maximum Area Coverage for Beam Detectors

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CEILING HEIGHT

As a smoke plume rises, it spreads and becomes diluted. As a result of this drop in density, point detectors tend to become less sensitive the higher they are mounted.
BS5839 part 1 thus limits the mounting height of point detectors for life protection to 10.5m, or 15m for property protection.

This is not necessarily the case with beam smoke detectors since they can sample across the entire smoke plume, and are thus ideally suited for high ceiling applications. This is reflected in BS5839 part 1 which permits the use of beam detectors up to heights of 25m for life protection (type L), and 40m for property protection (type P).

While not all fires start at the lower elevations of the hazard, at or near the floor level, this is a typical fire scenario. When this is the case the smoke produced by the fire will rise to, or near the ceiling. Typically the column of smoke begins to spread out as it travels from its point of origin, forming a smoke field in the shape of an inverted cone (See figure 1). The density of the smoke field can be affected by the rate of growth of the fire. Fast fires tend to produce more uniform density throughout the smoke field than slow burning fires where there may be dilution at the upper elevations of the smoke field.

In some applications, especially where high ceilings are present, beam smoke detectors may be more responsive to slow or smouldering fires than point detectors because they are looking across the entire smoke field intersecting the beam. Point detectors can only sample smoke at their particular "spot". The smoke that enters the chamber may be diluted below the alarm threshold (level of smoke needed for an alarm).

The major limitation of the projected beam smoke detector is that it is a line-of-sight device and is therefore subject to interference from any object or person, which might enter the beam path. This makes its use impractical in most occupied areas with normal ceiling heights.

However, many facilities have areas where beam smoke detectors are not only acceptable, but are the detector of choice. High ceiling areas such as atriums, lobbies, gymnasiums, sports arenas, museums, church sanctuaries, as well as factories and warehouses might be candidates for beam smoke detectors. Many of these applications present special problems for the installation of point detectors, and even greater problems for their proper maintenance. The use of beam smoke detectors in many of these areas may reduce these problems since fewer devices may be required, and the devices can be mounted on walls, which are more accessible than ceilings.

HIGH AIR VELOCITY

High air movement areas present a special problem for detecting smoke for both point and beam smoke detectors because the propagation of smoke developing under normal conditions may not occur. High air velocity may blow smoke out of the sensing chamber of a point detector. Careful consideration should be given to the point detector's performance where air velocities exceed 1.5 metres per second, or when air changes in the protected area exceed 7.5 changes per hour.

Beam smoke detectors are not tested for listing purposes for stability in high airflow because high air movement does not have as great an effect on their detection capabilities.
A beam smoke detector's sensing range can be as long as 100m, rather than the 50mm dimension of a point detector's sensing chamber. It is therefore less likely that smoke will be blown out of the beam smoke detector's sensing range.
Although reduced spacing is not required in high airflow areas, attention should be given to the anticipated behaviour of smoke in these applications.

STRATIFICATION

Stratification occurs when the air within a room forms into layers at different temperatures; for example, the area just beneath an atria roof may be heated by sunlight, and create a layer of hot air above the main volume of the room. Smoke is heated by the fire, and rises through cooler lower layers until it reaches the warmer layer, will not rise any further and will spread along the hot / cold boundary, rather than the ceiling, possibly never reaching detectors mounted on or near the ceiling (See figure 3). Normally on smooth ceilings, beam smoke detectors should be mounted between 300 and 600 millimetres from the ceiling. However, the final location and sensitivity of the detectors should be subject to an engineering evaluation which is beyond the scope of this guide, but which will typically include structural features, the size and shape of the room and bays, occupancy and uses of the area, ceiling height, ceiling shape, surface and obstructions, ventilation, ambient environment, burning characteristics of the combustible materials present, and the configuration of the contents in the area to be protected.

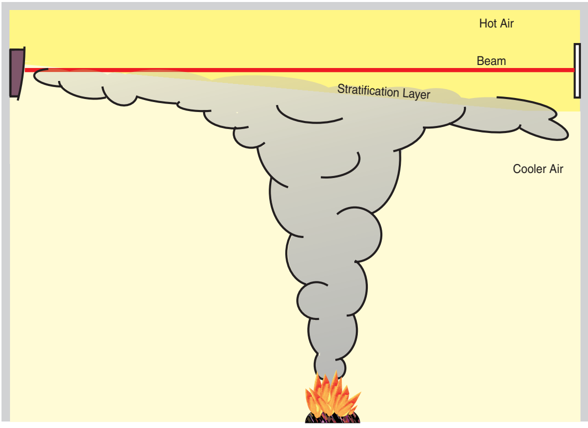

Figure 3: Effect of Stratification

HOSTILE ENVIRONMENTS

One of the major limitations of point smoke detectors is their inability to survive in hostile environments, such as temperature extremes, dirt, humidity, and corrosive gases. Beam smoke detectors may also be subject to some of these debilitating elements. While it is generally not recommended, a beam smoke detector can, in some applications and with certain restrictions, be placed behind clear glass windows outside the hazard, in order to overcome these effects. This feature may also allow them to be used in applications where explosion protection is required.

Barns and stables housing animals or equipment are good examples where early warning is required but where point smoke detectors are unsuitable because of temperature

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extremes and dusty, dirty conditions. Beam smoke detectors may be a good alternative because their optics can be kept behind windows that are easily cleaned on a regular basis. They may also have a much wider operating temperature range than point smoke detectors.

However restrictions do apply to the use of beam detectors operating through windows: the glass must be kept clean and free of obstructions, and in the case of reflective type detectors, the beam must be placed at an angle to the window to prevent reflections from the glass causing incorrect signals to be returned to the receiver (See figure 4). Consideration also needs to be made to the reduction in signal due to losses as the beam passes through the window. It may be necessary to reduce the maximum allowable beam length by up to 20% for a reflective type beam detector.

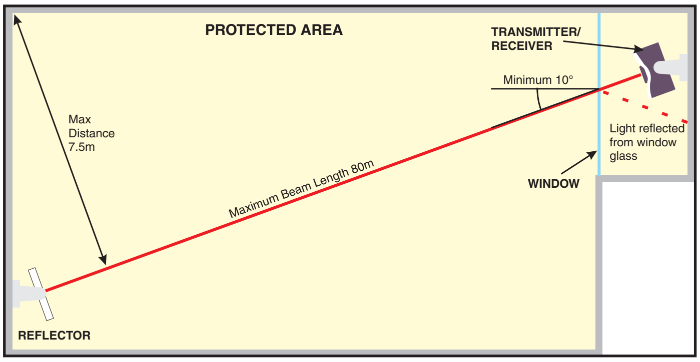

Figure 4: Reflective Beam Detector Operating though a Window.

4. DESIGN REQUIREMENTS

Many factors affect the performance of smoke detectors of all types. The type and amount of combustibles, the rate of fire growth, the proximity of the detector to the fire, and ventilation factors are all-important considerations.

European approved beam smoke detectors are tested to EN54-12: 2002 Fire Detection and Fire Alarm Systems - Smoke Detectors - Line Detectors using an optical light beam. They should be installed and maintained in accordance with the manufacturers requirements, and with local and national standards - in the UK BS5839 part 1: 2002.

SENSITIVITY

The detector's sensitivity should be set with reference to the length of the beam used on a given application, combined with the environmental conditions at that location.

LOCATION AND SPACING

Reference should be made to national or local codes or recommendations for the location and siting of detectors. The following recommendations are based on BS5839 part 1: 2002

On a flat, unobstructed ceiling, the maximum distance covered by a beam detector should be 100m, or as per the manufacturers recommendations if they are less. No point in the protected area should be more than 7.5m from the centre line of the detector beam. This gives a maximum spacing between two beam detectors of 15m, and a maximum distance from a wall to a beam detector of 7.5m (See figure 2c above).

Due to the large area it is possible to protect using a single beam detector, care needs to be taken that search distance requirements are not exceeded. BS5839 part 1 recommends that the maximum distance travelled to visually locate a fire within a fire zone should be 60m. Where a beam detector is used to protect for example a large warehouse with racking and partitioning, it would be easy to exceed this requirement.

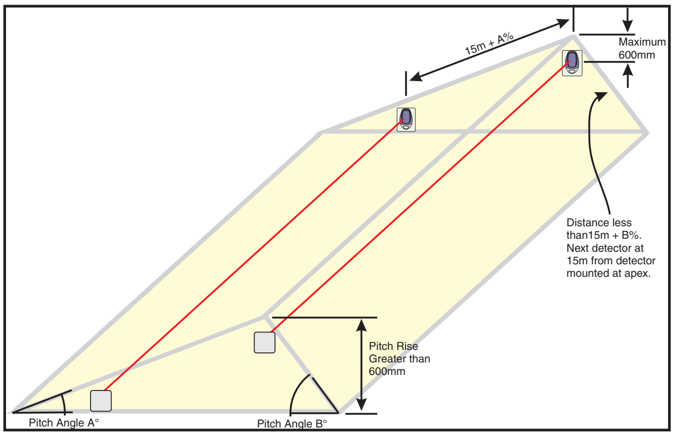

Figure 5: Beam Detector Mounting in Pitched Roofs.

PITCHED ROOFS

When a roof is pitched, smoke tends to roll quickly up the slope of the roof, and collect into the apex. Therefore, if a detector is to be mounted on a pitched ceiling, having a rise height of greater than 600mm, a detector should be mounted at or within 600mm of the apex of the roof (Figure 5). Where the sloped area of the roof is long enough, the distance from the detector at the apex of the roof to the next may be increased from 7.5m at a rate of 1% per degree of slope, up to a maximum of 25%. If the rise is less than 600mm the slope should be ignored and the roof treated as flat. Note that this increased coverage applies only to detectors fitted at the apex of the roof; standard spacing applies to all other detectors.

OBSTRUCTIONS

Obstructions on or near the ceiling or on the walls of a protected area will affect smoke distribution, and thus need to be taken into consideration during the fire protection system design.

Ceiling obstructions such as joists greater than 10% of the total room height should be treated as a wall, and thus the areas on either side should be treated as separate rooms. Similarly, if partitioning or racking is closer than 300mm to the ceiling they offer a significant obstruction to the distributions of smoke and should be treated as walls.

Where a beam detector is used to protect a room having a number of joists or structural beams, generally, the detector beam should be run parallel with the joists. Depending on the depth of the joists, the area that the detector can protect either side of its beam may be affected, and careful reference to local codes and practices should be made.

BS5839 part 1 states than any part of the optical beam closer than 500mm to such an obstruction should be discounted from providing detection. Normally therefore, beam detectors should not be mounted such that their optical beam runs any closer than 500mm to any wall or obstruction such as ducting or structural beam. Note that some types of beam detector use a wide beam, and these may require a greater spacing than 500mm from any obstructions, therefore reference should always be made to the manufacturers recommendations. Obstructions will inhibit the free flow of smoke within a room and thus affect the detectors ability to detect an incipient fire. When a reflective type beam detector is used and an obstruction is reflective, then spurious signals may be reflected back from the obstruction to the receiver and distort the detector's response. This can lead to nuisance alarms or to the detector failing to detect an incipient fire. In order to prevent any problems, all reflective surfaces should be a minimum distance (e.g. for System Sensor's 6500 detectors 380mm) from the centre line of the detector beam. It should be noted that sInce many beam detectors use Infra-Red rather than visible light it is often very difficult to determine if a surface is reflective to the beam. It is therefore good practive to ensure that the spacing from the beam centre line is applied to all objects.

BEAM BLOCKAGE

Optical beam detectors are line of sight devices, and rely on a clear path between the transmitter and receiver or reflector. If the beam is blocked, then the detector cannot detect a fire. Care must therefore be taken that the beam is not mounted where it could become blocked during normal operation. If people are likely to be present in the protected area, then the detector should be mounted a minimum of 2.7m above floor level. Other possible causes of beam blockage including forklift operation for example should also be considered.

SUPPLEMENTARY DETECTION

In areas with relatively high ceilings, for example an atrium, supplementary beam detectors can be used to provide earlier warning of a fire, or to help guard against the effects of stratification. However since they are not subject to the spreading effect of a ceiling on a plume of smoke, the beam spacing should be reduced. BS5839 part 1 recommends that supplementary beam detector cover should be 12.5% of the height of the beam above the highest likely seat of a fire to either side of the detector beam.

BUILDING MOVEMENTS

One of the major considerations when siting beam detectors is the effect of the movement of the building as it is subjected to various environmental forces. Wind, snow, rain and temperature can all cause a building to flex; for example a 60km/h wind acting on a 100m² wall can reach an equivalent pressure of 4 tonnes. Over longer ranges, even slight deformations of the mounting structure can cause the beam to move considerably from its target - over a 100m range, a movement of 0.5° at the transmitter will cause the centre point of the beam to move nearly 900mm (See figure 6).

In order to minimise possible false alarms or fault signals caused by building movement, the beam detector must be mounted on solid parts of the building such as the main support pillars. They should never be mounted on easily deformed sections such as metallic cladding. If it is not possible to mount both components of the detector onto solid construction, then the transmitter should be fixed to the more solid surface, since movement will affect the receiver or reflector less than the transmitter.

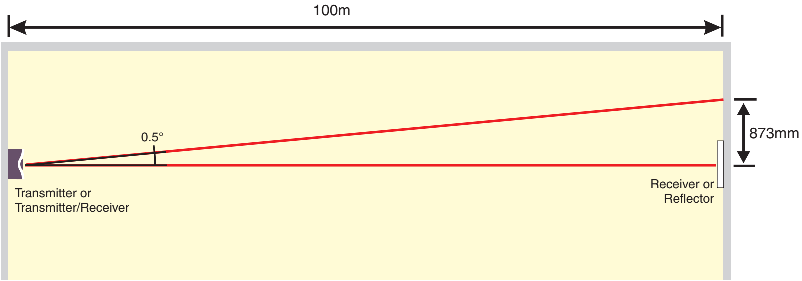

Figure 6: Effect of Detector Movement

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5. TESTING AND MAINTENANCE

MAINTENANCE

As dust builds upon a beam detector's optical components, its sensitivity will increase leading to an increased susceptibility to nuisance alarms. Most modern beam detectors such as the System Sensor 6500 range include algorithms to compensate for this gradual build up of dirt and reduce maintenance whilst retaining constant sensitivity, however, the detector lenses and reflector will still need periodically to be cleaned. The maintenance interval will be dependant on site conditions: obviously enough, the dirtier the site the more frequent cleaning will be required.

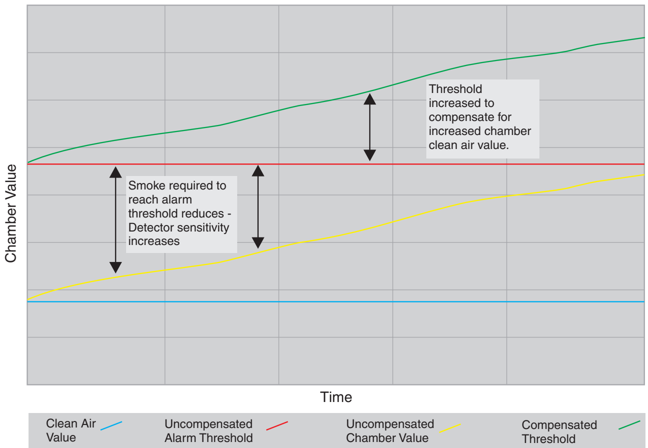

Figure 7: Dust Build up and Drift Compensation

Manufacturer's instructions should be referred to for cleaning procedures, however a fairly typical maintenance method is to clean the detector lenses and reflector with a damp soft cloth and a mild soap. Solvents should not normally be used.

Note: Before carrying out any maintenance on the detector, notify the relevant authorities that the fire detection system is undergoing maintenance, and that the system is therefore temporarily out of service. Disable the relevant zone to prevent unwanted alarms.

FUNCTIONAL TESTING

Following installation, or any routine maintenance work, beam detectors should undergo functional testing.

The normal means of testing a beam detector is to place a filter in the path of the beam to reduce the amount of received light below the detector threshold and thus produce an alarm.

With the System Sensor 6500 and 6500R beam detector, a graduated scale is marked on the reflector. To test the sensitivity, a suitable piece of opaque material is used to block off a section the reflector corresponding to the sensitivity, checking that the detector reacts as expected.

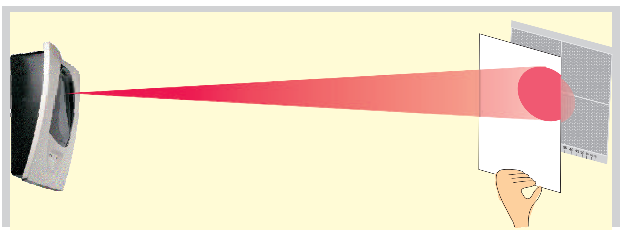

Figure 8: Beam Detector Functional Testing

By their nature, most beam detectors are mounted in high inaccessible areas, often requiring the use of a cherry picker or similar machinery to reach them. It can therefore be an expensive and time consuming procedure to test them.

The System Sensor 6500S and 6500RS beam detectors have overcome this problem by incorporating a unique automatic test feature. On command from a remote station, a servo controlled calibrated filter is moved in front of the receiver, simulating the effect of smoke on the beam. If the correct signal reduction in the returned light is detected then the detector will enter the alarm condition, otherwise a fault is returned. The Asuretest function meets the periodic maintenance and testing requirements of most local standards, testing both the electronics and optics of the unit installation.

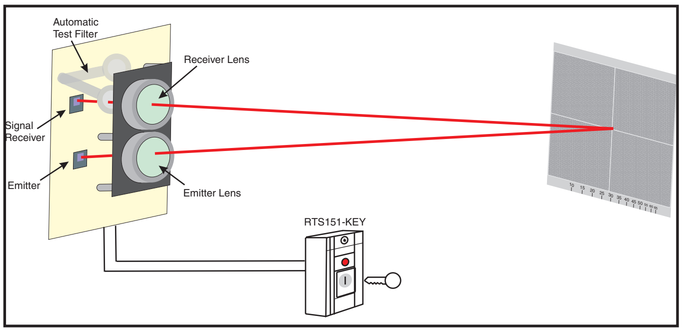

Figure 9: 6500 Beam Detector Asuretest Operation

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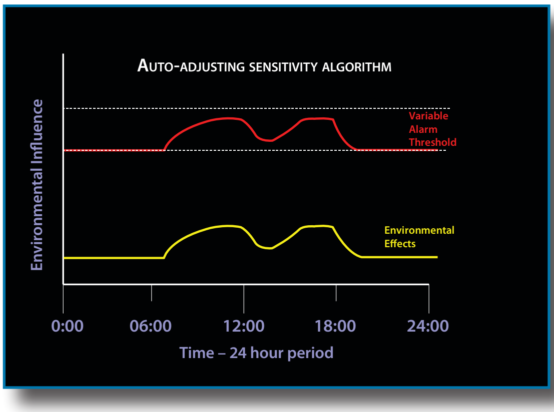
Asuretest is a unique patented servo operated remote test capability that fully tests both the optics and the electronics of the device without having to physically access the unit. In addition, the unique auto–adjusting algorithm automatically adjusts the alarm threshold to compensate for short-term environmental changes.

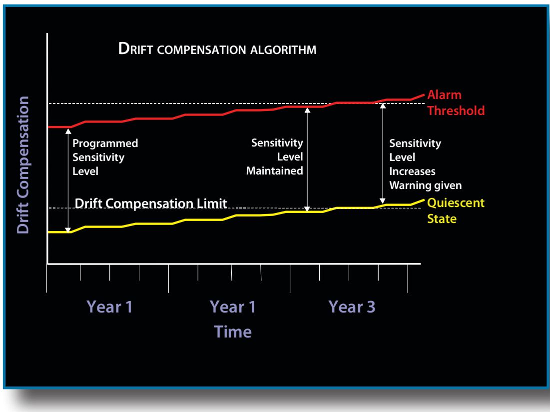
ASURE TEST™ is a unique patented remote test capability that fully tests both the optics and the electronics of the device without having to physically access the unit. An optical filter is introduced into the optical path, attenuating the beam and causing the unit to go into alarm. Unlike other test methods, this test process provides a complete check of every component in the alarm path without the need for access at high level. In the conventional version, the filter is activated from ground level by a hard-wired connection; in the analogue addressable model it is initiated by a command from the fire control panel to the servo motor. Given that the majority of beam detectors are likely to be installed at a considerable height, the time saved during routine maintenance should be significant.

The unique auto–adjusting sensitivity algorithm automatically



adjusts the alarm threshold to compensate for short-term changes in the environment which could otherwise result in unwanted alarms. Two alternative auto–adjusting sensitivity settings are available. These adjustments do not compromise the detector's ability to respond quickly to a fire incident.

Automatic drift compensation prevents the long-term build up of dust or dirt on the optical surfaces from making the detector more sensitive; the design of the enclosure also ensures that settling dust attenuates the optical path as little as possible. The sensitivity of the detector can be set to one of four levels between 25% and 50% obscuration, providing application flexibility to suit the environment in which the detector will be installed.



The 6500 Series consists of a transmitter and a receiver contained in a single enclosure, the emitted infrared beam is returned to the detector from a reflector panel located between 5 and 100 metres away. A special setup mode makes alignment and setup a simple operation for one man; alignment of the detector is simplified with the aid of the detector's "gun sight" targeting device. Alignment of the detector with the reflector can then be "fine tuned" with the aid of a numerical signal strength indicator. The unit can be adjusted by ±10 degrees in both the horizontal and vertical planes; where greater angular adjustment is required, the multi-mount accessory enables the detector to move through 180 degrees horizontally (6500-MMK with 6500-SMK).

6500RS AND 6500R Conventional units

The 6500RS is fitted with the Asuretest remote test option, the 6500R is identical in operation but lacks Asuretest. Both versions are externally powered, operating from either a nominal 12 or 24VDC, enabling them to form part of a fire or security system. The units are very versatile; they are compatible with any conventional control panel and, by using them in conjunction with a suitable interface control module, they can be added to any intelligent system irrespective of the communication protocol between the control panel and detectors.

6500S AND 6500 Addressable units

The 6500S is fitted with the Asuretest remote test option, the 6500 is identical in operation but lacks Asuretest. Both versions are loop powered, operating from any control panel running the System Sensor Advanced or Series 200 Plus protocols.

Note: External power is required for the Asuretest feature.

6500 AND 6500S ADDRESSABLE BEAM DETECTOR

The 6500S and 6500 are addressable reflector-type linear optical beam smoke detectors that can be directly connected to an analogue loop circuit as a component of an intelligent fire alarm system. The detectors have a range of 5m to 70m, extending to 100m with a long-range reflector kit (6500-LRK).

Tested and approved to EN54-12: 2002.

Voltage Range:	15 to 32VDC, or 15 to 29VDC if isolators used.
Standby Current:	2mA @ 24VDC; 1 comm. every 5sec, LED flashing. (Advanced Protocol Mode: Read 16 sec. LED blink 8 sec).
Max Alarm Current:	8.5mA
Temperature Range:	–30°C to 55°C
Humidity:	0 to 95% RH (Non-Condensing)
IP Rating:	IP54
Detector Dimensions:	253mm x 193mm x 84mm (h x w x d)
Reflector Dimensions:	200mm x 230mm (for 5-70m)
Shipping Weight:	1770g

6500RS AND 6500R CONVENTIONAL BEAM DETECTOR

The 6500RS and 6500R are conventional reflector- type linear optical beam smoke detectors designed to operate as a component of a conventional fire alarm system. They can be connected to an addressable system by using a suitable interface module. The detectors have a range of 5m to 70m, extending to 100m with a long-range reflector kit (6500-LRK).

Tested and approved to EN54-12: 2002.

Voltage Range	10.2 to 32VDC (12 or 24VDC nominal)
Standby Current	17mA
Alarm Current (LED on)	38.5mA
Temperature Range	–30°C to +55°C
Humidity	0 to 95% RH (non-condensing)
IP Rating	IP54
Detector Dimensions:	253mm x 193mm x 84mm (h x w x d)
Reflector Dimensions:	200mm x 230mm (for 5-70m)
Shipping Weight:	1770g

REMOTE TEST SWITCH - RTS151KEY

In the conventional version of the beam detector, an optical filter is activated from ground level by a hard-wired connection from the test switch. This test process provides a complete check of every component in the alarm path without the need for access at high level.

Note: This document is based on the recommendations of BS5839 Part 1: 2002. It is intended only as a guide to the application of fire detection systems.

Reference must be made to relevant national and local standards and manufacturer's recommendations.

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Installation information: in order to ensure full functionality, refer to the installation instructions as supplied.

LTR150-3