FIRERAY 2000 EExd
Hazardous Area Smoke Detector
Installation Guide

♦ KEY FEATURES

⇒ *Flameproof Receiver and Transmitter*
⇒ *Standard Fireray Controller Unit*
⇒ *High Coverage - up to 1500^{2}m per system*
⇒ *Low Cost*
⇒ *Beam Range 10 metres to 100 metres, in normal use, 3m to 30 m retro operation.*
⇒ *12 Volts dc to 24 Volts dc operation*
⇒ *Selectable Alarm Thresholds*
⇒ *Low Current Consumption*
⇒ *Manual or Automatic Fire Alarm Reset*
⇒ *Automatic Fault Alarm Reset*
⇒ *Ground Level Electronics*
⇒ *Extremely Rugged*
⇒ *Easy installation*
⇒ *Low maintenance*

♦ APPLICATIONS

⇒ Zone 1 Environments
⇒ Refineries
⇒ Mills
⇒ Munitions Factories
⇒ Munitions Stores
⇒ Flammable Liquid Stores
⇒ Flammable Gas Stores
⇒ Flammable Powder Stores
⇒ Industrial Plants
⇒ Power Stations
⇒ Warehouses
⇒ Applications requiring highly rugged detector heads

DESCRIPTION

The *FIRERAY 2000 EExd SMOKE DETECTOR SYSTEM* is designed primarily to protect EExd, IIB hazardous areas.

It consists of a standard Fireray 2000 Controller/Analyser, combined with highly rugged flameproof Transmitter and Receiver heads.

The Transmitter and Receiver Heads are designed to be mounted within the protected hazardous area, whilst the Analyser is housed outside it. Using the Standard Analyser unit in this way allows a significant cost reduction when compared to a system utilising flameproof enclosures for all component parts. The maximum lateral beam coverage is 15m per Fireray System installed.

Once installed, the Transmitter Head projects a modulated Infra-Red Beam across the protected area, to the Receiver head mounted opposite. The received signal strength is monitored and analysed in the Ground Level Controller. Should the beam strength fall below the preset threshold for more than 8 -10 seconds, a Fire Alarm is signalled to the Control Equipment. The analyser also incorporates monitoring for cable breaks or loss of function at the Transmitter or Receiver. If the signal strength is reduced suddenly (<5 seconds) by greater than 93% a Fault Alarm is indicated to the Control equipment. The Fire and Fault Alarm outputs are provided via two sets of Voltage-Free change-over relay contacts.

The Fire Alarm Relay may be set for latched or auto-reset operation as desired. The Fault Alarm is designed to auto-reset once the signal is returned to serviceable limits.

The system may be used with ‘intelligent’ or ‘non-intelligent’ systems. Due to the very low current consumption, back-up battery life is extended and the system may be powered from alarm loop supplies in most cases.

PARTS LIST

1 x Transmitter Head (With Clear Lens)
1 x Receiver Head (With Dark Lens)
1 x Controller/Analyser Unit
1 x Adjustable Head Mounting Bracket
1 x Bag of Bracket Fixings
1 x Test Filter
1 x Installation Guide (This document)
1 x Atex Addendum Sheet 0600-(issue)
2 x Allen keys (5mm & 10mm)

** See specification on page 13 for technical details

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PRINCIPLE OF OPERATION

General
The Fireray system operates by passing an infra-red beam between a Transmitter and Receiver, through the protected area. The received signal strength will be attenuated if smoke is present in the beam. The beam strength is measured continuously and, should any attenuation be present which exceeds presets thresholds, fire or fault alarms are generated as appropriate. Each installed Fireray can cover an area 7.5 metres either side of the beam, giving a maximum coverage of up to 1500^2m with a 100m beam path length.

Transmitter and Receiver Units
A modulated Infra-Red light beam is projected from the Tx (Transmitter) via it's optical system. The projected beam has a circular footprint, with a useable spread of approx 3m @ 100m range. The Rx (Receiver) has a corresponding filtered optical system which collects and focuses the beam onto a photo-detector. During installation, the Rx has a maximum beam acceptance angle of up to 5° (dependant on gain and threshold settings). The wide Tx beam, in conjunction with the large Rx acceptance angle simplifies alignment and gives good tolerance to beam mis-alignments after installation.

Controller Unit And Alarm Thresholds
The signal received at the Rx is amplified and filtered to reject sunlight and other unwanted optical noise such as may be caused by ambient lighting,. The signal is then passed to the Controller Unit, where it undergoes further filtering and validity checking, before finally being analysed for signal strength. The signal is then compared to a reference level (determined by the user's threshold setting), and should the signal be reduced below the set threshold, the FIRE ALARM relay will be activated within approx 12 seconds. Three user selectable threshold setting are available **. *Note that only one threshold switch must be closed to select the required threshold.* A red lamp on the Controller Unit front panel also indicates a FIRE ALARM condition.

Controller Unit -Fault Thresholds
If the signal is reduced suddenly by more than 93% in 8 to 10 seconds, perhaps due to total beam blockage, a cable break, or the Tx or Rx becoming unserviceable, the controller interprets this as a fault situation. Loss of power to any of the system parts will also cause a fault signal to be generated. In any of these events, the controller will activate the FAULT ALARM relay continuously. The system will return to normal operation immediately, once the correct signals are restored, except in the event of a power loss to the controller, in which case normal operation is resumed after 50 seconds from restoration of power. A yellow lamp (LED4) in the Controller Unit also indicates when the system is in a FAULT or RESET condition.

Controller Unit - Compensation (AGC) Operation And Action At Compensation Limit
The Controller Unit also incorporates an AGC (Automatic Gain Control) system **, which monitors very slow changes in the received signal due to contamination of the optical system (EG: build up of dust on the lenses) and any changes due to system ageing. If the signal is reduced by more than approx 11%, the AGC system is activated. Then if the signal is still low after 1.5 hours, a 7% increase is made to the system gain, to bring the signal strength back into the nominal range. Additionally, should the signal strength increase, perhaps due to improved alignment following building movement, the system can reduce its gain in 7% steps. From an initial nominal setting, up to 11 increasing and 3 decreasing correction steps are possible.

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Two possible actions are selectable, once the system has exhausted all compensation steps, as follows:-

- Leave the COMP switch in the Controller unit OPEN for BS5839 installations (UK). This setting allows generation of a FIRE ALARM after reaching the compensation limit, even though a FAULT ALARM will be active. This is the only time Fire and Fault indications can occur together.

- Close the COMP switch if it is required that FIRE ALARM generation is inhibited once a FAULT ALARM has occurred, due to reaching compensation limit.

Controller Unit - Relay Outputs
The Controller Unit has two sets of outputs for Fire and Fault indication, in the form of voltage free single pole changeover relay contacts. The FIRE relay may be set to give either latching or non-latching operation, determined by a switch (ALARM LATCH) on the Controller pcb. With the switch closed, latching operation is selected.

Controller Unit - Signal Strength Metering
A 'Metering ' output is also provided, to assist with installation. This gives a dc voltage which is proportional to the received signal strength and can be monitored using a voltmeter.

Controller Unit - System Resetting
The system can be reset in any of three ways, as follows :-

- Using the RESET switch in the Controller Unit (Normally only used during installation).
- By taking the External Reset input low (to system 0V) for at least 5mS.
- By de-powering the system for 1 second, then re-powering.

Following a reset the system takes 50 seconds to self-calibrate. During this time the Fireray adjusts it's 100% signal reference level and so must have a clear unobstructed beam. No tests should be carried out until this initialisation period has elapsed.

Notes On Resetting Using The Internal RESET Switch
Note that for correct operation, the internal RESET switch must not be set to OFF whilst either of the HIGH or LOW signal lamps in the Controller Unit are illuminated. The gain must be set correctly to extinguish both lamps first. If this is not done the system AGC is locked and will not operate. (This does not apply to the other two reset methods).

SUMMARY OF SYSTEM CONDITIONS :-

Possible Causes of FAULT Alarms

- Controller Unit RESET switch in ON position.
- Controller Unit EXTERNAL RESET input active (at 0V)
- No power to Controller unit
- No Power to Tx unit
- Beam obscuration >93% for >5 seconds (for whatever reason)
- Tx or Controller power cable break.
- Receiver Signal cable break.
- AGC at limit of compensation.
- Rx/Tx Mis-alignment causing low signal strength

** See specification on page 13 for technical details

- System unable to initialise following reset, due to inability to calibrate correctly (perhaps caused by interference or testing of the beam before expiry of the 50 second calibration period.
- High or Low signal when Controller Unit's RESET switch set to OFF (AGC locked out).

Possible Causes Of FIRE Alarms

- In normal use, beam strength reduced by more than the set threshold (Smoke in beam).
- During installation, no threshold switch set at the Controller Unit (One switch only must be set).

Possible Causes Of FIRE And FAULT Alarms Together

- AGC at limit of compensation, COMP switch OPEN (UK installations only) and beam strength reduced by more than the set threshold.

PRECAUTIONS WHEN INSTALLING THE SYSTEM

Always ensure that the hazardous area into which the system will be installed is safe to work in, and that neither you nor the installation will compromise the safety of that area.

Ensure that all mandatory and local regulations, regarding both fire alarm systems and EExd, IIB applications, are adhered to.

Choose solid, stable surfaces on which to mount the Receiver and Transmitter.

If one of the mounting surfaces for the Transmitter or Receiver is likely to be susceptible to movement, always mount the Transmitter on the more stable surface. The Receiver is less affected by mis-alignments.

The beam should be positioned approx 30cm to 60cm below the ceiling, to avoid smoke layering or masking effects.

Take precautions to position the beam such that it cannot be blocked during the normal course of operations in the building.

Avoid mounting near or over heaters systems etc. Heat haze may cause obscuration and high levels of beam 'noise'.

If possible, avoid areas subject to thermal 'shock', such as near external loading bay doors etc. If condensation forms on the lenses, this will be seen as an obscuration.

Avoid high intensity lighting near the receiver lens and avoid angling the Receiver directly at the sun. The system incorporates circuitry to minimise effects due to high levels of ambient light (>15000 Lux), but over heating of internal parts may occur with very strong sources, due to the focused beam within the Receiver.

If possible, avoid bunching the system cables with factory power or other cabling.

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To achieve maximum EMI rejection, use screened cables for the system wiring, properly terminated at metal glands (Do not use screen pigtails). MICC cable is recommended.

Use the correct EExd approved cable gland types for all system parts in the hazardous area.

Cables must be suitable for a minimum temperature of 101°C.

SETTING UP AND ALIGNING - DIRECT BEAM MODE

The Transmitter and Receiver heads must be positioned on ***stable, solid facing surfaces***, such as parallel walls, approx 0.3m to 0.6m below the area ceiling (See application notes near the end of this guide). The surfaces must be parallel, vertically and horizontally within approx 20 degrees, although a greater positioning range is possible (up to 40 degrees off line-of-sight) if the Receiver is also fitted it with an Adjustable Mounting Bracket. This is available as an optional extra. If only small adjustments are required, the Receiver line-of-sight may be adjusted by fitting spacer washers to it's wall fixing screws, between the Receiver Case and the mounting surface. (Some applications may require fabrication of angled mounting brackets etc, in order to cope with awkward wall positions etc. These are not supplied).

Install all required cabling to the defined positions for each system part. (See wiring diagram on following page, for a typical installation). Ensure compliance with all regulatory and local requirements for Hazardous Areas and Fire Alarm Systems. Approved screened cables and approved EExd glands and termination methods must be used. Glands at the Controller, Rx and Tx must be metal EExd types. The Cable screens or jackets must be terminated properly at the glands, with a 360° termination. Screen Pigtails must not be used.

Mount the Receiver first, such that it faces, and has un-obstructed line of sight with the expected final Transmitter position. Remove the Receiver housing top (using 5mm Allen key provided). Connect the system cabling to the 3 way terminal block on the internal pcb. It is recommended that the External Earth point be used on the Tx and Rx housings, to minimise wiring lengths. This must be taken to the nearest suitable building Earth point. Alternatively, the housing's Internal Earth stud may be connected, via an additional cable core and connected back at the Control Unit Earth. (see wiring diagram on the following page for connections and earthing regimes). Check the connections and tighten the cable glands, then refit the housing top, taking care to position the 'O' ring seal correctly, just below the flange. Tighten the 4 securing screws firmly. ***For safety reasons, and to give the best EMI rejection, do not omit any of the Earth connections.***

Fit the Transmitter head in a position which aligns as closely as possible with the Receiver line of sight, making use of the adjustment bracket provided. A 12mm AF spanner/wrench is required for the adjustment bolts. Remove the Transmitter housing top (using 5mm Allen key provided) and set the Range Switch to the correct or next higher setting, to match the expected operating range. Use a biro tip to set the switches. The switches are 'ON' when moved outward, and 'OFF' when moved inward, toward the housing centre. Note that only one setting must be selected 'ON'. Connect the system cabling to the 3 way terminal block on the internal pcb and Earth the unit housing in the same manner as used for the Rx (see wiring diagram on the following page for connections and earthing regimes). Check the connections and tighten the cable glands, then refit the housing top, taking care to position the 'O' ring seal correctly, just below the flange. Tighten the 4 securing screws firmly. ***For safety reasons, and to give the best EMI rejection, do not omit any of the Earth connections.***

Install and wire the Controller unit in it's defined position, ***outside*** the hazardous area. Set the unit's Alarm threshold to 25%, 35% or 50%. ***Only close one switch position, for the desired threshold***. Set the 'ALARM LATCH' switch as required. Switch Closed = latching Fire Alarm operation. For UK

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installations, leave the 'COMP' switch open (Sets AGC operation at compensation limit - See functional descriptions on page 2).

Check all wiring then apply power to all parts of the system.

At the Controller Unit, Set the Reset Switch to 'ON', and the Gain Control knob to approx midway.

Connect a length of two core bell wire or similar to the Metering terminals in the Control Unit. Run this temporarily to the Transmitter position and connect a dc voltmeter to the ends. Set the voltmeter to read up to 10Vdc or 'autorange'.

Whilst observing the meter reading, adjust the Transmitter-to-Receiver alignment to achieve the highest reading possible. A reading of at least 4.1Vdc is required for correct function (Note : <=2.7Vdc = no signal). On completion, lock the transmitter adjustment bracket and all mountings securely, checking the alignment on the meter whilst doing so. Remove the temporary meter wiring on completion.

SETTING UP AND ALIGNING - RETRO-REFLECTED BEAM MODE

In this mode the beam is reflected from either a reflective prism or mirror. For most applications we recommend using prisms, which are much easier to align. Prisms return the light beam along the same axis as they receive it, whereas with a mirror the angle of reflection is the same as the angle of incidence. Using a mirror, the beam may be reflected around structures or wall corners etc, however setting up can be very difficult. Mirror applications are not covered in this document.

Using prsims, the installation and cabling is identical to that for the direct mode method except that the Transmitter and Receiver must be mounted next to each other (as close as possible) and adjusted such that both point at the prisms.

Choose Receiver and Transmitter mounting surfaces that are parallel to the prism mounting surface within +/- 20°. If greater adjustment is required, then a second adjustable bracket may be fitted to the Receiver (Optional extra)

Mount the Receiver first, such that it faces, and has un-obstructed line of sight with the expected prism positions. Remove the Receiver housing top (using 5mm Allen key provided). Connect the system cabling to the 3 way terminal block on the internal pcb. It is recommended that the External Earth point be used on the Tx and Rx housings, to minimise wiring lengths. This must be taken to the nearest suitable building Earth point. Alternatively, the housing's Internal Earth stud may be connected, via an additional cable core and connected back at the Control Unit Earth. (see wiring diagram on the following page for connections and earthing regimes). Check the connections and tighten the cable glands, then refit the housing top, taking care to position the 'O' ring seal correctly, just below the flange. Tighten the 4 securing screws firmly. ***For safety reasons, and to give the best EMI rejection, do not omit any of the Earth connections.***

Fit the prisms on the opposing surface, ensuring (by eye) that they are perpendicular to, and centred on, the Receiver lens central axis.

Mount the Transmitter on it's adjustment bracket close alongside the Receiver, aligning it as closely as possible with the prisms, making use of the movements provided. A 12mm AF spanner /wrench is required for the adjustment bolts. Remove the Transmitter housing top (using 5mm Allen key provided) and set the Range Switch to at least twice the range between the Tx/Rx and the prisms. Use a biro tip to set the switches. The switches are 'ON' when moved outward, and 'OFF' when moved inward, toward the housing centre. Note that only one setting must be selected 'ON'. Connect the

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system cabling to the 3 way terminal block on the internal pcb and Earth the unit housing in the same manner as used for the Rx (see wiring diagram on the following page for connections and earthing regimes). Check the connections and tighten the cable glands, then refit the housing top, taking care to position the 'O' ring seal correctly, just below the flange. Tighten the 4 securing screws firmly. ***For safety reasons, and to give the best EMI rejection, do not omit any of the Earth connections.***

Install and wire the Controller unit in it's defined position, ***outside*** the hazardous area. Set the unit's Alarm threshold to 25%, 35% or 50%. ***(50% recommended, which is approximately equivalent to a 25% setting in direct mode) Only close one switch position, for the desired threshold***. Set the 'ALARM LATCH' switch as required. Switch Closed = latching Fire Alarm operation. For UK installations, leave the 'COMP' switch open (Sets AGC operation at compensation limit - See functional descriptions on page 2).

Check all wiring then apply power to all parts of the system.

At the Controller Unit, Set the Reset Switch to 'ON', and the Gain Control to approx midway.

With the system installed and powered up, monitor the signal strength using a voltmeter (10Vdc range or 'autorange') connected to the Controller unit's METER + and - terminals.

Whilst observing the meter reading, adjust the Transmitter-to-prism alignment to achieve the highest reading possible. A reading of at least 4.1Vdc is required for correct function (Note : <=2.7Vdc = no signal). On completion, lock the transmitter adjustment bracket and all mountings securely, checking the alignment on the meter whilst doing so. Note that, as for the direct mode installation, a Fireray Alignment Aid may be used in place of the Voltmeter, aligning for the highest flash rate. Remove the temporary meter wiring on completion.

Return to the Controller Unit and observe the Green lamps either side of the Gain Control. Adjust the Gain Control such that the two lamps ***both extinguish completely*.**

Set the Controller unit's Reset Switch to 'OFF', observe that the yellow FAULT lamp extinguishes, then wait at least 50 seconds while the system calibrates. After 50 seconds, check that the FAULT lamp is still extinguished. The system is now armed and active.

TESTING THE SYSTEM

Following installation, test the system as follows :-

First ensure that the system is running and has been allowed time to calibrate (50 seconds after power-up or reset).

Fire Alarm

- Place the striped end of the test filter over the Receiver lens.
- A Fire Alarm shall be indicated in approx 10 to 12 seconds.

Fault Alarm

- Place a complete blockage (example: a hand) over the Receiver lens. Ensure that the lens is fully covered.
- A Fault Alarm shall be indicated in approx 4 to 6 seconds.

For Retro operation only

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- To check that the beam is being reflected by the prisms, rather than some other reflective surface, block off the beam completely at the prisms using a suitable non-reflective blind (sheet of black cardboard or similar). A Fault Alarm shall be indicated in approx 4 to 6 seconds.

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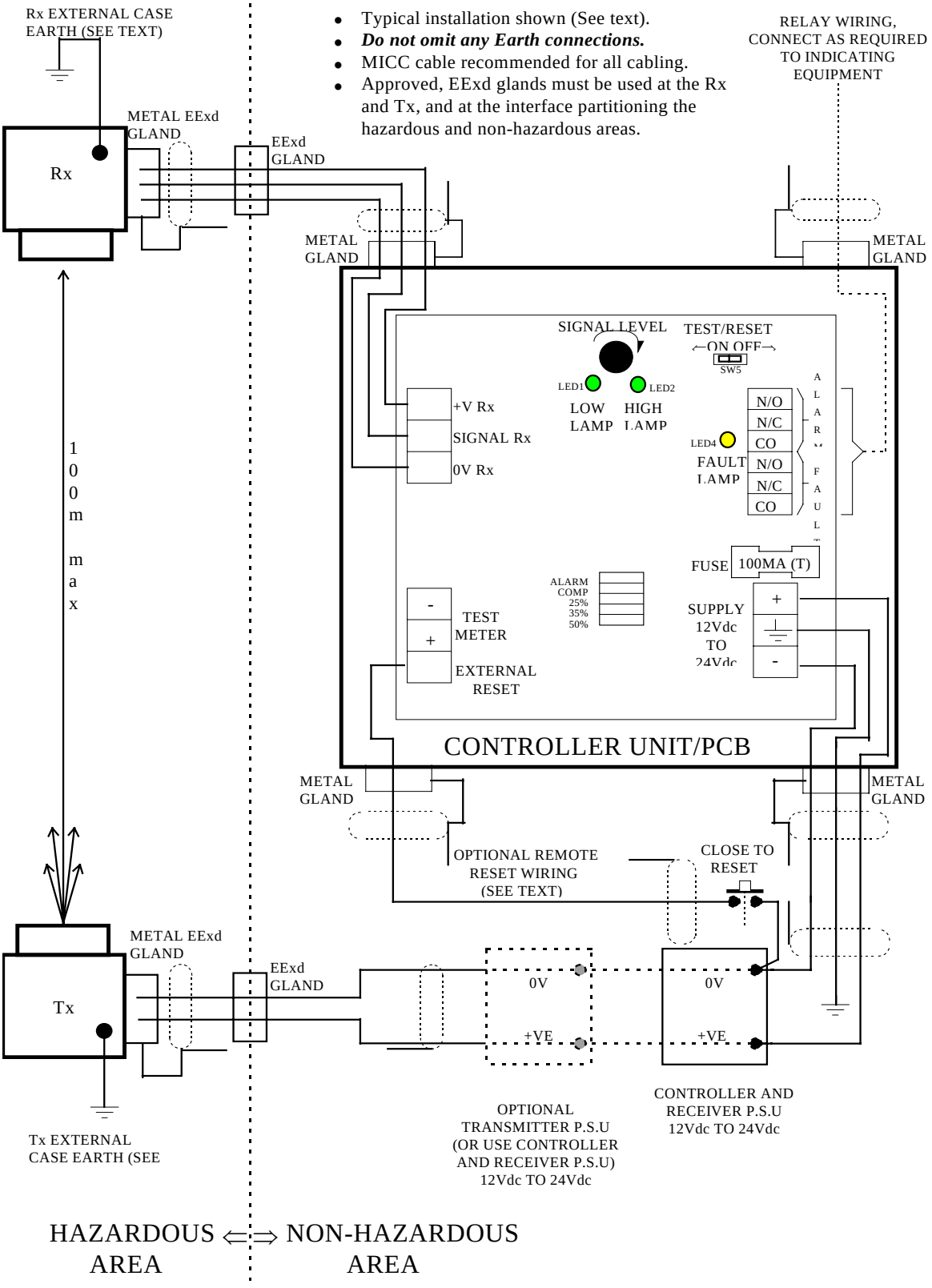

- Typical installation shown (See text).
- ***Do not omit any Earth connections.***
- MICC cable recommended for all cabling.
- Approved, EExd glands must be used at the Rx and Tx, and at the interface partitioning the hazardous and non-hazardous areas.

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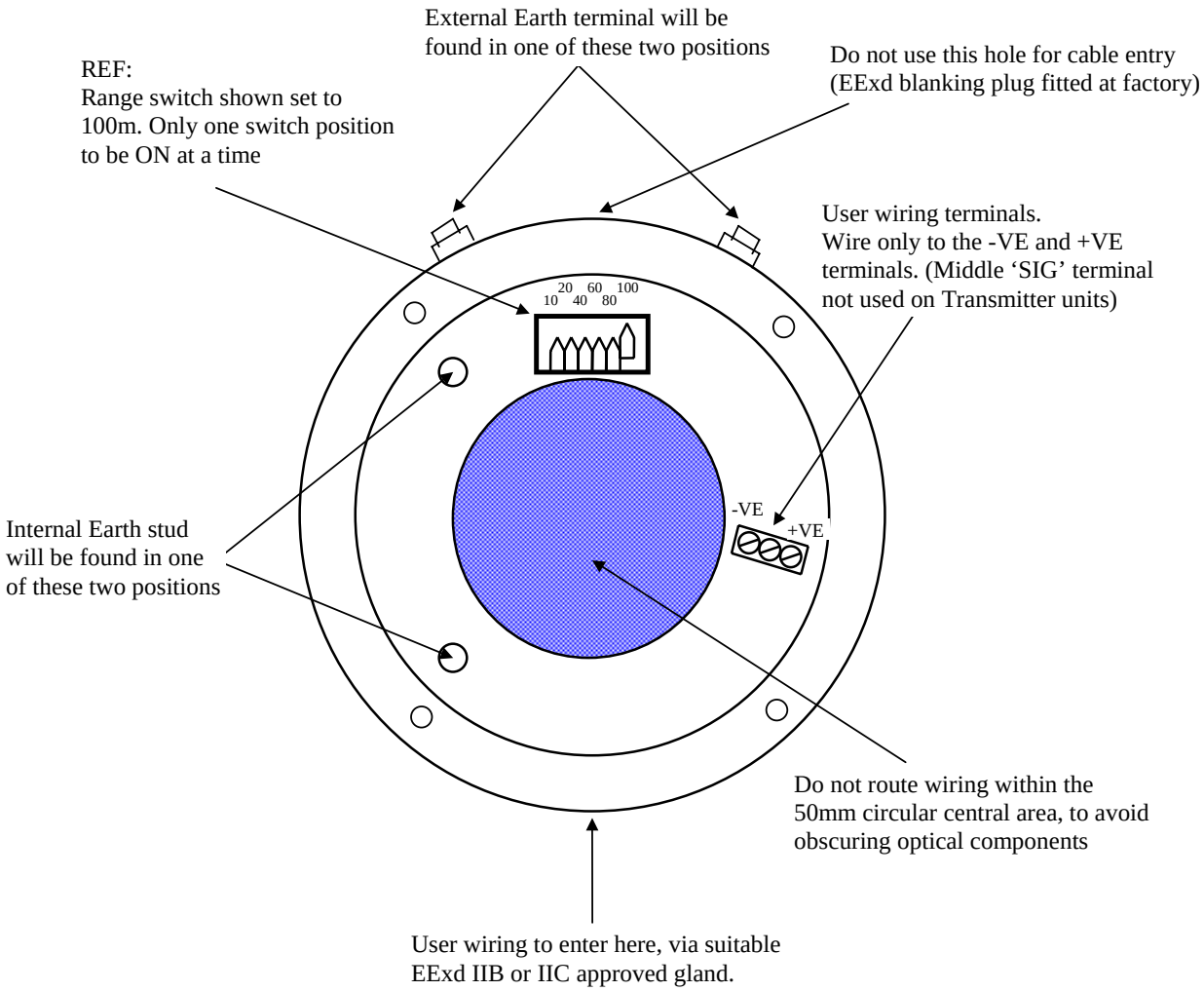
VIEW INSIDE TRANSMITTER UNIT WITH TOP WINDOW SECTION REMOVED SHOWING TERMINALS AND SETTINGS ETC
note: some components not shown for clarity



TRANSMITTER REQUIRES 2 CORE SCREENED WIRING TO SUITABLE POWER SUPPLY, PLUS ENCLOSURE EARTH BONDING.

THE ENCLOSURE EARTH BOND MAY BE CONNECTED TO THE INTERNAL OR EXTERNAL EARTH TERMINALS ***AND MUST NOT BE OMITTED.***

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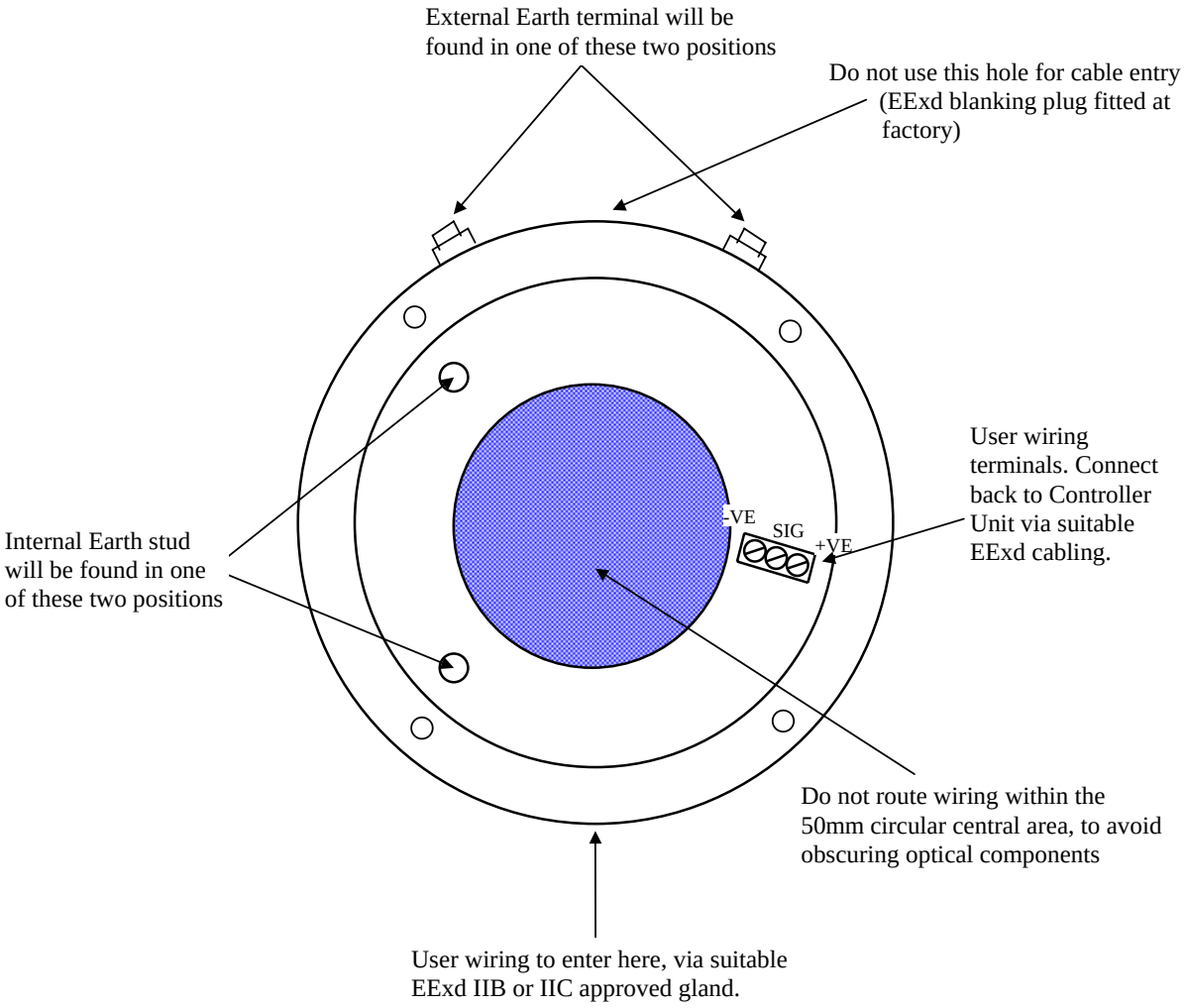
VIEW INSIDE RECEIVER UNIT WITH TOP WINDOW SECTION REMOVED SHOWING TERMINALS AND SETTINGS ETC
note: some components not shown for clarity



RECEIVER REQUIRES 3 CORE SCREENED WIRING TO CONTROLLER UNIT, PLUS ENCLOSURE EARTH BONDING.

THE ENCLOSURE EARTH BOND MAY BE CONNECTED TO THE INTERNAL OR EXTERNAL EARTH TERMINALS
AND MUST NOT BE OMITTED.

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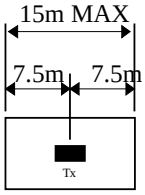
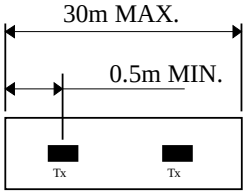
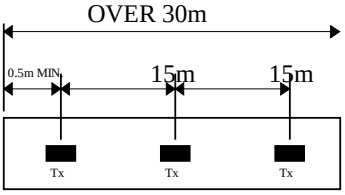
SINGLE BEAM SEE NOTE 3



MULTIPLE BEAMS





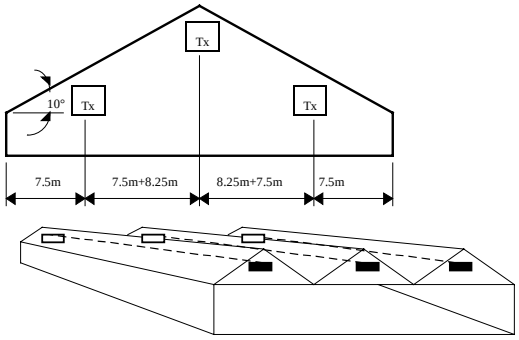
A ceiling or roof with a slope in excess of 3.5 degrees should be regarded as an apex roof.

Note 3: No more than 3m of the beam path should be within 500mm of any wall or partitions.

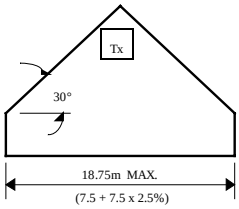
When Firerays are mounted in the apex the horizontal distance may increase by 1% for each degree of ceiling slope, up to 25% maximum, (for Fireray in apex only).

APEX CEILINGS

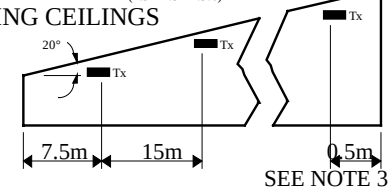
10° SLOPING ROOF



30° SLOPING ROOF



SLOPING CEILINGS



SEE NOTE 3

RECEIVER AND TRANSMITTER SHOULD BE POSITIONED 0.3m TO 0.6m BELOW THE CEILING

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FIRERAY 2000 EExd - SYSTEM SPECIFICATION

SYSTEM TYPE	
Transmitter (TX)	Rugged for EExd IIB areas - IP67
Receiver (RX)	Rugged for EExd IIB areas - IP67
Controller (CU)	Designed to be sited *outside* the hazardous area. Rugged for light industrial and domestic use - IP50
CERTIFICATION	
	SIRA03ATEX1504
CONFORMS WITH	
EExd General requirements)	BS EN 50014 : 1998
EExd enclosures	BS EN 50018 : 2000
Fire Alarm Systems	BS 5839 : Pt 5 : 1988
Emc Immunity	BS EN 61000-6-2:1999
Emc Emissions	BS EN 61000-6-4:2001
Alarm Systems - EMC	BS EN 50130-4 1996
ATEX Directive	94/9/EC
TEMPERATURE	
Range	-20°C to +55°C
THRESHOLDS	
Alarm	25%, 35% or 50%**, switch selectable (1.25db, 1.87db or 3.01db**)
	** For full compliance with BS5839 Pt.5, use 25% and 35% thresholds. 50% threshold is normally recommended for retro mode.
Fault	>=93% (11.55db), fixed
DETECTION TIMES	
Fire	10 seconds (min)
Fault	5 seconds (min)
SYSTEM RANGE	
Minimum	10m (3m in 'Retro' mode)
Maximum	100m (30m in 'Retro' mode)
RETRO PRISMS	Use Part No: 23901
Range	3m to 5m use 2 prisms 6m to 10m use 4 prisms (Square) 11m to 30m use 6 prisms (Rectangle)
TRANSMITTER	
Type	Pulsed, Focused Infra-Red beam
Beam Half-Angle	1° approx
Spectrum	Nominally 880Nm (Near Infra-Red)
Max IR O/P (mean)	6.4mW/Sr at IR LED
Max IR O/P (peak)	800mW/Sr at IR LED
Misalignment angle	@25% and (@ 50%) threshold settings
During installation	+/-1° (+/-1°) for a measurable signal
After installation	+/-0.5° (+/-0.75°) (After perfect alignment)
Connections	2 wire, power only required - no connection to other system parts necessary
RECEIVER	
Misalignment angle	@25% and (@ 50%) threshold settings
During installation	+/-4° (+/-5°) for a measurable signal
After installation	+/-3° (+/-4°) (After perfect alignment)
Connections	3 wire, connected to Controller Unit only
SUPPLY VOLTAGES	(At each detector component)
Tx (nominal)	+12Vdc to +24Vdc
Tx (min/max)	+11.5Vdc to +28Vdc
Control/Rx (nominal)	+12Vdc to +24Vdc
Control/Rx (min/max)	+11.5Vdc to +28Vdc
Rx	N/A, Supplied from Control Unit

SUPPLY CURRENT	
Control/Rx (Normal)	7.5mA @ all ranges
Control/Rx (Alarm)	13.5mA @ all ranges
Tx	1.6mA @10m to 5.6mA max @100m
SUPPLY RIPPLE	
Tx	0.5V p-p min, sine, 50-100Hz @11.5Vdc Immunity increases with higher supply voltage
Control/Rx	0.5V p-p min, sine, 50-100Hz @11.5Vdc Immunity increases with higher supply voltage
SYSTEM RESET	
Internal	Via slider switch in controller unit
External (1)	Remote Reset input - Ground for >5mS
External (2)	Power break for 1 second then re-power
INITIALISATION TIME	
Following reset	50 seconds
SYSTEM OUTPUTS	
Fire Alarm	Voltage-Free SPCO contacts, switch selectable for latching or auto-reset operation.
Fault Alarm	Voltage-Free SPCO contacts, auto-resetting operation
Contact ratings	1.0A @ 24Vdc (resistive) 0.3A @ 24Vdc (Inductive) 0.5A @ 120Vac (resistive) 0.2A @ 120Vac(inductive)
Meter Output	DC output proportional to signal strength, for alignment and maintenance check purposes
Meter Range No signal Low signal Normal signal High signal	2.7Vdc to 6Vdc approx 2.7Vdc >2.7Vdc to <4.1Vdc 4.25Vdc +/-0.15Vdc > 4.4Vdc
COMPENSATION	(AGC)
Function	Detects and corrects for Rx/Tx lens contamination, or minor gain errors after installation or reset.
Update Period	Every 1.5 hours
Correction step	Approx 7% per step
Correction Range	Approx -28% to +77% (% with respect to initial setting)
SYSTEM CABLING	
Max Cable Run	100m to any system part
Cable Type	Screened (MICC recommended)
Max Capacitance	100pF/m
SIZES	
Controller	215mm x 265mm x 88mm
Heads	120mm x 125mm x 125mm
Brackets	172mm x 124mm x 56mm
WEIGHTS	
Controller	1060 grammes
Tx	2140 grammes
Rx	2165 grammes
Brackets	1530 grammes
FINISH	
Controller	White Powder Coat, to RAL 9010
Heads	Red Powder Coat to RAL 2002
Brackets	Red Powder Coat to RAL 2002

STATEMENT OF INTENDED USE

This system is intended for use as a Smoke Detector only, in EExd IIB, or lower grade areas. It must not be used in areas with a greater hazard rating. It must be installed and tested by approved, competent personnel, in accordance with all regulatory and local codes of practise. No liability shall be accepted for installations not conforming to this requirement.

WARNING

The area into which the Fireray parts are to be fitted must be made safe before attempting any work on the system. It must also be checked thoroughly prior/during/after commissioning, to ensure it cannot compromise the safety of the area in which it is fitted. Note that only the Transmitter and Receiver parts may be installed in the hazardous area, NOT the Controller Unit.

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** See specification on page 13 for technical details