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**DOCUMENT CONTROL NUMBER /**

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**FIRERAY 2000 OPTICAL BEAM DETECTOR**  
**INSTALLATION INSTRUCTIONS**

**1. GENERAL INFORMATION**

**1.1 INTRODUCTION**

The FIRERAY 2000 Optical Beam Smoke Detector would normally be installed as part of a complete system, therefore cable types and requirements should logically be approached from the controller end of the system. Cable requirements for all parts of the installation are discussed in publication 05A-02-I1.

The FIRERAY 2000 Optical Beam Smoke Detector comprises three units, Control box, Transmitter unit, Receiver unit, fixing brackets and an acetate Test Card with black markings. The acetate Test Card is used in the alignment procedure and should be kept with the Control Box.

Installation comprises:

- Fitting mounting brackets, fixing the Control box, and fitting of cable glands
- Fixing the Transmitter and Receiver brackets and mounting the units
- Cable Installation

Note:

- 1) *The connection of electrical cables to internal equipment is NOT a part of installation and must not be carried out at this stage. Instructions for cable connection are given in the appropriate commissioning instructions.*
- 2) *It is recommended that on receipt of the controller and ancillary components, the units be checked visually. Return damaged or defective items for exchange.*
- 3) *The mains supply must be in accordance with Clause 16.2 of BS5839 Pt1 (1988), where applicable.*
- 4) *For installation of Intrinsically Safe equipment refer to Publication 26A-02-I1 - Intrinsically Safe Systems for use in Low Voltage Fire Detection Systems - Installation Instructions.*

**1.2 SITING THE EQUIPMENT**

All equipment must be sited and installed in accordance with the requirements of the relevant approval bodies and as detailed in the specification and/or drawings for the system. To ensure reliability and integrity, good installation practise such as that laid down in 'IEE Regulations for the Installation of Electronic and Electrical Equipment' must be observed.

It is not always possible to show on a drawing the precise positions of detectors and other devices. When siting detectors the guidelines shown in Figs 1, 2, and 3, and the parameters stated in para. 1.3 should be observed.

Reference should be made to the Tyco standard document 05A-02-I1.

**1.3 MOUNTING REQUIREMENTS**

The Fireray 2000 Optical Beam Smoke Detector is supplied as a complete kit of items comprising, Control Box, Transmitter and Receiver Units, mounting brackets and fastenings.

The following points should be considered when installing the Beam detector:

- Ensure the position in which the Control Box is to be fitted allows adequate clearance for cables and for opening the front cover, (which is hinged on the left and opens to 180<sup>0</sup>).
- Each pair of detectors must be mounted on a firm structural part of the building
- The beam between the Transmitter (Tx) and Receiver (Rx) must be between **0.3m and 0.6m below and parallel to the ceiling** of the building in which the detectors are installed.
- The transmitter and receiver must be mounted so that the beam emitted from the round glass area of the transmitter is in line-of-sight with the round glass area of the receiver.
- Ensure that there is no source of infrared (heat) near the detectors such as a heater, an incandescent light bulb or direct sunlight.

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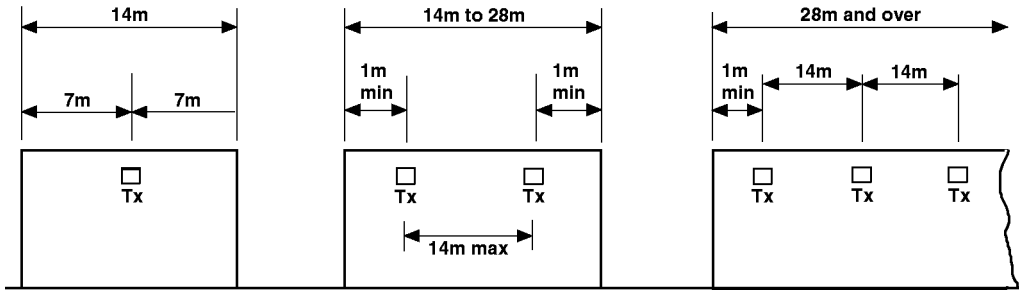


Fig. 1 Flat Roofs

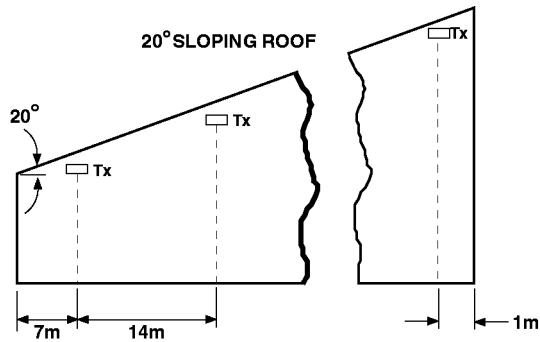


Fig. 2 Sloping Roofs

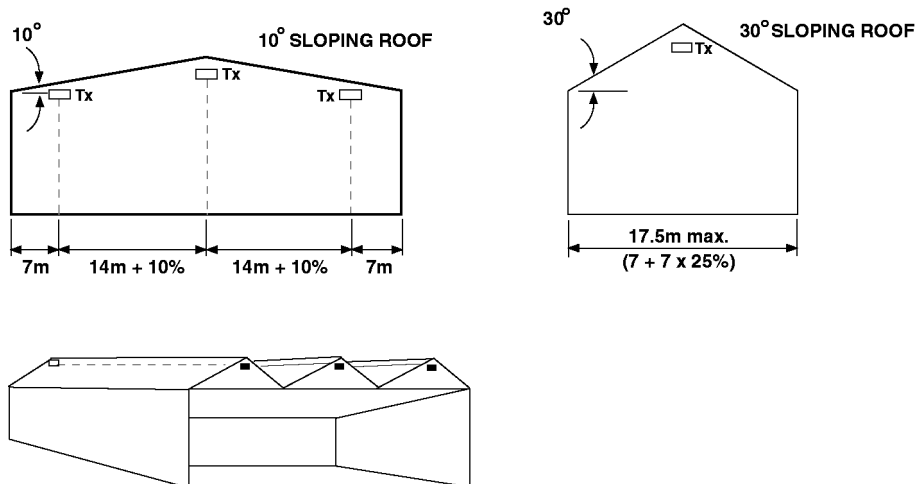
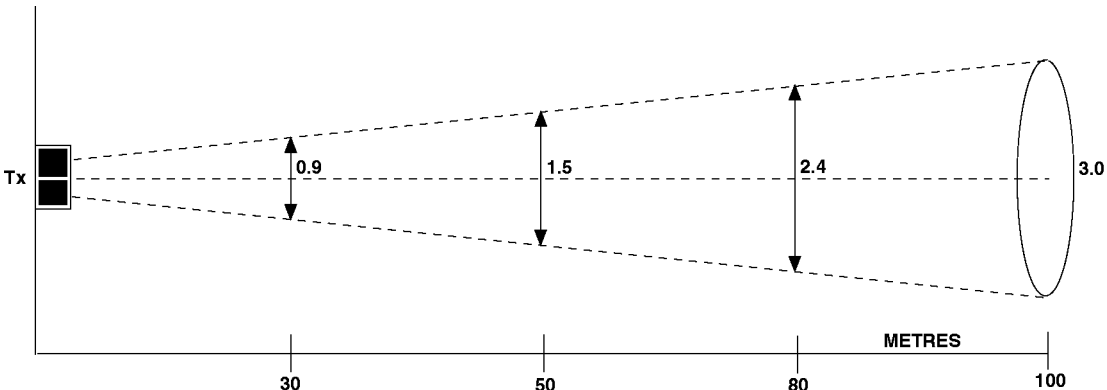
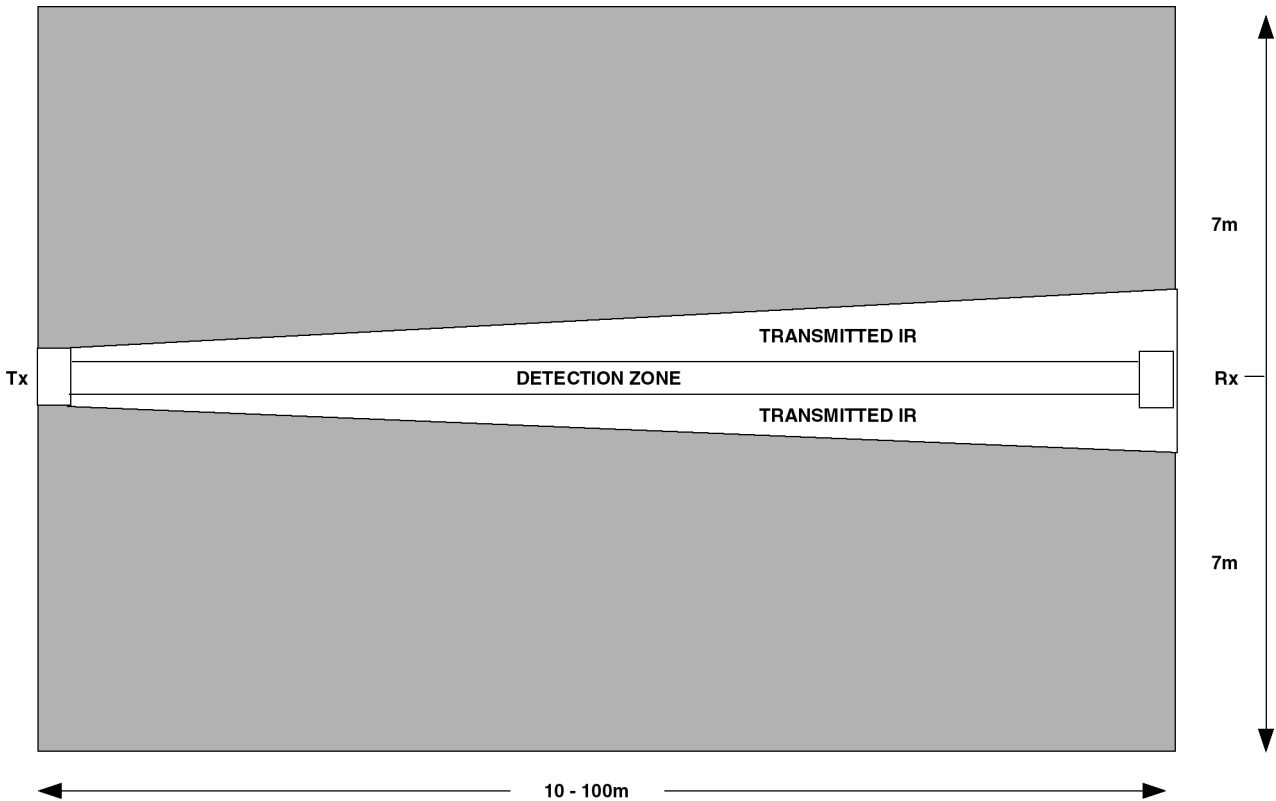


Fig. 3 Pitched and North Light Roofs



**Fig. 4 Beam Divergence**



**Fig. 5 Area of Protection**

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## 2. INSTALLATION

### 2.1 DETECTOR INSTALLATION

Both the Transmitter and Receiver unit are of identical size and of similar appearance:

The TRANSMITTER UNIT has a CLEAR lens and is factory fitted with 4-core unscreened cable - only two cores are used, namely RED and BLUE. (The other cores should be trimmed flush with the outer sleeving).

The Receiver unit has the dark lens and is factory fitted with 4-core unscreened cable - but only three cores are used, namely RED, YELLOW and BLUE. (The fourth core should be trimmed flush with the outer sleeving).

Both detector units (Tx and Rx) are supplied with a 'U' shaped mounting bracket which has two threaded bushes. The 'U' shaped bracket engages on a spigot at either side of the detector body and is secured to the detector body with two knurled plastic headed thumb screws.

A plain angled bracket with unequal length sides is supplied with each detector. The angled bracket has cutouts to allow adjustment of the detector position after fixing.

Mount the units as follows:

- a) Mount the detectors onto the right angled brackets using the two hex-head M5 x 12 screws provided.
- b) For the orientation of the brackets for either wall mounting or ceiling mounting of the detectors refer to Fig. 9 or Fig. 10.
- c) Use suitable fasteners to fix the plain angled brackets to the wall or ceiling.
- d) Mount the Receiver on a rigid structure at one end of the beam path and facing towards where the transmitter or reflector will be mounted.
- e) Mount the Transmitter on a rigid structure near to the ceiling and facing towards the receiver.
- f) For retro-reflective operation mount the reflector using suitable screws (see Fig.6).

### 2.2 ALIGNMENT

Accurate beam alignment is part of the commissioning procedure and is carried out using an alignment aid. At installation align the detectors as accurately as possible by eye.

### 2.3 CONTROL BOX INSTALLATION

The Control Box should be mounted at ground level, within 100 metres of the receiver.

The Control Box is mounted to the wall or other suitable surface with four fixing screws which pass through the 4 x 7mm holes on the back of the box.

Fit the control box as follows:

- a) Position the control box as shown on the site plan.
- b) Mark the positions of the fixing holes either from the dimensions diagram or by using the box as a template.
- c) Fix the control box in position with suitable fasteners.
- d) Ensure the control box is physically secure.
- e) Remove knockouts and fit cable glands as required.

## 3. CABLING

Run the cables generally as shown in the system layout.

Receiver Unit - Connect the Red (+), Black (-), and Yellow (signal) wires to the Control Box terminals using screened cable.

As the cable supplied with the receiver unit is nominally one metre in length, use a conduit box to connect between the receiver unit cable and the cable to the Control Box. Mount the conduit box as close as practicably possible to the receiver unit so that the cable between conduit box and receiver is kept as short, to reduce the possibility of electromagnetic interference.

Transmitter Unit - Connect the Red (+), Black (-), and Yellow (screen) wires either to the Control Box terminals or to a suitable power supply using screened cable.

As with the receiver unit, the the cable supplied with the transmitter unit is also nominally one metre in length, therefore use a conduit box to connect between the transmitter unit cable and the incoming power supply cable. Position the the conduit box as close as practicable to the transmitter unit.

Terminate the screen braid to the cable gland on the control box.

The terminal blocks in the control box accept a maximum of 2.5mm<sup>2</sup> cable.

The size for the cables from the detectors is 0.5mm<sup>2</sup>. Use fire resistant cable between the detectors and Control Box.

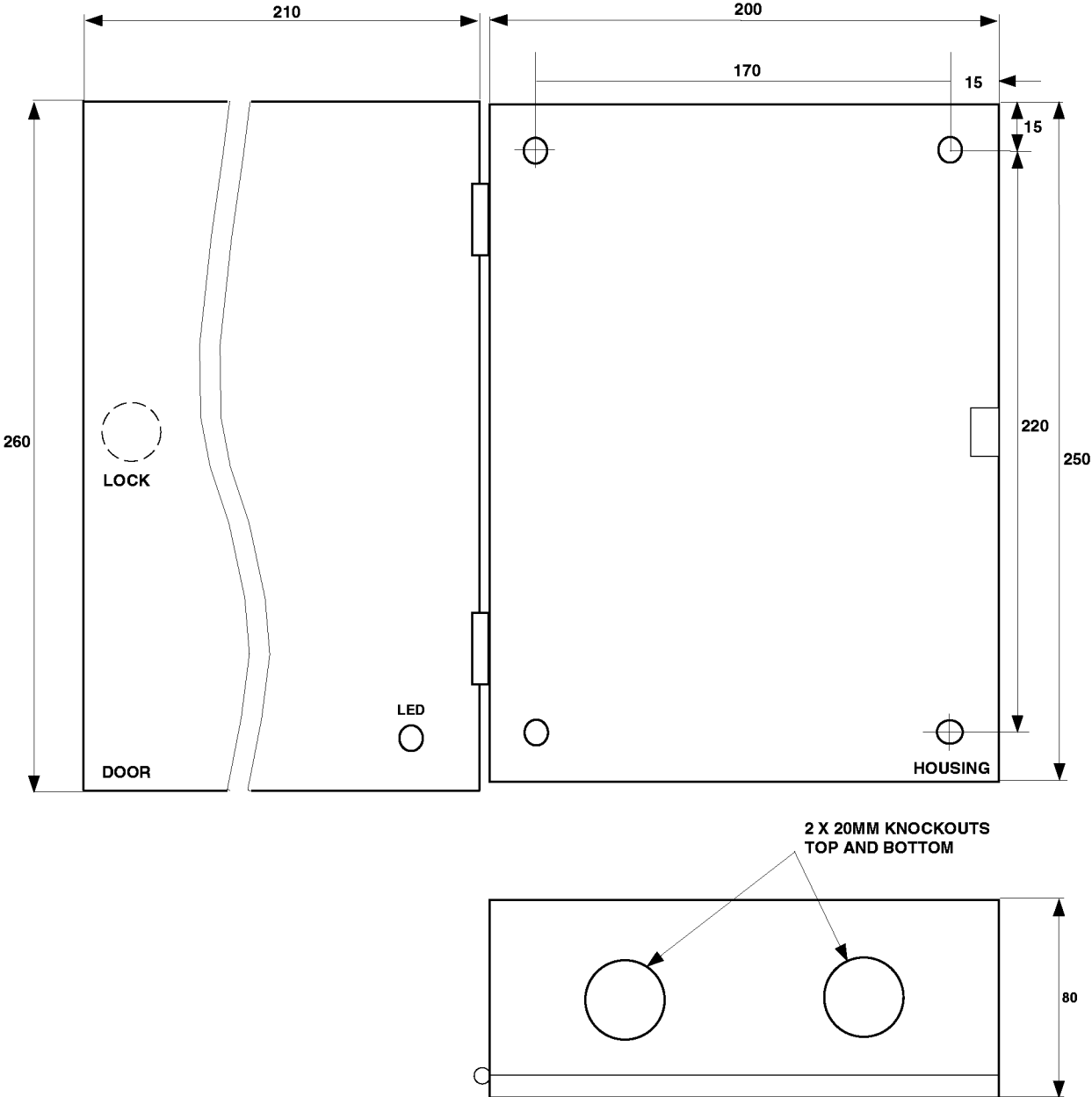


Fig. 6 Control Box - Overall and Fixing Dimensions

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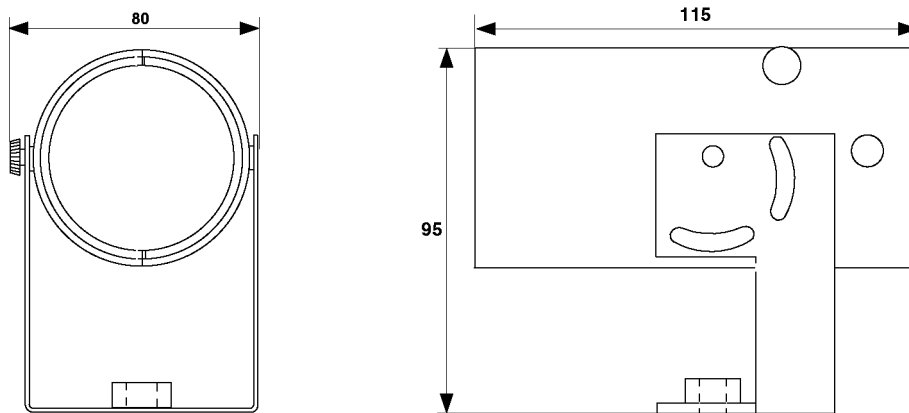


Fig. 7 Transmitter and Receiver - Overall Dimensions

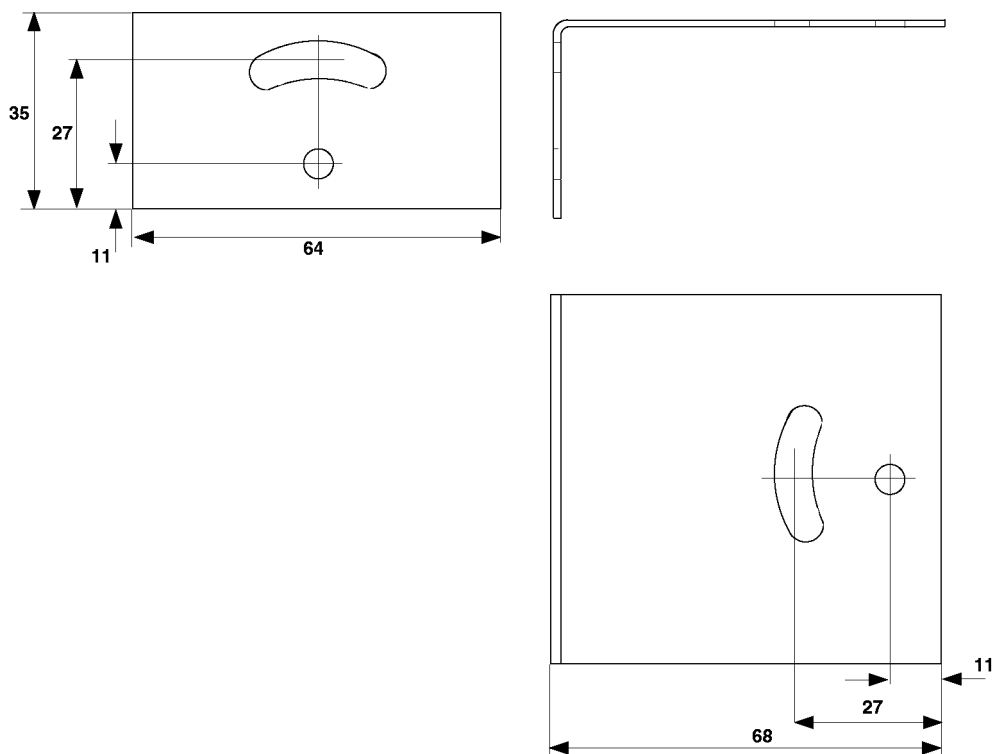
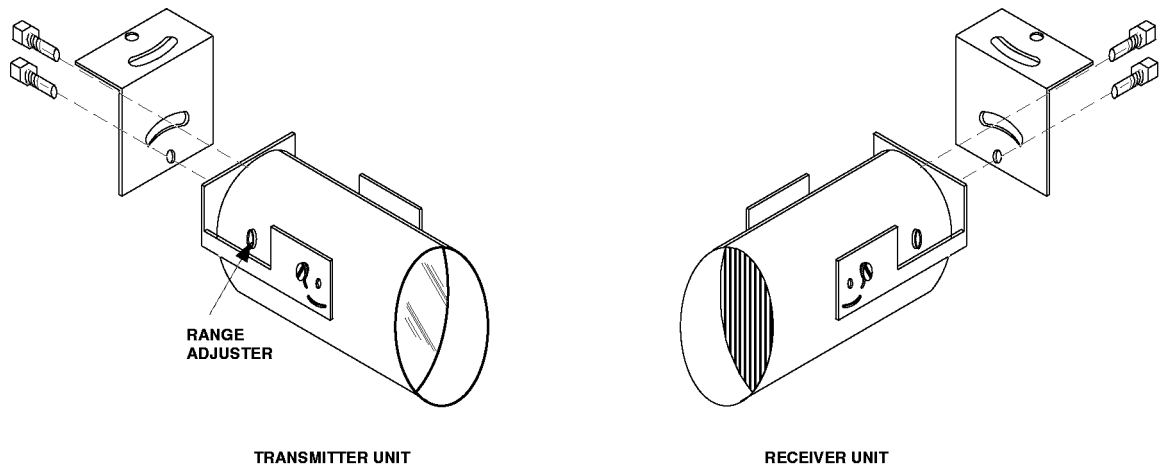
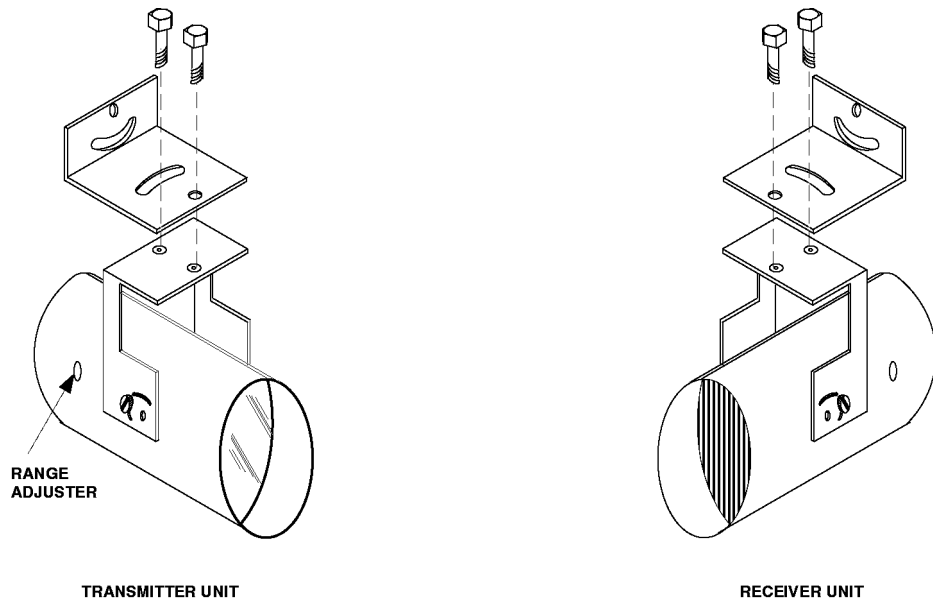


Fig. 8 Transmitter/Receiver Mounting Bracket



**Fig. 9 Ceiling Mounting**



**Fig. 10 Wall Mounting**

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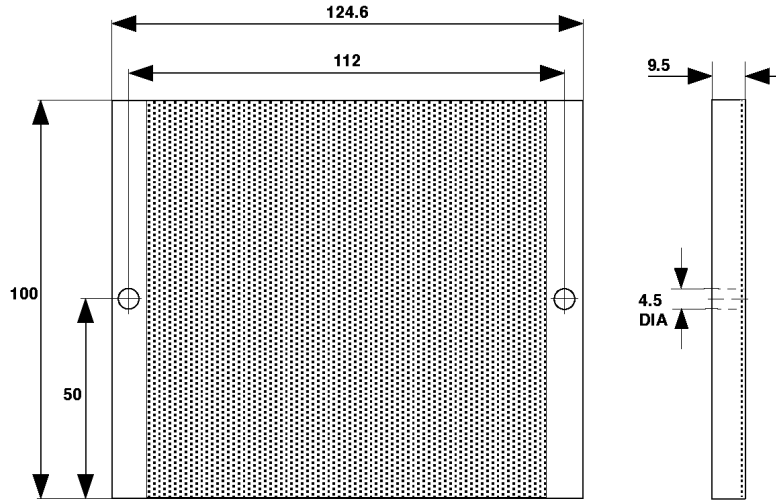


Fig. 11 Reflector TKS100x100

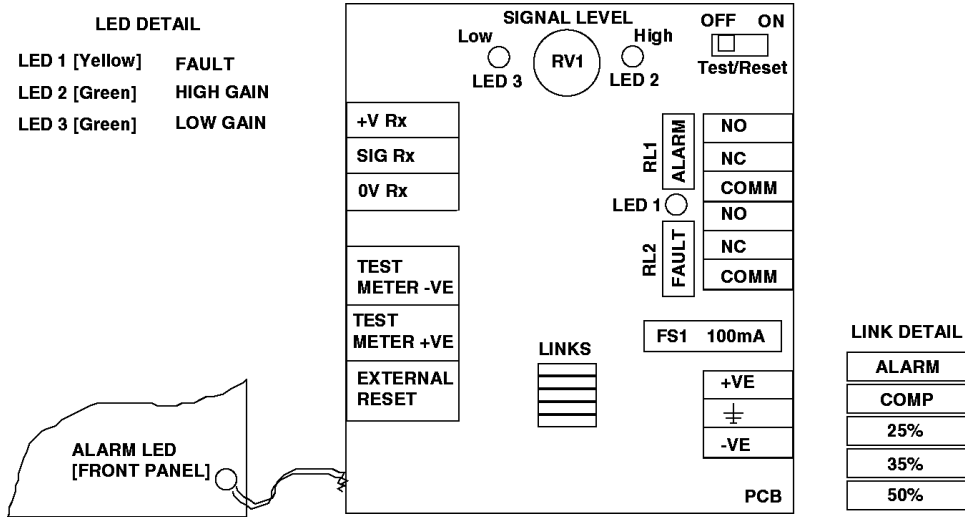
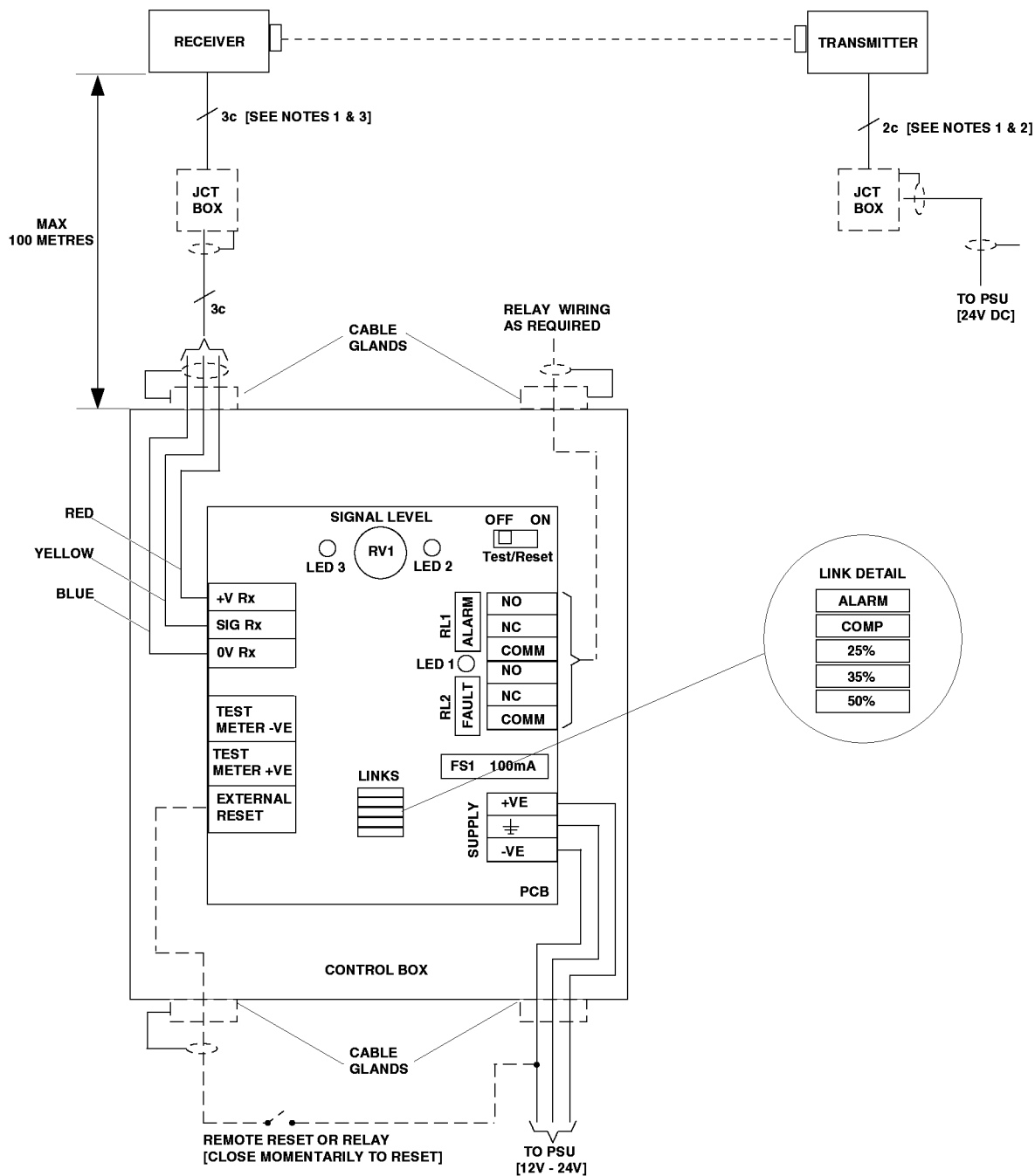


Fig. 12 PCB Layout





- NOTE 1:** BOTH THE TRANSMITTER [TX] AND RECEIVER [RX] UNIT ARE SUPPLIED WITH 1 METRE [NOMINAL] OF FACTORY CONNECTED 4-CORE CABLE [UNSCREENED]. THE TX UNIT USES ONLY THE RED [+VE] AND BLUE [-VE]. THE RX UNIT USES THE RED [+VE], YELLOW [SIGNAL], AND BLUE [-VE]. ENSURE THAT THE CABLE LENGTH BETWEEN TX AND RX UNITS AND THEIR RESPECTIVE JUNCTION BOXES IS KEPT AS SHORT AS PRACTICABLE.
- NOTE 2:** FOR TRANSMITTER POWER USE A COMMON OR INDEPENDENT POWER SUPPLY, DEPENDING ON THE INSTALLATION AND THE LOCATION.
- NOTE 3:** THE MAXIMUM CABLE RUN BETWEEN THE RECEIVER UNIT AND THE CONTROL BOX IS 100 METRES.

Fig. 13 System Cabling Layout

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## 4. FINISHING OFF

At the Control Box and associated detectors ensure that metal chippings, cable snippets etc. are cleared away.

Place the acetate test card in the Control Box for use by the Commissioning Engineer.

## 5. ASSOCIATED PUBLICATIONS

- 05A-02-D1 LOW VOLTAGE FIRE DETECTION SYSTEMS - GENERAL DESIGN INFORMATION
- 05A-02-I1 LOW VOLTAGE FIRE DETECTION SYSTEMS - GENERAL INSTALLATION INFORMATION
- 08A-02-D26 LOOP POWERED BEAM DETECTOR INTERFACE MODULE PRODUCT APPLICATION AND DESIGN INFORMATION
- 26A-02-I1 INTRINSICALLY SAFE SYSTEMS FOR USE IN LOW VOLTAGE FIRE DETECTION SYSTEMS INSTALLATION INSTRUCTIONS

CB/jm

12th January 2001