

DRD-E
Conventional Infrared
Flame Detector
Installation Manual



This manual details the installation of:

DRD-E Flame Detector

If you have any queries regarding these products or their functionality please contact:

- ▶ Hochiki Europe (UK) Limited
Grosvenor Road
Gillingham Business Park
Gillingham
Kent ME8 0SA
- ▶ Tel: +44 (0) 1634 260133
- ▶ Fax: +44 (0) 1634 260132
- ▶ Web: <http://www.hochikieurope.com>
- ▶ Email: psupport@hochikieurope.com



DRD-E	0832-CPD-1347	10	EN54-10 Flame detectors – point detectors
-------	---------------	----	---

©2010 Hochiki Europe (UK) Ltd. All rights reserved. No part of this document may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, without the prior permission in writing of Hochiki Europe (UK) Ltd.

Hochiki Europe (UK) Limited reserves the right to alter the specifications of its products from time to time without notice. Although every effort has been made to ensure the accuracy of the information contained in this document it is not warranted or represented by Hochiki Europe (UK) Limited to be a complete and up-to-date description.

Document Details:

Title: DRD-E Flame Detector - Installation Manual
 Issue: 1.0
 Issue Date: November 2010
 Part No.: 2-3-0-1376

Table of Contents

1	General	4
1.1	Description	4
1.2	Alarm Response Modes	4
1.3	IR Detection Basics	4
2	Application	6
2.1	Detectable Fire Sources	6
2.2	Typical Applications	6
2.3	Applications and Locations to Avoid:	6
3	Quantities and Positioning	7
3.1	Field of View	8
3.2	Detector Window Contamination	9
3.2.1	Cleaning	9
4	Installation	10
4.1	Functional Testing	11
4.2	Service & Repairs	11
5	Detector Specifications	12
5.1	Compatible Bases	12

1 General

1.1 Description

The flame detector is designed for use where open flaming fires may be expected. It responds to the light emitted from flames during combustion. The detector discriminates between flames and other light sources by responding only to particular optical wavelengths and flame flicker frequencies. This enables the detector to avoid false alarms due to such factors as flickering light sources.

1.2 Alarm Response Modes

The detector is normally configured to latch into an alarm state when a flame is detected. The supply to the detector has to be removed in order to reset the detector.

1.3 IR Detection Basics

Flame detectors are classified into two types by their principle of detection. UV detectors are sensitive to ultraviolet, and IR detectors are sensitive to infrared.

This DRD-E detector can detect IR radiated from flames. Flames radiated from a fire have an IR peak emission of 4.3 μ m occurring during the CO₂ formation due to the combustion of hydrocarbons from 2 to 15 Hz.

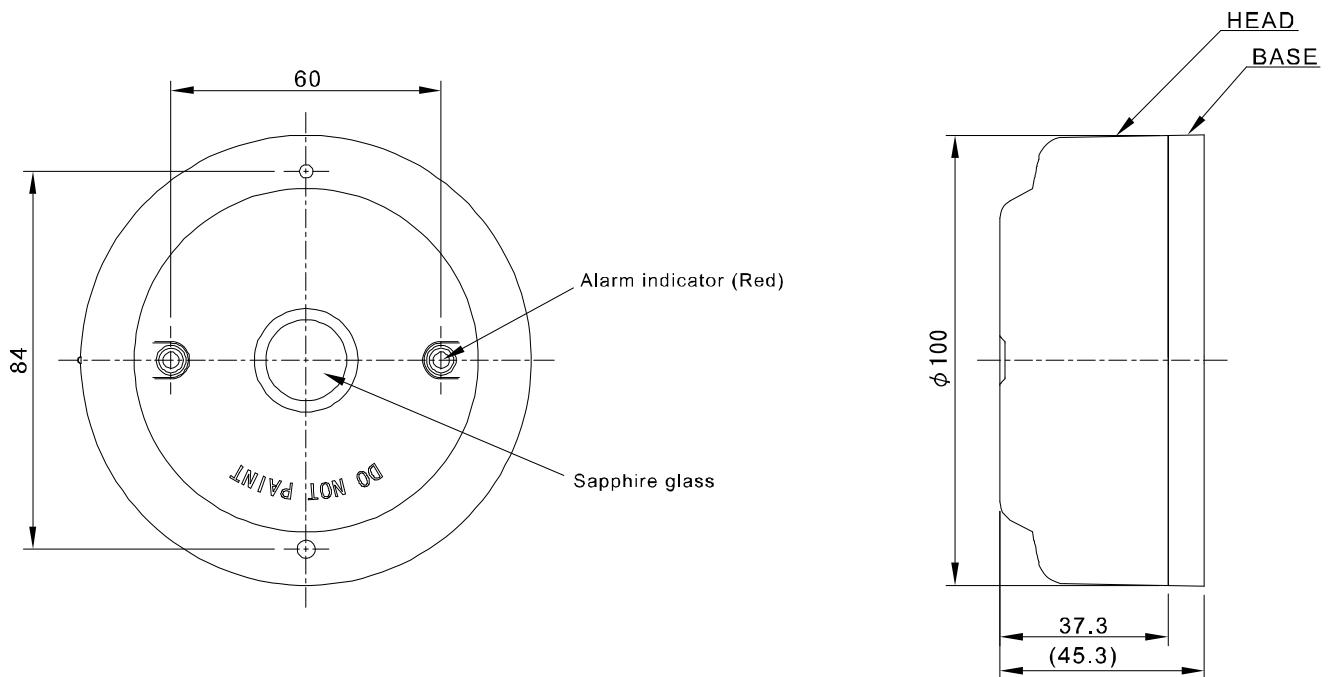


Fig 1 : External View of DRD-E

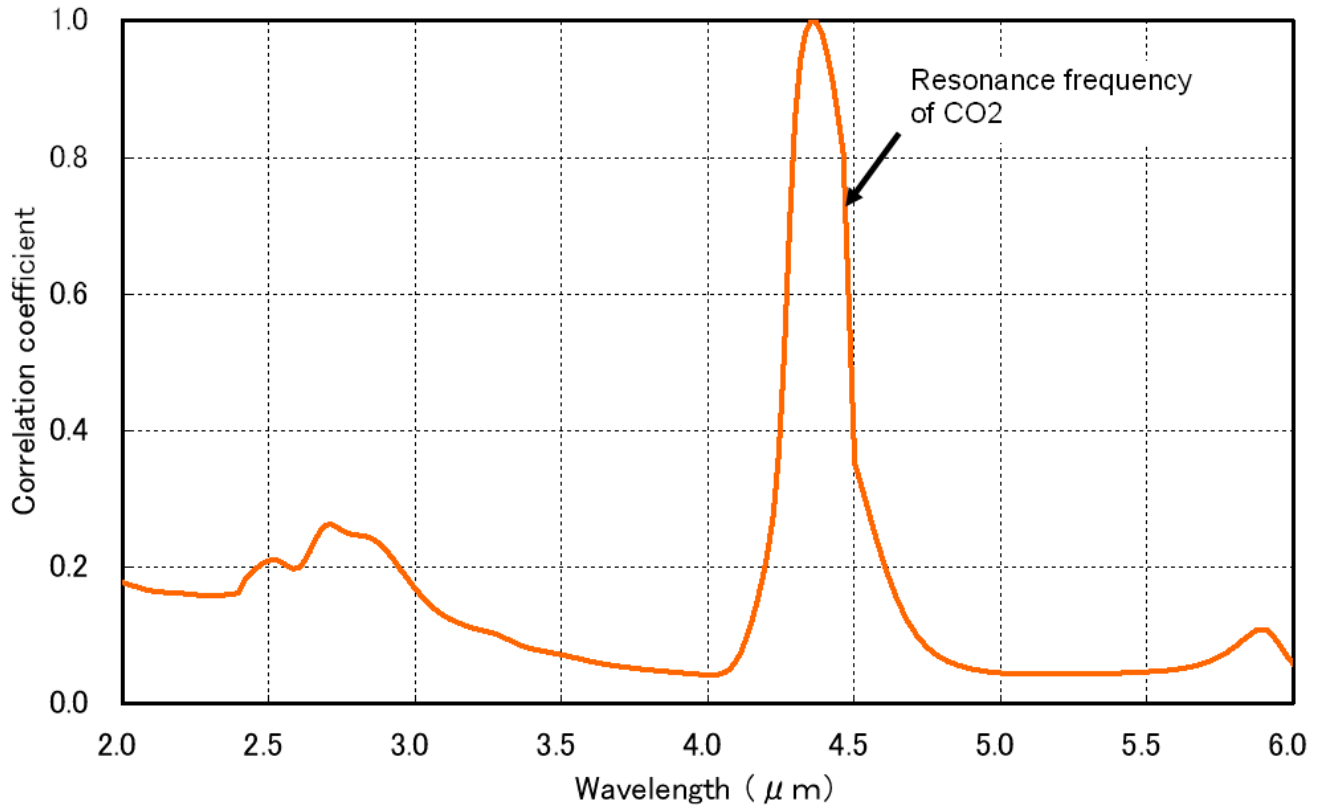


Fig 2 : Spectrum of white gas flame

The pyroelectric device fitted within the DRD-E detector, can detect CO₂ formation during combustion through an optical filter. The output is amplified from 2 to 15 Hz. The DRD-E detector will then make a fire decision using an AC-DC converter, comparator, and capacitor. It will then send an alarm signal to the fire panel via a switching circuit.

2 Application

Flame detectors are used when detection is required to be:

- ▶ Unaffected by convection currents, draughts or wind
- ▶ Tolerant of fumes, vapours, dust and mist
- ▶ Fast reacting

2.1 Detectable Fire Sources

- ▶ Liquids - Aviation Fuels (kerosene), Ethanol, Methylated Spirits, n-Heptane, Paraffin, Petrol (gasoline)
- ▶ Solids – Coal, Cotton, Grain & Feeds, Paper, Refuse Wood
- ▶ Gases – Butane, Natural Gas, Off Gas, Propane

2.2 Typical Applications

- ▶ Coal handling plant
- ▶ Aircraft hangars
- ▶ Atria
- ▶ Automotive industry - spray booths, parts manufacture
- ▶ Paper manufacture
- ▶ Pharmaceutical
- ▶ Engine rooms
- ▶ Generator rooms
- ▶ Metal fabrication
- ▶ Waste handling
- ▶ Woodworking
- ▶ Power plants
- ▶ Textiles
- ▶ Transformer stations
- ▶ Petrochemical

2.3 Applications and Locations to Avoid:

- ▶ Ambient temperatures above 50°C
- ▶ Dusty or steamy atmospheres
- ▶ Atmospheres containing corrosive gases
- ▶ Where condensation exists
- ▶ In the vicinity of large IR sources – such as heaters, burners, flares
- ▶ Close proximity to RF sources
- ▶ Obstructions to field of view
- ▶ Exposure to weather
- ▶ Large amounts of flickering reflections
- ▶ Direct sunlight or its reflected light by puddle, glass, or mirror surface of metal
- ▶ Spot lighting directly on the detector optics

3 Quantities and Positioning

The number of detectors required and their position depends on:

- ▶ the anticipated size of the flame
- ▶ the distance of the flame from the detector
- ▶ the angle of view of the flame detector

The DRD-E flame detector is designed to have a class 1 performance as defined in BS EN54-10 on the high sensitivity setting. That is the ability to detect an n-heptane (yellow) fire of 0.1m² or methylated spirit (clear) fire of 0.25m² at a distance of up to 25m within 30 seconds.

In fact, the DRD-E flame detector will detect fires at distances of up to 40 metres, but the flame size at such distances needs to be proportionally greater in order to be sure of reliable detection. Thus the yellow flickering flame that can be detected at 25m, provided that its size is not less than 0.1m², will have to be 0.4m² in order to be detected at 40metres.

In a rectangular room the distance from the flame detector to the fire is calculated by the formula:

$$\text{Maximum distance} = \sqrt{L^2 + W^2 + H^2}$$

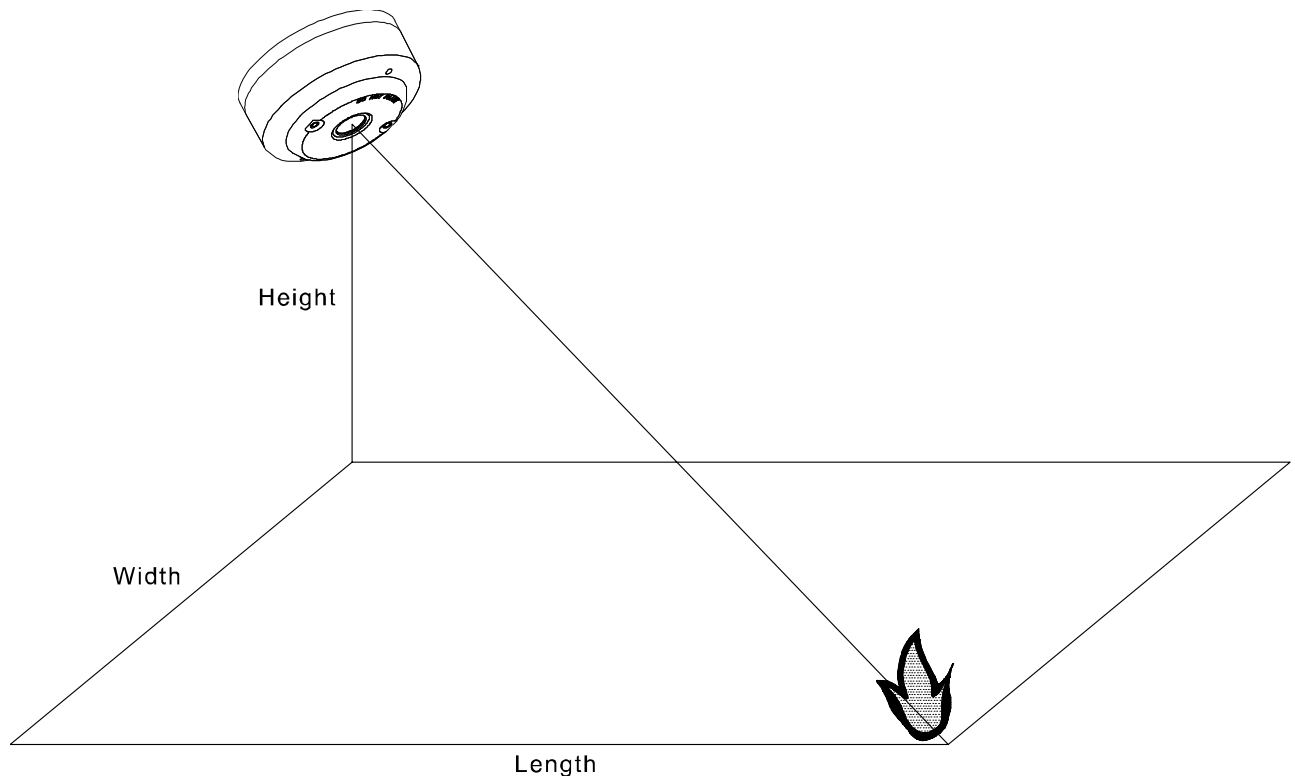


Fig 3 : Calculation of distance from detector to flame

3.1 Field of View

The DRD-E flame detector has a field of view of approximately 90°, as shown in the diagram below.

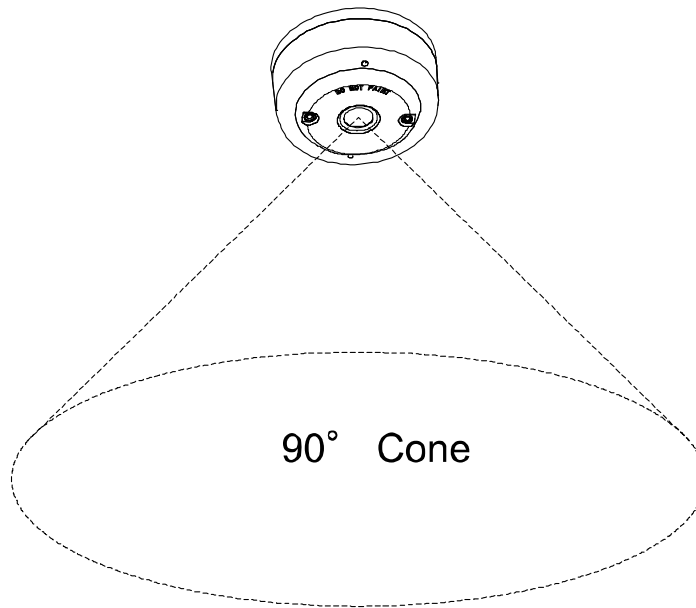


Fig 4 : Conical field of view of the flame detector

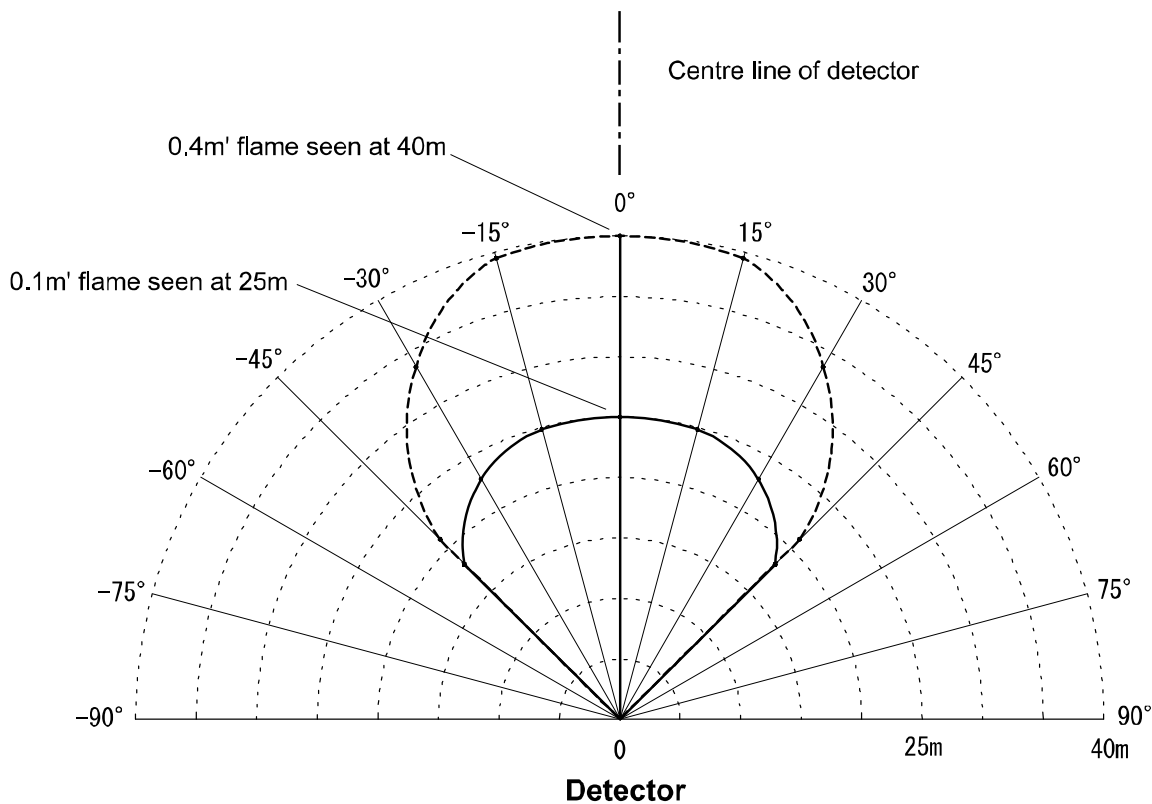


Fig 5 : Detector Field of View Plot

The DRD-E flame detector should be positioned at the perimeter of the room, pointing directly at the anticipated flame or at the centre of the area to be protected. If the detector cannot 'see' the whole of the area to be protected, one or more additional detectors may be required.

The DRD-E flame detector is not affected by normal light sources but should be positioned so that sunlight does not fall directly onto the viewing window.

3.2 Detector Window Contamination

It is important to keep the detector window clean and checks should be carried out at regular intervals – determine locally according to the type and degree of contamination encountered – to ensure optimal performance of the DRD-E flame detector. Although IR detectors can detect flames when the window is contaminated, there may be a reduction of sensitivity.

3.2.1 Cleaning

If the window of the DRD-E flame detector is coated with dust or oil, the sensitivity to flames may decrease. To remove the contamination, use a damp cloth; please ensure to remove any excess moisture with a dry cloth.

NOTE: Do not wipe the main body of the detector window with alcohol or benzene.

4 Installation

The DRD-E flame detector can be used in conjunction with the following mounting bases: YBN-R/6, YBO-R/6R, YBO-R/6RN, YBO-R/6PA, YBN-R/6SK, and YBN-R/6RS.

A wall and ceiling mounting bracket are available if required, these should be ordered separately. Please refer to Fig 7 and Fig 8 below.

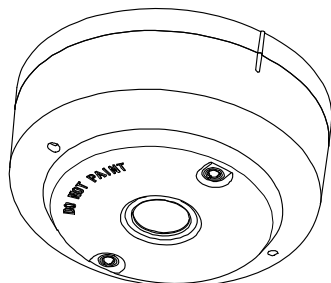


Fig 6 : Installation with Mounting Base

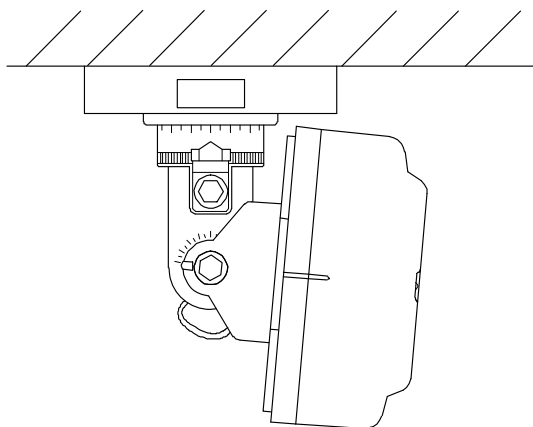


Fig 7 : Installation with ceiling bracket (YZU-A)

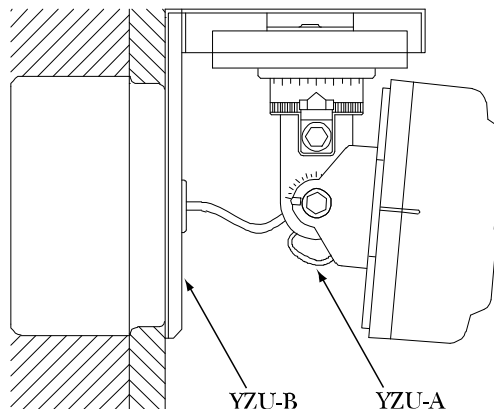
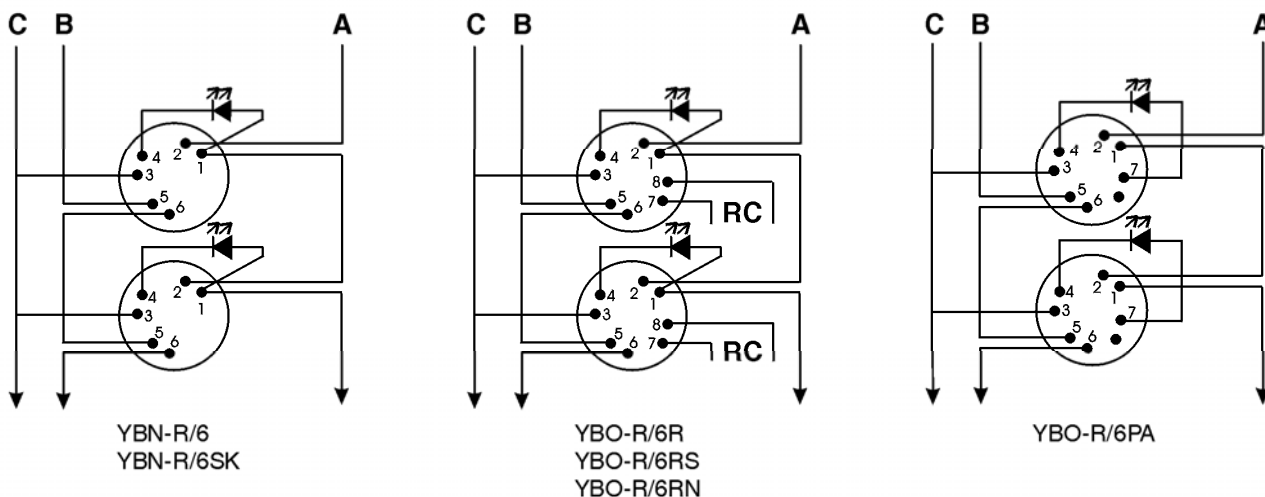


Fig 8 : Installation with wall bracket (YZU-B with YZU-A)

A: Zone +ve B: Zone -ve C: Cable Screen



RC Relay Contacts - a flying lead on either terminal 7 or 8 selects either N/C or N/O (supplied as N/C)

Remote Indicator

Fig 9 : Connection to Conventional Control Panel via CDX Mounting Bases

4.1 Functional Testing

A portable flame detector test unit is available to generate simulated flame behaviour (Fig 10.). To test the detector, the test unit needs to be within 600mm of the DRD-E flame detector. The DRD-E incorporates a 15 second delay to help filter out any transient IR sources that may occur. Between each test the DRD-E flame detector will need to be left for minute to allow for stabilisation.

If it is safe to do so, a naked flame could also be used to test the DRD-E flame detector, please ensure that the flame is not exposed directly to the outer casing or lens as damage may occur.

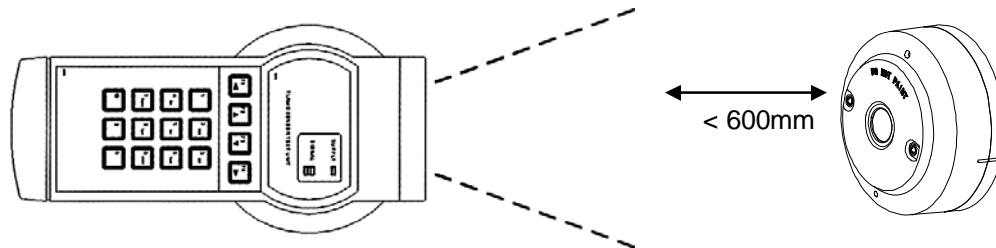


Fig 10 : Portable Flame Detector Test Unit

4.2 Service & Repairs

Servicing of the fire protection system should be carried out by competent persons familiar with this type of system, or as recommended by the local regulations in force.

Only the manufacturer or equivalent authorised body may carry out repairs to the flame detectors. In practical terms this means that flame detector may be repaired only at the manufacturer's factory.

5 Detector Specifications

Ordering code	DRD-E
Operating voltage	15-30 Vdc (Nominal rating 24Vdc)
Standby current	70 uA at 24Vdc
Delay time	15 to 21 Second
Detection angle	90°Cone
Infrared sensitivity range	Class 1 – 0.1m ² n-heptane at 25m
Maximum current in alarm state	40mA
Remote indicator drive(max)	20mA
Operating temperature range	-10°C to +50°C
Maximum humidity	95%RH - Non condensing (at 40°C)
Colour and case material	White Ivory ABS
Weight	125g

5.1 Compatible Bases

Order Code	Function
YBN-R/6	Common Mounting Base.
YBN-R/6SK	Common Mounting Base c/w Schottky Diode.
YBO-R/6RN	Non-Latching Relay Base
YBO-R/6RS	Latching Relay Base c/w Schottky Diode.
YBO-R/6PA	For use with compatible 2-Wire systems.
YBO-R/6R	Latching Relay Base

NOTE: Alarm control panel compatibility is required for certain base types.