To check the screen continuity, proceed as follows

a) Remove the +ve short circuits at each detector.

b) Short circuit the screen and -ve at the detector furthest from the control equipment.

c) Using an ohmmeter set to its lowest range, check the resistance between the screen and the -ve line at the control equipment end.

d) If the reading obtained is less than 50 ohms record the reading obtained.

e) If the reading obtained is greater than 50 ohms locate and rectify continuity faults by quartering the system.

f) Remove the short circuit and fit the end of line resistor.

TESTS ON INTRINSICALLY SAFE SYSTEMS

When carrying out tests on wiring of intrinsically safe systems it is essential that an INTRINSICALLY SAFE INSULATION TESTER is used, unless the area can be shown to be completely free of flammable gases. Further guidance on testing such systems can be found in BS EN 60079-14.

T110 TEST SOURCE S/C No. 592.001.012

This is a test torch that simulates a fire and may be used to test the sensitivity of the S131 after installation and during routine maintenance.

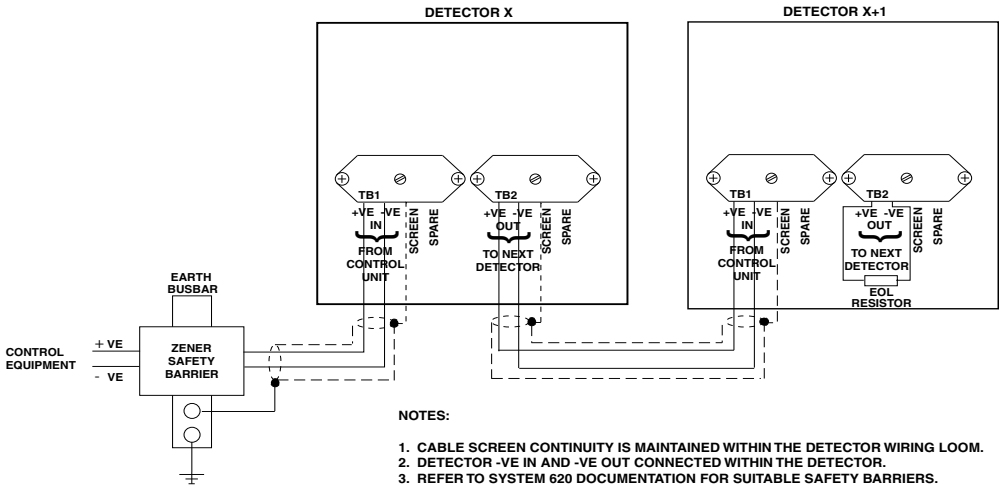


Fig. 5 Detector Wiring - Intrinsically Safe Circuits

S131
INFRA-RED FLAME DETECTOR

Installation Sheet 120.415.597 Issue 1

Fig. 1 S131 Infra-red Flame Detector

INTRODUCTION

The S131 detector is supplied with the option of an adjustable mounting bracket for fixing to a convenient rigid surface. All electrical connections are made via the two 4-way terminal blocks inside the detector housing. Two 20mm cable entries are provided. Guidance on mounting and wiring the detectors is given below.

MOUNTING A DETECTOR

The location of each detector should have been determined at the system design stage according to the principles detailed in Publication 01A-04-D4 and marked on the site plan. The actual mounting position must, however, be decided during installation, and in choosing the position, the principles given below should be followed.

CHOICE OF MOUNTING POSITION

The following points must be observed when choosing the mounting position.

a) The detector must be positioned such that a clear line of sight is provided to all parts of the risk area within the 90º field of view (see Fig. 5, Publication 01A-04-D4). Roof trusses, pipework, supporting columns etc. in front of the detector can cause significant shadowing and should be avoided.

b) If supervision of an area immediately below the detector is required it is essential that the angle between the detector and the horizontal is not less than 45°.

c) The detector should not be sited in a position where it will be continually subjected to water drenching.

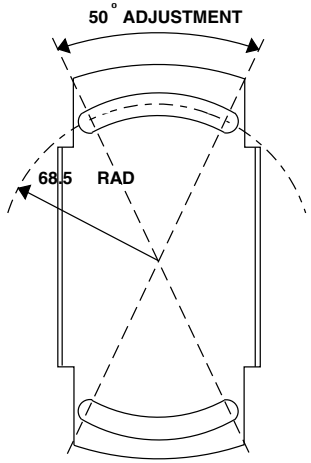
d) In outdoor installations in areas of high solar radiation, some form of sunshade is recommended to prevent excess heating of the detector.

e) The detector should not be sited in a position in which it will be subject to severe icing.

f) The detector must be mounted on a stable structure free of vibrations which is readily and safely accessible for maintenance staff.

The detector mounting bracket is to be secured with two M8 bolts, studs or screws at the fixing centres as shown in Fig. 2. A drilling template is provided to allow optimum selection of the fixing centres and the 2.5mm diameter, 3mm deep pivot hole.

Alternatively, the detector may be secured directly to the fixing surface with four M8 bolts, studs or screws at the fixing centres shown in Fig. 2.



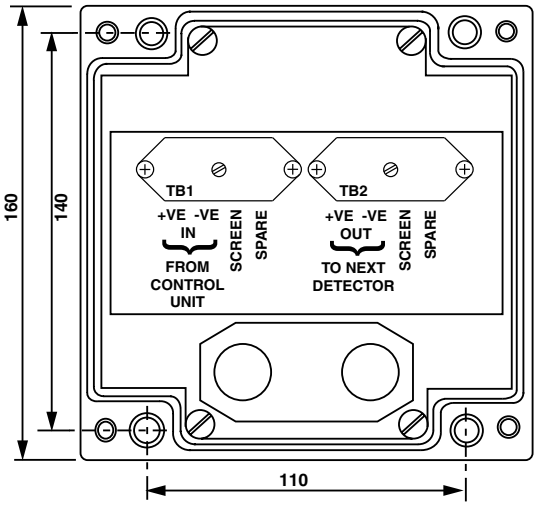


Fig. 2 Fixing Dimensions

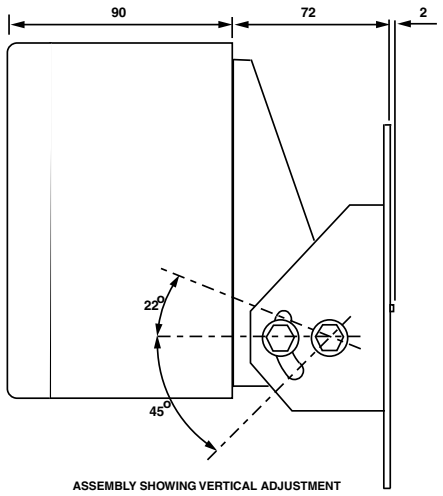


Fig. 3 Clearance Required for Full Adjustment

The surface chosen for the mounting should be flat over the area of the bracket to ensure a stable fixing.

The S131 may be operated in any position, but the mounting point must obviously be chosen to allow sufficient clearance for adjustment of the angle and must also allow space for the cable assembly. A clearance of 200mm, in all directions, from the fixing point will normally be sufficient to allow the full range of adjustment. Fig. 3 refers.

DETECTOR WIRING

Detectors will normally be connected in zones which may contain up to ten detectors. All detectors on a zone are connected in parallel and some form of end-of-line device should be used to monitor line continuity.

The wiring between the detectors and control equipment must provide the required degree of mechanical protection, but allow the detector alignment to be adjusted to suit the area to be protected.

The detector is fitted with two 4-way terminal blocks giving separate terminal blocks for incoming and outgoing lines including cable screens. The two 20mm cable entries provided permit convenient connection of the incoming and outgoing lines including cable screens. It is essential that cable entries prevent the ingress of water.

To ensure no moisture ingress to the detector during the time between Installation and Commissioning, tighten the four hexagonal socket cover retaining screws to torque of 3.5 -4.5N.m (2.6 - 3.3lbf.ft).

CONVENTIONAL CIRCUITS (SAFE AREAS)

Wiring for conventional circuits is as shown in Fig. 4.

Screened cable must be used.

The S131 infra-red flame detector is compatible with the DM520 Conventional Detector Module for use with the Minerva range of analogue addressable controllers.

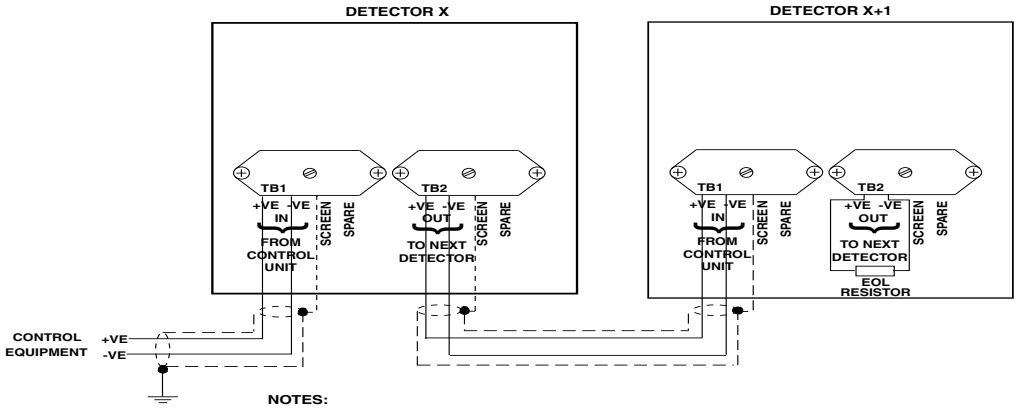


Fig. 4 Detector Wiring - Conventional (Safe Area) Circuits

RECOMMENDED CABLE TYPES - CONVENTIONAL CIRCUITS

The cable selected for interconnection to the control equipment should meet the requirements of any national codes (eg, BS5839) or relevant approval bodies. Cables should not normally have a cross sectional area of less than 1mm^2 for solid conductors or 0.5mm^2 for stranded conductors.

The following cables are generally recommended for use:

a) PVC insulated and protective screen, twin 16/0.2mm type 16.2.2.c to DEF Standard 61-12 Part 5.

b) Mineral insulated cable, twin or multi-core, to BS6207 Pt. 1, with all cable terminations and fittings supplied by the manufacturer of the cable.

c) Shipwiring Cable to BS6883 with braid.

d) PVC insulated, PVC inner sheathed, steel wire armoured and PVC oversheathed cable to BS6346.

CABLE ROUTING

All interconnecting cables should be run in conduit or trunking which is reserved exclusively for fire alarm circuits. Where such separation is not possible MICC cable should be used.

Particular care must be taken to ensure that detector wiring is not run close to ac power circuits.

INTRINSIC SAFETY

The detectors are designed to comply with EN 50 014 and EN50 020 for intrinsically safe apparatus. They are certified:

ATEX code:

Ⓔx II 1 G

Cenelec code:

EEx ia IIC T5 (-40°C≤Ta≤+40°C)
or T4 (-40°C≤Ta≤+80°C

under ATEX certificate number Baseefa03ATEX0360.

Two +ve terminals are provided to allow monitoring of the circuit wiring through the detector.

The body assembly of the detector is filled with polyurethane resin so that all critical components and conductors are encapsulated giving protection against corrosion and mechanical shock.

These detectors are designed and manufactured to protect against other hazards as defined in paragraph 1.2.7 of Annex II of the ATEX Directive 94/9/EC.

The detector cannot be repaired and must be replaced by an equivalent detector.

The detector must not be exposed to dusty conditions.

When the detector is installed as described in Page 1, the detector will not be subjected to mechanical stresses.

The detector and base should not be installed where they may be subject to mechanical or thermal stresses or where they may be attacked by existing or foreseeable aggressive substances.

The intrinsic safety certification specifies the following parameters:

Max input voltage:	U_i	28V
Max power input:	P_i	1W
Equivalent capacitance:	C_i	4nF
Equivalent inductance:	L_i	0

System 620 [cat.[ia]], by Thorn Security Limited, is a certified systems incorporating the S131 detector. Details of this system is available from Thorn Security Limited.

Wiring from the hazardous area to the safe area passes through the diode safety barrier as shown in Fig. 5.

Note: The screen or sheath of the cable should be earthed only at the safety barrier.

RECOMMENDED CABLE TYPES - I.S. CIRCUITS

The cable selected for interconnection to the control equipment should meet the requirements of any national codes (eg, BS5839) and additionally must meet the requirements of the intrinsic safety certification. These requirements will depend, among other things, on the type of barrier used in the system.

Examples of suitable cables are given below:

a) PVC insulated and protected screened twin 16/0.2mm type 16.2.2.c to DEF Standard 61-12 Part 5.

b) Elastomeric instrument screened twin 0.5mm^2 type MEHCBH (DL) with EPR insulation and CSP sheathed.

c) Twin MICC type 2L1 and 2L1.5 and 2H1.5.

d) PVC insulated, PVC inner sheathed, steel wire armoured and PVC oversheathed cable to BS6346.

e) Shipwiring Cable to BS6883 with braid armour.

Note: In determining the maximum cable length it must be remembered that the total capacitance calculation should allow 4nF for each S131 on a circuit.

INITIAL WIRING CHECK

After installing the wiring as detailed above, and before connecting any detectors or end-of-line devices, the following tests should be carried out.

CONTINUITY AND INSULATION TESTS

To check continuity of the detector circuit, proceed as follows:

a) Short-circuit +ve to +ve at each detector terminal block.

b) Short-circuit +ve (OUT) to -ve (OUT) at the end furthest from the control equipment.

c) Using an ohmmeter set to its lowest range, check the loop resistance at the control equipment end.

d) If the reading obtained is less than 50 ohms record the reading obtained.

e) If the reading obtained is greater than 50 ohms locate and rectify continuity faults by quartering the system.

To check the insulation of the detector circuit, proceed as follows:

a) Using an ohmmeter set to its highest range, check the resistance between the detector circuit and earth.

b) If the reading obtained is greater than 1 megohm record the reading, otherwise locate and rectify the earth fault.