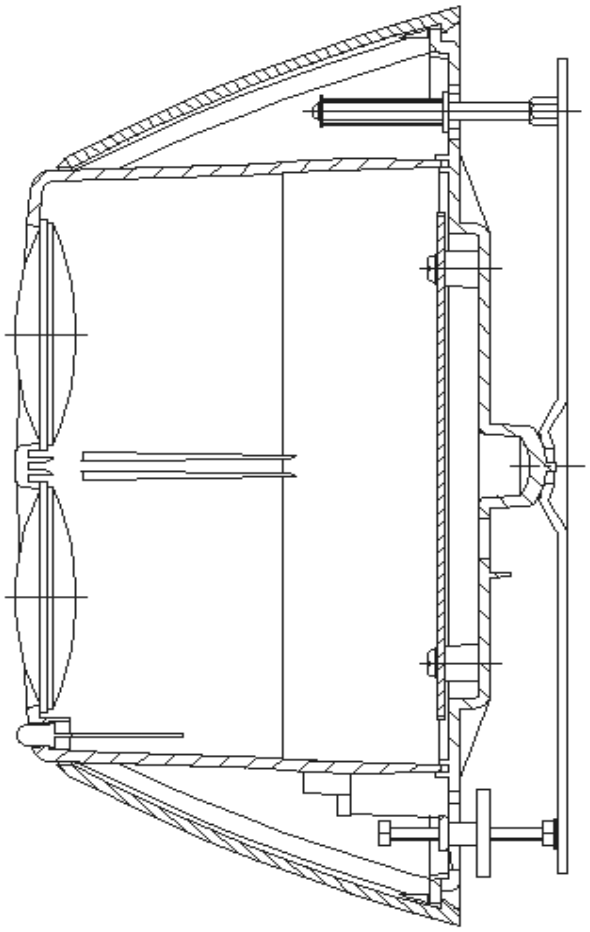
ZITON

ZP7BMR-50/100



FEATURES

- **Microprocessor controlled**
- **Range 5 – 50 Metres**
- **Range 50 – 100 Metres**
- **Unique simple alignment**
- **Loop powered**
- **Selectable alarm thresholds**
- **Low current consumption**
- **Automatic contamination compensation**

Loop Powered
Analogue Addressable

22318.41.01 12.05.05

Installation Guide Index

Section

1. System Description (page 2)
2. System Operation (page 2)
3. Detector Positioning (page 2 to 4)
4. Installation (page 4 & 5)
5. Prism Targeting (page 5)
6. Alignment (page 5 to 7)
7. System Testing (page 7)
8. Connection and configuration Settings (page 8)
9. Detector Back View (page 9)
10. Address settings (page 10)
11. Clearances (page 11)
12. Technical Data (page 11)
13. Service/Application Notes (page 12)
14. Parts List (page 12)
15. Remarks (page 12)

1. System Description.

The ZP7BMR-50/100 Detector comprises a Transmitter and Receiver contained within one enclosure.

The Detector installs to the building fabric between 0.5 and 0.6 metres from the ceiling.

The Transmitter emits an invisible infrared light beam that is reflected via a prism(s) mounted directly opposite and with a clear line of sight. The reflected infrared light is detected by the Receiver and analysed.

The Detector has maximum lateral detection of 7.5 metres either side of the beam.

2. System Operation.

Smoke in the beam path will reduce the received infrared light proportionally to the density of the smoke. The Detector analyses this attenuation or obscuration of light and acts accordingly.

Alarm thresholds of 25%, 35%, and 50% can be selected to suit the environment, where 25% is the most sensitive. If the received infrared signal reduces to below the selected threshold, and is present for approximately 10 seconds, a Fire condition is activated.

If the infrared beam is obscured rapidly to a level of 90% or greater for approximately 10 seconds a Fault condition is activated.
This condition can be entered in a number of ways, for example, an object being placed in the beam path, transmitter failure, loss of the prism(s), or sudden misalignment of the Detector. The fault condition will reset within 10 seconds of the condition being rectified.

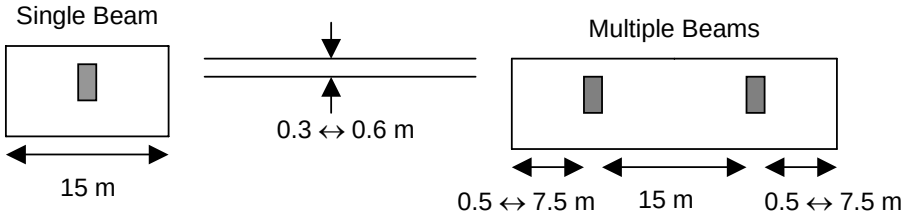
The Detector monitors long term degradation of signal strength caused by component ageing or build up of dirt on optical surfaces. This operates by comparing the received infrared signal against a standard every 15 minutes. When the detector is showing AGC fault, the detector will still operate correctly indicating Alarm and Fault as normal.

3. Detector Positioning.

It is important that the ZP7BMR-50/100 Detector is positioned correctly to minimise the detection time.

Experiments have shown that smoke from a fire does not rise directly upwards, but fans out or mushrooms due to air currents and heat layering effects. The time to signal a fire condition depends on the location of the Detector within the premises, the volume of smoke produced, construction of the roof, and ventilation arrangements.

The maximum distance either side of the beam axis is found to be typically 7.5 metres for satisfactory detection under flat ceilings.



Smoke layering, where smoke does not reach the ceiling level due to layers of static hot air is overcome by mounting the Detector at the recommended height below the ceiling of between 0.5 and 0.6 metres, bringing the infrared beam below the heat layer and into the smoke layer.

However, in all installations the latest national fire standards **must** be consulted. If there is any doubt on the correct mounting height, positioning may be determined by smoke tests.

3.1. Detector Positioning In Apex Of Sloping Ceiling.

A ceiling is defined as sloping if the distance from the top of the apex to the intersection of the ceiling and adjacent wall is greater than 0.6 metres. See Fig. 1.

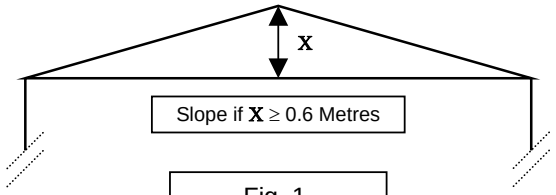


Fig. 1.

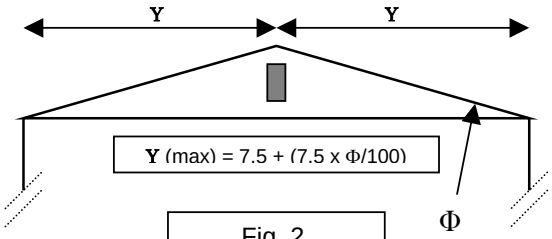


Fig. 2.

When a Detector is positioned in the apex of a ceiling (See Fig. 2), the lateral beam distance covered (Y) can be increased in relation to the angle of pitch (Φ).

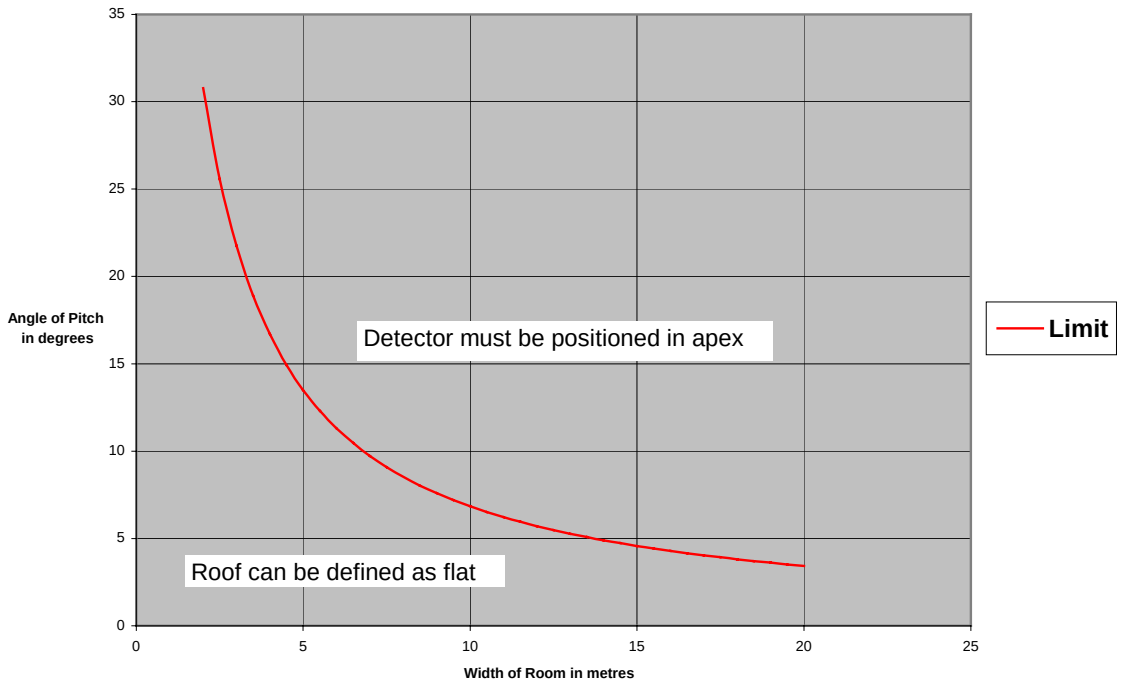
For Example:

If the pitch angle is 20 degrees, the lateral coverage can be increased from 7.5 metres either side of the beam (Y) to:

Y = 7.5 + (7.5 x 20/100) metres
Y = 9 metres

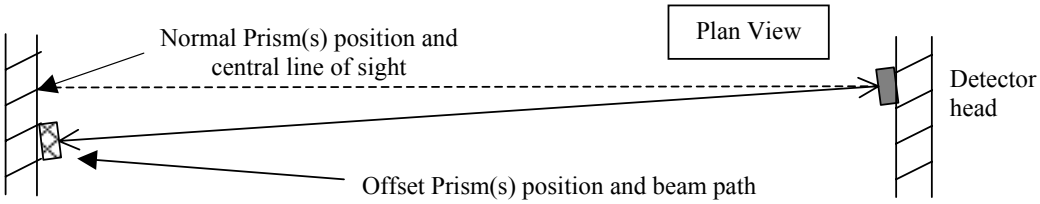
Therefore, with a roof pitch of 20 degrees the lateral coverage can be increased from 7.5 metres either side of the beam to 9 metres either side of the beam, but only for the beam positioned in the apex. All other calculations remain the same.

Limit to when a Detector must be positioned in roof apex



3.2. Detector Positioning In Atrium.

If the detector is to be placed in an atrium, or near glass/polished surfaces, the prism(s) should be offset from the central line of sight (approximately 300mm), and angled back to the beam detector. This can be either on the vertical or horizontal axis. This will reduce the amount of spurious returned signal from the glass/polished surfaces. The reflected signal from the prism(s) will be returned to the detector in the normal way.



4. Installation.

Pre-installation at Ground Level.

Confirm that all parts have been supplied as listed in the parts list. See page 10.

Select the required alarm threshold using configuration switches 3 and 4 (See page 8, fig. 4. for switch configuration settings). The factory default setting is 35% this should be adequate for most environments, if the Detector is to be installed into an exceptionally dirty environment change the threshold to 50%.

Select the required address using address switches 1 to 7 (See page 9, Table 1. for address switch settings) where 1 is 'ON' and 0 is 'OFF'. The factory default setting is address 1.

Shown below is an example of address 85 (1+4+16+64 = 85).

	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Switch Value	1	2	4	8	16	32	64	X
Switch Position	ON	OFF	ON	OFF	ON	OFF	ON	X
Logic	1	0	1	0	1	0	1	X

The Detector Head Assembly is now ready for installation. If configuration switches 3 and 4 require resetting after installation, a power down reset is required (entering into Alignment Mode can also be used as a reset).

4.1. Detector Head Assembly Installation.

Remove the outer cover before installation; this is only to prevent the cover becoming dislodged during handling.

► **Do not mount on plasterboard or cladded walls as these surfaces do, and will move.** ◄

Determine the position of the Head Assembly, which must be mounted on a **solid structure** between 0.5 and 0.6 metres below the ceiling, and no closer than 0.5 metres to an adjacent wall or structure. Ensure that there is a **clear line of sight** to the proposed position of the prism(s), which is to be mounted on a solid structure between 5 and 100 metres directly opposite the Detector (range dependent on model).

Using the template provided mark and install all 4 fixing points to the structure. The rear mounting plate of the Detector Head Assembly is provided with 4 keyhole slotted apertures to allow for easy installation onto the 4 fixing points. Install the detector on the four mounting points.

Replace the outer cover.

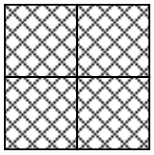
Terminate the field wiring. See section 8.

4.2. Prism(s) Installation.

Due to the principle of the detector i.e. reflective, the prism(s) must ***NOT* be mounted on glass or a polished reflective surface.**

Mount the Prism(s) on a **solid structure**, 90º to the beam path, between 5 to 50 metres (ZP7BMR-50), and 50 to100 metres (ZP7BMR-100) directly opposite the Detector.

50R = 1 Prism 

100R = 4 Prisms 

Ensure that there is a clear line of sight to the Detector, taking care that no moving objects i.e. doors, mechanical lifting equipment etc, will interfere with the beam path between the Detector and Prism(s).

Note: On ranges of ≥5 metres and ≤50 ***metres use a ZP7BMR-50.***
On ranges of ≥50 meters and ≤100 ***meters use a ZP7BMR-100.***

5. Prism Targeting Mode.

If the beam is less than 15 metres from the reflector ignore Prism Targeting mode and go to Alignment mode.

Apply power to the Detector. There is a pre-charge delay after power is applied to allow the internal circuits to stabilise correctly.

Do not remove the detector from the wall during this action.

Using the mode switch (See fig. 4) select 'Prism Targeting Mode' (Switch will be in the up position). At this time there will be a fault condition showing on the panel.

Find the prism(s) by adjusting the horizontal and vertical thumbwheels until the Amber LED is flashing. Both the Red and Amber LED will be OFF when no signal is being received. The Red LED will start to flash when a weak signal is received (the stronger the signal, the faster the flash rate). When the received signal is high enough the Red LED will extinguish and the Amber LED will start to flash.

- **At this point it is essential to test that the prism(s) and not another surface is reflecting the beam.**

This can easily be confirmed by covering the prism(s) with a non-reflecting surface and confirm that the AMBER and RED indicators are OFF.

6. Alignment Mode.

Mechanical alignment is provided by two adjustment thumb wheels on two sides of the Detector, positioned just behind the Detector Head cover. Adjustment is achievable in both axes.

6.1. Enabling Alignment Mode.

Do not remove the detector from the wall during this action.

Using the mode switch (See fig. 4) select 'Alignment Mode' (Move switch to the middle position). At this time there will be a fault condition showing on the panel.

6.2. Adjustment in Alignment Mode.

The Detector will automatically adjust its infrared beam power and receiver sensitivity to give an optimum receiver signal strength.

The alignment progress is indicated by the colour and state of the indicator lamp on the front of the Detector.

- **FLASHING RED**

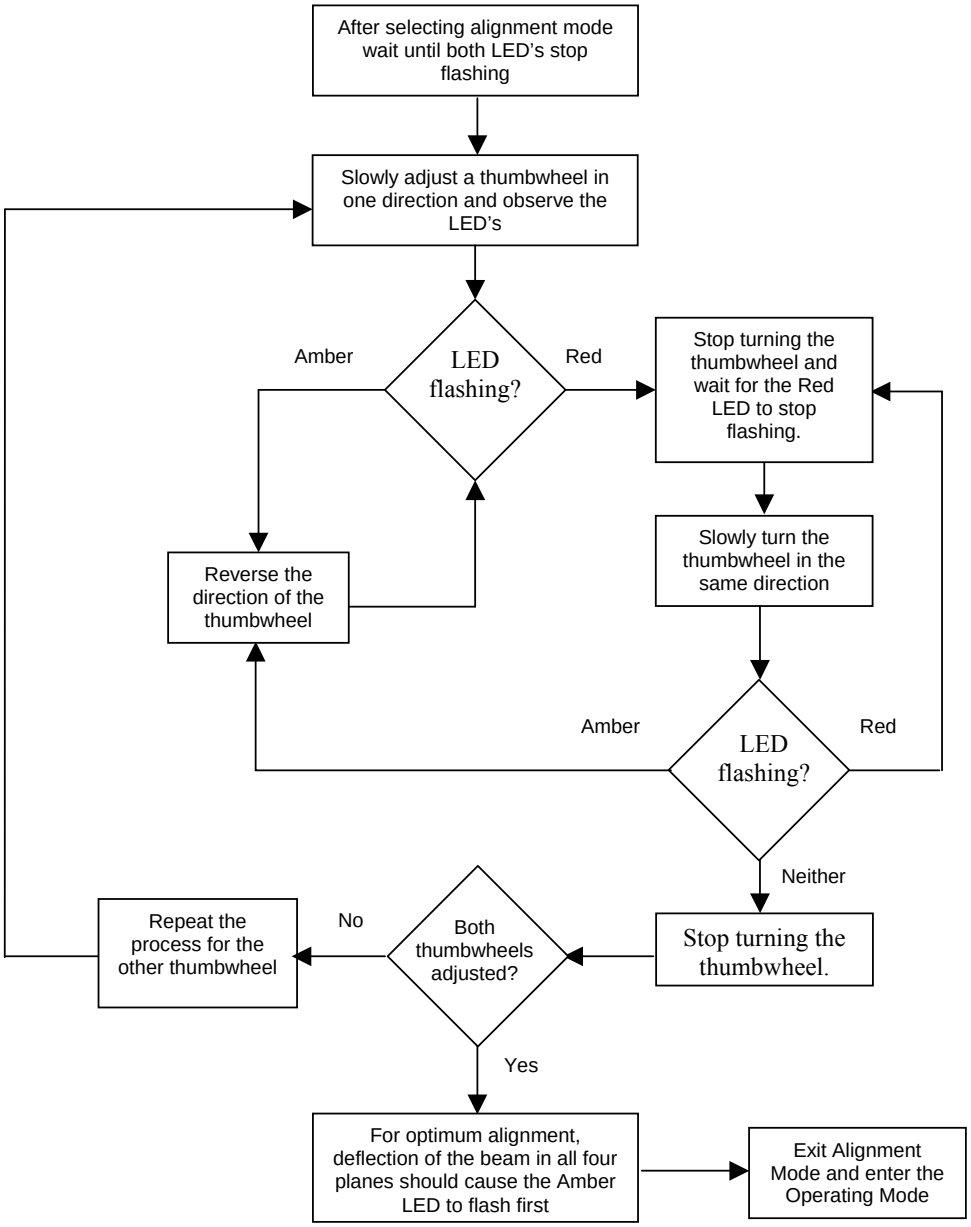
The Detector is receiving too much signal and is attempting to reduce the infrared power output to compensate**. Wait** at this point until the indicator lamp is **OFF**, this may take up to 20 seconds depending on the distance between Detector and Prism(s), the shorter the distance the longer the time.

- **FLASHING AMBER**
  The Detector is receiving a weak signal and is attempting to increase the infrared power output.

- **OFF**
  The Detector has optimised the infrared power and receiver gain for the current orientation of the Detector and Prism(s). **This does not mean that the Detector to Prism(s) alignment is at its optimum**, i.e. if the power is too high, a misaligned Detector may be receiving a fringe reflection from another object.

- **FLICKERING RED/AMBER**
  This state can occur sometimes. It means that the infrared power is stepping through the optimum setting for the current orientation of the Detector and Prism(s).

6.3. Alignment Process Flow Diagram.



6.4. Exiting Alignment Mode.

Do not remove the detector from the wall during this action.

Using the mode switch (See fig. 4) select 'Operating Mode' (Switch will be in the down position).

On exiting 'Alignment mode' the Detector will perform an internal calibration check. If this fails, which would be due to bad alignment or either electrical or optical noise, the power level will try to compensate. If, after 60 seconds, the power level is still not correct, the Fault LED will flash every 2 seconds and the panel will show a Fault. In this case the alignment procedure must be repeated.

7. System Testing.

After successful installation and alignment the System will require testing for both alarm and fault conditions.

7.1. Alarm (smoke) Test.

Taking note of the threshold selected during installation (default 35%).

Select obscuration mark on filter to correspond with the Detector alarm threshold (see fig. 3).

Place the filter over the receiver optics (Top of Detector Head – opposite end to the status indication LED's) at the correct obscuration value determined by the threshold selected, i.e. if a threshold of 35% has been selected position the filter just past the 35% obscuration value on the filter (see fig 3.).

Take care not to cover the transmitter optics.

The Detector will indicate a fire within 10 seconds.

7.2. Fault Test.

Cover the Prism(s) totally with a non-reflective material and confirm that the Detector indicates a fault condition after approximately 10 seconds. The Amber LED on the Detector will flash, and the panel will show a Fault condition. The fault condition will automatically reset after a period of 10 seconds when the obstruction is removed.

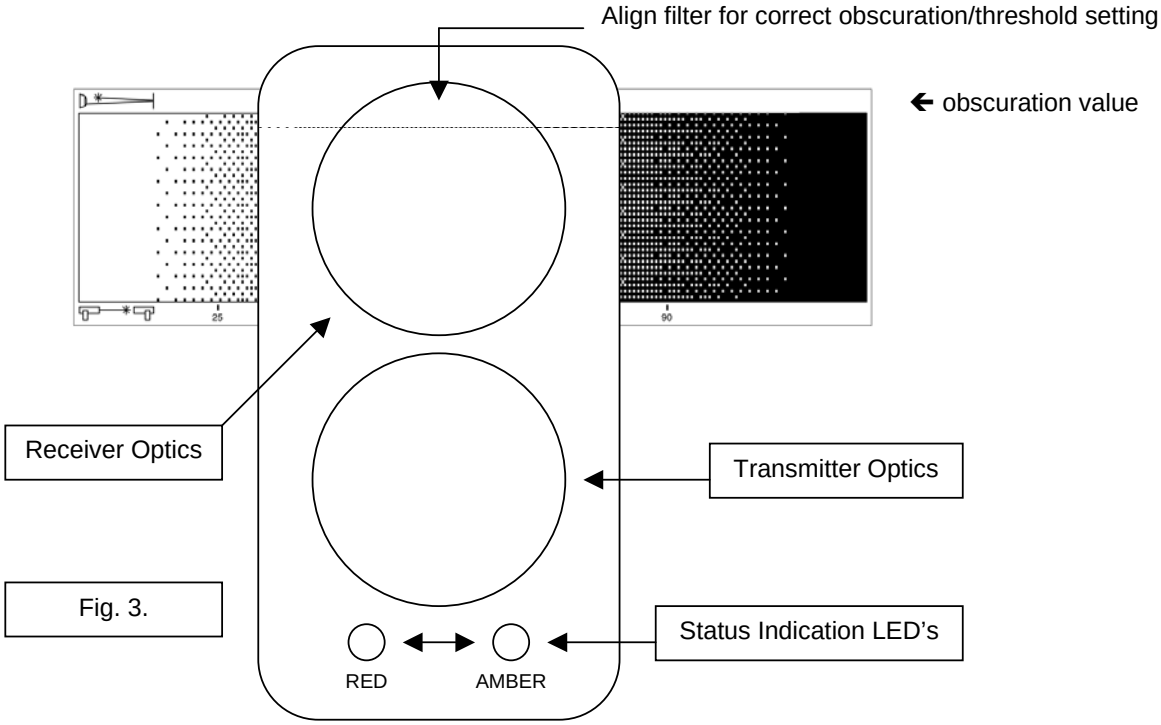


Fig. 3.

8. Connection and Configuration Settings.

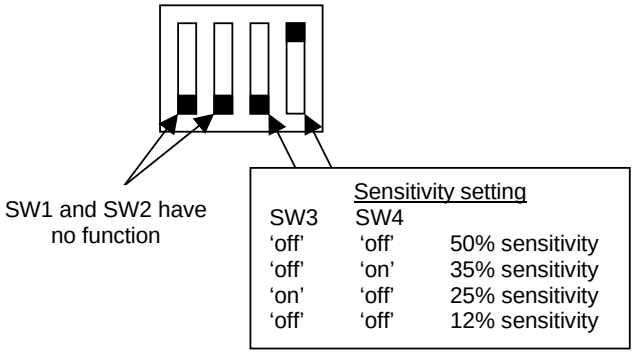
8.1. Field Wiring.

The loop wiring is accessed through the back plate of the Detector Head (See Fig 4). The small 2-pin connector on the left is for future use.

8.2. DIP Switch Settings.

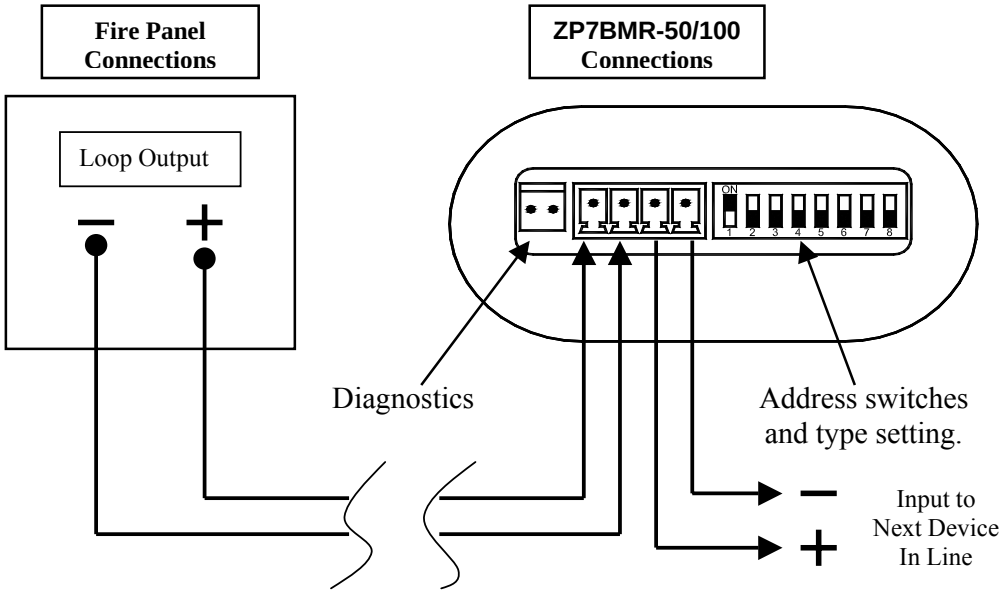
There are two sets of DIPswitches.

The top of the beam has a 4-way switch with the following features.



The address settings is set up via the 8 way DIP switch on the lower part of the beam (See Fig 4).

8.3. Typical Loop Wiring.



9. Detector Interface Assembly Configuration Settings.

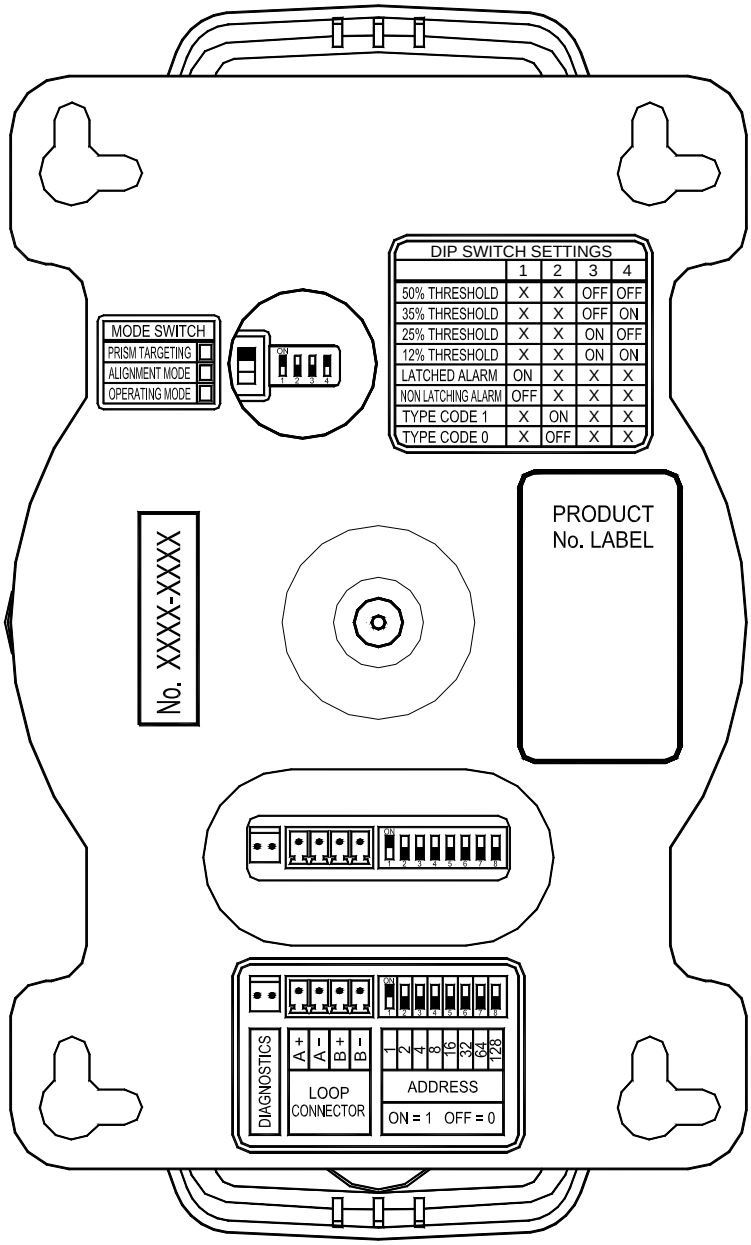


Fig. 4.

10. Address Settings.

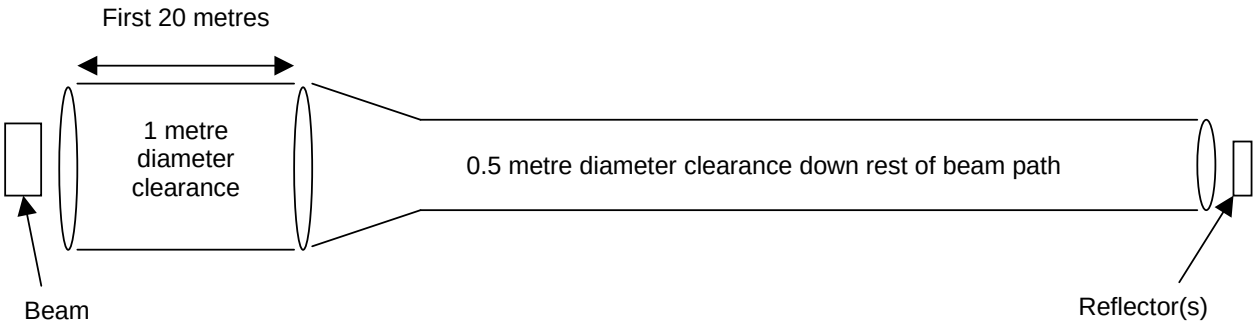
Table 1 - Address settings:

Address #	Switch Configuration	Address #	Switch Configuration	Address #	Switch Configuration
	SW1 SW8		SW1 SW8		SW1 SW8
0	Not allowed				
1	1000000X	44	0011010X	87	1110101X
2	0100000X	45	1011010X	88	0001101X
3	1100000X	46	0111010X	89	1001101X
4	0010000X	47	1111010X	90	0101101X
5	1010000X	48	0000110X	91	1101101X
6	0110000X	49	1000110X	92	0011101X
7	1110000X	50	0100110X	93	1011101X
8	0001000X	51	1100110X	94	0111101X
9	1001000X	52	0010110X	95	1111101X
10	0101000X	53	1010110X	96	0000011X
11	1101000X	54	0110110X	97	1000011X
12	0011000X	55	1110110X	98	0100011X
13	1011000X	56	0001110X	99	1100011X
14	0111000X	57	1001110X	100	0010011X
15	1111000X	58	0101110X	101	1010011X
16	0000100X	59	1101110X	102	0110011X
17	1000100X	60	0011110X	103	1110011X
18	0100100X	61	1011110X	104	0001011X
19	1100100X	62	0111110X	105	1001011X
20	0010100X	63	1111110X	106	0101011X
21	1010100X	64	0000001X	107	1101011X
22	0110100X	65	1000001X	108	0011011X
23	1110100X	66	0100001X	109	1011011X
24	0001100X	67	1100001X	110	0111011X
25	1001100X	68	0010001X	111	1111011X
26	0101100X	69	1010001X	112	0000111X
27	1101100X	70	0110001X	113	1000111X
28	0011100X	71	1110001X	114	0100111X
29	1011100X	72	0001001X	115	1100111X
30	0111100X	73	1001001X	116	0010111X
31	1111100X	74	0101001X	117	1010111X
32	0000010X	75	1101001X	118	0110111X
33	1000010X	76	0011001X	119	1110111X
34	0100010X	77	1011001X	120	0001111X
35	1100010X	78	0111001X	121	Not allowed
36	0010010X	79	1111001X	122	Not allowed
37	1010010X	80	0000101X	123	Not allowed
38	0110010X	81	1000101X	124	Not allowed
39	1110010X	82	0100101X	125	Not allowed
40	0001010X	83	1100101X	126	Not allowed
41	1001010X	84	0010101X	127	Not allowed
42	0101010X	85	1010101X	X ‘ON’	Type 1
43	1100010X	86	0110101X	X ‘OFF’	Type 0

11. Clearances

Most reflective beams produce a focused beam to a reflector on the opposite side of the protected area. The returned signal is then sampled and any obscuration calculated. If there are highly reflective surfaces, or objects near the beam path, there may be a possibility that some of the beam energy is inadvertently reflected into the receiver, rather than via the reflector. This may increase the possibility of faults or false alarms. Hence the importance of following the recommendations in **Section 5** of this installation guide.

It is, for this reason, recommended that the beam path should be surveyed to confirm that a reflective beam can be used. As a general rule of thumb there should be at least 0.5m diameter clearance down the entire beam path. If there are highly reflective objects within 1 metre diameter of the beam path for the first 20 metres of the beam path (for the ZP7BMR-100R), then tests should be carried our to see if the beam is suitable.



12. Technical Data.

- Operating Range ZP7BMR-50 — 5 to 50 metres
- Operating Range ZP7BMR-100 — 50 to 100 metres
- Supply Voltage — 10.2Vdc to 30Vdc (Loop powered)
- Quiescent Current (no lamp illuminated) — <5mA
- Alignment current — <25mA
- Fault Current — <15mA
- Power Down Reset Time — >5 seconds
- Operating Temperature — -30°C to 55°C
- Tolerance to Beam Misalignment at 35% — Detector ± 0.8°, Prism ± 5.0°
- Fire Alarm Thresholds — 2.50dB (25%), 3.74dB (35%), 6.02dB (50%)
- Optical Wavelength — 880nm
- Head Maximum Size — Width 130mm, Height 210mm, Depth 120mm
- Weight — 740 gm

- Type code 1

		Min	Typical	Max
Slot 1		209	212	215
Slot 2		209	212	215
Slot 3		149	152	155
Slot 5	Normal	72	75	78
	Alarm	155	160	165
	Fault	200	205	210

- Type code 0

		Min	Typical	Max
Slot 1		209	212	215
Slot 2		209	212	215
Slot 3		51	54	57
Slot 5	Normal	84	86	88
	Alarm	209	212	215
	Pre-alarm	177	181	185
	Fault	147	149	151
	AGC exceeded	51	54	57

12. Service / Application Notes.

- For full compliance with BS5839 part 5, use 25% and 35%(default) thresholds. The threshold of 50% is recommended for hostile and extreme environments.
- When in normal run mode the fire panel controls the Red LED flashing.
- Amber LED flashing once every 2 seconds indicates FAULT.
-

13. Parts List.

- 1 off: Detector Head Assembly
- 1 off prism for the 50R or 4 off prisms for the 100R
- 1 off: Dual Test Filter
- Installation guide
-

14. Remarks.

- If beam is in fault mode then amber led flashes every 2 seconds.
- Other than Targeting Mode or Alignment Mode the red LED will be controlled via the fire panel.



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