

# IR6003/7+

## IR Oil Mist/Smoke Detector



The IR6003/7+ Oil Mist/Smoke Detector has been specially designed to be highly sensitive to the presence of oil and kerosene mists or smoke particles in the path of the detector beam.

### Features

- Automatic self-calibration
- Range: 2-30 metres
- Weatherproof to IP65
- Certified Intrinsically Safe Ex ib IIB T5 Gb
- Suitable for open path and duct applications
- Robust Design
- Heavy-duty mounting bracket available
- Independent "beam blocked" output
- "Cleaning status" output
- Dual automatic compensation

The detector has been developed for use in enclosed oil rig well head areas, generator rooms, and turbine enclosures, with variants for both hazardous and safe area locations. The detector automatically compensates for detector lens contamination and signals when further deterioration cannot be tolerated and the lenses require cleaning.

There are two levels of alarm: low and high. There is also a "beam blocked" status that activates whenever the beam is interrupted. The detector is intended to be used together with our P-UIM 6005/2, which provides the detector with volt-free contacts.

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### Functional description

#### Initialisation

When the detector is switched on, its LED indicator blips to signify power up. During the first 10 seconds, the detector performs auto-calibration to establish the quiescent obscuration level.

**Please note:** It is important that the beam path is cleared to a healthy state (no obscuration) prior to resetting the detector. If the beam path is not healthy, the detector will recalibrate to the current level of obscuration, in turn reporting false alarm/fault conditions as the path clears. If obscuration is high (dirty lenses or oil/smoke is present) then the detector will not be able to establish operational state and will report a clean fault (LED pulses on for four seconds) or a life fault (LED is illuminated continuously). The P-UIM will latch the fault condition and the detector/P-UIM will require resetting.

#### Alarm level detection

The detector monitors the obscuration level within the beam path. When it detects a loss of 0.5 dB it latches a low-level alarm condition. If the loss is maintained within the 0.5 to <1.5 dB band during the subsequent 15-second alarm monitoring period, a low-level alarm will then be reported (LED will pulse on/off for 30 seconds). If the loss exceeds 1.5 dB, then a high-level alarm is latched and this status will be reported (LED pulses on/off for two minutes), at the earliest, eight seconds from the

beginning of the alarm monitoring period. If the high level occurs subsequent to the initial eight seconds of the alarm monitoring period and before a total of 15 seconds has elapsed, the high-level alarm will be latched and reported immediately.

**Please Note:** If the level of loss during the alarm condition monitoring period falls below 0.5 dB, the latched alarm level will reset and the detector will continue to monitor.

#### Beam block

If the level of obscuration increases suddenly to a high level of loss, a beam blocked status will be latched. If this level is maintained for 60 seconds, beam blocked status will be reported (LED flashes On for two seconds). If the beam blocked level of obscuration clears for more than a few seconds during the 60-second monitoring period, the detector will return to its normal operating state.

#### Dual automatic compensation

The detector automatically compensates for gradual detector lens contamination and also compensates for the more rapid environmental changes (eg., temperature change). The detector will report a clean fault (LED flashes on for four seconds) once. If the detector is not cleaned, it will continue to operate until a life fault is detected (LED on steady) at which point the detector is latched to an off condition.

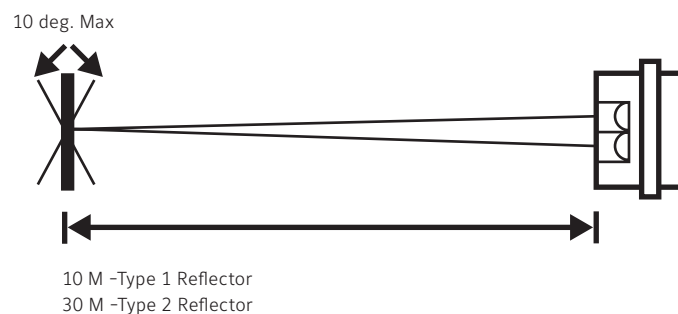
The detector must be cleaned and reset once the life fault has been detected.

### Installation procedure

To install the detector, find an unobstructed path, ideally above head height, that covers the area to be monitored. When choosing the beam path, the direction of any prevailing air currents should be noted to assess the direction that any oil mist would be conveyed.

It should be noted that the beam must not be within 500mm of any wall or partition. The operating range is 2-50 metres.

The reflector sheet must be mounted on a flat surface (self-adhesive backing) such that the detector and reflector are aligned horizontally and vertically. To assist in this procedure, a tool is available (01-33-21) to ensure the detector beam is focused centrally on the reflector. The alignment tool intensifies the IR beam and converts its image to visible light. Because of the operating nature of the alignment tool, it is recommended that it should be used in subdued light conditions. The physics of the reflector construction enable the reflector to be up to 10 degrees out of alignment in any one plane as detailed in the following diagram:

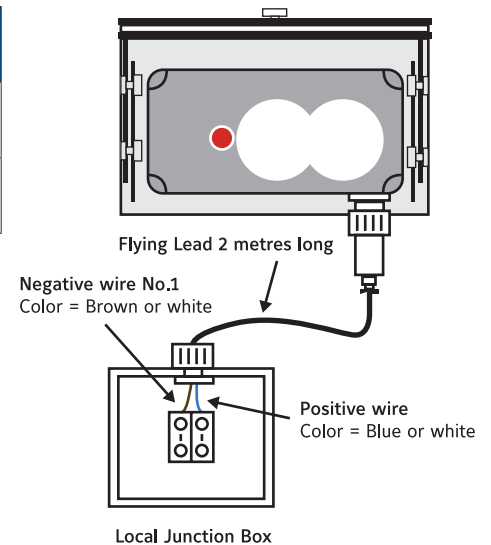


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Distance	Reflector Size	Type
2 to 10 metres	0.6 x 0.6m (1 x 6m x 0.6m)	1
10 to 30 metres	0.6 x 0.6m (1 x 6m x 0.6m)	1

This diagram shows the detector connected to a local junction box via the flying lead (01-33-14TMA). The local junction box will require connecting to our P-UIM via a suitable safety barrier which provides the necessary detector-to-user equipment interface. (For more information, see the Power UIM 6005/2 Datasheet 01-33-22). For details on how to mount the detector, refer to the heavy duty mounting bracket datasheet (01-33-24).



## Commissioning

Once the detector has been installed correctly by connecting it to the hazard monitoring system via the P-UIM, the user should power up the detector loop and perform the following confidence checks:

1. The detector LED blips on briefly as it receives power from the P-UIM. The P-UIM Life indicator is flashing.
2. Also Output On indicator should be on steady = all other indicators are extinguished.
3. Wait 20 seconds and check that the status detailed in step 1 above remains unchanged.
4. Block the beam path of the detector for one minute and check that the detector signals a beam blocked state (LED flashes on for two seconds). The P-UIM beam blocked indicator is lit steady. Now remove the obstruction from the detector's path.
5. Initiate a short reset and check that the P-UIM returns to the status detailed in step 1.
6. Initiate a long reset with the beam path blocked and check that the detector indicates a Life Fault (LED is lit steady). The P-UIM Life indicator is lit steady. Now remove the obstruction from the detector's path.
7. Initiate a long reset and check that the P-UIM returns to the status detailed in step 1.

## Operational parameters

The detector receives its DC supply from the P-UIM and provides status reports to the P-UIM as follows:

- A **normal/healthy** detector input condition is indicated when the current is  $>20$  mA and  $<32$  mA (normally 25mA). The LED on the front of the detector will be extinguished.
- A **low alarm** condition is indicated when the current pulses from normal to 42 mA with a one second equal mark space ratio for 30 seconds.
- A **high alarm** is indicated when the current pulses from normal to 42 mA with a 0.5 second equal mark space ratio for a period of two minutes.
- A **beam blocked** condition is indicated when the current switches from normal to 17 mA for a period of two seconds.
- A **cleaning fault** condition is indicated when the current switches from normal to 17 mA for a period of four seconds.
- A **life fault** condition is indicated when the current falls to 17 mA for less than five seconds.

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## Technical specifications

### Electrical:

Operating Voltage: 24 V (via P-UIM)  
 Quiescent Current: 25 mA  
 Alarm Current: 80 mA (max)  
 Beam Length: 2 to 30 metres

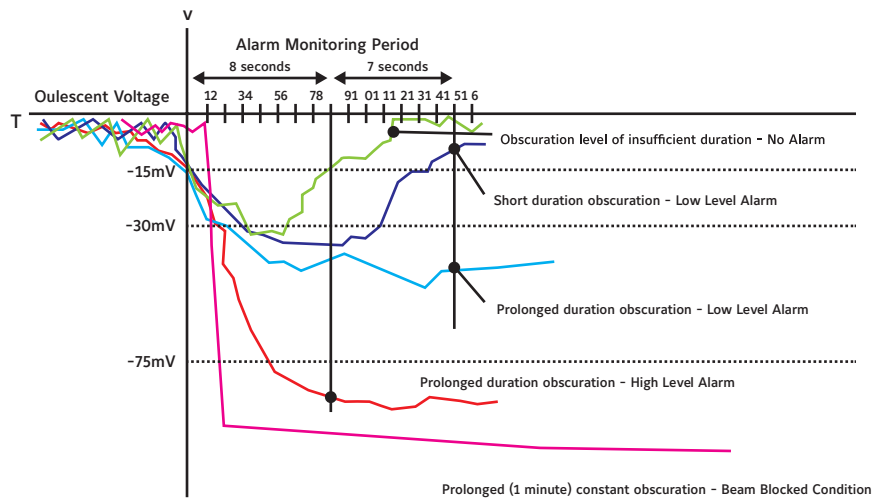
### Mechanical:

Dimensions: W165 x H125  
 x D165 mm  
 Weight: .96 kg  
 Material: Noryl GTX Grade 810

### Environmental:

Operating Temperature: -20 to +40°C  
 Housing Protection: IP65  
 EX Certificate: BAS 02 ATEX 2313X  
 Ex ib IIB T5 Gb

## Detector monitoring characteristics



IECEX SIR 14.0009X  
 Ex ib IIB T5 Gb

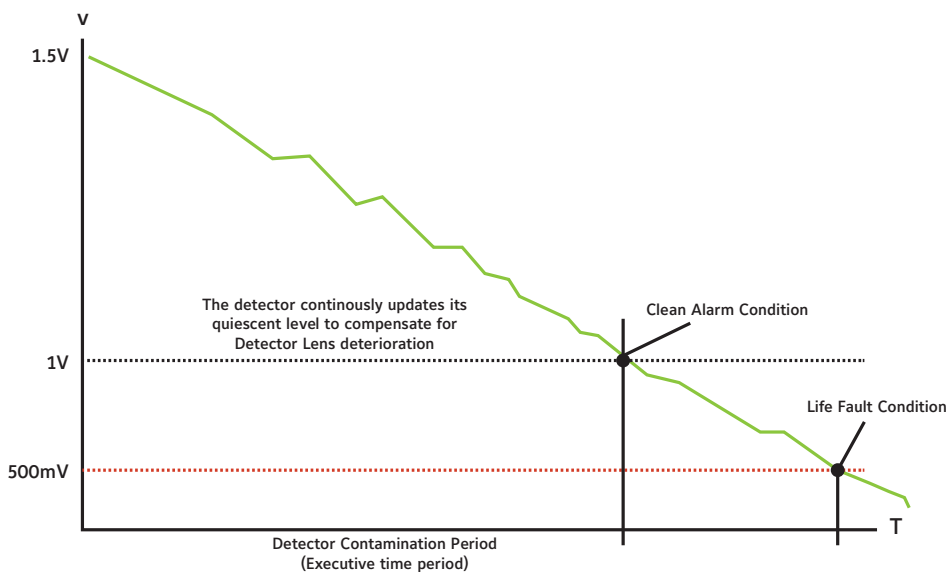
### Part Numbers

IR6003/7+ Detector for use in hazardous area (ATEX/IECEX approved): 01-33-43

### Accessories

Flying Lead: 01-33-14TMA  
 Reflector Type 1: 01-33-05  
 Reflector Type 2: 01-33-10  
 Reflector Type 3: 01-33-11  
 P-UIM: 01-33-22  
 0-20 mA Adapter: 01-33-22A  
 Heavy Duty M/B: 01-33-24  
 U-Bracket: 01-33-12  
 IR Alignment Tool: 01-33-21  
 IR Test Film: 01-33-26  
 Duct Bracket: 01-33-17  
 Duct Reflector: 01-33-16

## Detector life compensation characteristics



The power behind your mission



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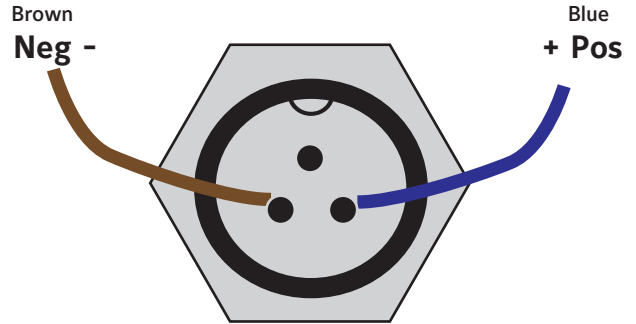
## IR Oil Mist/Smoke Detector

### Installations in hazardous areas

To maintain the EEx certified status of the equipment, the following requirements must be met:

- The apparatus cannot be repaired and must be replaced by an equivalent unit.
- The apparatus is not intended to be exposed to dusty conditions.
- The equipment when installed in accordance with the instruction manual will not be subjected to mechanical stress.
- The equipment should not be installed where it may be subjected to mechanical and thermal stress or where it may be attacked by existing or foreseeable aggressive substances.

### Flying lead connections



View of connector on detector

### SPECIFIC CONDITIONS OF USE (denoted by X after the certificate number)

Under certain extreme circumstances, the non-metallic enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. Do not clean with solvents, do not rub.

There are many other companies who integrate our oil mist detection equipment into their safety systems:

- Heavy Industrial Areas
- e.g. Engine Rooms
- Hazardous Areas
- Warehouses
- Marine Applications
- Oil Rigs
- FSPOs e.g., Shell Bonga
- Turbines
- Hydraulic Power Units

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