Series 7000
Type 7011 Infra-red Flame Detector
With Air Purging

DESCRIPTION & SPECIFICATION
INSTALLATION - COMMISSIONING
OPERATION - MAINTENANCE

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Associated Drawings

11076 - 7011 Infra-red Flame Detector With Air Purging - General Arrangement Drawing.

11077 - 7011 Infra-red Flame Detector With Air Purging - Internal Arrangement Drawing.

1 INTRODUCTION

1.1 General

The Patol 7011 Long Range Flame Detector is specifically designed for the protection of large enclosed or open spaces where other forms of monitoring are inadequate or impractical. The unit is particularly suited when there is a potential hazard due to volatile materials such as **Aviation Fuel** or **PRB Coal**.

The type 7011 detector employs enhanced infra-red monitoring technology that analyses the levels of IR emission in specific bands. The unique “signature” of a flame condition can be recognised whilst “background” and “transient” IR spectra are discriminated. If non-flame IR conditions prevail at sufficient level and duration to effectively “blind” the flame detection function then a fault warning is signalled.

The unit incorporates an air cleansing scheme which permits operation in dusty environments such as coal fired power stations.

There are many other uses within sectors such as Aircraft Hangars, Petro-chemical, Process Plant, Waste Disposal, Road Tunnels and Rail Networks. The 7011 unit has been specifically designed to both meet the rigors of all of these environments and to provide the reliability demanded by these industries.

Features of the unit are:-

- Detection of flame at distances in excess of 100m.
- Resilient to optical background interference - High false alarm immunity.
- Sixteen high integrity detectors - Eight channels of discrete viewed field processing - Enhanced optical and spectral analysis.
- Unique multi-axis reflective cone lensing system with solid state controlled focal adjustment - Zoom feature analogous to photographic cameras.
- Four sensitivity level settings - each with the focal axis zoom option.
- Volt free contact outputs for Fire and Fault signalling.
- Tuned response - Solar blind - Static anomaly and transient immune.
- Air purging scheme for use in dusty environments.
- Specifically designed for high EMC compliance.
- **Patent Pending - GB1013271.0**

1.2 Principles

Infra-red (IR) emissions are dependant on the material of origination, its temperature and its physical state or (chemical) process.

Figure 1 (over page) shows ‘black body’ IR emissions for passive material at various temperatures.

Superimposed is the IR peak emission at 4.3um occurring on CO_2 formation during the combustion of hydrocarbons.

Other conditions, such as arc welding, provide different spectra, however, only flame provides significant IR energy over a narrow band centred on 4.3um, with virtually zero accumulative energy occurring in the long pass band above 5um.

The unit has sensors, configured in pairs as channels, which generally respond to modulated infra-red in the range 1Hz to 10Hz, as is produced by flame flicker.

Static background black body emissions are automatically rejected.

The unit's narrow band (4.2-4.7um) and wide band (>5um) filters, together with electronic analysis in relation to the various energy level parameters, enable the discrete channels to reject spurious and transient emissions from the local environment. The 7011 does not react to visible light from the sun or local luminaires.

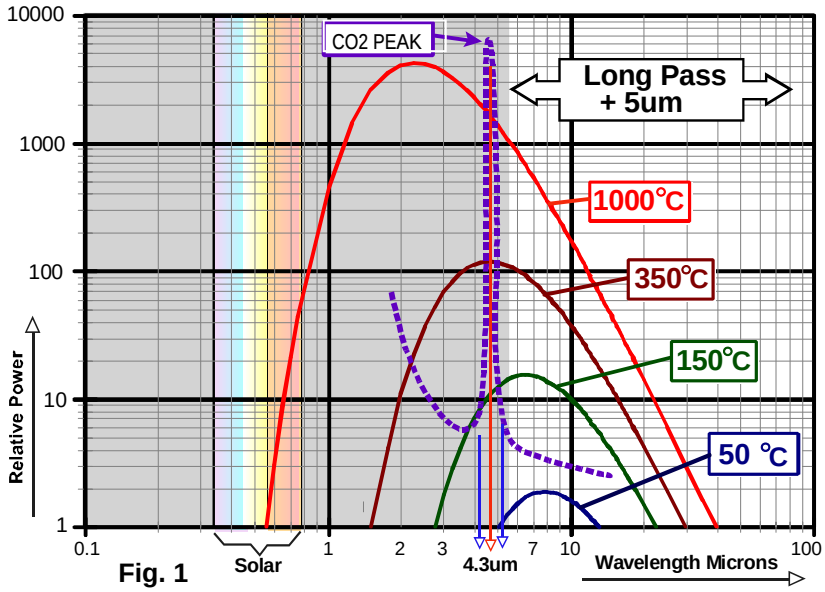


Fig. 1

It is possible for certain conditions to 'dazzle' any particular detector channel. For example hot machinery rotating at 300 rpm could produce 5Hz IR modulation at 4.3um. Whilst the channel's analytical circuit associated with the long pass detector will identify this as an erroneous signal and override an Alarm being raised, that channel is in effect blind for the duration of the condition.

The 7011 Detector incorporates timer functions that check the ability of the unit to be able to detect flame by **all** channels for at least a proportion of a defined monitoring period. If the local environment has prevailing IR conditions at sufficient level to effectively "blind" any one channel's flame detection function over all of this period then a fault warning is signalled. The monitoring period is nominally set at 10s but can be adjusted to suit particular site conditions. The 7011 unit continuously checks itself. It will always provide a response to a flame condition, unless the site has problematical ambient conditions in which case an advanced fault warning will be registered.

The 7011 has eight pairs of detectors, each pair operating as a discrete channel (alarm path). With this arrangement the overall field of view is sub-divided such as to more readily analyse & compute background emissions. The optical viewing field of each detector pair is 30° x 90°. The overall arrangement is such that the eight channels are mounted on a 22.5° rotational pattern which provides a 360° coverage.

Refering to Figure 2 :-

- All eight channels have a 30° field of view (+/-15° off the optical axis) Green area.
- Within a 60° window (+/- 30° off axis) a minimum of two channels will register.
- The Light Blue area indicates the field of view for at least two channels.
- A target within 90° (+/- 45° off axis) will be in the view field of one channel as a minimum.

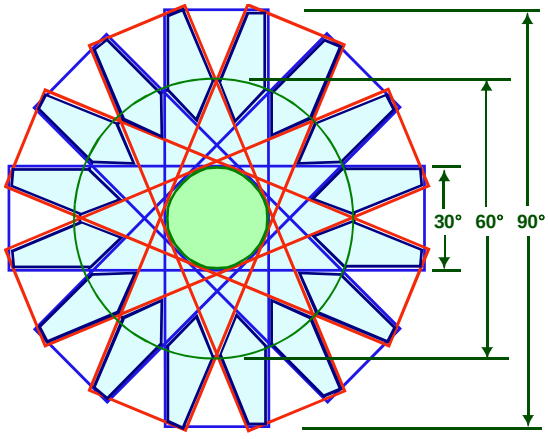


Fig. 2

2. EQUIPMENT DETAIL

2.1 General Description

The 7000 Series system described here comprises two primary elements :-

- Detector unit - Type 7011
- Air Supply / Blower Unit

The 7011 Unit is designed to monitor large spaces for flame conditions. The unit is most applicable to situations where conventional building fire protection monitors can not be practically employed. With both open air sites and large enclosed areas, such as aircraft hangars, the normal rules regarding heat convection patterns, smoke stratification, and collection profiles at the ceiling are not applicable. This makes point heat and smoke detectors ineffective. Sites where there is a potential hazard due to volatile materials such as aviation fuel are particularly suitable for protection by Patol's Type 7011 Flame Detectors.

The Type 7011 Detector outer case is equipped with an air hose spigot for connection of an air supply. This is required such that a positive air pressure is maintained around the inner module sensor "windows".

There is a continuous air flow from the outer case optical path aperture which stops dust settling on the inner sensor module. Also, by maintaining a positive pressure within the enclosure, ingress of explosive gas or dust is prevented. The arrangement can permit the unit to be employed in a Hazardous Area depending on applicable local regulations.

The air purging is essential in dusty environments and is recommended in even relatively clean applications. A Patol Series 5000 air purge blower and filter unit is employed when an 'on site' air supply is not available. (See section 2.7)

A pressure switch is located within the unit to monitor the purge air and signals a loss of pressure as a Fault.

The unit may be user selected to either of two principal operating settings which are referenced as "Relay mode" and "Low power mode" - see following.

2.2 Relay Mode

The unit's relays are enabled in this mode by linking terminals 8 to 10 and 9 to 11.

The supply requirement is 20 to 30Vdc - max current 40mA).

The unit's volt free relay contacts are used for signalling of Fire and Fault conditions.

The Fire relay is normally de-energised and energises on flame detection alarm.

The Fault relay is normally energised and de-energises on power supply removal, extended spurious *background* view-field signals or loss of purge air.

Refer to - section 2.8 - figure 6

2.3 Low Power Mode

In this mode the relays are disabled (no connection at terminals 8 & 9) and the 'open collector' type solid state outputs at terminals 10 & 11 are employed directly for fire and fault signalling.

In this mode there is a wider supply operating range of 13 to 30Vdc

The Fire output at terminal 10 is normally OFF - Switching to the 0V rail on flame condition.

The Fault output at terminal 11 is normally switched to the 0V rail - Going OFF on fault.

Refer to - section 2.8 - figure 6

2.4 Detector Arrangement

The Type 7011 flame detector comprises an inner polycarbonate enclosure located within an outer housing which is connected to an air blower such as to keep a positive air pressure around the unit's sensor windows. An air hose spigot is located on the unit's rear.

An adjustable bracket permits alignment in both vertical and horizontal planes. The bracket has two mounting bush locations for upward and downward orientations.

The inner module's windows and lid are sealed to provide a high environmental rating.

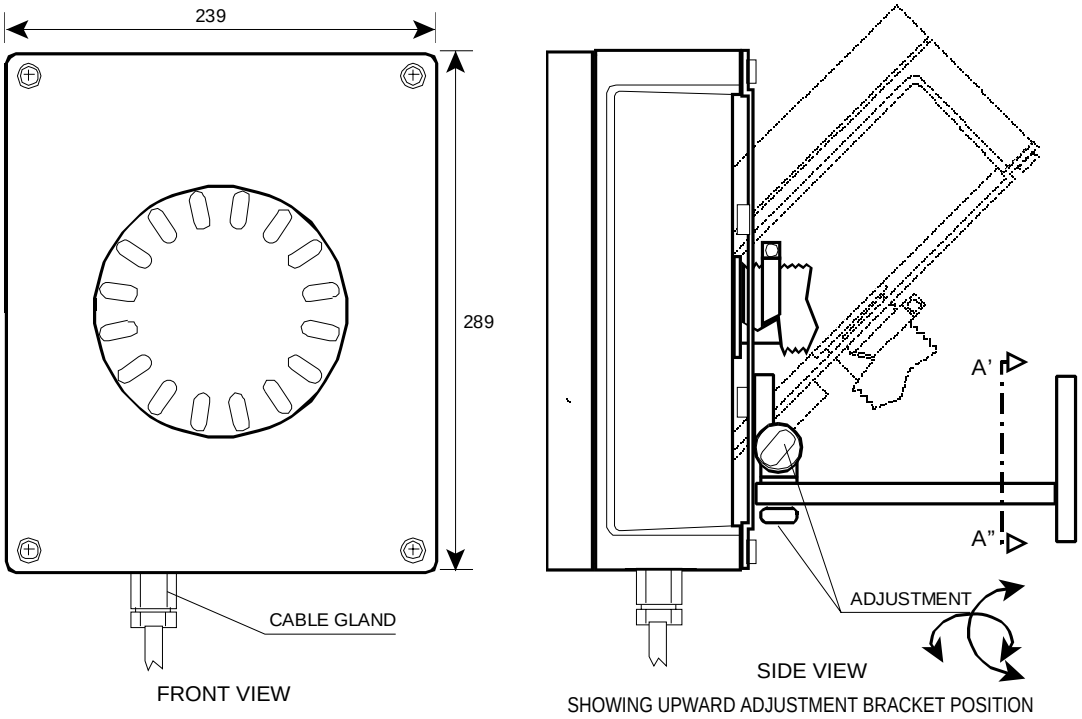
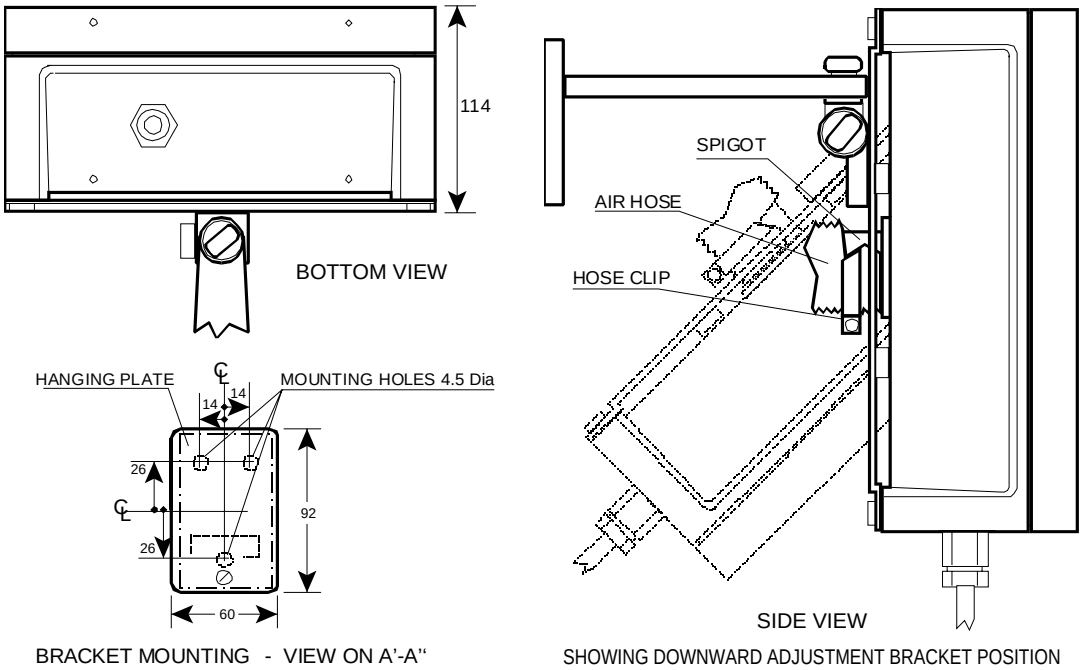


Fig. 3



A pressure switch monitors the cleansing air supply, with a Fault being signalled on failure.

Removing the outer lid and inner fascia gives access to the unit's maintenance features.

The unit provides volt free relay change over contacts for both Fire and Fault signalling.

Cable connections for the input supply and signal outputs are made at rising clamp screw terminals. These blocks are two part plug-in types permitting PCB module removal without wiring disconnection.

Sixteen LEDs can be enabled during commissioning and maintenance for indication of the dynamic status of the eight flame detection channels.

Located at the rear of the fascia unit is a six pole SIL program switch for setting the sensitivity level and optical axis focal 'zoom' characteristics of the device.

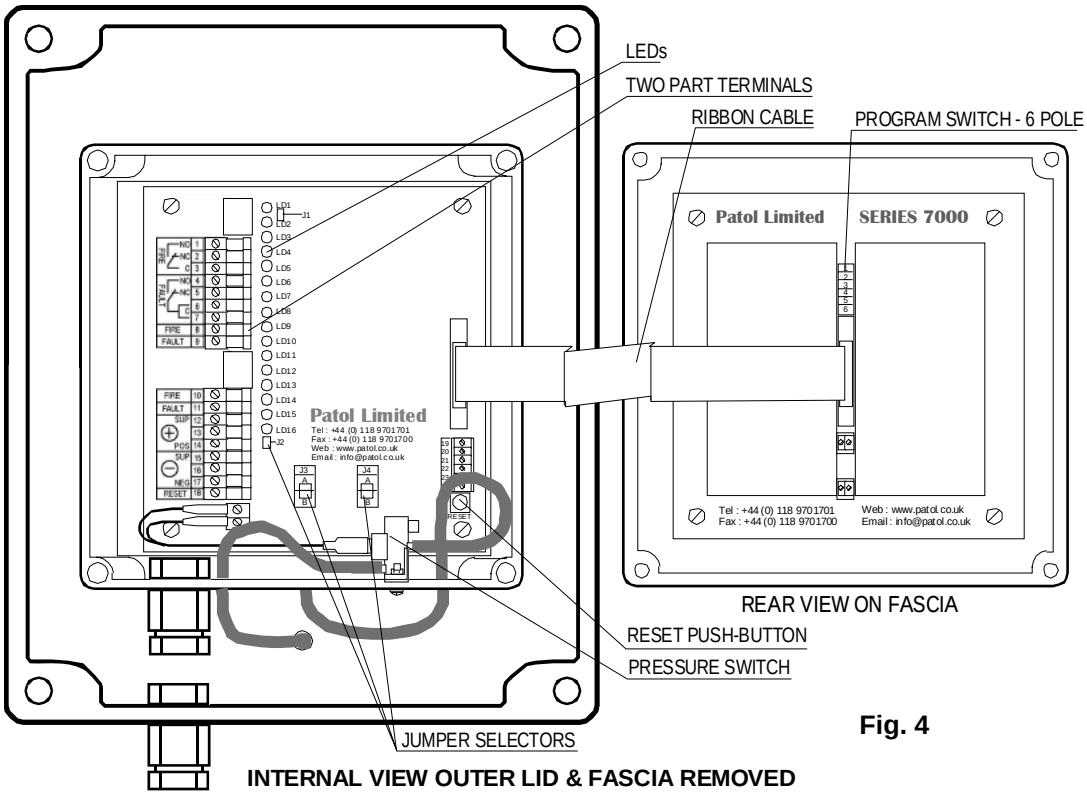


Fig. 4

INTERNAL VIEW OUTER LID & FASCIA REMOVED

2.5 Specification

2.5.1 General

a) Outer Case:- Material : ABS
Finish : RAL 7035

b) Inner Module:- Material : Polycarbonate
Finish : RAL 7035
Ingress Rating : IP66

c) Termination:- Within inner module : Two part rising clamp terminals
Cable Core Size : 2.5mm² - 14AWG

d) Temperature :- -20°C to +70°C

e) Weight:- 2.6 kg

f) Purge Air Supply:- Pressure : 4 mBar (1.6"WG) (Switch monitored)
Delivery : 5.0 litres / sec (11 cubic feet per min)
Input Fitting : 45mm (1 3/4") dia. hose spigot

2.5.2 Internal / Maintenance Features - Accessed on inner module cover removal

a) Indications:- 8 off Red Flame LEDs - One per sensor channel
8 off Yellow Background LEDs - One per sensor channel

b) Controls:- Reset Push-button

c) J1 & J2 Selectors LED enable / disable - Refer 2.6.1 & 2.6.2

d) J3 & J4 Selectors Background Fault OFF/ON delays Refer 2.6.3 & 2.6.4

e) Program Switch:- SIL 6 Way - Sensitivity & Zoom - Refer to section 2.7

2.5.3 Relay Mode - Relays Enabled

a) Supply Voltage:- 20 to 30 Vdc

b) Supply Current:- Standby - <30 mA Fire (Alarm) - 50 mA (max)

c) Alarm Output:- Fire Relay Contacts - 1 set
Volt free change over - 30 Vdc 500 mA
Normally De-energised

d) Fault Output:- Fault Relay Contact - 1 set
Volt free change over - 30 Vdc 500 m
Normally Energised
De-energises on view-field fault supply / air failure

2.5.4 Low Power Mode - Relays Disabled

a) Supply Voltage:- 13 to 30 Vdc

b) Supply Current:- <20 mA (LEDs Disabled)

c) Fire Output:- Solid state switch - Open collector type
Normally OFF - Switched to 0V rail on alarm (ON).

d) Fault Output:- Solid state switch - Open collector type
Normally ON (Switched to 0V rail) - OFF on fault.

2.5.5 Detectors

a) Configuration:- 16 off - Configured as 8 channels each comprising a pair of sensors - 1 off Long Pass and 1 off Band Pass

b) Arrangement:- Rotational pattern with 22.5 degree step between channels.

c) Characteristic Long Pass Spectral Filter : 5 - 15 µm
Band Pass Spectral Filter : 4.2 - 4.7 µm

2.6 Jumper Settings

2.6.1 J1 - Alarm LED Operation

Jumper IN - Internal Red Maintenance Flame Alarm LEDs Enabled
Jumper OUT - LEDs Disabled

2.6.2 J2 - Background LED Operation

Jumper IN - Internal Yellow Maintenance Background LEDs Enabled
Jumper OUT - LEDs Disabled

2.6.3 J3 - Fault OFF Delay

Sets the minimum operate time of the fault relay once a Background fault condition is registered.

Table 1

J3-A	OUT	1s	OUT	2s	IN	4s	IN	6s
J3-B	OUT		IN		OUT		IN	

2.6.4 J4 - Fault ON Delay.

Sets the period of continuous Background override to register a Fault.

Table 2

J4-A	OUT	3s	OUT	6s	IN	12s	IN	15s
J4-B	OUT		IN		OUT		IN	

2.7 View-field and Range - SIL Program Switch

The detector has four basic sensitivity settings. Each of these levels has a 'zoom' option. Euro-Standard EN54-10 employs a 330 x 330 mm pan of ignited n-heptane for range classification. Based on this, Table 3 shows the typical range along the optical axis. Figure 5 charts the field of view.

Table 3

Sensitivity A - Least D - Most	Axial Range metres	
	Zoom Off	Zoom On
A	20	25
B	45	60
C	70	90
D	80	105

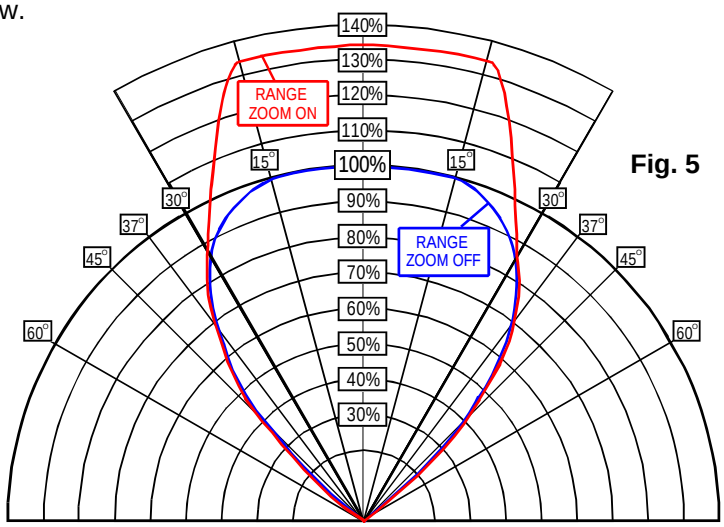


Fig. 5

Table 4

SIL Switch Settings		ZOOM OFF						ZOOM ON					
	Pole	1	2	3	4	5	6	1	2	3	4	5	6
Sensitivity Level	A	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	ON	ON
	B	OFF	ON	ON	ON	OFF	ON	OFF	ON	OFF	OFF	OFF	ON
	C	ON	OFF	ON	ON	ON	OFF	ON	OFF	OFF	OFF	ON	OFF
	D	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

2.8 Connections

The unit's primary connections are at two nine way terminal blocks. These blocks are of the two part type permitting site cabling to be un-plugged without disconnecting wires at individual terminals.

The unit has Fire and Fault solid state outputs at terminals 10 & 11. These are 'open collector' type switching to the Common/0V rail. The fire signal is normally off - connecting to 0V on alarm. The fault signal is switched to 0V in normal conditions and 'open circuits' on trouble.

These outputs may be used for direct signalling purpose; in which case the unit operates with its widest supply voltage range and lowest current.

Alternatively, the outputs may be connected to terminals 8 & 9 thus utilising the unit's integral relays. This requires a higher voltage supply to be maintained and the quiescent current is increased by the load of the Fault relay coil, which is normally energised.

Reset from a remote location is achieved by momentary supply interruption. An option for connection of a normally open push-button (or similar signal) is provided at terminal 18.

A small 6 way TB (19 to 24) is also located within the unit. This is for factory test and special applications.

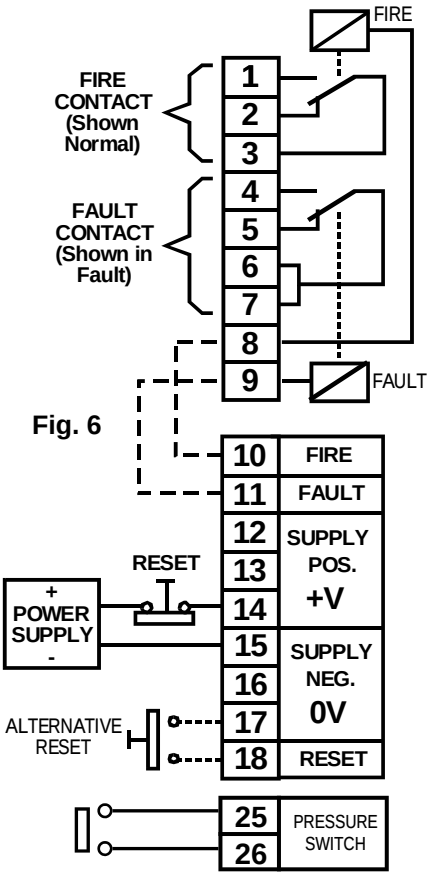


Fig. 6

3. INSTALLATION

3.1 Detection Coverage

The 7011 Unit is designed to monitor large spaces for flame conditions. The unit is most applicable to situations where conventional building fire protection monitors can not be practically employed. With both open air sites and large enclosed areas, such as aircraft hangars and power station turbine halls, the normal rules regarding heat convection patterns, smoke stratification, and collection profiles at the ceiling are not applicable. This makes point heat and smoke detectors ineffective. Sites where there is a potential hazard due to volatile materials such as aviation fuel are particularly suitable for protection by Patol's Type 7011 Flame Detectors.

The exact location of the flame monitors, in order to adequately protect any particular site, is dependant on:- the space's dimensions, the flame hazard (potential flame type/size), and the performance characteristics of the type 7011 flame detector (Table 3 & Fig.5 - Page 9).

The 7000 units should be directed toward the centre of the protected area and ideally have a completely unobstructed view of all hazards. This is an un-usual site coverage for a single detector.

The exact position and orientation of units must take into account obstructions to the field of view, and most applications will require two or more detectors for full coverage, even though some sub-areas will then be monitored by multiple devices.

Figures 7 & 8 show a typical arrangement for an aircraft hangar. The area under the aircraft is a particular hazard. Thus the example shows detector placement at both high and low level to obviate obscuration by aircraft wings and body. Similar positioning will apply when mezzanine floors or machinery cause obstruction.

If fire extinguishing media is to be automatically activated, all associated sub-areas should have duplex coverage such that a "double knock" regime for "release" can be implemented.

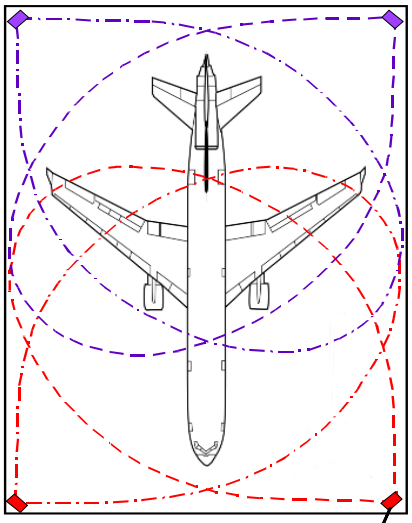


Fig. 7

7011 Detectors

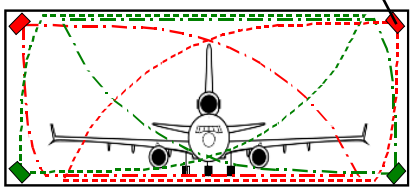


Fig. 8

When the protected area is very large, as would be for multi-bay aircraft service facilities, the overall space must be sub-divided into zones - each zone similar to that indicated in Figures 7 & 8. A degree of overlap of zone boundaries should be employed to ensure effective coverage.

3.2 Supply / Signal Cable

The Type 7011 Detector outer case is fitted with a 20mm gland as standard, which is suitable for cables of 6 to 12mm overall diameter. A second 20 mm EMC gland is fitted to the inner sensor module.

Cable terminations are made at plug-in rising clamp screw terminal connectors located within the inner module. The terminals accept wires of up to 2.5mm² (14AWG). Refer to section 2.8 for connections.

To access the terminals it is necessary to remove the covers / lids to both the outer case and the inner sensor module.

When armored cable or conduit is employed it may be most practical for these circuits to terminate at a junction box adjacent to the detector. A screened flexible cable should then connect the junction box to the Detector in order to permit adjustments to sensing alignment.

3.3 Purge Air Supply

The Sensor unit is equipped with a spigot for connection to a flexible hose. The air supply must be capable of delivering at least 5.0 ltrs/sec at this connection and maintain a minimum pressure of 4.0 mBar (1.6" water gauge) in order to operate the sensor's pressure monitoring switch.

If an "on site" air supply is not available a Series 5000 Air Purge Blower (APB) should be employed. Some units are equipped with an easily removable and washable air filter, however these filters are intended to preserve blower life in *normal* conditions. The blower should either be installed outside the dirty/dusty area or the unit inlet piped to a *clean* air environment.

Intermediate rigid ducting is most readily achieved by the use of standard µPVC pipes and fittings. 2 m of hose is provided with each purge unit for couplings at sensor & blower.

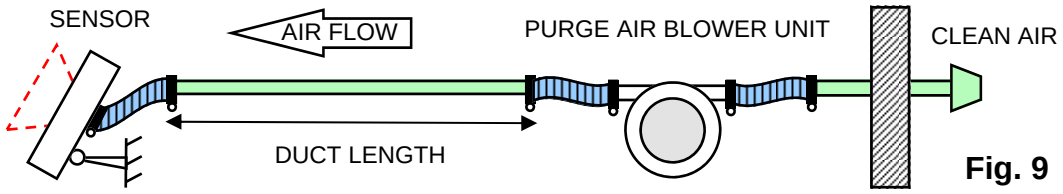


Fig. 9

In most applications the 'clean air' input will be quite close to the blower unit and sensor(s). In the case of over-ground conveyors, sufficiently clean air is simply obtained by ducting to the outside of the conveyor housing cladding. A minimal amount (<6m) of ducting being used.

However, in some applications (such as under-ground tunnels) the Sensor may need to be remote from a 'clean air' area.

There are limits to the distance that any APB can deliver the required air to the Sensor which are principally dependant on the APB specification and duct bore size. Other factors such as the ducting inner wall surface characteristic and the air temperature/pressure also have an effect.

5000 Series Air Purge units (APBs) are centrifugal blowers available in a variety of multistage configurations. The standard unit is a two stage unit Type 5040, the second most prevalent is the four stage Type 5044.

Whilst coupling hoses, reduction fittings and bends also have an effect, the following table indicates typical limitations for smooth bore PVC ducting with the worst case air parameters of minus 20°C at sea level pressure. (Warmer Air enables greater distance)

Table 5 takes to account 1m flexible hose connections at Sensors, and 2m at the Blower.

Table 5

Imp. Duct / Pipe		Metric Duct / Pipe		APB to Sensor Duct		
O/D	I/D	O/D	I/D	**5051** 1stg.	**5040** 2stg.	**5044** 4stg.
1-5/16 "	1-1/4"	40mm	32mm	n/a	20m	60m
1-7/8"	1-1/2"	50mm	40mm	10m	50m	140m
2-3/8"	2"	63mm	50mm	35m	180m	520m
Flexible Hose (Non-smooth)			45mm	7m	40m	110m

4. COMMISSIONING

4.1 Cable Checks

The installation wiring should be checked for correct connection, continuity and insulation. These checks should include cabling to both detector and air blower (if appropriate).

For relay mode implementation the relay coil link connections at terminals 8/10 & 9/11 should be checked. Refer to figure 6 section 2.8.

4.2 Controller Set Up

For most applications it is recommended that jumpers J3 and J4 are set to maximum delay. Refer to sections 2.6.3 & 2.6.4.

For commissioning set jumpers J1 & J2 - IN Note: Unless supply current is a critical issue the LEDs can remain enabled during normal operation. . Refer to sections 2.6.1 & 2.6.2.

The Controller program SIL switch must be set for the required range and view.
Refer to table 3 section 2.7.

4.3 Power Up & Functional Checks

Note: The unit has three signaled / output states which are monitored by remote equipment. These are referenced as Normal - Fire - Fault in the following.

For relay mode : Normal = Fire relay de-energized & Fault relay energized.

For low power mode : Normal = TM 10 - OFF (Open Cct.) / TM 11 - ON (0V)
Fault = TM 11 - OFF
Fire = TM 10 - ON

4.3.1 With the outer lid removed locate the inner fascia 'offset' from the inner box so as to access the inner module and view the LEDs. Figure 9.
Disconnect the pressure switch at TMs 25 & 26 and link the terminals together.

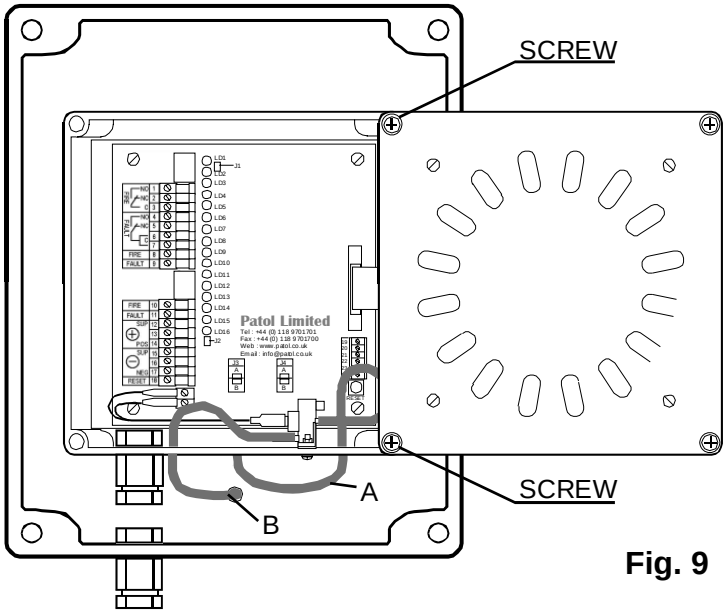


Fig. 9

4.3.2 Apply power to the detector.
Check supply :- 20 to 30 Vdc for relay mode or 13 to 30 Vdc for L.P. mode.
Check initially :- Unit output in Fault state.
Check after approx. 60s :- Unit output in Normal state.

4.3.3 Disconnect the link at TMs 25 & 26.
Check :- Unit output in Fault state.
Reconnect the link at TMs 25 & 26.
Check :- Unit output in Normal state.

4.3.4 Move a hand in the view field at a distance of approx. 100mm.
Check :- All Yellow Background momentarily ON.
Keep moving hand in view field so that at all times at least one yellow LED is on.
Check after 15s :- Unit output in Fault state.
Remove hand from view field.
Check after 6s :- Unit output in Normal state.

4.3.5 Introduce a 1 to 2 cm test flame into the view field at approx. 500mm distance.
Check :- All Red Flame LEDs latch ON and Unit output in Fire state.
Operate internal Reset push-button.
Check :- All LEDs OFF and Unit output in Normal state.

WARNING : On certain sites it may be necessary to obtain a permit to undertake this flame test. In some cases the use of a naked flame may be totally forbidden.

4.3.6 Remove the link at TMs 25 & 26 and re-connect the pressure switch. Fit detector inner and outer lids.
Ensure that the air supply is connected and operational. If a 5000 Series blower is employed this must be powered.
At this stage purge air should be blowing from the optical aperture.
Check:- Unit output in Normal state.

4.3.7 Remove air supply.
Check :- Unit output in Fault state.
Reinstate air supply.
Check:- Unit output in Normal state.

4.4 Purge Air Supply & Pressure Switch Adjustment.

The purge air is monitored by a pressure switch located within the inner module.
The operation of the switch is dependant on the differential pressure between the air input point to the outer detector case and the external atmosphere.

Should the detector remain in Fault at stage 4.3.6, even though it is apparent that purge air is present, the switch's electrical connection and monitoring tubes should be checked for correct connection / positioning.

The switch is correctly factory set to operate at approximately 3.74 mBar (1.5 inch WG). However, should the switch setting have become incorrect for the air flow/pressure being achieved on the installation, an on site adjustment can be made as in the following.

Check & Adjustment Procedure

Refer to section 4.3.1 - figure 9

4.4.1 Remove the air hose from the unit rear and check that the end of pressure switch Tube A is resident in the air inlet spigot.

4.4.2 Remove the outer & inner lids. Check that both tubes are fitted to the pressure switch and that the switch wires connect to the rear board via plug-in terminals 25/26. Check that Tube B is fitted to the nipple at the back of the compartment.

4.4.3 If all tube and electrical connections have been correctly made then the pressure switch may need adjustment:-

- Disconnect wires at TMs 25 & 26 and monitor with a multi-meter set to ohms. The reading should be open circuit.
- Using a screwdriver turn the adjustment screw clockwise until the switch closes - meter indicates zero ohms.
- Turn the adjustment anti-clockwise (counter-clockwise) until the switch opens. Continue for one quarter of a turn.

4.4.4 Reconnect the switch wires at TMs 25 & 26 and refit inner and outer lids.

5. OPERATION

5.1 Normal

- Relay Mode:- Fault relay energized. Fire relay de-energized.
- LP Mode:- Signal at terminal 10 OFF / Open Circuit.
  Signal at terminal 11 ON/ switched to 0V.

5.2 Alarm Condition

An Alarm condition will occur on abnormal Infra-red detection by the Sensor Head.
This status will Latch On.

On Alarm :-

- One or more internal red LED indicators illuminated. (If enabled by insertion of J1)
- Relay Mode:- Fire relay energized.
- LP Mode:- Signal at terminal 10 switched to 0V supply rail.

5.3 Reset

Latched Alarm conditions may be normalized by :-

- Momentary interruption of the supply.
  A local or remote normally closed push-button may be implemented to achieve this.
- Operation of normally open push-button connected between terminals 17 & 18.
- Operation of the internal Reset push-button.

5.4 Fault Warning

- Relay Mode:- Fault relay de-energized
- LP Mode :- Transistor O/P signal at terminal 11 OFF / Open Circuit from 0V supply rail.

A fault warning may occur for any of the following:-

- Supply failed .
- Spurious background *dazzle* occurring for longer than set delay period .
- Loss of Purge Air

The output will automatically normalize on rectification of the fault.

6. MAINTENANCE

6.1 General

It is recommended that a System Log Book / File is raised at the Commissioning Stage and that the system configuration and initial settings recorded. These should include:-

- Jumper J1 to J4 selections.
- Operation configuration and sensitivity - SIL switch set-up.
- Supply voltage.

Subsequently all system events should be recorded in the log.
These should include all maintenance activity, changes to settings, Fault warnings and Alarm occurrences. (including cause and actions taken).

An operational regime should be developed that includes both frequent inspection of the Sensor for undue accumulation of dust, and to confirm air (blower) operation.

In addition, the system should be subjected to a **periodic service** as defined in the following.

6.2 Purge Air Filters (if fitted)

Some blower units have integral air filters, and some installations may employ ducting filters. If installed these should be removed and washed using a warm water soap solution. The use of solvent cleaners is not recommended for Patol Series 5000 blowers.

6.3 Fault Monitoring Functions

Tests should be conducted to confirm the correct operation of the fault monitoring circuits :-

6.3.1 Move a hand continuously in the view field at a distance of approx. 100mm.
Check after 15s :- Unit output in Fault state.
Remove hand from view field.
Check after 6s :- Unit output in Normal state.

6.3.1 Remove purge air supply.
Check :- Unit output in Fault state.
Reinstate purge air supply
Check :- Unit output in Normal state.

6.3.2 Remove electrical supply.
Check :- Unit output in Fault state.
Reinstate electrical supply
Check :- Unit output in Normal state.

6.4 Flame Detection

Introduce a 1 to 2 cm test flame into the view field at approx. 500mm distance.
Check :- Unit output latched to Fire state.
Operate Reset.
Check :- Unit output in Normal state.

WARNING : On certain sites it may be necessary to obtain a permit to undertake this flame test. In some cases the use of a naked may be totally forbidden.

Note : Infra-red LED Torches are NOT suitable for testing 7000 Series equipment.

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