Patol Limited

5000 Series
Infra-red Fire Detection System
Internal Lens Cleansing & Purge Air Configuration
5010 Sensor Head - 5020 Controller

SPECIFICATION
INSTALLATION - COMMISSIONING
OPERATION - MAINTENANCE

Document Ref : D1125

Issue	Change	Date	Remarks
1	Original	25/05/05	

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1 INTRODUCTION

1.1 General

The Patol 5000 Series of equipment is specifically designed for the protection of establishments and systems where a movement of materials with a potential fire hazard is a routine occurrence.

The 5000 Series system employs enhanced Infra-red monitoring technology that enables the detection of fire initiating materials, whilst they are being transported, and before they have reached a flame condition.

The system has many applications within industries such as Power Generation, Coal Mining, Process Plant, Road Transportation and Rail Networks and has been specifically designed to both meet the rigors of these environments and to provide the reliability required.

The equipment monitors for fire and fire potential of materials in transit. The system can detect anomalies where combustion has not yet been reached, but where there is sufficient energy for a fire initiation upon destination arrival.

A typical example is in the coal feed systems on power stations where coal on the 'out field stack' may very well smoulder with little adverse effect for long periods of time. However, if imported to the power station it may have devastating effects on conveyor systems, holding hoppers, blending plants etc.

- Detection of hazards at temperatures below flame point including both embers and buried hot spots.
- Air purged system for *Dusty* environments with air pressure monitoring.
- Eight high integrity detectors for maximum reliability
- Multi-facet lensing provides wide uniform coverage superior to some ember/spark detectors.
- Coincidence- *Double Knock* - option for unit detectors as standard.
- Timed auto reset / coincidence analyser circuit.
- Tuned response - solar blind.
- Special configurations and application specific calibration options.
- Specifically designed for high EMC compliance

1.2 Principles

The principle of operation is that temperature dependant black body emissions occur for all materials. These emissions range through the infra red spectrum to visible light. Both the wavelength and level of peak energy emission are related to temperature.

The Series 5000 detectors are designed to detect the changes in these emissions that occur when a hot body enters the field of view of the detector.

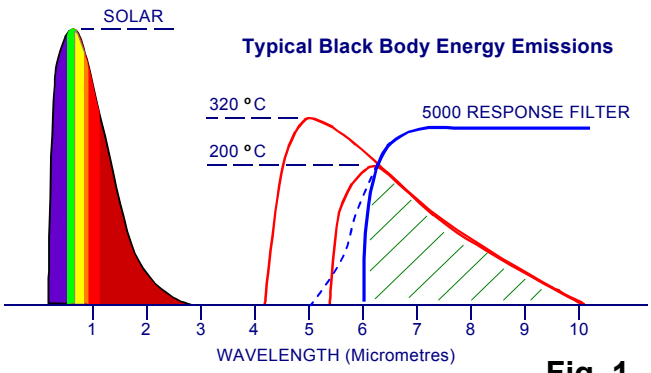


Fig. 1

By the use of both optical filtering and electronic analysis of the various parameters the system is blind to visible light from the sun or local luminaires, whilst being able to detect relatively low temperature material moving through the field of view.

2. EQUIPMENT DETAIL

2.1 Description

The 5000 Series system described here comprises three primary elements :-

Sensor unit - Type 5010

Control Unit - Type 5020

Air Supply / Blower Unit

The Sensor Unit is located above the materials transit path (e.g. conveyor) by means of the adjustable mounting bracket and aligned such that the monitored hazard passes through the sensor's field of view. The height and angle of the sensor determine the width of the monitored path.

The Type 5010 Sensor 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 within the sensor unit.

There is a continuous air flow from the optical lens aperture which stops dust settling on the lens. 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 such as coal conveyors, and is recommended in even relatively clean applications. A series 5000 air purge blower and filter unit is employed when an 'on site' air supply is not available. (See section 2.7)

Within the unit is a pressure switch to monitor the purge air and signal a loss of pressure as an Air Fault to the controller.

The Type 5020 Control Unit provides various indications and controls related to infra-red detection alarms and fault monitoring.

The unit is mounted such as to provide ready access for operational and maintenance purpose and connects to the sensor by means of a ten core screened signal cable.

TYPICAL SYSTEM

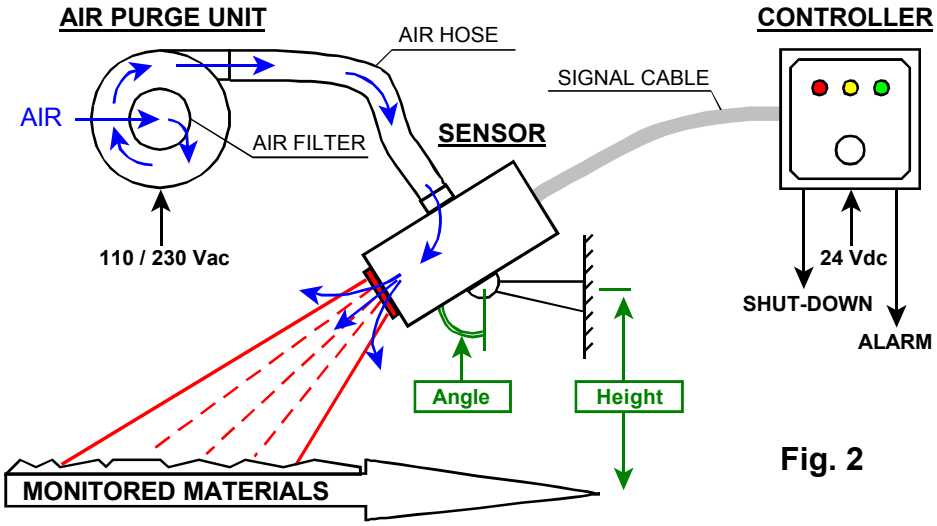


Fig. 2

2.2 Type 5010 Sensor Head

An octal detector sensing module is located within an aluminium alloy housing which is mounted by means of an adjustable bracket permitting alignment in both vertical and horizontal planes. The housing is equipped with a purge spigot for coupling to a 45mm I/D air hose and internal screw terminals for connection to the controller cable.
The sensing module fits to the housing by means of a connector and thus may be readily de-mounted (upon removal of the housing cover) without disturbance to cable connections.
The injected air exits via the IR lens aperture thus preventing ingress / settlement of dust.

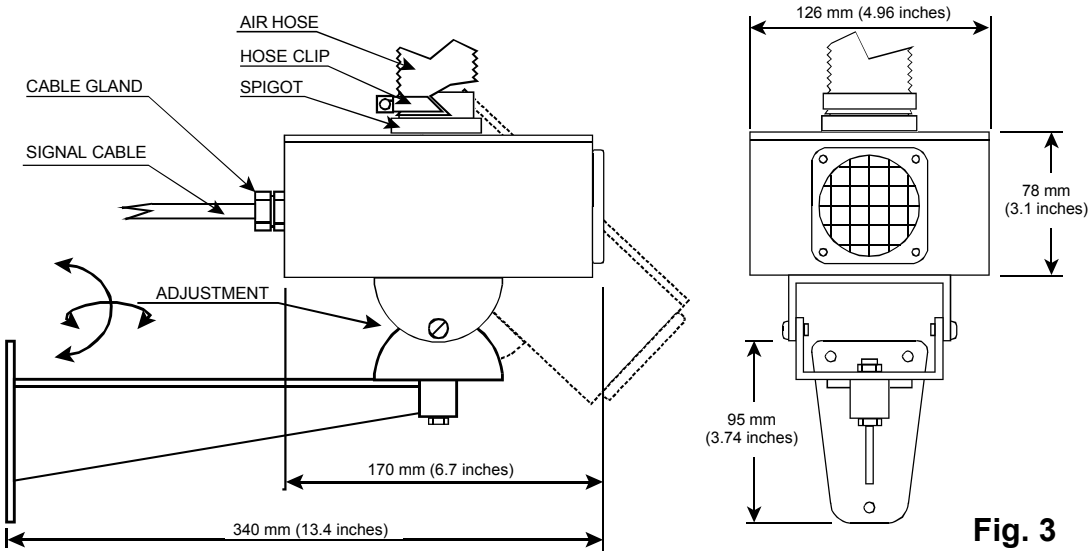


Fig. 3

2.3 Type 5020 Controller

The control module is easily de-mountable from the housing and connects to the sensor by means of a ten core screened cable. These terminations, together with supply and output contact connections are via two part screw terminals thus enabling installation of the housing and site cables prior to fittment of the module.The housing has a high level of ingress protection (IP67).
The unit incorporates a user programmable DIL switch to set the options which include detector sensitivity setting, auto/manual reset sequence selection, and one-shot/ coincidence voting for the alarm and trip/shutdown outputs.
The sensor air pressure and signal cable connections are fault monitored/fail safe. The unit incorporates an aux. fault input & common fault output contact.

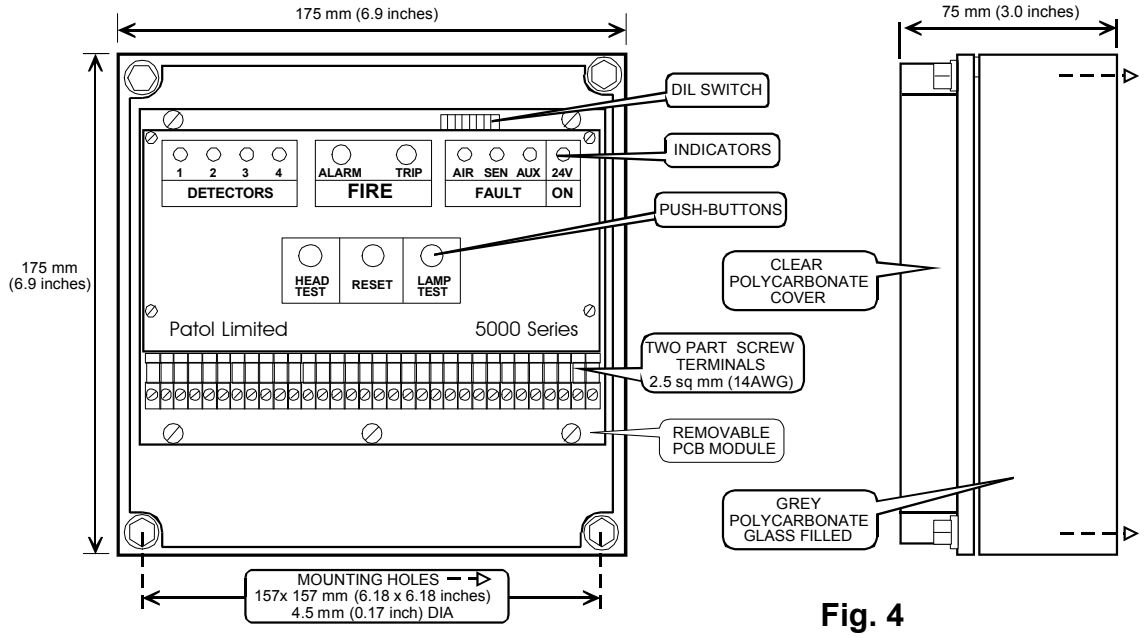


Fig. 4

2.4 General Specification (Sensor and Controller)

2.4.1	Electrical:-	Supply Voltage : 20 - 30 Vdc Stand-by Current : 35 mA Maximum Current : 70 mA (Full Alarm) Terminals : 2.5 mm² (14 AWG)
2.4.2	Purge Air Supply:-	Pressure : 5 mBar (2"WG) Delivery : 5.0 litres / sec (11 cubic feet per min) Input Fitting : 45mm (1 3/4") dia hose spigot
2.4.3	Sensor Head:-	Weight : 1.15 kg (2.5 lbs) - Excluding mounting arm Weight : 1.45 kg (3.2 lbs) - Including mounting arm
2.4.4	Controller:-	Weight : 0.9 kg (2 lbs) Rating : IP67
2.4.5	Temperature :-	-20°C to +70°C
2.4.6	Indications:-	Detection Channels : Red LEDs - 5mm - 4 off Alarm : Red LED - 8mm Trip : Red LED - 8mm Air Fault : Yellow LED - 5mm Sensor Fault : Yellow LED - 5mm Auxiliary Fault: Yellow LED - 5mm Supply On - Green LED - 5mm
2.4.7	Outputs:-	Alarm Contact : 1 pole C/O - 500mA @ 30Vdc / 120Vac Trip Contact : 1 pole C/O - 500mA @ 30Vdc / 120Vac Fault Contact : 1 pole C/O - 500mA @ 30Vdc / 120Vac
2.4.8	Controls:-	Sensor Head Test Push-button Reset Push-button Lamp Test Push-button
2.4.9	Program DIL Switch :-	8 Pole - Also refer to section 2.5 Sensitivity - 4 level Latching / Auto Reset Alarm - One Shot / Voting Trip - One Shot / Voting Auto Reset Timer - 4 settings
2.4.10	Inputs:-	Auxiliary Fault (PSU / Charger etc.) Remote Reset
2.4.11	Detectors:-	8 off - Using interlaced lensing - Configured as 4 pairs. Sensitivity : 10 to 40 µW adjustable in four steps. Spectral Filter : 5 to 14 µm Transit speed : 1 to 6 m/s Response : 80 - 1000 ºC (170 - 1800 ºF) - Refer Fig.5

Figure 5 indicates the correlation between the temperature and size of 'hot spot' anomalies for a typical installation to produce one or more detector channel activations at various trigger level settings.

Exact response is dependant on the emissivity factor of the monitored material, sensor orientation and target speed.

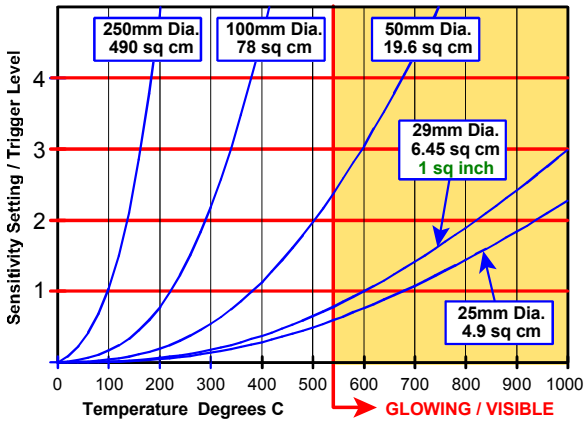


Fig. 5

2.5 Operational Programmability - DIL Switch

The system is fitted with eight IR detectors that are arranged in pairs within a four channel configuration. The DIL switch located at the top of the controller PCB permits the selection of system parameters related to the triggering of these channels.

2.5.1 Alarm & Trip Outputs

The controller is equiped with two logic functions.
One function operates when **any** channel registers a detection (1 out of 4).
The other function operates on a voting principle which is activated when two **coincident** channel detections occur (2 out of 4).
Two primary outputs are available - ALARM & TRIP
Each of these having both a discrete LED indicator & output relay contact
Poles 1 & 2 of the DIL switch permit selection of the following options:-

POLE 1	POLE 2	LED & RELAY OPERATION
OFF	OFF	ALARM & TRIP functions both operated on **any** sensor head detector activation. (1 out of 4)
ON	OFF	ALARM & TRIP functions both operated on **coincident** head detector activation. (2 out of 4)
OFF	ON	ALARM & TRIP functions both operated on **any** sensor head detector activation. (1 out of 4) **as per Off Off**
ON	ON	ALARM operated on **any** detector activation (1 out of 4) TRIP operated on **coincident** (voted) activation (2 out of 4)

2.5.2 Latching / Auto Reset Selection.

Both ALARM & TRIP outputs may be set for either Latching or Auto Reset operation.
Poles 3 & 4 of the DIL switch permit selection of the following options:-

POLE 3	POLE 4	LATCHING OPERATION
OFF	OFF	ALARM & TRIP functions both auto-reset (see scan / reset delay following)
ON	OFF	***1 out of 4*** functions auto-reset after scan / reset delay ***2 out of 4*** functions latch if within scan period
OFF	ON	All detections will Latch On
ON	ON	All detections will Latch On

The time of delay before the Auto Reset occurs (when appropriate) may be set.
When the option for latching only on coincident (2 out of 4) detection is selected then the Auto Reset delay is in effect the Scan Period within which a second channel must occur after first detection. Poles 5 & 6 of the DIL switch set the delay / Scan period.

POLE 5	POLE 6	SCAN - AUTO RESET TIME DELAY
OFF	OFF	Scan / Delay 0.5s (Shortest)
OFF	ON	Scan / Delay 1s
ON	OFF	Scan / Delay 1.5s
ON	ON	Scan / Delay 2s (Longest)

2.5.1 Detector Sensitivity

The detection sensitivity may be set by means of switch poles 7 & 8.

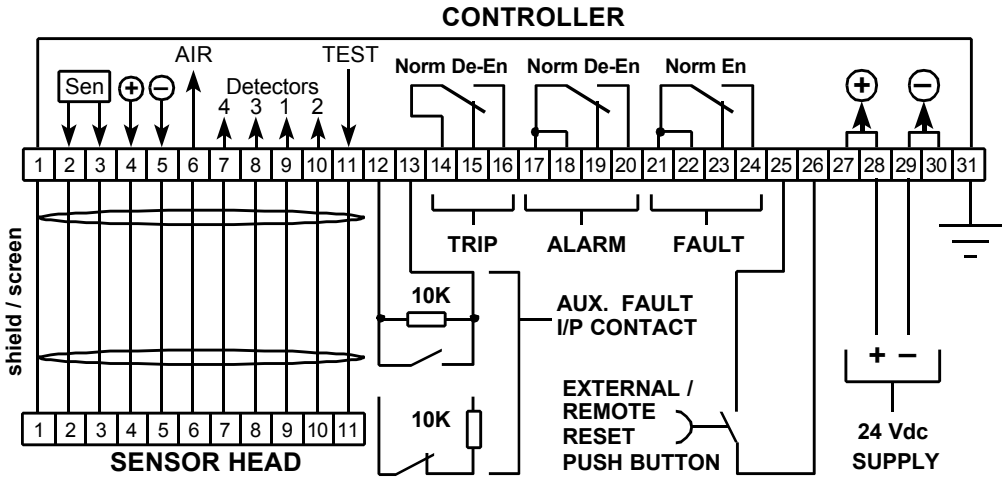
POLE 7	POLE 8	DETECTOR SENSITIVITY
OFF	OFF	Level 1 (Most Sensitive)
OFF	ON	Level 2
ON	OFF	Level 3
ON	ON	Level 4 (Least Sensitive)

2.6 Connections

2.6.1 General

A ten core shielded / screened cable is required for connections between the Controller and Sensor Head. The remainder of the terminals located in the controller provide various supply, output, and signal functions.

Fig. 6



2.6.2 Sensor Head Cable - Terminals 1 to 11

The Sensor is connected to the Controller by means of a ten core shielded/ screened cable. This cable may be provided by Patol Ltd., as part of a “system package”, and may be of a five pair form. The screen (earth) of the cable should be tailed and connected as show in the above figure.

Earth continuity at Controller & Sensor Head terminals (#1) must be maintained, and a system / site earth implemented at the Controller terminal #31 as is most appropriate. This is in effect an *instrumentation* earth - not a *safety* earth.

Safety earth arrangements to the Sensor must be made as appropriate to local / national standards.

2.6.3 Auxiliary Fault Signal - Terminals 12 &13

The controller incorporates an auxiliary FAULT input circuit. This may be employed, for example, to integrate a failure / warning signal from an associated local 24 Vdc power supply / battery charger. The circuit connection is both open & short circuit fault monitored. The above diagram shows how both opening and closing reporting contacts should be configured. If the circuit is not utilised then the terminals should have a 10k resistor connected to *blank off* the indication / warning.

2.6.4 Relay Contacts - Terminals 14 to 24

The controller provides three sets of repeat signal contacts. The above diagram shows the contacts in their *DE-ENERGISED condition.* Alarm & Trip contacts are normally de-energised; the fault contact is normally energised. The operation of Alarm & Trip contacts may be programmed by means of the DIL switch.

2.6.5 Remote Reset Signal - Terminals 25 & 26

This input may be utilised for the connection of a local external push-button, or for signalling from remote equipment.

2.6.6 Supply Connections - Terminals 27 to 31

Two terminals are provided for each supply pole.

It should be noted that the recommended EARTH connections are related to RFI considerations and must not be taken as being compliant with any site SAFETY EARTH requirements.

2.7 Series 5000 Blower Units

Where a suitable “on site” air supply is not readily available Patol 5000 Series air purge units may be employed.

These devices are multistage centrifugal blowers that can be provided in a variety of configurations that accommodate differing application requirements such as air delivery volume / pressure, supply voltage and mounting arrangements.

The units are equipped with a removable and washable/replaceable inlet air filter, which protects the blower in normal air input conditions. These filters are not intended to cope with high dust environments (such as within coal conveyor housings) and the inlet should be piped/ducted to a relatively clean air area.

The units are provided with a 2m flexible supply cable for connection at an adjacent junction box.

As standard each blower is provided with a length of 45mm I/D hose for coupling inlet and outlet to rigid ducting adaptors.

Type 5040 2 stage unit employed on most applications.

Supply :- Available in 115/230 Vac 50/60 Hz options.

Weight :- 5 kg

Delivery :- 5 l/s at 11 mBar - 10 l/s at 7.5 mBar

Size :- See drawings - Fig.7

Type 5044 4 stage unit employed with long duct lengths.

Supply :- Options as above

Weight :- 7 kg

Delivery :- 5 l/s at 23.5 mBar - 10 l/s at 19 mBar

Size :- See table below

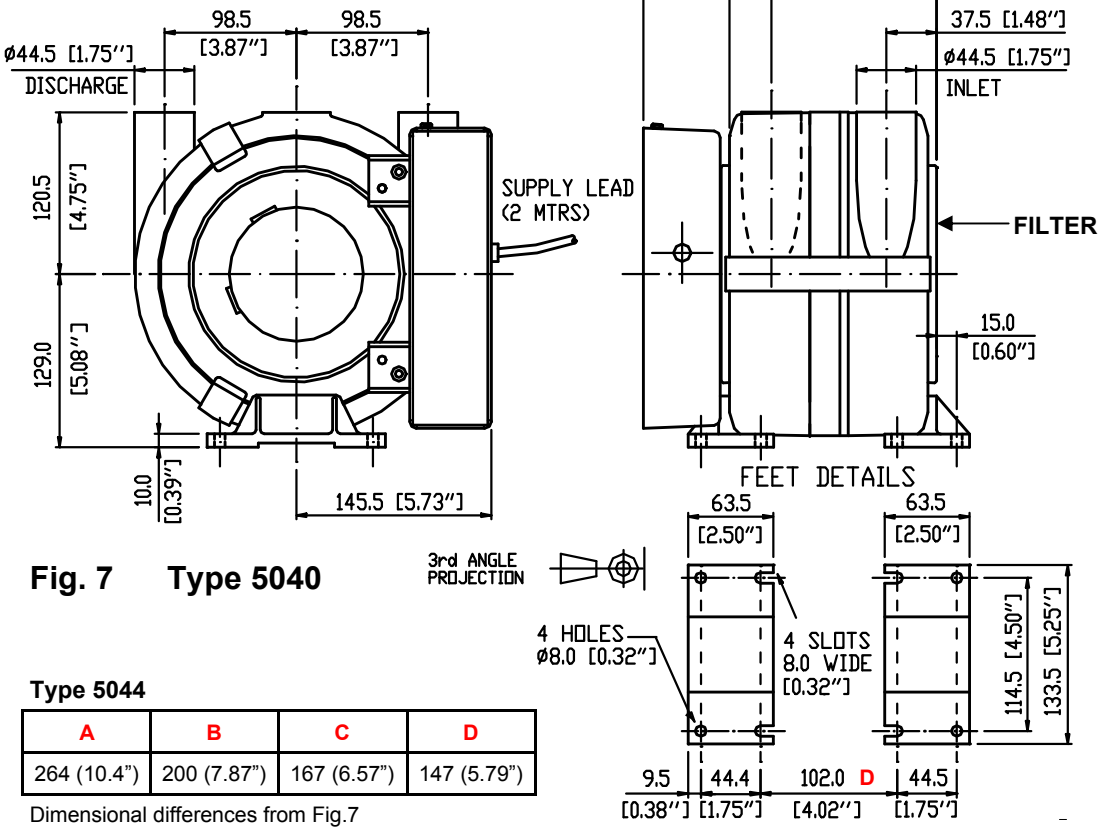


Fig. 7 Type 5040

Type 5044

A	B	C	D
264 (10.4”)	200 (7.87”)	167 (6.57”)	147 (5.79”)

Dimensional differences from Fig.7

3. INSTALLATION

3.1 Sensor Head

The angle and height of mounting determine the monitored width.

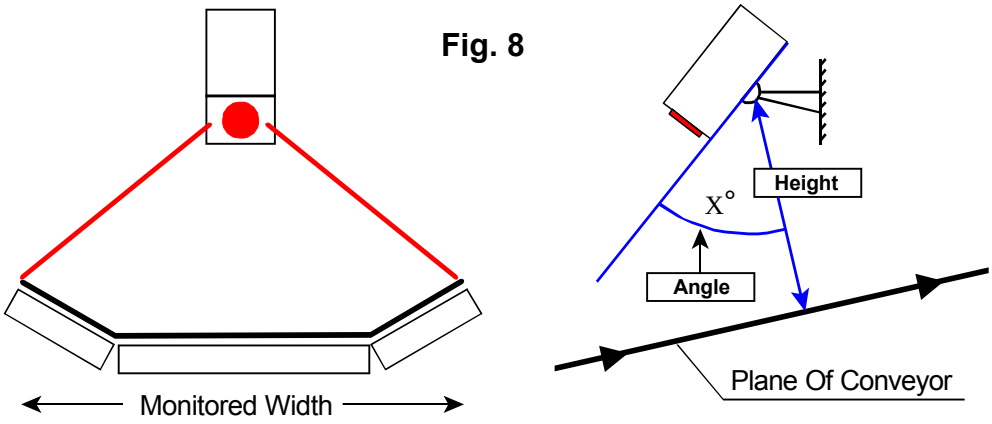


Fig. 8

The example shown on the chart is for a sensor mounted 0.8m above the transit path at an angle of 30°. This provides a maximum monitored width of 1.3m which would be suitable for most coal conveyors. The minimum recommended angle is 30°. Should the most practical mounting height (e.g. 1m) produce a wider view field than the conveyor this is perfectly acceptable, so long as the "overlap" on each side is not so large that external hot targets, such as vehicles on an adjacent roadway, are within the units view.

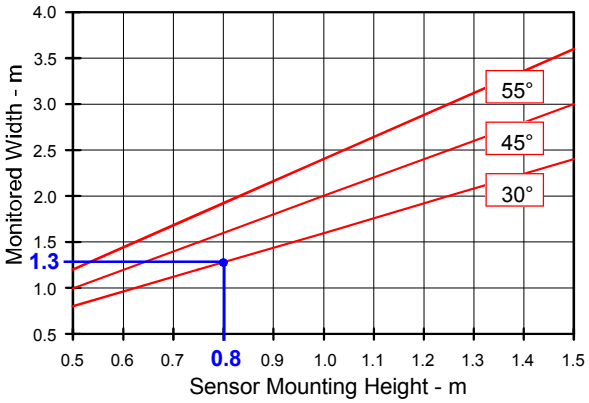


Fig. 9

3.2 Controller Cable

The Type 5010 Sensors are fitted with a 20mm gland as standard, which is suitable for the flexible screened / shielded cable provided.

If the Controller is being mounted at a location "remote" from the Sensor, armored cable or conduit may be employed, however this should terminate at an adjacent junction box. The flexible controller cable should connect the Sensor to this JB in order to permit adjustments to Sensor alignment. Any interposing cable must maintain the screen / shield connection.

On sites defined as "Hazardous Areas" it may be a requirement that all cables are installed in conduit. In this case it is recommended that a short length of approved flexible conduit is fitted between the Sensor Head and an adjacent junction box. The Sensor gland should be replaced with an appropriate flexible conduit coupler which must be sealed with a suitable conduit sealant, such as silicone rubber, in order to maintain the Purge Air pressure within the enclosure.

Cable terminations at both Sensor and Controller are made at plug-in screw terminal connectors with reference to Fig.6 in section 2.6.
This activity at the Sensor Head may be assisted by removal of the inner sensor module.

When re-fitting the Sensor lid it is essential that the air switch "pressure" tube is inserted into the air inlet spigot such that the tube end lies in the input hose.

Refer to section 4.4 for further detail on air switch tube and sensor module removal.

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 Unit should be employed. These 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.

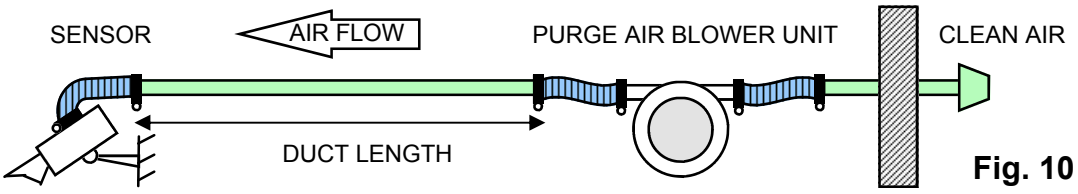


Fig. 10

In coal handling plant applications twin conveyors may be required to be monitored.
A single blower may purge both sensors by employing a "T" branch in the air ducting.

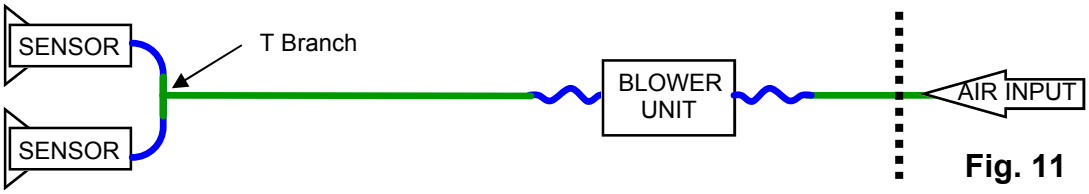


Fig. 11

In some applications the Air Purge Blower unit (APB) may need to be remote from the Sensor. This may be due to the Sensor being situated at some distance from a "clean air" environment; as in the reclaim tunnels of power station coal handling plants. Similarly, the APB may need to be located in a "Safe Area" on sites with a "Hazardous" classification.

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)

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

Sensor Quantity	Imperial Ducting / Pipe		Metric Ducting / Pipe		APB to Sensor Duct	
	O/D	Bore Dia.	O/D	Bore Dia.	**5040** 2 stg.	**5044** 4 stg
1	1-5/16 "	1-1/4"	40mm	32mm	20m	60m
	1-7/8"	1-1/2"	50mm	40mm	50m	140m
	2-3/8"	2"	63mm	50mm	180m	520m
2	1-5/16 "	1-1/4"	40mm	32mm	3m	12m
	1-7/8"	1-1/2"	50mm	40mm	7m	28m
	2-3/8"	2"	63mm	50mm	25m	100m
1	Flexible Hose Direct (Non-smooth)			45mm	40m	110m

4. COMMISSIONING

4.1 Cable Checks

The installation wiring should be checked for correct connection, continuity and insulation. These checks should include:-
Sensor to Controller cable including screen / shield.
Controller supply cable.
Controller output cables. (alarm, trip, fault relay contact signals)
Controller input signal cables (aux. fault / remote reset)
Blower supply cable. (If appropriate)

4.2 Controller Set Up

The Controller program DIL switch must be set for the required operation.

In most applications the selected operation will be for both ALARM & TRIP to occur on single channel detection. These outputs latching until manually reset.
It is recommended that initially, detection is set to the most sensitive level.
During maintenance / testing it may be of advantage to temporarily select the Auto Reset mode. The associated reset / scan delay should be set for 1s.

The DIL switch setting for this configuration is:-

POLE 8	POLE 7	POLE 6	POLE 5	POLE 4	POLE 3	POLE 2	POLE 1
OFF	OFF	ON	OFF	ON	ON	OFF	OFF

4.3 Power Up Procedure

4.3.1 Check that the air supply is connected and operational. If a 5000 Series blower is employed this must be powered.

4.3.2 Check at the Sensor Head that purge air is blowing from the lens aperture.

Note : The purge air is monitored by a pressure switch located within the sensor casing. If the air delivery is insufficient to operate the switch then the “Air Fault” LED will be illuminated at stage 4.3.4 following. Reference should be made to section 4.4.

4.3.3 Apply the controller electrical supply and check to be within limit - 20 to 30 Vdc.

4.3.4 Check that the Supply LED is illuminated and all other LEDs are Off.

4.3.5 Operate the Lamp Test push-button and check that all LEDs illuminate.

4.3.6 Momentarily remove the Purge Air Supply and check that the Air Fault LED is illuminated and that the Fault output signal operates. (For duration of Air Supply interruption).

4.3.7 Momentarily simulate an Auxiliary Fault input (if appropriate) and check that the Aux Fault LED is illuminated and that the Fault output signal operates. (For duration of the simulation).

4.3.8 Momentarily remove the electrical supply and check that the Supply LED is Off and that the Fault output signal operates. (For duration of supply interruption).

4.3.9 Operate the Head Test push-button and check all Detector, Alarm & Trip LEDs are illuminated and that Alarm & Trip output signals are operated.

4.3.10 Operate the Reset push button and check that the controller indications and output signals return to normal. Repeat 4.3.9 and check remote reset operation if appropriate.

4.4 Sensor Head & Purge Air Supply

The purge air is monitored by a pressure switch located within the sensor casing.
The switch is factory set to operate at approximately 3.74 mBar (1.5 inch water gauge).
The operation of the switch is dependant on the differential pressure between the air input point to the Sensor and the external atmosphere.
Should an “Air Fault” be prevailing at stage 4.3.4, even though it is apparent that purge air is present, the switch’s monitoring tubes should be checked for correct positioning.
Similarily, the switch setting may be “marginal” for the air flow/pressure being achieved on the installation, in which case an adjustment can be made.

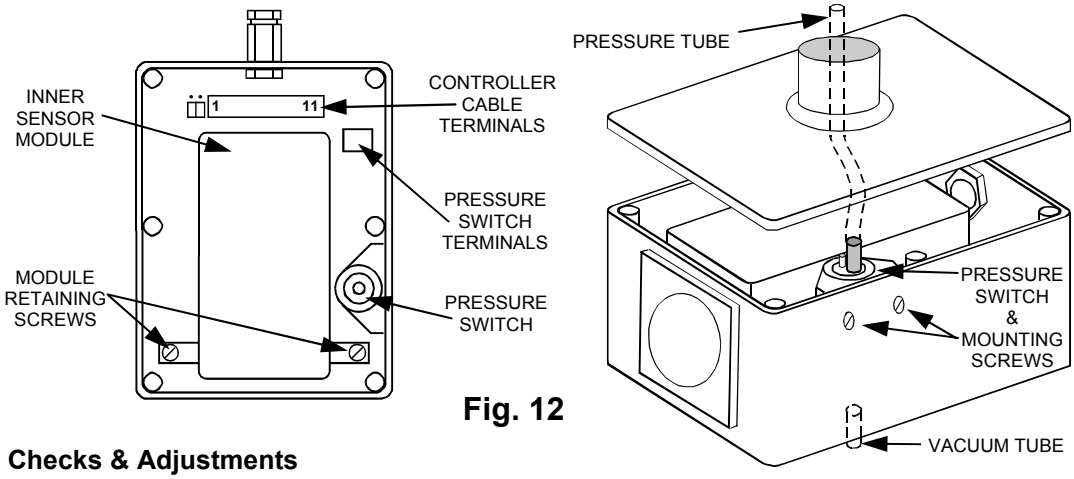


Fig. 12

Checks & Adjustments

4.4.1 Remove the sensor lid to access the pressure switch and inner sensor module.

4.4.2 Check that both the “pressure” & “vacuum” tubes are fitted to the switch.

4.4.3 Check that the “vacuum” tube exits via the hole in the lower case face and is not blocked.

4.4.4 When re-fitting the sensor lid the “pressure” tube must sit in the inlet spigot / hose.

4.4.5 Adjustment of the pressure switch may be undertaken by loosening the two mounting screws and sliding the switch upward. A setting screw is located on the lower face of the switch. The operation of the switch may be monitored with a multimeter at the switch terminal.

4.4.6 Access to both switch and terminals may be improved by un-plugging the inner sensor module after removal of the two retaining screws.

4.5 Hot Body Simulation Tests

A heat simulation test should be conducted. This testing may be facilitated by temporarily setting the system to auto reset mode by placing DIL switch poles 3 & 4 Off.

In either Auto Reset or Latching mode the “window” of the Sensor Head will momentarily illuminate Red when any IR Detector triggers.

The test is conducted by moving a “hot” (IR emitting) target into the view field of the Sensor Head and observing / checking the consequential Alarm/Trip operation.

It is preferable that the “test target” is of sufficient size and temperature that the simulation can be conducted at the plane of the monitored path (conveyor) such that the view field of the Sensor can be validated. However, a smaller and cooler “test target” may be employed so as to at least confirm basic operation of the sensor. It will be necessary with a “target” of this nature to introduce it to the view field nearer to the Senor than the “monitored plane”.

If the location of the Sensor is classified as a “Hazardous Area” it will be necessary to make special arrangements for this testing as the electrical / hot nature of the test simulation may breach normal site regulations. It may even be that the test is precluded.

Refer to section 6.4 for information on “test targets”.

5. OPERATION

5.1 Normal

When the system is healthy only the green supply LED will be illuminated.

5.2 Alarm Condition

An Alarm condition will occur on abnormal Infra-red detection by the Sensor Head.
Normally this status will Latch On, however in special configurations the condition can be set to momentary operation; auto resetting after a selected delay.
During the ALARM :-

- One or more Red DETECTOR indicators will be illuminated.
- The Red ALARM indicator will be illuminated.
- An ALARM output is signalled by means of a relay contact.

5.3 Trip condition

A Trip condition will occur on abnormal Infra-red detection by the Sensor Head.
Normally this status will be coincident with the ALARM condition and will Latch On.
In special configurations the condition can be set such as to require more detector triggers than for ALARM. Similarly, the condition can be set to momentary operation; auto resetting after a pre-selected delay.
During the TRIP :-

- One or more Red DETECTOR indicators will be illuminated.
- The Red TRIP indicator will be illuminated.
- A TRIP output is signalled by means of a relay contact.

5.4 Reset

Latched Alarm and Trip conditions may be normalized by :-

- Operation of the Controller's integral Reset push-button.
- Operation of the remote reset push-button / signal (if implemented)

5.5 Fault Warning

The equipment continuously monitors for various fault conditions and is equipped with indicators to identify the failure.

- Yellow AIR FAULT indicator illuminated - Sensor Head "purge air" failed.
- Yellow SEN FAULT indicator illuminated - Sensor Head disconnected.
- Yellow AUX FAULT indicator illuminated - Auxiliary equipment fault input signal.
- Green 24 V ON indicator extinguished - Electrical supply failed.

On any of the above conditions a FAULT output is signalled by means of a relay contact.
The indications and output will automatically normalize on rectification of the fault.

5.6 Lamp Test

Operation of the Controller's integral Lamp Test push-button illuminates all indicators.
Output relay signals are not initiated on this test.

5.7 Head Test

Operation of the Controller's integral Head Test push-button signals the Sensor Head and simulates a *detection* condition on all circuits. The system will respond as if a true Alarm / Trip condition has occurred, including operation of Alarm & Trip relay contact outputs.

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:-

- Operation configuration and Sensitivity - DIL 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/Trip occurrences. (including cause and actions taken).

An operational regime should be developed that includes both frequent inspection of the Sensor Head for undue accumulation of dust, and to confirm air (blower) operation. The regime should encompass use of the Lamp & Head Test controls to check basic operation.

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

6.2 Purge Air Filter

The blower filter should be removed and washed using a warm water soap solution.
The use of solvent cleaners is not recommended.

6.3 Fault Monitoring Functions

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

6.3.1 Purge Air Pressure - Check as per 4.3.6

6.3.2 Auxiliary Fault - Check as per 4.3.7

6.3.3 Supply Failure - Check as per 4.3.8

6.4 Infra-red Detection

A heat simulation test should be conducted by moving a “hot” (IR emitting) target into the view field of the Sensor Head and checking the consequential Alarm/Trip operation.

The controller may be temporarily set for auto reset mode by means of the DIL switch.

The “window” of the Sensor Head will momentarily illuminate Red on any Detector trigger.

It is preferable that the “test target” is of sufficient size and temperature to enable simulation at the plane of the monitored path (conveyor) in order to validate the view field of the Sensor . Smaller and/or cooler “test targets” may be used closer to the Sensor so as to at least confirm basic operation of the Sensor.

Fig.5 in Section 2.4 indicates the relationship between the surface area and temperature required for triggering at the various trip settings.

If the location of the Sensor is classified as a “Hazardous Area” it may be necessary to make special arrangements for this testing as the electrical / hot nature of the test simulation will breach normal regulations. It may even be that the test is precluded.

Potential “test targets” are :-

Type 5501 Infra-red Radiator - Test and Commissioning Platen - Patol product.

100W Lamp Bulb - (The Sensor responds to the glass temperature - not the visible light).

Domestic Flat Iron (smoothing iron).

Electrical or Catalytic soldering iron.

Note : Infra-red LED Torches are NOT suitable for testing 5000 Series equipment.