

# CONVENTIONAL INFRARED FLAME DETECTORS

## **AUTOCALL® S232f+ and S262f+ Series**

### Features

- **Triple Waveband, Infrared, Solar Blind Flame Detection for Optimum False Alarm Immunity**
- **Black Body Rejection Over a Wide Range of Source Temperatures**
- **Range Adjustable to 164' (50m) for a 0.1m Gasoline Pan Fire**
- **Discrimination of Optical Faults (Dirty Windows) from Other Faults in the Built-in Self Test**
- **Very Low Power Consumption (0.35mA)**
- **Powered Directly By Initiating Circuit; No Additional Power Required (S232f+)**
- **Patented, Dual Filter, Complete Solar Blindness for Outdoor Use**
- **Explosionproof to Meet Applicable NEMA and NEC Requirements**
- **90° Field of View**
- **Housing Designed for Easy Installation of Wiring**
- **Flexible Mounting and Angular Adjustment**
- **Rugged Stainless Steel Alloy Housing and Mounting Bracket**
- **Operating Temperature Range of -40°F to 176°F (-40°C to 80°C)**
- **Variable Response Times and Sensitivity Settings**
- **Remote Self Test and Range Setting**
- **True Window Test in Detection Area (i.e. Not in the Edge of the Window)**
- **Terminals Provided for Remote LED Connection**
- **Available with Relay or 4-20mA Outputs (262f+)**

### General Information

The AUTOCALL S232f+ and the S262f+ explosionproof flame detector is the result of over 30 years experience in the development and manufacturing of infrared, solar blind and multi-channel infrared flame detectors with low power consumption and high false alarm immunity. Both Detectors incorporates the dual, solar blind feature. All electrical interfaces are supported through a conventional series fire alarm control panels.

The AUTOCALL S232f+ and the 262f+ incorporate a sophisticated, built-in, self test function that tests the detector every 20 seconds for window contamination and electronic circuitry functionality signals. It incorporates two different color light emitting diodes, and by using differing flash rates, provides separate indication of alarm, detector (electronic) fault and "dirty" window (optical integrity monitoring).

### Operation

The AUTOCALL detectors apply a new concept for eliminating false alarms from modulated blackbody sources. The design incorporates an optical filter which enables a single infrared sensor to measure the radiated energy present in two separate wavebands placed on either side of the flame detection waveband, at 3.8µm and 4.8µm respectively (see Figure 1).



The signal obtained from this "guard" channel is cross-correlated with the signal from the flame detection channel to provide an accurate prediction of the non-flame energy present in the flame detection waveband. This prediction is independent from the temperature of the radiation source, allowing the detectors to provide blackbody rejection over a wide range of source temperatures.

The use of an optical processing technique as opposed to the use of two separate electronic sensors improves the overall reliability of the detector, by reducing the number of components and eliminating the need for complex calibration procedures during manufacture.

### Listings & Approvals

- FM ID No. 3009986



## Flame Detection in the Presence of Blackbody Radiation

The sensitivity of the detectors are essentially not affected by the presence of blackbody radiation in the same field of view as the flame. The ability of the detector to accurately determine the amount of non-flame radiation received, allows the detector to set a variable alarm threshold. This threshold is calculated so that the sensitivity of the detector remains largely unchanged in the presence of blackbody sources of differing temperatures and intensity.

### Performance

The detectors are designed to respond in a minimum of 3 seconds, this being the optimum signal processing time constant of the circuitry. Varying sizes of fire will be detected at given distances in the same time. The time taken by the fire to reach equilibrium depends on the initial temperature of the fuel. If kerosene was preheated to a temperature above its flash point, then its behavior would be equivalent to that of gasoline at 77°F.

The AUTOCALL S232f+ and S262f+ detectors offer a significantly increased sensitivity to flame with the ability to detect a fully developed 3.9 inch<sup>2</sup> (0.1m<sup>2</sup>) gasoline pan fire at up to 164ft (50m). This increase is made possible by precisely predicting non-flame energy in the flame detection waveband thus enabling discrimination of the signal from a smaller flame. These detectors include three normal standard ranges. Maximum range is 164ft (50m), default range is 82ft. (25m) and there is a short range of 41ft. (12.5 m).

The AUTOCALL S232f+ and S262f+ flame detectors use proven flame detection techniques, based on monitoring for modulated infrared radiation in the 4.3 μm waveband, which corresponds to CO<sub>2</sub> emission. It incorporates techniques for improved rejection of solar energy by using a dual 4.3 μm filter combination. Gaussian noise rejection is achieved by averaging the output signal of two separate sensor elements.

The minimum delay to alarm is 3 seconds from a fire in the field of view that is large enough to be detected. This delay is also selectable via dip switch settings for a 6 or 12 second delay.

Use of the S232f+ or S262f+ can significantly reduce installation costs without loss of system integrity.

The S262f+ provides a relay interface for alarm and fault condition. The alarm and fault relay can be programmed for either latching or non-latching operation. Both relays are rated 2A at 30VDC.

The detectors can be bulkhead mounted or for greater flexibility a Stainless Steel 316 bracket provides horizontal and vertical adjustment, thus allowing the detector to be positioned to give an accurate cone of vision to the area. The bracket provides axial rotation of 50° and an elevation of 67°.

The detectors is supported by the T210+ calibrated IR test source. The T210+ test source can be used with our series of telescopic and extension poles. See catalog page 261 for more information.

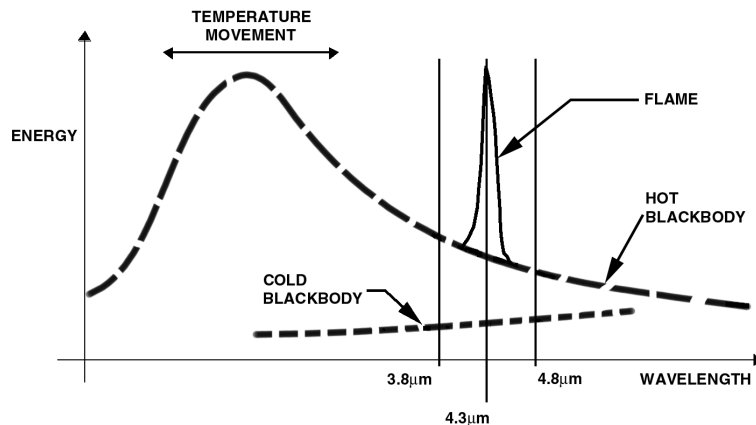


Figure 1

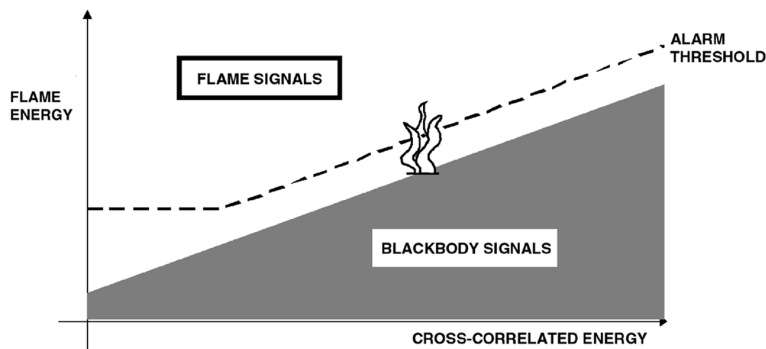


Figure 2

## Directional Sensitivity and Range

The polar diagram in figure 2a shows the directional sensitivity of the explosion proof detectors using a 3.9 inch<sup>2</sup> (0.1m<sup>2</sup>) gasoline pan fire. This figure shows that maximum detector sensitivity to the extremities of its coverage.

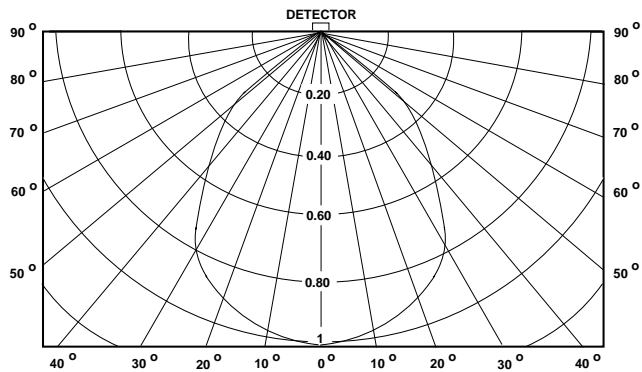


Figure 2a

The polar diagram in figure 2b shows the same information using a chopped gas flame. This figure shows that maximum detector sensitivity to the extremities of its coverage.

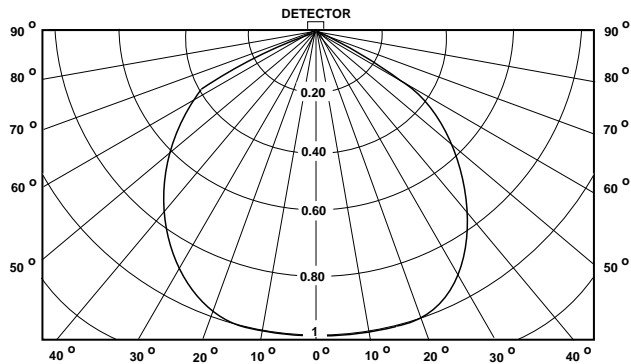
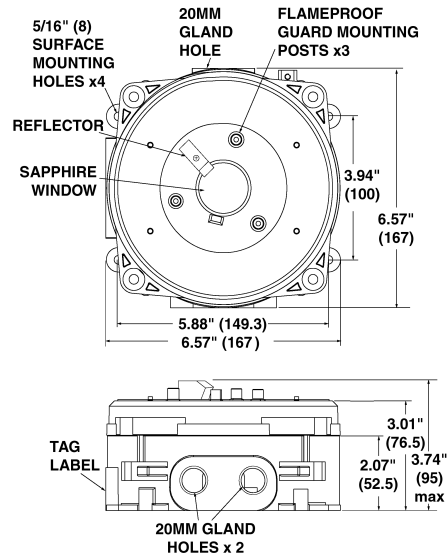


Figure 2b

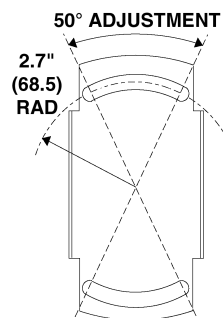
See User's Guide (Publication Number 850547) for additional information.



S252f+ Flame Detector  
Dimensions in inches (mm)

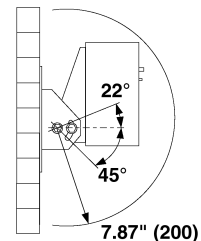


Rear View of Mounting Bracket, P/N 515567



Rear View of Mounting  
Bracket - side to side  
movement shown

CLEARANCE  
REQUIRED FOR  
FULL ADJUSTMENT

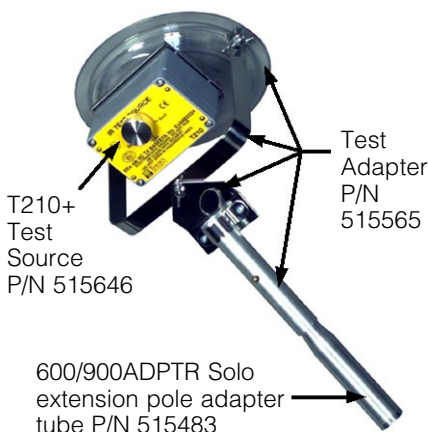


Side View of Mounting  
Bracket - tilt  
movement shown

Dimensions in inches (mm)

# CONVENTIONAL INFRARED FLAME DETECTORS

## AUTOCALL® S232f+ and S262f+ Series



See Installation Sheet (Publication Number 19700585) for additional information on S200+ Series detector accessories.

### Detector Accessories

The T210+ Test Source enables the user to test the response time and sensitivity of the S200+ Series Flame Detectors in both safe and hazardous areas. It can test detectors set to three different ranges: 50m, 25m, or 12m.

The T210+ is mounted in a hand-held cradle or attached to an extendable pole. When the adaptor is secured to the front of the cradle the module will self-align in the correct position when held against the detector.

The Test Source is enclosed in a glass filled polyester housing approved for increased safety or 'e' housing. It contains a bulb which is electrically pulsed by an intrinsically safe circuit to simulate typical flame flicker. Infra-red radiation from the lamp is focused by a parabolic reflector through a sapphire window onto the detector.

The T210+ Test Source requires a battery. It is recommended that PP3 nickel metal hydride (NiMH) or nickel carbon batteries be used as approved for hazardous areas.

### Specifications

Operating Temperature:	-40°F to 176°F (-40°C to + 80°C)
Operating Humidity:	95% RH (100% intermittent)
Standby Current:	11.0 mA
Alarm Current:	32.0 mA
Range:	3.9 sq. inches (0.1 sq. m) gasoline at 164ft. (50m) 15.7 sq. inches (0.4 sq. m) gasoline at 197ft. (60m)
Field of View:	90° min inclusive - flameproof versions
Response Time:	Field selectable 3,6 and 12 seconds
Sensitivity:	3 range settings
Detector Material:	Stainless steel 316L
Metal Parts (external & internal):	Bright stainless steel 316 to BS 1449 Pt 2
Tag Label:	Stainless steel 316
Dimensions:	6.57"H x 6.57"W x 3.5"D (167mmH x 167mmW x 89mmD)

### Ordering Information

Part No.	Model	Description
515644*	S232f+	Flame detector, infrared, conventional, explosionproof, triple waveband, wall mount or use 4-way movement bracket, P/N 515567*
515563*	S262f+	Flame detector, infrared, conventional, explosionproof, triple waveband, relay interface, wall mount or use 4-way movement bracket, P/N 515567*
515567	---	Mounting bracket for S200f+ series detectors, allows 4-way movement of detector
515646	T210+	Test source for S200f+ series detectors, for use with test adapter P/N 515565
515565	---	Test adapter for S200f+ series detectors, for use with T210+ test source (to use with SOLO 100 or 101, order adapter tube, P/N 515483)
515483	600/900ADPTR	Solo extension pole adapter tube (required when connecting the test adapter [P/N 515565] to SOLO 100 or 101)
920359	SOLO 101	Extension pole, 3'8" (with button lock)
920360	SOLO 100	Telescopic extension pole, extends from 3'11" to 14'9" (with button lock)

Please reference both the model and part numbers when ordering.

\* Contact the factory for required battery information.

This literature does not cover all the variations in the equipment described, nor does it provide for every possible contingency to be met in connection with installation, operation and maintenance. All specifications and listings are subject to change without notice. If you need more information on this product, or have a question, contact Grinnell Fire Protection, Westlake, Ohio 44145. © 2001 Grinnell Fire Protection, a Division of the Grinnell Corporation. AUTOCALL is a registered trademark of the Grinnell Corporation.

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