

# Minerva S200PLUS

Ex ia Intrinsically  
Safe & Ex d  
Flameproof Solar  
Blind Flame Detectors

# Triple Waveband Infra-Red Flame Detection

### Key Features

- Unrivalled black body rejection over a wide range of source temperatures

- Triple waveband infrared solar blind flame detection for optimum false alarm immunity

- Discrimination of optical faults (dirty windows) from other faults in the built-in self test

- Range adjustable to 50 metres for a 0.1m<sup>2</sup> n-heptane pan fire



The new MINERVA S200 PLUS flame detectors are the latest step in over 30 years experience of developing and manufacturing IR, solar blind and multi-channel infra-red flame detectors with low power consumption and high false alarm immunity. The MINERVA S200 PLUS incorporates the patented dual solar blind feature of the S100 and S200 flame detectors which have had over 26,000 installations world-wide. The MINERVA S200 PLUS range of advanced flame detectors is the most comprehensive range available. The devices are available in both Intrinsically Safe or Flameproof versions incorporating a variety of electrical interfaces. All electrical interfaces are supported through the existing range of Minerva Fire control panels.



## S200 PLUS Series

### Intrinsically Safe and Flameproof Applications

Unlike other flame detectors on the market the MINERVA S200PLUS is available in both Intrinsically Safe (EEx ia) and Flameproof (EEx d) models.

The intrinsically safe models are suffixed by the letter "i" and meet the requirements of EN50020 part 7 and are BASEEFA certified EEx ia IIC T5. As part of an intrinsically safe circuit, it is suitable for zones 0,1 and 2 where group IIC gases or lesser hazards can be continuously present in explosive concentrations.

The flameproof models are suffixed by the letter "f" and meet the requirements of EN50018 and are BASEEFA certified EEx d IIC T6. The detectors are suitable for zones 1 and 2 where group IIC gases or lesser hazards can be intermittently present in explosive concentrations.



### Benefits of the MINERVA S200 PLUS

- Very low power consumption (0.35mA)
- Models available with Conventional or Analogue Addressable interface (requires 2 core cable only)
- Models also available with relay or 4-20mA outputs
- Patented dual filter solar blindness for complete solar blindness is outdoor use
- Available in Intrinsically Safe and Flameproof variants
- Housing designed for easy installation of cabling
- Flexible mounting and angular adjustment
- 3 x 20mm field cable entries
- IP66/67 housing designed for external use
- Rugged stainless steel ANC4 LM25 alloy housing and mounting bracket
- Operating temperature range of -40 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
- BASEEFA (CENELEC) certified with other approvals in process
- Meets the requirements of EN54 Pt 10
- FM Approved Variants
- Designed and manufactured in the UK
- Lloyds Register and DNV approved variants



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**Triple IR Blackbody Rejection**

The MINERVA S200 PLUS implements a new concept for eliminating nuisance alarms from modulated black body sources. The design incorporates a novel optical filter which enables a single infra-red sensor to measure the radiated energy present in two separate wavebands placed on either side of the flame detection waveband, at 3.8  $\mu\text{m}$  and 4.8  $\mu\text{m}$  respectively (see fig 3). 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 MINERVA S200 PLUS to provide blackbody rejection over a wide range of source temperatures.

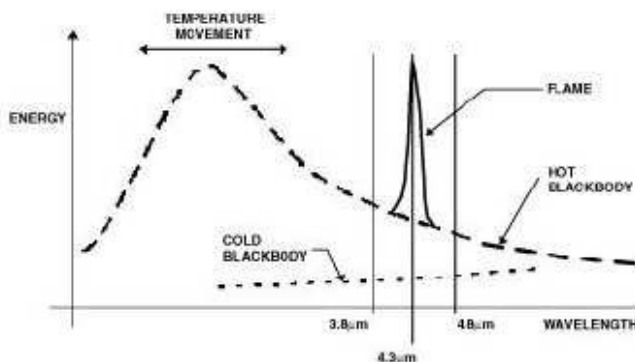


Fig. 3. Blackbody Rejection

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.

**Flame detection in the presence of blackbody radiation**

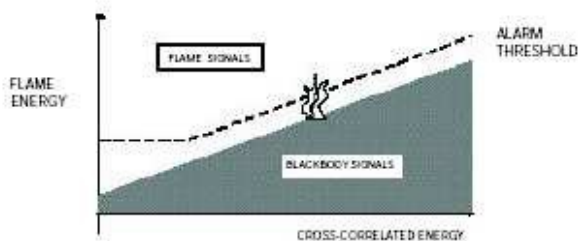


fig. 4. Variable Alarm Threshold

The sensitivity of the MINERVA S200 PLUS is 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. Refer to fig 4. 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.

**Built-in self test**

The MINERVA S200 PLUS incorporates a sophisticated self test facility that tests the detector remove for window contamination and electronic circuitry functionality signals. It incorporates two different colour light emitting diodes, and by using differing flash rates, provides separate indication of alarm, detector (electronic) fault and "dirty" window (optical integrity monitoring).

The S241+ and S251+ and S271+ provide separate analog output currents, signalling electronic fault and "dirty" window conditions to their respective control equipment.



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## S200 PLUS Series

### Technical Information

#### Mechanical

Detector Material:	Stainless Steel 316L
Dimension mm:	167mmW x 167mmL x 89mmD
Weight:	4.5Kg
Gland Entry:	3 x 20mm
Metal Parts: (external & internal)	Bright Stainless Steel 316 to to BS 1449 Pt 2
Tag Label:	Stainless Steel 316

#### Electrical

Supply Voltage:	15 to 28 Vdc	
Quiescent Current:	S231i/S23X	350 $\mu$ A max at 20Vdc
	S241i/S241f	350 $\mu$ A max at 20Vdc
	S251i/S25X	350 $\mu$ A max at 20Vdc
	S26X	17 mA max at 20 Vdc
	S271f+	Determined by controller
Alarm Current:	S231i/S231f	33 mA (typical)
	S241i/S241f	Signalled on current loop
	S251i/S251f	Determined by controller
	S261f	30mA (typical)
	S271f+	(Quiescent Current) 350 $\mu$ A max at 20Vdc
Connections:	One way 2.5mm heavy duty terminal block	
Electrical interface:	See range for details	

### Technical Information

#### Environmental

Operating Temp Range:	-40°C to + 80°C
Storage Temperature:	-40°C to + 80°C
Relative Humidity:	95% (100% intermittent)
Enclosure to:	IP 66 and IP 67

#### Performance

Range	0.1m <sup>2</sup> n-heptane at 50m 0.4m <sup>2</sup> n-heptane at 60m
Max Field of View:	90° - Flameproof Versions 100° - Intrinsically safe versions
Response Time:	Field Selectable 3, 6 and 12 seconds.
Sensitivity:	3 range settings

#### Mounting Bracket

Weight:	1.1 Kg
Construction:	Bright Stainless Steel 316 to BS1449 Pt2
Axial Rotation:	50°
Elevation:	67°
Fixing Details:	M8 bolts (location template provided)

Cammach Group Ltd  
Cammach Business Centre.  
Greenbank Road  
East Tullos.  
Aberdeen AB12 3BN  
Tel: 0044 (0) 1224 249977  
E: [info@cammachgroup.com](mailto:info@cammachgroup.com)  
W: [www.cammachgroup.com](http://www.cammachgroup.com)

