



FlameGard IR³

[Triple Infrared Flame Detectors]

The MSA XI and MI Flame Detectors incorporate all the features of the IR³ FlameGard with its patented triple IR sensor technology. Together with the XI in an explosion proof stainless steel enclosure there is also a smaller intrinsically safe low power version, the MI.

The MSA FlameGard is a self contained, triple-spectrum flame detector. The sensor band pass has been carefully selected to ensure the greatest degree of spectral matching to the radiant energy emissions of fire, and the lowest degree of matching to non-fire stimuli.

The FlameGard IR³ XI is extremely sensitive. It can detect a 0.1 m² [1 ft.²] gasoline pan fire at 60 m in less than 5 seconds. The sensitivity is user-programmable, offering 4 ranges of detection.

The IR³ XI incorporates both Automatic and Manual BIT [Built-In-Test].

The outputs of 4–20 mA and RS-485 interface, as well as the standard alarm, accessory and fault relays, make the FlameGard IR³ the most diverse flame detector available.

The XI Flame Detector incorporates a new EEx de stainless steel housing with heated optics to eliminate condensation and icing on the window.

The FlameGard IR³ utilises Mil-spec. electronic components and materials. The MTBF [Mean Time Between Failure] is calculated to be 100,000 hours [11 + years].

This outstanding performance permits a 3-year warranty on the entire detector, not just the sensors.



FlameGard: State of the art

[Features & Benefits]

- Extremely sensitive [flame detection]
- Triple spectrum design
- High immunity to false alarms
- Automatic and manual “Built-In-Test”
- Heated optics [XI]
- RS-485 Modbus compatible
- Sensitivity selection
- User programmable function through a handheld unit
- MTBF minimum 100,000 hours
- 3-Year warranty



[Hazards]

The FlameGard protects against the following fires:

- Fuel oil
- Hydrocarbon flammable waste
- Solvent and paint

[Applications]

The FlameGard Triple IR [IR³] Flame Detector has been designed as a general-purpose flame detector with special emphasis on immunity to false alarms. It has applications in a wide range of industrial and commercial facilities, where the threat of accidental fire involves hydrocarbon fuels. Fires can be detected from gasoline, kerosene, diesel fuel, aviation jet fuels like JP-4, JP-5, JP-8, hydraulic fluids, paints and solvents, monomers and polymers like ethylene and polyethylene, natural gas [LNG], town gas and liquefied petroleum gas [LPG], hydrocarbon gases like methane, ethane, propane, butane, acetylene, propylene, etc.

- Aircraft hangars [Commercial & Military]
- Petrochemical facilities
- Offshore platforms
- Printing industry
- Tank farms



technology in flame detection



[IR³ Technology]

Most fire radiation is due to hot CO₂ and H₂O molecules that are the main combustion products. In the IR³, the fire is considered to be an alternating infrared source that emits strongly at the CO₂ emission band and weakly at the background emission band.

Most IR sources [considered as IR false alarm stimuli] including the sun, incandescent and halogen lamps, arc discharge, electrical heaters, etc., do not possess this unique spectral feature.

Three spectral wavelength bands have therefore been selected for this flame detection technique:

- Within the CO₂ spectral emission band
- Outside the CO₂ emission band
- Over a background broad band

The relation between each sensor signal allows the IR³ to distinguish between a fire and interfering IR stimuli.

This technology has extremely high immunity to false alarms without significantly decreasing the sensitivity and has been adopted as “standard requirement for high risk industries” and specified by fire protection experts world-wide.

[Description]

The patented Triple IR scans for oscillating IR radiation [1 to 10 Hz] in the spectral bands ranging from 4.0 to 5.0 microns.

Only detection of radiation emissions matching the spectral fingerprint of fire will produce an alarm, making the FlameGard immune to false alarms.

The MTBF [Mean Time Between Failures] is calculated to be 100,000 hours [11 + years]. This outstanding performance permits a 3-year warranty on the entire detector, not just the sensors.

[Installation and Operation]

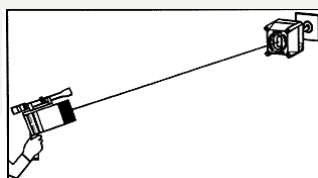
The FlameGard is a self contained Flame Detector designed to operate as a stand alone unit directly connected to alarm systems or automatic fire extinguishing systems.

The detector should be aimed toward the centre of the detection zone and have a completely unobstructed view of the protected area.

The FlameGard has an automatic and manual “Built-In-Test” [BIT] function. After power up the FlameGard performs an automatic BIT to check correct operation.

An intrinsically safe hand held unit can be used to change the FlameGard XI configuration or check the function. The IR³ also has a RS-485 Modbus compatible output for data communication with a network of up to 247 detectors or a PC with host software, allowing easy maintenance using remote diagnostic tools.

Complete functional testing can be carried out using a Fire Simulator.



Technical Data & Specification [XI and MI unless stated otherwise]

Spectral response: Three IR Channels

Detection range: [highest sensitivity setting]
Hydrocarbons

Detection range:	XI	MI
0.1 m ² Gasoline fire	60 m	40 m
0.1 m ² n-Heptane fire	60 m	40 m
0.1 m ² Diesel Oil fire	42 m	28 m
0.1 m ² 95% Alcohol fire	45 m	30 m
0.1 m ² JP4 fire	45 m	30 m

Response time: Typical 5 s

Time delay: Adjustable up to 30 s

Sensitivity range:

Four sensitivity ranges for 0.1 m² [1 sq. ft.] gasoline pan fire

Range	Detection Distance [metres]	
	MI	XI
1	10	15
2	20	30
3	30	45
4	40	60

Field of view: XI 90° horizontal and vertical
MI 100° horizontal and vertical

Built-In-Test: Manual and automatic BIT

Temperature ranges:

Operating	-40° to +70 °C
Storage	-55° to +85 °C

Humidity: RH to 95% for operational temperature

Operating voltage:

24 VDC [18...32 VDC]

Power consumption:

XI including heated optics
150 mA [max.] standby
250 mA [max.] in alarm
MI
25 mA [max.] standby
40 mA [max.] in alarm

Heated optics XI: To eliminate condensation and icing on the window

Electrical interface XI:

There are three output wiring options. The required option must be specified at time of order.
1. Alarm & fault relays, 4...20 mA [default]
2. Alarm, fault and accessory relays
3. Alarm relay, 4...20 mA and RS-485

Outputs:

Dry Contact relays SPST, resistive load,
XI – Alarm, Accessory and Fault
[0,25 A at 30 VDC]
MI – Alarm and Fault
[0,25 A at 30 VDC]
4–20 mA sink or source

Fault	0 mA	Warning	10 mA
BIT fault	2 mA	Alarm	15 mA
Normal	5 mA		

Approvals:

FlameGard and Handheld Unit:

ATEX Directive 94/9/EC
EMC Directive 89/336/EEC
XI Ⓢ II 2[1]GD EEx de ia [ia] IIC T5
EN 54-10
MI Ⓢ II 1G EEx ia IIC T5 [60 °C] T4 [85 °C]
EN 50270 Type 2, EN 61000-6-3
Handheld Unit: Ⓢ II 1G EEx ia IIC T4 Ta –20 °C to +50 °C
EN 50081-1, EN 50082-2

Ingress protection: Water/dust tight, IP 66/67

Electronics: Conformal coated

Electrical entries: **Optional XI**

2 x M25 or 3/4" NPT

Optional MI

12 way electrical connector
12 wires for junction box

Dimensions: XI – 146 x 140 x 123 mm,
MI – 100 x 100 x 62 mm

Weight: XI – 3.4 kg [Stainless Steel]
MI – 1.2 kg [Stainless Steel]

Environmental: meets MIL STD 810C for humidity, salt and fog, vibration, mechanical shock, high and low temperature

Warranty: 3 years for entire detector

Ordering Information

FlameGard IR³ – XI

10046929	FlameGard XI, mA, Alarm + Fault Relay, M25
10048912	FlameGard XI, Alarm + Fault + Acc. Relay, M25
10048913	FlameGard XI, RS-485, Alarm Relay, M25
10048914	FlameGard XI, mA, Alarm + Fault Relay, NPT
10048915	FlameGard XI, Alarm + Fault + Acc. Relay, NPT
10048916	FlameGard XI, RS-485, Alarm Relay, NPT

FlameGard IR³ – MI

10048917	FlameGard MI Long range, Cable, St.St.
10048919	FlameGard MI Long range, Plug, St.St.
10048921	FlameGard MI Short range, Cable, St.St.
10048923	FlameGard MI Short range, Plug, St.St.

Accessories

10047010	Tilt Mount XI
10048925	Tilt Mount MI
10048926	Fire Simulator
10048608	Intrinsically Safe Handheld Kit [XI]
10065727	Beam Collimator

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