FlameSpec
IR3 CO2L
Triple IR Flame Detector

Introduction

The FlameSpec-IR3 CO2L flame detector has been optimized to provide a fast, robust detection of a wide range of heavy hydrocarbon fires, where combustion exhaust gases may be present, and standard IR3 detectors might false alarm.

Typical applications include:
• Aircraft hangars
• Hardened aircraft shelters
• Helipads (Onshore, Offshore, Hospitals)
• Areas with high vehicle activity:
    - Waste recycling facilities
    - Road / Rail tanker loading racks

Key Benefits

• Highest levels of false alarm immunity.
• Detects up to 262 ft. (80m) for a 1 ft2 ($0.1m^2$) n-heptane pan fire.
• Hydrocarbon flame detection. Three wavelengths, in the infrared spectral range of 4.0 to 5.0 μm, with clear separation.
• Each sensor has the same field of view to further improve false alarm immunity.
• Ultra-fast detection mode – detection within 40 milliseconds for fireballs or explosions.
• Fast flame detection, <1.5 s for standard fire up to 30 m. Option for <0.5s, in compliance with NFPA 33, available.
• 5 selectable sensitivity levels
• Universal outputs, 3 and 4 wire, 4-20 mA sink / source, Fire, Auxiliary and Fault Relays. RS485 port using Modbus RTU.
• Event logger – alarms & faults are logged to non-volatile memory.
• Built-in-Test (BIT) – Automatic and manual self-test of window cleanliness and overall detector operation.
• Dirty optics warning for preventive maintenance needs.
• HART® 7, as standard. Enhanced configuration & maintenance.
• Window heater to avoid condensation and icing.
• Stainless steel tilt mount provides horizontal and vertical adjustment.
• SIL 2 compliant - suitable for use as part of a SIL 2 compliant safety system.

The FlameSpec IR3 will detect fires and explosions extremely quickly, thereby allowing mitigation steps to be initiated more rapidly to limit event escalation.

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Response Characteristics

Fuel	Size	Sensitivity	Distance ft. (m)	Avrg Resp. Time (s)
n-Heptane	1 x 1 ft.	Extreme	262 (80)	4.6
n-Heptane	1 x 1 ft.	High	197 (60)	3.7
n-Heptane	1 x 1 ft.	Medium	98 (30)	1.1
n-Heptane	1 x 1 ft.	Low	49 (15)	1.4
n-Heptane	1 x 1 ft.	Very Low	24.5 (7.5)	1.1
Gasoline	1 x 1 ft.	Extreme	230 (70)	3.6
Gasoline	1 x 1 ft.	Medium	98 (30)	1.5
Diesel	1 x 1 ft.	Extreme	164 (50)	3.6
Diesel	1 x 1 ft.	Medium	79 (24)	3.2
JP5	2 x 2 ft.	Extreme	292 (80)	11.0
JP5	1 x 1 ft.	Extreme	164 (50)	3.6
JP5	1 x 1 ft.	High	148 (45)	3.5
JP5	2 x 2 ft.	Medium	148 (45)	3.5
JP5	1 x 1 ft.	Medium	82 (25)	1.5
JP5	1 x 1 ft.	Low	39 (12)	1.5
JP5	1 x 1 ft.	Very Low	20 (6)	1.3
Kerosene	1 x 1 ft.	Extreme	164 (50)	3.8
Kerosene	1 x 1 ft.	Medium	82 (25)	1.6
Polypropylene	1 x 1 ft.	Extreme	115 (35)	3.3
Polypropylene	1 x 1 ft.	Medium	66 (20)	2.1
Isopropanol (IPA)	1 x 1 ft.	Extreme	180 (55)	2.8
Isopropanol (IPA)	1 x 1 ft.	Medium	75 (23)	1.2
Wood	1 x 1 ft.	Extreme	131 (40)	5.0
Wood	1 x 1 ft.	Medium	66 (20)	1.2

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Immunity to False Alarm

False Alarm Source	Modulated		Unmodulated	
	Distance ft. (m)	Response	Distance ft. (m)	Response
Sunlight, (direct or reflected)	No response		No response	
Sunlight, (direct or reflected) with water droplets on sensors	No response		No response	
Incandescent frosted glass light, 300W	2.0 (0.5)	No Alarm	2.0 (0.5)	No Alarm
Fluorescent, 70W (3x23.3W)	2.0 (0.5)	No Alarm	2.0 (0.5)	No Alarm
Electric arc	2.0 (0.5)	No Alarm	2.0 (0.5)	No Alarm
Arc welding	12.0 (3.5)	No Alarm	12.0 (3.5)	No Alarm
Radiation heater, 1850W	2.0 (0.5)	No Alarm	2.0 (0.5)	No Alarm
Radiation heater, 1850W with water droplets on sensors	2.0 (0.5)	No Alarm	2.0 (0.5)	No Alarm
Quartz lamp (1000W) shielded	2.0 (0.5)	No Alarm	2.0 (0.5)	No Alarm
Quartz lamp (500W) non-shielded	2.0 (0.5)	No Alarm	2.0 (0.5)	No Alarm
Mercury vapor lamp 160Wx3	2.0 (0.5)	No Alarm	2.0 (0.5)	No Alarm
Car Exhausts	2.0 (0.5)	No Alarm	2.0 (0.5)	No Alarm
Projector led	2.0 (0.5)	No Alarm	2.0 (0.5)	No Alarm
Solenoid bell	2.0 (0.5)	No Alarm	2.0 (0.5)	No Alarm
Soldering iron	2.0 (0.5)	No Alarm	2.0 (0.5)	No Alarm
Electric Drill	2.0 (0.5)	No Alarm	2.0 (0.5)	No Alarm

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FIRE DETECTION	**Detection time and distance**	40ms — for fast fire burst or explosion 1.1s — for 1 ft² (0.1m²) n-heptane pan fire at 0–100 ft. (0–30m) 4.6s — for 1 ft² (0.1m²) n-heptane pan fire at 100–262 ft. (30–80m)
	Sensitivity range	5 sensitivity ranges: Extreme, High, Medium, Low, Very Low
	Field of view (IR detection)	90° Horizontal, 75° Vertical
	Time Delay	Configurable 0-30 seconds
	Built in Test	Automatic and Manual
ELECTRICAL SPECIFICATIONS	**Operating Voltage**	24 VDC nominal (18-32 VDC)
	Current Consumption	Standby: 120mA 180mA all systems in operation (including window heater)
	Electrical Entries	2x cable and conduit entries 3/4" NPT(F) or M25x1.5
	Wiring	12-20AWG (2.5–0.35mm²)
OUTPUTS	**Relays**	SPST volt-free contacts rated 2A at 30 VDC 3 relays: Alarm & Auxiliary – normally open; Fault – normally closed
	0-20mA (stepped) current output	3 wire and 4 wire (isolated) configurations (sink and source) HART® rev 7.0
	Indication	Tri-color LED (Green, Yellow, Red)
	Modbus	RTU compatible on RS-485
MECHANICAL SPECIFICATIONS	**Size**	5.51 x 3.54 x 3.54" (140x90x90mm)
	Weight	Detector (Stainless Steel 316): 6.6 lbs. (3.0 kg) Tilt mount (Stainless Steel 316): 3.3 lbs. (1.5 kg)
ENVIRONMENTAL SPECIFICATIONS	**Temperature Range**	Operating: -67°F to +185°F (-55°C to +85°C) Storage: -67°F to +185°F (-55°C to +85°C)
	Humidity	Up to 99% (RH), non-condensing
	Ingress Protection	IP66 & 68 (2m, 24hr); NEMA 4X & 6P
APPROVALS	**ATEX**	ATEX: II 2 G D Ex db IIC T5 Gb or Ex db eb IIC T5 Gb and Ex tb IIIC T95°C Db -55°C<Ta<75°C Ex db IIC T4 Gb or Ex db eb IIC T4 Gb and Ex tb IIIC T105°C Db -55°C<Ta<85°C
	IECEx, INMETRO & PESO	Ex db IIC T5 Gb -50°C≤Ta≤75°C Ex db IIC T4 Gb -50°C≤Ta≤85°C
	FMus & FMc	Class I, Div. 1, Groups B, C & D; T4 Class I, Zone 1, AEx/Ex db IIC T4 Gb T4 -50°C≤Ta≤85°C T5 -50°C≤Ta≤75°C
	EAC CU TR	1Ex d IIC T5 Gb or 1Ex de IIC T5 Gb and Ex tb IIIC T95°C Db -55°C≤Ta≤75°C 1Ex d IIC T4 Gb or 1Ex de IIC T4 Gb and Ex tb IIIC T105°C Db -55°C≤Ta≤85°C
	Performance	ANSI FM 3260 EN 54-10
	Functional safety	Complies to SIL2, per IEC 61508
ACCESSORIES	**Stainless steel weather cover, model FLS-WCO-S01**	
	Flame simulator, model FLS-FSIM-IR3-KIT	
	2" & 3" pole mount adapter, model FLS-PMA-S23	
	Airshield for areas with high airborne contamination, model FLS-ASD-S01	
WARRANTY	**5 years**	